

MOORHEAD RIVER CORRIDOR TRAIL MASTER PLAN

AN EXCERPT FROM:

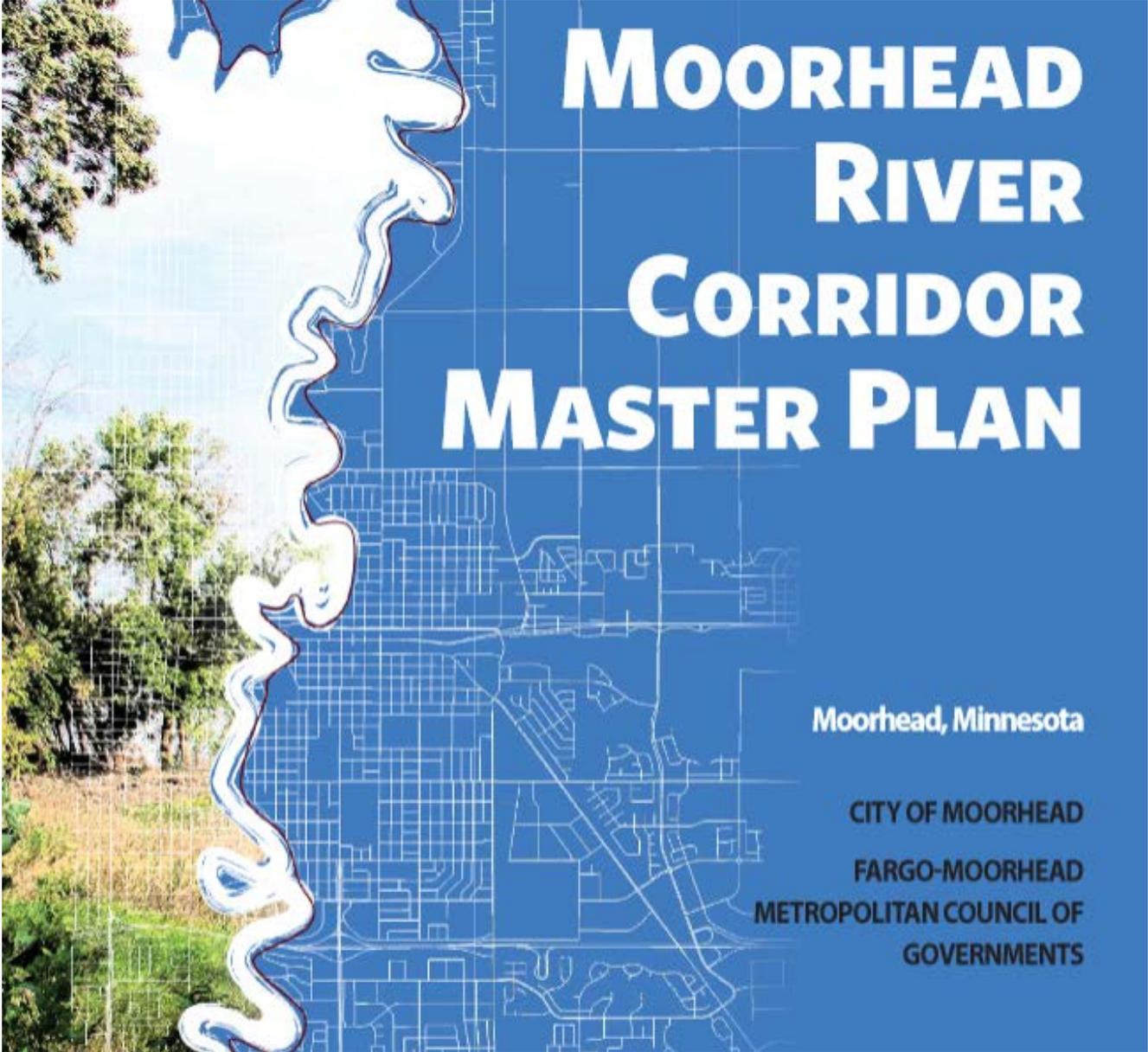


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INTRODUCTION

Traveling through the heart of the Fargo-Moorhead metropolitan area, the Red River of the North is a defining natural water feature in both cities and provides life-giving water, scenic views, natural habitat and recreation. However, floods have posed a consistent concern and threat to public and private development along the River Corridor. In response, the City of Moorhead has initiated a number of flood mitigation actions. One of the most visible actions has been the purchase of flood prone properties for flood mitigation measures, notably the construction of floodwalls and levees.

There is widespread community recognition that the new public land along the river is a unique opportunity for the City to not only achieve its flood mitigation goals but reconnect to the river corridor and transform it to a visible and publicly accessible source of pride, beauty, culture, and recreation for residents.

This Moorhead River Corridor – Trail Master Plan Excerpt is derived from the 2014 River Corridor Master Plan. This Excerpt includes master plan requirements outlined in the Greater Minnesota Regional Parks and Trails Strategic Plan while featuring how the Moorhead community embraces the River Corridor, a non-motorized, regional trail extending over 18 miles, the entire length of the City of Moorhead, along the Red River of the North. This distance does not include trails located within parks connected by the Moorhead River Corridor Trail. The full Moorhead River Corridor Master Plan presents a long term vision for the corridor with implementation actions that can be undertaken in the near term, within current budgets, land ownership, and flood protection infrastructure. This excerpt is a guide to a continuous river trail, future public accesses, recreation development, and vegetation restoration for the River Corridor in Moorhead, Minnesota. Near-term solutions for the Moorhead River Corridor Trail include on-road bike facilities with the intent to fill gaps that proposed to be paved, off-road trails in the future.



<http://www.wday.com/content/moorhead-parks-hosted-cross-country-skiing-open-saturday-afternoon>

PURPOSE

As a result of significant floods, the City of Moorhead initiated a number of interrelated flood mitigation actions. One of the most visible actions is the proactive and voluntary acquisition of flood-prone properties adjacent to the river. Through that effort, over 225 acres along the Red River have been transferred to public ownership. While the priority use for this property is flood risk reduction, there has been significant public interest in how these areas will be maintained, managed, and transformed into a community asset.



The purpose of the River Corridor Master Plan is to present a long term (25+ years) community vision and comprehensive strategy to guide sustainable management and maintenance of the River Corridor in Moorhead. The benefits of public open space for property values, public health, and quality of life have been documented in numerous studies and publications.

INCREASED PROPERTY VALUE

Close proximity to public open space increases property values. Evidence has shown that large, natural areas in urban locations have the greatest positive impact on property values – up to a 15% increase in home value – compared to active, neighborhood parks and parks in suburban or rural areas.

IMPROVED HEALTH

Quality of open spaces and quantity of parks in a community equals healthy residents. People who live near parks and open spaces tend to get more exercise and be healthier. In addition, the natural landscapes and vegetation in parks and open space contribute to a healthier planet. Trees provide shade, wildlife habitat, and evapotranspiration of stormwater.

QUALITY OF LIFE

Parks and public open space are unique in that they are places that are free for people of all ages, abilities, and incomes to enjoy. They provide spaces for intimate contemplation and community wide events. Parks can be community symbols of pride and beauty. They attract tourists, benefitting the local economy. Their welcoming nature and social functionality contribute to high quality of life.

REGION

The City of Moorhead is located along the Red River of the North on Minnesota's western border. Moorhead is the largest city in Clay County and the second largest in the Fargo-Moorhead Metropolitan area. Interstate 94, Highway 10, and Highway 75 connect Moorhead to other areas of the region. The Twin Cities Metropolitan Area is 250 miles to the southeast; Winnipeg, Canada is approximately 220 miles to the north.

The Moorhead River Corridor Trail serves residents of the City of Moorhead with a population of approximately 40,000, the greater Fargo-Moorhead metropolitan (est. pop. 225,000) area, as well as visitors from the larger west central Minnesota region. The regional appeal of the Moorhead River Corridor Trail and the attractions it passes through, proximity to Downtown Moorhead and Fargo, coupled with several annual events at the Parks connected by the trail system, draw people to Moorhead, resulting in a positive economic impact for the city.

Moorhead anticipates a future planned Heartland Trail connection at the Moorhead River Corridor Trailhead at MB Johnson Regional Park; other nearby non-motorized trails in the area include:

- Buffalo River State Park trails (~15 miles/20 minutes)
- Future Perham to Pelican Rapids Trail runs through Maplewood State Park, a 27.18 mile trail (~45 miles /45 minutes)
- Future Northern Cass Pass, a 6 mile asphalt Rails to Trails project near Arthur, ND that is still under construction (~35 miles /40 minutes)



MINNESOTA TRAIL SYSTEM

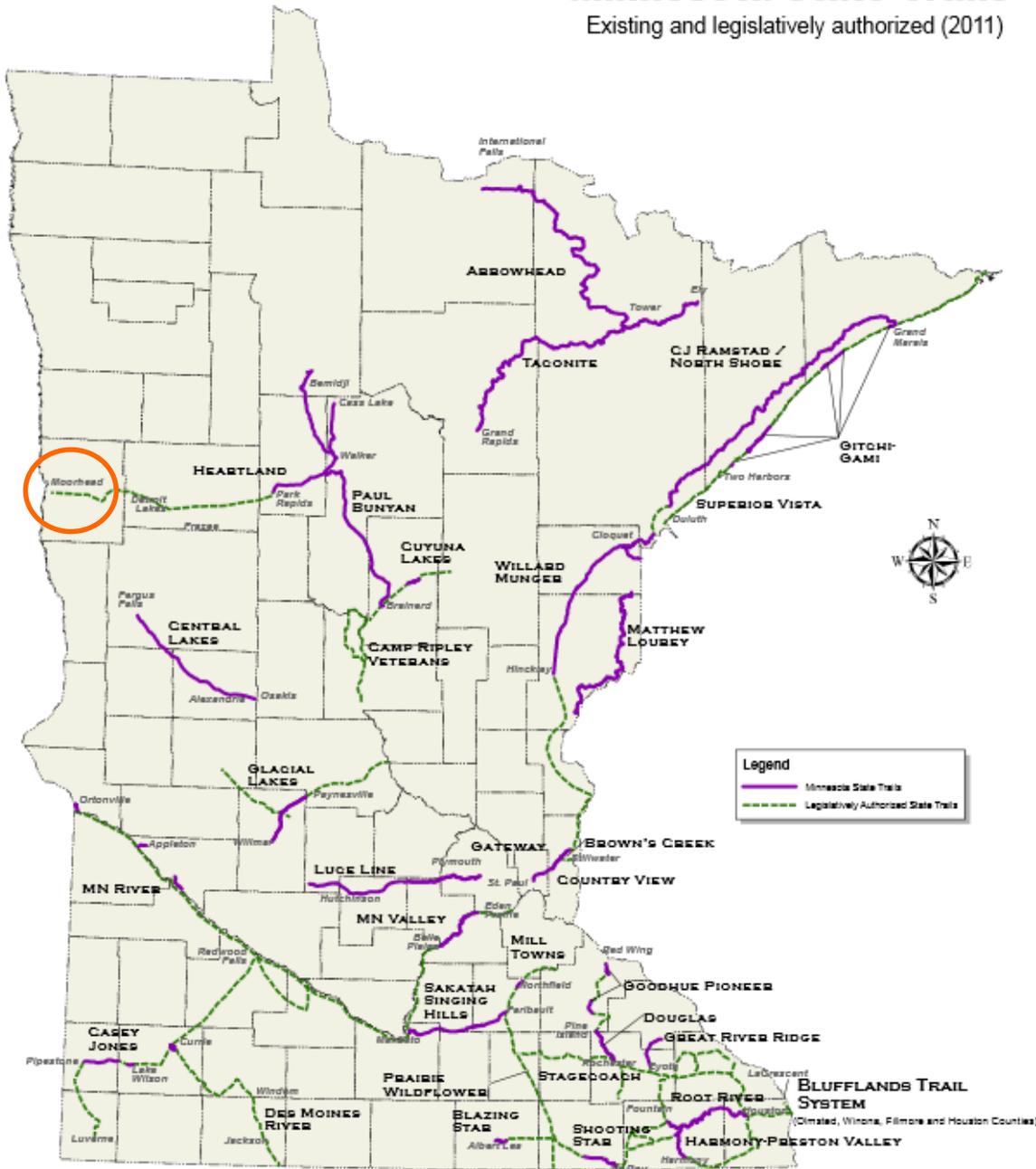
MINNESOTA DNR

STATE PARKS AND TRAILS



Minnesota State Trails

Existing and legislatively authorized (2011)



Legend

- Minnesota State Trails
- - - Legislatively Authorized State Trails

FARGO-MOORHEAD METRO TRAIL SYSTEM

All on and off-road trails within the Fargo – Moorhead Metropolitan Area total 475 miles. 75 miles of the metro trails are located within Moorhead. The Moorhead River Corridor Trail will provide over 18 miles of scenic trails to “getaway” from the urban commuter trails. Moorhead’s River Corridor Trail features the Red River of the North including natural resources, cultural amenities and connections to many unique destinations.

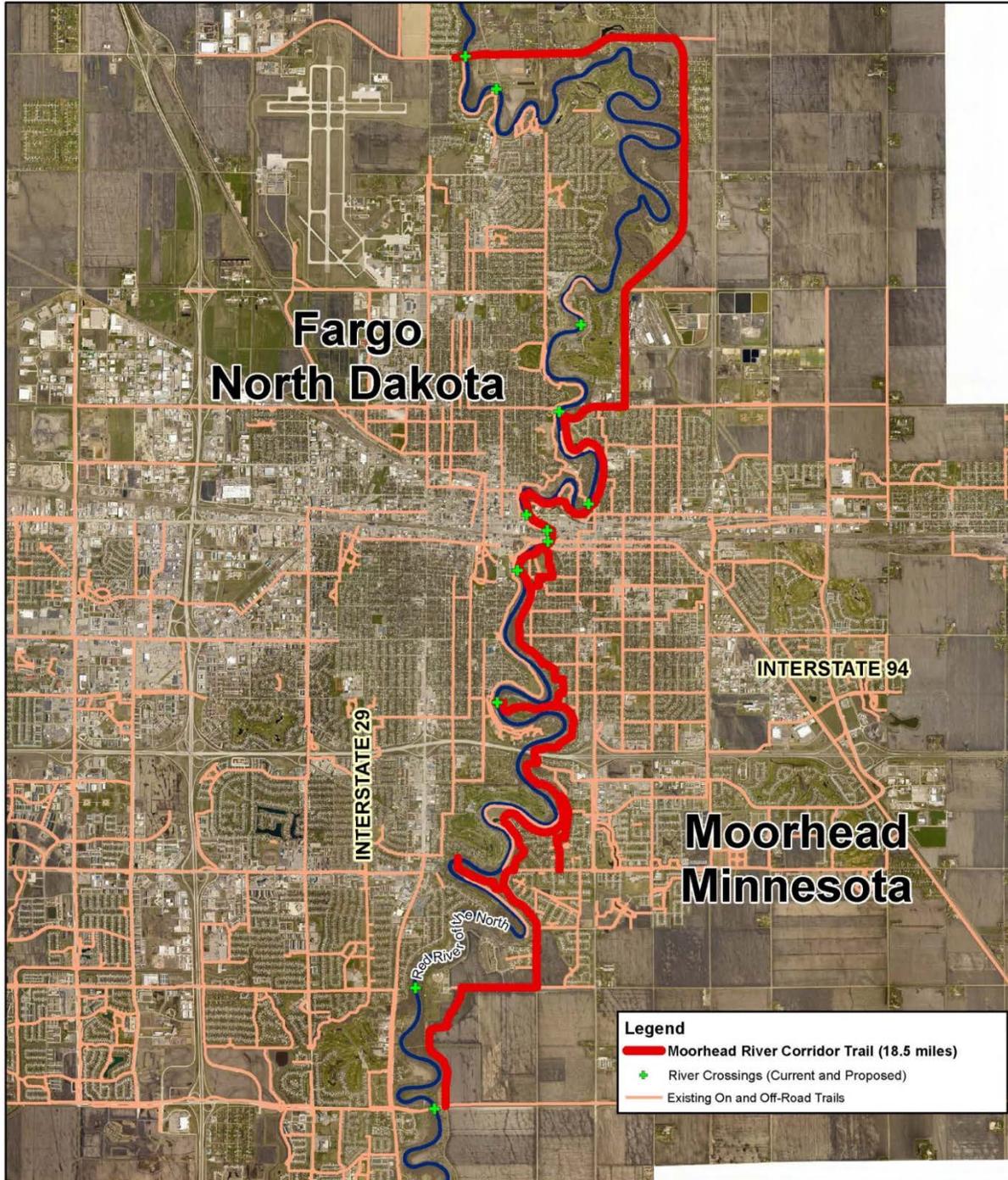
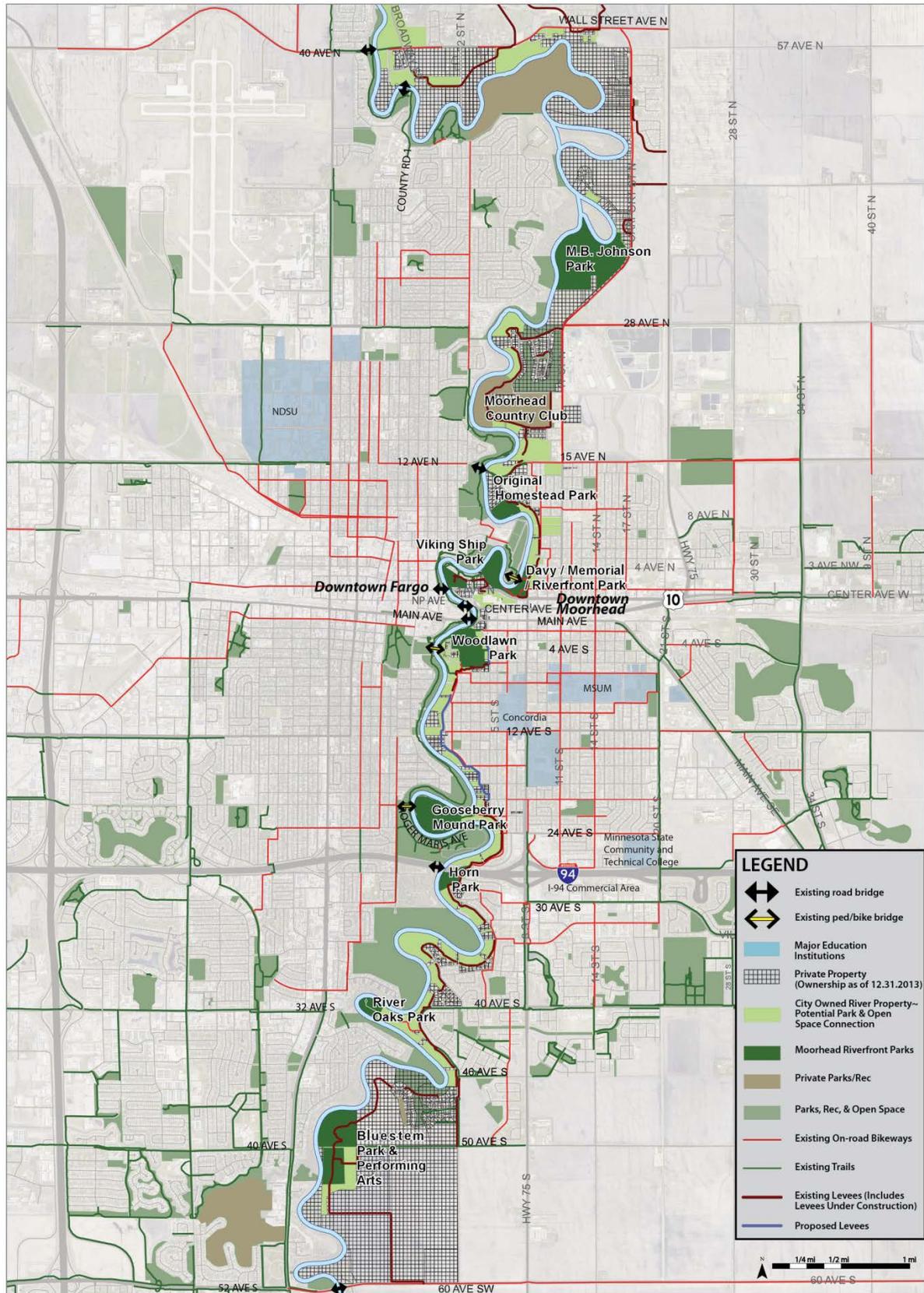


FIGURE 11. EXISTING CONDITIONS



MOORHEAD RIVER CORRIDOR

VISION

The Moorhead River Corridor will serve as a flood risk reduction asset for the City of Moorhead. The River Corridor provides opportunities for economic vitality, improves and restores ecological stability of the river corridor, links residents and tourists to four seasons of recreation and transportation facilities, balances the desire for public uses with adjacent private property, provides linkage between the cities of Moorhead and Fargo, preserves and promotes the history and culture of the region through education, and improves the quality of life for future generations.



PRINCIPLES



PRINCIPLE 1: FLOOD PROTECTION

First and foremost, the purpose of the River Corridor is to provide a unified flood mitigation strategy. The purpose of this Master Plan is to recognize the corridor's role in flood mitigation while guiding how the corridor can simultaneously function as an attractive, accessible public asset.



PRINCIPLE 2: ATTRACTIVE RIVER CORRIDOR

Attractive River Corridor means creating a destination for the community with attention to clear delineation of public and private land, aesthetics, safety, and to create a positive economic impact.



PRINCIPLE 3: CONNECTIVITY

Connectivity refers to the non-motorized routes between social nodes, recreation areas, schools, workplaces, and residential areas. These routes include: on-road and off-road bikeways, trails, and sidewalks. These routes enable safe, non-motorized recreation and transportation.



PRINCIPLE 4: RECREATION

Recreation is activity done for personal health and wellness or for enjoyment or pleasure. Within the River Corridor, enhanced and varied outdoor recreation opportunities including group and individual sports and nature-related activities, are recommended to draw people to the River Corridor.



PRINCIPLE 5: HABITAT ENHANCEMENT & WATER QUALITY

Habitat enhancement includes the restoration and preservation of native landscapes, as well as establishing key patch and corridor connections to create a well-functioning ecological matrix. Water quality can be thought of as a measure of the suitability of water for a particular use. Stormwater that is discharged into a public body of water is frequently cited as a cause of poor water quality due to the pollutants that are carried in the stormwater. Improvements to open space areas must consider opportunities to treat stormwater before it enters the river.



PRINCIPLE 6: INTERPRETATION

Informational, cultural, historical, and environmental interpretation can be communicated in many ways, including: signage, organized events and programs, classes, tours, interactive technology, and brochures.

PROCESS & ENGAGEMENT

PUBLIC PROCESS

Needs and Issues. This outlines existing conditions, public input, identification of limitations, needs, and opportunities along the River Corridor, and presents a range of needs and opportunities as identified by the public, residents, and City staff. During this phase of the project the following outreach activities were conducted including open houses, committee meetings and a public survey.

Alternative Policies & Strategies. This phase established a set of policy and strategy alternatives that could be used to address the issues, needs and opportunities identified along the River Corridor and developed the Moorhead River Corridor Master Plan. At this phase of the project Hoisington Koegler Group Inc. was hired to work closely with Metro COG and the City on the remainder of the Master Plan. The project also hosted a River Corridor Summit inviting agency and recreation partners to committee meetings and a river corridor field day inviting the public to interact on site and open house meetings.

COMMUNITY ENGAGEMENT

The Moorhead River Corridor Master Plan is the result of an 18 month planning process which involved cooperation and discussion among a number of project partners and stakeholders, as well as direct consultation with the community at large.

Metro COG & City of Moorhead Staff – Fargo Moorhead Metropolitan Council Of Governments (Metro COG) served as the principal investigator for the River Corridor Master Plan and worked closely with staff from the City of Moorhead. Hoisington Koegler Group Inc. (HKGi) and Emmons and Olivier Resources (EOR), planning and natural resource consultants hired mid-way through the project, are responsible for data analysis, meeting and stakeholder coordination, and drafting of the Master Plan.

River Corridor Advisory Committee - The River Corridor Advisory Committee (RCAC) was appointed by the City Council to assist with providing input into the development of the overall River Corridor Master Plan. The Advisory Committee consists of representation from each of Moorhead's eight (8) flood zones and City Council representation from Wards 1 and 3.

Moorhead City Council - The Council was updated on the River Corridor Master Plan at the conclusion of each phase of the Master Plan. The Council was kept apprised of the River Corridor Master Plan through direct representation on the River Corridor Advisory Committee and through informal communication with City and Metro COG staff.

City Residents at Large - Three (3) public input meetings were held during the planning process. The meetings were structured to gather input and feedback from Moorhead residents and the general public regarding various aspects of the River Corridor.

Stakeholders - Outreach and coordination with public agencies, recreation providers and other key stakeholders was conducted during the planning process. These groups included: City of Fargo, Oakport Township, Buffalo Red River Watershed District, Clay County, Minnesota Department of Natural Resources (MN DNR), Fargo Moorhead Trailbuilders, Fargo-Moorhead River Keepers, Prairie's Edge Nordic Skiers (PENS), River Corridor Advisory Committee, and Trollwood Performing Arts School.

TRAIL ALIGNMENT

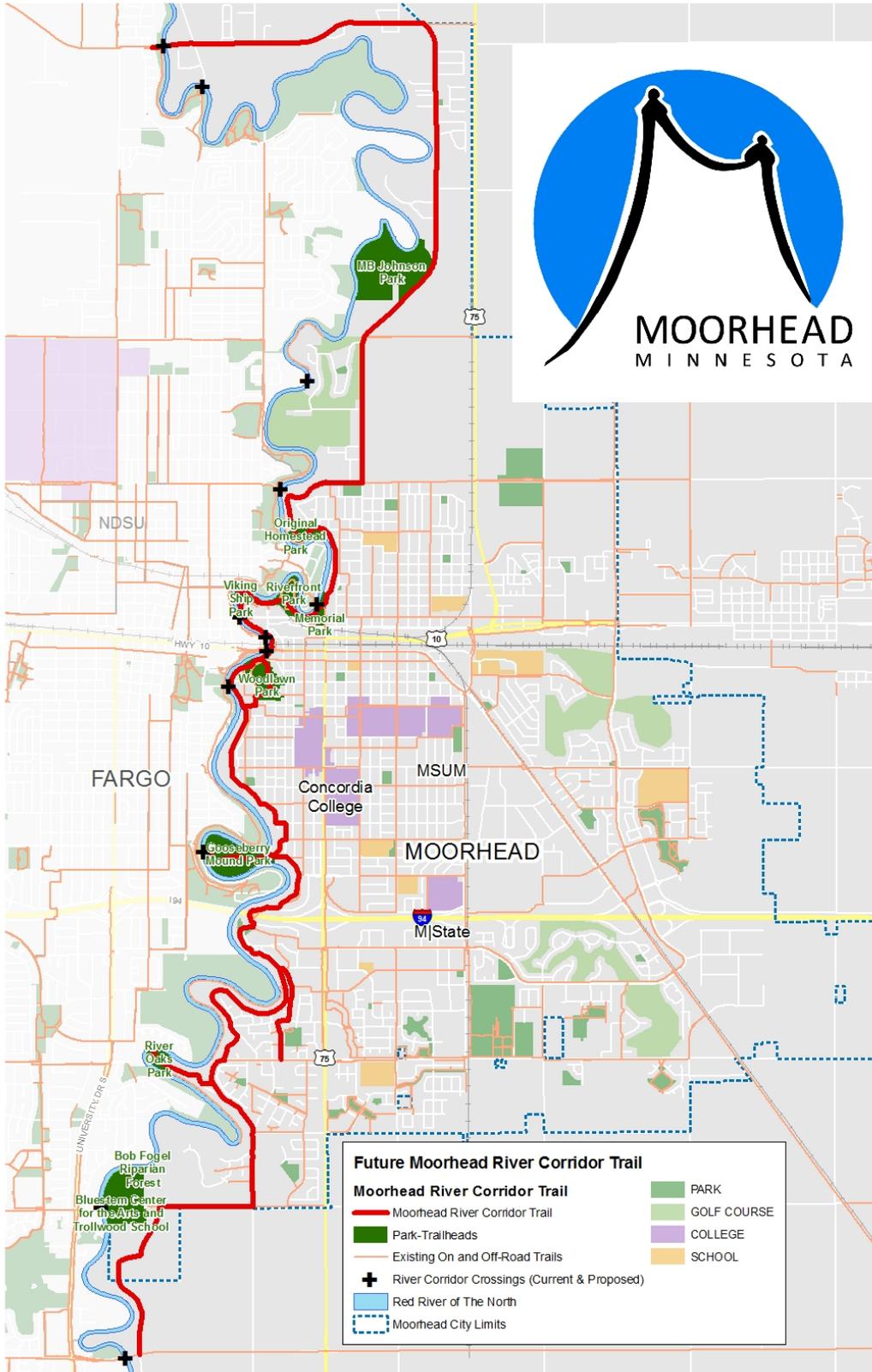
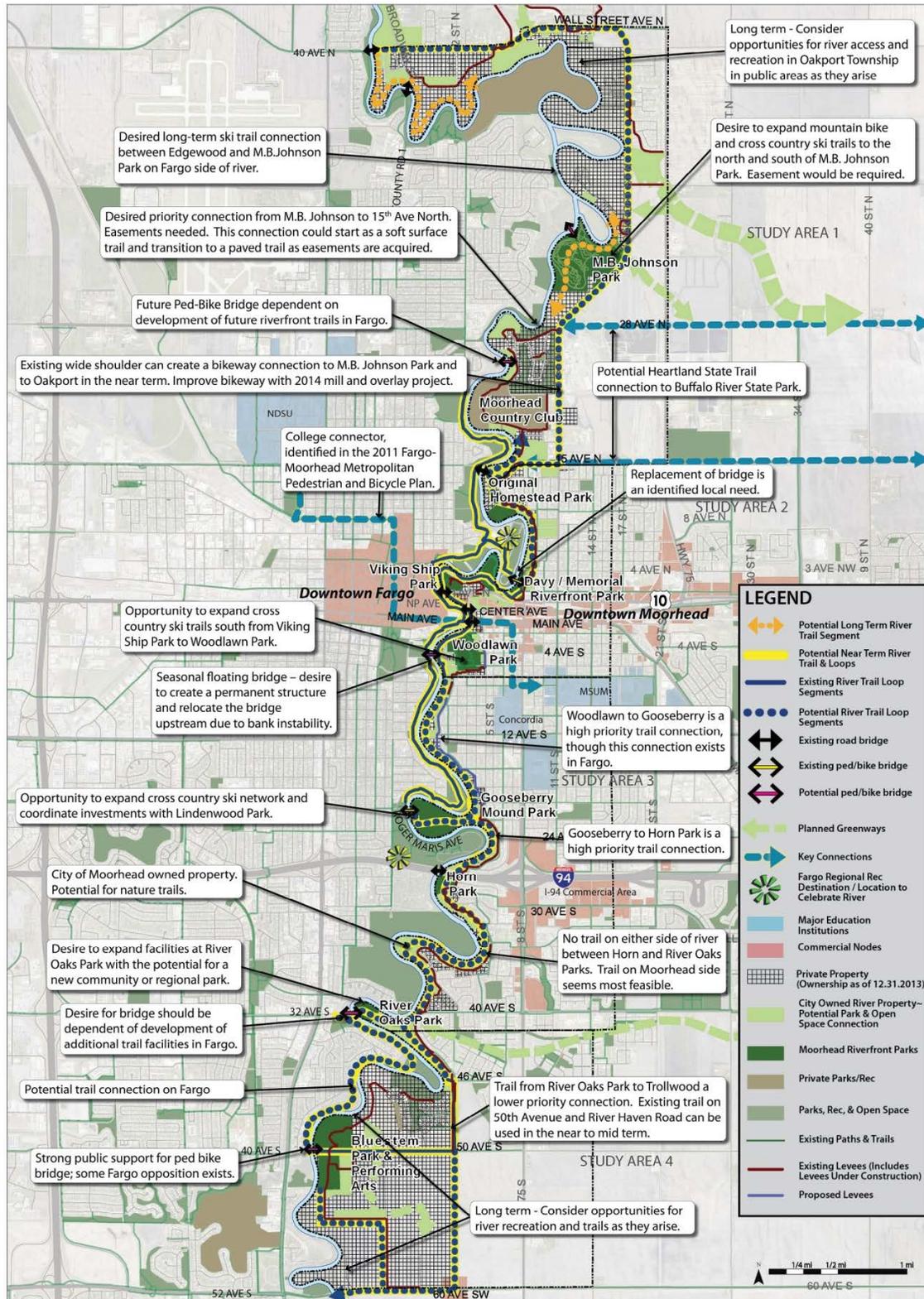


FIGURE 18. NEEDS AND OPPORTUNITIES



PRIORITIES

CONNECTIVITY

Connectivity refers to connecting destinations in the River Corridor as well as bringing people to the River. This section describes the bikeways, trails, and bridges needed for a fully connected River Corridor. Though a continuous trail is the long term vision, recommendations recognize that today much of the River Corridor is privately owned. Therefore, recommendations are a combination of visionary and interim measures that will create a connected corridor in the near term.

Connectivity refers to the non-motorized routes between social nodes, recreation areas, schools, workplaces, and residential areas. These routes include: on-road and off-road bikeways, trails, and sidewalks. These routes enable safe, non-motorized recreation and transportation that will be easily accessible and connected to people of all ages and abilities.

NON-MOTORIZED, ATTRACTIVE RIVER RECREATIONAL TRAIL

The visionary concept is a continuous River Corridor paved regional trail, which will serve as a recreational spine and non-motorized transportation route. The trail will be multipurpose, bituminous or concrete, and designed in line with the City of Moorhead trail standards and MnDOT trail design standards. It is a goal that the Moorhead River Corridor Trail will be an economic asset to the City with a unified look, a natural signature and an overall unique brand.

The plan identifies 18.5 miles of pedestrian and bicycle facilities along the Moorhead River Corridor including separated shared use paths, signed or striped roadways and bridges. A significant issue with current facilities is persistent flooding of existing paved trails below the 24' flood elevation, which results in trail closures during flooding, increased maintenance to clear trails of silt and debris, and shortened pavement life. In addition, in some areas, notably the Woodlawn Park area, there is the need to review options for permanent relocation of the existing river trail due to bank instability and slumping issues. Since 2009, the City has added 225 acres of newly acquired property through flood mitigation efforts some of which is available for new river trails.

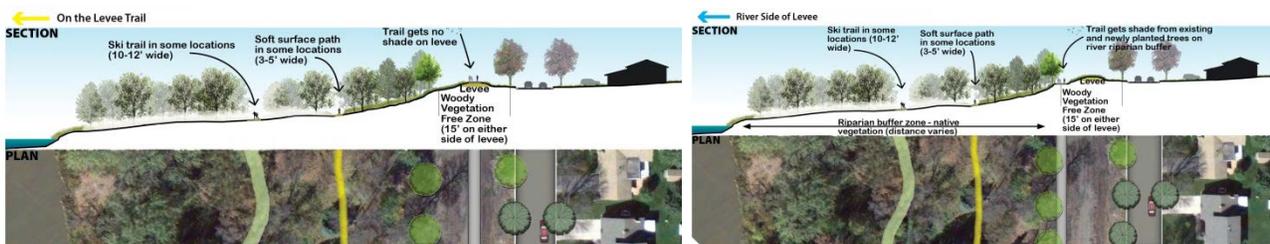


FIGURE 33. SECTION - TRAIL ON DRY SIDE OF LEVEE

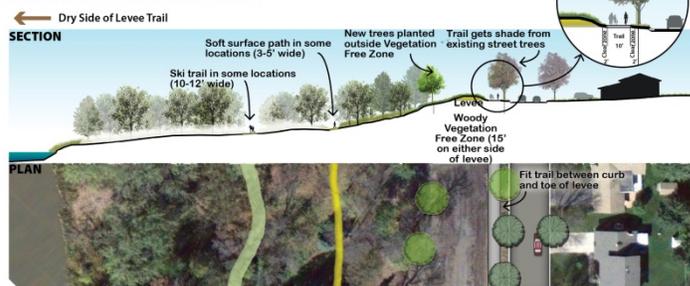
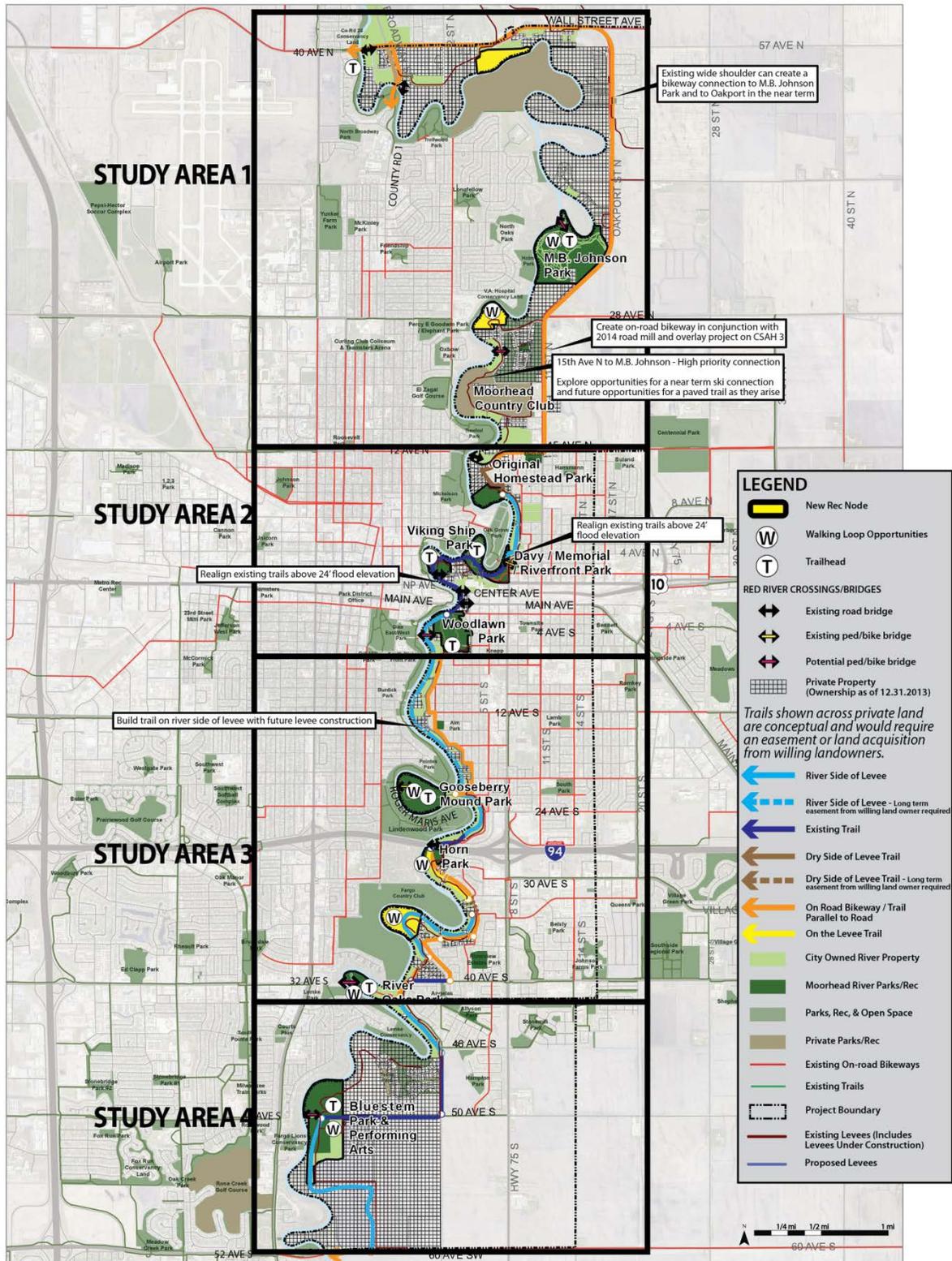


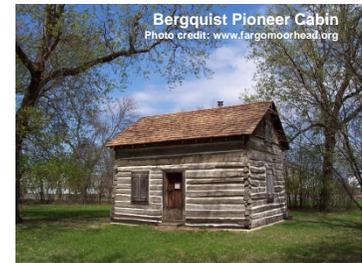
FIGURE 28. CONNECTIVITY AND RECREATION OVERVIEW



CONNECTING PLACES

The Moorhead River Corridor Regional Trail is a non-motorized trail that meanders parallel with the Red River. This River Corridor Trail will connect existing Moorhead parks, natural and cultural amenities and other recreational facilities that are adaptable and flexible throughout the entire year – four season activities. Places that will be connected by the Moorhead River Corridor Regional Trail include:

- Probstfield Living History Farm, listed on the National Register of Historic Places.
- Heartland Trail future connection at MB Johnson Regional Park where snow skis and shoe rental is available and a boat launch for fishing.
- Privately-owned Moorhead Country Club and Golf Course
- Homestead Park featuring the oldest house in Moorhead, Bergquist Pioneer Cabin built in 1870. This cabin is listed on the National Register of Historic Places.
- Memorial/Davy Parks with a Historic Log Cabin, RiverArts Festival, farmer's market, 12 holes of disc golf which is connected by a bike/pedestrian bridge to Oak Grove Park with an additional 18 holes of disc golf in Fargo, ND
- Viking Ship Park featuring the Hjemkomst Center which houses a full-sized replica Viking warship constructed out of wood by Robert Asp, a guidance counselor with Moorhead Schools. The Hjemkomst Center also contains the Historical & Cultural Society of Clay County offices, archives, gallery and museum. Viking Ship Park also features the Hopperstad Stave Church, a full-scale replica of Viking Age church in Scandinavia in 1100 and 1200's. Canoes and kayaks are available for rent at this location.
- Woodlawn Park's Frisbee golf course which is connected by a floating bridge to Fargo's Dike East and West Parks that have sledding in winter, Skate Park and farmer's markets.
- Gooseberry Mound Park has a 250 person picnic shelter. The park also has many amenities including sand volleyball courts and is connected to Lindenwood Park in Fargo by a bike/pedestrian bridge. Lindenwood Park has bike rental, ballparks, and 47 campsites with water and electricity.
- Horn Park for quiet picnicking.
- River Oaks Park is another quiet park great for geocaching, birding and fishing North Dam.
- Robert A. Fogel Riparian Forest a 32 acre forest reserve.
- Trollwood Performing Arts School, located at Bluestem Center for the Arts, is a unique arts organization committed to providing high quality arts education, exceptional community entertainment, and serves as a community events and exposition center that features a 2,500 seat outdoor amphitheater with an educational center which is available for rental.



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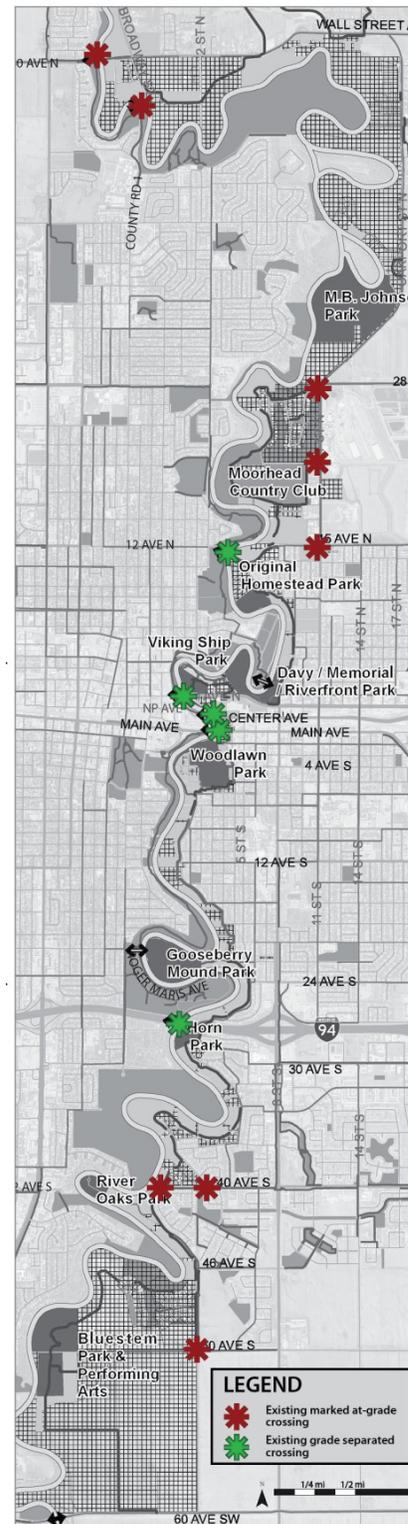
RIVER CROSSINGS

There is a strong desire to build upon and expand existing connections between Moorhead and Fargo by linking existing and future bicycle and pedestrian paths for recreation, commuting (transportation), and supporting an active community. There is also the need and desire to link existing recreational features along the River Corridor (e.g. MB Johnson Park, Memorial/Davy Parks, Bluestem Park) as part of a connected park and trail network that supports outdoor activity. The following are specific needs, desires and opportunities for connectivity organized by Study Area.

- Memorial/Oak Grove Bicycle and Pedestrian Bridge - this bridge is anticipated to be replaced in 2016-2018
- Power Plant / Dike East Floating Pedestrian Bridge
- Gooseberry Mound / Lindenwood Pedestrian Bridge
- Pan additional Pedestrian Bridge is planned for the south trail area in River Oaks or Bluestem Park.

ROAD BRIDGE LOCATION	BIKE/PED FACILITIES
Wall Street Ave NW/County 20/County 22	Yes – dedicated segment
Broadway Street North	On road
North of Country Club or MB Johnson Park	Proposed in future
15 th Ave N/12 th Ave N	Yes – dedicated segment (narrow)
Memorial Park/Oak Grove Park	Yes – Ped-Bike only crossing
1 st Avenue North	Yes – dedicated segment
Center Avenue/NP Avenue	Yes – dedicated segment (narrow)
Main Avenue	Yes – dedicated segment
Floating Bridge at Power Plan/Dike East	Yes – Ped-Bike only crossing (seasonal)
Gooseberry Mound Park/Lindenwood Park	Yes – Ped-Bike only crossing
Interstate 94	None
Future River Oak or Bluestem	Proposed in future
60 th Ave S/52 nd Ave S	On road

FIGURE 35.1. ROAD CROSSINGS AND BRIDGES



INTERPRETATION

Moorhead's River Corridor has numerous cultural amenities and historic sites that provide opportunities for interpretation. In some cases, there is still existing physical evidence of a historical feature along the River Corridor in Moorhead (e.g. Probstfield Farm, etc.).

As Moorhead works to recapture the value of the Red River, the City will work to improve awareness and appreciation of the River Corridor and its history, culture, and role in nature. As part of these efforts, recreation in the River Corridor will be enhanced by dynamic and interactive educational opportunities, as well as an attractive and consistent interpretive signage.

Potential interpretive themes include:

- River Recreation
- The Changing Landscape
- The Changing River
- River History
- Transportation
- Agricultural History



RECOMMENDATIONS

Interpretation can be integrated into the River Corridor using multiple methods. Following are options for interpretive methods and media.

- **Traditional Interpretive Signage** - integrate interpretive media into wayfinding orientation signs.
- **Performance** – partner with the Trollwood Performing Arts School on theatrical interpretation and performances in parks throughout the River Corridor. Performances could interpret Moorhead history, wildlife stories, and natural history.
- **Tours and Classes** – work with the local school district, colleges, and universities, to create educational programming in the parks. Develop a Red River Steward program for those interested in serving at a higher level. Currently there are four annual educational tours on the Red River.
- **Art Installations** – temporary and fixed installations could portray historical figures or environmental situations. Art could be solicited from local artists, schools, and universities.
- **Outdoor Learning Lab** –an educational facility with access to the river, floodplain ponds, soils, and vegetation; the proposed recreation node at Riverview Circle is a possible location.
- **Technology** – develop phone based audio tours and use QR codes for updated information at key locations, capture River Corridor photos and distribute them using Facebook, Twitter, and Instagram.
- **Interactivity** – interpretation can be integrated into play features, water fountains, moveable items, and large scale maps or formations.
- **Site Design** – use the designed environment to frame and highlight attractive views, hide undesirable views, and guide appropriate activity.
- **Visitor Center** – Hjemkomst Center could be utilized as the hub for River Corridor visitor information.
- **Publications** – brochure

AMENITIES

WAYFINDING SIGNAGE

Ease of navigation throughout the Corridor is important to the experience of the River Corridor Trail. Direct trail routes are a high priority to reduce the amount of directional and informational signage needed. At trail intersections, recreation nodes, and road crossings, unified signage will be essential to orient and inform users. Signage content could be developed in coordination with the City of Fargo, Fargo Park District, and local business organizations in order to highlight and guide corridor users to local businesses, trail connections, social and cultural destinations, recreation nodes, trail loops, and neighborhoods. Metro COG is currently undertaking a bicycle signage implementation plan for kiosks and guide signs; future River Corridor signage style should be coordinated and consistent with this effort.

Wayfinding signs typically show destination, direction and distance. Signs are placed where routes change and periodically along the route. For cyclists, pavement markings can be easier to see and can be used to supplement signage. Types of wayfinding signs are described as:

- **Kiosk** - *Role:* route maps, information about the destination and interpretation; *Placement:* trail heads and destinations such as parks
- **Directional Sign** - *Role:* identify turns, route destination choices and distance; *Placement:* route intersections and decision points
- **Route Sign** - *Role:* identify route name and major destination; *Placement:* every 1/2 mile along on-road bike routes and at major intersections
- **Button** - *Role:* identify bikeways; *Placement:* on existing street signs along bikeway
- **Pavement Markings** - *Role:* identify on road bike routes, in addition to route signs; *Placement:* pavement

OTHER

Other amenities proposed for the Moorhead River Corridor Regional Trail include:

- Permanent trail support facilities such as benches, lighting, waste receptacles, picnic tables, and kiosks
- Restrooms, gazebo shelters, and concession stands to further increase use of the River Corridor and promote positive public activity
- A community gathering and/or congregational space (such as a small scale amphitheater) developed for music and other community events and programming
- Continuation and expansion of river activities such as canoe and kayak rentals
- Better utility of boat launches and portages along the River Corridor to support user safety and to increase accessibility for low impact water based recreation.

NATURAL RESOURCES

LANDSCAPE SENSITIVITY

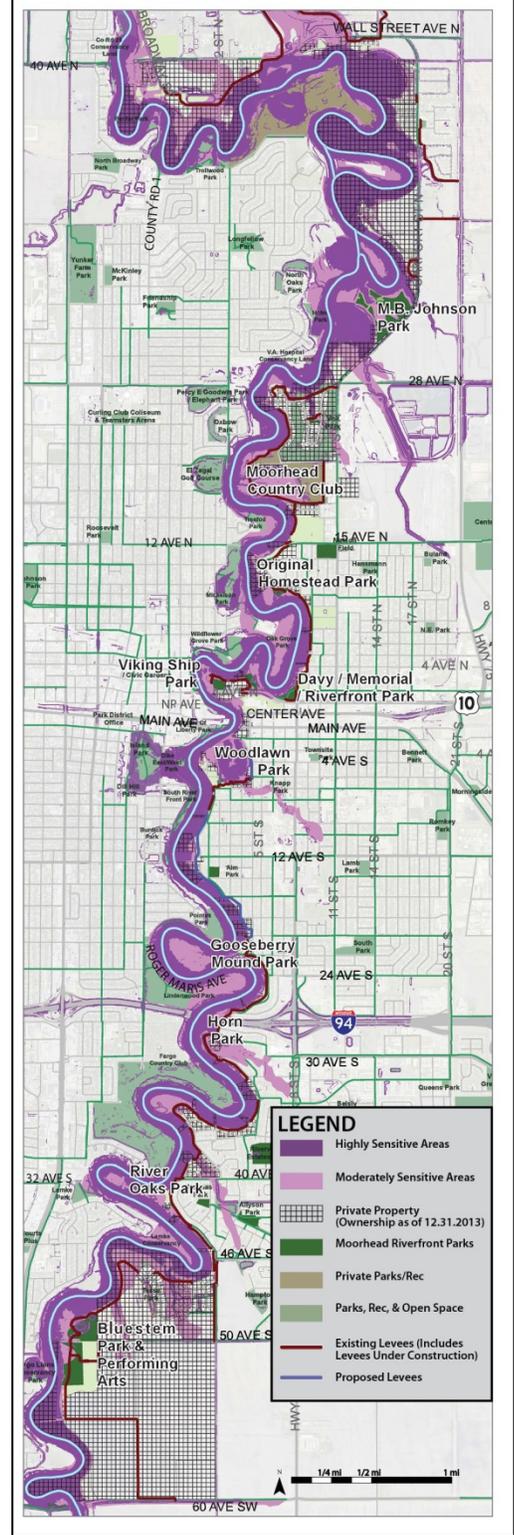
To determine which areas of the River Corridor are appropriate for recreation development and which are most appropriate for re-vegetation and habitat restoration, a comprehensive analysis of the River Corridor landscape was completed based on topography, habitat, and flood frequency.

1. High Sensitivity areas are most sensitive to human impact and are least suitable for recreation because of impact to resources or frequent flooding. These areas represent:
 - Slopes of 10% or greater
 - Areas where geotechnical analysis has deemed the soils unstable and prone to slumping
 - Areas of sensitive habitat based on tree cover, patch interior, patch size, and flood frequency
2. Moderate Sensitivity areas are somewhat sensitive to human impact and recreational use. These areas represent:
 - Areas of moderately sensitive habitat based on tree cover, patch size (smaller than in the High category), and flood frequency
 - Areas within the 100-year floodplain below the levee, but above the 24' flood elevation
3. All other areas are considered low sensitivity and are appropriate for a variety of recreational activities and other land uses

HABITAT ENHANCEMENT

The primary goal of habitat enhancement is to increase the area of native vegetation through preservation and restoration, while maintaining an overall natural feel that appears cared for and intentional. Native vegetation provides several benefits including wildlife habitat, erosion and flood control, recreational opportunities, such as birding and wildflower viewing, and is an important component to the natural history of the Fargo-Moorhead area. Target restoration and preservation areas have been identified along the Red River Corridor in the Moorhead area and include restoration of habitats that are compatible with the riparian corridor and require minimal amounts of maintenance. Specifically, habitats that are proposed for restoration along the River Corridor include prairie, oak savanna, and floodplain forest.

FIGURE 19. LANDSCAPE SENSITIVITY ANALYSIS



TOPOGRAPHY

The River Corridor is a mix of steep slopes and flat lowlands. Construction on and adjacent to slopes greater than 10% presents limitations regarding slumping and increased construction costs related to grading, filling, and other issues, and can have negative vegetative/riparian impacts and introduce erosion control issues. Development of less formalized off-road mountain biking or unpaved nature trails are not as constrained by steep slopes.

VEGETATION

Today the River Corridor is a mix of natural habitat, maintained areas, and restored prairie communities. Recent construction of flood control structures has changed the landscape with the removal of homes and in some areas; there has been significant tree loss as a result of levee construction.



FIGURE 14. EXISTING VEGETATION



PRAIRIE

Prairies once covered 18 million acres of Minnesota although due to agriculture and development, only 235,000 acres of original prairie remain. The prairies of western Minnesota were tallgrass prairies that were dominated by grass species such as big bluestem and Indiangrass, as well as wildflowers such as sunflowers, blazing stars, and many aster species. Prairies were historically maintained by fire, drought, and grazing by native herbivores such as bison and elk, meaning that these types of disturbances were necessary for maintaining the vast grasslands. Without such disturbances, trees and shrubs encroach on the prairies converting them to forests.



Prairies provide a number of ecosystem services that benefit both humans and wildlife. The plants of prairies are adapted to the conditions of Minnesota, including droughts and flooding. The strong roots of these plants provide stabilization and erosion control of the soils. As prairies were the natural vegetative plant communities that once covered 1/3 of the state of Minnesota, they are important for our natural history and provide a sense of place. Prairies are important for wildlife, including many rare species such as the state-listed regal fritillary and Dakota skipper. Prairies also offer aesthetic value to our landscapes with plants in flower from the early spring to the late fall, as well as recreational birding and butterfly observation opportunities.

Restoring and maintaining prairies in urban environments is relatively easy because once established, prairies require little maintenance compared to high maintenance turf which requires frequent mowing. Restoring prairies on land that has been used for other purposes, such as residential properties and areas currently maintained as turf, includes removing existing vegetation, such as turf grass or invasive species. After vegetation removal, the selected areas will be seeded with a local ecotype prairie seed mix. Because native plants are adapted to local climatic conditions, such as drought, once established they will require minimal maintenance, such as watering. During initial establishment, selective weed control will be implemented to remove invasive and undesirable species. After the prairie vegetation has become established, it should be mowed or prescribed burned every 3-5 years.

RECOMMENDATIONS

Several areas along the River Corridor in the Moorhead area are proposed to be restored to prairie, including:

- Many areas along the corridor that were formerly residential have already been and will continue to be seeded with prairie plants by the City of Moorhead, including north and south of the Moorhead Country Club, Homestead Park, and north of River Oaks Park.
- Restored prairie along the levees in many areas will serve as a transition between maintained turf and forested areas along the corridor and in several parks.
- Portions of public parks including MB Johnson Park, Gooseberry Mound Park, and River Oaks Park.

OAK SAVANNA

Oak savannas are among the rarest habitats in North America. They are a transition habitat between the tallgrass prairie and woodlands. Oak savanna is comprised of prairie plant species with a sparse canopy of trees (typically bur oak) and shrubs. Similar to prairies, oak savanna was historically maintained by fire, drought, and grazing. Without such disturbances, oak savannas would fill in with trees and become forests.



Because oak savannas are a transition habitat, they are important for both forest dwelling species as well as prairie species (including both plants and animals). For example, red-headed woodpecker, indigo bunting, eastern kingbird, and karner blue butterflies occur in oak savannas. As such, this ecosystem provides an aesthetic and accessible landscape for birding and searching for insects, such as butterflies.

RECOMMENDATIONS

Many areas along the River Corridor have bur oak saplings that have naturally recruited. Restoring bur oak savanna in these areas would entail protecting the saplings that are already growing, by enclosing them in tubes or mesh wiring. Protecting saplings will ensure survival and growth and will eliminate costs associated with purchasing, planting, and maintaining new trees. In addition to protecting existing bur oak saplings, native prairie plants will be seeded in these areas. As mentioned above, native plants are adapted to local climatic conditions which minimize the need for watering. During establishment of native plants, selective weed control will have to be implemented. Similar to prairie, once oak savanna becomes established, maintenance is minimal, and would include mowing or prescribed burning every 3-5 years.

FLOODPLAIN FOREST

Floodplains are the broad, flat, low-lying areas at the bottom of river valleys that typically flood in spring and during periods of unseasonably high rainfall. Floodplain forests are dominated by trees such as cottonwood, silver maple, and black willow. The understory of these forests is typically sparse with many areas of bare ground due to the high frequency of flooding. These forests are important along rivers with a high frequency of flooding, such as the Red River, because the trees help stabilize the river banks and prevent excessive erosion.



Floodplain forests provide important habitat for many wildlife species, including migrating songbirds that rely on vegetative corridors. Ephemeral pools within the forest provide habitat for amphibians and invertebrates. Examples of wildlife include: wood duck, black-crowned night-heron, cerulean warbler, acadian flycatcher, warbling vireo, blue-winged warbler, prothonotary warbler.

RECOMMENDATIONS

Floodplain forests provide many public use and recreational benefits including birding during spring and fall migrations, fishing along the Red River, and dog walking and passive recreation on hiking trails. Floodplain forests occur along many parts of the Red River in the Moorhead area, especially in parks and north and south of the core urban areas of the city. Restoring and maintaining these areas would entail maintaining permanent tree cover and allowing some areas to naturally succeed back to forest. Additionally, controlling invasive species, such as buckthorn, may be required.

WATER QUALITY

Creating wetland features along the Red River Corridor will provide ecosystem services such as water storage during large rain events, improve water quality through infiltration, and provide habitat for wildlife. Wetland features include wetland restoration, rain gardens, and created wetlands. Adding wetland features will increase heterogeneity in the landscape and add interest, as well as ensure the City of Moorhead meets its stormwater management needs. Such water quality improvement projects can also provide public education opportunities.

RECOMMENDATIONS

Restoring existing wetlands will entail removing invasive species, such as reed canary grass and cattails, and planting native wetland plant species. Maintenance for restored wetlands will include invasive species control and monitoring establishment of native species and supplemental plantings as needed. Constructing rain gardens and created wetlands will involve dredging the target area, installing drainage and filtration systems, and planting native wetland species. Similar to restored wetlands, invasive species will have to be controlled as needed and native species establishment will have to be monitored and supplemented as necessary.



PROGRAMMING PLAN

Trail systems throughout Moorhead are free for all and are accessible year round to the public. Picnic Shelters are currently rented at a cost of \$55 - \$160 for the day. Park Hours are open from 10 a.m. – 10:00 p.m. with the exception of MB Johnson Park where there is a boat launch and that is open until 11 p.m. in the summer. There is currently site lighting in parking lots and along the paths in Viking Ship Park to extend trail usage in winter months.

Most significant is to have connectivity along the 18.5 mile trail the plan calls for a number of recreation amenities to be added including:

1. Recreation nodes;
 - interpretive signage, informational kiosk, wayfinding signs,
 - public art
 - parking and restroom facilities / garbage cans, benches, dog waste receptacles
 - picnic shelters 20 – 120 people
 - Existing:
 - a. MB Johnson Park - natural resource park, off road bike trails, shelters, fishing boat launch
 - b. Moorhead Country Club - golf
 - c. Memorial/Davy Parks – shelter, festivals, cross country ski, disc golf, farmers market
 - d. Viking Ship Park,- cultural center, arts, historical interpretation, canoe and kayak launch and educational excursions, festivals
 - e. Woodlawn Park – disc golf, Heritage Garden and Amphitheater
 - f. Gooseberry Mound Park – shelters (250 person), off road bike trails, sand volleyball, Soroptimist Funland - accessible playground.
 - g. River Oaks Point- shore fishing, dam portage
 - h. Bluestem Center for Arts – performing arts center, shelters
2. New Community Park developed at Riverview Circle South
3. Disc Golf Course (South Moorhead)
 - Existing:
 - a. 13 holes at Memorial/Davy Parks
 - b. 18 holes at Woodlawn Park
2. 2 additional pedestrian bridges
 - Bluestem Center for the Arts,
 - North of the Moorhead Country Club
 - Existing:
 - a. MB Johnson (crossing Snaky Creek) install 2017
 - b. Memorial Park
 - c. Woodlawn Park
 - d. Gooseberry Park
 - e. 6 traffic bridges with Pedestrian lanes
4. Cross country ski trail expansion parallel to pedestrian trails
 - Homestead Park to Memorial/Davy Parks,
 - Horn Park through Gooseberry to River Oaks,
 - River Oaks Park to Bluestem Center for the Arts
 - Existing:
 - a. MB Johnson Park
 - b. Gooseberry Park

5. Canoe and kayak launch
 - Location in South Moorhead
 - Existing:
 - a. MB Johnson
 - b. Viking Ship Park
6. Prairie Restoration at 10 locations
 - Existing
 - a. 2 in progress in partnership with Audubon Society – Audubon Dakota
7. Off Road Bicycle Paths
 - River Oaks Park to Bluestem Park
 - Existing
 - a. MB Johnson Park
 - b. Gooseberry Park
8. Compleitive Race / Charity Fun Run - paths will keep the streets open during these special events. There are many including:
 - Fargo Marathon ran ½ in Moorhead – 10,000 runners annually over 3 days
 - Streets Alive
 - Frostival – Winter Festival

Trailhead and/or park amenities vary by venue, which may impact access to certain trail segments during special events.



Photo Credit: <http://www.inforum.com/variety/3930880-f-m-warming-first-frostival>



Photo Credit: <https://msumadvocate.com/2015/11/23/dragons-take-disc-golf-to-the-next-level/>



RESEARCH PLAN

Moorhead is part of the metropolitan planning organization, Fargo-Moorhead Metropolitan Council of Governments (FM MetroCOG). This organization facilitates a regional Metropolitan Bicycle and Pedestrian Committee that advocates for alternative transportation modes including issues and needs. The committee actively plans and implements improvements to pedestrian and bicycle facilities that improve safety and quality of life for citizens. Counts of bike and pedestrian users on Fargo-Moorhead metro trails are managed by FM MetroCOG.

Organizers of destinations and events along the Moorhead River Corridor often manage and solicit user profile information and visitation counts.

City of Moorhead's Park Advisory Board reviews usage profiles and makes recommendations for recreation demands and trends as determined by user surveys and other research techniques. A regional comprehensive recreation study was facilitated by the Fargo-Moorhead metropolitan park districts which noted trails as a #1 Priority for development.

Riverkeepers provides educational and usage research throughout the river corridor.



Photo Credit: <http://www.dl-online.com/outdoors/3813208-outdoor-winter-sporting-events-planned-fargo-moorhead>

IMPLEMENTATION PLAN

COST ESTIMATES

GENERAL RECREATION & PARK CAPITAL, OPERATION, & MAINTENANCE COSTS

The following table is a tool that the City can use to initially evaluate and budget for new improvements and quickly grasp the general cost for new improvements. Equally important to the initial capital cost for a project are the on-going operations and maintenance costs. Adequately budgeting operations and maintenance ensures that facilities last their expected life and the River Corridor remains safe and welcoming.

	ELEMENT	CAPITAL COST	ANNUAL O & M COST	EST. LIFE (YEARS)
TRAILS & SURFACES	Trails (10 ft. wide asphalt)	\$140,000 per mile	\$5,280 per mile	30
	On-Road Bikeway	\$10,000-\$50,000 per mile	Re-striping and sign maintenance	--
	Natural Surface Hike/Ski Trails	\$30,000 per mile	\$500 per mile	--
	Pedestrian Bridges	\$1,200 per linear foot	\$3.50 per linear foot	30
TRAILHEAD PARKS	New River Corridor Recreation Node	\$50,000 per area	\$300 per area (assumes small parking area, natural surface loop trail, informational kiosk)	25-50
	Parking Lots (asphalt)	\$2,500-\$3,000 per stall	\$20-\$25 per stall	40
	Restrooms	\$250,000 (\$350-\$400 sq. ft.)	\$11,000 per building per year	40
	Picnic Shelters (24-120 capacity)	\$40,000-\$300,000 (\$125-\$150/SF.)	\$3,800 per shelter per year	40
VEGETATION	Mowed Turf grass (not irrigated)	\$25,000 per acre of new sod or \$1,500 per acre of new seed	\$800 per acre (Includes: mowing, trimming, fertilizing, weed control, aerating, & over-seeding.) \$400 per acre (Includes: mowing and trimming only)	15-30
	Wetland Restoration	\$10,000 per acre	\$900 per acre	--
	Prairie – Savanna	\$5,000 per acre	\$300 per acre	--
	Floodplain Forest	\$4,000 per acre	\$400 per acre	--
	Invasive Species Management	\$500 per acre	\$200 per acre	--
	Tree Protection	\$20 per tree	Negligible	20

CAPITAL COST ESTIMATE

With a total estimated cost of over \$17 million, prioritization and phasing will be essential to successful implementation. Planning level estimated capital, operations/maintenance, and long term capital replacement costs are identified in Table 84. While the table identifies phasing for projects, development will occur as funding becomes available and at the discretion of the City Council. The table identifies the full anticipated costs of the plan elements, though it is not anticipated that the City of Moorhead will be responsible for the full costs of improvements outlined.

TABLE 84. RIVER CORRIDOR COST ESTIMATES

Project ID	Project Name	Priority	Project Capital Cost	Operations & Maintenance Cost (Annual)	Capital Replacement Cost (Annual)
A-1	Design unified property boundary signage	Near Term	\$10,000.00	\$0.00	\$0.00
A-2	Develop and adopt landscape buffer design guidelines and a landscape buffer policy	Near Term	\$30,000.00	\$0.00	\$0.00
C-1	Develop wayfinding design standards and install wayfinding signs	Near Term	\$50,000.00	\$500.00	\$2,000.00
C-2	Bikeway – Red River to 15 th Avenue North (Wall Street North, Oakport Road North and North)	Near Term	\$312,000.00	\$23,636.36	\$0.00
C-4	New Bicycle – Pedestrian Bridge North of Moorhead Country Club	Visionary	\$1,200,000.00	\$500.00	\$1,000.00
C-6	Cross Country Ski Expansion within and South of M.B. Johnson Park	Near Term	\$30,000.00	\$568.18	\$1,500.00
C-7	Mountain Bike Trail Expansion South of Snaky Creek within M.B. Johnson Park	Near Term	\$50,000.00	\$946.97	\$2,500.00
C-8	On-road bikeway between 15th Avenue North and Homestead Park	Near Term	\$20,500.00	\$1,553.03	\$0.00
C-9	Paved Trail Homestead Park to Davy/Memorial Park	Near Term	\$365,750.00	\$3,850.00	\$18,287.50
C-10	Reconstruct Paved Trails from Davy/Memorial Park to Woodlawn Park	Near Term	\$893,000.00	\$9,400.00	\$44,650.00
C-14	Natural Surface hiking and cross country ski trail from Homestead Park to Davy/Memorial Park	Near Term	\$12,500.00	\$236.74	\$625.00
C-15	Realign Cross Country Ski Trails in Davy/Memorial Park, Riverfront Park and Viking Ship Park	Near Term	\$31,500.00	\$596.59	\$1,575.00
C-12	Replace Memorial/Oak Grove Bridge	Near Term	\$1,200,000.00	\$2,000.00	\$24,000.00
C-19	Relocate floating bridge from Woodlawn Park to Dike East Park in Fargo	Near Term	\$200,000.00	\$2,000.00	\$4,000.00
C-16	On road bikeway from Woodlawn Park to Gooseberry Mound Park (River Drive and 4 th Street South)	Near Term	\$20,500.00	\$0.00	\$0.00
C-17	Paved Trail from Gooseberry Mound Park to Horn Park	Near Term	\$427,500.00	\$4,500.00	\$21,375.00
C-21	Hiking Loop in Gooseberry Mound Park	Near Term	\$30,500.00	\$577.65	\$1,525.00
C-22	Cross Country Ski/Hiking Trail from Gooseberry Mound Park and Horn Park	Near Term	\$21,750.00	\$411.93	\$1,087.50
C-26	Bluestem Park to 60 th Avenue Southwest	Near Term	\$888,250.00	\$9,350.00	\$44,412.50
C-29	Cross Country Ski/Hiking Trail in River Oaks Park	Near Term	\$29,500.00	\$558.71	\$1,475.00
R-4	DNR Canoe Portage and Parking Improvements 15th Avenue North	Near Term	\$50,000.00	\$550.00	\$2,500.00
R-8	Improvements to Horn Park	Near Term	\$50,000.00	\$550.00	\$25,000.00
R-11	New Recreation Node at Riverview Circle South	Near Term	\$50,000.00	\$550.00	\$25,000.00
H-1	Prairie/Savannah Restoration at the New Recreation Node on Buffalo River Watershed District Land	Near Term	\$146,125.00	\$781.25	N/A
H-4	Prairie/Successional Floodplain Forest North of Moorhead Country Club	Near Term	\$61,300.00	\$375.00	N/A
H-5	Prairie/Savana Restoration North of 15th Avenue North	Near Term	\$22,400.00	\$156.25	N/A
H-6	Prairie/Successional Floodplain Forest between Homestead and Davy/Memorial Parks	Near Term	\$9,800.00	\$93.75	N/A
H-11	Prairie Restoration/Successional Floodplain Forest from Gooseberry Mound Park to Horn Park	Near Term	\$39,600.00	\$312.50	N/A
H-12	Prairie/Oak Savanna Restoration in Horn Park	Near Term	\$22,990.00	\$125.00	N/A
H-13	Prairie/Successional Floodplain Forest/Tree Planting South of Horn Park	Near Term	\$70,125.00	\$468.75	N/A
H-14	Prairie/Oak Savannah Restoration at New Recreation Node at Riverview Circle South	Near Term	\$96,125.00	\$468.75	N/A
H-15	Prairie/Successional Floodplain Forest in River Corridor North of River Oaks Park	Near Term	\$18,315.00	\$93.75	N/A
H-16	Prairie/Oak Savanna Restoration in River Oaks Park	Near Term	\$22,725.00	\$156.25	N/A
Sub-total:			\$6,482,755.00	\$65,867.42	\$222,512.50

Funding will be collaboration between the City, partner agencies, and organizations. In addition, all cost estimates are planning level, based on the level of detail outlined in this plan. Prior to implementation, refined cost estimates associated with desired design and anticipated operations and maintenance activities should be prepared.

The table identifies annual maintenance/operations costs for River Corridor improvements. It is important to note that for natural resource projects, a higher level of maintenance is anticipated for the first 5 years. For the purposes of this table, that additional maintenance cost is wrapped into the capital cost. Table 87 includes a breakdown of total capital and maintenance costs for natural resource projects for the 1-5 year time frame and 5-10 year timeframes. Table 84 also includes yearly amortization of costs for major capital maintenance, or full facility replacement at the end of the lifecycle of each project (typically 25 years with 50 years for bridges).

Project ID	Project Name	Priority	Project Capital Cost	Operations & Maintenance Cost (Annual)	Capital Replacement Cost (Annual)
C-30	Cross Country Ski/Hiking Trails within and South of Bluestem Park	Long Term	\$91,750.00	\$1,737.69	\$4,587.50
C-27	Southern Pedestrian and Bicycle Bridge I (River Oaks Park)	Long Term	\$1,200,000.00	\$2,000.00	\$24,000.00
R-2	Improvements to M.B. Johnson Park	Long Term	\$636,000.00	\$3,400.00	\$31,800.00
R-3	New Recreation Node North of Moorhead Country Club	Long Term	\$50,000.00	\$550.00	\$2,500.00
R-5	Improvements to Original Homestead Park	Long Term	\$50,000.00	\$946.97	\$2,500.00
R-6	Improvements to Davy/Memorial/Riverfront Park/Viking Ship Park	Long Term	\$500,000.00	\$550.00	\$25,000.00
R-9	Improvements to Gooseberry Mound Park	Long Term	\$500,000.00	\$550.00	\$2,500.00
R-10	Improvements to River Oaks Park	Long Term	\$500,000.00	\$550.00	\$2,500.00
R-12	Improvements to Bluestem Park and Events Center	Long Term	\$500,000.00	\$550.00	\$25,000.00
I-1	Create a Comprehensive River Corridor Interpretation Plan	Long Term	\$75,000.00	\$0.00	\$0.00
H-2	Prairie Restoration at M.B. Johnson Park	Long Term	\$51,565.00	\$281.25	N/A
H-3	Wetland Restoration at M.B. Johnson Park	Long Term	\$31,025.00	\$281.25	N/A
H-7	Water Quality Improvements at Davy/Memorial Park, Riverfront Park, and Viking Ship Park	Long Term	\$27,405.00	\$156.25	N/A
H-10	Prairie/Oak Savanna Restoration in Gooseberry Mound Park	Long Term	\$44,945.00	\$218.75	N/A
H-18	Prairie seeding/Successional Floodplain Forest South of Bluestem Park	Long Term	\$88,975.00	\$468.75	N/A
Sub-total:			\$4,346,665.00	\$12,240.91	\$120,387.50
C-3	New Bicycle – Pedestrian Bridge at M.B. Johnson Park	Visionary	\$1,200,000.00	\$2,000.00	\$24,000.00
C-5	Ped-Bike- Ski Bride over Snaky Creek in M.B. Johnson Park	Near Term	\$100,000.00	\$2,000.00	\$24,000.00
C-8.1	Riverside Trail 15th Avenue North and Homestead Park	Visionary	\$194,750.00	\$2,050.00	\$9,737.50
C-11	15 th Avenue North Toll Bridge Improvements	Visionary	\$38,000.00	\$400.00	\$1,900.00
C-13	Pedestrian and Bicycle Improvement to 1st Avenue Bridge	Visionary	\$38,000.00	\$400.00	\$1,900.00
C-19.1	Replace floating bridge from Woodlawn Park to Dike East Park in Fargo with a permanent structure	Visionary	\$1,200,000.00	\$2,000.00	\$24,000.00
C-16.1	Paved Trail from Woodlawn Park to Gooseberry Mound Park	Visionary	\$560,500.00	\$5,900.00	\$28,025.00
C-18	Paved Trail from Horn Park to River Oaks Park	Visionary	\$1,021,250.00	\$10,750.00	\$51,062.50
C-20	Natural Surface Cross Country Ski/Hiking Trail from Woodlawn Park to Gooseberry Mound Park	Visionary	\$62,250.00	\$1,178.98	\$3,112.50
C-23	Cross Country Ski/Hiking Trail from Horn Park to River Oaks Park	Visionary	\$51,000.00	\$965.91	\$2,550.00
C-24	Paved Trail from River Oaks Park to 46th Avenue South	Visionary	\$289,750.00	\$3,050.00	\$14,487.50
C-25	Paved Trail from 46th Avenue South to Bluestem Park	Visionary	\$41,000.00	\$776.52	\$2,050.00
C-28	Southern Pedestrian and Bicycle Bridge II (Bluestem Park)	Visionary	\$1,200,000.00	\$2,000.00	\$24,000.00
R-1	New Recreation Node on Buffalo River Watershed Land	Visionary	\$50,000.00	\$550.00	\$2,500.00
R-7	Improvements to Woodlawn Park	Visionary	\$500,000.00	\$550.00	\$25,000.00
H-8	Restored Wetland in Woodland Park	Visionary	\$51,700.00	\$250.00	N/A
H-9	Prairie/Successional Floodplain Forest South of Woodlawn Park	Visionary	\$47,300.00	\$937.50	N/A
H-17	Prairie and Potential Wetland Feature in Tessa Terrace Development	Visionary	\$90,650.00	\$562.50	N/A
Sub-total:			\$6,736,150.00	\$36,321.40	\$238,325.00
Total:			\$17,565,570.00	\$114,429.73	\$581,225.00

FUNDING SOURCES

Funding for initial capital cost and ongoing operations and maintenance costs is essential in implementing the vision for the River Corridor. Funding should be a collaborative effort including local, state, and federal funding sources, grant resources, and philanthropic/local investment. In-kind contributions of land, easement, design, engineering, construction and maintenance and operations are encouraged and will be outlined in agreements among agencies and stakeholder groups. It is anticipated that many future capital projects will be well positioned to secure regional, state and federal funds for recreation, transportation, water quality, interpretation and habitat restoration.

Table 77 identifies potential funding sources for each project type. Sources are identified as possible, likely, and best depending on how well the project and the funding source are matched.

TABLE 77. POTENTIAL FUNDING SOURCES BY PROJECT TYPE

	Capital Improvement Funds	Dedicated Tax Levy	Bond Referendum	State Aid Funds	Park/Trail Dedication	Utility Fee	Grants	Partnerships	Donations	Notes
FLOOD PROTECTION										
Land acquisition for flood protection	●					○	●	●		FEMA, DNR
Flood control structures	●					○	●	●		FEMA
ATTRACTIVE RIVER CORRIDOR										
Private Property Delineation	○	○						●		Funded by property owners
Property Boundary Signage	○	○						●		
CONNECTIVITY										
On-road bikeways	●	○	○	●						
Paved trails	○	○	●	○	●		●			
Natural surface trails	●	○	○		○		○	●		
Bridges	●		●				●	●		City of Fargo
Wayfinding signage	●	○	○				○			
RECREATION										
Park improvements	●	○	●		●		●	○		
Programs	●						●	●		
HABITAT ENHANCEMENT & WATER QUALITY										
Habitat restoration	●	○	○				●	●		Soil and Water Conservation District
Water quality projects	●	○	○			●	●	●		Soil and Water Conservation District
INTERPRETATION										
Physical projects (signage, site design)	○	○	●				●	●	○	
OPERATIONS & MAINTENANCE										
Regular maintenance						●		●		

Key

Best Funding Source	Likely Funding Source	Possible Funding Source
●	●	○

OPERATIONS AND MANAGEMENT PLAN

Maintenance and sustainability are the key ingredients to the long-term success of the River Corridor. The Moorhead River Corridor should be economically, ecologically, and socially sustainable. In addition to sustaining future River Corridor recreational facilities, maintenance of the flood protection facilities are essential to the future of the community. The City's high investment in constructing these facilities deserves consideration when planning on and around them.

GENERAL MANAGEMENT

General operations will continue to be a coordinated effort across the City's Engineering, Planning, and Parks and Recreation Departments. The Planning Department is charged with overall coordination of River Corridor improvements and City initiatives that may impact the River Corridor. Engineering will continue to take the lead in management of all flood control structures and designing future river corridor infrastructure (such as bike trails). Parks and Recreation will continue to manage and operate the recreational facilities as well as maintain natural and landscaped vegetation.

With additional property acquisition along the River Corridor comes additional programming and maintenance of these properties. The city must provide appropriate staff and funding to maintain the corridor to appropriate levels and expectations as well as to implement and succeed with the goals outlined in the Plan.

MULTI-JURISDICTIONAL COORDINATION AND PARTNERSHIPS

Several agencies and organizations have political and jurisdictional interests in the River Corridor: City of Moorhead, City of Fargo, Fargo Park District, and Fargo-Moorhead Metro COG. Coordination is needed among these entities in order to ensure successful projects. In addition, Clay County, the Minnesota Department of Natural Resources, the Buffalo - Red River Watershed District, Minnesota Department of Transportation and Dakota Audubon could be involved in funding or decision making processes for various projects.

Partnerships can prove to be important economic sustainers in parks and recreation. Working with the various recreation organizations, such as the River Keepers, FM Trail Builders, Prairie's Edge Nordic Skiers, and Dakota Audubon to provide construction and maintenance of natural surface trails, prairie restoration and other river oriented recreation facilities, gives the residents of Moorhead a larger array of recreational options than the City alone could provide. Additional partnership opportunities include working with existing local businesses to provide services within the River Corridor parks, including: bike rental, skate rental, fishing tackle rental, canoe/kayak rental, ski rental, food and drink concessions, river tours and interpretive classes, etc.

STAINABLE OPERATIONS AND MAINTENANCE

As with many public improvement projects, capital costs are often given much more attention than operations and maintenance costs. It is easy to think of applying for a grant to build a new, facility for public use, but acquiring additional funding for mowing, hiring maintenance staff, plowing trails, or administering new or expanded programs is more complicated and must be considered. Creative fiscal thinking is required when attempting to realize a grand vision for the Red River Corridor in Moorhead.

Prior to implementation of any project outlined in this plan, planning and budgeting for operations, maintenance and capital replacement must be completed. Sometimes spending more time, effort, and money at the start of a project can pay off in the long run. High investment in planning and construction will lead to longer life facilities with lower repair and replacement costs.

REGULAR MAINTENANCE ACTIVITIES

Maintenance of facilities and lands is essential to protect public investment, enhance natural resource and achieve the community's vision for an attractive river corridor. The City of Moorhead Parks Department has a defined maintenance program. Some maintenance, such as for cross country ski trails and mountain bike trails is done in partnership with user groups. Regular maintenance activities for the River Corridor will include:

- Sign maintenance
- Trash collection
- Sweeping and blowing
- Trail repair
- Bridge repair
- Park facility repair and maintenance
- Mowing
- Forestry
- Winter trail clearing
- Winter cross-country ski trail grooming

ECOLOGICAL SUSTAINABILITY

Low maintenance landscapes are good for the environment as well as the pocketbook. Restored native vegetation areas, such as prairies, savannas, shorelines, and floodplain forests, function as part of the natural landscape. They provide wildlife habitat, natural water filtration, windbreaks, shade, oases in urban environments and places of respite. Once established, native landscapes require minimal maintenance because the vegetation is adapted to local conditions.

In addition to maintaining native vegetation landscapes, maintaining a healthy river system is important for sustainability. A healthy river that meets its water quality goals and is allowed to ebb and flow with the seasons will also provide economic, ecological, and social benefits. Maintaining a healthy river includes properly managing and treating stormwater to reduce pollutants before they reach the river. Additionally, maintaining natural vegetation along the River Corridor is important to provide stabilization, erosion control, stormwater filtration, and flood protection.

SOCIAL SUSTAINABILITY PROGRAMS AND EVENTS

Key to creating an attractive River Corridor is not only building new facilities and restoring land, but attracting people to the River. Building on existing organized programs and creating new ones such as interpretive walks, educational classes, volunteer natural resource stewards, cross country ski-clinics etc. will add to activity within the River Corridor and foster resident champions.

Existing parks and facilities currently provide the space needed for community and regional events that attract visitors to the River Corridor. M.B. Johnson Park and Bluestem Park have parking and large open fields and already host large events. Potential future events include: farmers markets or public markets, cross country ski races, mountain bike races, 5K runs or obstacle course, fundraising walk, art fair, pond hockey tournament, tree planting event, buckthorn bust, and other events.

SAFETY-ENFORCEMENT AND SECURITY

The perception and reality of safety on the River Corridor is essential for success. River Corridor visitors will be informed of rules and regulations through strategically located signs that address specific information about hours, permitted and prohibited activities, fees and directions. City of Moorhead Police and other city employees will also educate visitors and enforce ordinances.

ONGOING MAINTENANCE

Natural resource restoration require a large investment at start up with potential cost savings in the long term (compared to mowed grass). Annual maintenance costs are higher during the first 5 years, when a native community is being established. After an establishment, these costs are lower. In areas that are currently being mowed, restoration can result in significant reductions in maintenance costs over the long term. It takes approximately 10 years for the initial investment in restoration to 'pay-off' with reduced annual maintenance costs. Figure 86 indicates the frequency of maintenance needed for natural and maintained landscapes. Maintained park areas require a continuous maintenance effort, while natural areas require maintenance one year or less.

FIGURE 86. ON-GOING MAINTENANCE EFFORT

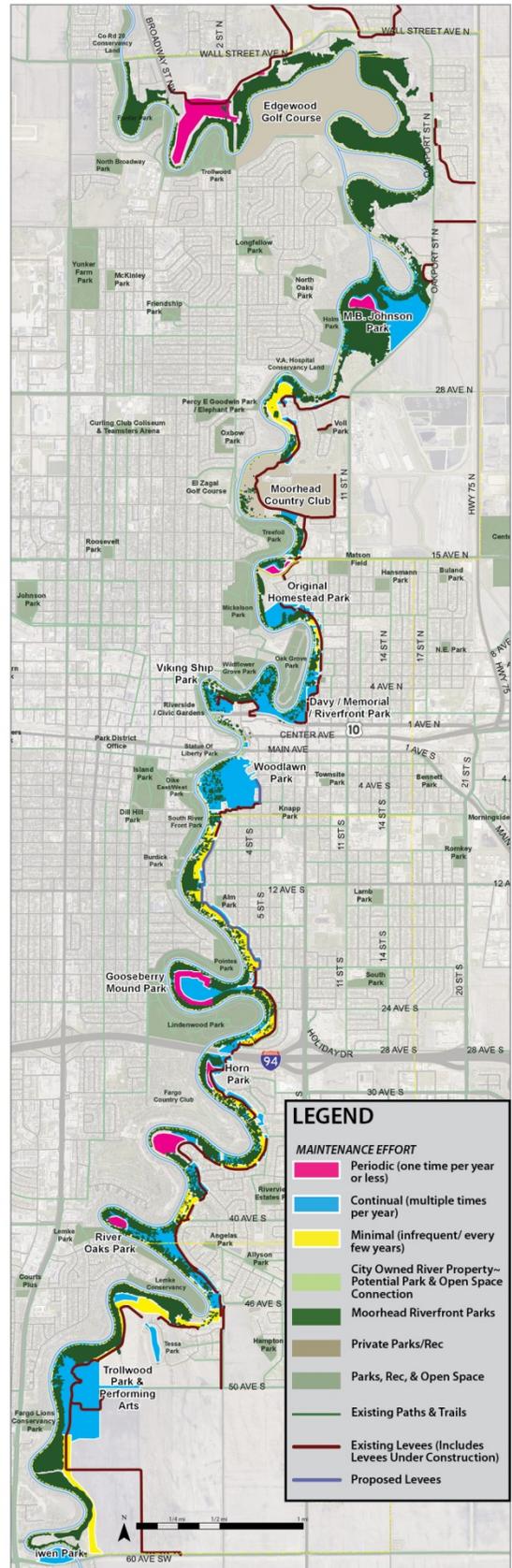


TABLE 87. ON-GOING MAINTENANCE COST ESTIMATES

Project #	Project	0-5		5-10		Total	
		Restoration	Mowing	Restoration	Mowing	Restoration	Mowing
H-1	Prairie/oak savanna restoration at the new recreation node on Buffalo Red River Watershed District Land	\$150,800		\$ 3,900		\$3,900	
H-2	Prairie/oak savanna restoration in M.B. Johnson Park	\$ 53,000	\$ 24,800	\$ 1,400	\$ 24,800	\$54,400	\$ 49,600
H-3	Wetland restoration in M.B. Johnson Park	\$ 32,400		\$ 1,400		\$33,800	\$ -
H-4	Prairie seeding/successional floodplain forest at area just north of Moorhead Country Club at N. River Dr.	\$ 51,900		\$ 1,000		\$52,900	\$ -
H-5	Prairie/oak savanna restoration at river just north of 15th Ave. N.	\$ 23,200	\$ 13,800	\$ 800	\$ 13,800	\$24,000	\$ 27,600
H-6	Prairie seeding/successional floodplain forest and tree planting on river corridor between Homestead Park and Davy/Memorial Park	\$ 21,100		\$ 900		\$22,000	\$ -
H-7	Water quality landscape improvements in Davy/Memorial/Riverfront and Viking Ship Parks	\$ 2,900		\$ 1,600		\$4,500	\$ -
H-8	Restored wetland in Woodlawn Park	\$ 54,200		\$ 1,500		\$55,700	\$ -
H-9	Native prairie seeding/ successional floodplain forest in corridor south of Woodlawn Park	\$ 50,000		\$ 3,100		\$53,100	\$ -
H-10	Prairie/oak savanna restoration in Gooseberry Mound Park	\$ 47,100	\$ 19,300	\$ 2,200	\$ 19,300	\$49,300	\$ 38,600
H-11	Prairie seeding/ successional floodplain forest in corridor between Gooseberry Mound Park and Horn Park	\$ 42,700		\$ 3,100		\$45,800	\$ -
H-12	Prairie/oak savanna restoration in Horn Park	\$ 24,200	\$ 11,000	\$ 1,300	\$ 11,000	\$25,500	\$ 22,000
H-13	Prairie seeding/ successional floodplain forest in corridor south of Horn Park	\$ 73,300		\$ 2,500		\$75,800	\$ -
H-14	Prairie/oak savanna restoration at open space at end of Riverview Circle South	\$ 98,500	\$ 41,300	\$ 2,300	\$ 41,300	\$100,800	\$ 82,600
H-15	Prairie seeding/ successional floodplain forest in corridor north of River Oaks Park	\$ 19,300		\$ 900		\$20,200	\$ -
H-16	Prairie/oak savanna restoration in River Oaks Park	\$ 24,300	\$ 13,800	\$ 1,600	\$ 13,800	\$25,900	\$ 27,600
H-17	Native prairie seeding and potential wetland feature in Tessa Terrace development	\$ 103,600		\$ 1,600		\$105,200	\$ -
H-18	Prairie seeding/ successional floodplain forest in corridor south of Bluestem Park	\$ 91,400		\$ 2,300		\$93,700	\$ -

Initial investment in project start-up, but in long term, costs associated with maintenance of restoration projects are significantly lower than costs associated with continued mowing

Does not include native plantings already installed along with flood mitigation structures, initial restoration costs may lower.

Cost estimates assume all work is to be done by contractors. If City staff, non-profits, volunteers, etc. do the work (implementation/ maintenance), costs may be significantly reduced.

Estimates for mowing were only provided for park areas that are currently maintained as turf grass. Costs for mowing were based on \$550/acre (most areas with mowing and trimming only, some with fertilizing, weed control, aerating, and over seeding).