



Native Plant Community and Special Species Verification and Mapping

St. Louis River Natural Area Project

Submitted to Minnesota Land Trust

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St. Louis River Natural Area Project – Native Plant Community Summary

The proposed project areas of the St. Louis River Natural Area have many assemblages of native plant species that classify as native plant communities (NPC) as defined by the Minnesota Department of Natural Resources. Across the nine (9) project areas within the corridor, there are 17 distinct native plant community types comprised of various types of hardwood forest, mixed hardwood-conifer forest, floodplain forest, forested swamps, shrub swamps, wet meadows, and marshes. The corridor has widespread past and current human use and disturbance. Although these disturbances pose challenges to the ecological integrity of the corridor, they have not removed NPCs and rare species habitat except in limited patches.

Significant native plant communities include Estuary Marsh (Lake Superior), Minnesota NPC Code MRu94a. This community occurs only in estuaries and river mouths influenced by the Lake Superior seiche. The fluctuating water levels of the seiche, caused by wind-driven changes in Lake Superior elevation, can reverse the flow of the river and flush sediment and nutrients back upstream. The MRu94a community is more species-diverse than similar native marsh communities in inland settings. The proposed St. Louis River Natural Area below the Fond du Lac dam contains the largest area of this community in the state; its only other documented presence is in much smaller patches at river mouths on the north shore of Lake Superior through Lake County, Minnesota.

The corridor contains one (1) state-listed endangered species, pale sedge (*Carex pallescens*). In addition, the corridor contains two (2) state-listed special concern species, discoid beggarticks (*Bidens discoidea*) and soapberry (*Shepherdia canadensis*). Plant communities in the corridor may also provide suitable habitat for other rare species, including state-listed special concern narrow reedgrass (*Calamagrostis lacustris*) and state-listed endangered two leaf waterweed (*Elodea bifoliata*).

In Rask Bay and other project areas with large areas of wetlands influenced by the seiche of Lake Superior, there were significant areas of dead or dying woody species, likely past forested or shrub swamps that are currently classified as sedge meadows or marshes. These locations were generally inundated with surface water. It appears that wetland shrubs and trees are stressed by higher water levels in Lake Superior over the course of the previous years, after experiencing a historic low water level in 2007. The lake elevation at the time of the survey in August 2018 was approximately 602.69 feet, compared to a 602.13 foot long term average, and a low of 600.43 feet in August 2007. These communities may fluctuate between open wetland and tree/shrub dominated communities as water levels vary over the course of multiple years. The presence of native plant communities across a range of elevations from below to well above the current St. Louis River and Lake Superior water levels helps to preserve the ability of these communities to succeed between different NPCs as water levels change.

Table 1 – Summary of Plant Communities

Community Grouping	Percent of Project Areas	Description
Forested Upland NPCs ¹	22%	Plant communities variously dominated by aspen, basswood, birch, white cedar, and oak
Forested Wetland NPCs	7%	Plant communities with a shallow water table variously dominated by ash, balsam poplar, and white cedar
Shrub and Open Wetland NPCs	31%	Plant communities with a shallow water table to inundation with surface water, dominated by shrub and herbaceous plants adapted to wet conditions
Aquatic Communities	29%	Aquatic communities include open water and areas dominated by submerged and floating-leaf plants
Non-native / Disturbed	11%	Non-NPC cover types such as maintained turf, non-native species, bare ground, pavement, and etc...

¹ NPCs – Native Plant Communities as defined by the Minnesota Department of Natural Resources (2003)

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Native Plant Community and Special Species Verification and Mapping

St. Louis River Natural Area Project

Prepared for Minnesota Land Trust on behalf of the City of Duluth

1 Introduction

This project collected natural resources data in approximately 1,300 acres of properties along the Lower St. Louis River within the City of Duluth to inform potential inclusion of parcels in the Duluth Natural Areas Program (DNAP). Field scientists collected data in July and August of 2018, verifying remote sensing native plant community data, collecting plot-based vegetation data, and surveying for target state-listed rare plant species. Results indicated a number of plant communities ranging from disturbed areas to excellent quality examples of native plant community types.

Objective

The overall objective of the project is to characterize natural resources conditions within the project area. A secondary objective is to determine the condition of specific resources to inform site management and restoration goals.

In order to meet these objectives, the Minnesota Land Trust (MLT) sought classification and condition ranking of native plant communities (NPCs), as well as description of plant communities not meeting NPC classifications. Additionally, MLT sought identification of occurrences of rare and protected plant species (also referred to as species of greatest conservation need, or SGCN) within the St. Louis River project area.

2 Analysis by Project Area

Field scientists surveyed nine (9) project areas along the Lower St. Louis River (**Figure 1**). Areas dominated by native vegetation were classified by native plant community according to the *Field Guide to Native Plant Communities of Minnesota: the Laurentian Mixed Forest Province* (MNDNR 2003). The Minnesota Department of Natural Resources (MNDNR) developed the nomenclature for the plant community codes to consider the ecological system (e.g., “MH” for mesic-hardwood), floristic region (e.g., “n” for northern), relative soil moisture regime on a scale from 0-9 (0 being driest and 9 the wettest), and nutrient regime on a scale from 0-9 (0 being the poorest and 9 the richest). For example, MHn44 is a northern wet-mesic hardwood-conifer forest with a moderate moisture regime and moderate nutrient regime. A lowercase letter after the plant community code identifies a specific type of the native plant community; MHn44a is an Aspen-Birch-Red Maple Forest type within the MHn44 class.

Cover types not representing native plant communities are also present in the St. Louis River project areas, and these were also identified and mapped. Plant communities not classified as NPCs were given identifiers specific to this report: NN for nonnative plant cover (e.g., old field or turf grass), NVMM for non-vegetated manmade (e.g., roads or rail corridors), DIST for recently disturbed, INV for a discrete patch of one invasive species, and OW for open water. The code SAq was assigned to aquatic communities dominated by submerged and floating-leaf vegetation. Although these aquatic communities were dominated by native plants, the MNDNR has not assigned an NPC class to this habitat. **Figures 2-1** through **2-27** show NPCs and other cover types in the natural area. All NPCs have condition ranks ranging from excellent to poor; **Table 1** below describes the ranking system.

Table 1 – Condition Ranks for Native Plant Communities

Condition Rank	Description
A	Excellent ecological integrity. Little disturbed by recent human activity or invasive species.
B	Good ecological integrity. Lightly disturbed or recovered from past disturbance. Can return to A-rank with protection or management.
C	Fair ecological integrity. Strong evidence of human disturbance, but retain some characteristic species.
D	Poor ecological integrity. Severely altered by human disturbance or invasive species.
NA	Non-NPC cover types are not assigned a condition rank.

Source: MNDNR 2009

Figures 3-1 through **3-13** show the condition rank of each NPC. Condition ranks consider abundance of invasive species; where invasive plants are present throughout an NPC, the condition rank and detailed descriptions provide this information. Where there are discrete, concentrated patches of invasive plants, **Figures 4-1** through **4-8** identify these locations. Detailed methods for assigning NPCs and collecting vegetation data follow in **Appendix A**. The sections below contain summaries for each of the nine project areas within the larger St. Louis River Natural Area.

2.1 Chambers Grove

2.1.1 Significant Features

The Chambers Grove project area extends along the St. Louis River upstream of Trunk Highway (TH) 23 and adjacent to TH 210, on terraces, steep slopes, and cliffs above the river (**Figures 2-2** and **2-3**).

This project area contains mesic and wet-mesic forested communities as well as areas of Dry Sandstone Cliff (Northern), CTn11e, and Wet Sandstone Cliff (Northern), CTn42d, NPCs not found elsewhere in the St. Louis River natural area. See Photo 1 in **Appendix B** for a typical area of CTn11e. **Figures 2-2** and **2-3** detail the locations of NPCs within Chambers Grove, and **Table 2** below lists the NPC codes with descriptions. With the exception of eroded slopes (discussed in Section 2.1.2 below), the communities in Chambers Grove rank B and A for “good” to “excellent” condition (see **Figure 3-1**), and community composition appears typical of minimally

disturbed habitat. Chambers Grove contains suitable habitat for the boreal shrub soapberry (*Shepherdia canadensis* – state special concern).

Uses of the Chambers Grove area include established mountain biking and walking trails. Informal fire pits and “social” (unofficial) trails are also present.

The Chambers Grove project area is contained within a MNDNR-identified site of high biodiversity significance (MNDNR 2006), that covers a portion of the Mission Creek watershed and surrounding area south of I-35 and north of the St. Louis River. The biodiversity significance designation identifies the statewide significance of a natural area based on rare species, size and condition of native plant communities, and landscape context (i.e., connectivity to other native plant communities).

Table 2 – NPCs in Chambers Grove

NPC Code	Description	Condition Rank
CTn11e	Dry Sandstone Cliff (Northern)	D
CTn42d	Wet Sandstone Cliff (Northern)	A
MHn35a	Aspen-Birch-Basswood Forest	B
MHn44b	White Pine-White Spruce-Paper Birch Forest	B
MHn46b	Black Ash-Basswood Forest	A
NN	Nonnative plant community ¹	NA

¹ Not an NPC identified in the *Field Guide* (MNDNR 2003), this classification was developed for this report to refer to communities not dominated by native plant species.

2.1.2 Threats

The Chambers Grove project area has been affected by significant erosion, presumably beginning with the historic rain event of June 2012. Large areas of exposed clay are present (see Photo 2 in **Appendix B**, and areas with a condition rank of D or “poor” on **Figure 3-1**), with some early-successional and disturbance-adapted plant species such as red raspberry (*Rubus idaeus*), goldenrods (*Solidago canadensis* and *S. altissima*), and staghorn sumac (*Rhus typhina*). Erosion control measures are evident, including biorolls and erosion control netting staked into the open hillsides.

Although not widespread in the project area, common buckthorn (*Rhamnus cathartica*) was present on site. Garden lily-of-the-valley (*Convallaria majalis*) was also found in one dense patch. Locations of concentrations of invasive species are shown on **Figure 4-1**.

Social trails and fire pits are located in suitable habitat areas for soapberry, and may negatively affect the sustainability of this area for soapberry.

2.1.3 Restoration and Management Actions

In order to protect existing NPCs and rare species occurrences, erosion control activities should continue. Treatment and ongoing monitoring of common buckthorn will likely be necessary to protect the current good to excellent conditions of forested NPCs. Removal of social trails may preserve suitable habitat for soapberry.

2.2 Rask Bay

2.2.1 Significant Features

The Rask Bay project area covers aquatic, wetland, and forested areas of Rask Bay south of TH 23 in the Fond du Lac neighborhood of Duluth.

Rask Bay has large areas of Estuary Marsh (Lake Superior), MRu94a, an NPC occurring only in estuaries and embayments near river mouths along the shores of Lake Superior, where water levels are influenced by Lake Superior seiche. This community may be present in smaller patches along the north shore of Lake Superior, but is only found in sizable areas in the St. Louis River estuary below the Fond du Lac dam. The MRu94a community is suitable habitat for discoid beggarticks (*Bidens discoidea* – state special concern). Areas of deeper water with submerged and floating leaf vegetation were dominated by native species such as yellow pond-lily (*Nuphar variagata*), American white water-lily (*Nymphaea odorata*), and water marigold (*Bidens beckii*). This community is not given a native plant community classification in the *Field Guide* (MNDNR 2003), but still appears to be a good condition community with few invasive species. Rask Bay also contains sedge meadows (WMn82b), shrub swamps (WMn82a), floodplain terrace forest (FFn57a), and wet-mesic forest (MHn44a). **Figures 2-3** through **2-5** detail locations of NPCs in Rask Bay, and **Table 3** below lists the NPCs with descriptions. Most communities in Rask Bay are ranked B for “good” condition, with the exception of a few areas of marsh with dense cover of nonnative cattails (*Typha angustifolia* and/or *Typha x glauca*) (**Figure 3-2**).

In Rask Bay and other project areas with large areas of wetlands influenced by the seiche of Lake Superior, there were significant areas of dead or dying woody species (see Photo 3 in **Appendix B**). These locations were generally inundated with surface water, and anecdotally wetland shrubs and trees appear stressed by high water levels in Lake Superior over the course of the previous two (2) years, after experiencing a historic low water level in 2007. The lake elevation at the time of the survey in August 2018 was approximately 602.69 feet, compared to a 602.13 foot long term average, and a low of 600.43 feet in August 2007 (NOAA-GLERL 2018). These communities may fluctuate between open wetland and tree/shrub dominated communities as water levels vary over the course of multiple years. The presence of native plant communities across a range of elevations from below to well above the current St. Louis River and Lake Superior water levels helps to preserve the ability of habitats to succeed between different NPCs as water levels change.

Rask Bay is contained within a DNR identified site of outstanding biodiversity significance, covering both Rask and adjacent North Bays.

Table 3 – NPCs in Rask Bay

NPC Code	Description	Condition Rank
FFn57a	Black Ash-Silver Maple Terrace Forest	B, C
MHn44a	Aspen-Birch-Red Maple Forest	C
MRn83a	Cattail-Sedge Marsh (Northern)	C
MRu94a	Estuary Marsh (Lake Superior)	A, B
WMn82a	Willow-Dogwood Shrub Swamp	B, C
WMn82b	Sedge Meadow	B, C
SAq	Shallow Aquatic Community ¹	NA
NN	Nonnative plant community ²	NA

¹ Not an NPC identified in the *Field Guide* (MNDNR 2003), but dominated by native species
² Not an NPC identified in the *Field Guide* (MNDNR 2003), this classification was developed for this report to refer to communities not dominated by native plant species.

2.2.2 Threats

Reed canary grass (*Phalaris arundinacea*) is present in scattered patches in the FFn57a community (typical FFn57a shown on Photo 4 in **Appendix B**). Wild rice (*Zizania palustris*) in the shallow aquatic plant communities of the bay appears to have been heavily grazed.

2.2.3 Restoration and Management Actions

Monitoring for reed canary grass and nonnative cattails, combined with herbicide treatment as needed may help maintain the integrity of the terrace forest and marsh communities. Recent research in the St. Louis River estuary by University of Wisconsin – Superior students has investigated hazing of herbivores such as Canada geese to protect wild rice. Depending on eventual results of this and other studies, herbivore hazing or exclosure fences may be considered for preserving wild rice in Rask Bay.

2.3 North Bay

2.3.1 Significant Features

The North Bay project area is located just east of Rask Bay in the Fond du Lac neighborhood, south of TH 23.

North Bay contains eight (8) distinct NPCs, as well as an aquatic community dominated by native species (see **Table 4** below). North Bay contains B rank or “good” condition examples of MRu94a (see Photo 5 in **Appendix B**), including areas of native emergent plant species with few nonnative cattails. This area also has A and B rank (excellent and good condition) examples of wet-mesic hardwood forest (MHn44a, MHn44d, and MHn46a), with canopies typical of mature forest (>95 years) and diverse ground layers (**Figures 2-6 to 2-9** and Photo 6 in **Appendix B**). In general, this project area had the highest condition ranks of the nine (9) project areas, ranking A and B for all areas assigned NPCs (**Figures 3-3 to 3-4**).

Recreational OHV/pedestrian trails cross the site on three parallel corridors: one through forested areas on the grade of old “Fond du Lac Road”, one along old rail grade through wetland communities to the south (Photo 8 in **Appendix B**), and one along the outer edge of the bay through terrace forest. The old rail grade has likely changed hydrology of the low-lying areas to

the north, which are now disconnected from the influence of the St. Louis River and Lake Superior seiche.

North Bay is contained within a DNR identified site of outstanding biodiversity significance.

Table 4 – NPCs in North Bay

NPC Code	Description	Condition Rank
FFn57a	Black Ash-Silver Maple Terrace Forest	A, B
FPn73a	Alder Swamp	B
MHn44a	Aspen-Birch-Red Maple Forest	B
MHn44d	Aspen-Birch-Fir Forest	B
MHn46a	Aspen-Ash Forest	B
MRu94a	Estuary Marsh (Lake Superior)	A
WFn55a	Black Ash-Aspen-Balsam Poplar Swamp (Northern)	B
WMn82a	Willow-Dogwood Shrub Swamp	A, B
WMn82b	Sedge Meadow	B
DIST	Recently disturbed ¹	NA
NN	Nonnative plant community ¹	NA
OW	Open Water	NA
SAq	Shallow Aquatic Community ²	NA

¹ Not an NPC identified in the *Field Guide* (MNDNR 2003), this classification was developed for this report to refer to communities not dominated by native plant species.

² Not an NPC identified in the *Field Guide* (MNDNR 2003), but dominated by native species

2.3.2 Threats

Threats to ecological integrity in North Bay include invasive plant species, localized areas of off-trail/unsustainable OHV use, and erosion on slopes downslope from and south of TH 23 (**Figure 2-9**). Field observation of erosion included locations where OHV trails cross wetland habitat, and rills forming from the top of slope near TH 23 in the forested communities on the north side of the project area. Similar to Rask Bay, wild rice in the shallow aquatic plant communities of the bay appears to have been heavily grazed (some grazed stems are visible on Photo 7 in **Appendix B**). Concentrations of invasive species, including purple loosestrife (*Lythrum salicaria*) on end of point, are shown on **Figure 4-2**.

2.3.3 Restoration and Management Actions

Reduce erosion by working to reduce OHV trail usage in unsuitable locations and educate the community on appropriate places for OHV use. Explore stormwater management solutions for slopes eroding near TH 23. Invasive plant species in North Bay should be monitored. If increasing in cover, management such as herbicide treatment or release of biocontrol insects (specifically for purple loosestrife) may be appropriate.

2.4 Radio Tower Bay

2.4.1 Significant Features

Radio Tower Bay is located east of North Bay, and is separated from Mud Lake to the north by TH 39.

The Radio Tower Bay project area is comprised almost entirely of aquatic, wetland, and floodplain terrace forest communities (**Figure 2-10**). The bay contains a relatively species diverse example of MRu94a (Photo 10 in **Appendix B**) that provides suitable habitat for discoid beggarticks. Most NPCs in Radio Tower Bay are in “good” condition with a B rank; a few areas rank as C or “fair” based on dense stands of nonnative cattails (**Figure 3-5** and Photo 9 in **Appendix B**). There are visible timbers and coarse woody debris at the river shoreline. A 2014-2015 restoration project removed sawmill wood waste from the bottom of the bay to restore sheltered bay bathymetry; therefore the remaining visible slab wood may not be present in ecologically significant quantities that would affect the condition ranks of the NPCs.

Like a number of other low-elevation communities in the project area, portions of Radio Tower Bay had stressed ash (*Fraxinus* species) and balsam poplar (*Populus balsamifera*) with typical marsh species such as lake sedge (*Carex lacustris*) and cattails growing in the ground layer vegetation. The trees appear to be stressed due to high water levels.

Radio Tower Bay is contained within a DNR identified site of high biodiversity significance.

Table 5 – NPCs in Radio Tower Bay

NPC Code	Description	Condition Rank
FFn57a	Black Ash-Silver Maple Terrace Forest	B
FPn73a	Alder Swamp	B
MHn44a	Aspen-Birch-Red Maple Forest	B, C
MRn83a	Cattail-Sedge Marsh (Northern)	C
MRu94a	Estuary Marsh (Lake Superior)	B
WMn82a	Willow-Dogwood Shrub Swamp	B, C
WMn82b	Sedge Meadow	B
DIST	Recently disturbed ¹	NA
NN	Nonnative plant community ¹	NA
NVMM	Nonvegetated, manmade feature (rail corridor) ¹	NA
OW	Open Water	NA

¹ Not an NPC identified in the *Field Guide* (MNDNR 2003), this classification was developed for this report to refer to communities not dominated by native plant species.

2.4.2 Threats

Nonnative cattails are present in Radio Tower Bay in a few dense stands, shown as sites of C (“fair”) condition rank on **Figure 3-5** and in locations detailed on **Figure 4-3**.

2.4.3 Restoration and Management Actions

Monitor patches of nonnative cattails, and treat as needed to maintain the ecological integrity of marsh communities.

2.5 Mud Lake

2.5.1 Significant Features

The Mud Lake project area includes portions of the former U. S. Steel “Duluth Works” industrial site near the Duluth neighborhood of Morgan Park. This project area stretches from TH 39 on the south to near Idaho St. and 88th Ave. West in the north.

Mud Lake contains a mix of native plant communities and disturbed/non-native dominated habitats. Native plant communities persist in wetland and aquatic habitats immediately adjacent to the St. Louis River and in forested communities on ravines and on steep side slopes that were likely undisturbed for industrial development (**Figures 2-11** through **2-18** and Photo 11 in **Appendix B**). Areas of MRu94a in this project area provide suitable habitat for discoid beggarticks. Community condition ranks in Mud Lake are based largely on abundance of invasive species, which may itself be a function of the level of past disturbance of each community. Forested communities ranking as C or “fair” had abundant common buckthorn and showy honeysuckle (*Lonicera x bella*) in the shrub layer. The wet forest (WFn55a) community ranked A/B or “excellent/good” had a mature canopy and plant species typical of the NPC, and would rank as A except that the community is small in size, and is likely vulnerable to invasion from nearby stands of invasive plant species. Marsh communities with a C rank had dense stands of nonnative cattails. Many other areas in Mud Lake ranked as B or “good”, with plant communities typical of NPCs with more limited occurrences of invasive species (**Figures 3-6** through **3-8**).

A railroad causeway running roughly northeast to southwest bisects this bay of the St. Louis River, and may limit the influence of the Lake Superior seiche on water levels inside the causeway.

Higher-quality forested as well as all wetland/aquatic portions of the Mud Lake project area are contained within a DNR identified site of high biodiversity significance that stretches to the north and also covers portions of the Munger Landing project area.

Table 6 – NPCs in Mud Lake

NPC Code	Description	Condition Rank
FFn57a	Black Ash-Silver Maple Terrace Forest	C
FPn73a	Alder Swamp	B
MHn35b	Red Oak-Sugar Maple-Basswood-(Bluebead Lily) Forest	B
MHn44a	Aspen-Birch-Red Maple Forest	B, C
MHn46a	Aspen-Ash Forest	B
MHn47a	Sugar Maple – Basswood – (Bluebead Lily) Forest	B
MRn83a	Cattail-Sedge Marsh (Northern)	B, C
MRu94a	Estuary Marsh (Lake Superior)	B, C
WFn55a	Black Ash-Aspen-Balsam Poplar Swamp (Northern)	A/B, C
WMn82a	Willow-Dogwood Shrub Swamp	B/C
WMn82b	Sedge Meadow	B
DIST	Recently disturbed or open ground ¹	NA
NN	Nonnative plant community ¹	NA
NVMM	Nonvegetated, manmade feature (rail corridor) ¹	NA
OW	Open Water	NA

¹ Not an NPC identified in the *Field Guide* (MNDNR 2003), this classification was developed for this report to refer to communities not dominated by native plant species.

2.5.2 Threats

Threats to the ecological integrity of the Mud Lake project area include invasive plants, particularly in open fields where woody species are struggling to establish (Photo 12 in **Appendix B**). Lack of regeneration of a tree canopy could be due to lack of topsoil, compaction from past industrial use, and/or unsuitable substrate due to chemical characteristics (such as nutrient limitation). In areas already meeting NPC classifications, common buckthorn is a threat to the condition of these habitats. **Figure 4-4** identifies some localized patches of invasive plant species; where invasive plants are more broadly distributed in an NPC, these occurrences are reflected in the condition rank of the community rather than a point location.

2.5.3 Restoration and Management Actions

Tree planting could restore upland forested communities like MHn44, particularly at the boundaries of NPCs with nonnative plant communities. Investigation of soil characteristics and soil amendments, as appropriate, may encourage regeneration of native forested communities. Common buckthorn control will be important to maintaining/improving condition of Mud Lake NPCs. Herbicide treatment or hydrologic/bathymetric restoration may be useful to manage nonnative cattails.

2.6 Munger Landing

2.6.1 Significant Features

The Munger Landing project area extends north and south from the Munger Landing boat launch, and includes the mouth of Stewart Creek.

Munger Landing encompasses plant communities along the Stewart Creek floodplain (see Photo 13 in **Appendix B**), marsh and aquatic communities along the St. Louis River (Photo 14 in **Appendix B**), and upland mesic forests at higher elevations. **Figures 2-19 to 2-22** show the locations of NPCs within the Munger Landing project area, and **Table 7** below lists the NPCs with descriptions. Condition of the NPCs in Munger Landing is generally B or “good”, with limited disturbance from erosion localized at trails. The marsh communities provide suitable habitat for discoid beggarticks. A few areas at the northern end of the project area rate C or “fair” based on invasive plant occurrences and remaining evidence of past development (e.g., cleared areas that have not regrown a tree canopy). **Figures 3-9 and 3-10** show condition ranks by NPC location.

Munger Landing also contains two rail corridors as well as walking and OHV trails. Similar to roads and railroad grades in other project areas, the railroad causeway may be isolating some areas of marsh from the influence of the Lake Superior seiche, and therefore having the effect of converting MRu94a to MRn83a communities.

Nonnative communities within the Munger Landing project area include both maintained turf and recreational fields in Blackmer Park, as well as old field areas just south of Clyde Avenue and parallel to an OHV/walking trail north of the Munger Landing boat launch.

The southern portion of the Munger Landing project area is contained within a DNR identified site of high biodiversity significance, which extends to the south to cover portions of the Mud Lake project area as well.

Table 7 – NPCs in Munger Landing

NPC Code	Description	Condition Rank
FFn57a	Black Ash-Silver Maple Terrace Forest	B
MHn35a	Aspen-Birch-Basswood Forest	B
MHn44a	Aspen-Birch-Red Maple Forest	B, B/C, C
MHn46b	Black Ash-Basswood Forest	B
MRn83a	Cattail-Sedge Marsh (Northern)	B
MRu94a	Estuary Marsh (Lake Superior)	A/B, B, C
WFn55a	Black Ash-Aspen-Balsam Poplar Swamp (Northern)	B, C
WMn82a	Willow-Dogwood Shrub Swamp	B
WMn82b	Sedge Meadow	B
DIST	Recently disturbed or open ground ¹	NA
INV	Invasive plant species (nonnative common reed) ¹	NA
NN	Nonnative plant community (old field, turf) ¹	NA
NVMM	Nonvegetated, manmade feature (rail corridor) ¹	NA
OW	Open Water	NA
SAq	Shallow Aquatic Community ²	NA

¹ Not an NPC identified in the *Field Guide* (MNDNR 2003), this classification was developed for this report to refer to communities not dominated by native plant species.

² Not an NPC identified in the *Field Guide* (MNDNR 2003), but dominated by native species

2.6.2 Threats

Stands of nonnative common reed (*Phragmites australis*) are present at the northern edge of the project area; this species may be spreading from a larger infestation to the north (**Figure 4-6**).

2.6.3 Management and Restoration

To protect the integrity of the site NPCs, manage nonnative common reed with the goal of eradicating it from this project area. The disturbed corridor paralleling the OHV trail may be a target for restoration to MHN44a or MHN44b with tree planting (including paper birch, red maple, white pine, and/or white spruce). Old field areas near Clyde Avenue may be target for restoration to wet forest such as WFN55b or similar, by planting yellow birch, basswood, and/or red maple.

2.7 Tallus Island

2.7.1 Significant Features

The Tallus Island project area encompasses Tallus Island itself, as well as adjacent shoreline, the Knowlton Creek mouth, and a strip of upland forest parallel to the Western Waterfront Trail. Tallus Island was once connected to the shoreline by built-up sediment from the creek mouth, but is again a distinct island after a restoration and sediment removal project was constructed in 2010. The sediment removal project was part of work to restore the St. Louis River/ Interlake/Duluth Tar (SLRIDT) Superfund Site.

Plant communities in this project area include shallow aquatic communities, various wetland communities, and upland mesic forests (**Table 8** below, Photos 15 and 16 in **Appendix B**). There are disturbed and nonnative (old field) plant communities within the project area, in areas of relatively recent construction and along the Western Waterfront Trail and rail corridors.

Figures 2-22 to 2-24 show the locations of plant communities within the project area. NPCs within the Tallus Island project area rank as B or C condition (**Figures 3-10 and 3-11**), with C or “fair” condition ranks based mostly on the abundance of common buckthorn and/or nonnative cattails.

Other notable observations at Tallus Island are recent restoration in and along Knowlton Creek (see Photo 14 in **Appendix B**). Although this area is currently described as “disturbed” based on open ground and disturbance-adapted plant species, native plants and erosion control measures have been installed. The area will likely classify as an NPC in the near future. Other management/restoration efforts observed in the project area are deer enclosure fences, planted native trees with herbivore protection, and cut/treated stumps of common buckthorn.

The wetland and aquatic habitats in the Tallus Island project area, along with Tallus Island itself, are part of a DNR-identified site of moderate biodiversity significance. This site also extends north to encompass the marsh and aquatic habitats of Kingsbury Bay.

Table 8 – NPCs in Tallus Island

NPC Code	Description	Condition Rank
FPn73a	Alder Swamp	C
MHn44a	Aspen-Birch-Red Maple Forest	B
MHn44b	White Pine-White Spruce-Paper Birch Forest	B
MHn44d	Aspen-Birch-Fir Forest	B
MHn46a	Aspen-Ash Forest	B
MRn83a	Cattail-Sedge Marsh (Northern)	B, C
MRu94a	Estuary Marsh (Lake Superior)	C
WFn55a	Black Ash-Aspen-Balsam Poplar Swamp (Northern)	B
WMn82a	Willow-Dogwood Shrub Swamp	B
WMn82b	Sedge Meadow	B, C
DIST	Recently disturbed or open ground ¹	NA
INV	Invasive plant species (nonnative common reed) ¹	NA
NN	Nonnative plant community (old field, turf) ¹	NA
NVMM	Nonvegetated, manmade feature (trail, rail corridor) ¹	NA
OW	Open Water	NA
SAq	Shallow Aquatic Community ²	NA
YF_CX	Young forest complex (dense young balsam poplar) ¹	NA
¹ Not an NPC identified in the <i>Field Guide</i> (MNDNR 2003), this classification was developed for this report to refer to communities not dominated by native plant species. ² Not an NPC identified in the <i>Field Guide</i> (MNDNR 2003), but dominated by native species		

2.7.2 Threats

Purple loosestrife is common in recently disturbed areas on Tallus Island and in marshes on the nearby shoreline. A large stand of nonnative common reed is located at the southern edge of the Tallus Island project area, extending onto the adjacent private property. Common buckthorn has been treated in some areas near Knowlton Creek, but significant populations still exist in upland forests in the project area. Wild parsnip is present along trails and in old field areas. **Figures 4-6 and 4-7** detail localized concentrations of invasive plants.

2.7.3 Restoration and Management Actions

To maintain or improve the condition of existing NPCs, ongoing monitoring and follow-up treatment of common buckthorn will be important. In marsh and wetland areas, purple loosestrife should be monitored. If increasing in cover, management such as release of biocontrol insects may be appropriate. To ensure wetland and marsh areas continue to classify as NPCs, common reed will need to be controlled. Management should include attempts to coordinate treatment with the adjacent landowner at the area of the large reed stand. Some areas currently classified as disturbed or nonnative communities have been planted with native trees; these plantings could be expanded to the nonnative areas parallel to the Western Waterfront Trail to restore native forest to old fields.

2.8 Kingsbury Bay

2.8.1 Significant Features

The Kingsbury Bay project area is adjacent to the Kingsbury Creek mouth, and includes Indian Point Campground, a portion of the Western Waterfront Trail, and surrounding natural areas.

Plant communities in this project area include various wetland communities, floodplain terrace forest, and upland mesic forests (**Figures 2-25** and **2-26**, and listed in **Table 9** below). Kingsbury Bay has been affected by human disturbance and erosion/sedimentation from flooding, such as the large flood event of 2012. More NPCs in this project area rank as C or D (“fair” or “poor”) compared to other locations in the St. Louis River project area (**Figure 3-12**); however, current and planned restoration activities may improve these rankings. Field observations included recently planted trees in floodplain (Photo 17 in **Appendix B**) and on slopes, and cut/treated common buckthorn.

The wetland and aquatic habitats in the Kingsbury Bay project area are part of a DNR-identified site of moderate biodiversity significance.

Table 9 – NPCs in Kingsbury Bay

NPC Code	Description	Condition Rank
FFn57a	Black Ash-Silver Maple Terrace Forest	B
MHn35a	Aspen-Birch-Basswood Forest	C/D
MHn44a	Aspen-Birch-Red Maple Forest	C, C/D, D
MRu94a	Estuary Marsh (Lake Superior)	C
WFn55a	Black Ash-Aspen-Balsam Poplar Swamp (Northern)	C
WMn82a	Willow-Dogwood Shrub Swamp	B, C
WMn82b	Sedge Meadow	B, C
DIST	Recently disturbed or open ground ¹	NA
INV	Invasive plant species (reed canary grass) ¹	NA
NN	Nonnative plant community (turf, old field) ¹	NA
OW	Open Water	NA

¹ Not an NPC identified in the *Field Guide* (MNDNR 2003), this classification was developed for this report to refer to communities not dominated by native plant species.

2.8.2 Threats

A community on the north side of Kingsbury Bay ranks as D condition (“poor”) with a sparse ground layer that appears to be negatively affected by earthworms. Anecdotal observations from the field included a lack of humus and leaf litter, and earthworm castings on the ground surface. Some areas along Kingsbury Creek have dense stands of reed canary grass. Farther into the bay, marsh communities are dominated by nonnative cattails (see Photo 18 in **Appendix B**). **Figure 4-8** shows localized concentrations of invasive plants.

2.8.3 Restoration and Management Actions

Monitoring and maintenance of planted trees will help ensure this project area improves in condition rank. Earthworm chemical treatment may be appropriate where the infestation is

severe. Treatment of nonnative cattails will improve the condition rank of marsh and/or restore desirable aquatic communities. A planned restoration project for Kingsbury Bay will deepen areas currently dominated by cattails and may re-establish more diverse MRu94a and shallow aquatic vegetation communities.

Excluding areas maintained for Indian Point Campground facilities, nonnative plant communities in the Kingsbury Bay project area have potential for restoration to forested communities through plantings. These small, open old field and turf areas would be appropriate for restoration to MHn44a or MHn44b with tree planting (e.g., paper birch, red maple, white pine, and white spruce).

2.9 Grassy Point

2.9.1 Significant Features

The Grassy Point project area is located at the Keene Creek mouth, in a former industrial area that deposited significant wood waste in the St. Louis River.

Grassy Point contains wetland and open water communities along Keene Creek and the St. Louis River (**Figure 2-27**, and listed in **Table 10** below). The areas of highest elevation on the west side of Grassy Point contain wetland forest dominated by balsam poplar (see Photo 19 in **Appendix B**), as well as other trees [e.g., tamarack (*Larix laricina*), white cedar (*Thuja occidentalis*), and white spruce (*Picea glauca*)] that appear to have been planted approximately 15-20 years ago. Grassy Point contains suitable habitat for pale sedge (*Carex pallescens* – state endangered) and discoid beggarticks. Condition ranks for the NPCs at Grassy Point are mostly B and C, due to presence of nonnative plant species (**Figure 3-13**).

The wetland and aquatic habitats in the Grassy Point project area are part of a DNR-identified site of moderate biodiversity significance.

Table 10 – NPCs in Grassy Point

NPC Code	Description	Condition Rank
MRn83a	Cattail-Sedge Marsh (Northern)	C
MRu94a	Estuary Marsh (Lake Superior)	B, C
WFn55a	Black Ash-Aspen-Balsam Poplar Swamp (Northern)	B/C, C
WMn82a	Willow-Dogwood Shrub Swamp	A, B, C
WMn82b	Sedge Meadow	B
INV	Invasive plant species (nonnative common reed) ¹	NA
NVMM	Nonvegetated manmade (roadway, gravel) ¹	NA
OW	Open Water	NA

¹ Not an NPC identified in the *Field Guide* (MNDNR 2003), this classification was developed for this report to refer to communities not dominated by native plant species.

2.9.2 Threats

Grassy Point contains a large stand of nonnative, invasive common reed (**Figure 2-27** and **Figure 4-9**), and additional occurrences of nonnative common reed are present outside the project area nearby. Nonnative cattails are common at Grassy Point (Photo 20 in **Appendix B**). Purple loosestrife is scattered throughout the wetland communities on the site.

2.9.3 Restoration and Management Actions

Restoration to remove wood waste is planned for this area, which will improve the substrate for aquatic habitat and remove some of the nonnative cattails. Restoration activities may disturb occurrences of discoid beggarticks; however, habitat improvements through restoration may ultimately improve the area for this special concern species.

Nonnative common reed is a concern for Grassy Point. Management activities should target the existing large stand, and coordination with nearby landowners to manage additional stands of the species may be appropriate. Purple loosestrife should be monitored in this area. If it is observed to increase in cover, management such as release of biocontrol insects may be appropriate.

3 Analysis

3.1 NPC Mapping

Based on data collected, forested communities were most typical of NPCs in the Chambers Grove, Rask Bay, and North Bay project areas. In other locations, forested communities do classify as NPC types, but contained greater abundances of invasive plant species, or had more plant species with low affinity to any particular NPC. The condition of wetland communities was more consistent across the review area, with generally good quality through the corridor except in areas with high cover of nonnative cattails. Some communities were too disturbed to classify as a particular NPC, but may be restorable. Notably, old field areas dominated by nonnative grasses and forbs are likely restorable to forested NPCs typical of the corridor.

In many areas, condition rank was most affected by the presence and abundance of invasive plant species. Generally, management of invasive species has the most potential for preserving or improving NPC condition ranks. Management of the corridor as a whole may improve the likelihood of improving condition rank, as the river provides a corridor for movement of plant propagules – both desirable native plants and invasive species. For example, non-native common reed is present in small patches at the northern end of the Munger Landing project area, where it has likely spread from a larger occurrence in the Tallus Island project area.

3.2 SGCN Survey

A number of areas have potential to provide habitat for SGCN encountered during the survey. Other areas may be restorable to communities that could provide additional habitat. The MRu94a community, in particular where it ranked as A or B condition, provides suitable habitat for discoid beggarticks throughout the St. Louis River project area. Planned restoration projects that will create or restore MRu94a in areas dominated by nonnative cattails will likely provide additional suitable habitat.

Similar to management of invasive plant species discussed above, management for SGCN plants is more robust when conducted along the corridor as a whole compared to individual project areas. Discoid beggarticks in particular is an annual plant with habitat in deep marshes along the corridor. Fluctuating water levels likely cause shifts in the location of suitable habitat, and protecting an individual occurrence without considering the context of how the habitat may move in the future could negatively impact the sustainability of populations of discoid beggarticks within the St. Louis River estuary.

4 Bibliography

- National Oceanic and Atmospheric Administration – Great Lakes Environmental Research Laboratory (NOAA-GLERL). 2018. Great Lakes Water Levels. <https://www.glerl.noaa.gov/data/wlevels/> Accessed September 2018.
- Minnesota Department of Natural Resources (MNDNR). 2013a. A handbook for collecting vegetation plot data in Minnesota: The relevé method. 2nd ed. Minnesota Biological Survey, Minnesota Natural Heritage and Nongame Research Program, and Ecological Land Classification Program. Biological Report 92. St. Paul: Minnesota Department of Natural Resources.
- MNDNR. 2013b. MNTaxa: The State of Minnesota Vascular Plant Checklist. Accessed at: https://www.dnr.state.mn.us/eco/mcbs/plant_lists.html
- MNDNR. 2009. Guidelines for Assigning Statewide Biodiversity Significance Ranks to Minnesota County Biological Survey Sites. Guidance document, 2 pp. MNDNR St. Paul, MN.
- MNDNR. 2006. MCBS Sites of Biodiversity Significance [Geospatial Data, shapefile]. MNDNR St. Paul, MN.
- MNDNR. 2003. Field Guide to the Native Plant Communities of Minnesota: the Laurentian Mixed Forest Province. Ecological Land Classification Program, Minnesota County Biological Survey, and Natural Heritage Nongame Research Program. MNDNR St. Paul, MN.
- U.S. Army Corps of Engineers (USACE). 1987. Wetlands Delineation Manual. Wetlands Research Program Technical Report Y-87-1 (online edition). Waterways Experiment Station, Vicksburg, MS. Accessed at: <http://www.cpe.rutgers.edu/Wetlands/1987-Army-Corps-Wetlands-Delineation-Manual.pdf>

Figures

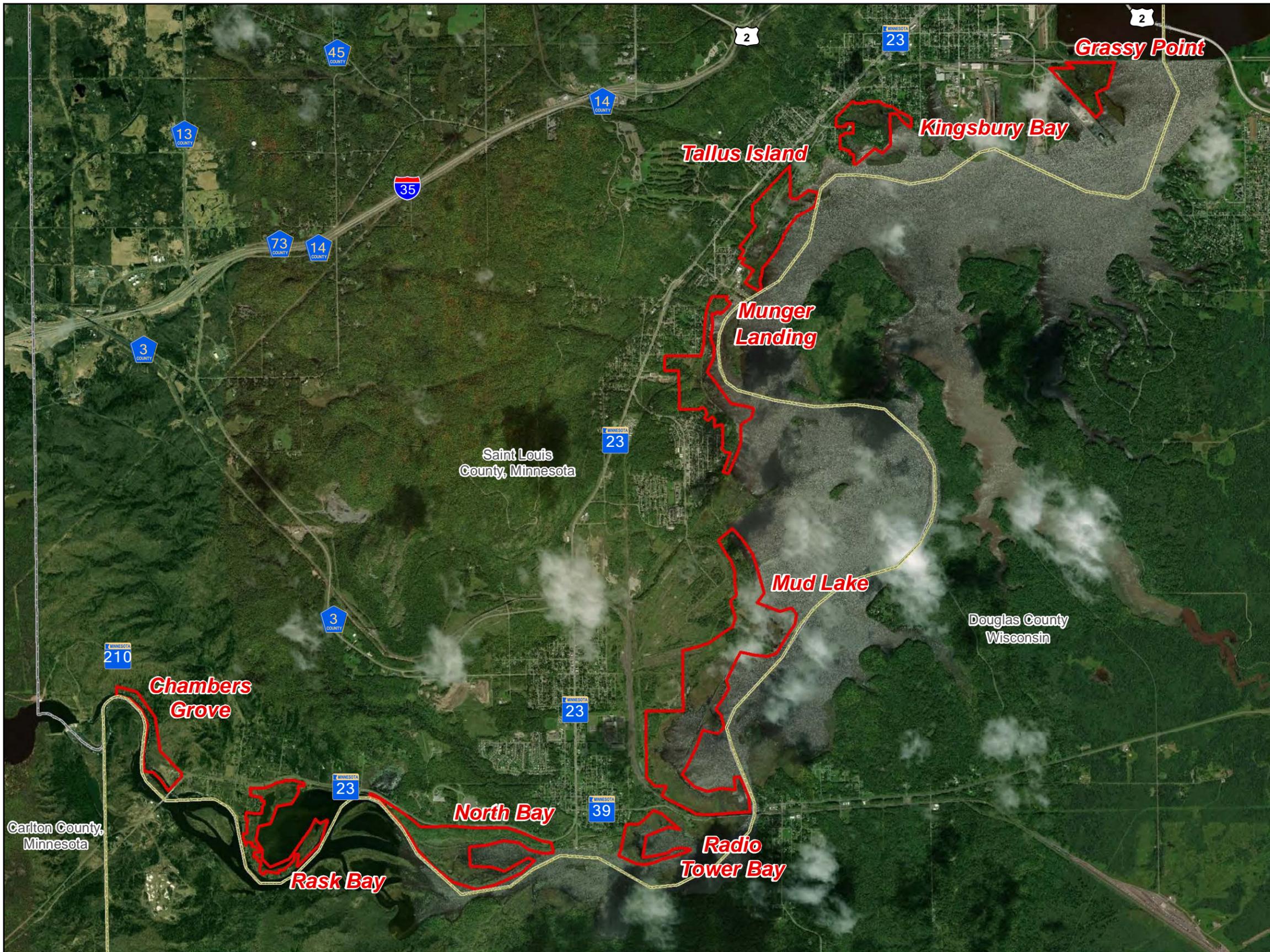
Figure 1 – Project Overview Map

Figure 2 – 1 through 2 – 27: Native Plant Community Map

Figure 3 – 1 through 3 – 13: NPC Condition Rankings Map

Figure 4 – 1 through 4 – 8: Invasive Species Observations

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Legend

 St. Louis River project areas



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Background: DigitalGlobe 2017

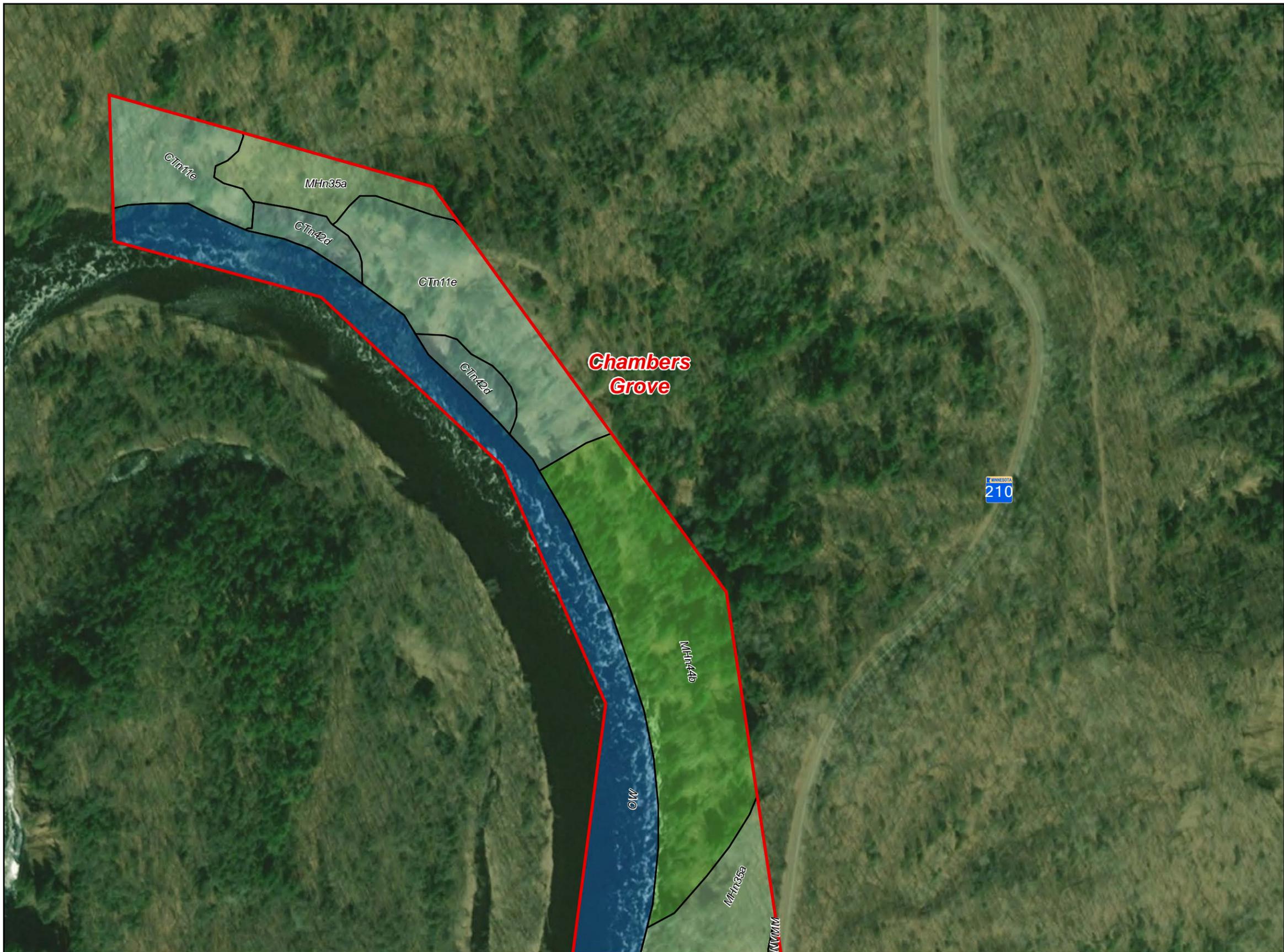
ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

Project Overview Map

Figure 1

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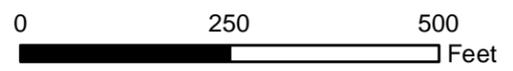
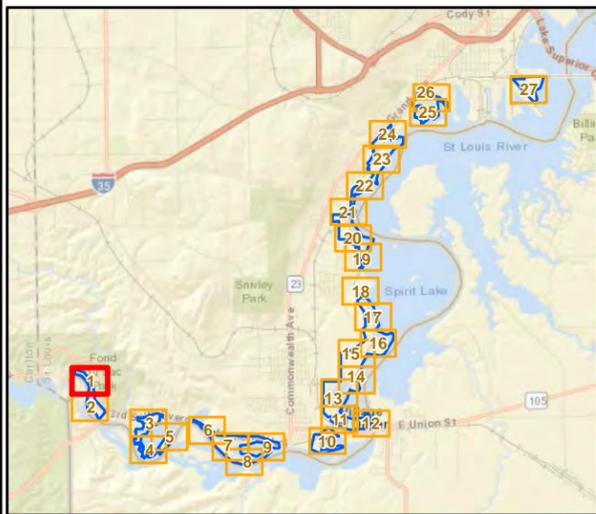


Legend

- St. Louis River project areas

Native Plant Community Code

- CTn11e
- CTn42d
- MHn35a
- MHn44b
- OW
- NVMM



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St. Louis County, Minnesota

**Native Plant
Community Map**

**Figure
2-1**

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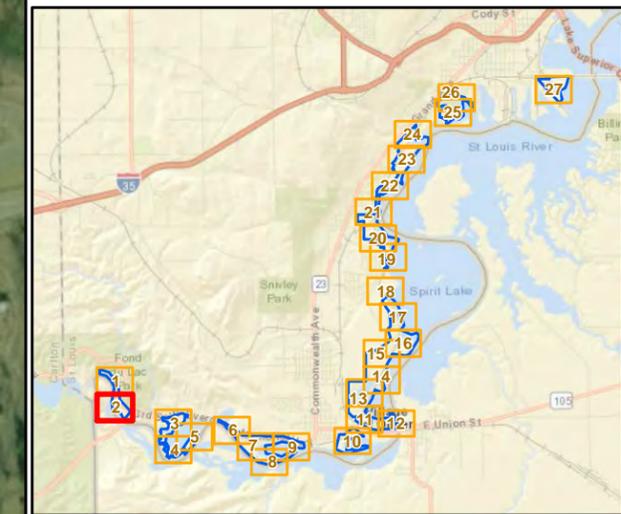


Legend

- St. Louis River project areas

Native Plant Community Code

- MHn35a
- MHn44b
- MHn46b
- OW
- NVMM
- NN



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ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

**Native Plant
Community Map**

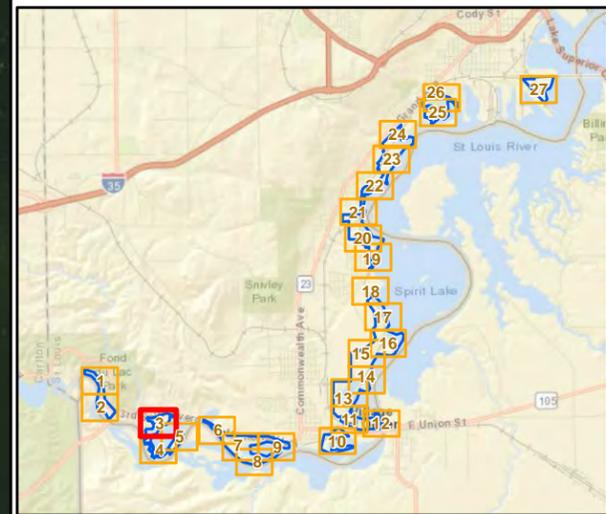
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Legend

- St. Louis River project areas
- Native Plant Community Code**
- WMn82b
- MRn83a
- MRu94a
- WMn82a
- FFn57a
- MFn44a
- WFn55a
- SAq
- DIST
- NN



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ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

**Native Plant
Community Map**

**Figure
2-3**

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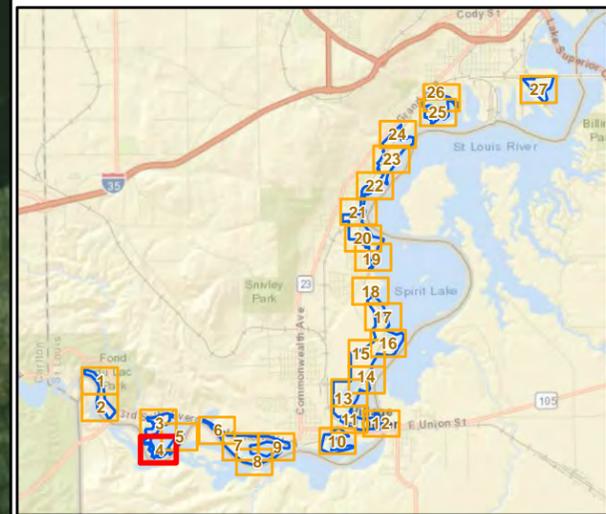


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St. Louis River project areas

Native Plant Community Code

- WMn82b
- MRn83a
- MRu94a
- WMn82a
- FFn57a
- MHn44a
- SAq
- NN



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St. Louis County, Minnesota

**Native Plant
Community Map**

**Figure
2-4**

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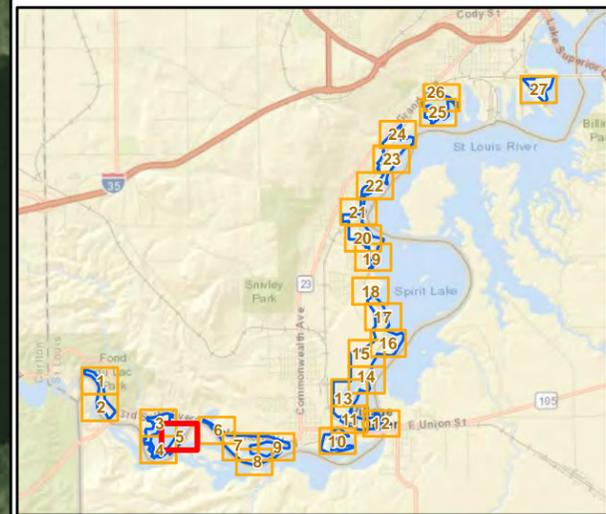


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St. Louis River project areas

Native Plant Community Code

- WMn82b
- MRn83a
- MRu94a
- WMn82a
- FFn57a
- MHn44a
- SAq



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ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

**Native Plant
Community Map**

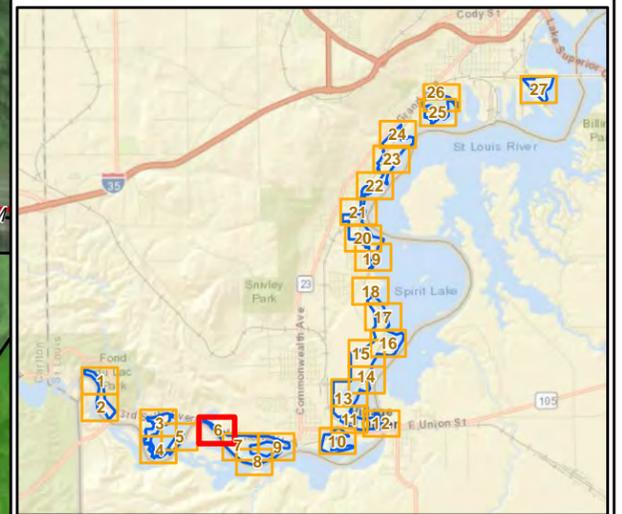
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Legend

- St. Louis River project areas
- Native Plant Community Code**
- WMn82a
- FPn73a
- FFn57a
- MHn44a
- MHn44d
- OW
- NVMM
- DIST



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ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

**Native Plant
Community Map**

**Figure
2-6**

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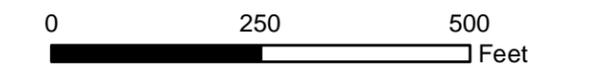
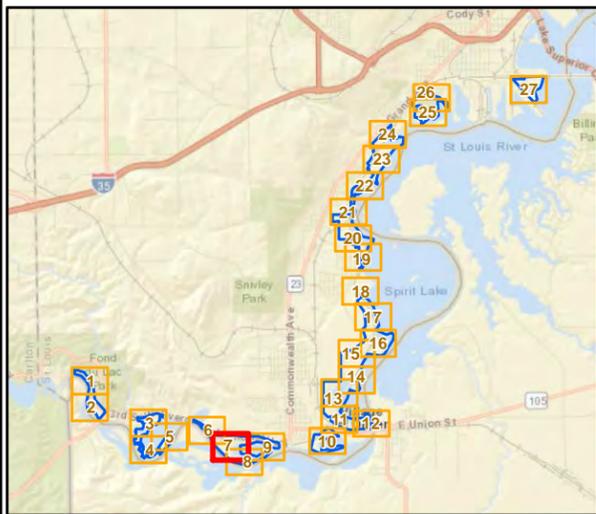


Legend

St. Louis River project areas

Native Plant Community Code

- WMn82b
- MRu94a
- WMn82a
- FPn73a
- FFn57a
- MHn44a
- MHn44d
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ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

Native Plant Community Map

Figure 2-7

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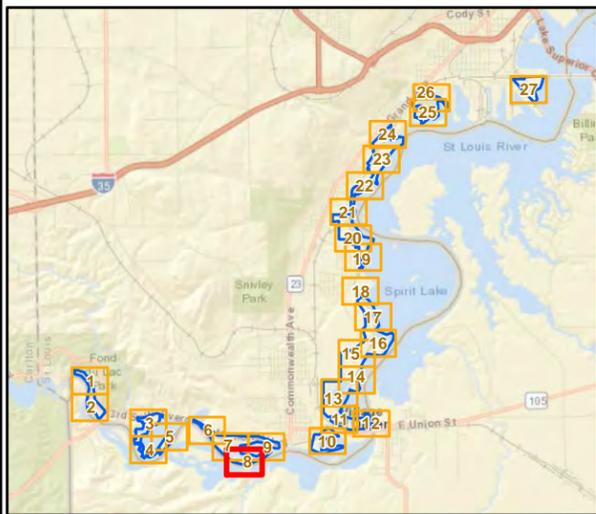


Legend

- St. Louis River project areas

Native Plant Community Code

- MRu94a
- WMn82a
- FPn73a
- FFn57a
- OW
- SAq



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ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

**Native Plant
Community Map**

**Figure
2-8**

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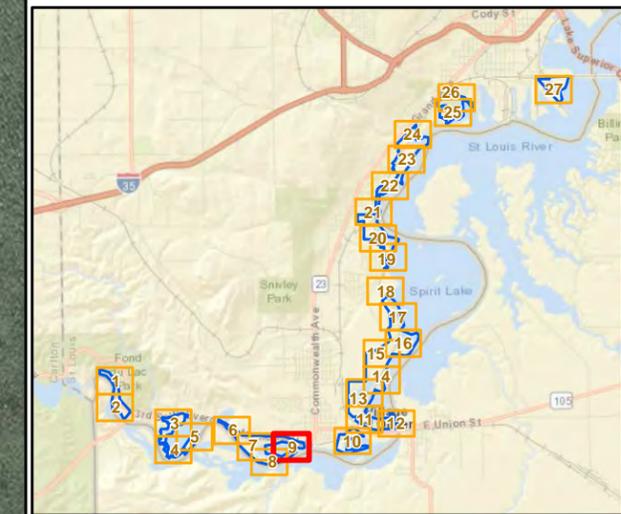


Legend

- St. Louis River project areas

Native Plant Community Code

- MRu94a
- WMn82a
- FFn73a
- FFn57a
- MHn44a
- MHn46a
- WFn55a
- OW
- SAq
- INV
- DIST
- NN



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Project: MNLAN 146196
Print Date: 10/31/2018
Map by: B. Tolcser
Projection: NAD83 UTM15N
Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

**Native Plant
Community Map**

**Figure
2-9**

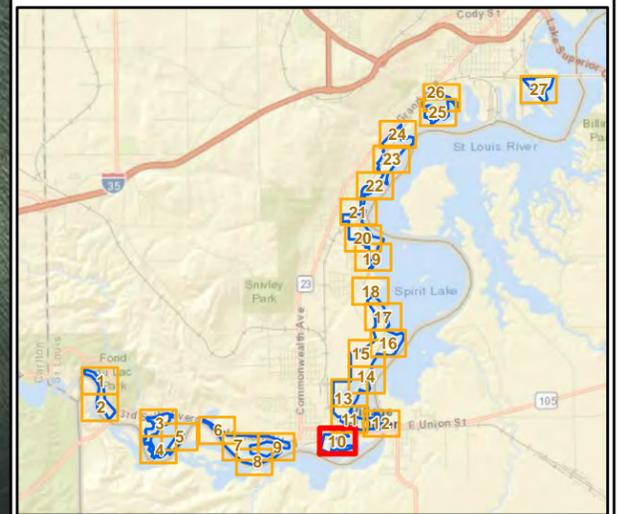


Legend

St. Louis River project areas

Native Plant Community Code

- WMn82b
- MRn83a
- MRu94a
- WMn82a
- FPn73a
- FFn57a
- MHn44a
- OW
- NVMM
- DIST
- NN



0 250 500
Feet

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Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

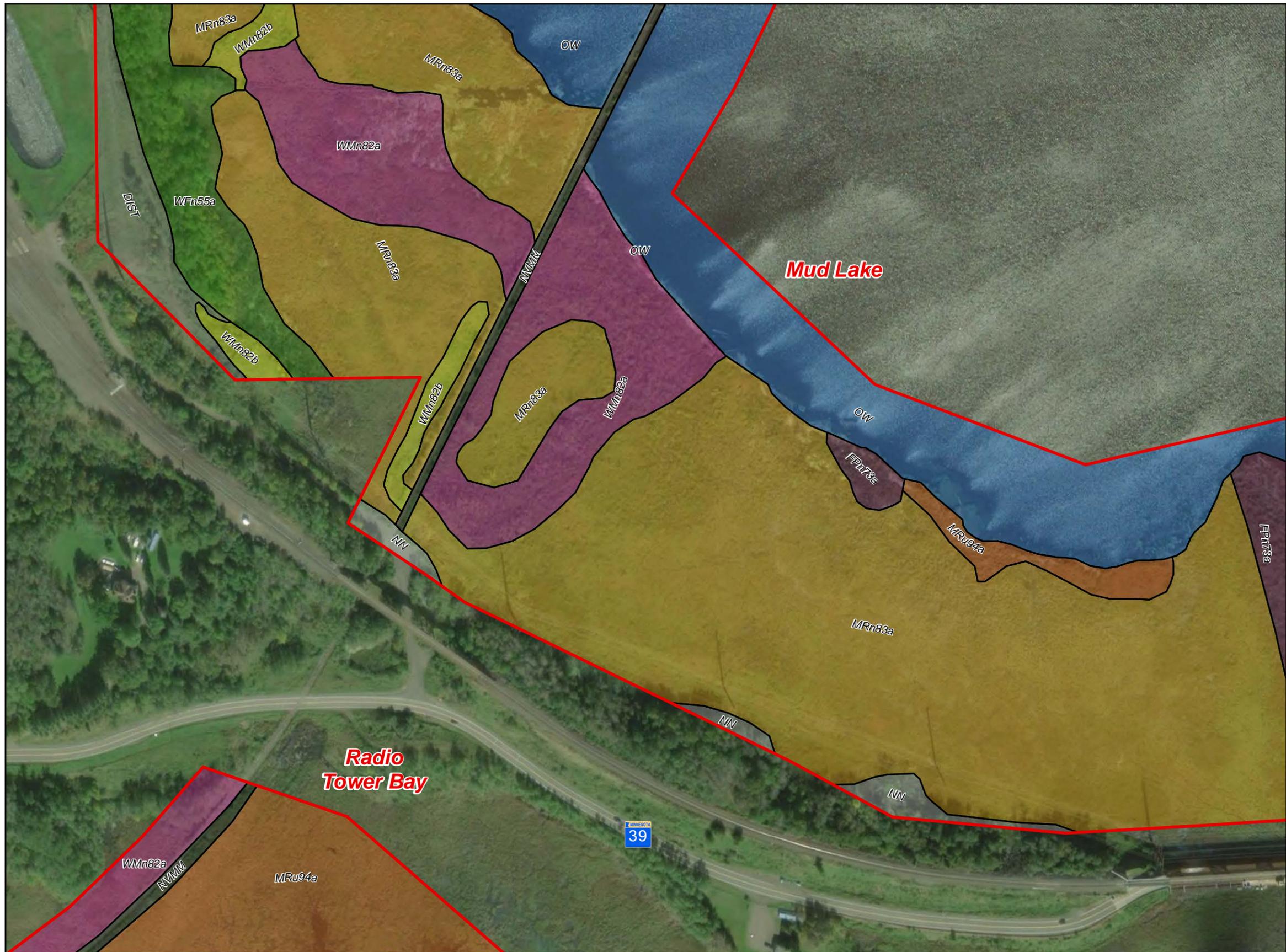
ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

**Native Plant
Community Map**

**Figure
2-10**

Path: S:\KOWMNLAN146196\3-env\study-regs\GIS\ReportMaps\Fig02_NPC_Mapbook.mxd

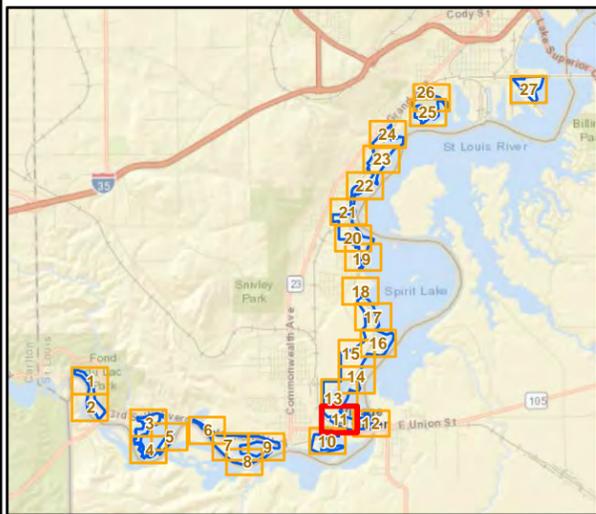


Legend

- St. Louis River project areas

Native Plant Community Code

- WMn82b
- MRn83a
- MRu94a
- WMn82a
- FFn73a
- WFn55a
- OW
- NVMM
- DIST
- NN



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Map by: B. Tolcser
Projection: NAD83 UTM15N
Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

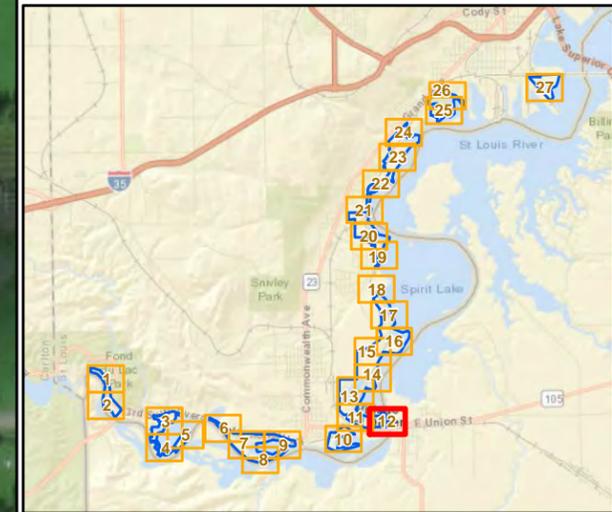
**Native Plant
Community Map**

**Figure
2-11**

Path: S:\KOW\MNLAN146196\9-env\study-regs\GIS\ReportMaps\Fig02_NPC_Mapbook.mxd



- Legend**
- St. Louis River project areas
- Native Plant Community Code**
- MRn83a
 - MRu94a
 - WMn82a
 - FPn73a
 - OW



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ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

Native Plant Community Map

Figure 2-12

Path: S:\KOW\MNLAN146196\env\stdy-regis\GIS\ReportMaps\Fig02_NPC_Mapbook.mxd

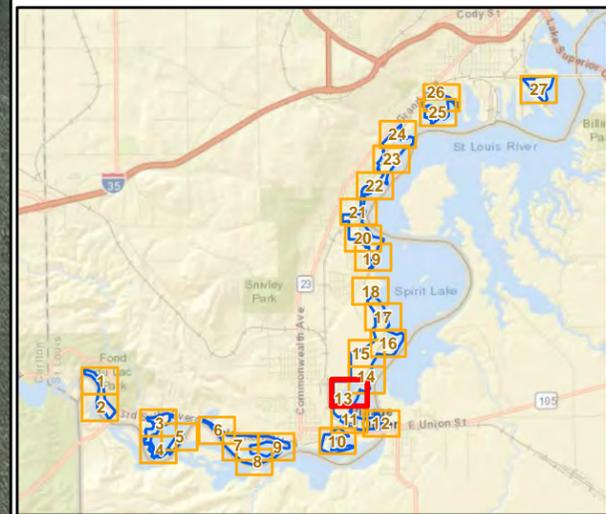


Legend

- St. Louis River project areas

Native Plant Community Code

- WMn82b
- MRn83a
- MRu94a
- WMn82a
- FFn57a
- MHn44a
- MHn46b
- MHn47a
- WFn55a
- OW
- NVMM
- DIST
- NN



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Print Date: 10/31/2018

Map by: B. Tolcser
Projection: NAD83 UTM15N
Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

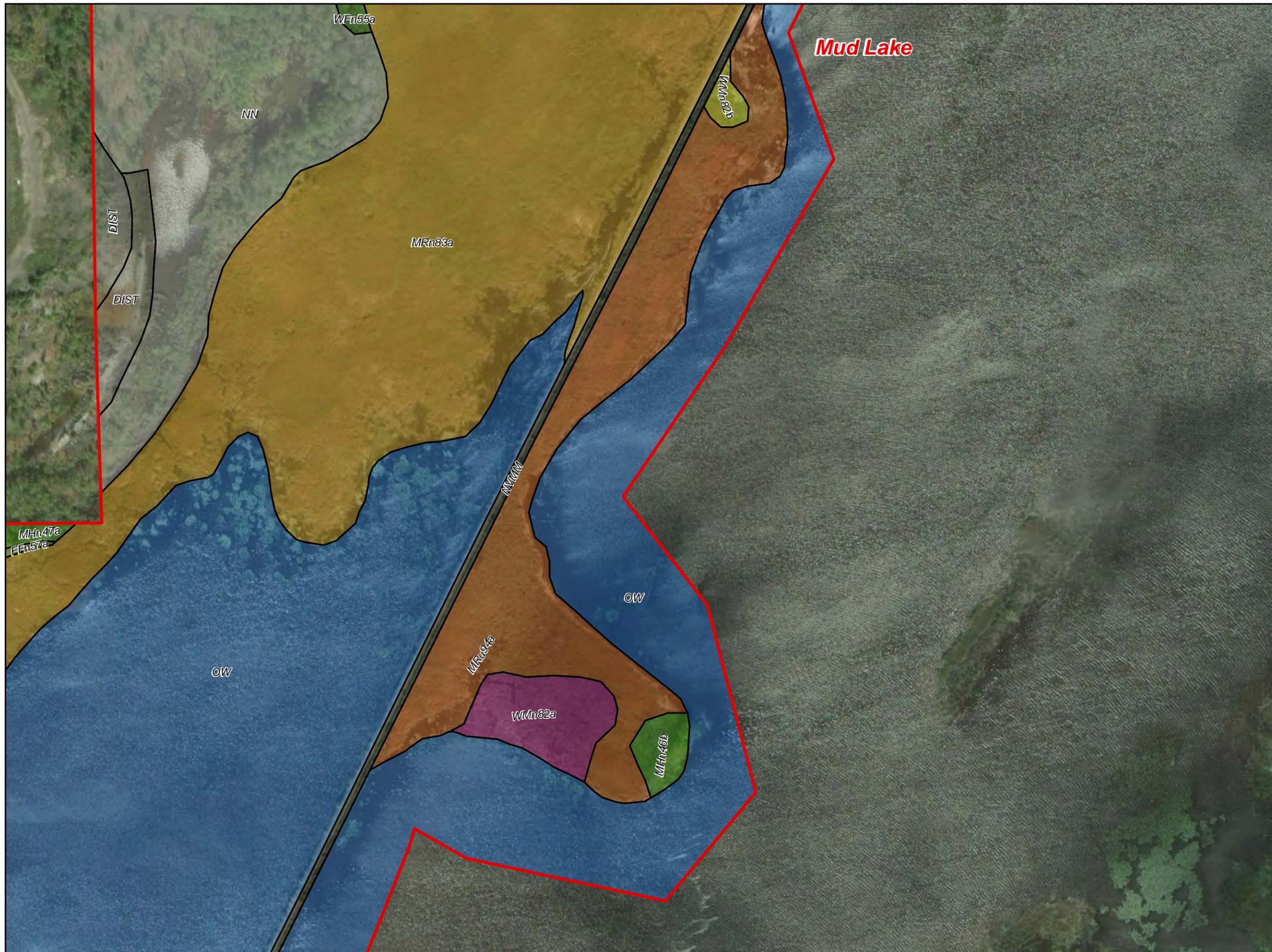
ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

**Native Plant
Community Map**

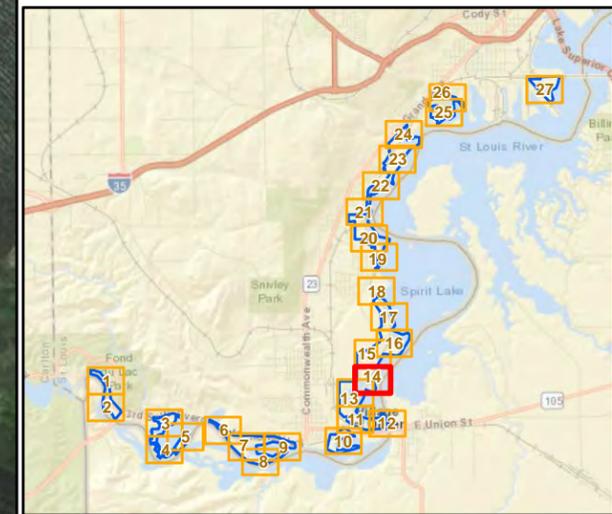
**Figure
2-13**

Path: S:\KOMMNLAN\146196\env\study-regs\GIS\ReportMaps\Fig02_NPC_Mapbook.mxd



Legend

-  St. Louis River project areas
- Native Plant Community Code**
-  WMn82b
-  MRn83a
-  MRu94a
-  WMn82a
-  FFn57a
-  MHn46b
-  MHn47a
-  WFn55a
-  OW
-  NVMM
-  DIST
-  NN



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ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

**Native Plant
Community Map**

**Figure
2-14**

Path: S:\KOW\MNLAN146196\env\study-reports\GIS\ReportMaps\Fig02_NPC_Mapbook.mxd

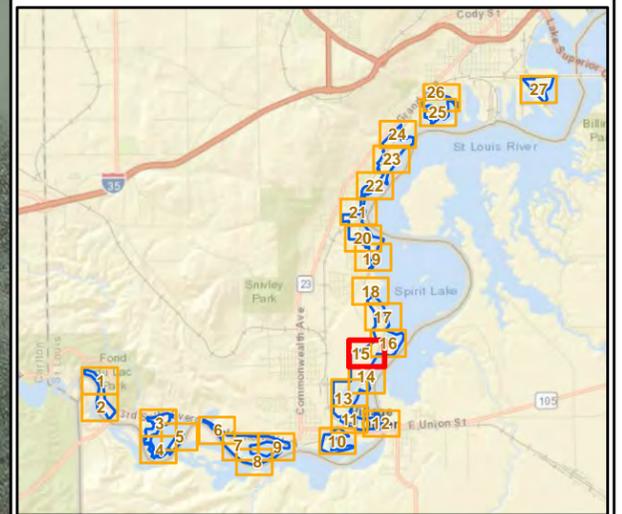


Legend

St. Louis River project areas

Native Plant Community Code

- MRn83a
- MRu94a
- MHn35b
- MHn44a
- MHn46a
- WFn55a
- OW
- NVMM
- NN



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Map by: B. Tolcser
Projection: NAD83 UTM15N
Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

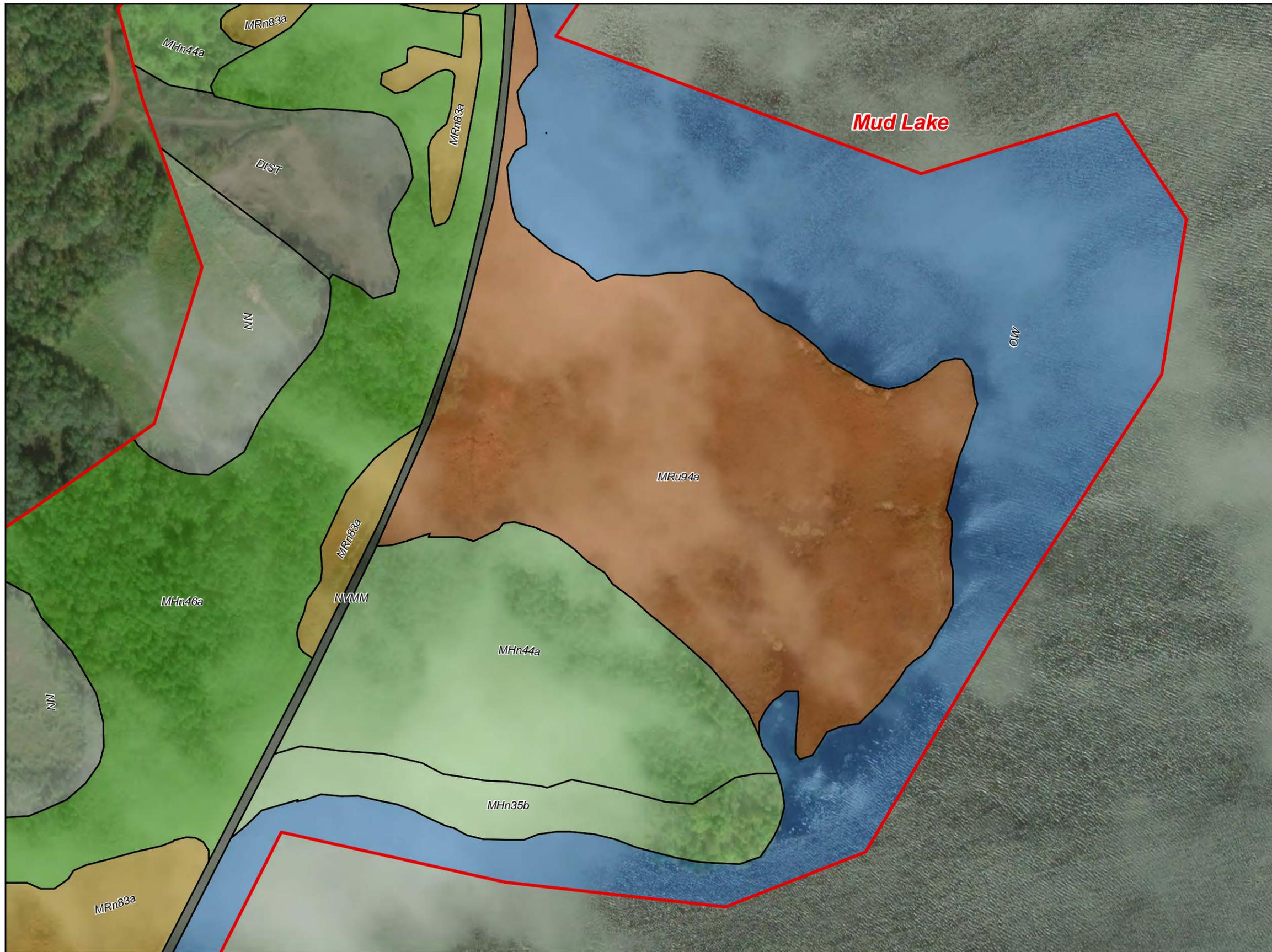
ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

**Native Plant
Community Map**

**Figure
2-15**

Path: S:\KOW\MNLAN146196\env\stdy-regs\GIS\ReportMaps\Fig02_NPC_Mapbook.mxd

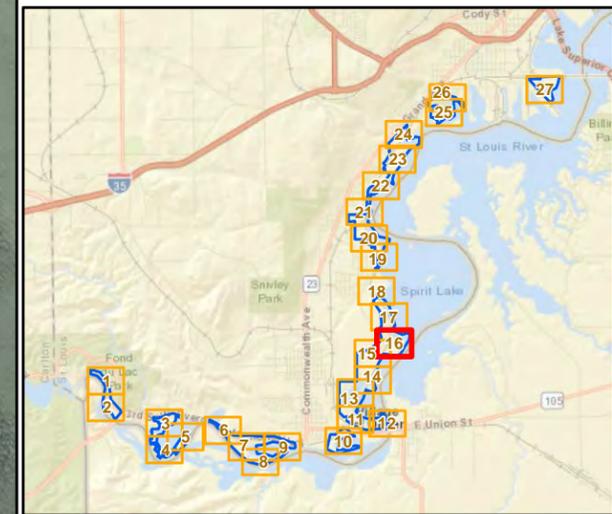


Legend

St. Louis River project areas

Native Plant Community Code

- MRn83a
- MRu94a
- MHn35b
- MHn44a
- MHn46a
- OW
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Source: MNDNR, MN Land Trust, SEH
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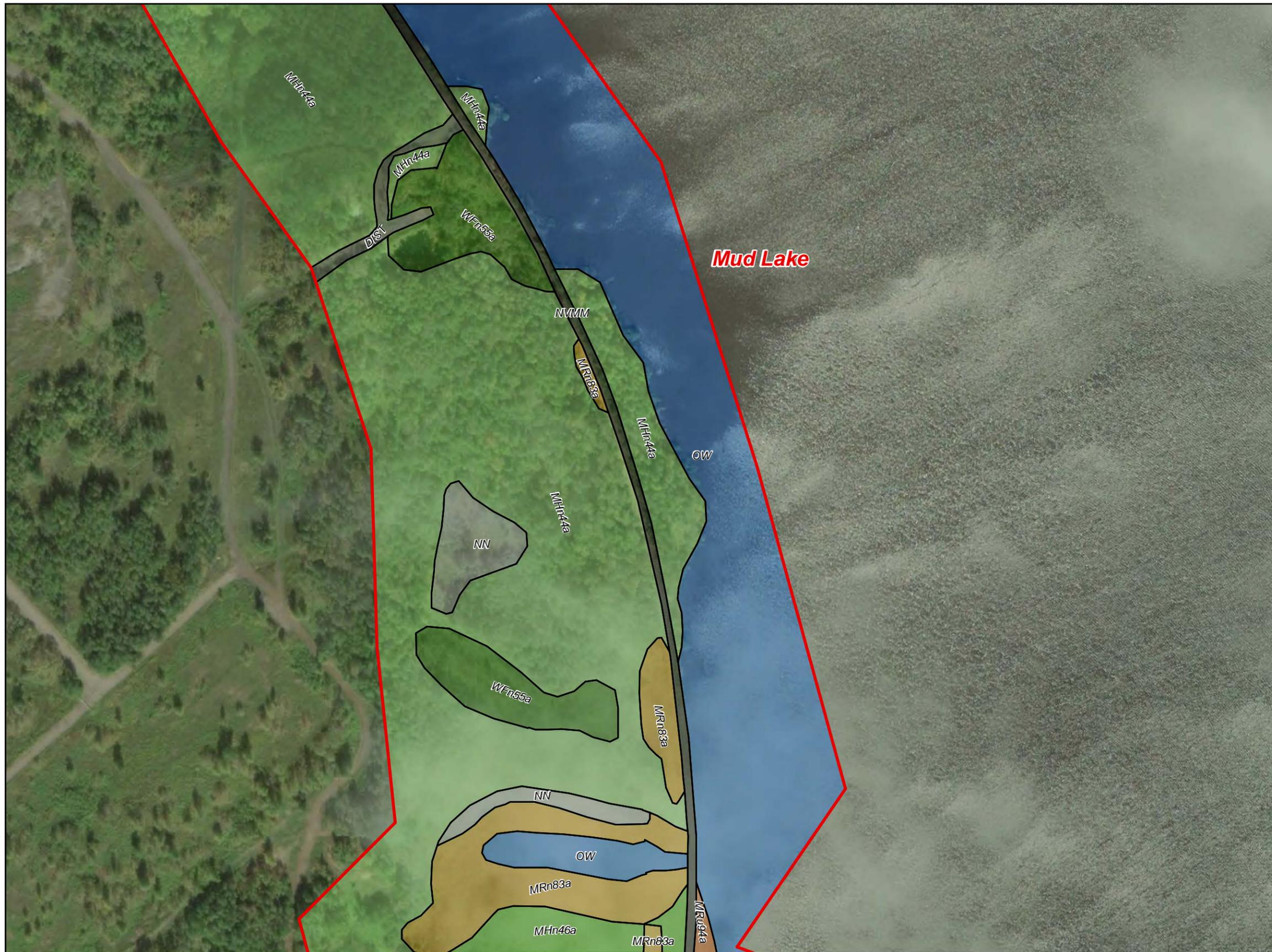
ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

**Native Plant
Community Map**

**Figure
2-16**

Path: S:\KOMM\LAN146196\3-env\study-regs\GIS\ReportMaps\Fig02_NPC_Mapbook.mxd

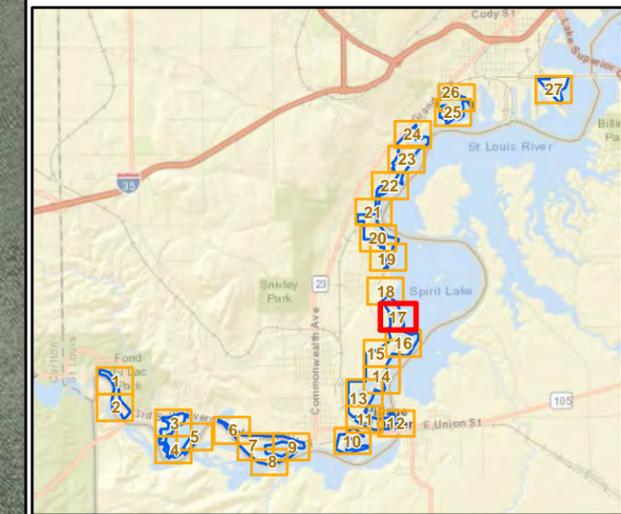


Legend

St. Louis River project areas

Native Plant Community Code

- MRn83a
- MRu94a
- MHn44a
- MHn46a
- WFn55a
- OW
- NVMM
- DIST
- NN



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Map by: B. Tolcser
Projection: NAD83 UTM15N
Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

**Native Plant
Community Map**

**Figure
2-17**

Path: S:\KOW\MNLAN146196\env\stdy-regis\GIS\ReportMaps\Fig02_NPC_Mapbook.mxd



Legend

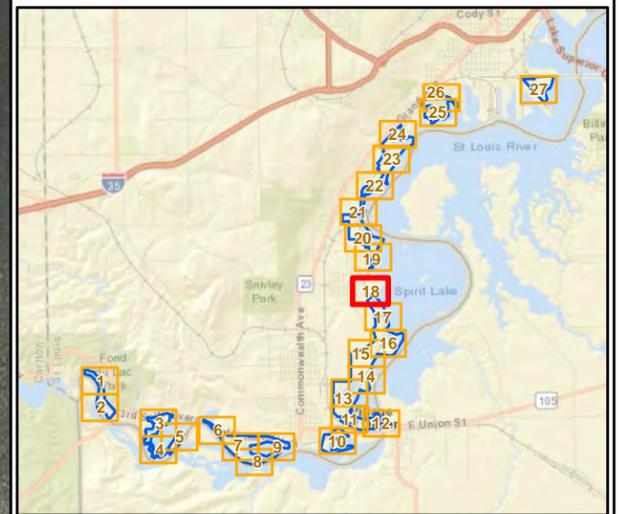
 St. Louis River project areas

Native Plant Community Code

 MHn44a

 OW

 NVMM



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Projection: NAD83 UTM15N
Source: MNDNR, MN Land Trust, SEH
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ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

**Native Plant
Community Map**

**Figure
2-18**

Path: S:\KOWMMLAN146196\env\stdy-regrs\GIS\ReportMaps\Fig02_NPC_Mapbook.mxd

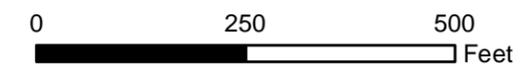
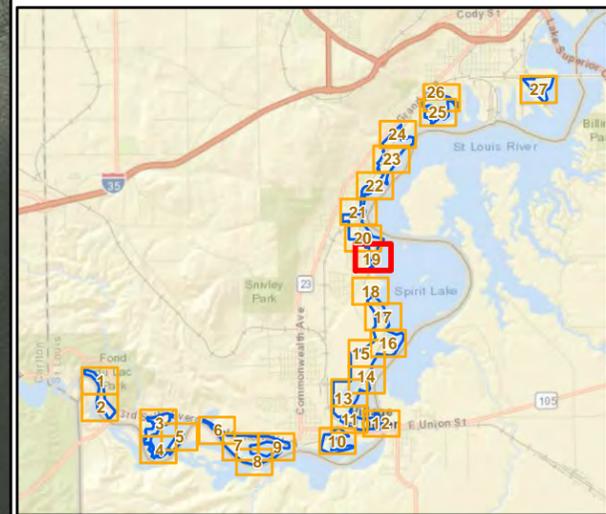


Legend

St. Louis River project areas

Native Plant Community Code

- MRn83a
- MHn35a
- MHn44a
- MHn46b
- WFn55a
- OW
- NVMM
- NN



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Source: MNDNR, MN Land Trust, SEH
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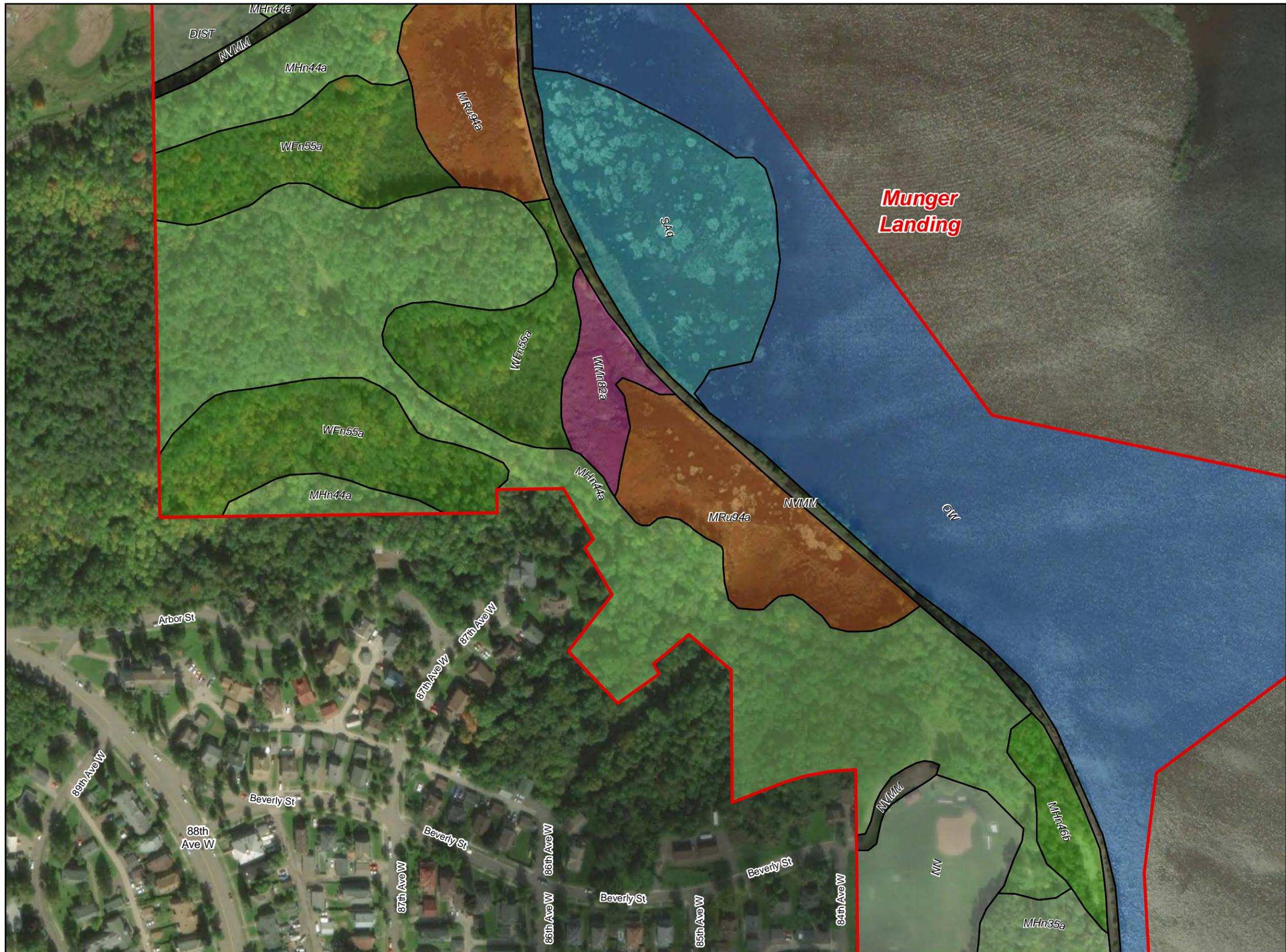
ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

**Native Plant
Community Map**

**Figure
2-19**

Path: S:\KOWMNLAN146196\3-env\stidy-regis\GIS\ReportMaps\Fig02_NPC_Mapbook.mxd

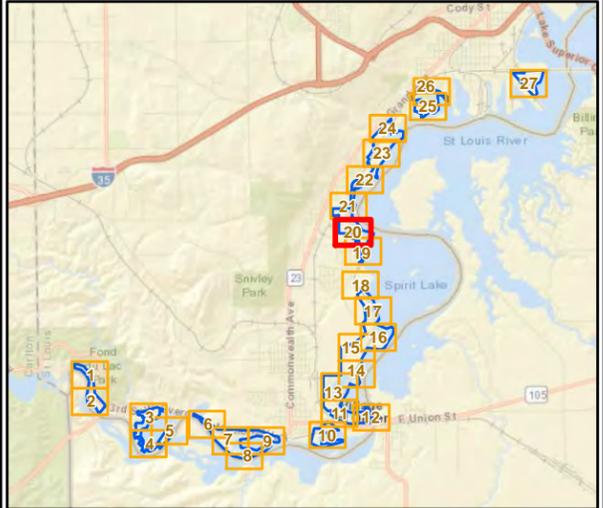


Legend

- St. Louis River project areas

Native Plant Community Code

- MRu94a
- WMn82a
- MHn35a
- MHn44a
- MHn46b
- WFn55a
- OW
- SAq
- NVMM
- DIST
- NN



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Map by: B. Tolcer
Projection: NAD83 UTM15N
Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

**Native Plant
Community Map**

**Figure
2-20**

Path: S:\KOWMNLAN146196\3-env\study-reports\GIS\ReportMaps\Fig02_NPC_Mapbook.mxd

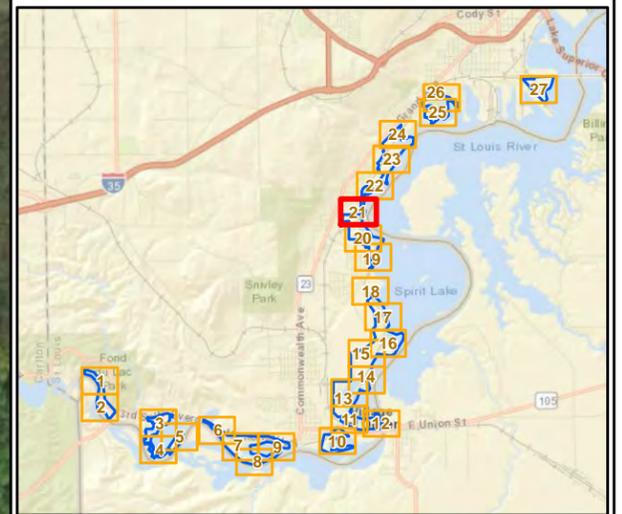


Legend

- St. Louis River project areas

Native Plant Community Code

- WMn82b
- MRn83a
- MRu94a
- WMn82a
- FFn57a
- MHn44a
- WFn55a
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Projection: NAD83 UTM15N
Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

**Native Plant
Community Map**

**Figure
2-21**

Path: S:\KOW\MNLAN146196\3-env+study-regs\GIS\ReportMaps\Fig02_NPC_Mapbook.mxd

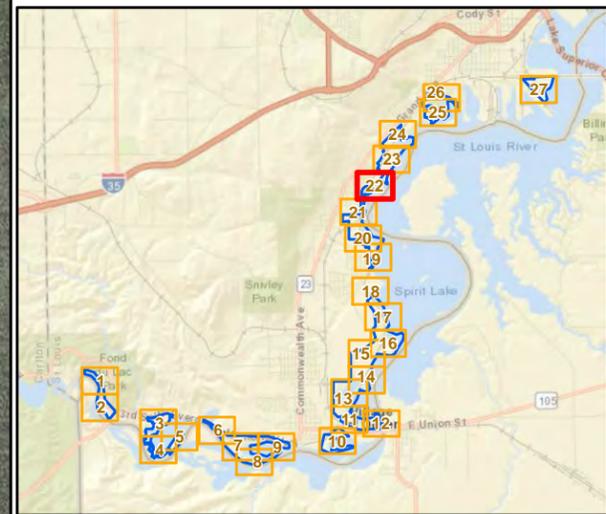


Legend

St. Louis River project areas

Native Plant Community Code

- WMn82b
- MRu94a
- WMn82a
- MHn44a
- OW
- NVMM
- INV
- DIST
- NN



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 Projection: NAD83 UTM15N
 Source: MNDNR, MN Land Trust, SEH
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ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

**Native Plant
Community Map**

**Figure
2-22**

Path: S:\KOWMNLAN146196\env\study\regs\GIS\ReportMaps\Fig02_NPC_Mapbook.mxd

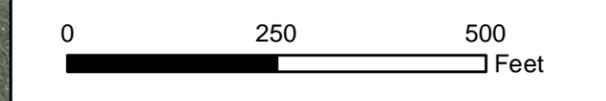
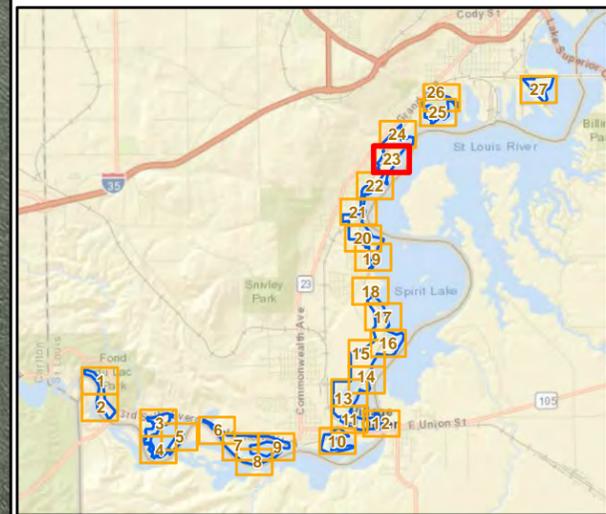


Legend

- St. Louis River project areas

Native Plant Community Code

- WMn82b
- MRu94a
- WMn82a
- FFn73a
- MHn44a
- MHn46a
- WFn55a
- OW
- SAq
- NVMM
- DIST
- YF_CX
- NN



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Project: MNLAN 146196
Print Date: 10/31/2018

Map by: B. Tolcser
Projection: NAD83 UTM15N
Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

**Native Plant
Community Map**

**Figure
2-23**

Path: S:\KOWMNLAN146196\env\study-regis\GIS\ReportMaps\Fig02_NPC_Mapbook.mxd

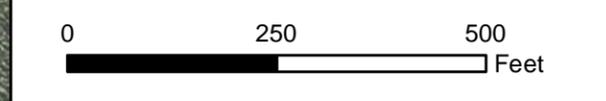
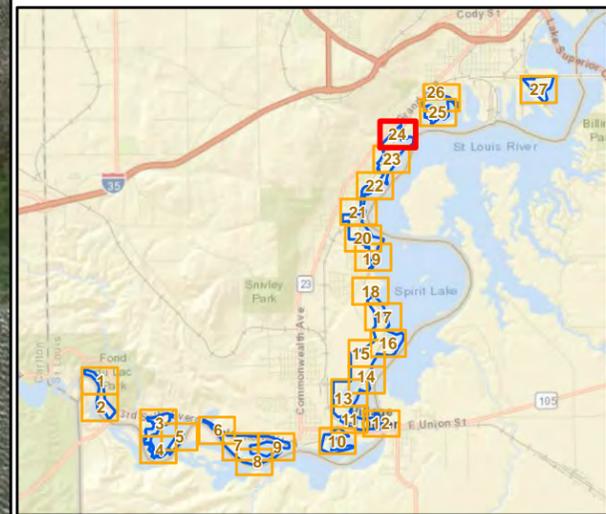


Legend

St. Louis River project areas

Native Plant Community Code

- WMn82b
- MRn83a
- MRu94a
- WMn82a
- MHn44a
- MHn44b
- MHn44d
- WFn55a
- OW
- NVMM
- INV
- DIST
- YF_CX
- NN



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 Print Date: 10/31/2018
 Map by: B. Tolcer
 Projection: NAD83 UTM15N
 Source: MNDNR, MN Land Trust, SEH
 Background: FSA 2017 (CIR)

ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

**Native Plant
Community Map**

**Figure
2-24**

Path: S:\KOWM\NLAN146196\env\stl-r-npc\GIS\ReportMaps\Fig02_NPC_Mapbook.mxd

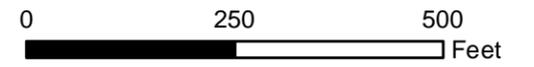
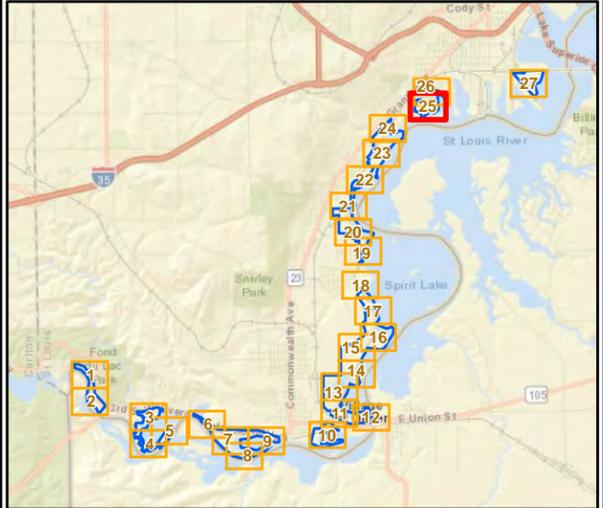


Legend

St. Louis River project areas

Native Plant Community Code

- WMn82b
- MRu94a
- WMn82a
- FFn57a
- MFn35b
- MFn44a
- WFn55a
- OW
- INV
- NN



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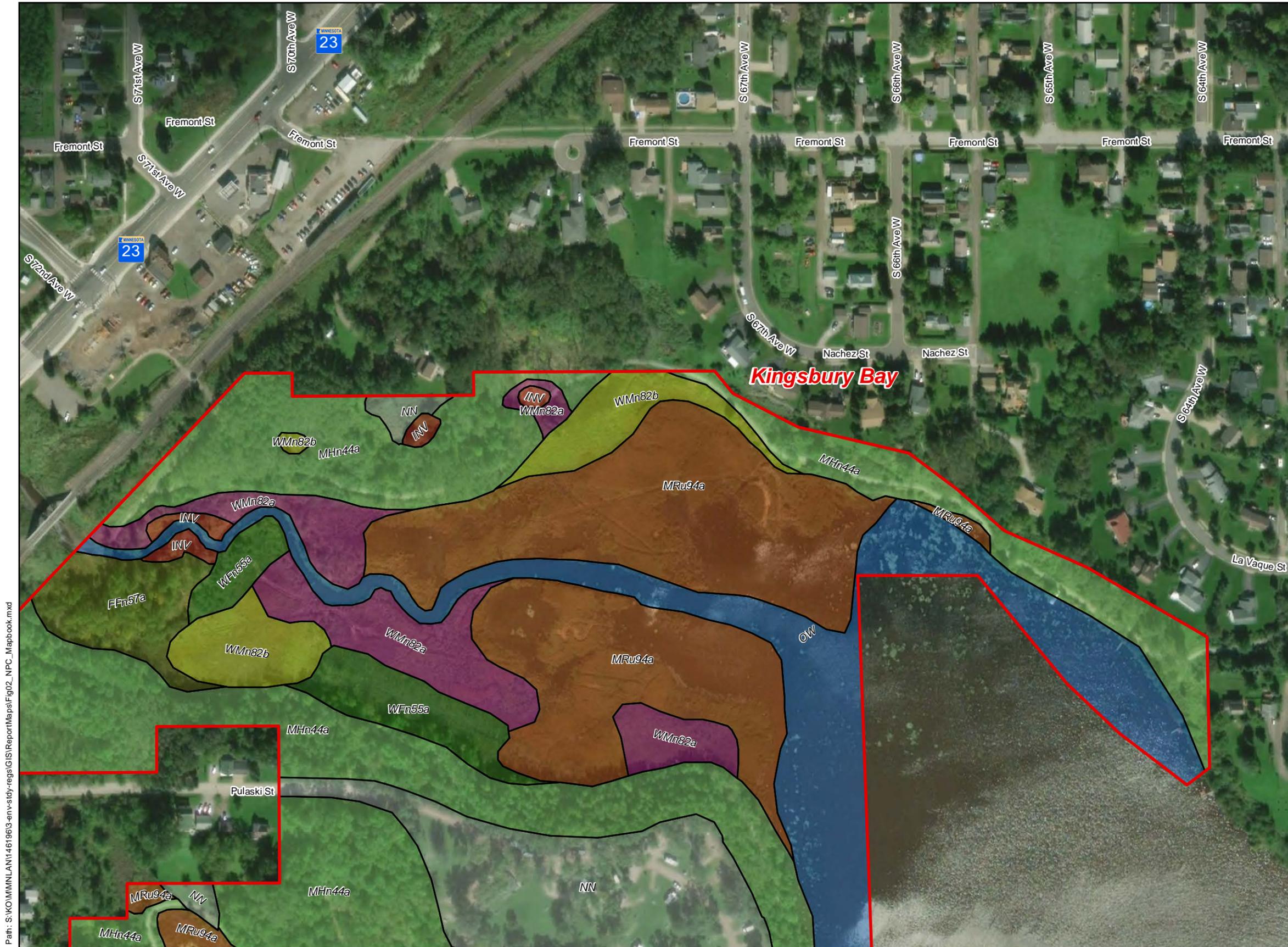
Map by: B. Tolcser
Projection: NAD83 UTM15N
Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

**Native Plant
Community Map**

**Figure
2-25**

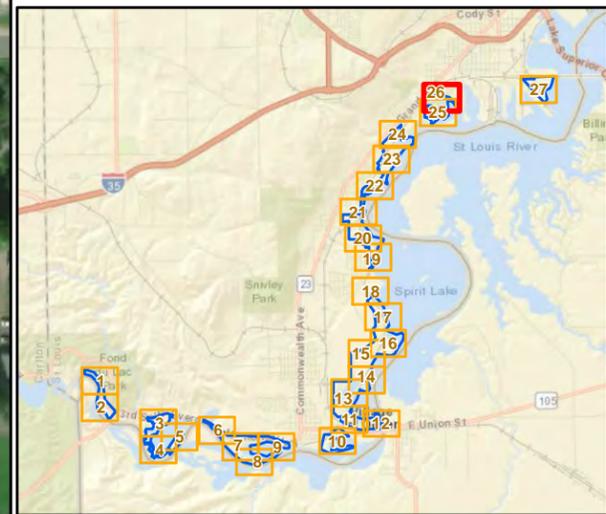


Legend

St. Louis River project areas

Native Plant Community Code

- WMn82b
- MRu94a
- WMn82a
- FFn57a
- MHn44a
- WFn55a
- OW
- INV
- NN



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Map by: B. Tolcser
Projection: NAD83 UTM15N
Source: MNDNR, MN Land Trust, SEH
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ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

**Native Plant
Community Map**

**Figure
2-26**

Path: S:\KOWM\LAN146196\env\study-regis\GIS\ReportMaps\Fig02_NPC_Mapbook.mxd

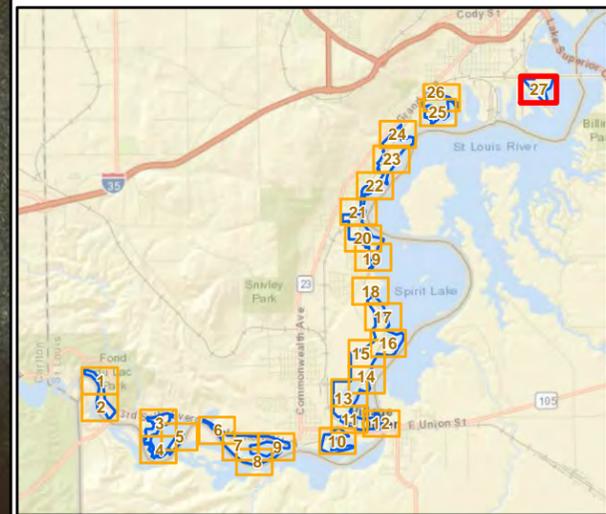


Legend

- St. Louis River project areas

Native Plant Community Code

- WMn82b
- MRn83a
- MRu94a
- WMn82a
- WFn55a
- OW
- NVMM
- INV



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Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

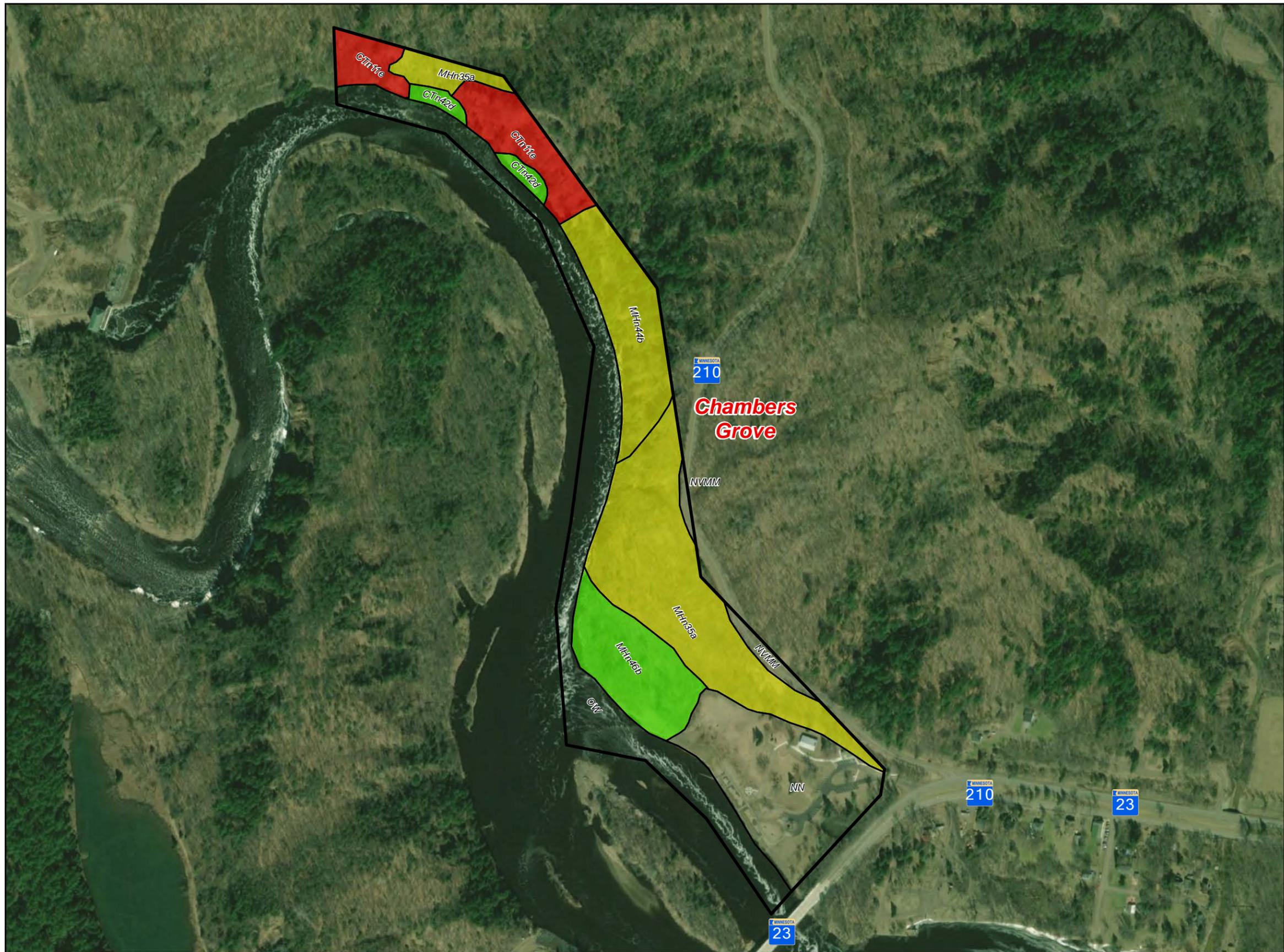
ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

**Native Plant
Community Map**

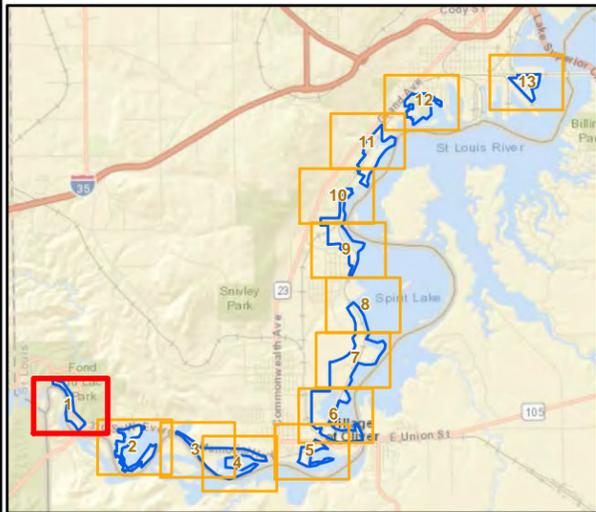
**Figure
2-27**

Path: S:\KOMM\MNLAN146196\3-env\study-regs\GIS\ReportMaps\Fig03_Condition_Ranks.mxd



Legend

 St. Louis River project areas
NPC Condition Rank
 A
 B
 D
 NA (Non-NPC)



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Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

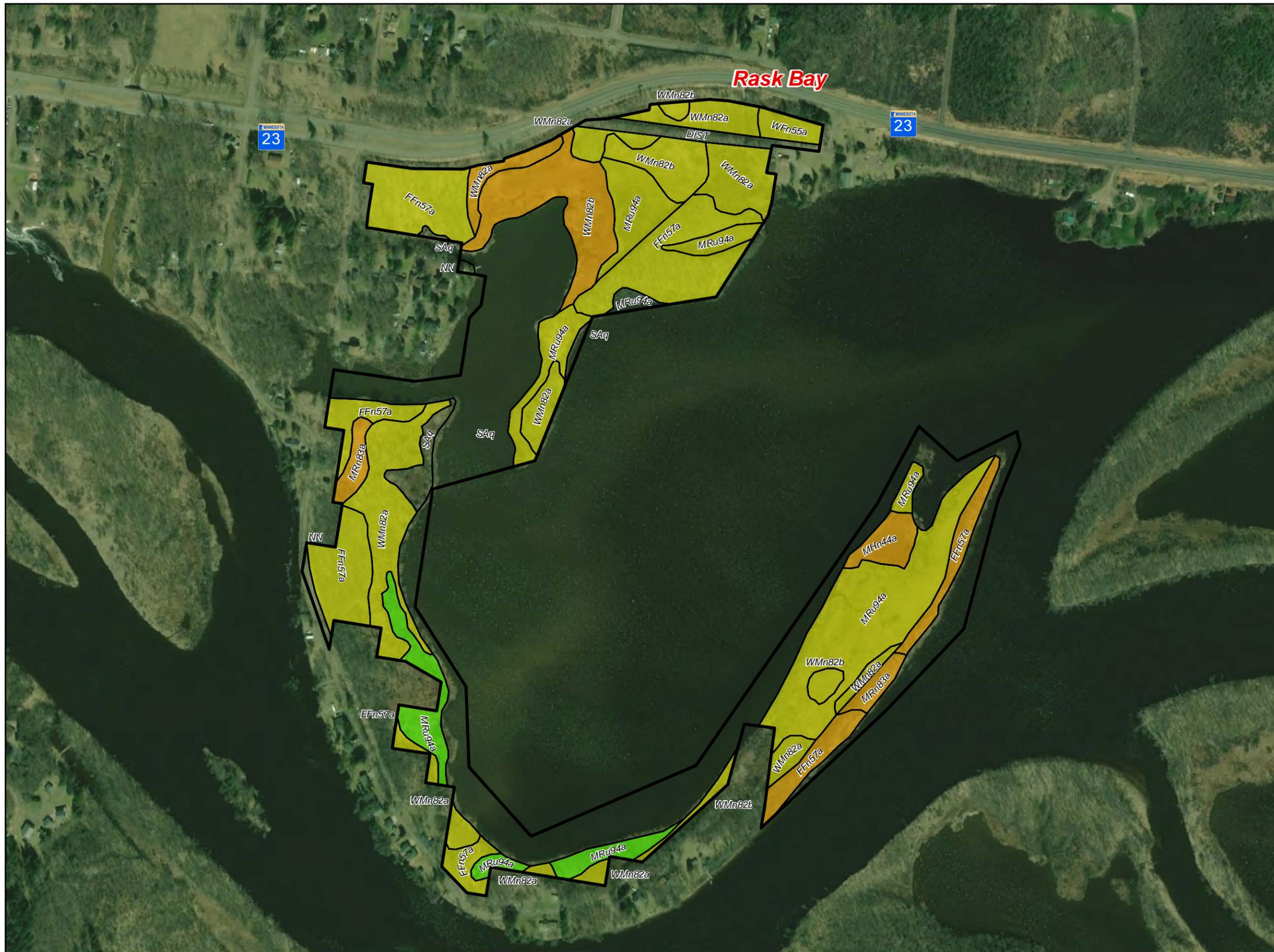
ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

NPC Condition Rankings Map

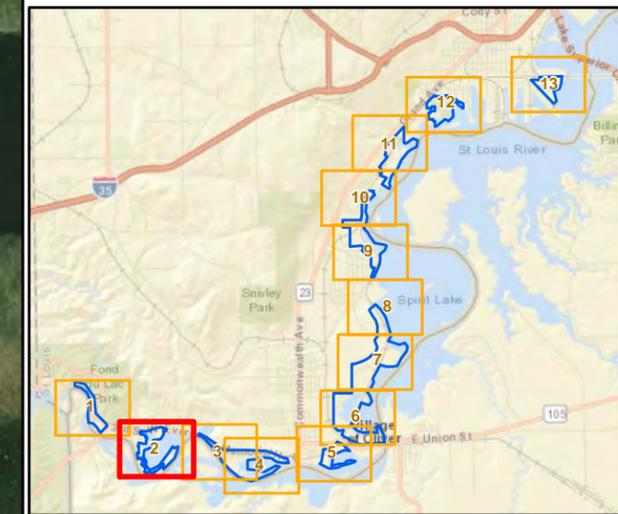
Figure 3-1

Path: S:\KOWMNLAN146196\3-env\stdy-regs\GIS\ReportMaps\Fig03_Condition_Ranks.mxd



Legend

 St. Louis River project areas
NPC Condition Rank
 A
 B
 C
 NA (Non-NPC)



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Source: MNDNR, MN Land Trust, SEH
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ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

NPC Condition Rankings Map

Figure 3-2

Path: S:\KOWM\LAN146196\9-env\study-regs\GIS\ReportMaps\Fig03_Condition_Ranks.mxd

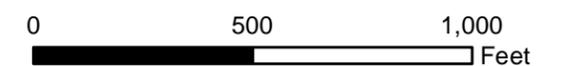
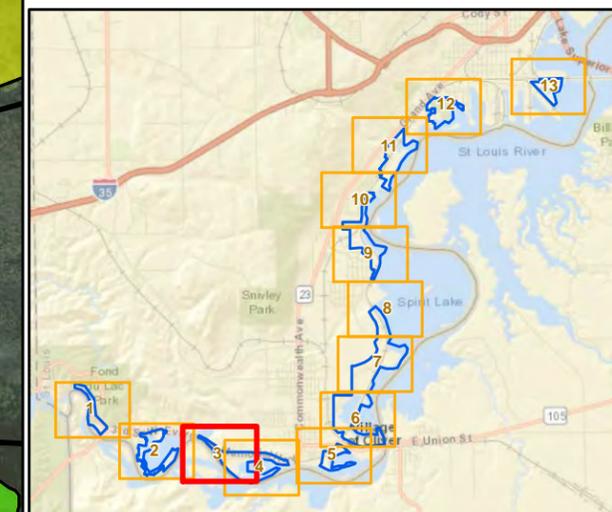


Legend

- St. Louis River project areas

NPC Condition Rank

- A
- B
- NA (Non-NPC)



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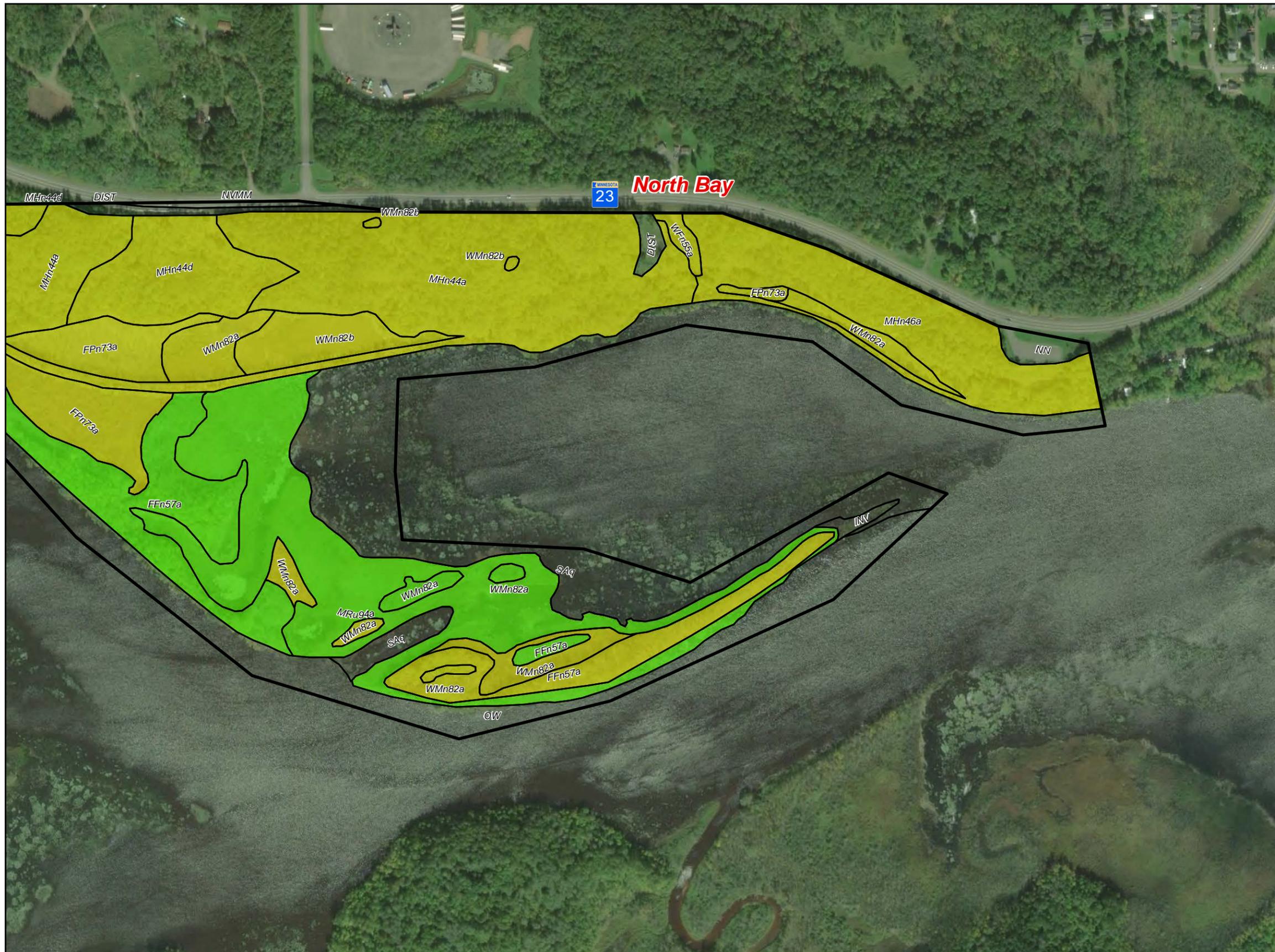
ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

**NPC Condition
Rankings Map**

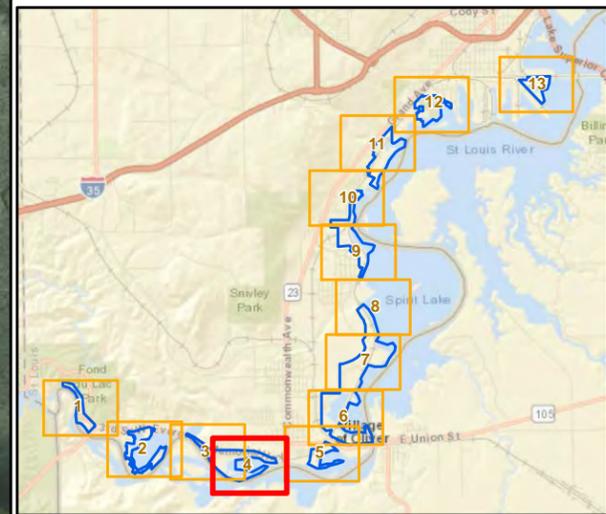
**Figure
3-3**

Path: S:\KOWMNLAN146196\9-env\stdy-regs\GIS\ReportMaps\Fig03_Condition_Ranks.mxd



Legend

-  St. Louis River project areas
- NPC Condition Rank**
-  A
-  B
-  NA (Non-NPC)



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Map by: B. Tolcser
Projection: NAD83 UTM15N
Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

NPC Condition Rankings Map

Figure 3-4

Path: S:\KOWM\MNLAN146196\3-env\stdy-regrs\GIS\Report\Maps\Fig03_Condition_Ranks.mxd

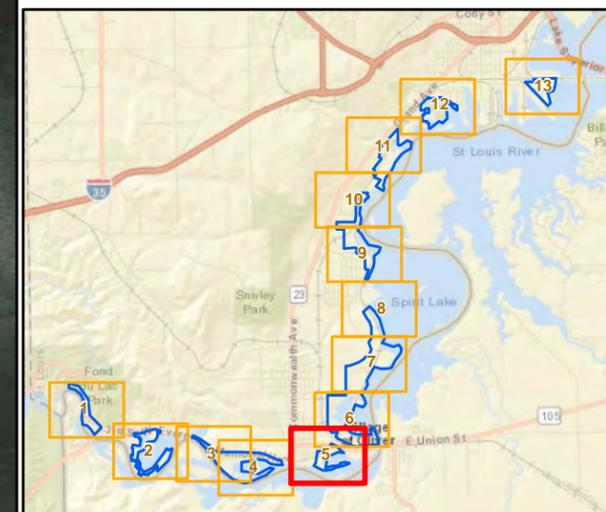


Legend

- St. Louis River project areas

NPC Condition Rank

- A/B
- B
- C
- NA (Non-NPC)



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Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

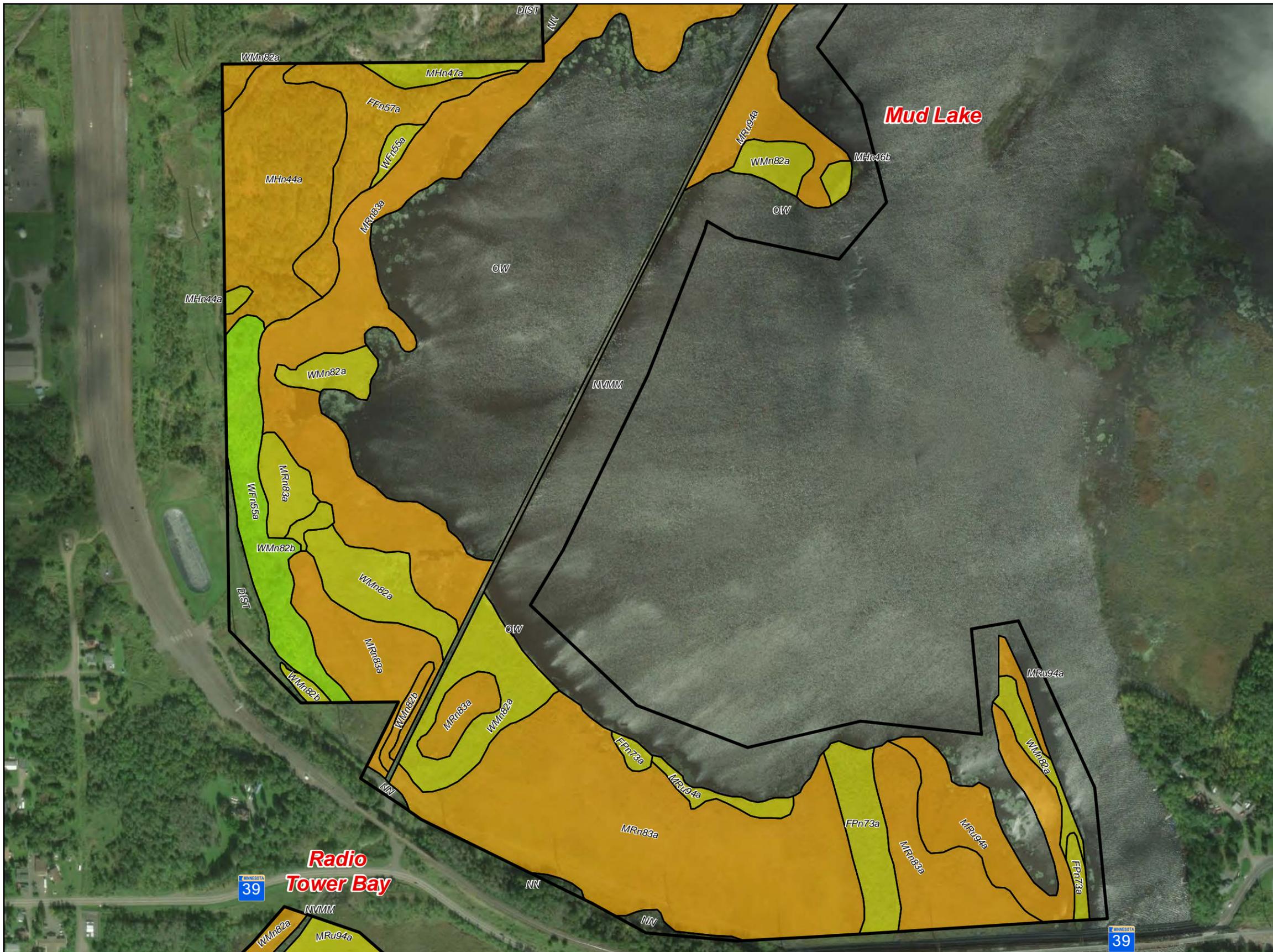
ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

NPC Condition Rankings Map

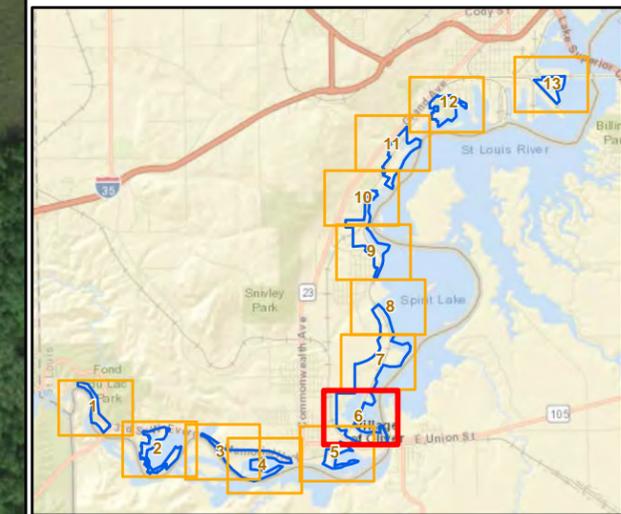
Figure 3-5

Path: S:\KOWMNLAN146196\3-env\study-regis\GIS\ReportMaps\Fig03_Condition_Ranks.mxd



Legend

- St. Louis River project areas
- NPC Condition Rank**
- A/B
- B
- C
- NA (Non-NPC)



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Print Date: 10/30/2018

Map by: B. Tolcser
Projection: NAD83 UTM15N
Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

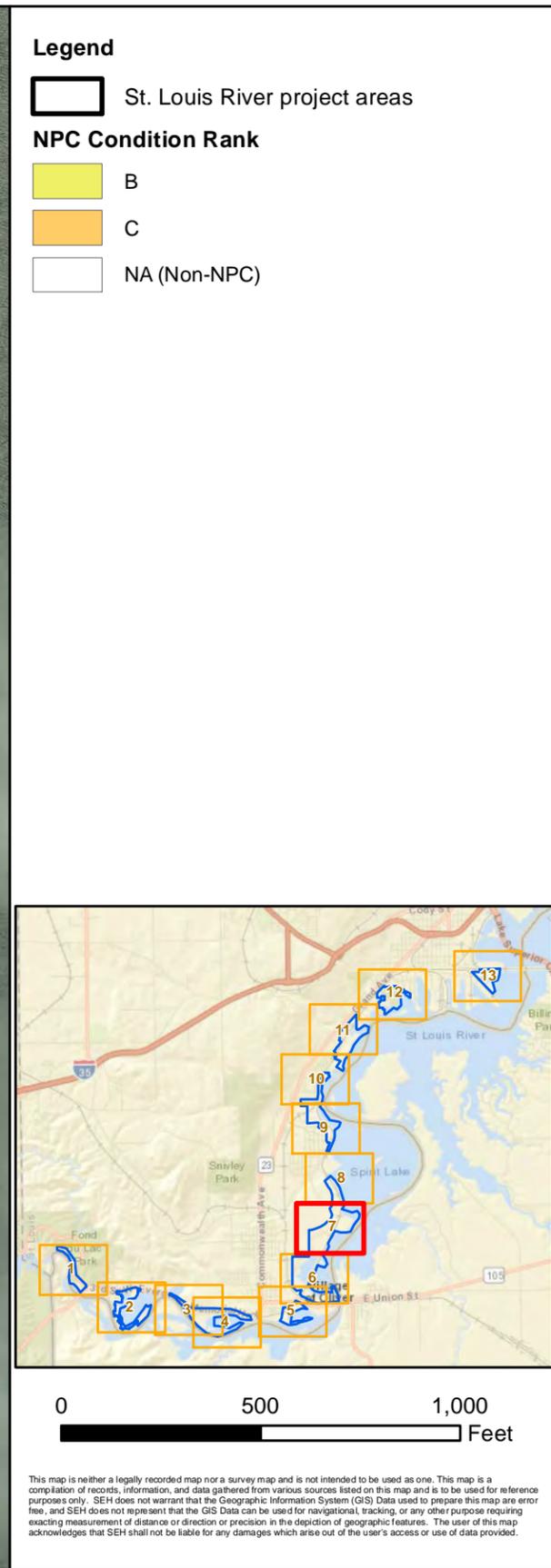
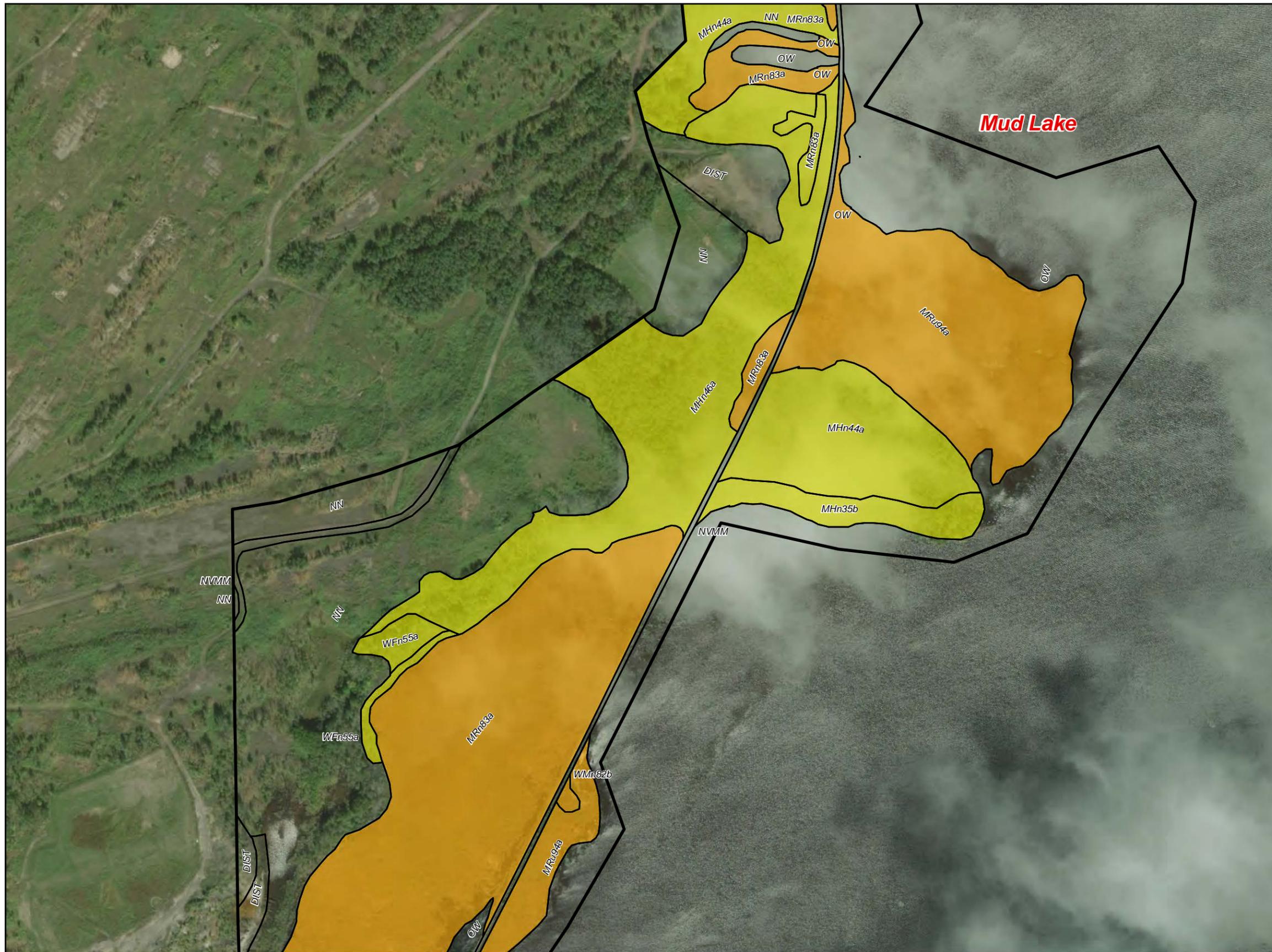
ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

NPC Condition Rankings Map

Figure 3-6

Path: S:\KOW\MNLAN146196\3-env\stdy-regrs\GIS\ReportMaps\Fig03_Condition_Ranks.mxd



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Map by: B. Tolcser
Projection: NAD83 UTM15N
Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

NPC Condition Rankings Map

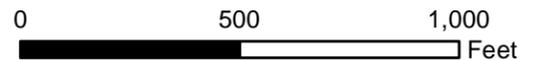
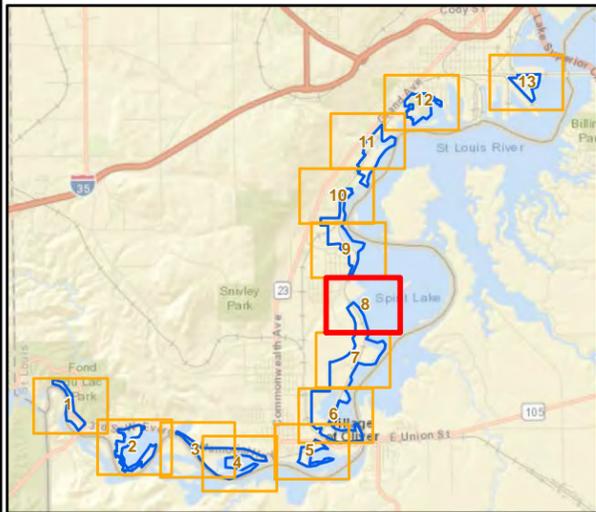
Figure 3-7

Path: S:\KOMM\LAN146196\3-env\study-reports\GIS\Report\Maps\Fig03_Condition_Ranks.mxd



Legend

-  St. Louis River project areas
- NPC Condition Rank**
-  B
-  C
-  NA (Non-NPC)



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Print Date: 10/30/2018

Map by: B. Tolcser
Projection: NAD83 UTM15N
Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

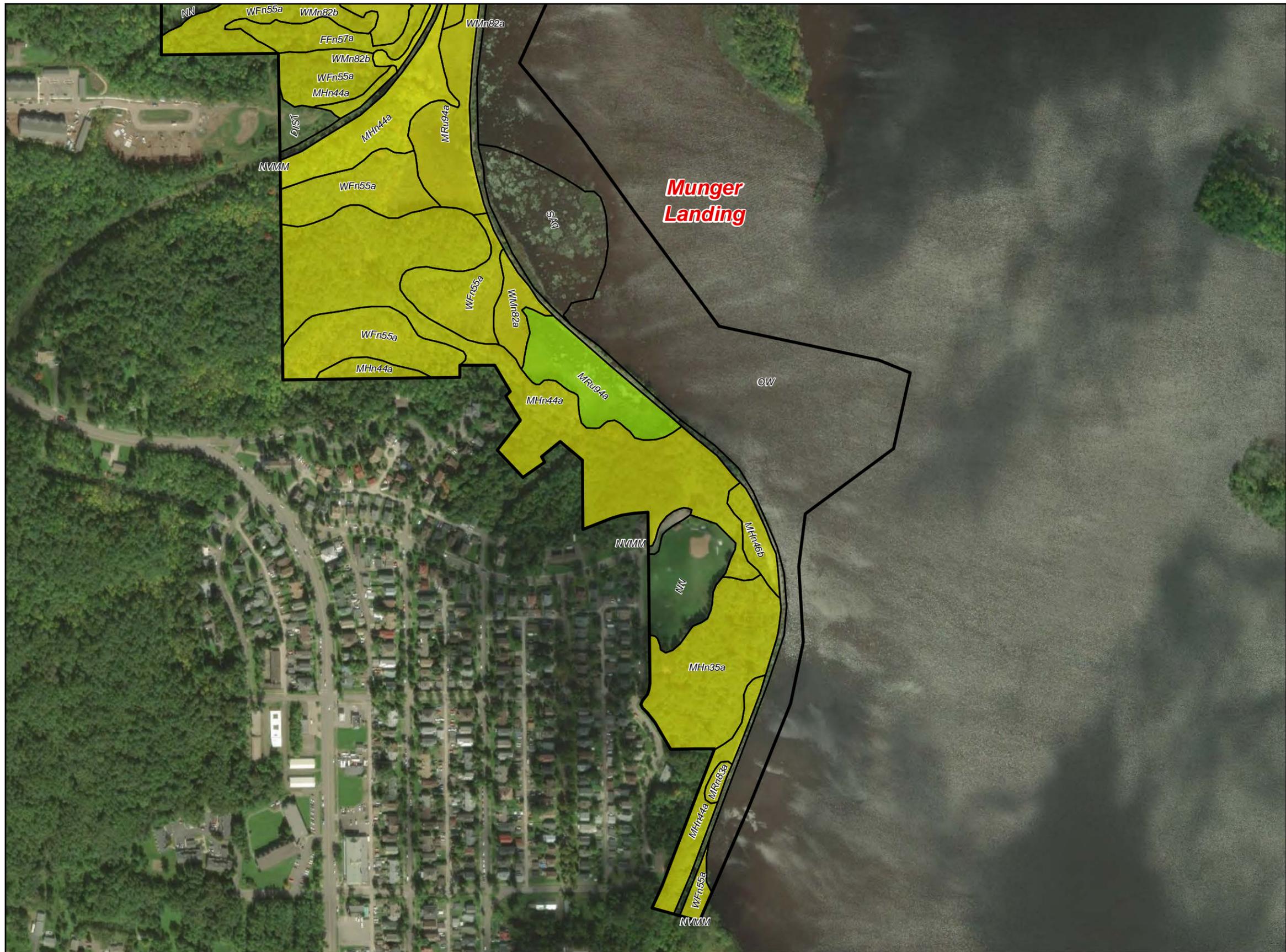
ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

**NPC Condition
Rankings Map**

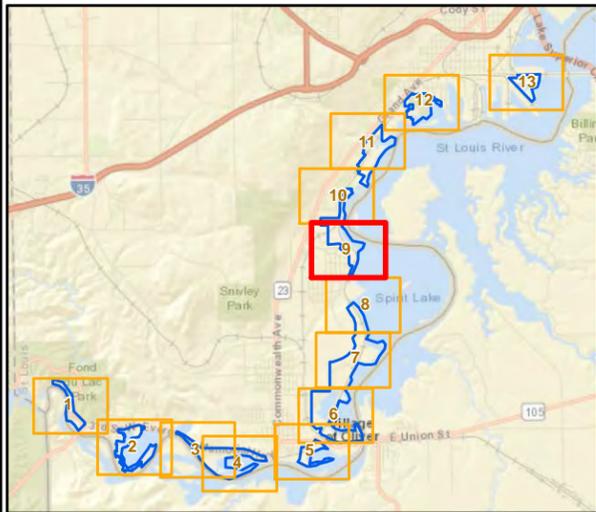
**Figure
3-8**

Path: S:\KOWM\NLAN146196\9-env\study-regs\GIS\ReportMaps\Fig03_Condition_Ranks.mxd



Legend

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- NPC Condition Rank**
-  A/B
-  B
-  B/C
-  NA (Non-NPC)



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Map by: B. Tolcser
Projection: NAD83 UTM15N
Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

NPC Condition Rankings Map

Figure 3-9

Path: S:\KOW\MNLAN146196\env\stidy-regis\GIS\ReportMaps\Fig03_Condition_Ranks.mxd

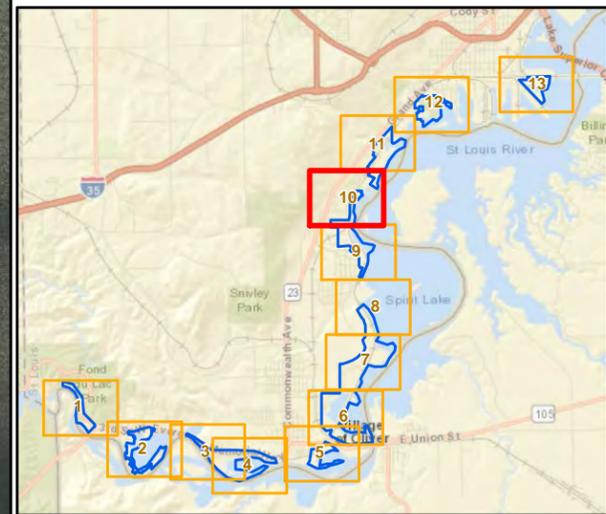


Legend

- St. Louis River project areas

NPC Condition Rank

- B
- B/C
- C
- NA (Non-NPC)



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 Print Date: 10/30/2018

Map by: B. Tolcser
 Projection: NAD83 UTM15N
 Source: MNDNR, MN Land Trust, SEH
 Background: FSA 2017 (CIR)

ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

**NPC Condition
 Rankings Map**

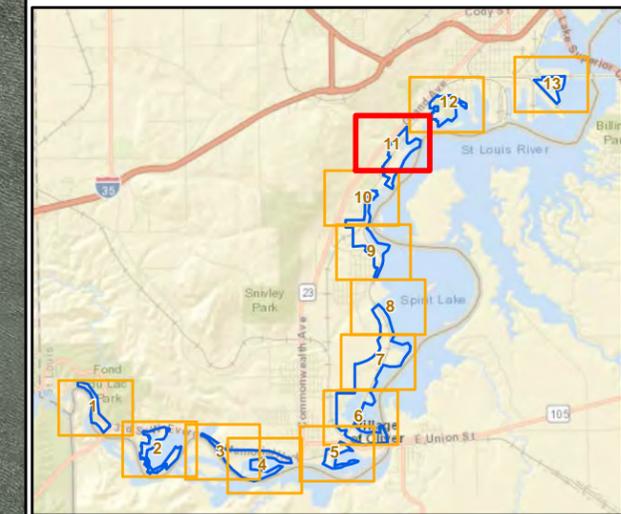
**Figure
 3-10**

Path: S:\KOWMNLAN146196\env-study-regs\GIS\ReportMaps\Fig03_Condition_Ranks.mxd



Legend

- St. Louis River project areas
- NPC Condition Rank**
- B
- C
- NA (Non-NPC)



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 Projection: NAD83 UTM15N
 Source: MNDNR, MN Land Trust, SEH
 Background: FSA 2017 (CIR)

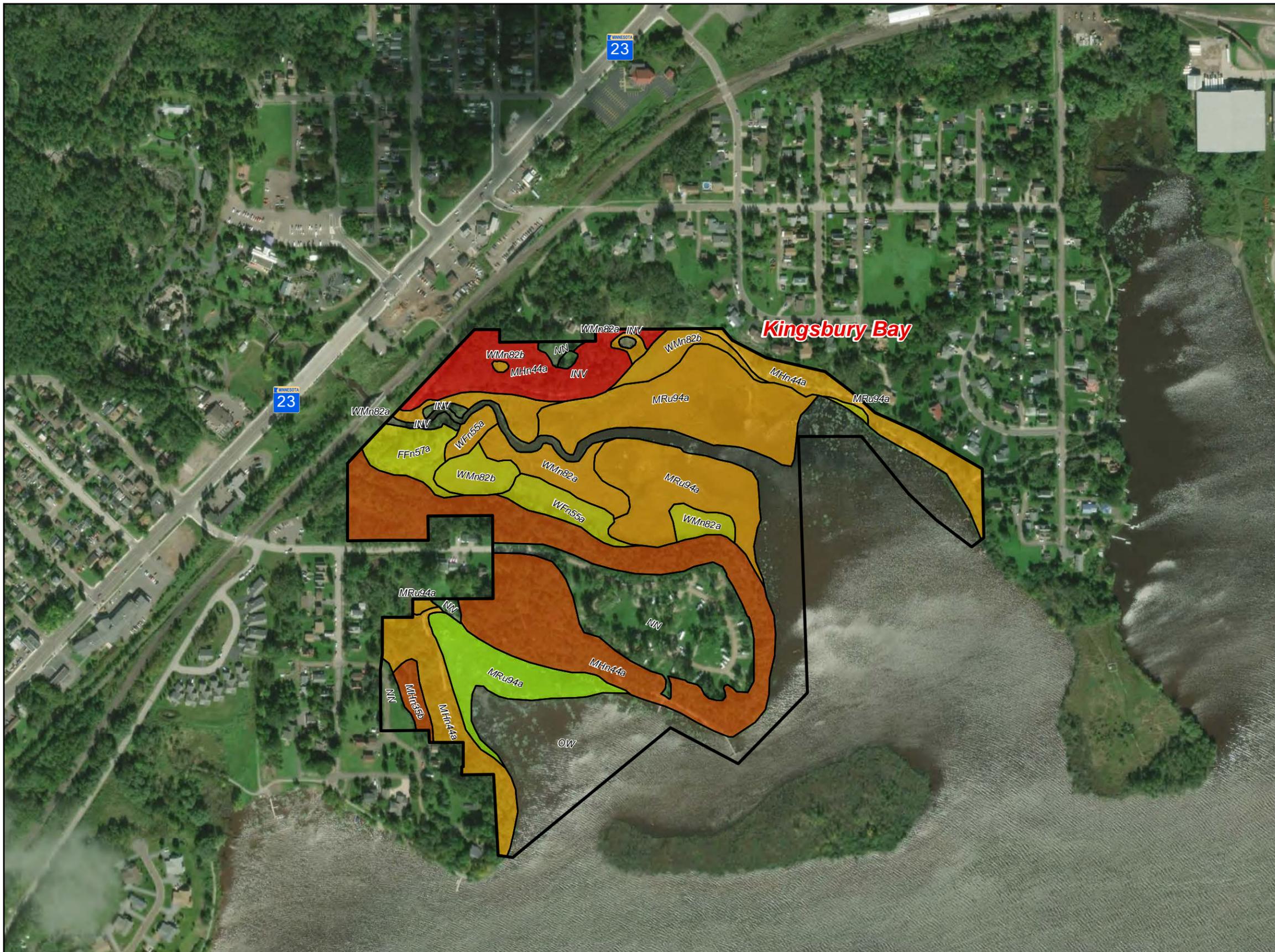
ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

**NPC Condition
 Rankings Map**

**Figure
 3-11**

Path: S:\KOWMNLAN146196\9-env\study-regs\GIS\ReportMaps\Fig03_Condition_Ranks.mxd

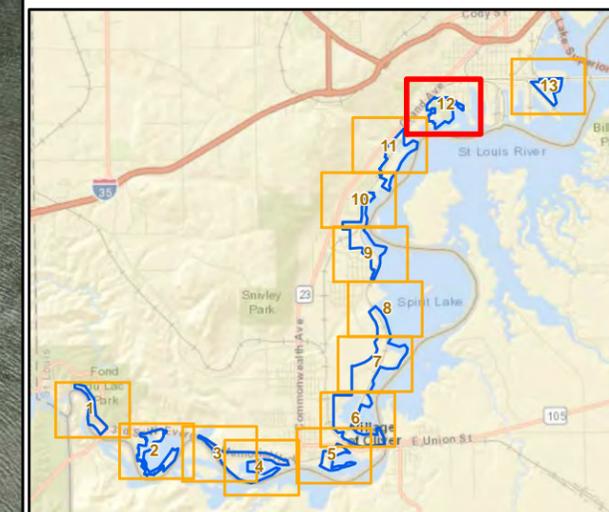


Legend

- St. Louis River project areas

NPC Condition Rank

- A/B
- B
- C
- C/D
- D
- NA (Non-NPC)



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Projection: NAD83 UTM15N
Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

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St. Louis County, Minnesota

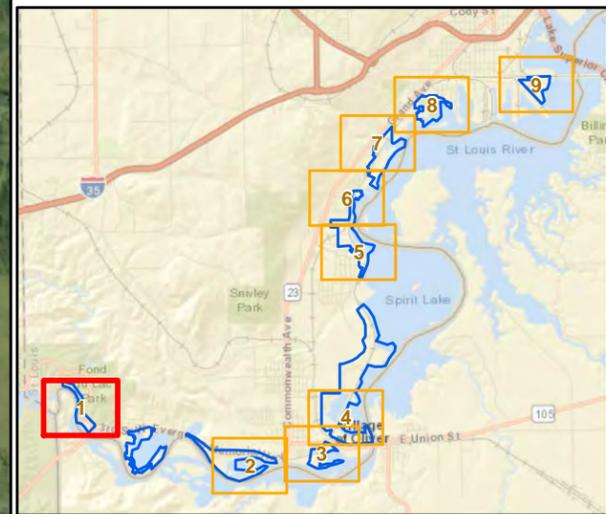
<p>NPC Condition Rankings Map</p>	<p>Figure 3-12</p>
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Legend

-  St. Louis River project areas
-  NPC Boundaries
-  Invasive Species - Localized Observations



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ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

Invasive Species Observations

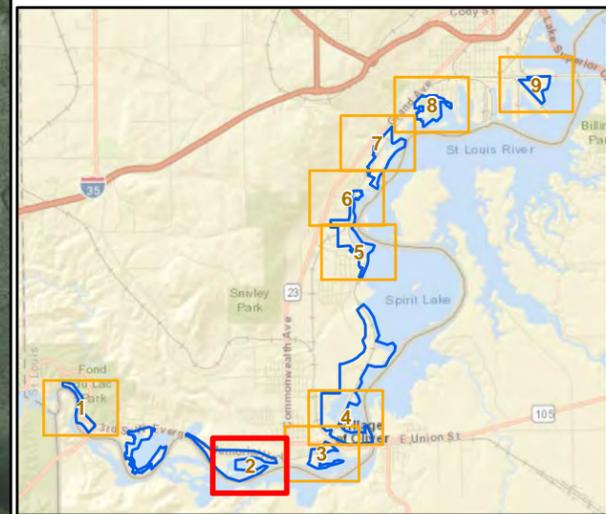
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Path: S:\KOWMNLAN146196\9-env\study-regs\GIS\ReportMaps\Fig04_invasiveLocations.mxd



Legend

-  St. Louis River project areas
-  NPC Boundaries
-  Invasive Species - Localized Observations
-  Invasive Species - Community



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ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

Invasive Species Observations

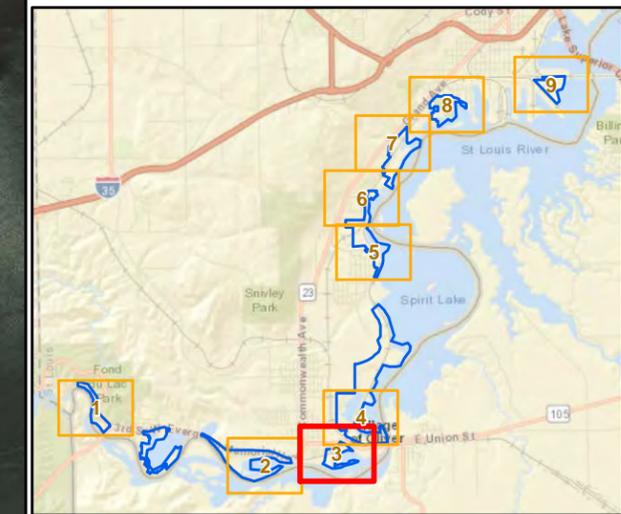
Figure 4-2

Path: S:\KOWMNLAN146196\9-env\study-reports\GIS\ReportMaps\Fig04_invasiveLocations.mxd



Legend

- St. Louis River project areas
- NPC Boundaries
- Invasive Species - Localized Observations
- Invasive Species - Community



0 500 1,000
Feet

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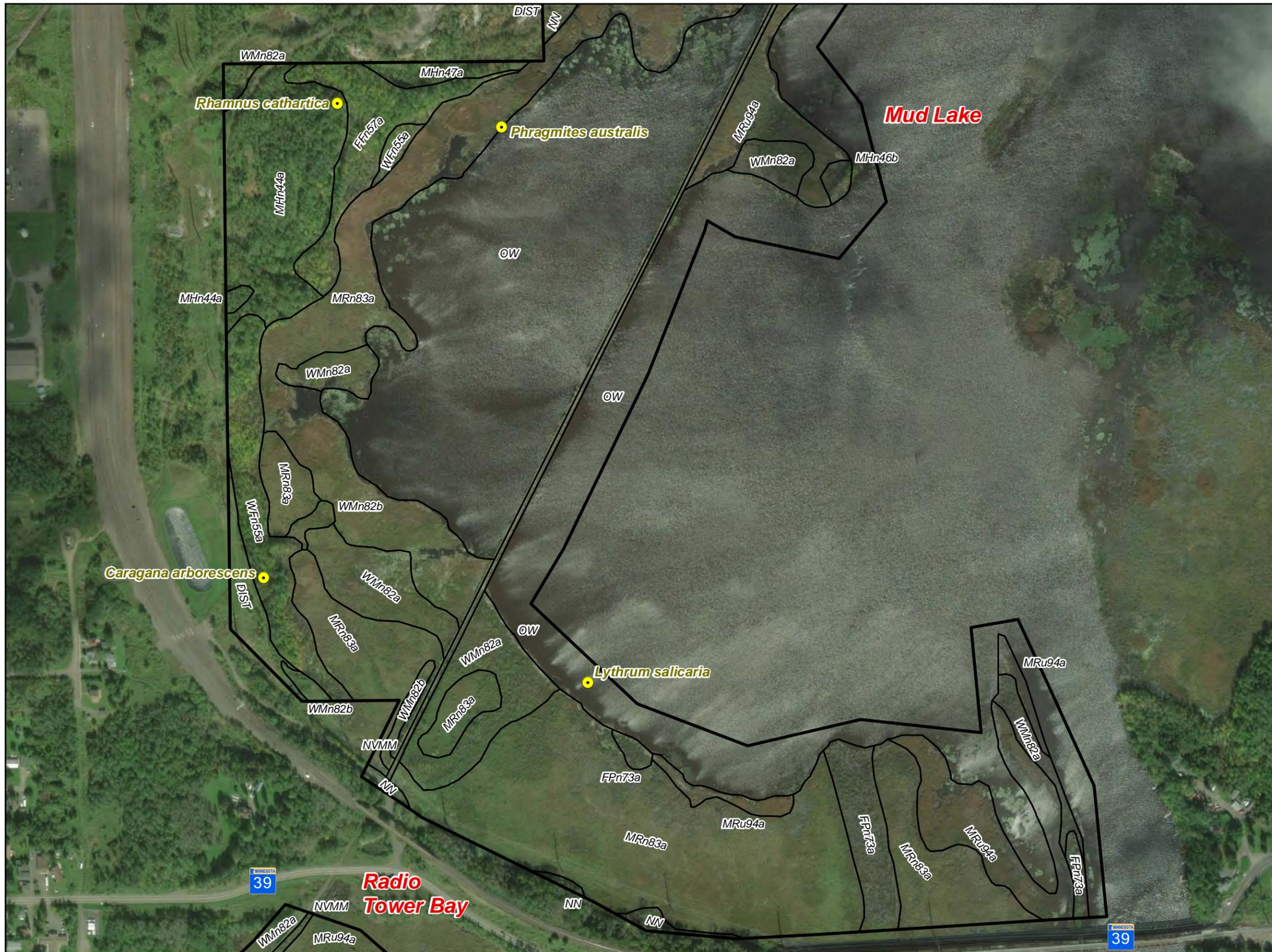
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St. Louis County, Minnesota

Invasive Species Observations

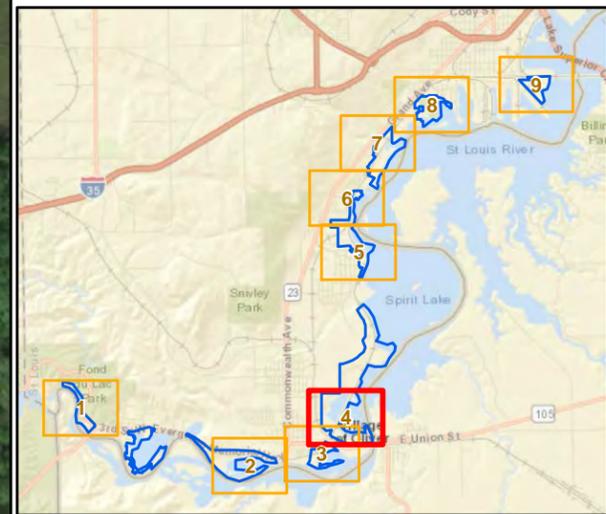
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Path: S:\KOWMNLAN146196\3-env\study-reports\GIS\ReportMaps\Fig04_invasiveLocations.mxd



Legend

- St. Louis River project areas
- NPC Boundaries
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Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

Invasive Species Observations

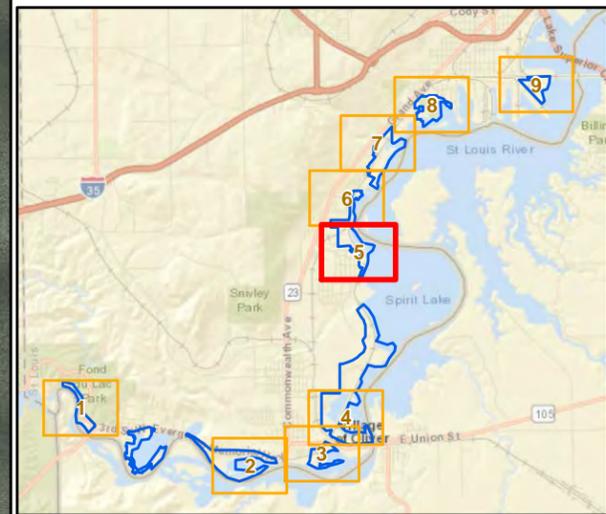
Figure 4-4

Path: S:\KOWMNLAN146196\9-env\study-reports\GIS\ReportMaps\Fig04_invasiveLocations.mxd



Legend

-  St. Louis River project areas
-  NPC Boundaries
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Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

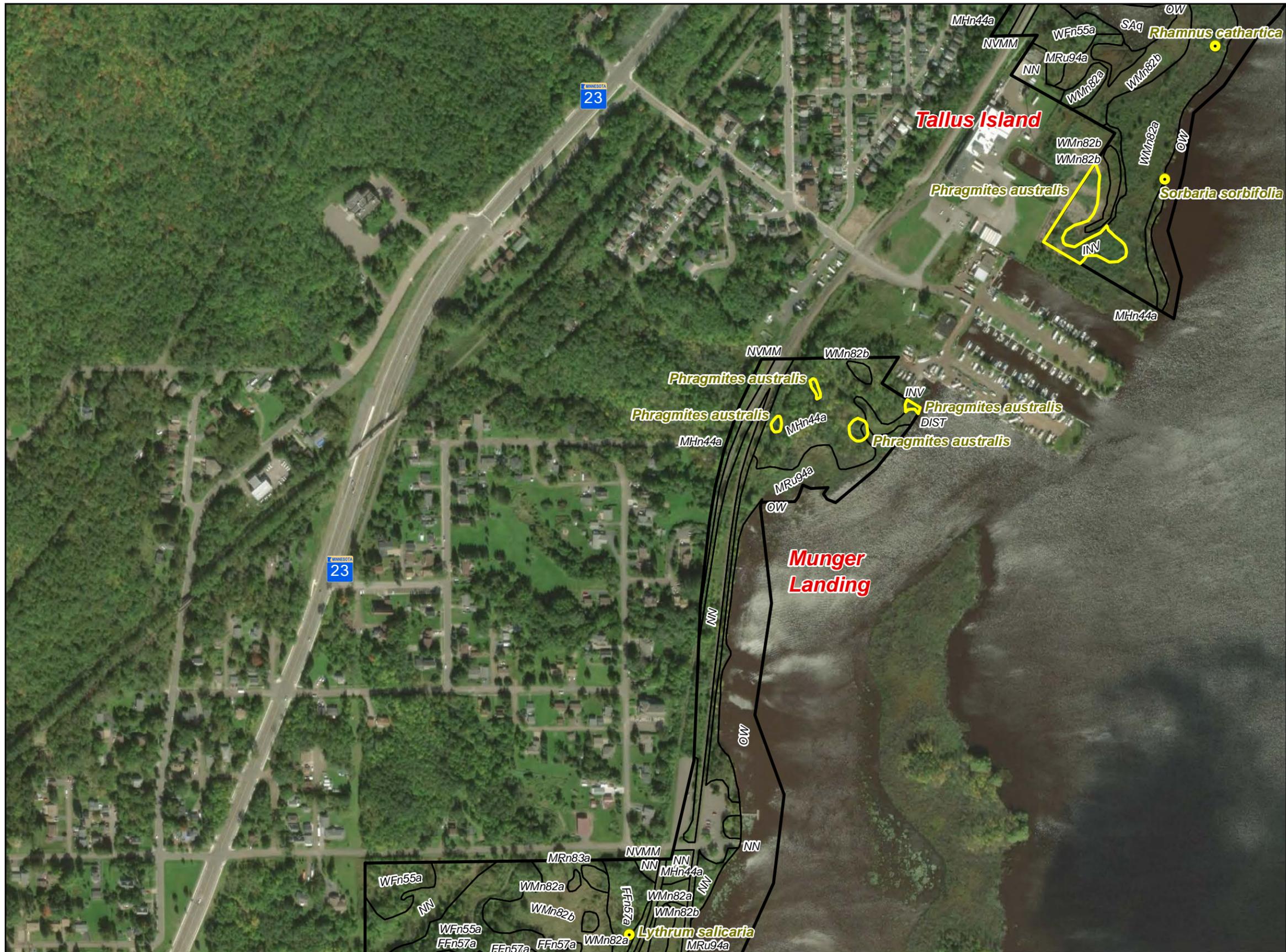
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St. Louis County, Minnesota

Invasive Species Observations

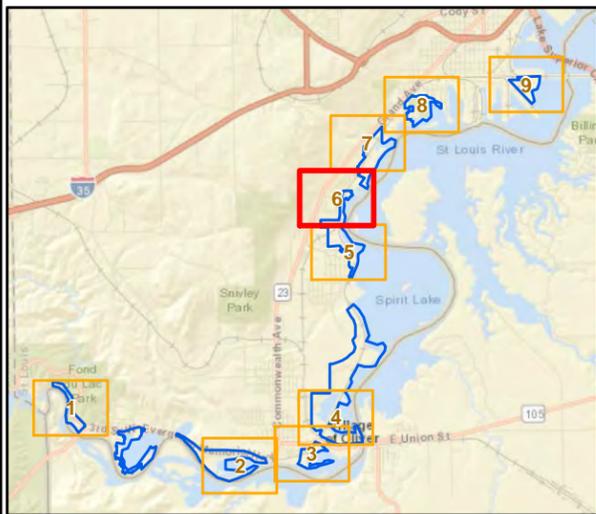
Figure 4-5

Path: S:\KOW\MNLAN146196\env\stidy-regs\GIS\ReportMaps\Fig04_invasiveLocations.mxd



Legend

- St. Louis River project areas
- NPC Boundaries
- Invasive Species - Localized Observations
- Invasive Species - Community



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Projection: NAD83 UTM15N
Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

Invasive Species Observations

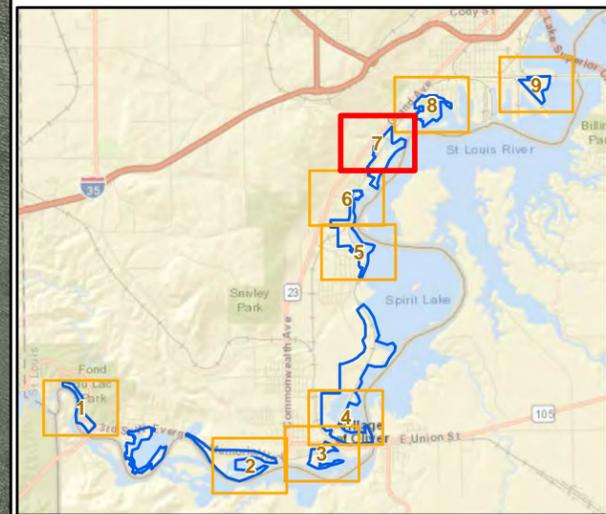
Figure 4-6

Path: S:\KOW\MNLAN146196\9-env\stidy-regis\GIS\ReportMaps\Fig04_invasiveLocations.mxd



Legend

-  St. Louis River project areas
-  NPC Boundaries
-  Invasive Species - Community



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Source: MNDNR, MN Land Trust, SEH
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ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

Invasive Species Observations

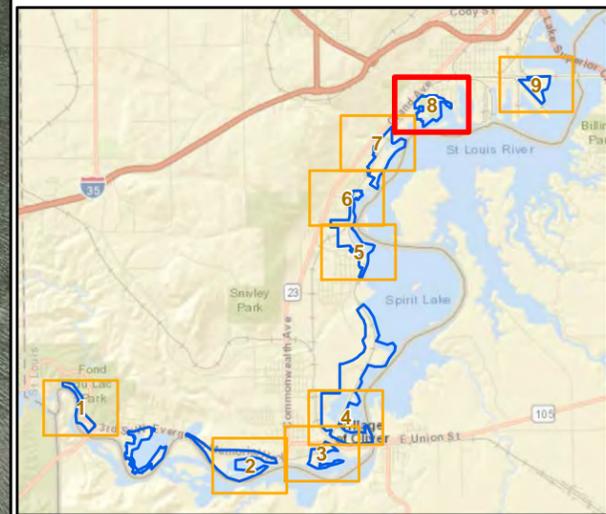
Figure 4-7

Path: S:\KOWMNLAN146196\env\study-regs\GIS\ReportMaps\Fig04_invasiveLocations.mxd



Legend

- St. Louis River project areas
- NPC Boundaries
- Invasive Species - Community



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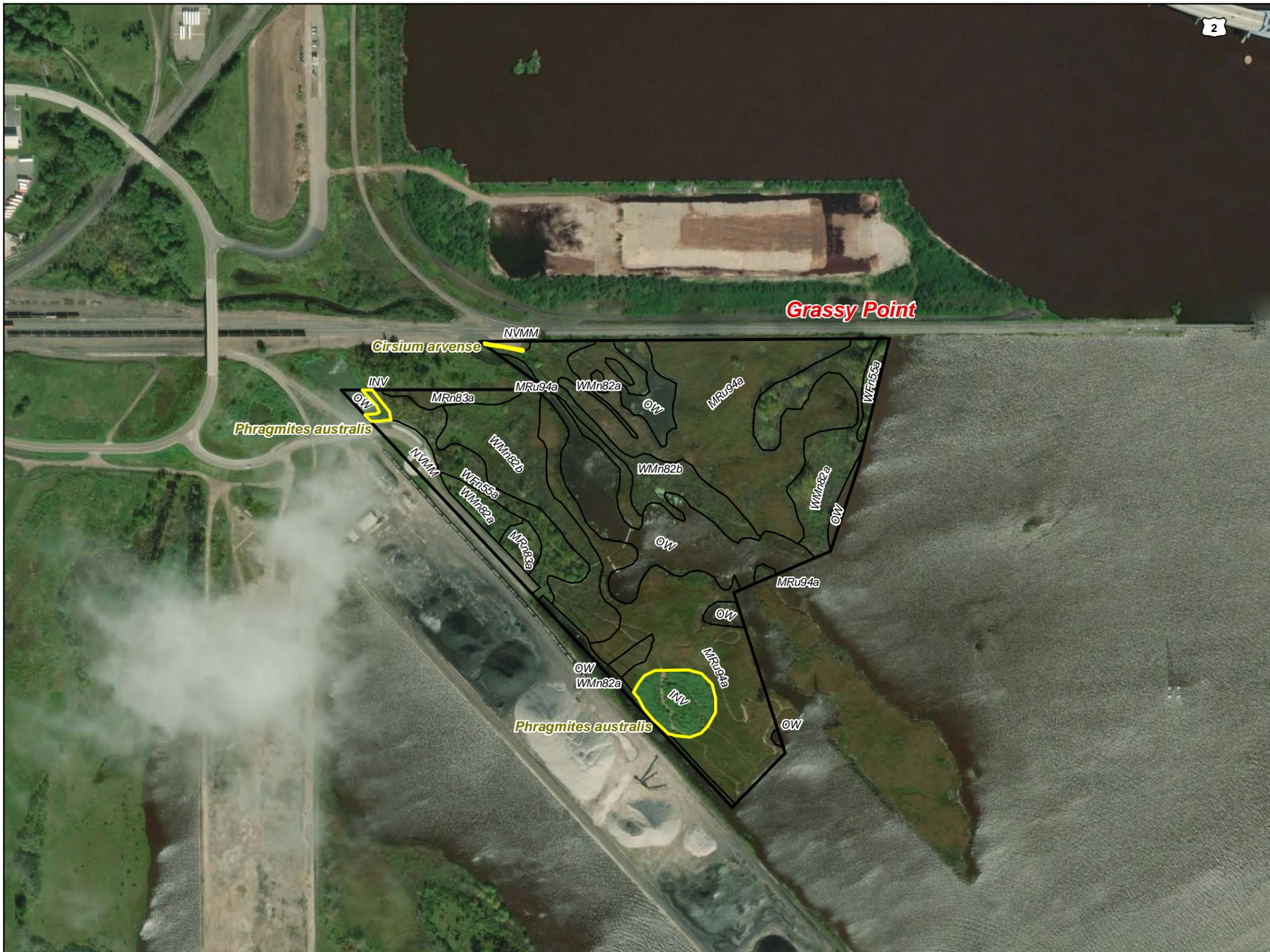
ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

Invasive Species Observations

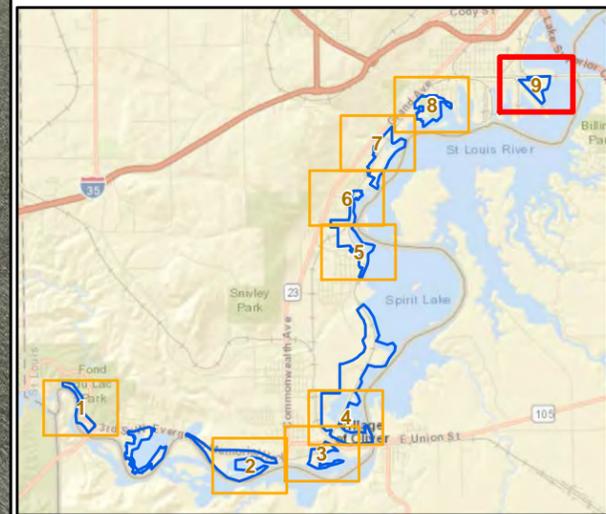
Figure 4-8

Path: S:\KOWMNLAN146196\9-env\study-regs\GIS\ReportMaps\Fig04_invasiveLocations.mxd



Legend

- St. Louis River project areas
- NPC Boundaries
- Invasive Species - Community



0 500 1,000 Feet

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ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

Invasive Species Observations

Figure 4-9

Appendix A

Methods

Methods

NPC Mapping

Field staff used methods for mapping Native Plant Communities (NPCs) according to Minnesota's Native Plant Community Classification (Vol 2.), and to document condition rank of each NPC. Documentation of condition rank included disturbances as well as presence and abundance of invasive species.

GIS Remote Sensing

Initial mapping used GIS remote sensing techniques to generate draft NPC boundaries within the areas of interest. The approach consisted of an initial supervised classification using high resolution aerial imagery in both color and near infrared, including band ratios such as the normalized differential vegetation index (NDVI). While elevation itself has not been shown to predict plant communities, other topographic derivatives such as slope, aspect, and wetness indices were used to differentiate and discriminate land cover and plant communities. The results of the classification informed a manual "heads up" digitizing effort to map NPCs, non-native plant communities, and non-vegetated lands. The results were used to compare consistency of vegetative cover within singular NPC polygons as previously mapped by the Minnesota Biological Survey (MBS) in an effort to identify any inclusions of different, smaller NPCs. The minimum mapping unit for the draft NPC boundaries was 1.0 acre. The results of the GIS remote sensing exercise were loaded onto GPS units for field verification. Following field verification, changes in polygon boundaries or in NPC or land cover types were incorporated into the final GIS and report maps.

Field Verification of Mapped Boundaries

Natural resources scientists visited the nine (9) project areas in the field to verify mapping and document any important changes. Inclusions of different NPCs 1.0 acre or larger within a previously mapped unit were documented, as these may have been too small to be included in MBS mapping done at a larger scale. Relevé plots and smaller vegetation data collection plots were placed in the field based on best professional judgement to document typical NPCs in the project areas. Other significant features were documented as observed; these included localized concentrations of invasive plant species and areas of existing restoration and management efforts.

Plot-based Vegetation Data Collection

As described above, scientists collected data in relevé and smaller plots to support the classification of NPCs in the project areas. Scientists used objective placement of the plots, based on the GIS mapping and best professional judgement during field review. The field team used visual (vs. mechanical) estimation of cover within a plot, using a cover class scale. Plot size follows a typical DNR survey design with 20 x 20 meter plots in upland forests and woodlands and wetland forests; and 10 x 10 meter plots in shrub swamps and open wetlands. Plot locations were documented with a sub-meter accuracy GPS unit in UTM coordinates NAD83, Zone 15N. For relevé plots, the field team collected data according to the DNR relevé method handbook (MNDNR 2013a).

In some areas, scientists used streamlined plot-based field methods, modified from methods for documenting representative vegetation (wetland and upland plots) in implementing wetland delineation procedures (USACE 1987). Field scientists selected a representative observation point within a plant community using best professional judgment, based on visual characteristics of the entire community. Streamlined sample points consisted of plots in nested concentric circles, variable in size by vegetation stratum: a 10-meter radius plot for trees, 3-meter radius plot for shrubs, and 1-meter plot for herbaceous species. Similar to relevé data, cover for each species was estimated on a cover class scale and plot locations were documented with a sub-meter accuracy GPS unit in UTM coordinates NAD83, Zone 15N. Vegetation plot locations (both relevé and streamlined plots) are shown on **Figure A-1**.

Reporting

For each previously unmapped NPC, SEH scientists assigned an NPC code according to *Field Guide to the Native Plant Communities of Minnesota: the Laurentian Mixed Forest Province* (MNDNR 2003), and a condition rank (A-D) according to DNR-established ranks for NPCs (MNDNR 2009). For non-NPC plant communities, the report identifies potential restoration target communities based on the existing ecological land type, physical characteristics, and nearby NPCs.

Plant species were recorded using nomenclature according to MNTaxa, the DNR's official checklist of names for vascular plant species in Minnesota (MNDNR 2013b). The field review did not spatially map all invasive species with occurrences less than 0.10 acre in size, unless notable for other reasons, but presence and abundance of invasive species are discussed in report text and inform the condition rank of each NPC. Similarly, important features such as major disturbances (e.g., eroded slopes) have been noted, even if not specifically identified as a target mapping feature.

SGCN Survey

Field staff used focused meanders to survey for target vascular plant species. **Table A-1** below lists target species. The Minnesota Land Trust provided a list of target species based on known occurrences in the area, and SEH understood that additional rare species had potential to be present based on suitable habitat and available Natural Heritage Information System (NHIS) data.

Table A-1: Target SGCN Plants

Common Name	Taxonomic Name	Taxonomic Class	State Status
Discoïd beggarticks	<i>Bidens discoidea</i>	Vascular plant	Special Concern
Narrow reedgrass	<i>Calamagrostis lacustris</i>	Vascular plant	Special Concern
Necklace spike sedge	<i>Carex ormostachya</i>	Vascular plant	Special Concern
Pale sedge	<i>Carex pallescens</i>	Vascular plant	Endangered
Beach heather	<i>Hudsonia tomentosa</i>	Vascular plant	Threatened
Small shinleaf	<i>Pyrola minor</i>	Vascular plant	Special Concern
Soapberry	<i>Shepherdia canadensis</i>	Vascular plant	Special Concern
Pale false mannagrass	<i>Torreyochloa pallida</i>	Vascular plant	Special Concern
Eastern hemlock	<i>Tsuga canadensis</i>	Vascular plant	Endangered

Survey and reporting was conducted under the direction of Principal Investigator Allyz Kramer and Field Supervisor Natalie White. Allyz Kramer is qualified by the DNR for survey of general flora and *Botrychium* spp. in the state. Natalie White is also a qualified botanist, and is pre-qualified by the DNR for survey of general flora.

Field survey took place in July-August 2018, when most target species had morphological features necessary for definitive identification (e.g., mature perigynia on *Carex* species, flowers, and/or mature fruits). SEH field scientists used a well-developed search image approach and conducted focused meanders in habitats most suitable for the target species. Selection of target habitats was informed by GIS remote sensing of Native Plant Communities (NPCs) conducted in support of NPC mapping, and field survey particularly targeted NPCs suitable for the target plant species.

Centroid point locations of rare plant occurrences were documented with a sub-meter accuracy GPS unit in UTM coordinates NAD83, Zone 15N. For species/occurrences for which photographs are adequate for a confirmed identification, there was no plant material collection. For most target species, photographic

documentation of occurrences was sufficient for a verified identification. For pale sedge, collection was limited to the minimum necessary for a verified identification. Collection followed guidelines for vascular plant specimens found in the DNR Division of Ecological and Water Resources publication *Guidance on Documenting and Collecting Rare Plants* (2018), and was completed under Special Permit #23228 issued to Ms. Natalie White. The collected specimen was prepared by drying in a plant press with blotters, ventilators, and newspaper. The specimen was labeled using archival quality paper; the label includes species, location of collection, description of habitat, name of collector, and date of collection as described in the DNR *Guidance*.

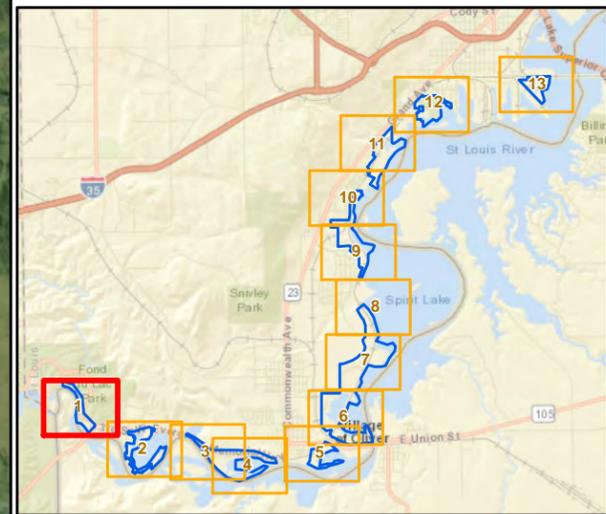
SEH sent the prepared specimen to Welby Smith, DNR Botanist, for verification. Additional data related to the survey was provided electronically as a spreadsheet with an accompanying shapefile as described on the Natural Heritage Information System (NHIS) website. Final disposition of the specimen collected was to the University of Minnesota Bell Museum of Natural History.

Path: S:\KOW\MNLAN146196\env\stdy-regrs\GIS\ReportMaps\Fig_A1_PlotLocations.mxd



Legend

-  St. Louis River project areas
-  NPC Boundaries
-  Data Collection Points



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Projection: NAD83 UTM15N
Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

Data Collection Locations

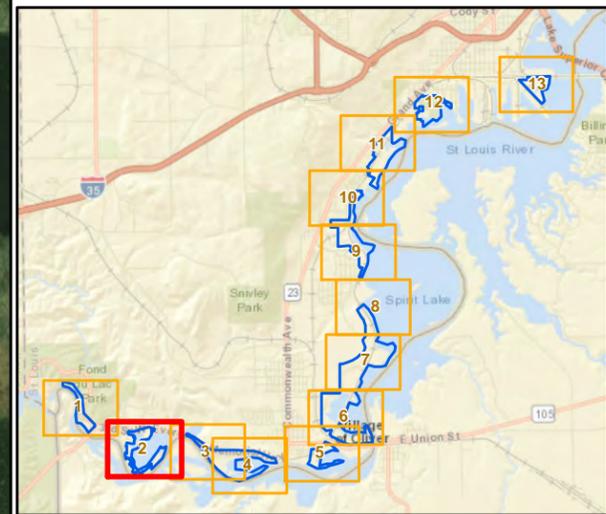
Figure A1-1

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Legend

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-  Data Collection Points



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ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

Data Collection Locations

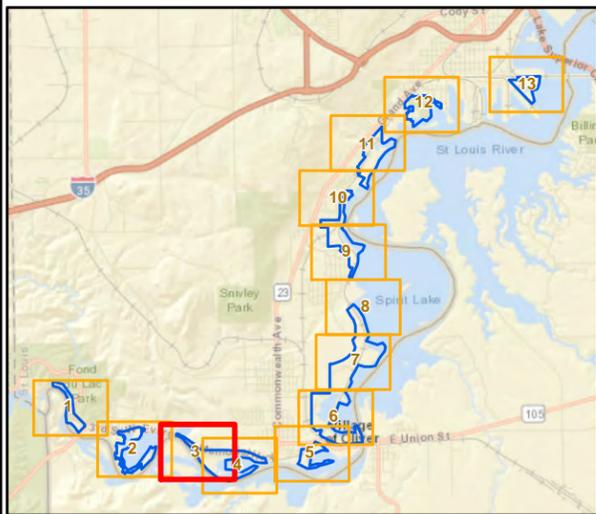
Figure A1-2

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Legend

- St. Louis River project areas
- NPC Boundaries
- Data Collection Points



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Project: MNLAN 146196
 Print Date: 10/30/2018
 Map by: B. Tolcser
 Projection: NAD83 UTM15N
 Source: MNDNR, MN Land Trust, SEH
 Background: FSA 2017 (CIR)

ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

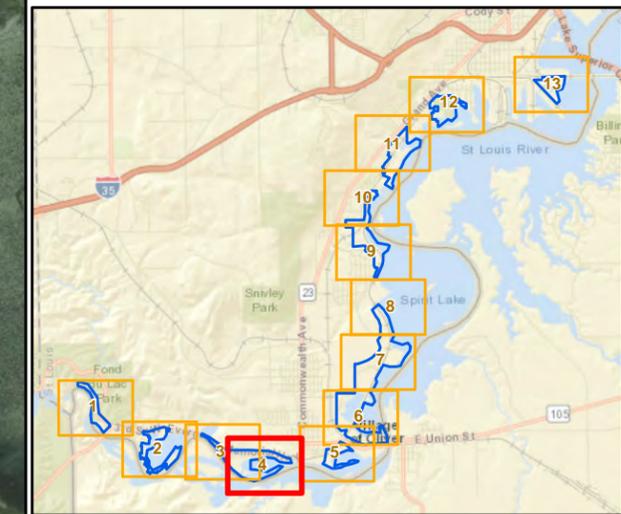
Data Collection Locations

Figure A1-3

Path: S:\KOWMNLAN146196\9-env-study-regs\GIS\ReportMaps\Fig_A1_Plot Locations.mxd



- Legend**
-  St. Louis River project areas
 -  NPC Boundaries
 -  Data Collection Points



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Map by: B. Tolcser
Projection: NAD83 UTM15N
Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

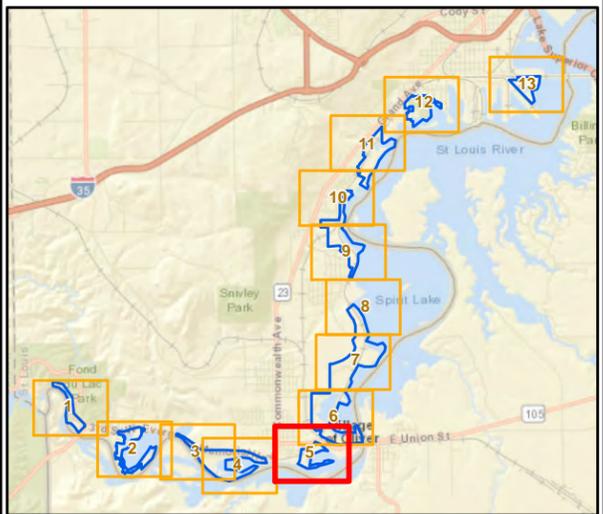
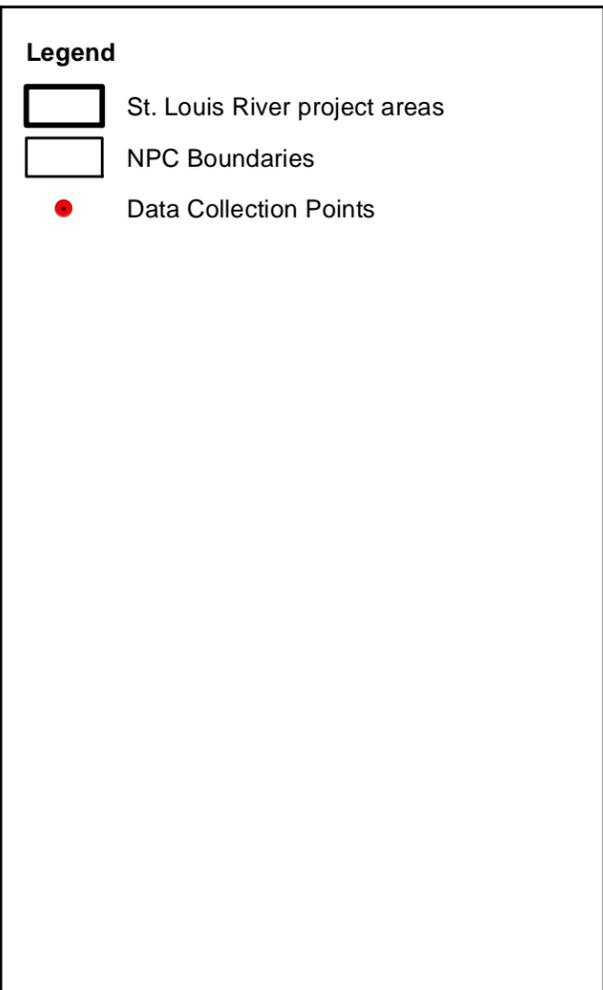
ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

Data Collection Locations

Figure A1-4

Path: S:\KOW\MNLAN146196\3-env\study-reports\GIS\ReportMaps\Fig_A1_PlotLocations.mxd



0 500 1,000 Feet
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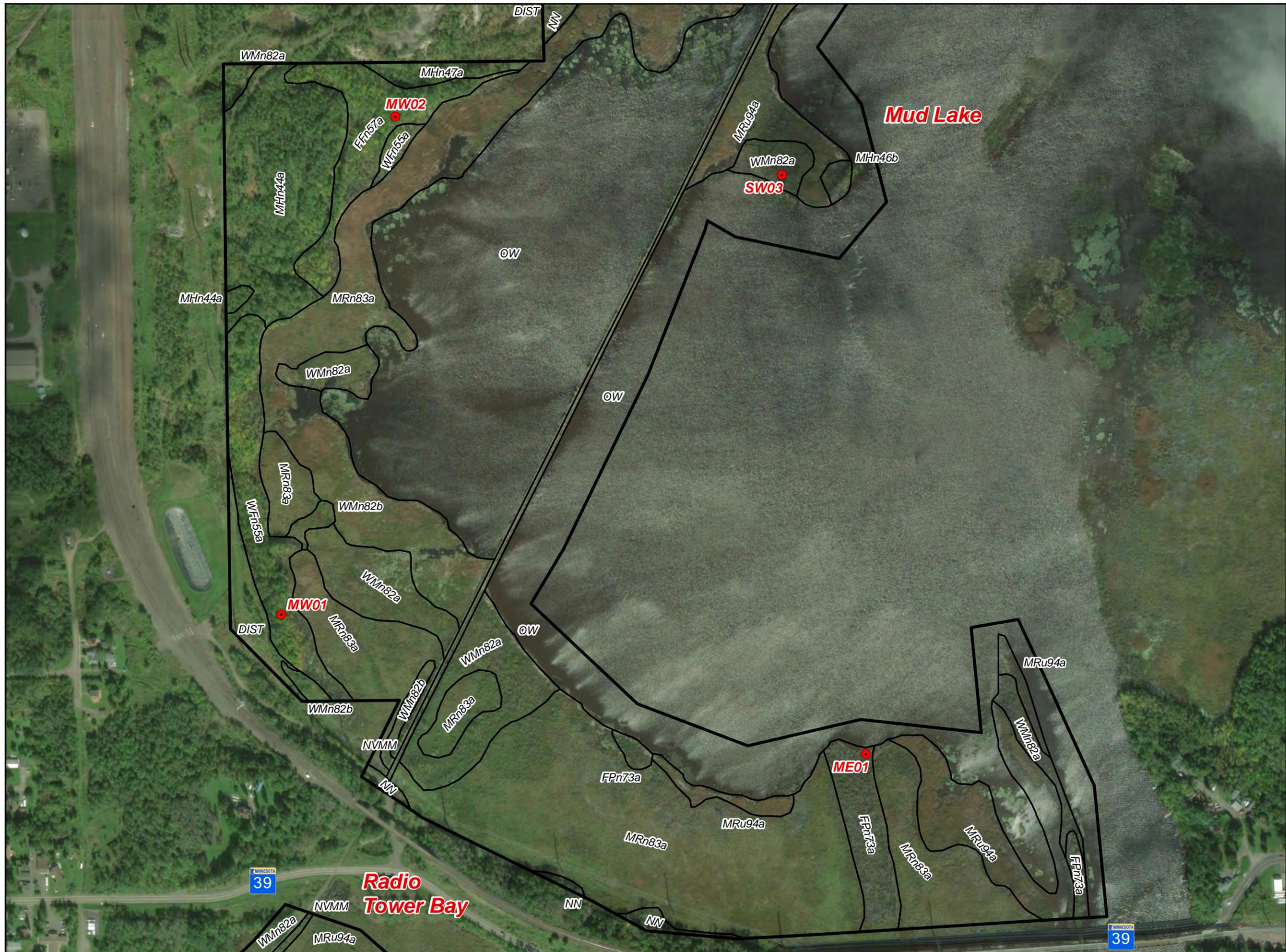
Project: MNLAN 146196
Print Date: 10/30/2018
Map by: B. Tolcser
Projection: NAD83 UTM15N
Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

ST. LOUIS RIVER NATURAL AREA PROJECT

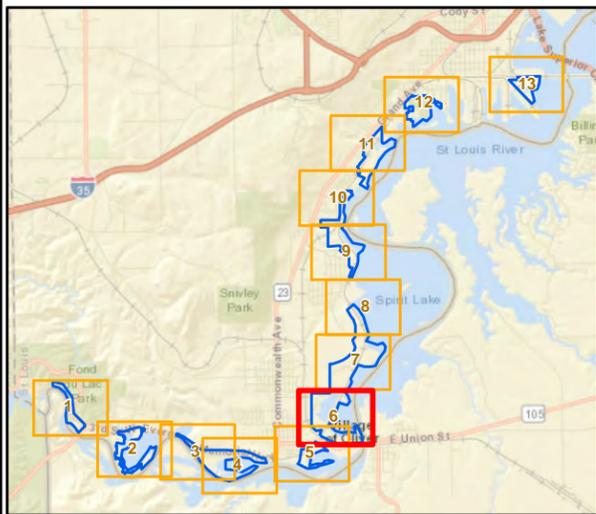
St. Louis County, Minnesota

Data Collection Locations
Figure A1-5

Path: S:\KOW\MNLAN146196\3-env\stidy-regis\GIS\ReportMaps\Fig_A1_PlotLocations.mxd



- Legend**
- St. Louis River project areas
 - NPC Boundaries
 - Data Collection Points



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Projection: NAD83 UTM15N
Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

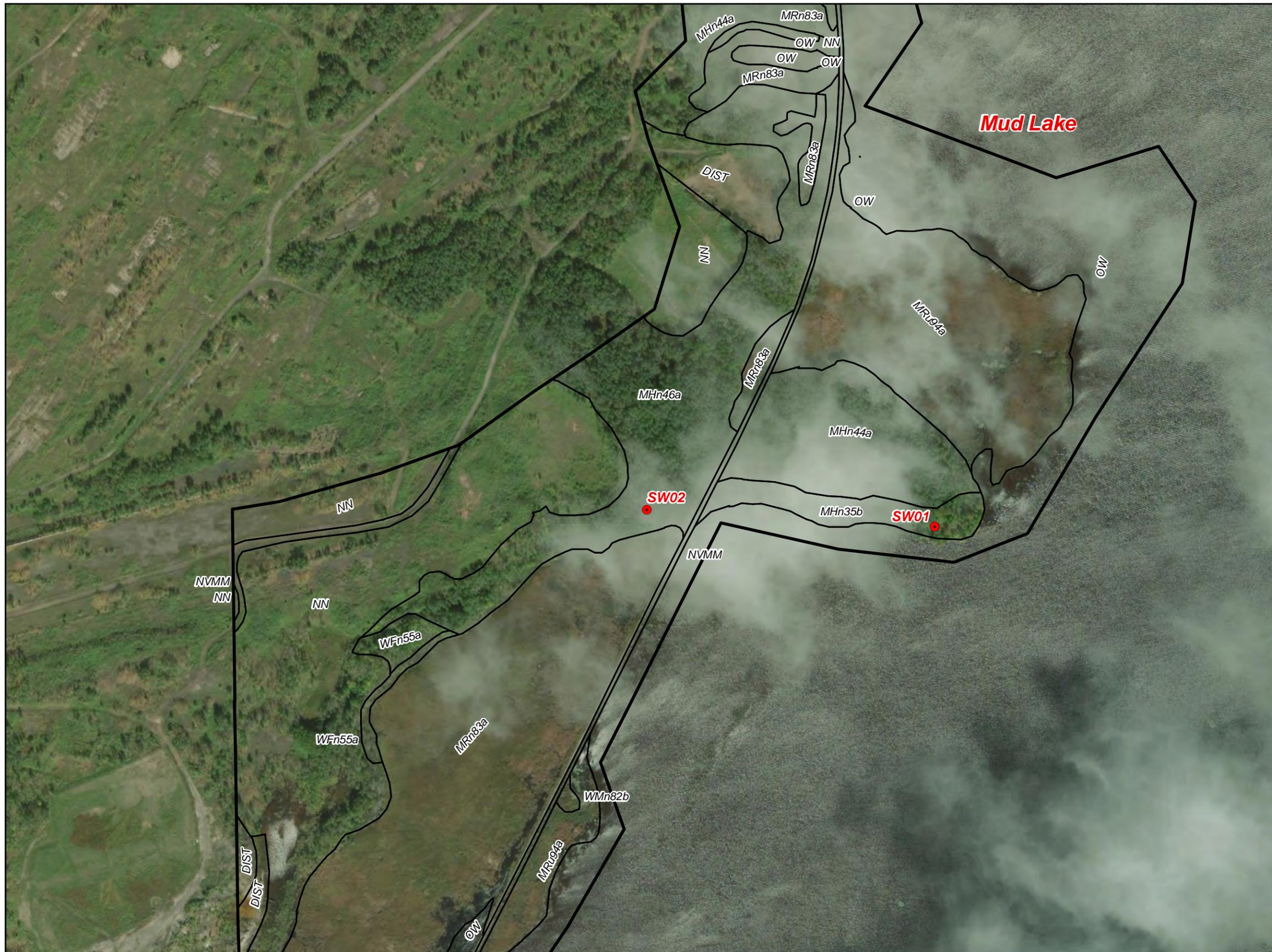
ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

Data Collection Locations

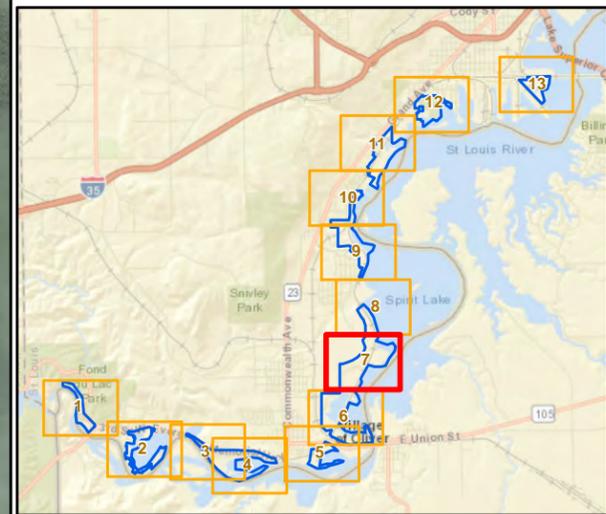
Figure A1-6

Path: S:\KOW\MNLAN146196\3-env\study-reports\GIS\ReportMaps\Fig_A1_PlotLocations.mxd



Legend

-  St. Louis River project areas
-  NPC Boundaries
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Projection: NAD83 UTM15N
Source: MNDNR, MN Land Trust, SEH
Background: FSA 2017 (CIR)

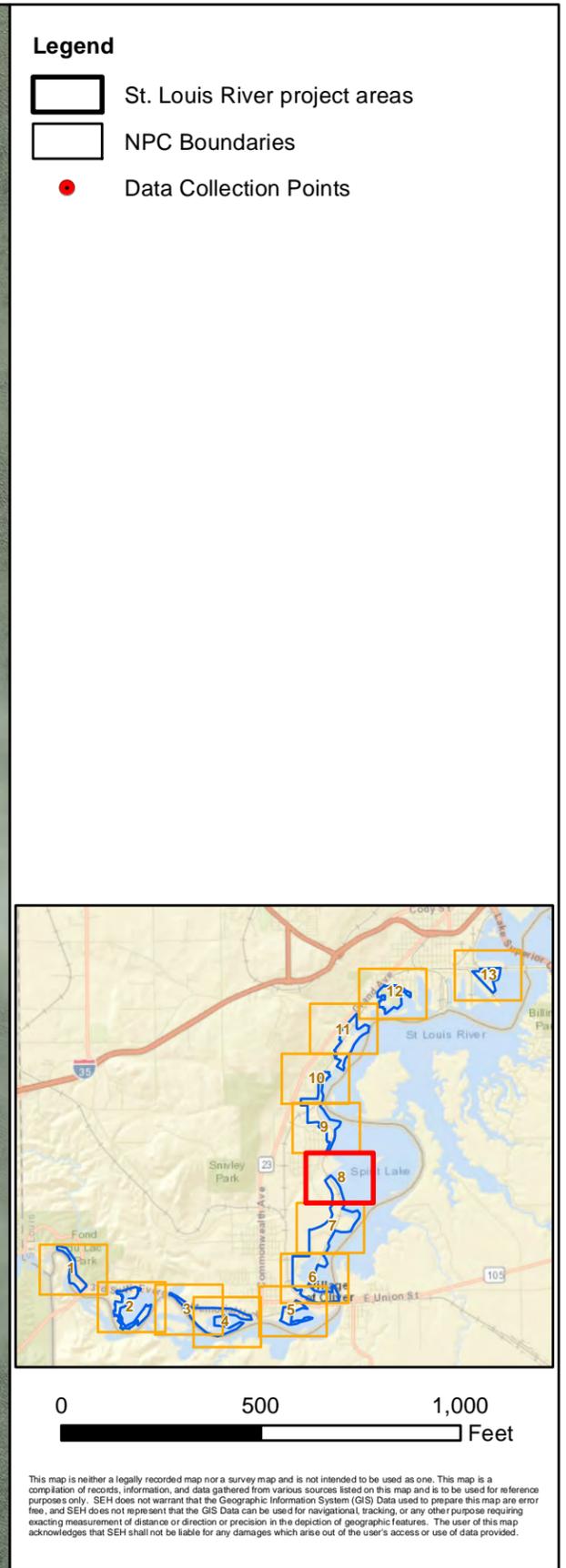
ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

Data Collection Locations

Figure A1-7

Path: S:\KOMM\NLAN146196\3-env\stidy-regrs\GIS\ReportMaps\Fig_A1_PlotLocations.mxd



Project: MNLAN 146196
Print Date: 10/30/2018

Map by: B. Tolcser
Projection: NAD83 UTM15N
Source: MNDNR, MN Land Trust, SEH
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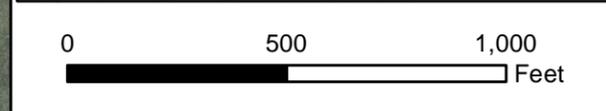
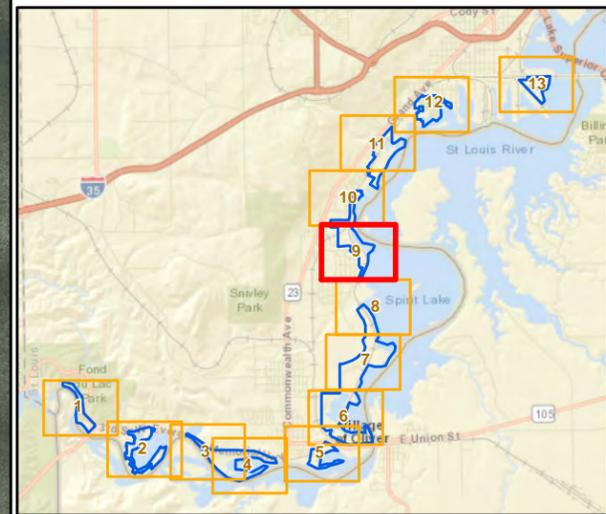
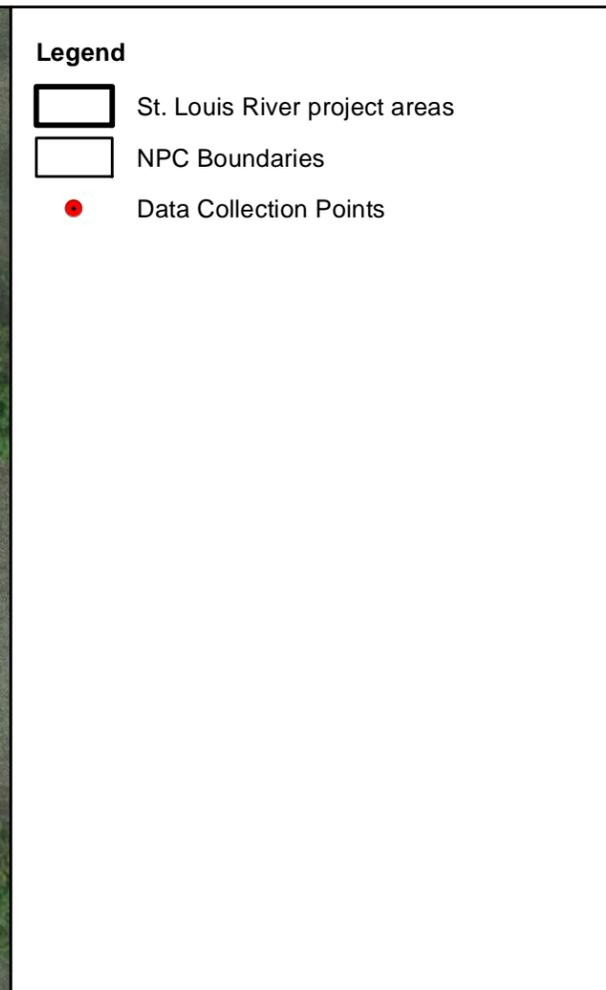
ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

Data Collection Locations

Figure A1-8

Path: S:\KOWMNLAN146196\9-env\stidy-regis\GIS\ReportMaps\Fig_A1_PlotLocations.mxd



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Source: MNDNR, MN Land Trust, SEH
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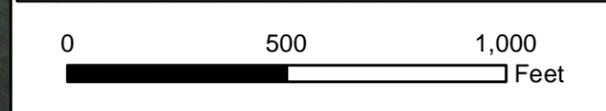
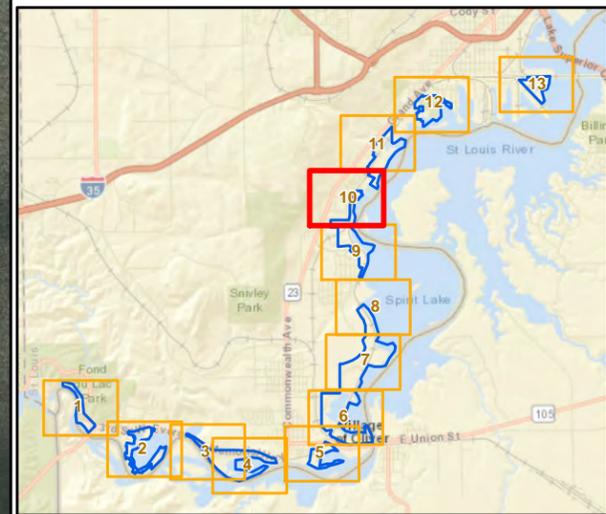
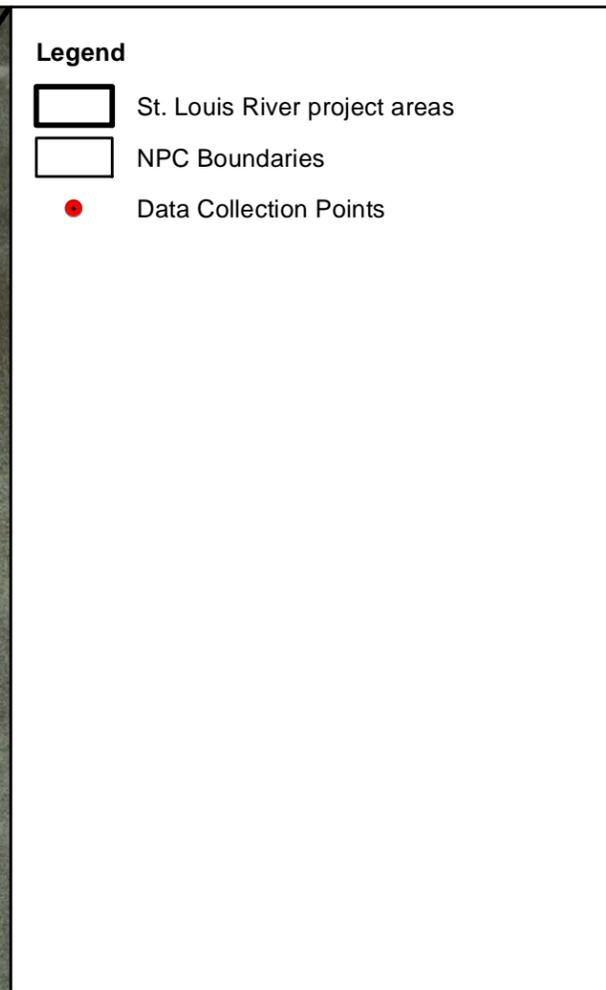
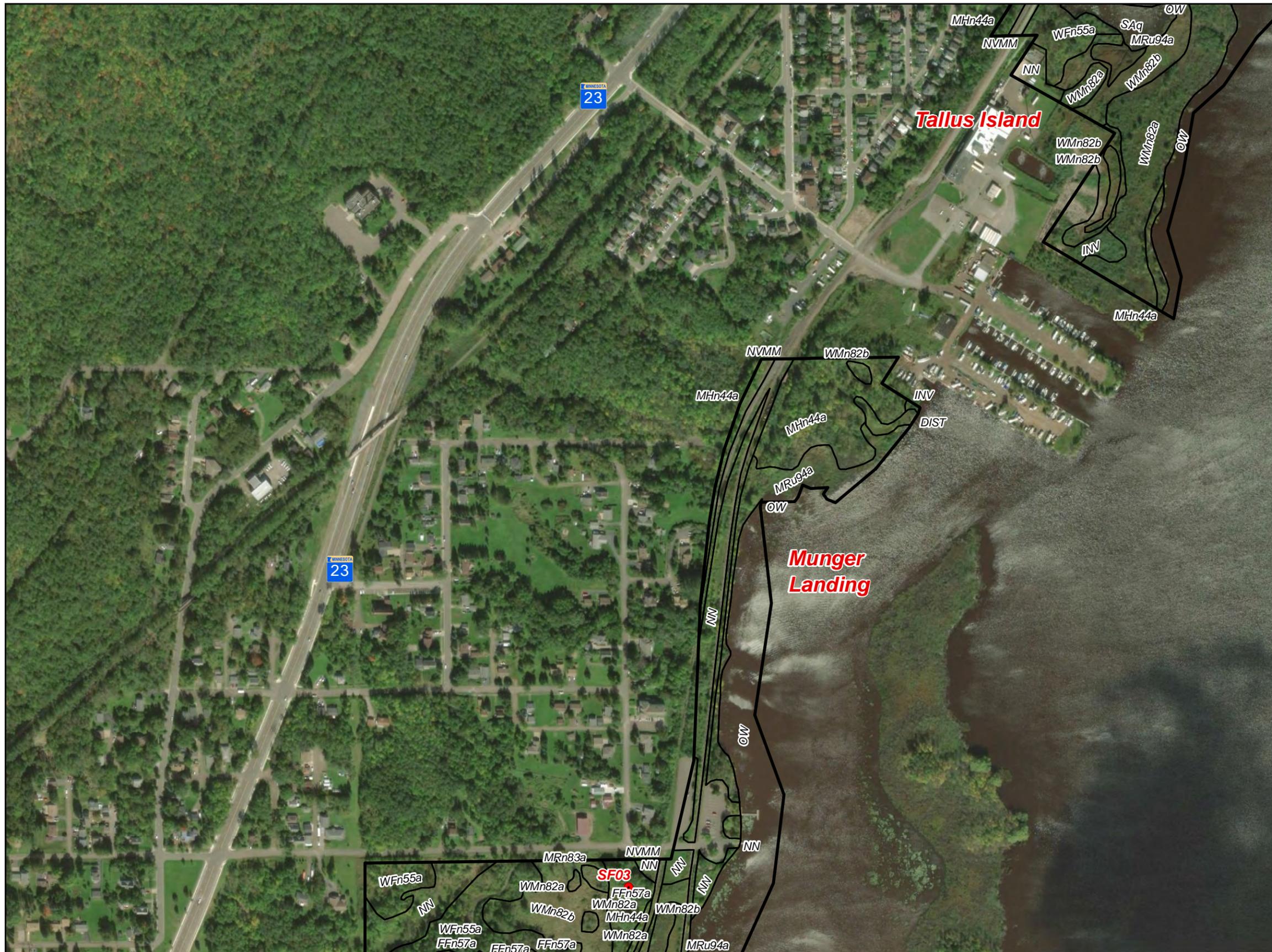
ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

Data Collection Locations

Figure A1-9

Path: S:\KOW\MNLAN146196\3-env\study-reports\GIS\ReportMaps\Fig_A1_PlotLocations.mxd



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Source: MNDNR, MN Land Trust, SEH
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ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

Data Collection Locations

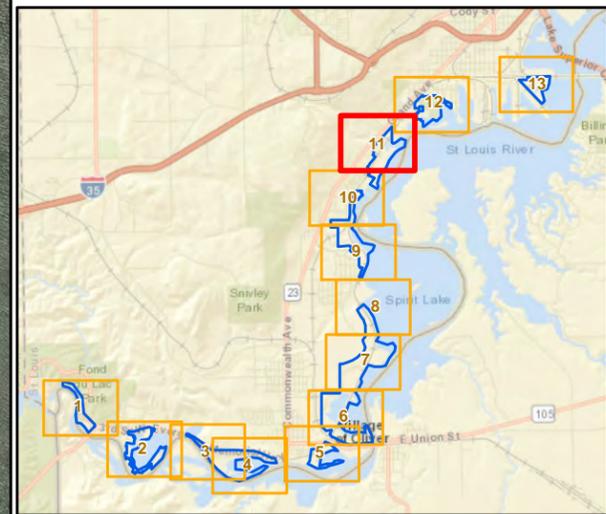
Figure A1-10

Path: S:\KOWMNLAN146196\9-env\stidy-regis\GIS\ReportMaps\Fig_A1_PlotLocations.mxd



Legend

- St. Louis River project areas
- NPC Boundaries
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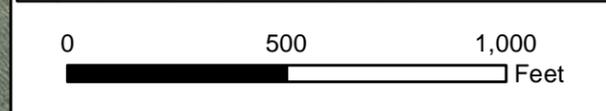
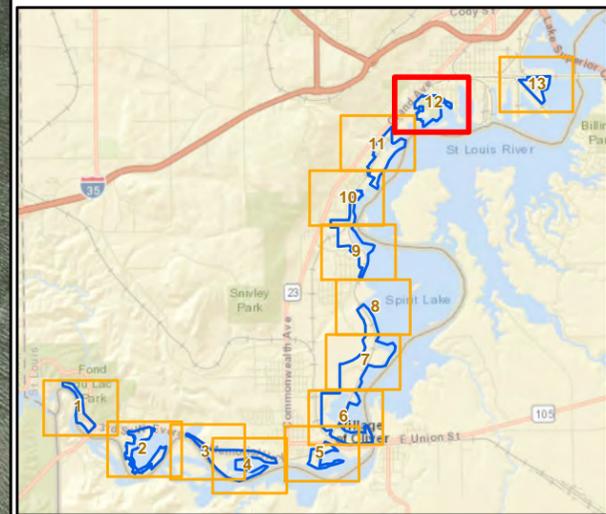
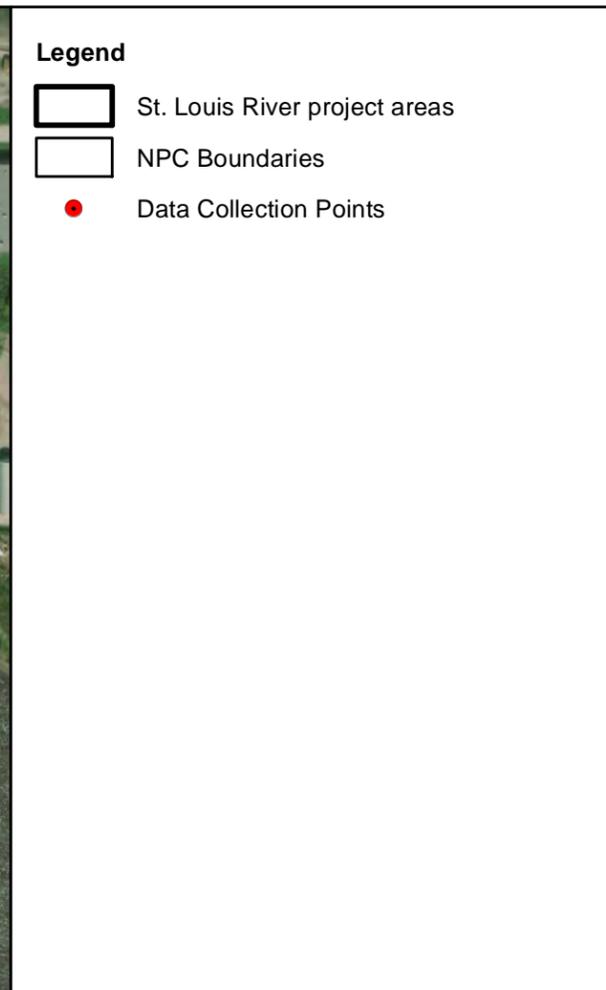
ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

Data Collection Locations

Figure A1-11

Path: S:\KOWMNLAN146196\9-env\study-reports\GIS\ReportMaps\Fig_A1_PlotLocations.mxd



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ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

Data Collection Locations

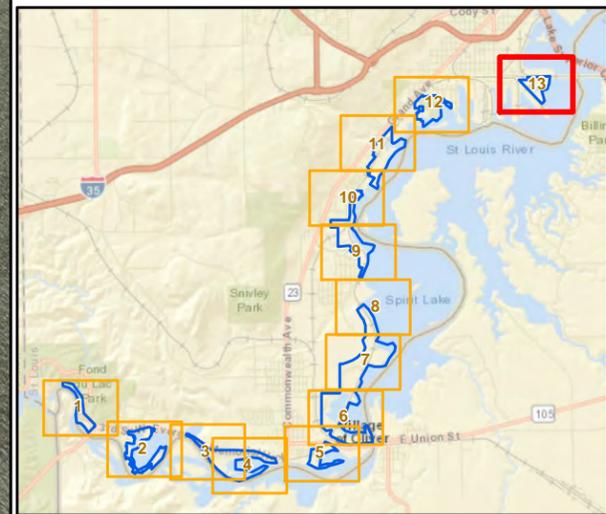
Figure A1-12

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Legend

-  St. Louis River project areas
-  NPC Boundaries
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ST. LOUIS RIVER NATURAL AREA PROJECT

St. Louis County, Minnesota

Data Collection Locations

Figure A1-13

Appendix B

Photo Pages



Photo 1 Chambers Grove project area – Dry Sandstone Cliff (Northern), CTn11e.



Photo 2 Chambers Grove project area – eroded hillslope.



Photo 3 Rask Bay project area – example of stressed trees, presumably due to high water. Aquatic vegetation community in foreground.



Photo 4 Rask Bay project area – Black Ash-Silver Maple Terrace Forest, FFn57a.



Photo 5 North Bay project area – Estuary Marsh (Lake Superior), MRu94a. Softstem bulrush dominant, few cattails in this area.



Photo 6 North Bay project area – example of wet-mesic forest present in upland areas of North Bay. Basswood and quaking aspen dominate the canopy in this photo.



Photo 7 North Bay project area – Aquatic vegetation community, some grazed stems of wild rice visible.



Photo 8 North Bay project area – OHV/pedestrian trail, in dry area with no obvious erosion.



Photo 9 Radio Tower Bay project area – Cattail-Sedge Marsh, MRn83a, dominated by hybrid cattail.



Photo 10 Radio Tower Bay project area – Estuary Marsh (Lake Superior), MRu94a, a relatively species diverse marsh community.



Photo 11 Mud Lake project area – Red Oak-Sugar Maple-Basswood-(Bluebead Lily) Forest, MHn35b, on south facing slope above the St. Louis River.



Photo 12 Mud Lake project area – example of disturbed/non-native community in former industrial site.



Photo 13 Munger Landing project area – Black Ash-Aspen-Balsam Poplar Swamp (Northeastern), WFn55a.



Photo 14 Munger Landing project area - Estuary Marsh (Lake Superior), MRu94a, grading into aquatic vegetation community in the St. Louis River.



Photo 15 Tallus Island project area – Aspen-Birch-Red Maple Forest, MHn44a, on Tallus Island.



Photo 16 Tallus Island project area – flowering forbs in Willow-Dogwood Shrub Swamp, WMn82a.



Photo 17 Kingsbury Bay project area – Black Ash-Silver Maple Terrace Forest, FFn57a, with planted trees in cages.



Photo 18 Kingsbury Bay project area – Sedge Meadow, WMn82b, in foreground with nonnative cattail-dominated Estuary Marsh (Lake Superior), MRu94a, in background.



Photo 19 Grassy Point project area – Black Ash-Aspen-Balsam Poplar Swamp (Northeastern), WFn55a.



Photo 20 Grassy Point project area - nonnative cattail-dominated Estuary Marsh (Lake Superior), MRu94a.



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