13.0 CITY OF MENDOTA HEIGHTS

The City of Mendota Heights is located south of the Minnesota River near the confluence with the Mississippi River in Dakota County, between Burnsville and Mendota. Like many communities within the LMRWD, it is located along steep river bluff slopes.

The 2008 Inventory identified 63 sites within the City of Mendota Heights. Through the desktop analysis, one point was removed because it was an erroneous point that did not have any gully information associated with it (**Figure 120**). Using the 2008 locations as the basis for the 2020 project, the field team evaluated 61 locations in the field, including 28 gully sites, 24 pipe outfall sites, and nine combination locations (**Figure 121**).

13.1 Previous Restoration Efforts

There are no known gully restoration projects within the City of Mendota Heights; however, according to the City's Surface Water Management Plan, soil erosion along the bluffs and scour at storm sewer outfalls are known issues. The City has also identified 22 culverts along the 1.5 miles of Union Pacific railroad track located within the LMRWD. Planned projects within the LMRWD include:

- CenterPoint/Commerce Drive Rehabilitation: a $50,000 storm sewer and stormwater BMPs project tied to the City's street rehabilitation project, scheduled for 2020
- Victoria Curve Reconstruction: a $50,000 storm sewer and stormwater BMP project incorporated into the City street reconstruction project, scheduled for 2022

13.2 Field Survey Discussion

Generally, this area within the LMRWD presented difficult access conditions due to steep slopes and areas that were heavily vegetated with buckthorn, which rendered several sites inaccessible, making it impossible to evaluate them during the 2020 Inventory Study. The team accessed the sites in the city by walking down game trails, along Big Rivers Regional Trail, or along the Union Pacific freight railroad tracks. Other sites were located along major roads, but few sites were on or near private property. No interactions with property owners occurred.

13.3 Findings

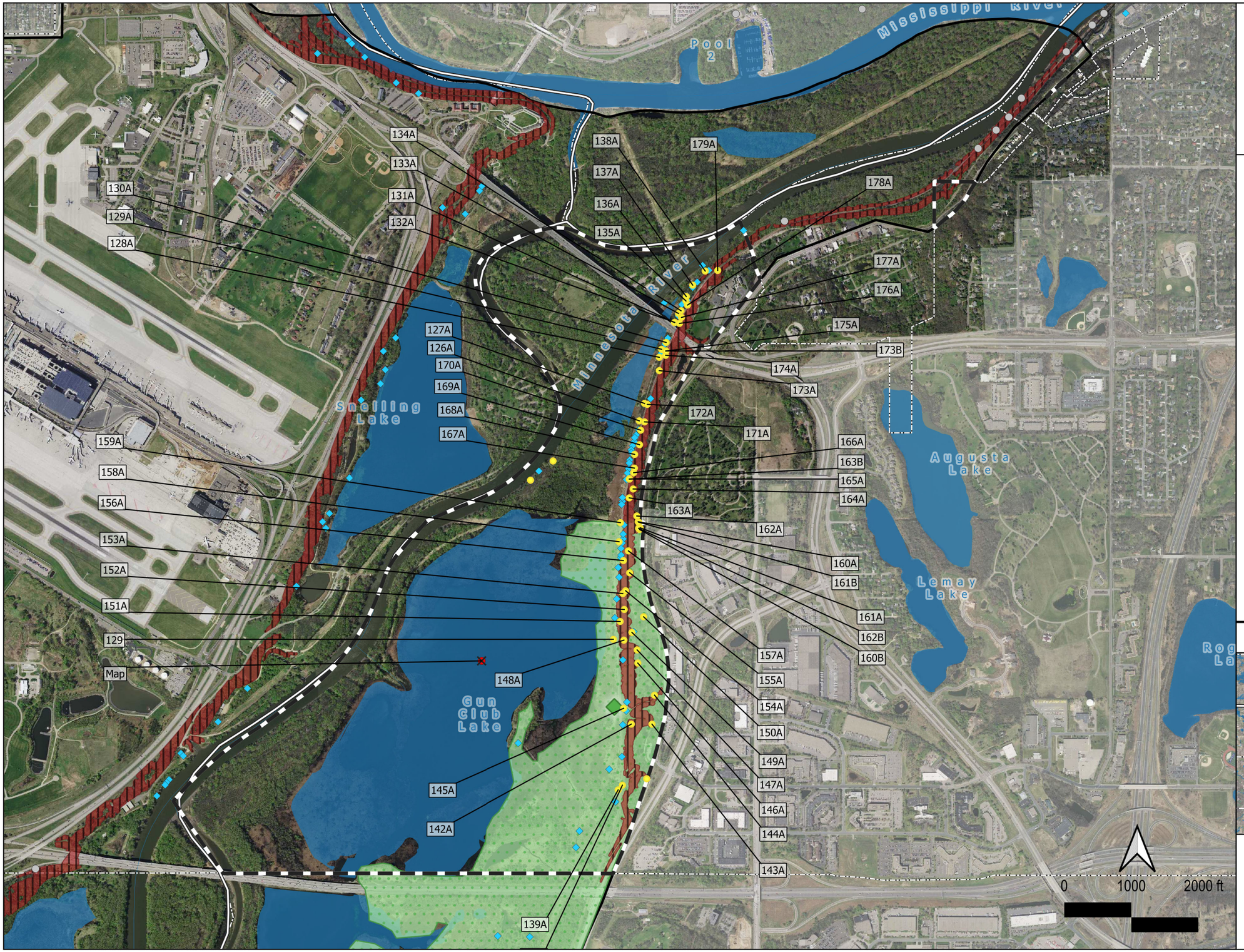
Mendota Heights contained many pipe outfalls along the railroad tracks. Often, a pipe carried stormwater beneath a road or walking trail at the top of a bluff, which would then flow downhill to a second pipe, which carries stormwater runoff underneath the railroad and ultimately to the Minnesota River. The 2008 inventory identified 22 pipe outfalls along the Union Pacific railroad track in Mendota Heights. In 2020,

the field team identified and evaluated 31 pipe outfalls located along the railroad track (**Figure 122**). Seven sites could not be reached due to vegetation, but may be good candidates for either drone inspection or for a reinspection in the early spring or late fall after the loss of foliage.

Mendota Heights contained very few groundwater-fed streams or seeps, despite evidence of groundwater upwelling in the region with the proximity of Black Dog Lake Fen and the numerous springs shown on the MnDNR Spring Inventory. Additionally, most of the gullies in Mendota Heights lay along the Steep Slopes Overlay District and shared similar characteristics (**Figure 123**). Generally, the gully head cut consisted of St. Peter sandstone eroding back and Platteville limestone toppling over the top of the contact. In many instances, upon assessing some of the 2008 gully locations, the field team determined the location would not be considered an actual gully, due to the lack of a distinct, down-cutting flow path formed by water. In those gullies, the wide, bowl-shaped head cut consisted of eroding bedrock, but few problem indicators. Generally, the team did not find that type of feature possessing high erosion potential.

The gullies in Mendota Heights generally contained debris, such as broken glass and litter, along the gully bottom.

Figure 120: Mendota Heights 2008 Inventory Locations



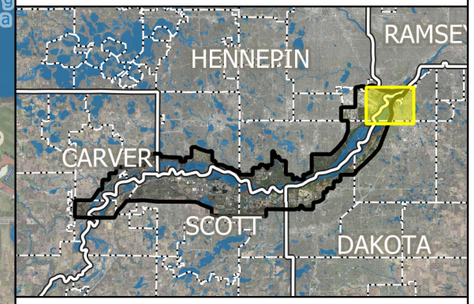
LEGEND

2008 Gully Inventory Waypoints
- Inside LMRWD
- Outside LMRWD Boundary
- Non-Applicable Points
- Outside Mendota Heights
- MnDNR Spring Inventory
- Calcareous Fens
- Public Waters
- Public Waterbodies

LMRWD Overlay Districts
- High Value Resource Area Overlay District
- Steep Slopes Overlay District [SSOD]

Political Boundaries
- Mendota Heights
- LMRWD Boundary
- Cities, Townships, Unincorporated Areas
- County Boundaries

LMRWD Watershed Location Map



Young Environmental Consulting Group, LLC

LOWER MINNESOTA RIVER WATERSHED DISTRICT

Figure 121: Mendota Heights 2020 Survey Locations

LEGEND

- 2020 Pipe Outfall Surveys
- 2020 Combination Surveys
- 2020 Gully Surveys
- 2020 Inaccessible Waypoints
- 2020 Non-Applicable Waypoints
- MnDNR Spring Inventory
- Calcareous Fens
- Public Waters
- Public Waterbodies

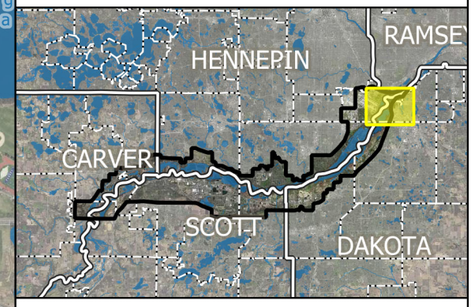
LMRWD Overlay Districts

- High Value Resource Area Overlay District
- Steep Slopes Overlay District [SSOD]

Political Boundaries

- Mendota Heights
- LMRWD Boundary
- Cities, Townships, Unincorporated Areas
- County Boundaries

LMRWD Watershed Location Map



Young Environmental Consulting Group, LLC

LOWER MINNESOTA RIVER WATERSHED DISTRICT

Figure 122: Mendota Heights 2020 Pipe Outfall Conditions

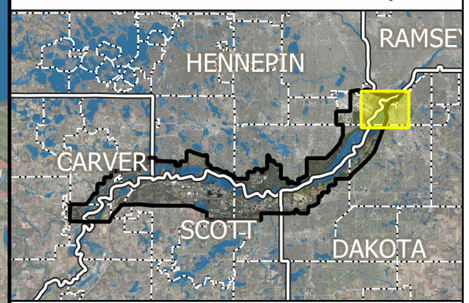
LEGEND

2020 Pipe Outfalls
- Needs Immediate Attention
- Potential/Future Repair Needed
- Good Condition/No Repair Needed
- MnDNR Spring Inventory
- Calcareous Fens
- Public Waters
- Public Waterbodies

LMRWD Overlay Districts
- High Value Resource Area Overlay District
- Steep Slopes Overlay District [SSOD]

Political Boundaries
- Mendota Heights
- LMRWD Boundary
- Cities, Townships, Unincorporated Areas
- County Boundaries

LMRWD Watershed Location Map



Young Environmental Consulting Group, LLC

LOWER MINNESOTA RIVER WATERSHED DISTRICT

Figure 123: Mendota Heights 2020 Gully Conditions

LEGEND

2020 Gully Condition

- High Erosion Potential
- Moderate Erosion Potential
- Good Condition/No Repair Needed
- MnDNR Spring Inventory
- Calcareous Fens
- Public Waters
- Public Waterbodies

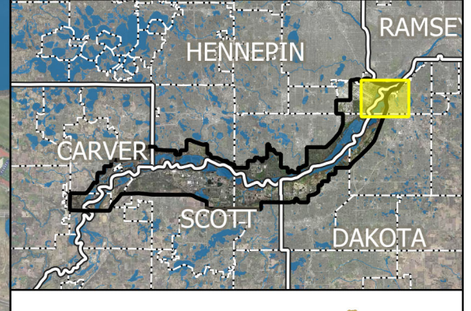
LMRWD Overlay Districts

- High Value Resource Area Overlay District
- Steep Slopes Overlay District [SSOD]

Political Boundaries

- Mendota Heights
- LMRWD Boundary
- Cities, Townships, Unincorporated Areas
- County Boundaries

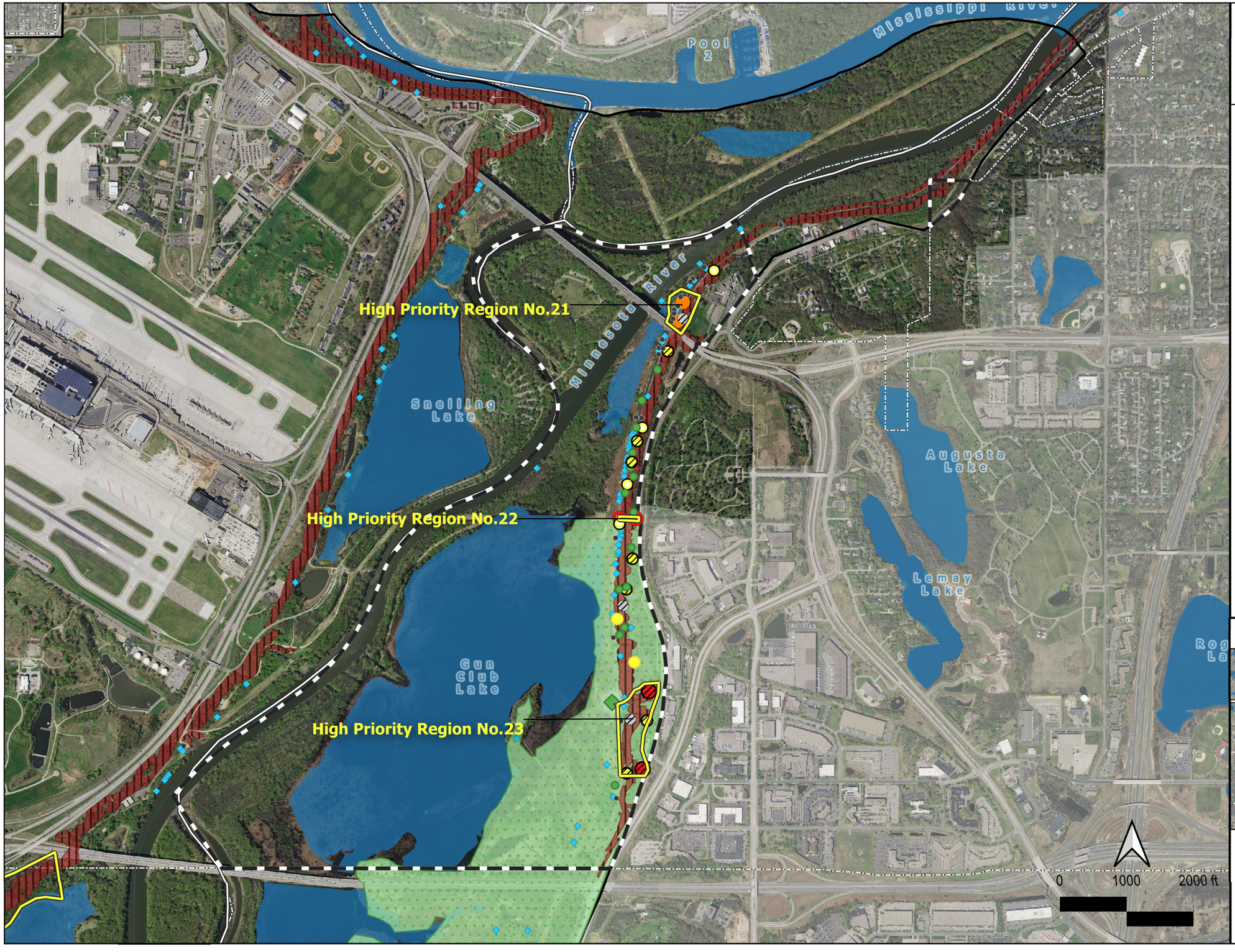
LMRWD Watershed Location Map



Young Environmental Consulting Group, LLC

LOWER MINNESOTA RIVER WATERSHED DISTRICT

Figure 124: Mendota Heights Erosion Progression and HPRs



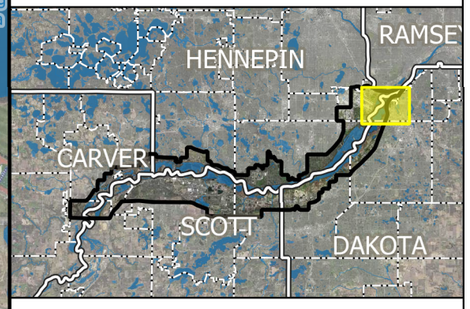
LEGEND

- High Priority Region

Erosion Progression (2008 --> 2020)

- Low --> High
- Moderate --> High
- High --> High
- New Site High
- Low --> Moderate
- Moderate --> Moderate
- New Site Moderate
- Low --> Low
- New Site Low
- Improved
- Non-Gully
- Public Waters
- Public Waterbodies
- High Value Resource Area Overlay District
- Steep Slopes Overlay District
- Mendota Heights
- LMRWD Boundary
- Cities, Townships, Unincorporated Areas
- County Boundaries

LMRWD Watershed Location Map



Young Environmental Consulting Group, LLC

LOWER MINNESOTA RIVER WATERSHED DISTRICT

13.4 Mendota Heights High-Priority Sites

The city of Mendota Heights has three HPRs; HPR 21, 22, and 23, shown in **Figure 124**. All three priority regions include portions of the LMRWD Steep Slopes Overlay District.

- **HPR 21:** These sites were grouped due to their geographic proximity to each other, similar characteristics, and similar erosion progression.
- **HPR 22:** This grouping reflects one large gully channel that has been evaluated with two waypoints, with one at the top of the bluff and one at the bottom.
- **HPR 23:** These sites were grouped because of their geographic proximity to each other, shared access locations, and ultimate discharge location of Gun Club Lake Fen.

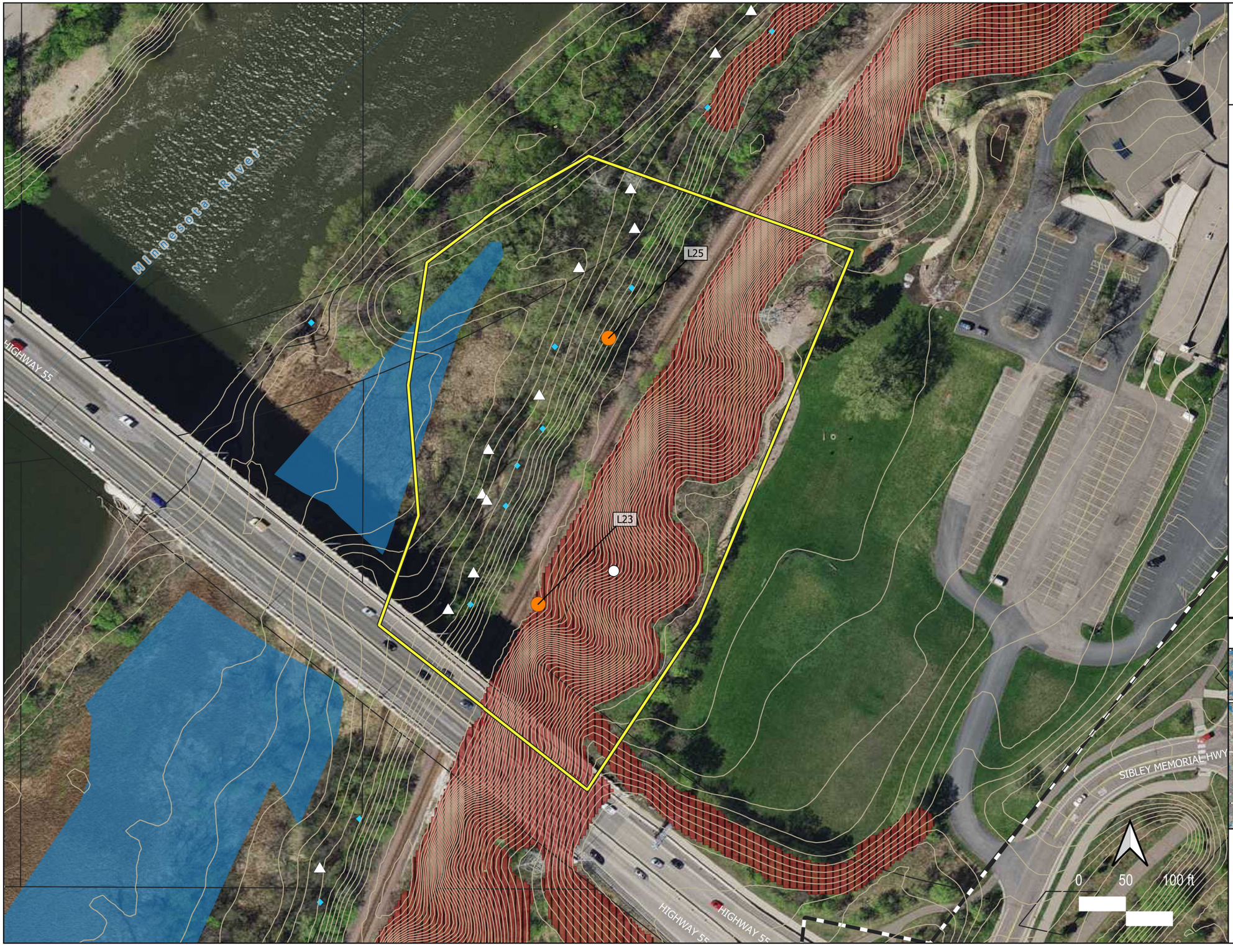
13.4.1 HPR 21

HPR 21 consists of Gullies L25 and L23 (**Figure 125**). Both gullies have progressed from moderate to high erosion potential between 2008 to 2020. The gullies in the region are deep and have a range from narrow to medium-sized channel width. Bare soil around the channels is common to the region, and the soil material was observed to be sandy due to the underlying St. Peter sandstone. Rockfall debris was seen throughout the region, with fractured pieces of bedrock acting as natural armoring for the channels. Throughout the region, eroding bedrock was observed as an apparent cause for gully formation along with high-gradient channel slopes. Leaning trees were commonly observed within HPR 21, pointing to active slope movement. Gully L25 was found to exhibit signs of channel incision and bank slumping. Gully L23 showed signs of degradation near the toe, where it entered a pipe outfall that ultimately drains into the Minnesota River.

In 2008, Gully L25 was described as a medium gully with moderate erosion on the sides; the desktop analysis classified it as moderate erosion potential. The team found that the gully has significantly worsened since the previous evaluation and determined it was now considered to have high erosion potential.

In 2008, Gully L23 was described as “moderate-major erosion” and it was classified as moderate erosion during the desktop analysis. In 2020, the field team observed the gully to have a high erosion potential, finding that the gully has progressed to a worsened state since the previous evaluation. Increased incision, reduced vegetation, and a significant amount of rockfall and fallen tree debris were seen during evaluation in 2020 (**Figure 126**).

Figure 125: Mendota Heights High Priority Region No. 21



LEGEND

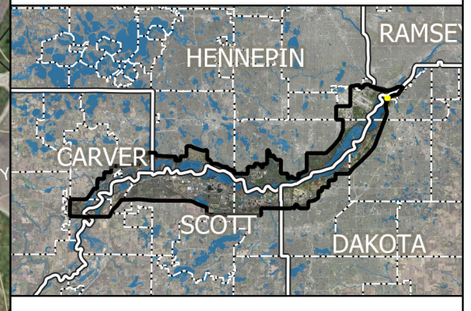
- High Priority Region

High Priority Sites

Other 2020 Locations

- Surveyed Gully
- Surveyed Pipe Outfall
- Dakota Co. 2-ft Contours
- MnDNR Spring Inventory
- Public Waters
- Public Waterbodies
- High Value Resource Area Overlay District
- Steep Slopes Overlay District
- Mendota Heights
- LMRWD Boundary
- Cities, Townships, Unincorporated Areas
- County Boundaries

LMRWD Watershed Location Map



Young Environmental Consulting Group, LLC

LOWER MINNESOTA RIVER WATERSHED DISTRICT

Figure 126. Upstream view of Gully L23; 3a is an upstream view of Gully L23's channel taken in 2008, 3b is an upstream view of Gully L23's channel taken in 2020.

13.4.2 HPR 22

HPR 22 consists of one gully composed of two sites, L17 and 999-047 (**Figure 127**). A culvert under Sibley Memorial Highway forms Gully L17, which discharges west into the gully, toward the Minnesota River over the top of the bluffs. At the bottom of the hillslope, the stormwater runoff has carved a scour hole and created the channel of Gully 999-047, which ultimately drains into Gun Club Lake Fen. Due to the proximity to Gun Club Lake Fen and location within the HVRA, this site was elevated to a regional high-priority ranking. **Figure 128b** shows the top of the knickpoint at the end of L17, **Figure 128c** depicts the end of the knickpoint forming the downstream channel of 999-047. In general, the gully system was found to have bare banks with an armored channel bottom due to rockfall debris. Both reaches of the channel were U-shaped and the gully material was found to be St. Peter sandstone. Differential weathering rates of the bedrock and overlying soil create incised and overhanging banks. **Figure 128b** shows an example of the differential weathering rates typical of this gully system; characterized by the overhanging, jutted out soil on top of receding sandstone outcrops below. Slumping was observed throughout the system, and leaning trees point to active slope movement. The steep knickpoint at the end of L17 causes degradation in the downstream channel of the system. The apparent causes for gully formation in HPR 22 were channel slope, incision, unstable drainage features, and eroding bedrock.

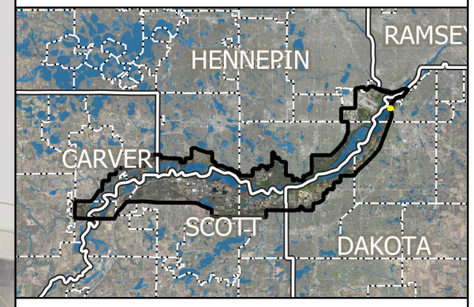
In 2008, the Gully L17 was noted to have "erosion due to a culvert creating a 3–4-foot-deep channel," as depicted in **Figure 128a**. During the 2020 desktop analysis, the team determined it was a high erosion potential site. The 2020 field observations are consistent with the previous findings and the site has remained a high erosion potential. Gully 999-047 was not evaluated in the 2008 survey, and with no previous benchmark its erosion progression is thus unknown.

Figure 127: Mendota Heights High Priority Region No. 22

LEGEND

- High Priority Region
- High Priority Sites
- Other 2020 Locations
- Surveyed Gully
- Surveyed Pipe Outfall
- Dakota Co. 2-ft Contours
- MnDNR Spring Inventory
- Public Waters
- Public Waterbodies
- High Value Resource Area Overlay District
- Steep Slopes Overlay District
- Mendota Heights
- LMRWD Boundary
- Cities, Townships, Unincorporated Areas
- County Boundaries

LMRWD Watershed Location Map



Young Environmental Consulting Group, LLC

LOWER MINNESOTA RIVER WATERSHED DISTRICT

Figure 128. Left to right: a. Gully L17 upstream view in 2008; b. Gully L17 downstream view in 2020; c. Upstream view of end of knickpoint and start of Gully 999-047 in 2020.

13.4.3 HPR 23

HPR 23 consists of Gullies L317 and L319 (**Figure 129**). Both gullies discharge into Gun Club Lake Fen and threaten that high-value resource, further providing rationale for the region's grouping and high-priority ranking. Due to the variable characteristics of the gullies in the region, each gully is described individually.

Gully L317 was a long, deep gully whose channel showed signs of slumping, undercut banks, and leaning trees. Rockfall debris was observed in the channel, and the steep gully slope was listed as one of the apparent causes of its formation. A large amount of buckthorn was found around the gully channel, with dense canopy listed as the other apparent cause.

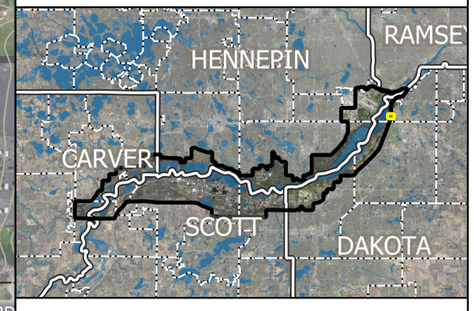
L317 was evaluated in 2008 and described as having major erosion; it was rated during the 2020 desktop analysis as having a high erosion potential. The field team confirmed this rating in 2020, finding the site to have high erosion potential. **Figure 130** shows a side-by-side comparison of the downstream channel from 2008 and 2020. Both images show overhanging and incised banks, with exposed roots, slumping, and steep bank slopes evident, further providing reasoning for the high erosion potential ranking attributed to it.

Figure 129: Mendota Heights High Priority Region No. 23

LEGEND

- High Priority Region
- High Priority Sites
- Other 2020 Locations
- Surveyed Gully
- Surveyed Pipe Outfall
- Dakota Co. 2-ft Contours
- MnDNR Spring Inventory
- Public Waters
- Public Waterbodies
- High Value Resource Area Overlay District
- Steep Slopes Overlay District
- Mendota Heights
- LMRWD Boundary
- Cities, Townships, Unincorporated Areas
- County Boundaries

LMRWD Watershed Location Map



Young Environmental Consulting Group, LLC

LOWER MINNESOTA RIVER WATERSHED DISTRICT

Figure 130. Photo 'a' is an upstream view of Gully 317's channel taken in 2008, Photo 'b' is a downstream view of Gully 317's channel taken in 2020.

Gully L319 is a long, medium-sized gully with a variable depth formed from an existing outfall pipe with severe downstream erosion that creates a downstream channel. The gully had exhibited evidence of slumping, incision, and degradation, undercutting the channel banks leading to slope instability exemplified by leaning trees. In 2008, it was described as having major erosion with large cuts into the ground stemming from a culvert. During the 2020 desktop analysis, it was benchmarked as a high erosion potential site. In 2020, the team confirmed these findings, documenting a down-cut channel exhibiting major erosion downstream of a pipe outfall and ranking it as a high erosion potential site. **Figure 131** is a side-by-side comparison of upstream views of L319's channel taken in 2008 and 2020. Both images depict incised stream channels and severely overhanging banks. Photo 'b' shows the increased channel incision observed at the time of the visit during the 2020 study, representing the evolution of the gully since 2008.

Figure 131. Photo 'a' shows the upstream view of Gully L319's channel taken back in 2008; Photo 'b' shows the upstream view of Gully L319's channel taken in 2020.