

Phase 4 MnDOT Slope Vulnerability Assessments

Jen Holmstadt, Principal Investigator
WSB & Associates, Inc.

FEBRUARY 2021

Research Project
Final Report 2021-04

To request this document in an alternative format, such as braille or large print, call [651-366-4718](tel:651-366-4718) or [1-800-657-3774](tel:1-800-657-3774) (Greater Minnesota) or email your request to ADArequest.dot@state.mn.us. Please request at least one week in advance.

Technical Report Documentation Page

1. Report No. MN 2021-04	2.	3. Recipients Accession No.	
4. Title and Subtitle Phase 4 MnDOT Slope Vulnerability Assessments		5. Report Date February 2021	
		6.	
7. Author(s) Jen Holmstadt, Nick Bradley, Nick Rodgers		8. Performing Organization Report No.	
9. Performing Organization Name and Address WSB & Associates, Inc. 701 Xenia Ave South, Suite 300 Golden Valley, MN 55416		10. Project/Task/Work Unit No.	
		11. Contract (C) or Grant (G) No. (C) 1036332	
12. Sponsoring Organization Name and Address Minnesota Department of Transportation Office of Research & Innovation 395 John Ireland Boulevard, MS 330 St. Paul, Minnesota 55155-1899		13. Type of Report and Period Covered Final Report	
		14. Sponsoring Agency Code	
15. Supplementary Notes http://mndot.gov/research/reports/2021/202104.pdf			
16. Abstract (Limit: 250 words) Phase 4 Slope Vulnerability Assessments is a continuation of Phases 1-3 previously conducted by WSB and MnDOT to determine the risk of slope failure along state highways. This phase includes 16 counties located in districts 1 and 3 and the Metro. The three main components of the model are 1) identify past slope failures, 2) model the causative factors of past failures and how they vary locally, and 3) model the risk of new slope failures. The vulnerability factors and expected failure types reflect the diverse geomorphology of Northeast Minnesota. Vulnerability factors for the new study area include slope angle, curvature, relief, slope orientation (aspect), and water table depth. The preliminary model developed prior to the field visit was underestimating slope vulnerability and was not effectively capturing all historical failure types. WSB determined the solution was to re-design the historical failures model. The model was refined and led to an improved vulnerability output. Model results were ranked into four proposed risk-management categories: action recommended, further evaluation, monitoring, and no action recommended. The risk estimation process was considered preliminary; further consideration of risk tolerance and consequence definitions should be conducted. Preliminary risk results indicated that 499 management areas and 1.4% of the total area was categorized as action recommended under the proposed risk matrix. The results of this study were intended to be the first step of actions required in minimizing slope failure effects including expensive mitigation and maintenance repairs and threats to public safety.			
17. Document Analysis/Descriptors Slopes, slope failure, risk, risk assessment, landslides, erosion, geotechnical engineering, geomorphology, geographic information systems, computer models		18. Availability Statement No restrictions. Document available from: National Technical Information Services, Alexandria, Virginia 22312	
19. Security Class (this report) Unclassified	20. Security Class (this page) Unclassified	21. No. of Pages 155	22. Price

PHASE 4 MNDOT SLOPE VULNERABILITY ASSESSMENTS

FINAL REPORT

Prepared by:

Jen Holmstadt
Nick Bradley
Nick Rodgers
WSB & Associates, Inc.

FEBRUARY 2021

Published by:

Minnesota Department of Transportation
Office of Research & Innovation
395 John Ireland Boulevard, MS 330
St. Paul, Minnesota 55155-1899

This report represents the results of research conducted by the authors and does not necessarily represent the views or policies of the Minnesota Department of Transportation or WSB & Associates, Inc. This report does not contain a standard or specified technique.

The authors, the Minnesota Department of Transportation, and WSB & Associates, Inc. do not endorse products or manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to this report.

ACKNOWLEDGMENTS

WSB would like to acknowledge Raul Velasquez and Katie Fleming. Their contributions and guidance were invaluable. WSB would also like to acknowledge the members of the Technical Advisory Panel for their time, ideas, and positive contributions to the final project: Nathan Bausman, James Bittmann, Chris Dulian, Shannon Foss, Bernard Izevbekhai, Sara Johnson, Blake Nelson, Tony Runkel, Andrew Shinnfield, Amy Thorson, and Jennifer Wiltgen.

TABLE OF CONTENTS

CHAPTER 1: Introduction	1
1.1 Phases 1-3 Summary	1
CHAPTER 2: LITERATURE REVIEW	2
2.1 Geomorphology.....	2
2.1.1 Geomorphic History of the Precambrian Bedrock in Northeast Minnesota	2
2.1.2 Geomorphic History of the Glacial Lobes in Northeast Minnesota.....	3
CHAPTER 3: MODEL DESIGN	5
3.1 Part 1 – Historical Slope Failures Model	5
3.1.1 Complex Slope Failures.....	5
3.2 Part 2 – Causative Factors.....	6
3.2.1 Bedrock Proximity	7
3.2.2 Soil Thickness	7
3.2.3 Slope Orientation	7
3.2.4 Slope, Relief, Terrain Curvature, and Water Table Depth	7
3.3 Part 3 – Model Slope Failure Probability	8
CHAPTER 4: DATA COLLECTED	9
CHAPTER 5: SENSITIVITY ANALYSIS.....	10
5.1 Phases 1-3 Recap.....	10
5.1.1 Elevation Data Resolution.....	10
5.1.2 Appropriate Size of the Study Area	11
5.1.3 Testing Site Selection.....	11
5.2 Phase 4 Ability of the geomorphic index to detect historical failures.....	11
5.3 Phase 4 Testing Vulnerability Factors	12
5.3.1 Phase 1 Final Input Parameters	12

5.3.2 Phase 2 Final Input Parameters	12
5.3.3 Phase 3 Final Input Parameters	12
5.3.4 Phase 4 Vulnerability Factors.....	13
5.3.5 Phase 4 Final Input Parameters	14
5.3.6 Further Testing: Individual Regions vs. Entire Study Area	14
5.4 Summary.....	15
CHAPTER 6: PRODUCE RISK MAPS	17
6.1 Draft PDF Maps	17
6.2 Risk Ranking	17
6.2.1 Methodology.....	17
6.2.2 Results	18
CHAPTER 7: Field verification.....	19
7.1 Methods.....	19
7.2 Model Progress Prior to Visit	19
7.3 Rationale for Site Selection	19
7.3.1 Site 1 – MN23 Holyoke, Carlton County, District 1	19
7.3.2 Site 2 – MN23 Holyoke, Carlton County, District 1	19
7.3.3 Site 3 – MN23 Holyoke, Carlton County, District 1	20
7.3.4 Site 4 – MN210 Esko, Carlton County, District 1	20
7.3.5 Site 5 – MN210 Esko, Carlton County, District 1	20
7.3.6 Site 6 – MN210 Esko, Carlton County, District 1	20
7.4 Equipment.....	20
7.5 Results.....	20
7.5.1 Site 1 – MN23 Holyoke, Carlton County, District 1	20
7.5.2 Site 2 – MN23 Holyoke, Carlton County, District 1	21

7.5.3 Site 3 – MN23 Holyoke, Carlton County, District 1	21
7.5.4 Site 4 – MN210 Esko, Carlton County, District 1	22
7.5.5 Site 5 – MN210 Esko, Carlton County, District 1	22
7.5.6 Site 6 – MN210 Esko, Carlton County, District 1	22
7.6 Model Refinement.....	23
7.7 Conclusions	24
CHAPTER 8: Final Report, Final Maps, GIS Model and Documentation	25
8.1 Final PDF Maps	25
8.2 Vulnerability Raster Files	25
8.3 Proposed Management Areas ShapeFiles	25
8.4 GIS Model and Documentation	25
8.5 Recommended Next Steps.....	25
REFERENCES	27
APPENDIX A	

EXECUTIVE SUMMARY

Geohazards are environmental risks to infrastructure. Unstable slopes, floods, excessive precipitation, karst, and seismic events are examples of environmental risks that damage state transportation assets and cause injury or even loss of life. Geohazards are managed through the implementation of geohazard risk assessments that quantify risk factors and incorporate them into transportation asset management plans (TAMPs).

Phase 4 Slope Vulnerability Assessments is a continuation of Phases 1-3 previously completed by WSB and MnDOT to determine the risk of slope failure along state trunk highways. The results from previous phases objectively identified risk and prioritized areas recommended for management using a new Geographic Information Systems (GIS) model that can be implemented anywhere in the state. This model was refined for the Phase 4 study area to reflect the geomorphology in this part of the state. The results of this study are intended to be the first step of actions required in minimizing the effects of slope failure including expensive mitigation actions and public safety hazards.

Literature Review and GIS Model Design

WSB incorporates a combination of geomorphology and GIS to identify the risk of slope failures along state trunk highways. This combination provides a powerful approach that identifies and statistically tests the specific causes of slopes failures with minimal data input, while covering more ground than previous research methods.

Geomorphology

The Phase 4 study area is one of the most diverse areas in the state in terms of hillslope geomorphology. This part of the state contains small mountain ranges consisting of igneous rock, steep bluffs along Lake Superior, glacial hummocky terrain, highly erodible streams, and areas of relatively low relief. Surface coarseness—or the roughness, irregularity, and unevenness of the terrain—varies widely in this study area. This variability is due to a wide range in topographic relief and depositional and erosional processes. The surface coarseness of slope failures also varies widely in this study area. For example, rock falls and rock topples are relatively coarse and other failure types such as low, gradual, rotational slides are relatively smooth. The literature review chapter in this report outlines the geomorphic history of the Precambrian bedrock and the glacial lobes in the study area. These geomorphic histories explain why several landforms are characteristic to this part of the state only. The literature also describes landforms that resemble similar characteristics to other phases of this project.

GIS Model

Results from Phases 1-3 indicated that the most powerful slope failure models account for past slope failures. Therefore, WSB created a method for detecting past slope failures using geomorphology and elevation data. Geomorphology was used to analyze terrain and landforms associated with slope failures; almost all slope failures have unique terrain in comparison to their surrounding environment. GIS and elevation data were used to highlight the areas that have geomorphic features resembling slope

failures along the state highways. These areas reveal thousands of slope failures including, slides, lake shores, riverbanks, and surface erosion.

The past slope failures model was applied to the study area to ensure the same types of slope failures identified in Phases 1-3 were accounted for as well as 1 additional type—complex failures consisting of two or more failure types. Results from Phase 4 indicated that the same types of slope failures identified in Phases 1-3 were accounted for as well as complex failure types. The historical failures reflect the diversity of geomorphology and failure types occurring in this region. The initial model developed in this phase prior to field validation did not fully capture this diversity. The past failure model was initially more focused on coarser failure types such as rock falls and translational and rotational slides. These failure types have distinct headscarps and more accumulated debris. The sensitivity analysis described in the next section tested the initial past failure model, but the model was further refined post-field validation activities.

Data on past slope failures are incorporated into the second part of the model—model for causative factors. Slope failure models that incorporate data on potential causative factors provide for a much more powerful approach to identifying risk. WSB designed a GIS model that permits any vulnerability factor (potential causative factor) to be tested. This process is important for providing a non-biased study and results that are driven by data. Furthermore, this design recognizes that slope angle is not always the best indication of slope failure in every region and that other factors may be at play. For the Phase 4 study area, WSB designs new datasets derived from elevation and bedrock data and post-processes them—slope orientation/aspect, depth to bedrock, and soil thickness.

The final step of the model—model for new slope failures—was revised using the new input parameters statistically tested for the new study area. These input parameters were tested as part of the sensitivity analysis described in the next section. Once the input parameters were determined, the model computed a logistic regression, like Phases 1-3, to identify the risk of slope failure for the entire study area.

Sensitivity Analysis

Once the GIS model was designed, a series of tests, collectively called a sensitivity analysis, was conducted to determine how well the model performed. The sensitivity analysis for this study tested 5 important parameters: elevation data resolution, size of the study area, capability of identifying past slope failures, site selection, and capability of identifying causative factors. The results from the sensitivity analysis revealed that:

- 10-meter elevation data resolution was most appropriate.
- Dividing the study area into sub-regions based on similar geomorphology/geology did not statistically enhance the model.
- The geomorphic index model for identifying past failures initially underestimated the number and size of historical failures and was adjusted.
- The most important factor in site selection was including locations from both failed and non-failed areas.

- 5 vulnerability factors with greatest statistical strength were initially selected as model input parameters (slope, elevation, slope orientation, depth to bedrock, and relief) and were later adjusted post-field validation.

Once the sensitivity analysis was complete, the model was initially executed for just Carlton County in preparation for the field. After the field verification, described below in more detail, final adjustments were made, and the model was scripted and executed for 16 counties in 3 districts: Aitkin, Carlton, Cook, Itasca, Lake, Pine, and St. Louis (District 1); Benton, Cass, Crow Wing, Isanti, Kanabec, Mille Lacs, and Morrison (District 3); Anoka and Chisago (Metro). Draft PDF maps were completed for these 16 counties.

Field Verification

The objective of this task was to field verify the model developed in previous tasks. This task included 6 site visits—three along TH 23 north of Holyoke and 3 along TH 210 in Jay Cooke State Park. WSB collaborated with the Technical Advisory Panel (TAP) committee to select the sites. WSB determined that the preliminary model developed prior to the field visit was underestimating slope vulnerability. Field observations provided the necessary information needed to enhance the model. Post-field analysis compared the field results with the preliminary model outputs to determine the cause of underestimation. The analysis revealed that the historical failures model was the cause of underestimation. The model was not effectively capturing all historical failure types because some historical failures were less coarse than previously thought. These less coarse failure types include gradual rotational slides and steep translational slides. WSB determined the solution was to redesign the historical failures model to match the field observations and the newly expected failure types for this study area. The new historical failures model specifically identifies headscarps by locating areas with sharp but local changes in terrain. Previous historical failures models used a roughness index. However, the results of this task show that using a roughness index is not the most efficient method for this study area.

The vulnerability factors were tested against the new past failure model. Statistical testing revealed that slope angle, relief, curvature, slope orientation, and groundwater depth have the strongest correlations with the past failure model. The draft PDF maps of all 16 counties for this phase were created with these vulnerability factors as the model input parameters. The new vulnerability output was analyzed at all the field sites to determine if the enhancements lined up with the documented field observations. The results of the analysis showed that the corrections made to the model led to an improved vulnerability output that was supported by field observations and provided a more accurate depiction of relative vulnerability.

Risk Estimation

Risk estimation involves two main components: the likelihood of failure (estimated from the model) and consequence to infrastructure (e.g., densely populated areas, and proximity to road centerlines). Risk is the product of these components and can be calculated using a risk matrix. To be most effective, risk matrices must have robust probability and consequence definitions. The outcome of risk matrices is defined levels of management. The matrix in this study has 4 proposed categories of risk management:

1. Site visit/action recommended* (A site specific study is recommended to determine the best mitigation strategy for the slope.)
2. Further evaluation* (A site specific study is recommended to more accurately classify and prioritize the slope.)
3. Monitoring* (Periodic checks on the slope are recommended.)
4. No further action recommended* (The risk is at an acceptable level and no action is necessary for this slope at this time.)

Risk ranking was conducted at the “management area” level for this study. A management area is defined as local regions consisting of one or more slopes with similar geomorphic, geologic, or hydrologic settings. Proposed management areas were delineated in GIS and then ranked using the risk matrix. Delineation took place at a scale that balanced efficiency and accuracy. The results from the risk ranking determined:

- Action Recommended*: 499 areas (37.17 mi²)
- Further Evaluation*: 755 areas (12.11 mi²)
- Monitoring*: 2154 areas (20.39 mi²)
- No Action*: the rest of the area of interest (2564.36mi²)

NOTE: * Denotes preliminary terminology

Recommended Next Steps

The results of this study are intended as the first step of actions required in minimizing the effects of slope failure including expensive mitigation actions and dangers to public safety. In this study, the GIS model developed in previous phases was refined and implemented to identify slope vulnerability along state trunk highways for 16 more counties. The model’s capability of identifying slope vulnerability anywhere in the state with minimal data input was field verified. Final maps depicting slope vulnerability for 16 counties in 3 districts were produced and proposed management areas were ranked based on risk that can provide useful information for district, county, or city engineers, planners, project managers, and maintenance staff. Several steps should be taken to maximize the value and usefulness of the model:

- Complete a robust risk estimation that incorporates the geomorphic vulnerabilities evaluated in this study with consequence definitions that will guide further action
- Design and implement mitigation and monitoring programs including severe weather investigations
- Incorporate additional geohazard risks such as subsidence into the state’s TAMP and/or Georilla

CHAPTER 1: INTRODUCTION

Phase 4 Slope Vulnerability Assessments is a continuation of Phases 1-3 previously completed by WSB and MnDOT to determine the risk of slope failure along state trunk highways. In previous phases, a new Geographic Information Systems (GIS) model was developed that can be implemented anywhere in the state. This model has been refined to reflect the geomorphology of the Phase 4 study area. The model identifies risk and prioritizes areas recommended for management for 16 additional counties. Through completion of this project, all 87 Minnesota counties have been modeled.

This report outlines the methods and results of each task of this project as well as recommended next steps. The results of this study are intended to be the first step of actions required in minimizing the effects of slope failure including expensive mitigation actions and threats to public safety. Below are the following tasks discussed in this report:

- Task 2 – Literature Review
- Task 3 – GIS Model Design
- Task 4 – Data Collection
- Task 5 – Sensitivity Analysis
- Task 6 – Draft PDF Maps and Risk Rankings
- Task 7 – Field Verification
- Task 8 – Final Report, Final Maps, GIS Model and Documentaion

1.1 PHASES 1-3 SUMMARY

Phases 1-3 were conducted from 2017 to 2020. In this study, a new GIS model was designed and implemented to identify slope vulnerability along trunk highways (Appendix A; Figure 1). The model provides an innovative, objective, and systematic approach to further understand geohazard risk to the state's transportation infrastructure. The model's capability of identifying slope vulnerability anywhere in the state with minimal data input was field verified. Final maps depicting slope vulnerability were produced for 71 counties and proposed management areas were ranked based on preliminary risk categories that provide useful information for district, county or city engineers, planners, project managers, and maintenance staff. The results can be incorporated into the state's transportation asset management plan (TAMP) or as part of Georilla (MnDOT's internal GIS platform).

CHAPTER 2: LITERATURE REVIEW

The main objective of the literature review was to understand how the model designed in Phases 1, 2, and 3 should be revised for the new study area (Appendix A; Figure 2). Phases 1, 2, and 3 methodologies, data requirements, and vulnerability factors were reviewed as well as documentation on historical landslides. The model designed in Phases 1, 2, and 3 uses a combination of geomorphology and GIS. This combination provides a powerful approach that identifies and statistically tests the specific causes of slope failures with minimal data input. However, the geomorphology of Minnesota varies across the state, requiring that the model be redesigned to capture the most important vulnerability factors and expected failure types for each region.

2.1 GEOMORPHOLOGY

The natural processes that result in slope failures are understood through geomorphology, the science of landscape evolution and function. Geomorphology is a multidisciplinary science incorporating terrain attributes, geology, hydrology, soil science, and climate science. Geomorphology provides a specific framework for understanding why a slope failure is occurring in a given location. A geomorphic approach allows for a more thorough risk assessment evaluation than a single disciplinary approach because it accounts for the local variation of causative factors and how they exacerbate one another.

Phase 1 included steep terrain and bedrock exposures characteristic of the Driftless Area (not affected by the last glaciation) in the southeastern part of the state. Phase 2 included a significant portion of the Minnesota River Valley in the southwestern and southcentral parts of the state that contains steep slopes along river tributaries formed by the catastrophic drainage of Glacial Lake Minnesota. Phase 3 had two major types of geomorphology: low relief and gradual slopes formed in the bed of Glacial Lake Agassiz in the northwest and far north part of the state, and glacially eroded and deposited landforms such as hummocky terrain formed by receding glaciers in the northcentral part of the state.

The Phase 4 study area contains geomorphology that is both similar to and unique from the study areas of Phases 1, 2, and 3. The Phase 4 study area contains the Precambrian bedrock. Resistant metamorphic and igneous rocks support some small mountain ranges with steep slopes and exposed bedrock. The Phase 4 study area also includes deposits from the Wisconsin Glaciation. These deposits of glacial till form gently rolling terrain.

The geomorphology of the Phase 4 study area is expected to form the basis of the model design. Therefore, review efforts began with understanding the geomorphology of this study area and how it compares to Phases 1, 2, and 3. Review of the geomorphology provides valuable information for the vulnerable conditions, expected failure types, and new data requirements for the model.

2.1.1 Geomorphic History of the Precambrian Bedrock in Northeast Minnesota

The northern part the Phase 4 study area contains the highest elevations in the state (Appendix A; Figure 3) along with shallow Precambrian bedrock. The bedrock in this area formed between

approximately 2.6 and 1 billion years ago (Jirsa et al., 2011). The oldest of these rocks were formed during the Archean while the Superior craton was forming. This bedrock is found mainly in the north-central and northwest parts of the Phase 4 study area but is much closer to the surface in the north-central portion. The younger bedrock was formed in the Proterozoic over the course of multiple tectonic rifts and mountain building events. During these events, rocks intruded into the crust and were deformed and eroded. These rocks are found in the northeast, central, and southern parts of the Phase 4 study area but are most exposed in the northeast. Northern Minnesota supports small mountain ranges throughout such as the Sawtooth Mountains and the Mesabi Range. There is little soil cover in the area and bedrock is frequently exposed on the surface (Anderson and Grigal, 1984). A unique feature in the Phase 4 study area is the Lake Superior Shoreline, where waves batter the rocks along the coast. The surface geology along the shoreline is a mix of Precambrian bedrock and glacial sediments (Johnston et al., 1994).

This brief geomorphic history explains 1) the specific slope failure types expected in this region, 2) the relatively high elevation in this region, 3) the rough terrain and 4) the abundance of bedrock outcrops. Expected failure types in this region include rockfalls and rockslides. This type of failure was seen in the Phase 1 study area, however, the type of bedrock in northern Minnesota is much more resistant than the limestone of southeastern Minnesota. In areas with more soil, rotational and translational slides may occur. The waves along the Lake Superior shoreline are a feature that is unique to this phase's study area (Appendix A; Figure 4). Slopes along the shoreline may have different failure types or fail at different rates than slopes in other parts of the study area.

2.1.2 Geomorphic History of the Glacial Lobes in Northeast Minnesota

The Phase 4 study area in the eastern part of the state is less rugged than the terrain of the north. The eastern part of the state has landforms associated with the last glacial maximum. Deposits from four glacial lobes are found in the Phase 4 study area (Lusardi and Dengler, 2017). The Wadena, Rainy, Superior, and Des Moines lobes are responsible for the majority of the glacial sediment in the study area. These lobes all formed during the Wisconsin glaciation which occurred between approximately 75,000 and 11,000 years ago. The Wadena lobe deposited sediment grey limestone in west-central Minnesota. This lobe covers the least amount of the Phase 4 study area. Both the Superior and Rainy lobes originated from the northeast and eroded igneous and metamorphic bedrock. The superior lobe deposits contain red sandstone, giving them a unique red color. The Des Moines lobe was the final of the four lobes to reach Minnesota. The deposits from the Des Moines lobe are made from shale-derived sediments and are grey in color. The deposition of the sediment and debris from all four lobes is responsible for forming the present-day gently rolling topography of this region. The low-lying depressions between these hills filled in with water and formed several lakes. As a result, the Phase 4 study area has many hilly regions.

This geomorphic history explains why several landforms are characteristic to this part of the study area only. Furthermore, this history explains why this region has different elevation, relief, slope, and particle sizes compared to other parts of the study area. Expected failure types in this region include rotational slides that are likely to occur along any steep hills as well as along lake shorelines. Translational slides

may occur in areas with sandier soils. Heavy rainfall in this region may exacerbate the risk of slope failures by causing higher water levels in lakes and more frequent flooding. The terrain left by these glacial lobes is similar to terrain in the Phase 3 study area which will help inform which vulnerability factors are important.

CHAPTER 3: MODEL DESIGN

The purpose of Task 3 was to refine the model developed in Phases 1, 2, and 3. This section describes the 3 main components of the model and how each was refined to apply to the Phase 4 study area. Specifically, this section discusses the methods used to design the new datasets required for the model.

3.1 PART 1 – HISTORICAL SLOPE FAILURES MODEL

Results from Phases 1, 2, and 3 indicated that the most powerful slope failure models account for past slope failures. Therefore, WSB created a method for detecting past slope failures using geomorphology and elevation data. Geomorphology was used to analyze terrain and landforms associated with slope failures; almost all slope failures have unique terrain in comparison to their surrounding environment. GIS and elevation data were used to highlight the areas that have geomorphic features resembling slope failures along the state highways. These areas reveal thousands of slope failures including, slides, rockfalls, lake shores, riverbanks, and surface erosion.

The past slope failures model was applied to the study area to ensure that the same types of slope failures identified in Phases 1, 2, and 3 were accounted for. Results from Phase 4 indicated that the same types of slope failures identified in Phases 1, 2, and 3 are accounted for as well as previously unrecorded complex slides along the Lake Superior shoreline and along steep tributaries in the Jay Cooke State Park area. Unlike Phase 3, which was comprised mainly of low-relief deep-seated rotational slides with relatively low slope angles, the past slope failures in Phase 4 occur on steep terrain in high relief environments. Translational and rotational slides were most common in the glacial deposits. These types of failures also occurred along the shoreline. Rock falls and rockslides were more common along areas with shallow bedrock particularly in the northeast part of this study area and along the shoreline. Verification of the model's ability to identify past slope failures was conducted in Task 5 (Sensitivity Analysis), where these results were checked with aerial photos, hillshade data, and documented historical slope failures mentioned in news articles and records from MnDOT the Geotechnical Section (Daily Global News, 2012; Meryhew, 2012; Adaptation Clearinghouse; 2013; Montgomery, 2013; Meyers, 2014).

3.1.1 Complex Slope Failures

The Phase 4 study area is one of the most variable parts of the state in terms of types of slope failures and sensitivity to erosion (Fitzpatrick et al., 2006). Complex slope failures are a combination of two or more types of slope failures (e.g. rotational slide-mudflow, or rockslide-translational slide) (Highland, 2004). This results in failures with different combinations of material including soil, sediment, rock fragments, or large amounts of water. Complex failures may also initiate as one type of failure and then transform into another (Crosta, 2001). The varied landscape of bedrock and soil mantled slopes as well as the Lake Superior shoreline are factors that explain why this area experiences more complex slope failure types. The exact failure combination may vary depending on the specific part of the study area. For example, landslide-rockfall failures are more prevalent along the shoreline, whereas landslide-flow

failures may occur near the Jay Cooke State Park region as was the case with several tributaries during the 2012 rain event. The GIS algorithm designed to identify past slope failures is the same as the one utilized in Phases 1 and 2 that contained naturally steep slopes, bedrock outcrops, and high relief.

3.2 PART 2 – CAUSATIVE FACTORS

Slope failure models provide a much more powerful approach to risk identification when they incorporate data on potential causative factors. WSB designed a GIS model that permits any vulnerability factor (potential causative factor) to be tested. This process is important for providing a non-biased study and results that are driven by data. Furthermore, this design recognizes that slope angle is not always the best indication of slope failure in every region and that other factors may be important.

WSB's model not only permits for any factor to be tested but is designed to incorporate how these factors vary locally. This design recognizes that a factor likely contributing to slope failure in one part of the state may not necessarily contribute to slope failures in another part. WSB's model for causative factors allows for multiple causative factors to be included in the model at once, and for each one to weigh appropriately according to its likely influence in causing slope failures in a particular area.

In Phases 1, 2, and 3, causative factors were modeled by a geostatistical process called Geographic Weighted Regression (GWR). GWR works by comparing a dependent variable with independent variables. In our study, the dependent variable is the past slope failures results from Part 1, and the independent variables are the causative factors. Specifically, GWR works by determining the relationships that dependent and independent variables have with one another. GWR accounts for failed and unfailed test sites. This removes an overemphasis of failed slopes that may have specific set of attributes, providing a more accurate representation of the landscape and a control for the test. For example, if there is no relationship between terrain curvature and past slope failure data, then it is probable that terrain curvature is not the most important parameter influencing slope failures for that specific area. In other words, terrain curvature is statistically similar in failed and unfailed locations and therefore not a strong local causative factor. If there is a correlation between these variables, then the independent variable is considered a local causative factor. If a vulnerability factor has no relationship to the dependent variable across the whole study area that factor will not be included as an input parameter in the final model. GWR is tested through trial and error, running through the process multiple times until the best results are produced (highest statistical strength). This process was executed in Task 5 (Sensitivity Analysis).

For the Phase 4 study area, WSB anticipates that some of the vulnerability factors passed through GWR will be different than those in Phases 1, 2, and 3. The proximity to Lake Superior and the inclusion of the shallow igneous and metamorphic bedrock indicate the need for new vulnerability factors. For this phase, three new vulnerability factors were developed – bedrock proximity, soil thickness, and slope orientation.

3.2.1 Bedrock Proximity

In this phase, bedrock proximity is defined as the inverse of the difference in the ground elevation and the bedrock elevation. In this dataset, smaller values indicate that the bedrock is deep and far from the ground surface; large values mean the bedrock is near the surface. This bedrock proximity is different from the vulnerability factor used in Phase 1 – proximity to bedrock outcrops, which only looked at areas with bedrock at the ground surface. This vulnerability factor is meant to capture areas vulnerable to rockfalls and rockslides such as the Lake Superior shoreline and the northeast region of the study area.

3.2.2 Soil Thickness

In this project, soil thickness is defined as the difference in the ground elevation and the bedrock elevation. In this dataset, smaller values indicate that the bedrock near the ground surface and little soil cover; large values mean there is thick soil over the bedrock. The soil thickness vulnerability factor is meant to capture areas vulnerable to slumps, slides, and flows such as the red drift areas. This vulnerability factor compliments the bedrock proximity vulnerability factor; highlighting areas of thick soil deposits as opposed to areas with bedrock exposures. Together, these two factors should describe the varied landcover found in the study area. Just one part of the study area, the Lake Superior shoreline, has areas with soil cover and other areas with bedrock exposures. The type of ground cover has been shown to not only control the type of failure but also the frequency of failure events (Johnston et al., 1994).

3.2.3 Slope Orientation

Slope orientation is defined as the slope aspect with respect to the Lake Superior shoreline. Normally, aspect is number from 0 to 360 where due north is 0, east is 90, south is 180, and west is 270. For this study, those numbers are redefined from 0 to 1 in relation to the overall orientation of the Lake Superior shoreline. In this dataset, slopes with values close to 1 are more parallel to the overall shoreline and are more exposed to the lake (Appendix A; Figure 5). Slope orientation deviating in either direction from parallel to the lake shoreline will decrease the value. This dataset is meant to provide predictive power for the slopes near the Lake Superior shoreline and is not expected to have much correlation with slope failures elsewhere in the study area. Slope orientation has been shown to be an important factor when assessing coastal slope stability (Montes et al., 2012).

3.2.4 Slope, Relief, Terrain Curvature, and Water Table Depth

Other vulnerability factors used in Phases 1, 2, and 3 are likely to stay and include: slope angle, relief, terrain curvature, and water table depth. Slope angle is a measure of how steep a slope is. Relief measures the vertical height of a slope. Terrain curvature describes the shape of a slope face as concave or convex. Water table depth is the distance between the ground elevation and the water table elevation. These datasets are expected to have no overlap and enhance the model's predictive

capability when they are all included in the model at once. Task 5 (Sensitivity Analysis) tested that prediction.

3.3 PART 3 – MODEL SLOPE FAILURE PROBABILITY

The final step in designing the model was determining the probability of slope failure for the entire right of way. This includes the same logistic regression computation used in Phases 1, 2, and 3 except the input parameters, test sites, and counties are different. This final stage of the model incorporates data from Parts 1 and 2 – Historical Slope Failures and Causative Factors. This step of the model is executed after the final input parameters are determined in Task 5.

CHAPTER 4: DATA COLLECTED

Task 4 of this project included data collection of the slope vulnerability factors. The data includes a combination of publicly available data and data derived from elevation data. This project includes the following slope vulnerability factors and their sources:

- Digital Elevation Models (DEM): United States Geological Survey (USGS)
- Slope angle (DEM-derived)
- Relief (DEM-derived)
- Slope Orientation/Aspect (DEM-derived)
- Terrain curvature (DEM-derived)
- Water table depth: (Derived from DNR lakes and streams shapefile and DEM)
- Bedrock Proximity, Soil Thickness (Minnesota Geological Survey)

It is important to note that in this project, vulnerability factors are all potential causative factors, whereas input parameters are statistically tested causative factors determined in later Tasks.

CHAPTER 5: SENSITIVITY ANALYSIS

Task 5 of the slope vulnerability project included a series of tests collectively called the Sensitivity Analysis. A sensitivity analysis determines how well the GIS model predicts slope failures and how the model responds to changes in testing parameters. This section reviews the Phase 4 sensitivity analysis results as well as the applicability of the results from Phases 1-3 for the new study area.

5.1 PHASES 1-3 RECAP

The sensitivity analysis tested five factors:

- elevation data resolution
- appropriate size of the study area (i.e. road buffer)
- ability of the geomorphic index to detect historical failures
- testing various vulnerability factors in the model
- testing site selection method for the model

Three of these factors — elevation resolution, size of the study area, and site selection methods were not adjusted for the Phase 4 study area and did not require further testing. However, they required different data collection and model preparation than for Phases 1-3. Recap of the Phase 1-3 results for these factors are described below in further detail.

5.1.1 Elevation Data Resolution

Spatial data resolution is an important quality control measure that affects the predictive accuracy of the model. An optimum level of resolution depends on the specific project objectives and scale of study. The model objectives in this study are to locate historical slope failures, determine the causative factors, and determine the risk of new slope failures. Elevation data at 1-meter, 3-meter, and 10-meter resolutions were tested to determine the most efficient resolution in locating and predicting slope failures at the district level (Holmstadt, Bradley, & Muehlbach, 2019).

In summary, the results indicated that 10-meter elevation resolution is most appropriate for the scale of the study. Smaller resolutions are time consuming, data intensive, and may be less accurate. They detect too much detail not required to meet project objectives and therefore do not improve model predictions. For example, artificial slopes like landscaped hills are detected using 1 and 3-meter resolution data. These “slopes” would need to be manually deleted from results. More information about the elevation resolution process please see Phase 1 Slope Vulnerability final report (Holmstadt et al., 2019).

Elevation data at 10-meter resolution was applied for the Phase 4 study area as well.

5.1.2 Appropriate Size of the Study Area

Selecting an appropriately sized right-of-way underpins the predictive accuracy of the model. The area incorporated into the model must balance the amount of data incorporated into the model with ensuring that the maximum number of slope failures are detected. In Phase 1, three options were analyzed: sub-watersheds that intersect the highways, a uniform buffer of 0.5 miles on each side of the highway, and a combination of the two.

In summary, testing results indicated a 0.5-mile buffer is the most appropriately sized study area for this project, since it captures slope failures most likely to occur in Minnesota (Holmstadt et al., 2019).

A 0.5-mile study area will be applied for the Phase 4 counties as well.

5.1.3 Testing Site Selection

Determining the number of testing sites for incorporation into the model was one of the final steps of the Phase 1 sensitivity analysis. Testing sites are a combination of verified historical slope failures and randomly generated locations in GIS used to test the results of the sensitivity analysis and run the model. Typically, a minimum of 30 sites are recommended for statistical analyses. For Phase 1, WSB included over 30,000 sites (combination of verified and random) for incorporation into the model (Holmstadt et al., 2019).

In summary, testing results indicated that the most important factor in site selection is including locations from both failed and non-failed areas rather than the sheer number of sites because the results of GWR will be interpolated for all areas in the right-of-way. If only failed areas were included in the model, the interpolated surfaces will inaccurately have high probabilities of failure.

Site selection for Phase 4 included similar methods—combination of verified and randomly generated sites, and a combination of failed and non-failed sites. The sites are single 10 by 10-meter grid cells and the total number of sites for Phase 4 is over 130,000, due to the larger scale of the study area. However, the number of sites per county is roughly the same as previous Phases.

5.2 PHASE 4 ABILITY OF THE GEOMORPHIC INDEX TO DETECT HISTORICAL FAILURES

WSB created a method for detecting historical slope failures by searching for geomorphic features that resemble failed slopes using elevation data as the only input (Phases 1-3 Final Report). The accuracy of this measure was compared to known slope failure sites from other work and verified with aerial photos and hillshade data for Phases 1-3. In summary, thousands of slopes from Phases 1-3 study areas were identified as having high risk of historical slope failures. This historical slope failure model is powerful because it accounts for over a dozen slope failure types while identifying the most common failure type occurring in each region. For example, rockslides and falls were more common in southeastern Minnesota, slides along tributary ravines were more common in southwestern Minnesota, and deep-seated gradual slides were more common in northwestern Minnesota. These slope failure types were objectively detected using historical slope failures algorithms. The objective of the Phase 4 historical

slope failures sensitivity analysis was to determine if the algorithms from Phases 1-3 should be adjusted for the new study area.

The initial results of the sensitivity analysis revealed that the geomorphic index used in Phases 1 and 2 efficiently captured the historical failures in this study area without adjustment, however, these results were later changed after the field verification activities. Please see section 7.6 “Model Refinement” for more detail.

5.3 PHASE 4 TESTING VULNERABILITY FACTORS

The process of statistically testing all potential causative factors of slope failures was completed in this Task. Task 4 defined vulnerability factors as all potential causative factors, whereas input parameters are causative factors with the greatest statistical strength. Vulnerability factors are discarded as input parameters through a process of elimination based on statistical strength. This statistical indicator is the r-squared value results of geographic weighted regressions (GWR). The following sections outline the results of this process in more detail.

5.3.1 Phase 1 Final Input Parameters

The sensitivity analysis results from Phase 1 narrowed down the number of vulnerability factors to just 4 final input parameters:

- Slope angle
- Distance to streams
- Distance to bedrock outcrops
- Terrain curvature

5.3.2 Phase 2 Final Input Parameters

The sensitivity analysis results from Phase 2 had two similar input parameters as Phase 1, but also two new ones to account for the new geomorphology of the study area:

- Slope angle
- Local relief
- Incision potential
- Terrain curvature

5.3.3 Phase 3 Final Input Parameters

The sensitivity analysis results from Phase 3 had two similar input parameters as Phases 1 and 2, but also one new one to account for the new geomorphology of the study area:

- Slope angle
- Water table depth

- Terrain curvature

Previous Tasks in this project predicted that some of these input parameters will stay in the model, but new ones will need to be generated to incorporate the geomorphology of the Phase 4 study area. The following sections test these predictions.

5.3.4 Phase 4 Vulnerability Factors

Data on the following vulnerability factors were collected/ derived and then processed for GWR:

- Slope angle – steepness of the hill
- Local relief – height of slopes
- Elevation – elevation above sea level
- Terrain curvature – shape of the slope (e.g. convex or concave)
- Water table depth – depth to groundwater from land surface
- Bedrock proximity – vertical closeness to underlying bedrock
- Soil thickness – amount of unconsolidated material above the bedrock
- Slope orientation – slope direction

5.3.4.1 Geographic Weighted Regression

As discussed in previous tasks, the execution of GWR is efficient because it not only permits more than one causative factor to be in the model at once, but it statistically tests how these causative factors vary locally. Furthermore, the trial and error process of GWR effectively eliminates potential causative factors that are either weak statistically or do not enhance the model.

GWR was computed with the vulnerability factors outlined above. First, each of the vulnerability factors were tested in the model individually, to test the significance of each variable in predicting slope failures. Once the variables were tested separately, different combinations of the variables were tested with the aim of determining the best possible combination of variables that generates the greatest statistical strength.

When the vulnerability factors are tested independently in the model the following results emerge:

- Unlike previous phases, slope angle is not the most important individual vulnerability factor. Local relief has an average r-squared value of 0.824 for all 130,000 plus points across the study area while slope angle has an average r-squared value of 0.739 (Appendix A; Table 1)
- Elevation has an average r-squared value of 0.604
- Terrain curvature has an average r-squared value of 0.591
- Water table depth has an average r-squared value of 0.556
- Bedrock proximity has an average r-squared value of 0.599
- Soil thickness has an average r-squared value of 0.524
- Slope orientation has an average r-squared value of 0.532

The new vulnerability factors: bedrock proximity, soil thickness, and slope orientation, had r-squared values suggesting that they may be incorporated as model input parameters. The previous phases have shown that combinations of vulnerability factors provide different results than individual factors thus final model input parameters were chosen based on vulnerability factors combinations.

When different combinations of the vulnerability factors are tested in the model the following results emerge:

- Slope and terrain curvature together had an average adjusted r-squared value of 0.778
- Slope and water table depth had an average adjusted r-squared value of 0.776
- Slope, terrain curvature, water table depth had an average adjusted r-squared of 0.810
- Slope, terrain curvature, water table depth, elevation had an average adjusted r-squared of 0.852
- Slope, terrain curvature, water table depth, elevation, slope orientation had an average adjusted r-squared of 0.880

These results highlight an important benefit of GWR — more data is not necessarily better. Particular additions to the model may not enhance the results, in fact, sometimes they slightly weaken the results. This benefit not only helps minimize the amount of data in the model but facilitates a data-driven approach for identifying causative factors. Additional vulnerability factors may slightly increase the average adjusted r-squared value, but not enough in a way that marginally enhances the model such as slope orientation in the above case.

5.3.5 Phase 4 Final Input Parameters

The sensitivity analysis results from Phase 4 narrowed down the number of vulnerability factors to five final input parameters:

- Slope angle
- Local Relief
- Elevation
- Bedrock proximity
- Slope orientation

Two input parameters from previous phases—slope angle and local relief—remained in the model. The new input parameters, elevation, bedrock proximity, and slope orientation, are included because they capture the rocky slopes important to the Phase 4 study area. The combination of these five input parameters results in an average r-squared value of 0.993.

5.3.6 Further Testing: Individual Regions vs. Entire Study Area

This section describes the results of an attempt to further refine the model by determining if r-squared values increase when changing the scale of the study area. The results in the previous section describe what happens when the model is performed at a larger scale (entire study area). Further tests were

conducted to determine if splitting the Phase 4 study area into smaller areas would further increase the input parameters' statistical strength. These tests divided the study area into six smaller regions based on the glacial lobes within the region and tested the five final input parameters in each region (Appendix A; Figure 6).

Initial GWR results of performing at the smaller scale show that some spatial variation is required in order for GWR to execute properly; when elevation was tested using these smaller regions, there was not enough variation for GWR to find a solution. As a result, only slope angle, local relief, bedrock proximity, and slope orientation could be used as input parameters when testing at an individual region scale.

The results above show that elevation enhances the model when running the model across the entire study area, but elevation weakens the model when running it at a smaller scale. Therefore, WSB determined that when performing the model for the individual regions, elevation should not be included, but it should remain in the model when performing across the entire study area. In order to determine which of these two scenarios (entire study area with five variables, or individual regions with four variables) yields the best results, GWR results were compared.

GWR results for the entire study area with all five variables yields an r-squared value of 0.993. This is a relatively high r-squared value, indicating that when the model is conducted at this scale, highly statistically significant input parameters are included. However, as described above, WSB determined there may be a chance for further refinement by comparing this r-squared value with the r-squared values of the individual regions and four variables.

R-squared values were typically lower when performing the model at an individual region scale, compared to the entire study area. Five out of six smaller region results have an r-squared value higher than 0.923 (Appendix A; Table 2). However, only one region has an r-squared value higher than 0.993, the original value for the whole study area when elevation is included. These additional tests show that there is an ideal size for the study area—one that is big enough to have important factors vary across it but small enough to have relatively consistent geology and geomorphology throughout. Dividing the study area into smaller regions did not improve the overall performance enough to permanently change the study area and final input parameters.

5.4 SUMMARY

WSB tested five components of the model: resolution of spatial data, size of the study area, historical slope failure detection, methods of site selection, and variable combinations. The sensitivity analysis reveals that:

- The geomorphic index for identifying historical failures was the same algorithm used in Phases 1 and 2 that account for areas with bedrock outcrops, incised rivers, high relief, and steep slopes

- The most important factor in site selection is including locations from both failed and non-failed areas
- Statistical tests identified slope angle, local relief, elevation, bedrock proximity, and slope orientation as the model input parameters for Phase 4 Counties
- Dividing the study area into smaller, more geologically consistent, regions did not improve model performance enough to warrant changing the study area

CHAPTER 6: PRODUCE RISK MAPS

Task 6, Produce Maps and Rank Lists was completed for 16 counties in Districts 1, 3, and Metro. In this Task, the model was refined, scripted, and executed for the following counties: Aitkin, Carlton, Cook, Itasca, Lake, Pine, and St. Louis (District 1); Benton, Cass, Crow Wing, Isanti, Kanabec, Mille Lacs, and Morrison (District 3); Anoka and Chisago (Metro). The deliverables include draft maps of the 16 counties, draft shapefiles and rasters. The following sections describe the methodology and results of this Task.

6.1 DRAFT PDF MAPS

WSB executed the model to produce slope vulnerability results. For this project, vulnerability is defined as likelihood of failure, and risk is defined as likelihood multiplied by consequence. Figure 7 shows an example of the draft maps and Figure 8 shows a zoomed in example of the vulnerability output (Appendix A). The vulnerability results were then utilized in a risk ranking procedure, described in the next section.

6.2 RISK RANKING

6.2.1 Methodology

Risk is the product of probability and consequence ($\text{Probability} \times \text{Consequence} = \text{Risk}$); risk matrices provide a framework for determining probability and consequence. To be most effective, risk matrices must have robust probability and consequence definitions. The Slope Vulnerability Risk Matrix with the definitions is presented in Appendix A Table 3.

The matrix has 4 proposed categories of risk management:

1. Site visit / action recommended,*
2. Further evaluation,*
3. Monitoring,* and
4. No further action recommended*

*Preliminary terminology for proposed risk management categories.

Risk ranking was conducted at the Management Area scale. Management areas are regions with similar risk scores. This aggregates the large amount of individual slopes into a workable number.

Management areas were delineated in GIS. Probability was delineated based on separating the slope vulnerability results into 3 categories: high, medium, and low likelihood of failure. Consequence was delineated based on proximity to roads and urban vs. non-urban areas.

6.2.2 Results

The draft risk rankings successfully transformed tens of thousands of slopes into hundreds of management areas. The full list of management areas ranked by risk is presented in Table 4 of the Appendix. The total number of areas and their total areas in square miles for each of the different rankings are as follows:

- Action Recommended: 499 areas (37.17 mi²)
- Further Evaluation: 755 areas (12.11 mi²)
- Monitoring: 2154 areas (20.39 mi²)
- No Action: the rest of the area of interest (2559.37mi²)

The management areas range in size from a few square feet to over a thousand square feet. The percent of the entire domain area that each risk ranking covers is below:

- Action Recommended: 1.4%
- Further Evaluation: 0.46%
- Monitoring: 0.77%
- No Action: 97.35%

Although draft results include many management areas, the majority of the study area falls into the No Action category.

CHAPTER 7: FIELD VERIFICATION

The objective of Task 7 was to field verify the historical slope failure model developed in previous tasks and investigate what causative factors are explaining slope failure in the area. This task included 6 site visits—three along TH 23 north of Holyoke and 3 along TH 210 in Jay Cooke State Park. WSB collaborated with the TAP committee to select the sites. The following sections outline the methods, results, and conclusions of this task.

7.1 METHODS

This section outlines the model’s progress prior to the field visits, rationale for site selection, and the methods and equipment used during the visits.

7.2 MODEL PROGRESS PRIOR TO VISIT

Task 7 was completed concurrently with Task 6 (Final Risk Maps), in case that the model needed to be redesigned or adjusted. Prior to the field visits, the first part of the model was executed— Part 1 (Model Historical Failures). Model Part 1 objectively identifies all areas of past slope failures, both where slopes are actively failing and where slopes have previously failed but are currently more stable. Data on past slope failures enhances predictive modeling. Initial predictive modeling was performed before field work as well to see how well possible outputs matched the field conditions.

7.3 RATIONALE FOR SITE SELECTION

These sites were selected with input from the TAP committee. These spanned the range of vulnerabilities on the initial predictive modeling outputs which would help constrain the high, medium, and, low values.

7.3.1 Site 1 – MN23 Holyoke, Carlton County, District 1

Site 1 is located north of Holyoke, Minnesota in District 1 (Appendix A; Figure 9). It is within the Nemadji River basin along the northwest side of the South Fork Nedmadji River where a cut bank is between the river and the road.

7.3.2 Site 2 – MN23 Holyoke, Carlton County, District 1

Site 2 is located north of Site 1 in District 1 (Appendix A; Figure 10). It is within the Nemadji River basin just south of where the Nemadji River crosses TH23. The slopes at this site are graded from the road construction.

7.3.3 Site 3 – MN23 Holyoke, Carlton County, District 1

Site 3 is located north of Site 2 in District 1 (Appendix A; Figure 11). Site 3 was added after the other 5 sites because a slope failure occurred there just a few days before the scheduled field validation. It is within the Nemadji River basin on the north bank of Deer Creek.

7.3.4 Site 4 – MN210 Esko, Carlton County, District 1

Site 4 is located within Jay Cooke State Park in District 1 (Appendix A; Figure 12). It is on the north side of the St. Louis River at the site where the 2012 flooding caused the 210 washout.

7.3.5 Site 5 – MN210 Esko, Carlton County, District 1

Site 5 is located 1 mile east of Site 4 in District 1 (Appendix A; Figure 13). It is within a drainage that leads to the St. Louis River.

7.3.6 Site 6 – MN210 Esko, Carlton County, District 1

Site 6 is located 1 mile east of Site 5 in District 1 (Appendix A; Figure 14). It is within a drainage that leads to the St. Louis River.

7.4 EQUIPMENT

The methods for this task along with equipment used are listed below:

- Navigation from site to site (ESRI mobile apps and printed maps)
- Quantifying slope angles using a laser range finder (Halo XL 450)
- Geomorphic, geologic, and hydrologic observations (field forms and photos with iPad)

The 6 site visits were completed on August 20th, 2020.

7.5 RESULTS

The sites showed varying levels of slope activity. The following sub-sections describe the field results in more detail.

7.5.1 Site 1 – MN23 Holyoke, Carlton County, District 1

The field results confirm that Site 1 is an active river cut bank (Appendix A; Figure 15). The slope between the road and the river is not very steep but there is slumping occurring likely caused by the South Fork Nemadji River. The slumping may be due to the river removing sediment from the toe of the slope and from soil saturation during flood events. According to a MnDOT engineer, the road near the cut bank needs repairs once every five years because of the ongoing slope failure. Field observations resembled similar geomorphology to the large slope failure near Granite Falls from Phase 2. The road

was likely constructed as an embankment in what appears to be a large but gradual historical failure. Large headscarps were observed close to the riverbank. Small semi-circular tension cracks were observed on the road confirming that the slope processes occurring at this location are relatively slow, ongoing, and deep-seated. Naturally recovered headscarps were observed on the other side of the road (north side) providing additional support that this location was likely constructed within a historical failure.

Steep and tall translational slides were common on the other side of the river, especially along river cut banks. These types of failures are more catastrophic and wash away easily erodible sediment and debris during heavy rainstorms. The culvert at the site was previously blocked following a heavy rain event, confirming that these slope processes are active. The road above the culvert was currently under construction during the time of the field visit.

Both types of failures observed at this site are very different geomorphically, suggesting that failures in this area are more heterogenous than previously expected. These observations provided insight into the model's overall performance at the time of the field visit. More detail on model refinement is discussed the next section.

Evidence of active erosion includes the following:

- Headscarps along riverbank
- Slumping and uneven slope profile
- Tension cracks in road
- Road construction
- Gradual rotational slide along road
- Translational slides along river

7.5.2 Site 2 – MN23 Holyoke, Carlton County, District 1

The field results indicate that the slopes at Site 2 are stable with no evidence of past failures (Appendix A; Figure 16). The graded slopes are covered in vegetation and are fairly shallow. The preliminary model output at the time of the field visit suggested that this site has moderate vulnerability, similar to Site 1. However, the field results indicate that Site 2 is less active and has little to no evidence of failure compared to Site 1. Comparison of the field results between these two sites provided additional guidance for model refinement.

7.5.3 Site 3 – MN23 Holyoke, Carlton County, District 1

The recent slide at Site 3 was a slump on the north side of Deer Creek (Appendix A; Figure 17). The slide occurred during construction and therefore it is not certain if the failure represents the geomorphology of the area or reflects construction geometry of the embankment. The width was between 75 and 100 feet and its height was around 40 feet, extending from the creek to the bridge above. The slump ran out into the creek, causing the channel to narrow by around 50% its normal width. The slope was covered in

riprap and the soil was a sandy clay. There was still a visible scarp near the top of the slump despite the construction work.

Evidence of active erosion includes the following:

- Headscarp
- Channel narrowing

7.5.4 Site 4 – MN210 Esko, Carlton County, District 1

The field results indicate that Site 4 is moderately active (Appendix A; Figures 18-19). This site includes the valley wall of the St. Louis River as well as the channel that was formed during the 2012 flood. There are some small, older scarps along the edge of the channel. The channel is geologically young and is likely to remain somewhat active. The preliminary model performed better overall at this site and the other Jay Cooke sites compared to Sites 1-3. The model's more accurate performance for this part of the study area may be due to the fact that the previous modeling focus was more on coarse, steep slides and less on the wider range of failure types actually observed in the field. Specifically, the failure types that were previously under-accounted for include gradual and subtle rotational slides and steep but less coarse mudslides/translational slides. The next section, "Model Refinement," describes in more depth the enhancements made to the model.

Evidence of active erosion includes the following:

- Small headscarps

7.5.5 Site 5 – MN210 Esko, Carlton County, District 1

The field results confirm that Site 5 is an active drainage with erosion along steep slopes (Appendix A; Figures 20-21). Most of the active erosion is north of the road and there was little indication of active slope failures near the culvert where the drainage and road intersect. There was some gully formation occurring near the road.

Evidence of active erosion includes the following:

- Headscarps
- Gully formation
- Gravitropism

7.5.6 Site 6 – MN210 Esko, Carlton County, District 1

The field results show that Site 6 is a stable site (Appendix A; Figures 22-23). There is a retaining wall at this site downslope of the road. The wall shows no indication of tilting due to slumping. There are small drainages at this site that do not show any signs of recent erosion.

7.6 MODEL REFINEMENT

The field visits indicated that the model is underestimating slope vulnerability and needs to be refined. WSB analyzed the field results against the preliminary model outputs to determine the cause of underestimation. Post-field analysis revealed that the past failure model was not effectively capturing all historical failure types because some historical failures were less coarse than previously thought. These less coarse failure types include gradual rotational slides and steep translational slides.

Gradual and deep-seated rotational slides were not expected to occur as much prior to the field visit. However, the field visit confirmed that this type of failure is present, especially in the clay-dominated river valleys of the Nemadji Watershed. These types of failures are difficult to identify on ground without a trained eye, especially since they are relatively large and subtle. Roads were sometimes built within these difficult to discern but large historical failures. This may be best visualized with hillshade data. Examples of roads constructed in areas with these historical failure types include Site 1 in this Phase and Granite Falls from Phase 2. Both sites have ongoing failures.

Translational slides in this area are also less coarse than previously thought. Several translational slides are relatively smooth and smaller scale in some areas. Slopes along the steep river valleys of the Nemadji Watershed have several translational slides, especially along river cutbanks. The lack of coarse deposits often found at the base of slides may be one reason why this area was difficult to model, especially TH23. Streams near TH23 are characteristically known for large flood events that transport debris such as sediment and trees, often at times clogging culverts, as described in the section above. It is likely that these flood events wash away the debris accumulated from slides that are easily erodible. The initial past slope failure model was designed to capture more coarse translational slides with debris mid-slope and accumulated at the base. The following paragraph discusses the specific changes to the past failure model that led to an overall better representation of past failures and vulnerability outputs.

WSB determined the solution was to adjust the past failures model to fit the observed and newly expected failure types. The new past failure model successfully captured these less coarse failure types. The past failure model was re-designed to specifically identify headscarps in this study area instead of accumulated debris or coarseness. Headscarps were commonly found among all failure types ranging from steep translational slides to gradual deep-seated slides to the coarse slides near Jay Cooke. The model identifies areas with sharp vertical drops in the terrain (similar to vertical walls) to locate the headscarps. Headscarps occur locally, meaning they are small in surface area. Previous past failure models used different derivatives of slope to find areas that matched the expected topographic signatures of failures in those areas. The new past failure model is supported by the field observations as well as hillshade data and aerial photos.

The vulnerability factors were tested against the new past failure model. Statistical testing revealed that slope angle, relief, curvature, slope orientation, and groundwater depth have the strongest correlations with the past failure model. The new vulnerability output was analyzed at all the field sites to determine if the enhancements line up with the documented field observations (Appendix A; Figures 24-29). The results of the analysis show that the corrections made to the model led to an improved vulnerability output that is supported by field observations and provides a more accurate depiction of relative vulnerability.

7.7 CONCLUSIONS

WSB determined that the preliminary model developed prior to the field visit was underestimating slope vulnerability. Field observations provided the necessary information needed to enhance the model. Post-field analysis compared the field results with the preliminary model outputs to determine the cause of underestimation. The analysis revealed that the historical failures model was the cause of underestimation. The model was not effectively capturing all historical failure types because some historical failures were less coarse than previously thought. These less coarse failure types include gradual rotational slides and steep translational slides. WSB determined the solution was to re-design the historical failures model to match the field observations and the newly expected failure types for this study area. The new historical failures model specifically identifies headscarps by locating areas with sharp but local changes in terrain. Previous historical failure models used a roughness index. However, the results of this Task show that utilizing a roughness index is not the most efficient method for this study area. The sites within Jay Cooke State Park were better represented by the initial historical failures model, but the newly designed historical failures model is all encompassing and captures the great diversity of slope failure types in this part of the state. These adjustments led to an overall enhanced predictive model supported by field evidence.

CHAPTER 8: FINAL REPORT, FINAL MAPS, GIS MODEL AND DOCUMENTATION

The deliverables in this phase include the following: final report, final PDF maps, vulnerability raster files, the GIS model and model documentation, and the proposed management areas ranked by risk for efficient use of project results.

8.1 FINAL PDF MAPS

WSB completed final PDF maps for the following counties: Aitkin, Carlton, Cook, Itasca, Lake, Pine, and St. Louis (District 1); Benton, Cass, Crow Wing, Isanti, Kanabec, Mille Lacs, and Morrison (District 3); Anoka and Chisago (Metro). The PDF maps show the slope vulnerability and proposed management area results. Management areas were labeled as “proposed management areas” and the titles of the four categories of risk management were marked as preliminary titles.

8.2 VULNERABILITY RASTER FILES

WSB combined the vulnerability final outputs from each of the 16 counties into one raster file that has the appropriate symbology, correct size study area, and most updated roads jurisdiction. The file is readily available for use in any ArcGIS platform.

8.3 PROPOSED MANAGEMENT AREAS SHAPEFILES

WSB combined the proposed management areas final outputs from each of the 16 counties into one shapefile that has the appropriate symbology, correct size of study area, and most updated roads jurisdiction. The file has been made readily available for use in any ArcGIS platform.

8.4 GIS MODEL AND DOCUMENTATION

WSB provided MnDOT the GIS model along with appropriate scripts and documentation for running the model. Final scripting edits included clipping the final outputs to a half-mile buffer and ensuring every cell within the study area had a value. When running the model, MnDOT will be prompted with instructions on how to use it.

8.5 RECOMMENDED NEXT STEPS

The results of this study were intended to be the first step of actions required in minimizing the effects of slope failure including expensive mitigation actions and threats to public safety. In this study, the GIS model developed in previous phases was refined and implemented to identify slope vulnerability along state trunk highways for 16 more counties. The model’s capability of identifying slope vulnerability anywhere in the Phase 4 study area with minimal data input was field verified. Field results revealed that the initial model developed prior to the field was underestimating slope vulnerability. Post-field analysis determined that the initial past failure model was not fully capturing all the failure types in this

area including more subtle and less coarse failures such as deep-seated failures. Chapter 7 provided more detail into model adjustment activities that led to an overall enhanced predictive model supported by field evidence. Final maps depicting slope vulnerability for 16 counties in 3 districts were produced and proposed management areas were ranked based on risk that can provide useful information for district, county, or city engineers, planners, project managers, and maintenance staff. Several steps should be taken to maximize the value and usefulness of the model:

- Complete a robust risk estimation that incorporates the geomorphic vulnerabilities evaluated in this study with consequence definitions that will guide further action
- Design and implement mitigation and monitoring programs including severe weather investigations
- Incorporate additional geohazard risks such as subsidence into the state's TAMP and/or Georilla

REFERENCES

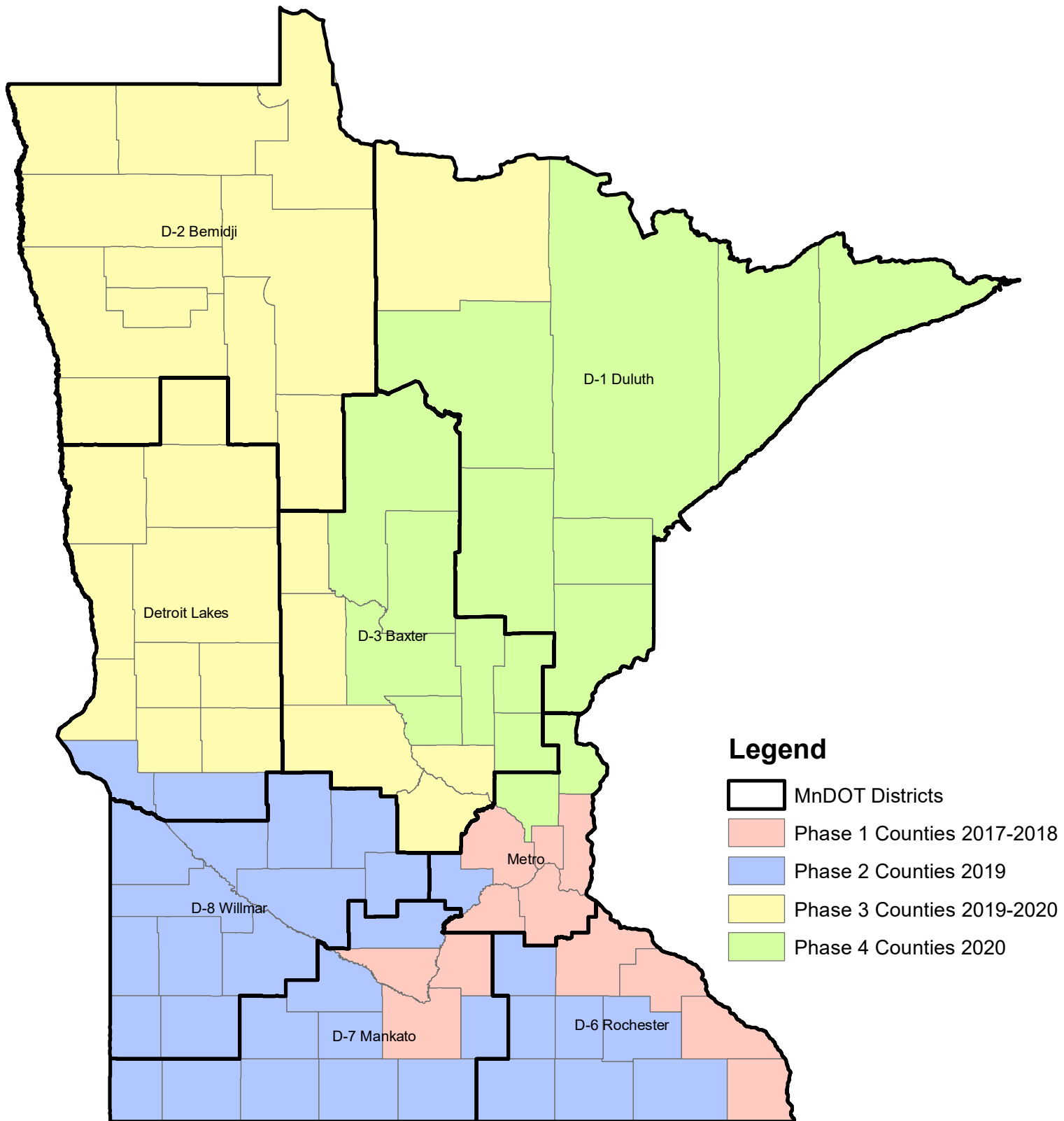
- Adaptation Clearinghouse. (2013). *Rebuilding Minnesota Highway 210 near Jay Cooke State Park*. Retrieved from <https://www.adaptationclearinghouse.org/resources/rebuilding-minnesota-highway-210-near-jay-cooke-state-park.html>
- Anderson, J. L., & Grigal, D. F. (1984). *Soils and landscapes of Minnesota*. St. Paul, MN: University of Minnesota.
- Crosta, G. B. (2001). Failure and flow development of a complex slide: The 1993 Sesa landslide. *Engineering Geology*, 59(1–2), 173–199.
- Daily Global News. (2012). *Heavy rains caused floods in Duluth*. Retrieved from <https://www.dglobe.com/news/1390357-heavy-rains-cause-floods-duluth-video>
- Fitzpatrick, F. A., Peppler, M. C., DePhillip, M. M. & Lee, K. E. (2006). *Geomorphic characteristics and classification of Duluth-area streams, Minnesota*. Reston, VA: U.S. Geological Survey.
- Green, J. C., Boerboom, T. J., Schmidt, S. T., & Fitz, T. J. (2011). The North Shore Volcanic Group: Mesoproterozoic plateau volcanic rocks of the Midcontinent Rift system in northeastern Minnesota. *Archean to Anthropocene: Field Guides to the Geology of the Mid-Continent of North America: Geological Society of America Field Guide*, 24, 121–146.
- Highland, L. (2004). *Landslide types and processes* (No. 2004-3072). Reston, Virginia: U.S. Geological Survey.
- Holmstadt, J., Bradley, N., & Muehlbach, P. (2019). *MnDOT slope vulnerability assessments* (No. MN/RC 2019-12). St. Paul, MN: Minnesota Department of Transportation.
- Jirsa, M. A., Boerboom, T. J., Chandler, V. W., Mossler, J. H., Runkel, A. C., & Setterholm, D. R. (2011). *Geologic map of Minnesota—Bedrock geology: Minnesota Geological Survey State Map S-21, scale 1:500,000*. St. Paul, MN: Minnesota Geological Survey.
- Johnston, C., Sales, J., Bonde, J., Aunan, T., & Raby, R. (1994). *Erosion hazard of Minnesota's Lake Superior shoreline*. St. Paul, MN: University of Minnesota.
- Leverett, F., & Sanderson, F. W. (1932). *Quaternary geology of Minnesota and parts of adjacent states* (No. 161). Reston, Virginia: U.S. Geological Survey.
- Lusardi, B. A., & Dengler, E. L. (2017). *Minnesota at a glance quaternary glacial geology*. Minnesota Geological Survey. Retrieved from <http://hdl.handle.net/11299/59427>
- Meryhew, R. (2012). *Duluth washed out by torrential rain, worst flooding in a century*. *Minneapolis Star Tribune*. Retrieved from <https://www.startribune.com/duluth-washed-out-by-torrential-rain/159690605/>

Meyers, J. (2014). MnDOT to rebuild flood-damaged portion of Highway 210. *Duluth News Tribune*. Retrieved from <https://www.duluthnewstribune.com/news/3223482-mndot-rebuild-flood-damaged-portion-highway-210>

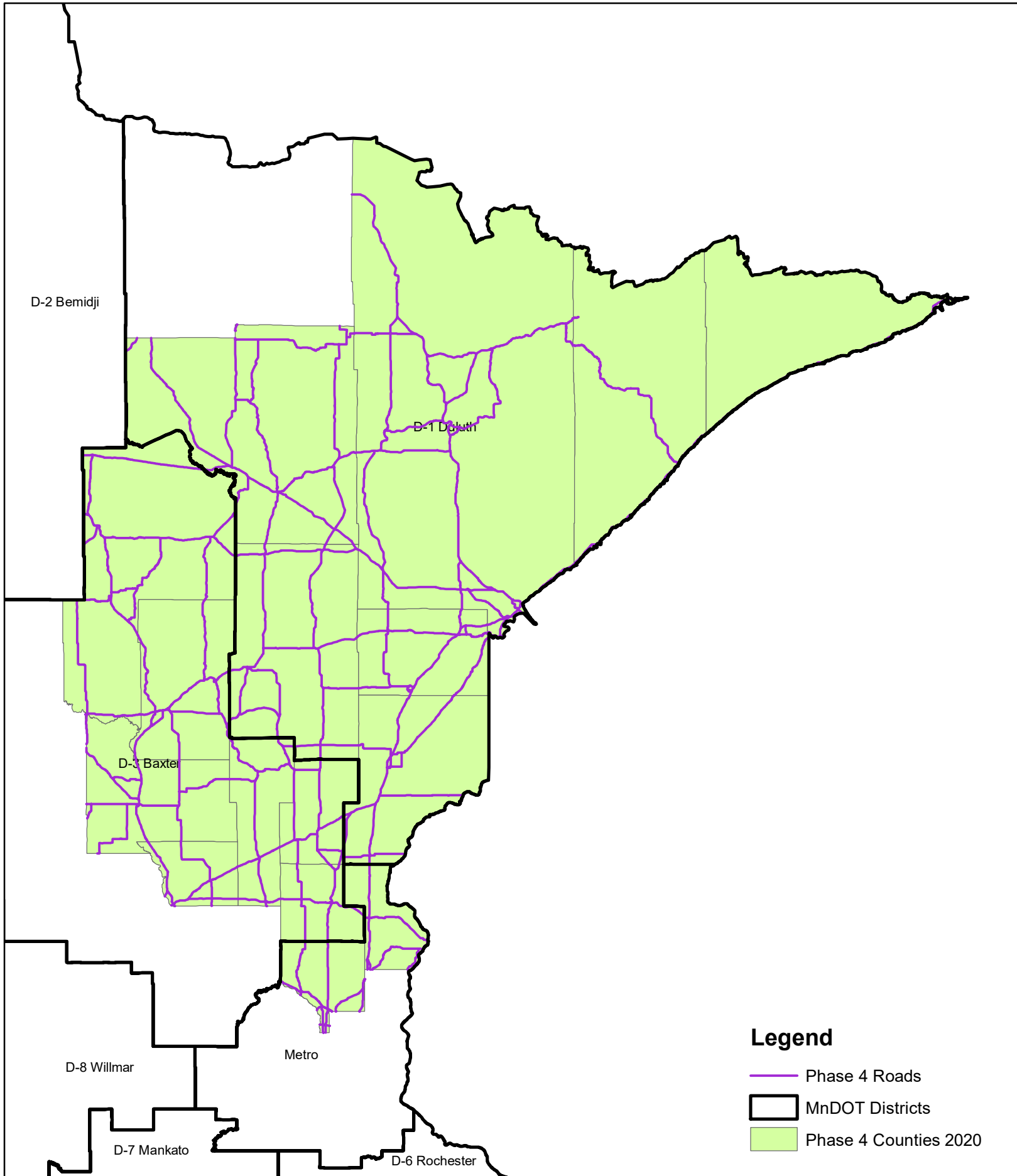
Montes, I. M., Santalla, I. R., García, M. S., Carrió, J. A., Velázquez, S. M., Ortiz, D. G., & Crespo, T. M. (2012). Mapping of landslide susceptibility of coastal cliffs: The Mont-Roig del Camp case study. *Geologica Acta*, 10(4), 439–455.

Montgomery, D. (2013). Before and after photos: 2012 flood damage, recovery in Duluth, Northeast Minnesota. MPR NEWS. Retrieved from <https://minnesota.publicradio.org/features/2013/06/duluth-flood-before-after-gallery/>

APPENDIX A

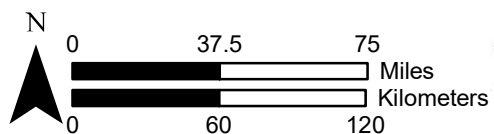


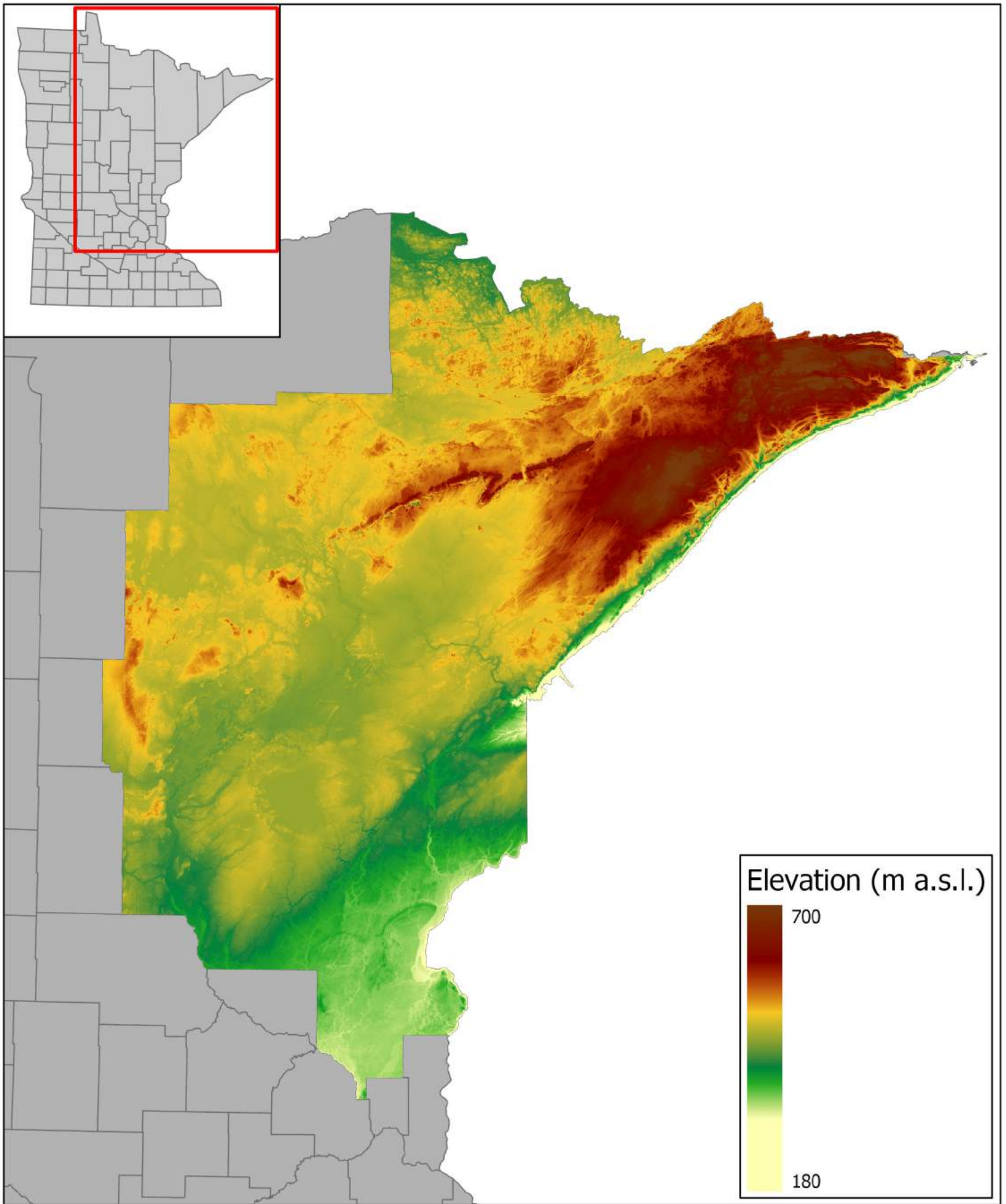
**Figure 1. MnDOT Slope Vulnerability
Project Study Area**

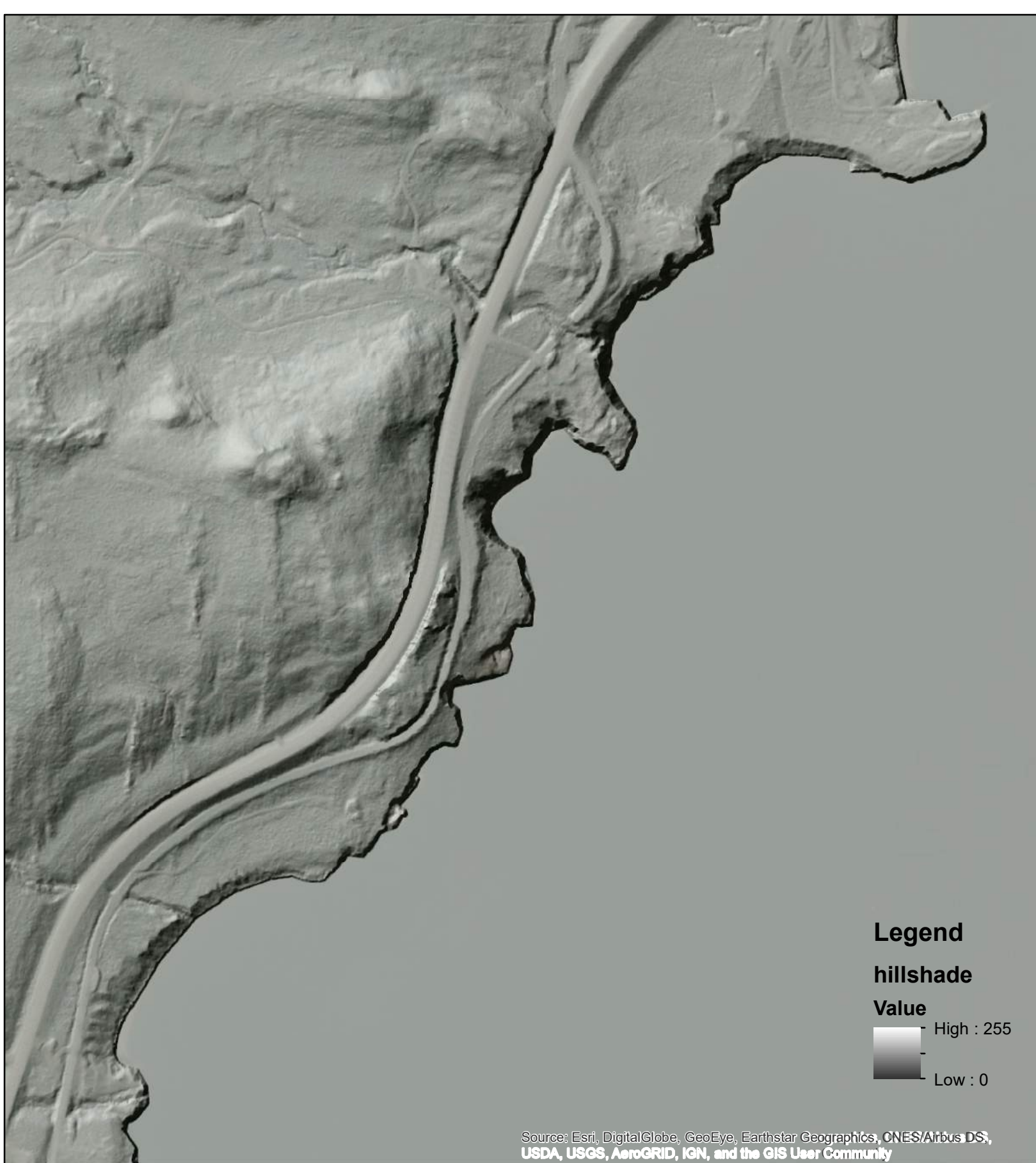


MnDOT Slope Vulnerability **Phase 4 Study Area**

Date Created: 4/21/2020
 Created By: Nick Bradley
 Basemap Source: ESRI Basemap
 Disclaimer: WSB is not responsible for implication from data provided by this map



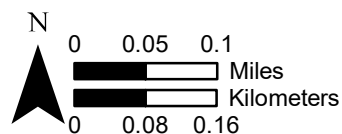




**Figure 4. MnDOT Slope Vulnerability
Shoreline Failures**



Date Created: 4/21/2020
 Created By: Nick Bradley
 Basemap Source: ESRI Basemap
 Disclaimer: WSB is not responsible for implication from data provided by this map



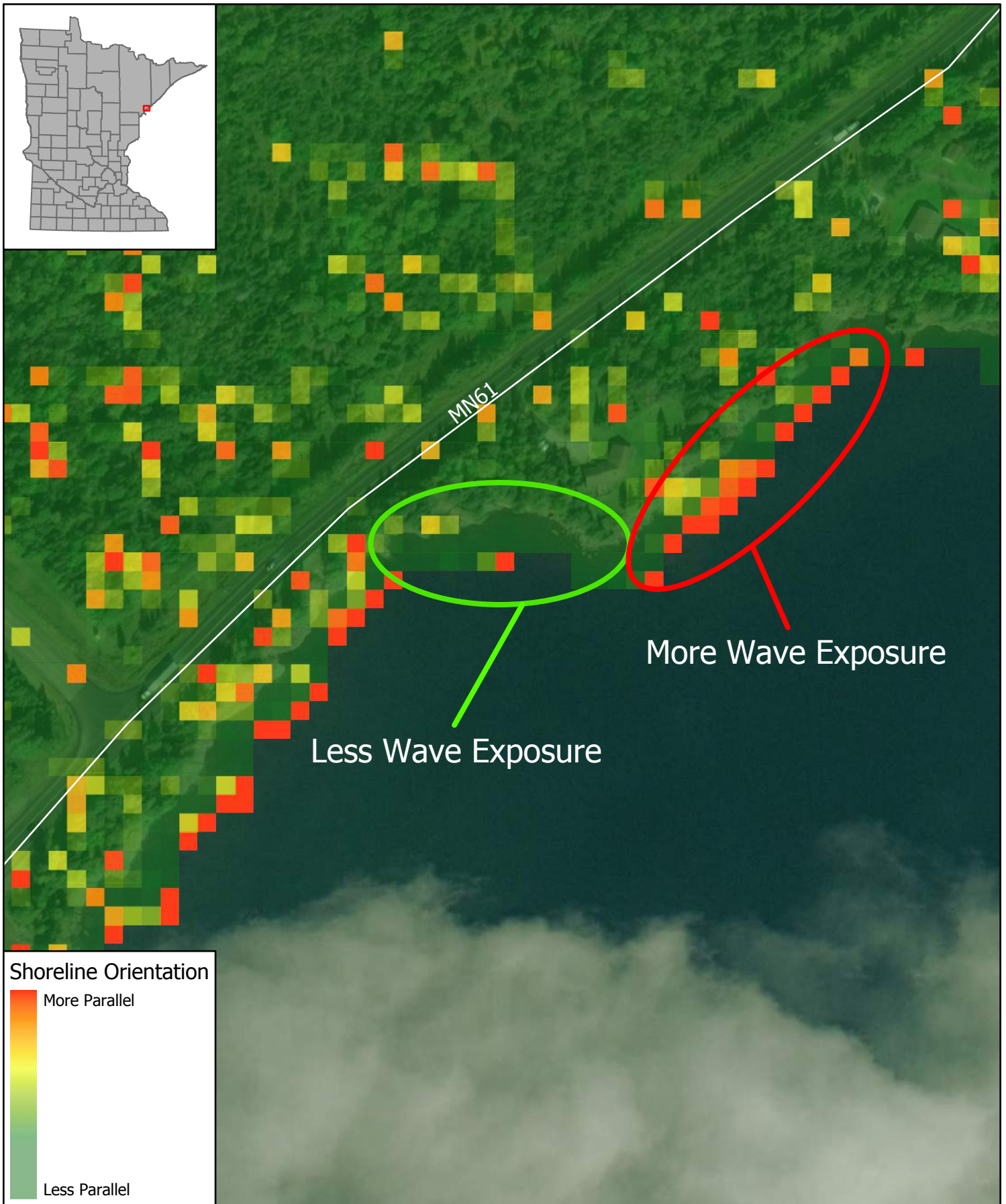


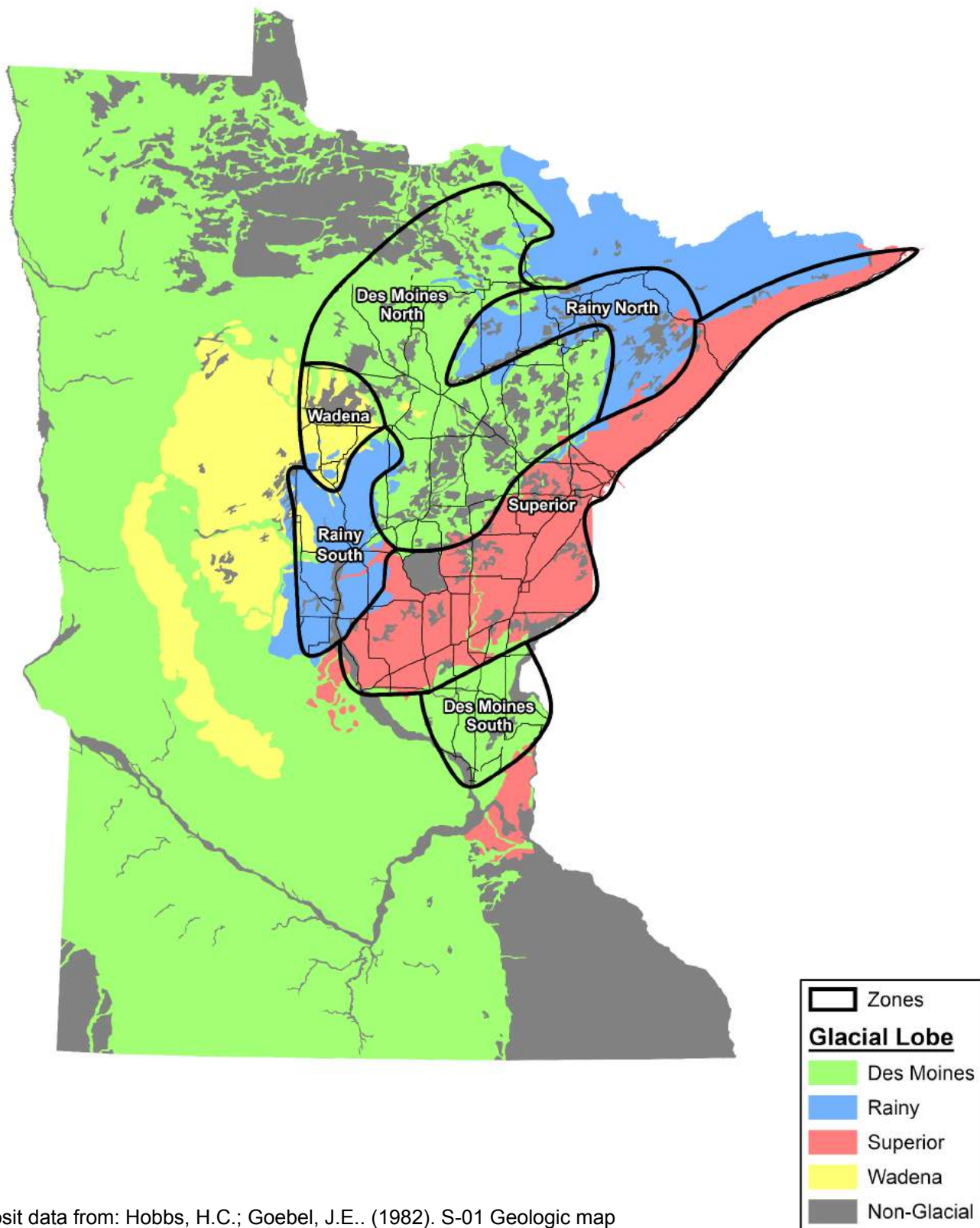
Figure 5: Example Shoreline Orientation Map

Date Created: 5/6/2020

Created By: Nick Rodgers

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Disclaimer: WSB is not responsible for implication from data provided by this map



Glacial deposit data from: Hobbs, H.C.; Goebel, J.E.. (1982). S-01 Geologic map of Minnesota, Quaternary geology. Minnesota Geological Survey.

Figure 6. GWR Zones
Slope Vulnerability Phase 4
MnDOT



0 300,000
Feet
1 inch = 300,000 feet



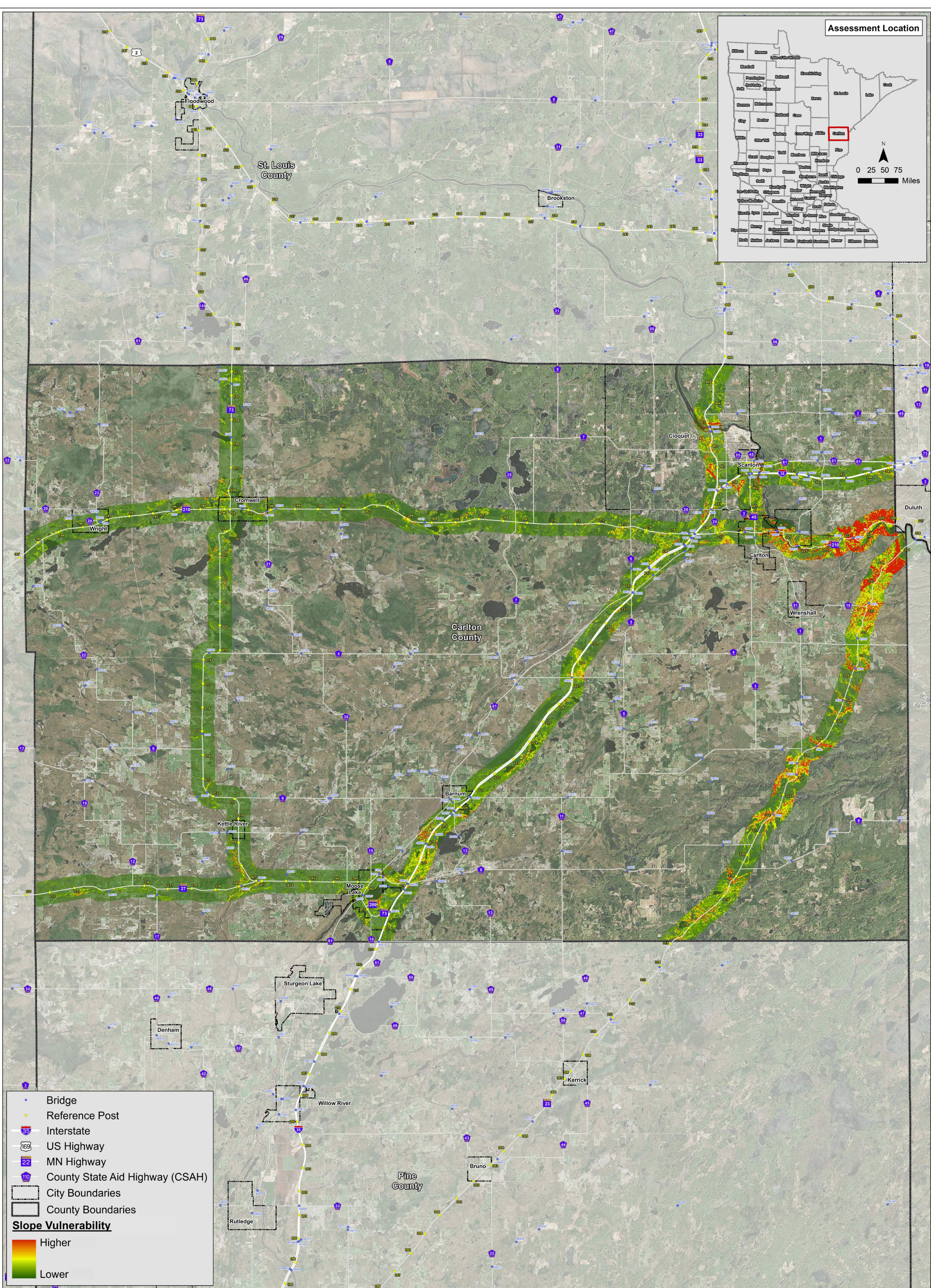
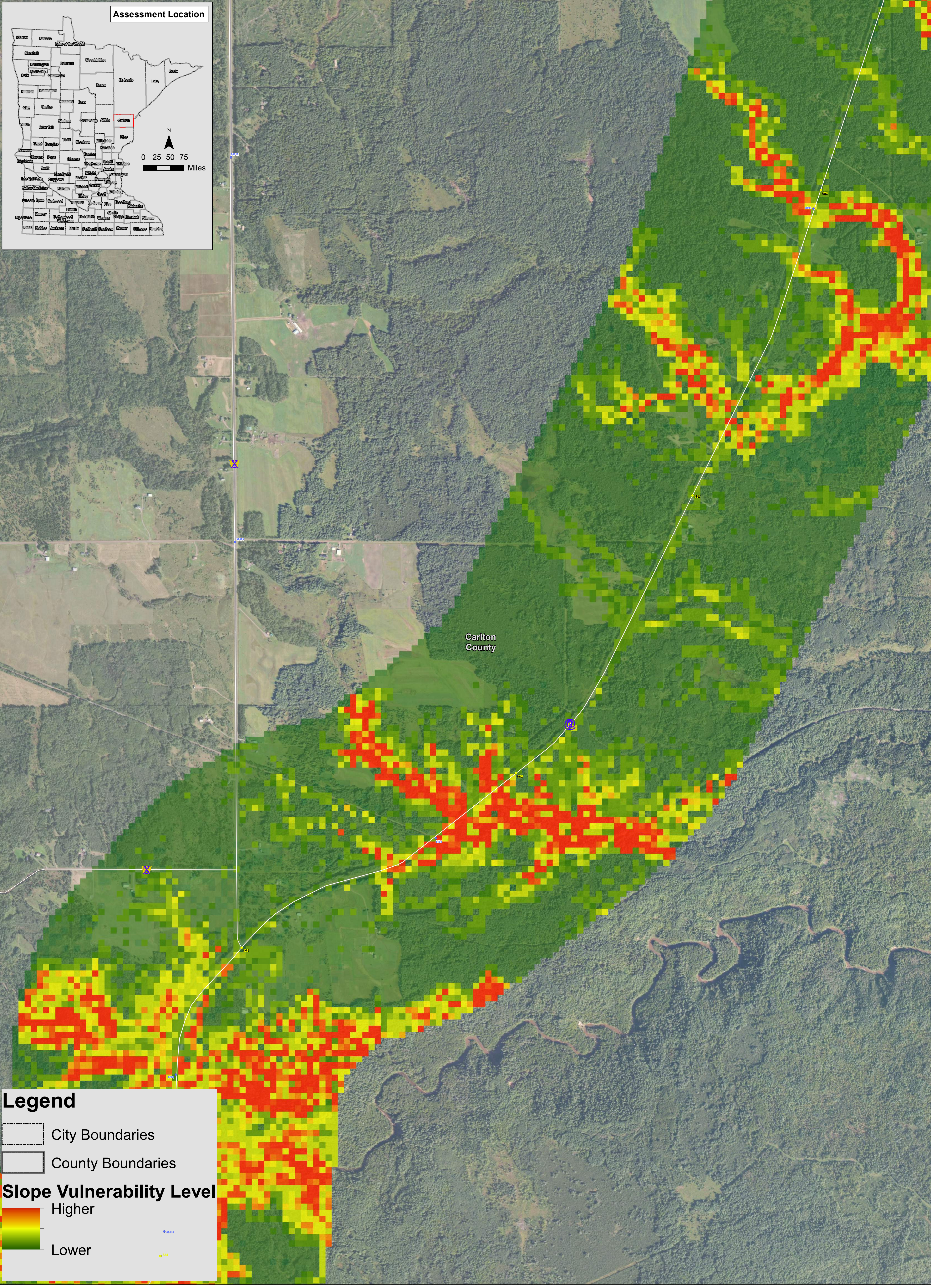


Figure 7. Slope Vulnerability Assessment
Carlton County, Minnesota



**Figure 8. Slope Vulnerability Example
Carlton County, Minnesota**

Date Created: 11/20/2020
Created By: Jen Holmstadt, Nick Bradley, and Nick Rodgers
Basemap Source: MN Geospatial Information Office, LIDAR Data / ESRI World Imagery WMS
Disclaimer: MnDOT is not responsible for implication from data provided by this map





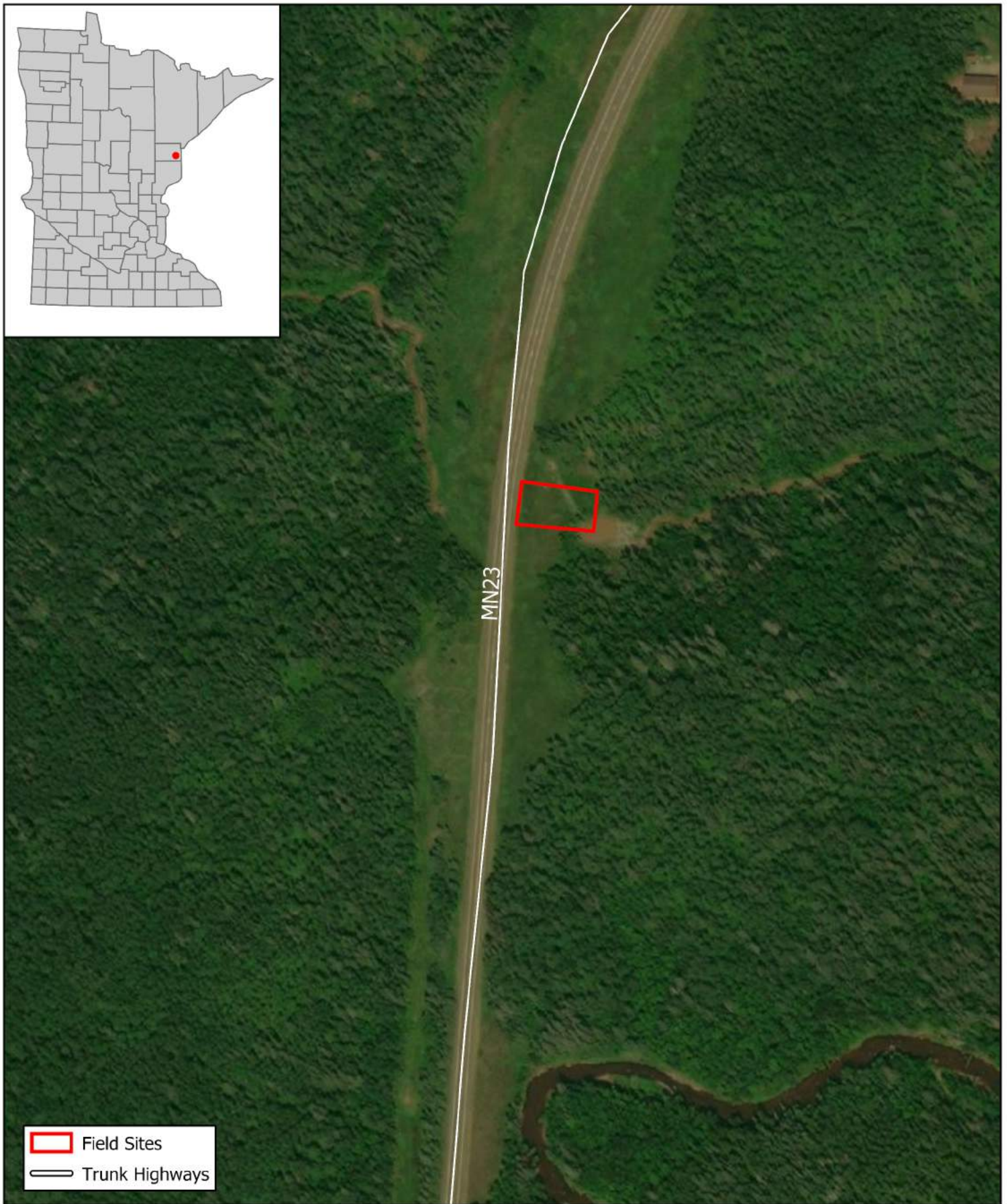


Figure 11. Site 3 - MN23
Holyoke, Carlton County, District 1

Date Created: 9/1/2020
Created By: Nick Rodgers
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Disclaimer: WSB is not responsible for implication from data provided by this map





Figure 13. Site 5 - MN210
Esko, Carlton County, District 1

Date Created: 9/1/2020
Created By: Nick Rodgers
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Disclaimer: WSB is not responsible for implication from data provided by this map



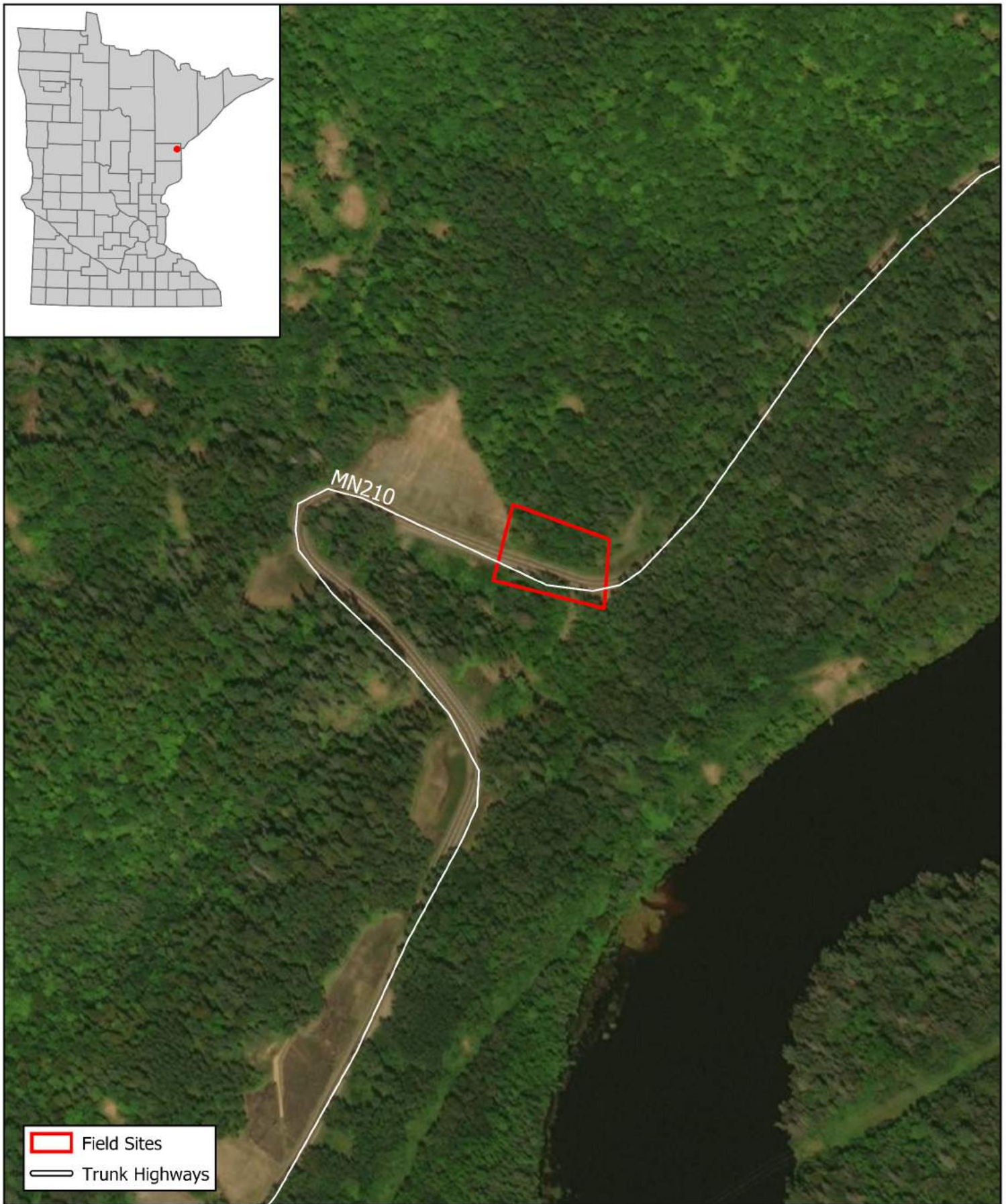


Figure 14. Site 6 - MN210
Esko, Carlton County, District 1

Date Created: 9/1/2020
 Created By: Nick Rodgers
 Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
 Disclaimer: WSB is not responsible for implication from data provided by this map



Figure 15. Headscarps along the South Fork Nemadji River at Site 1. MN23 is up the slope on the right of the image.



Figure 16. Shallow, graded slopes at Site 2.



Figure 17. Recent slope failure along the the north bank of Deer Creek at Site 3. Headscarp visible near MN23.



Figure 18. Older headscarp on the north side of MN210 at Site 4 near the channel created by the 2012 flood.



Figure 19. Graded slope on south side of MN210 at Site 4. Road was moved from the right side of the image to the left after the 2012 flood. St. Louis River is down the slope to the right.



Figure 20. Small 1-ft deep channel formed near the exit of the culvert at Site 5.

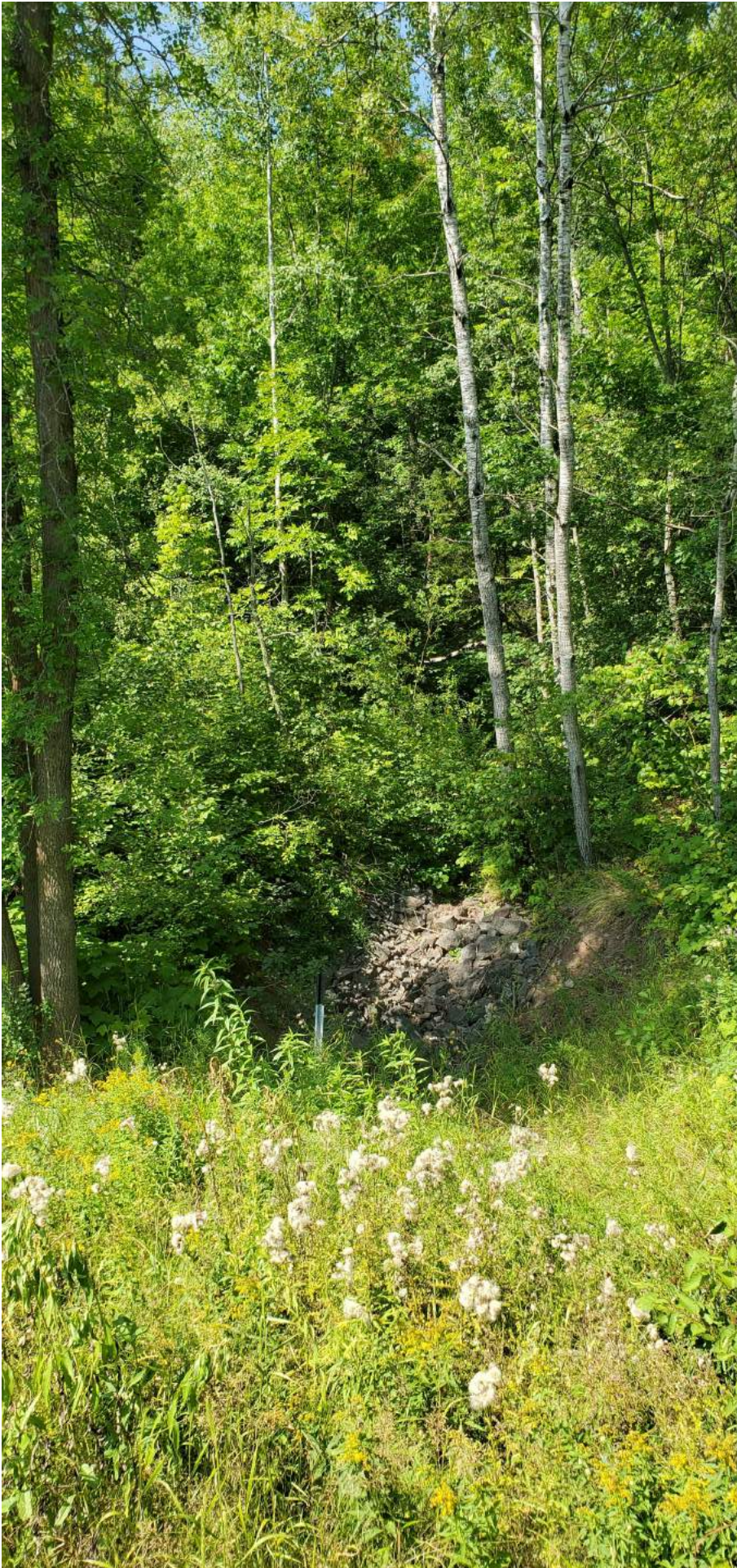


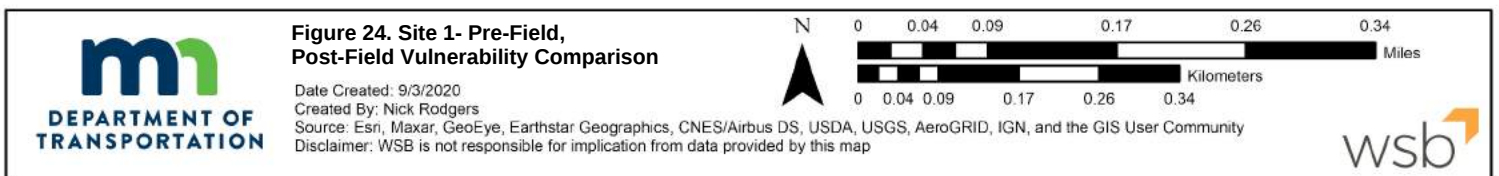
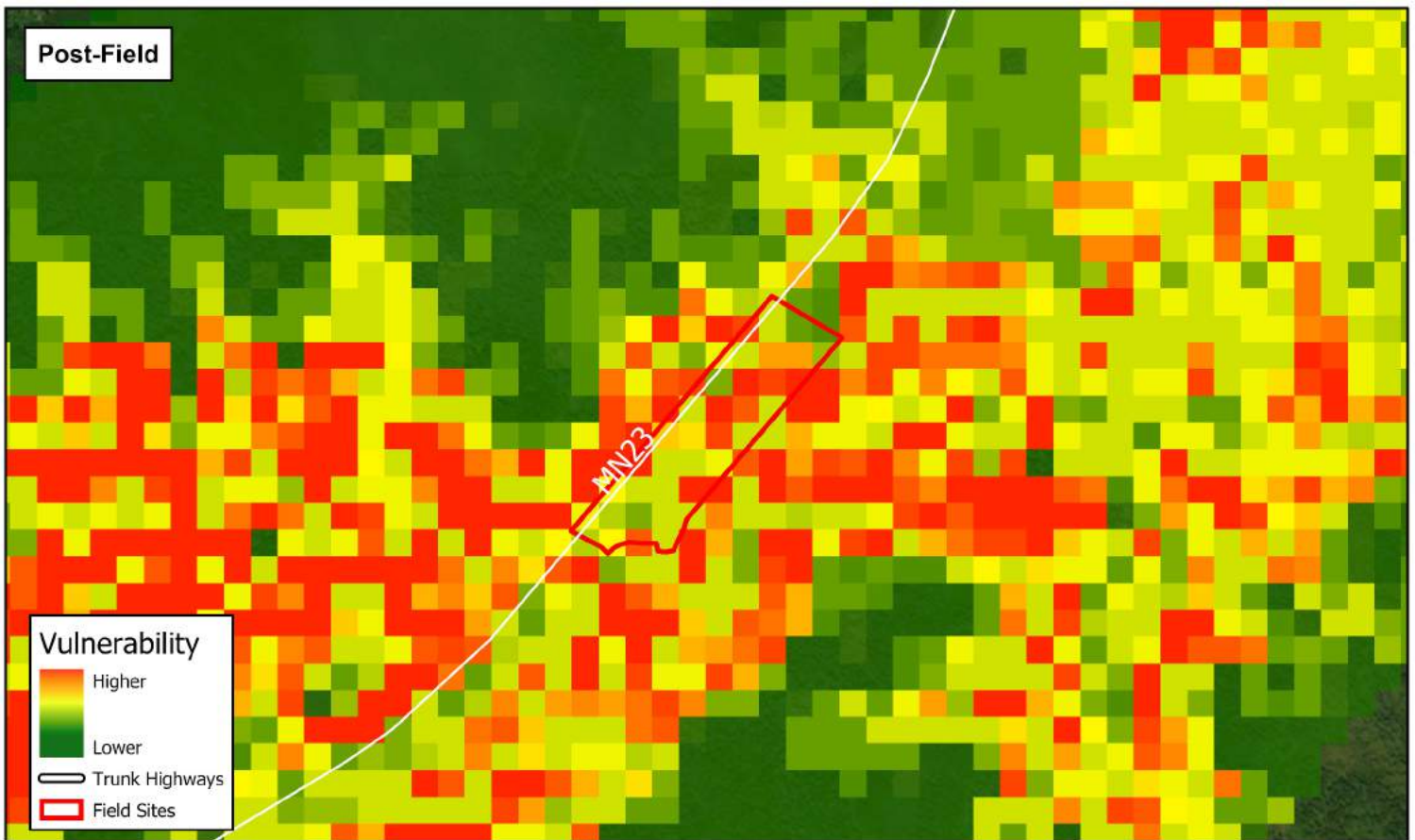
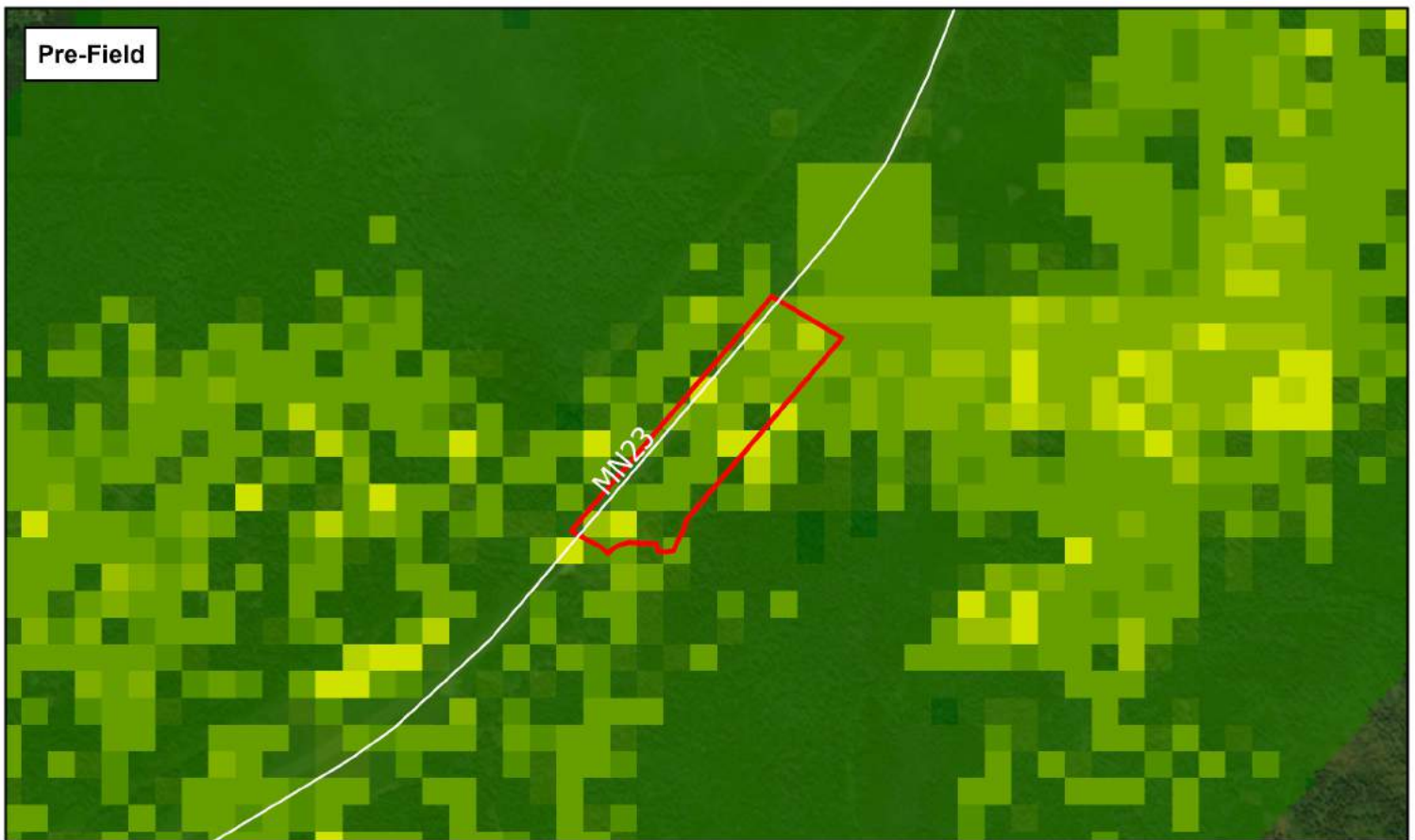
Figure 21. Steep slopes and headscarp near the entrance to the culvert at Site 5.

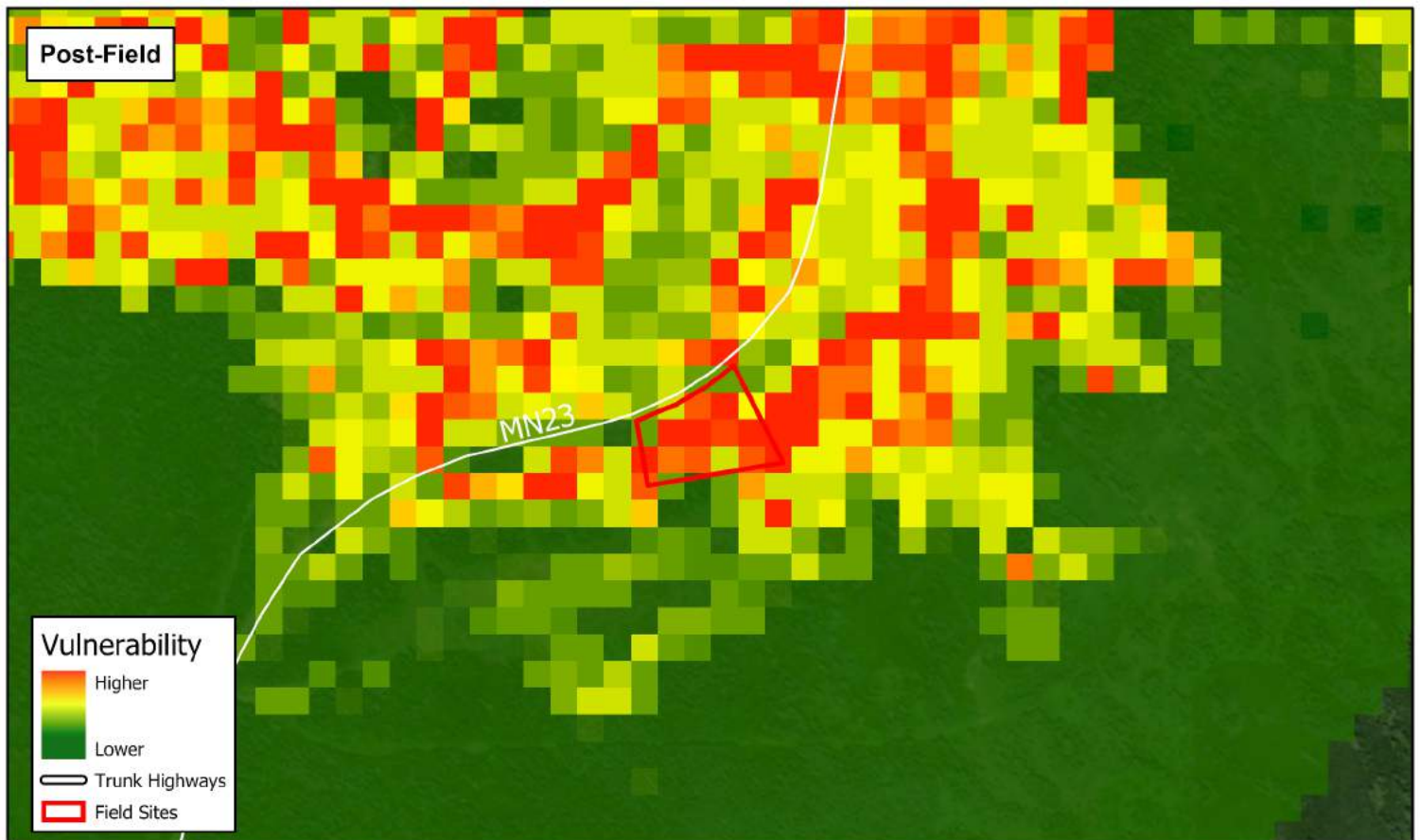
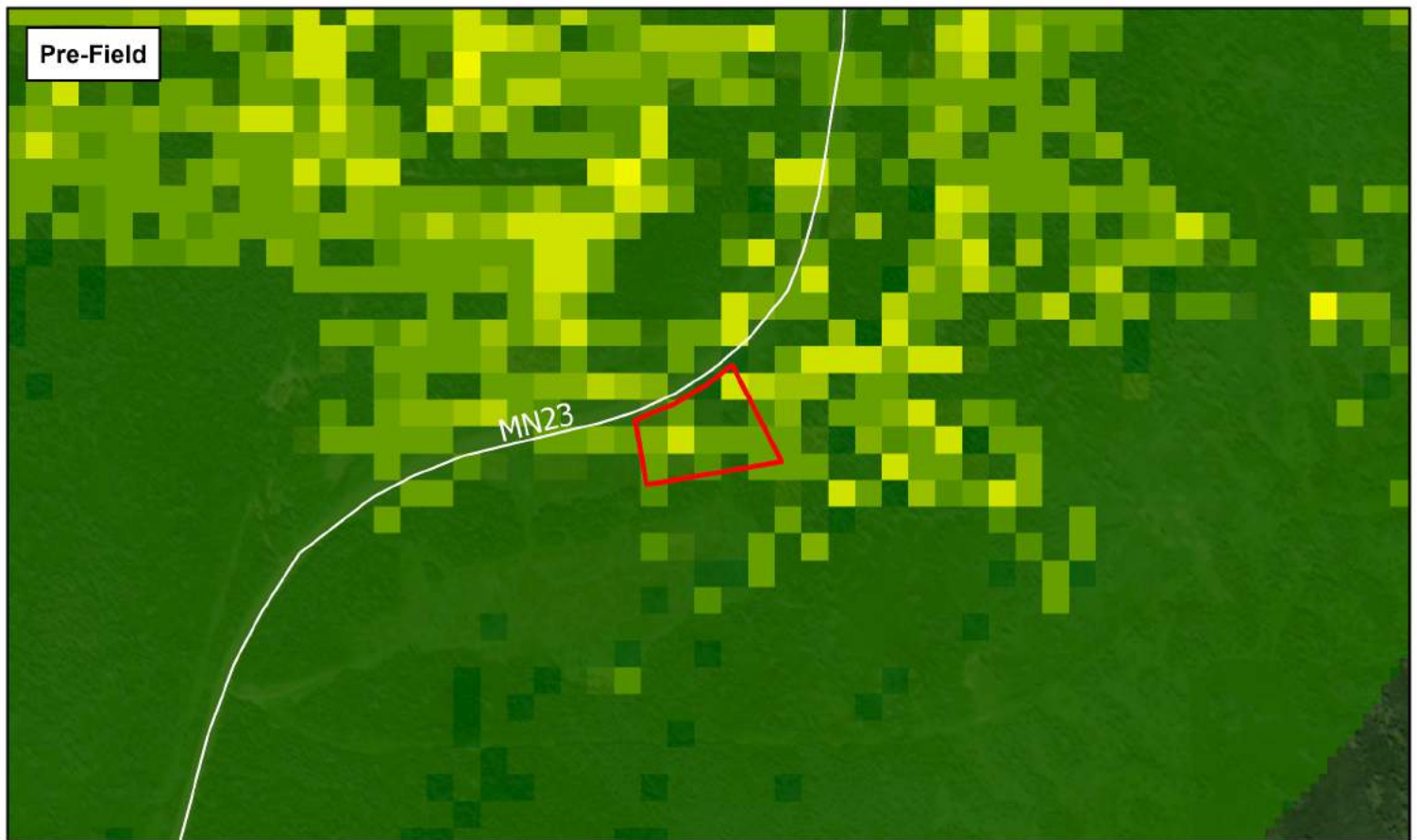


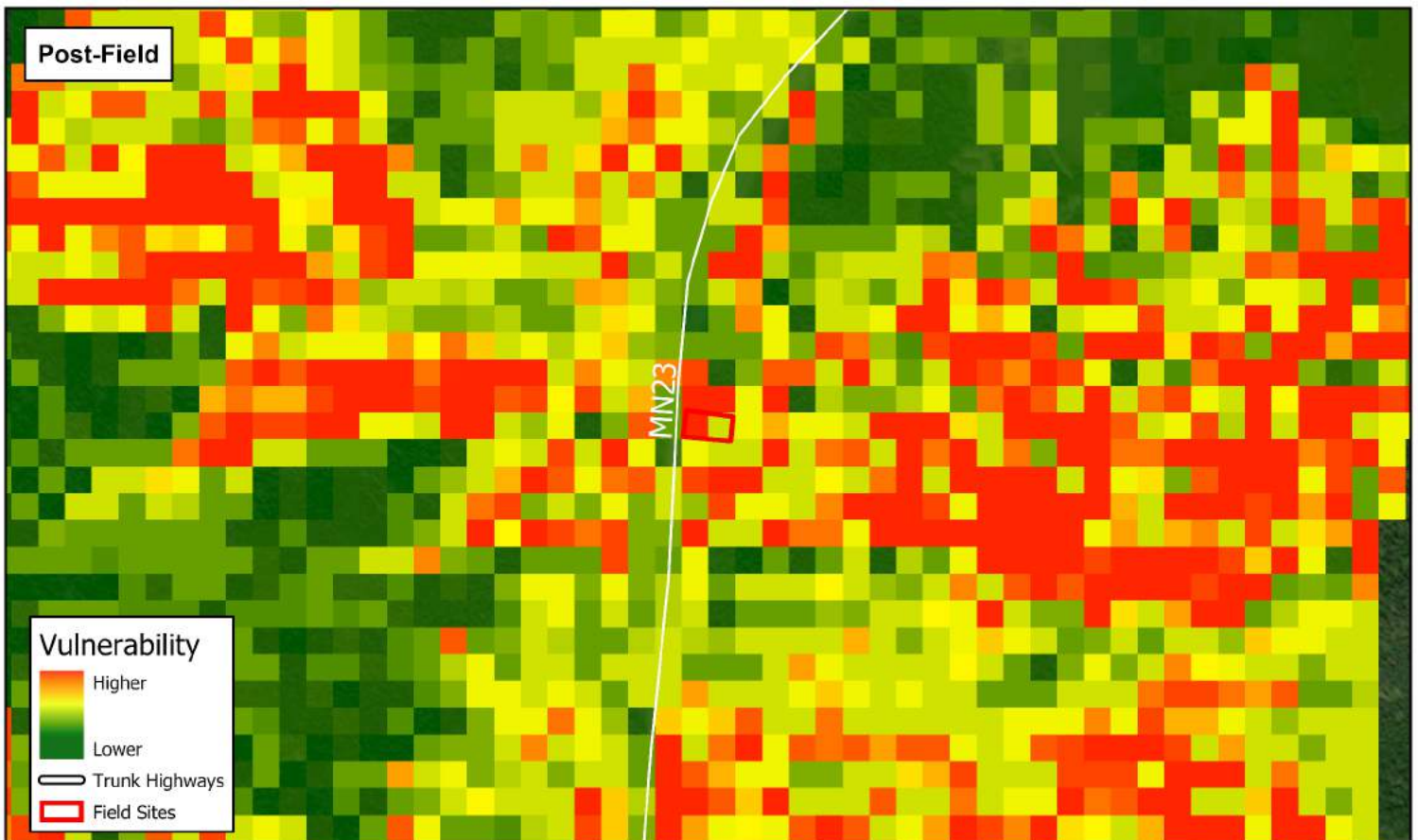
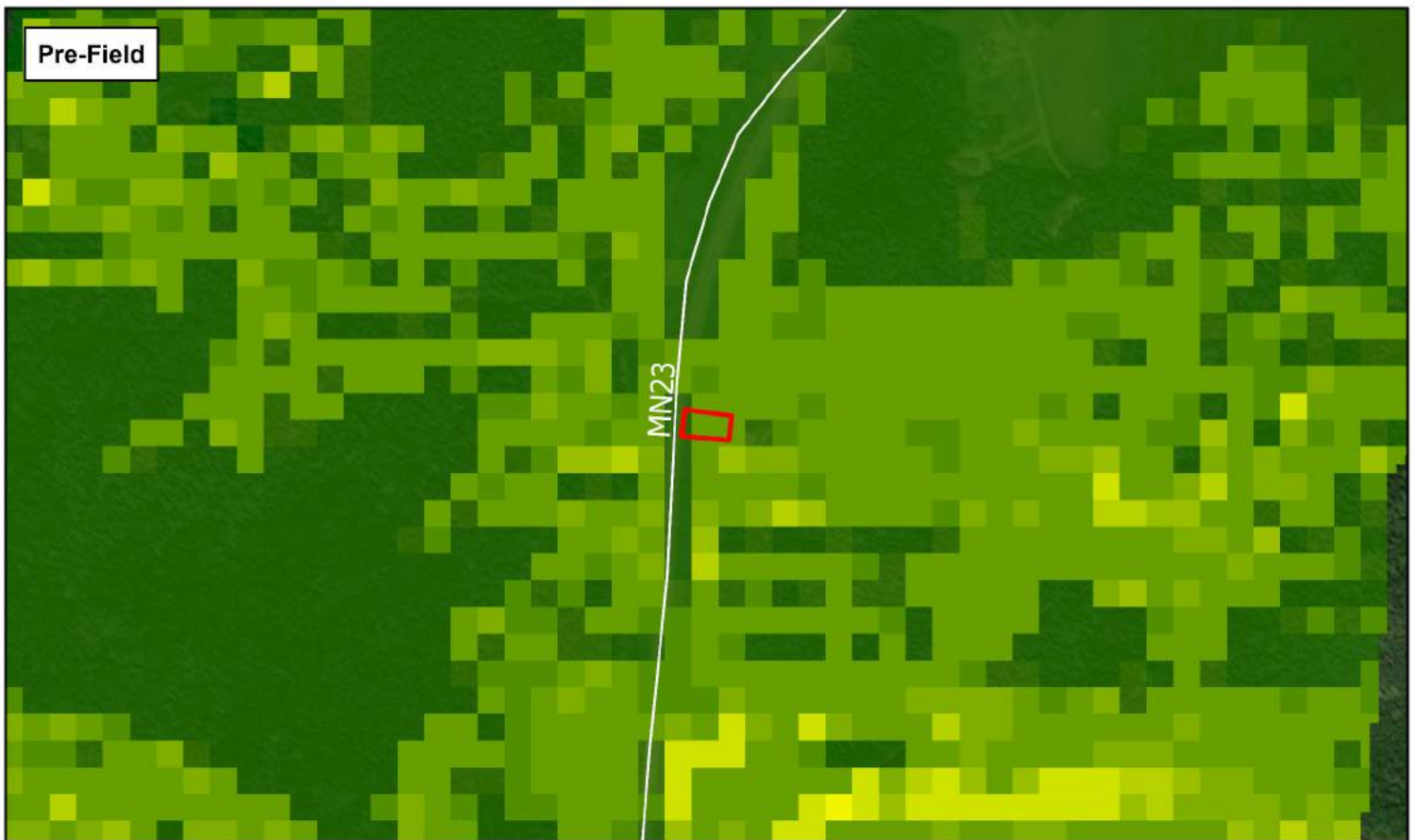
Figure 22. Graded slope
at Site 6.

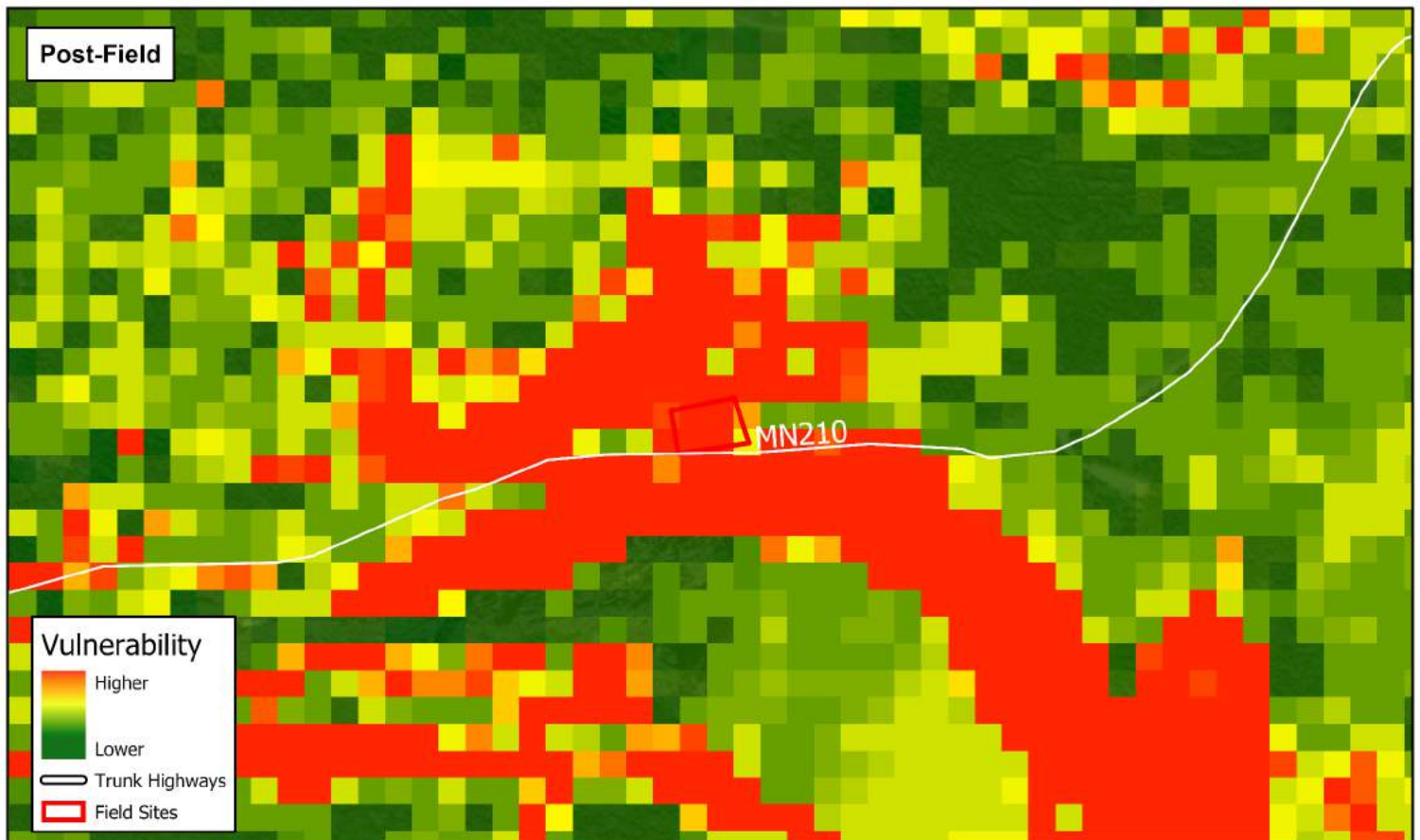
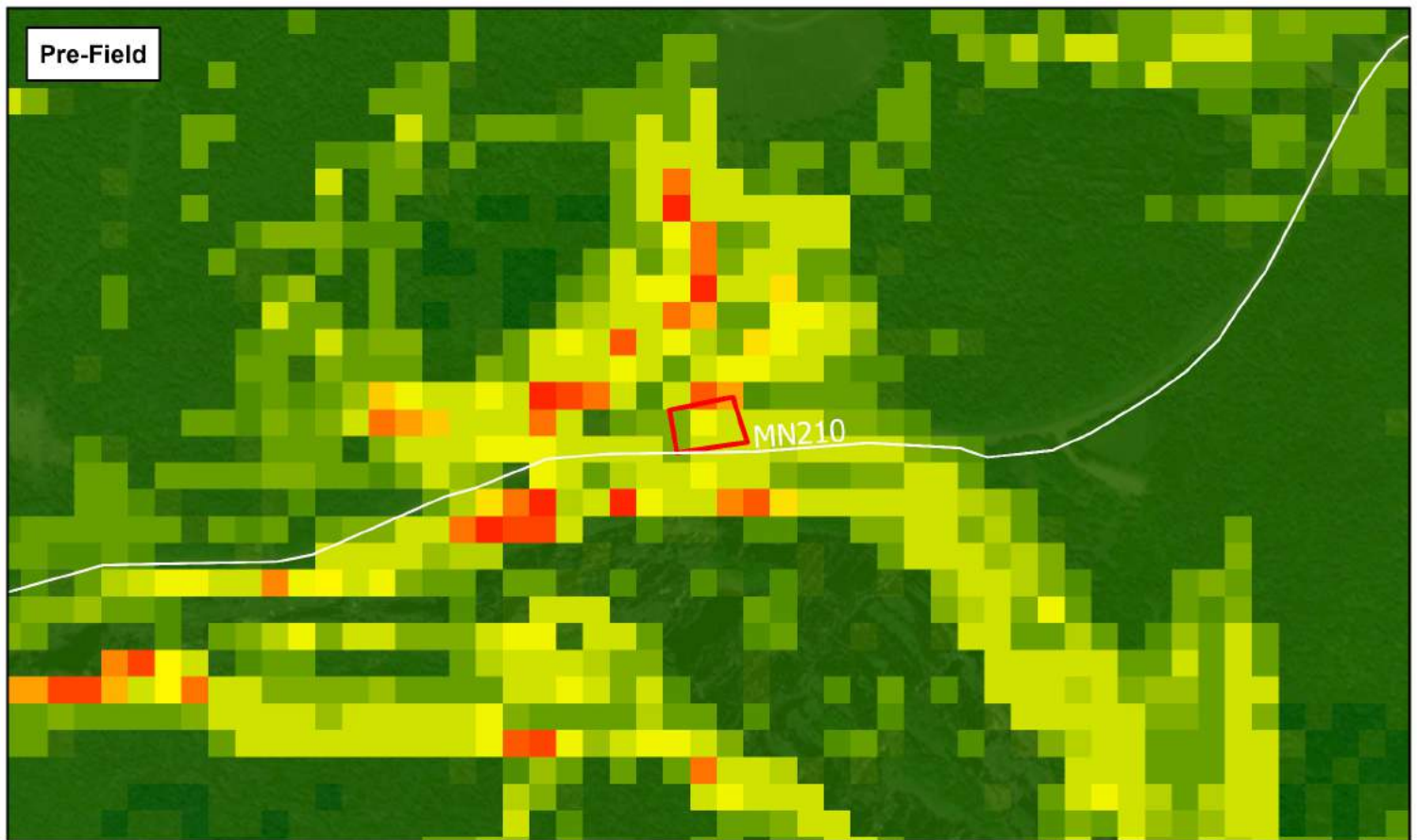


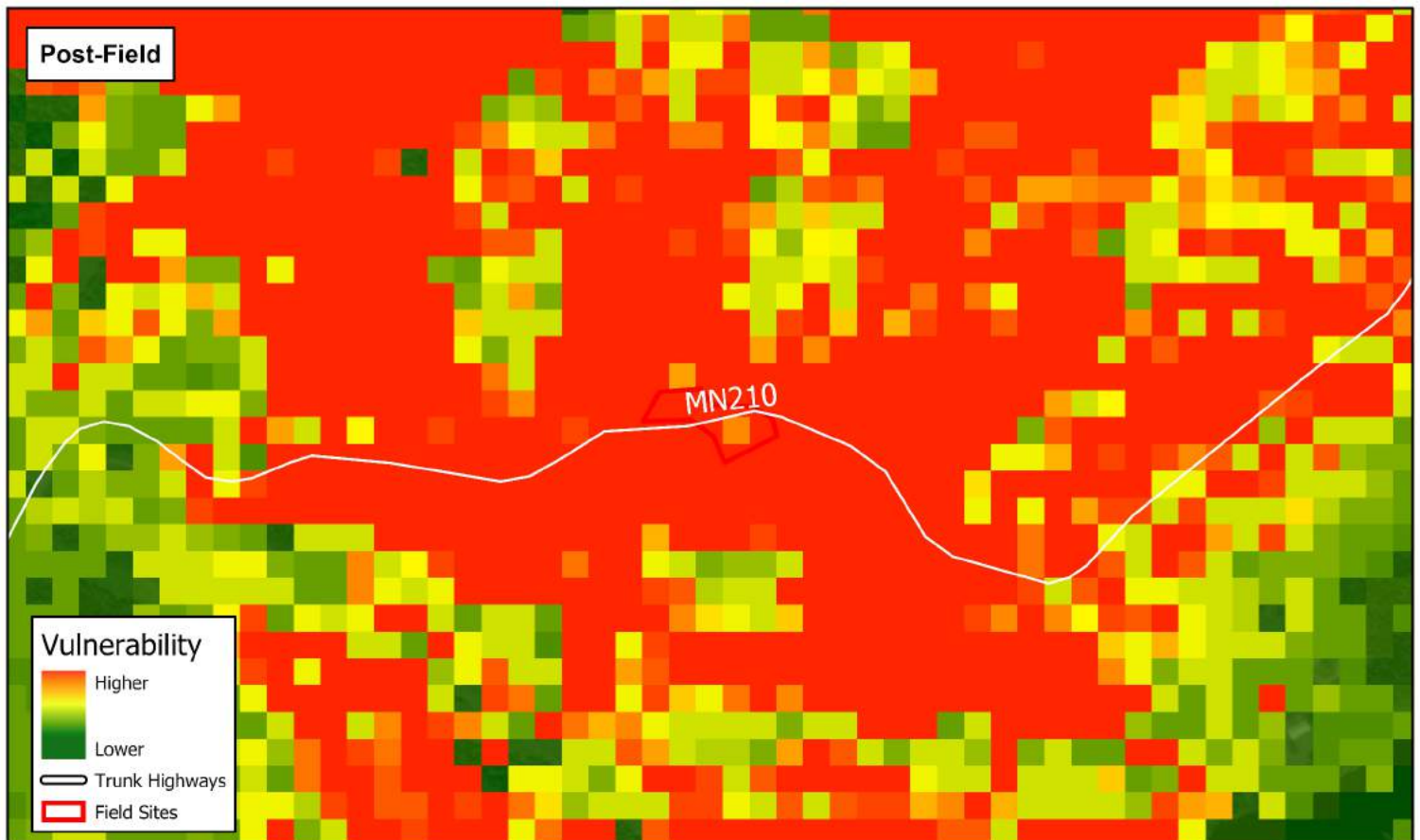
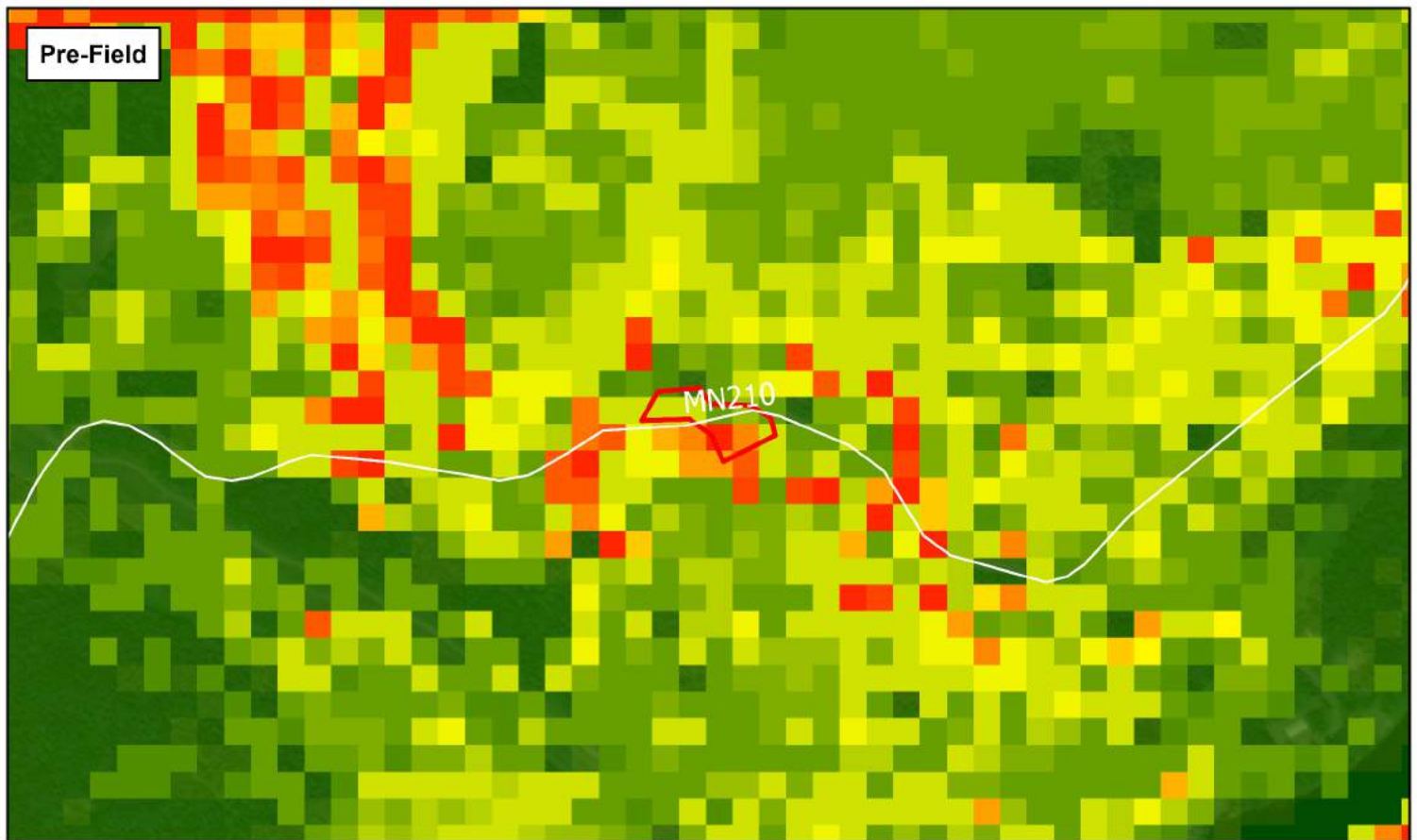
Figure 23. Retaining wall at Site 6.











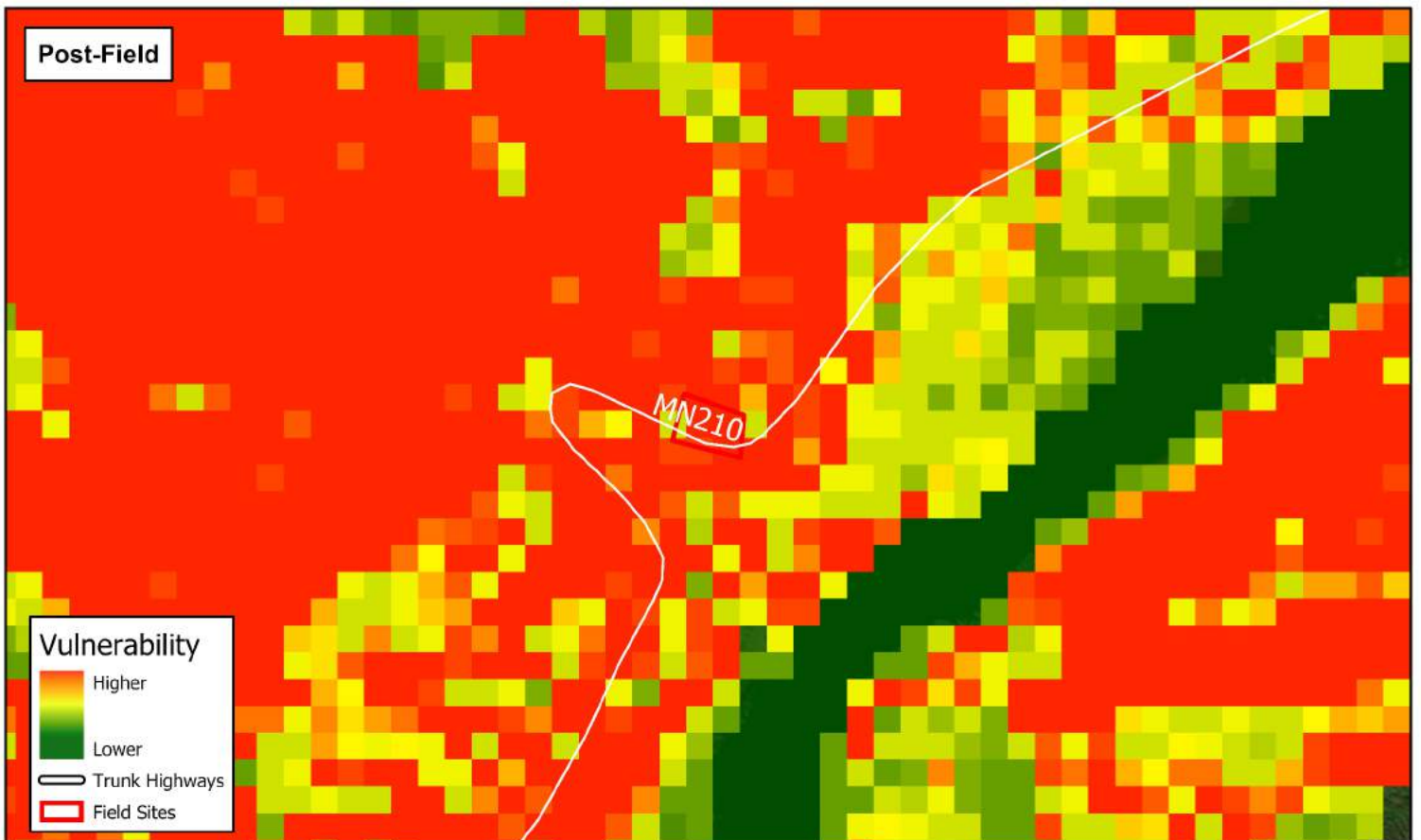
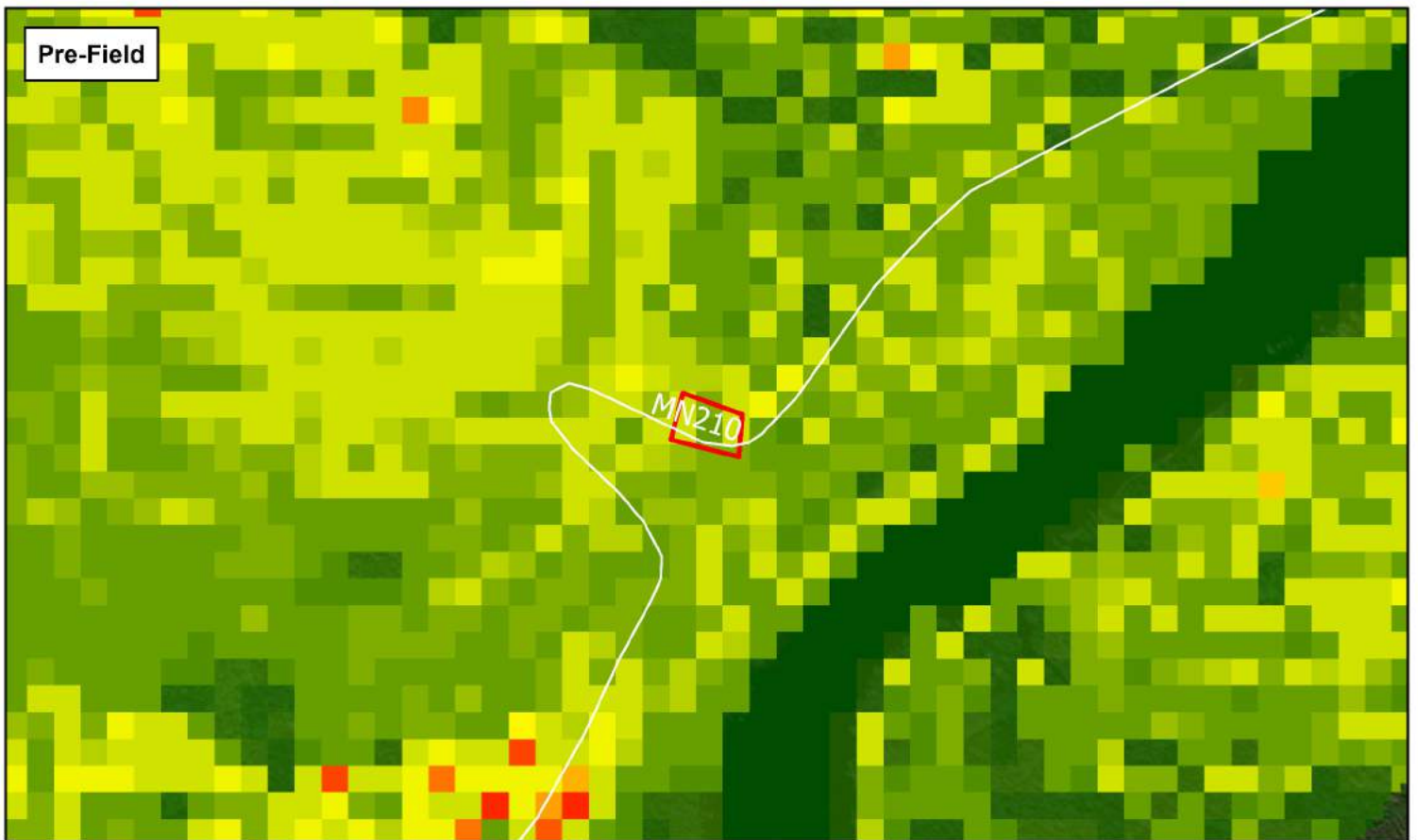


Table 1: Causative Factor Combination GWR Results

	Variable(s)	R ² Value
1 Variable	Slope Angle (Slope)	0.739
	Local Relief (Relief)	0.824
	Elevation	0.604
	Terrain Curvature (Curvature)	0.591
	Water Table Depth (Water Table)	0.556
	Bedrock Proximity (Bedrock)	0.599
	Soil Thickness (Soil)	0.524
	Slope Orientation (Orientation)	0.532
2 Variables	Slope, Relief	0.863
	Slope, Elevation	0.800
	Slope, Curvature	0.778
	Slope, Water Table	0.776
	Slope, Bedrock	0.791
	Slope, Soil	0.766
	Slope, Orientation	0.771
	Relief, Elevation	0.843
	Relief, Curvature	0.854
	Relief, Water Table	0.851
	Relief, Bedrock	0.866
	Relief, Soil	0.841
	Relief, Orientation	0.846
	Elevation, Curvature	0.702
	Elevation, Water Table	0.683
	Elevation, Bedrock	0.595
	Elevation, Soil	0.641
	Elevation, Orientation	0.672
	Curvature, Water Table	0.660
	Curvature, Bedrock	0.689
	Curvature, Soil	0.639
	Curvature, Orientation	0.645
	Water Table, Bedrock	0.704
	Water Table, Soil	0.609
	Water Table, Orientation	0.616
	Bedrock, Orientation	0.666
	Soil, Orientation	0.592
3 Variables	Slope, Relief, Elevation	0.869
	Slope, Relief, Curvature	0.885
	Slope, Relief, Water Table	0.882
	Slope, Relief, Bedrock	0.906
	Slope, Relief, Soil	0.875
	Slope, Relief, Orientation	0.879
	Slope, Elevation, Curvature	0.824
	Slope, Elevation, Water Table	0.831
	Slope, Elevation, Bedrock	0.897
	Slope, Elevation, Soil	0.816
	Slope, Elevation, Orientation	0.821
	Slope, Curvature, Water Table	0.810

Table 1: Causative Factor Combination GWR Results (Cont.)

	Variable(s)	R ² Value
3 Variables	Slope, Curvature, Bedrock	0.816
	Slope, Curvature, Soil	0.802
	Slope, Curvature, Orientation	0.807
	Slope, Water Table, Bedrock	0.842
	Slope, Water Table, Soil	0.800
	Slope, Water Table, Orientation	0.805
	Slope, Bedrock, Orientation	0.832
	Slope, Soil, Orientation	0.798
	Relief, Elevation, Curvature	0.866
	Relief, Elevation, Water Table	0.875
	Relief, Elevation, Bedrock	0.862
	Relief, Elevation, Soil	0.845
	Relief, Elevation, Orientation	0.865
	Relief, Curvature, Water Table	0.875
	Relief, Curvature, Bedrock	0.894
	Relief, Curvature, Soil	0.868
	Relief, Curvature, Orientation	0.872
	Relief, Water Table, Bedrock	0.901
	Relief, Water Table, Soil	0.865
	Relief, Water Table, Orientation	0.869
	Relief, Bedrock, Orientation	0.883
	Relief, Soil, Orientation	0.861
	Elevation, Curvature, Water Table	0.751
	Elevation, Curvature, Bedrock	0.656
	Elevation, Curvature, Soil	0.719
	Elevation, Curvature, Orientation	0.748
	Elevation, Water Table, Bedrock	0.447
	Elevation, Water Table, Soil	0.742
	Elevation, Water Table, Orientation	0.740
	Elevation, Bedrock, Orientation	0.567
	Elevation, Soil, Orientation	0.710
	Curvature, Water Table, Bedrock	0.759
	Curvature, Water Table, Soil	0.697
	Curvature, Water Table, Orientation	0.706
	Curvature, Bedrock, Orientation	0.743
	Curvature, Soil, Orientation	0.688
	Water Table, Bedrock, Orientation	0.754
	Water Table, Soil, Orientation	0.667
4 Variables	Slope, Relief, Elevation, Curvature	0.887
	Slope, Relief, Elevation, Water Table	0.886
	Slope, Relief, Elevation, Bedrock	0.898
	Slope, Relief, Elevation, Soil	0.866
	Slope, Relief, Elevation, Orientation	0.902
	Slope, Relief, Curvature, Water Table	0.900
	Slope, Relief, Curvature, Bedrock	0.925
	Slope, Relief, Curvature, Soil	0.895
	Slope, Relief, Curvature, Orientation	0.899

Table 1: Causative Factor Combination GWR Results (Cont.)

	Variable(s)	R ² Value
4 Variables	Slope, Relief, Water Table, Bedrock	0.922
	Slope, Relief, Water Table, Soil	0.893
	Slope, Relief, Water Table, Orientation	0.896
	Slope, Relief, Bedrock, Orientation	0.923
	Slope, Relief, Soil, Orientation	0.891
	Slope, Elevation, Curvature, Water Table	0.853
	Slope, Elevation, Curvature, Bedrock	0.770
	Slope, Elevation, Curvature, Soil	0.830
	Slope, Elevation, Curvature, Orientation	0.853
	Slope, Elevation, Water Table, Soil	0.854
	Slope, Elevation, Water Table, Orientation	0.867
	Slope, Elevation, Bedrock, Orientation	0.926
	Slope, Elevation, Soil, Orientation	0.851
	Slope, Curvature, Water Table, Bedrock	0.862
	Slope, Curvature, Water Table, Soil	0.832
	Slope, Curvature, Water Table, Orientation	0.835
	Slope, Curvature, Bedrock, Orientation	0.859
	Slope, Curvature, Soil, Orientation	0.829
	Slope, Water Table, Bedrock, Orientation	0.876
	Slope, Water Table, Soil, Orientation	0.828
	Relief, Elevation, Curvature, Water Table	0.891
	Relief, Elevation, Curvature, Bedrock	0.838
	Relief, Elevation, Curvature, Soil	0.859
	Relief, Elevation, Curvature, Orientation	0.891
	Relief, Elevation, Water Table, Soil	0.884
	Relief, Elevation, Water Table, Orientation	0.913
	Relief, Elevation, Bedrock, Orientation	0.943
	Relief, Elevation, Soil, Orientation	0.879
	Relief, Curvature, Water Table, Bedrock	0.915
	Relief, Curvature, Water Table, Soil	0.888
	Relief, Curvature, Water Table, Orientation	0.891
	Relief, Curvature, Bedrock, Orientation	0.915
	Relief, Curvature, Soil, Orientation	0.885
	Relief, Water Table, Bedrock, Orientation	0.922
	Relief, Water Table, Soil, Orientation	0.884
	Elevation, Curvature, Water Table, Bedrock	0.568
	Elevation, Curvature, Water Table, Soil	0.792
	Elevation, Curvature, Water Table, Orientation	0.795
	Elevation, Curvature, Bedrock, Orientation	0.473
	Elevation, Curvature, Soil, Orientation	0.785
	Elevation, Water Table, Bedrock, Orientation	0.753
	Elevation, Water Table, Soil, Orientation	0.807
	Curvature, Water Table, Bedrock, Orientation	0.787
	Curvature, Water Table, Soil, Orientation	0.742
5 Variables	Slope, Relief, Elevation, Curvature, Water Table	0.909
	Slope, Relief, Elevation, Curvature, Bedrock	0.897
	Slope, Relief, Elevation, Curvature, Soil	0.884

Table 1: Causative Factor Combination GWR Results (Cont.)

	Variable(s)	R ² Value
5 Variables	Slope, Relief, Elevation, Curvature, Orientation	0.910
	Slope, Relief, Elevation, Water Table, Soil	0.899
	Slope, Relief, Elevation, Water Table, Orientation	0.908
	Slope, Relief, Elevation, Bedrock, Orientation	0.993
	Slope, Relief, Elevation, Soil, Orientation	0.884
	Slope, Relief, Curvature, Water Table, Bedrock	0.940
	Slope, Relief, Curvature, Water Table, Soil	0.910
	Slope, Relief, Curvature, Water Table, Orientation	0.913
	Slope, Relief, Curvature, Bedrock, Orientation	0.937
	Slope, Relief, Curvature, Soil, Orientation	0.909
	Slope, Relief, Water Table, Bedrock, Orientation	0.922
	Slope, Relief, Water Table, Soil, Orientation	0.908
	Slope, Elevation, Curvature, Water Table, Soil	0.883
	Slope, Elevation, Curvature, Water Table, Orientation	0.880
	Slope, Elevation, Curvature, Bedrock, Orientation	0.908
	Slope, Elevation, Curvature, Soil, Orientation	0.888
	Slope, Elevation, Water Table, Soil, Orientation	0.883
	Slope, Curvature, Water Table, Bedrock, Orientation	0.891
	Slope, Curvature, Water Table, Soil, Orientation	0.856
	Relief, Elevation, Curvature, Water Table, Soil	0.896
	Relief, Elevation, Curvature, Water Table, Orientation	0.911
	Relief, Elevation, Curvature, Bedrock, Orientation	0.935
	Relief, Elevation, Curvature, Soil, Orientation	0.897
	Relief, Elevation, Water Table, Soil, Orientation	0.899
	Relief, Curvature, Water Table, Bedrock, Orientation	0.932
	Relief, Curvature, Water Table, Soil, Orientation	0.904
	Elevation, Curvature, Water Table, Bedrock, Orientation	0.846
	Elevation, Curvature, Water Table, Soil, Orientation	0.806
6 Variables	Slope, Relief, Elevation, Curvature, Water Table, Soil	0.881
	Slope, Relief, Elevation, Curvature, Water Table, Orientation	0.909
	Slope, Relief, Elevation, Curvature, Bedrock, Orientation	0.961
	Slope, Relief, Elevation, Curvature, Soil, Orientation	0.901
	Slope, Relief, Elevation, Water Table, Soil, Orientation	0.940
	Slope, Relief, Curvature, Water Table, Bedrock, Orientation	0.939
	Slope, Relief, Curvature, Water Table, Soil, Orientation	0.921
	Slope, Elevation, Curvature, Water Table, Soil, Orientation	0.906
	Relief, Elevation, Curvature, Water Table, Soil, Orientation	0.901
7 Variables	Slope, Relief, Elevation, Curvature, Water Table, Soil, Orientation	0.872

Table 2. Regional GWR Results

Region Name	R ² Value
Full Study Area with Elevation	0.993
Full Study Area without Elevation	0.923
Des Moines North	0.937
Des Moines South	0.956
Rainy North	0.996
Rainy South	0.944
Superior	0.904
Wadena	0.987

Table 3. Risk Matrix

				Consequence		
				Intersects Trunk Highways	Within 500 feet of Trunk Highways	More than 500 feet of Trunk Highways
				Within Metro or Incorporated Town	Rural	
				Critical (5)	Serious (3)	Marginal (2)
LIKELIHOOD	Slope Stability	Rational				
	Low	Slope is likely already experiencing mass failure or has the highest risk of failure.	Likely (4)	20 Action Recommended	12 Further Evaluation	8 Monitoring
	Medium	Surface erosion and other pre-cursors for catastrophic failure.	Possible (3)	15 Further Evaluation	9 Monitoring	6 No Action
	High	Slope has been repaired, recovered, or shows no signs of imminent future.	Unlikely (2)	10 Monitoring	6 No Action	4 No Action

Table 4. Ranked List of Slopes by County

Rank	ID	Action	Area (mi ²)	TH	Ref.	County
1	1212	Action Recommended / Site Visit	0.12736	MN200	192	Aitkin
2	1771	Action Recommended / Site Visit	0.094563	US169	230	Aitkin
3	1716	Action Recommended / Site Visit	0.055588	MN18	27	Aitkin
4	1764	Action Recommended / Site Visit	0.04587	MN18	68	Aitkin
5	1675	Action Recommended / Site Visit	0.034158	US169	247	Aitkin
6	1722	Action Recommended / Site Visit	0.029733	MN18	36	Aitkin
7	1466	Action Recommended / Site Visit	0.026929	MN65	130	Aitkin
8	1714	Action Recommended / Site Visit	0.024991	US169	241	Aitkin
9	1750	Action Recommended / Site Visit	0.020402	US169	237	Aitkin
10	1590	Action Recommended / Site Visit	0.019109	US169	263	Aitkin
11	1349	Action Recommended / Site Visit	0.01863	MN65	136	Aitkin
12	1227	Action Recommended / Site Visit	0.01689	MN200	147	Aitkin
13	1217	Action Recommended / Site Visit	0.015566	MN200	190	Aitkin
14	1612	Action Recommended / Site Visit	0.014395	MN210	175	Aitkin
15	1609	Action Recommended / Site Visit	0.014325	MN210	164	Aitkin
16	1344	Action Recommended / Site Visit	0.013794	MN65	136	Aitkin
17	1180	Action Recommended / Site Visit	0.012512	MN65	148	Aitkin
18	1473	Action Recommended / Site Visit	0.011583	MN65	130	Aitkin
19	1725	Action Recommended / Site Visit	0.010615	MN18	36	Aitkin
20	1730	Action Recommended / Site Visit	0.010412	US169	238	Aitkin
21	1364	Action Recommended / Site Visit	0.008763	MN65	135	Aitkin
22	1497	Action Recommended / Site Visit	0.008736	MN65	128	Aitkin
23	1694	Action Recommended / Site Visit	0.008352	MN18	34	Aitkin
24	1631	Action Recommended / Site Visit	0.003942	MN47	252	Aitkin
25	1481	Action Recommended / Site Visit	0.00315	MN65	130	Aitkin
26	1721	Action Recommended / Site Visit	0.002518	MN18	35	Aitkin
27	1749	Action Recommended / Site Visit	0.002429	US169	238	Aitkin
28	1563	Further Evaluation	0.081947	US169	264	Aitkin
29	1330	Further Evaluation	0.045676	MN65	137	Aitkin
30	1219	Further Evaluation	0.039449	MN200	179	Aitkin
31	1543	Further Evaluation	0.028417	US169	265	Aitkin
32	1740	Further Evaluation	0.025807	US169	236	Aitkin
33	1754	Further Evaluation	0.024754	US169	235	Aitkin
34	1268	Further Evaluation	0.018588	MN65	143	Aitkin
35	1718	Further Evaluation	0.017555	US169	240	Aitkin
36	1235	Further Evaluation	0.016983	MN200	176	Aitkin
37	1408	Further Evaluation	0.014408	MN65	133	Aitkin
38	4496	Further Evaluation	0.010054	US169	237	Aitkin
39	1443	Further Evaluation	0.009436	MN65	132	Aitkin
40	1203	Further Evaluation	0.009258	MN200	199	Aitkin
41	1720	Further Evaluation	0.009066	MN18	28	Aitkin
42	1224	Further Evaluation	0.008893	MN200	193	Aitkin

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
43	1204	Further Evaluation	0.00825	US169	289	Aitkin
44	1394	Further Evaluation	0.007898	MN65	134	Aitkin
45	1229	Further Evaluation	0.007888	MN200	195	Aitkin
46	1679	Further Evaluation	0.007122	US169	247	Aitkin
47	1228	Further Evaluation	0.006567	MN200	180	Aitkin
48	1635	Further Evaluation	0.005251	MN47	122	Aitkin
49	1257	Further Evaluation	0.005236	MN65	144	Aitkin
50	4479	Further Evaluation	0.005206	MN18	35	Aitkin
51	4477	Further Evaluation	0.004902	MN18	34	Aitkin
52	1495	Further Evaluation	0.004841	MN65	128	Aitkin
53	3959	Further Evaluation	0.004837	MN65	137	Aitkin
54	4525	Further Evaluation	0.004819	MN18	68	Aitkin
55	4485	Further Evaluation	0.004695	MN18	37	Aitkin
56	4116	Further Evaluation	0.003711	MN65	130	Aitkin
57	3969	Further Evaluation	0.003343	MN65	136	Aitkin
58	4356	Further Evaluation	0.003201	US169	252	Aitkin
59	1731	Further Evaluation	0.003142	MN18	37	Aitkin
60	4478	Further Evaluation	0.002944	MN18	35	Aitkin
61	1772	Further Evaluation	0.002609	MN47	100	Aitkin
62	4245	Further Evaluation	0.002579	US169	264	Aitkin
63	4417	Further Evaluation	0.002179	US169	248	Aitkin
64	4326	Further Evaluation	0.002156	US169	260	Aitkin
65	1350	Monitoring	0.032481	MN65	136	Aitkin
66	1795	Monitoring	0.029598	MN18	68	Aitkin
67	1245	Monitoring	0.026582	US169	286	Aitkin
68	1246	Monitoring	0.025694	MN65	144	Aitkin
69	1503	Monitoring	0.023533	US169	270	Aitkin
70	1221	Monitoring	0.020433	US169	288	Aitkin
71	1259	Monitoring	0.019288	US169	285	Aitkin
72	1343	Monitoring	0.018318	MN65	136	Aitkin
73	1306	Monitoring	0.017015	MN65	139	Aitkin
74	1674	Monitoring	0.015586	US169	247	Aitkin
75	1608	Monitoring	0.013933	MN210	170	Aitkin
76	1255	Monitoring	0.011218	US169	285	Aitkin
77	1678	Monitoring	0.011202	US169	248	Aitkin
78	1475	Monitoring	0.010867	MN65	129	Aitkin
79	1683	Monitoring	0.010712	US169	247	Aitkin
80	1302	Monitoring	0.010294	MN65	140	Aitkin
81	3787	Monitoring	0.010175	MN65	148	Aitkin
82	1339	Monitoring	0.010174	MN65	137	Aitkin
83	1319	Monitoring	0.009904	MN65	139	Aitkin
84	1593	Monitoring	0.009605	US169	263	Aitkin
85	1399	Monitoring	0.009558	MN65	134	Aitkin
86	1292	Monitoring	0.008837	MN65	141	Aitkin

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
87	1498	Monitoring	0.008756	MN65	128	Aitkin
88	1516	Monitoring	0.00861	MN65	125	Aitkin
89	1151	Monitoring	0.007986	MN200	193	Aitkin
90	3797	Monitoring	0.007981	MN200	193	Aitkin
91	1611	Monitoring	0.007863	MN210	170	Aitkin
92	1317	Monitoring	0.007435	MN65	139	Aitkin
93	1462	Monitoring	0.007308	MN65	131	Aitkin
94	1419	Monitoring	0.007136	MN65	133	Aitkin
95	1468	Monitoring	0.007056	MN65	131	Aitkin
96	1239	Monitoring	0.006836	MN200	172	Aitkin
97	1646	Monitoring	0.006832	MN47	114	Aitkin
98	1226	Monitoring	0.006537	MN200	191	Aitkin
99	1572	Monitoring	0.006455	US169	265	Aitkin
100	1236	Monitoring	0.006363	MN200	195	Aitkin
101	1423	Monitoring	0.006363	MN65	133	Aitkin
102	1637	Monitoring	0.005568	MN210	149	Aitkin
103	1244	Monitoring	0.005529	MN200	176	Aitkin
104	1220	Monitoring	0.005484	MN200	194	Aitkin
105	3808	Monitoring	0.005474	MN200	180	Aitkin
106	3814	Monitoring	0.005286	MN200	179	Aitkin
107	1348	Monitoring	0.005227	MN65	136	Aitkin
108	4120	Monitoring	0.005096	MN65	128	Aitkin
109	4476	Monitoring	0.005055	US169	241	Aitkin
110	1456	Monitoring	0.005054	MN65	132	Aitkin
111	1627	Monitoring	0.004945	MN47	122	Aitkin
112	1216	Monitoring	0.004916	MN200	193	Aitkin
113	1687	Monitoring	0.004772	US169	245	Aitkin
114	3962	Monitoring	0.004497	MN65	136	Aitkin
115	1233	Monitoring	0.004277	MN200	190	Aitkin
116	1493	Monitoring	0.004261	MN65	128	Aitkin
117	3860	Monitoring	0.00423	US169	286	Aitkin
118	1668	Monitoring	0.004208	US169	248	Aitkin
119	3821	Monitoring	0.004088	MN200	198	Aitkin
120	1358	Monitoring	0.004053	MN65	136	Aitkin
121	1353	Monitoring	0.004039	MN65	135	Aitkin
122	3985	Monitoring	0.003957	MN65	135	Aitkin
123	3818	Monitoring	0.003952	MN200	195	Aitkin
124	1499	Monitoring	0.003944	MN65	126	Aitkin
125	3777	Monitoring	0.003927	US169	289	Aitkin
126	4474	Monitoring	0.003805	US169	241	Aitkin
127	4445	Monitoring	0.003805	MN27	227	Aitkin
128	3802	Monitoring	0.003673	MN200	180	Aitkin
129	3812	Monitoring	0.003669	MN200	178	Aitkin
130	4318	Monitoring	0.003623	MN210	169	Aitkin

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
131	4480	Monitoring	0.00334	US169	240	Aitkin
132	1296	Monitoring	0.003292	MN65	140	Aitkin
133	1304	Monitoring	0.003292	MN65	140	Aitkin
134	4423	Monitoring	0.003176	US169	247	Aitkin
135	3967	Monitoring	0.003127	MN65	136	Aitkin
136	1463	Monitoring	0.003085	MN65	131	Aitkin
137	3810	Monitoring	0.002841	US169	288	Aitkin
138	3815	Monitoring	0.002805	MN200	179	Aitkin
139	3978	Monitoring	0.002804	MN65	136	Aitkin
140	4119	Monitoring	0.00277	MN65	128	Aitkin
141	4486	Monitoring	0.002766	MN18	37	Aitkin
142	3979	Monitoring	0.002583	MN65	136	Aitkin
143	4160	Monitoring	0.00255	MN65	126	Aitkin
144	4482	Monitoring	0.002545	MN18	28	Aitkin
145	3819	Monitoring	0.002473	US169	288	Aitkin
146	4473	Monitoring	0.002361	US169	241	Aitkin
147	3975	Monitoring	0.002346	MN65	136	Aitkin
148	4103	Monitoring	0.002345	MN65	130	Aitkin
149	3915	Monitoring	0.00224	MN65	143	Aitkin
150	4075	Monitoring	0.002182	MN65	132	Aitkin
151	7647	Monitoring	0.000491	MN18	27	Aitkin
152	7656	Monitoring	0.000235	US169	237	Aitkin
153	7052	Monitoring	0.000214	MN65	128	Aitkin
1	2096	Action Recommended / Site Visit	0.087716	MN47	12	Anoka
2	2099	Action Recommended / Site Visit	0.06428	US10	235	Anoka
3	2102	Action Recommended / Site Visit	0.035778	MN65	11	Anoka
4	2044	Action Recommended / Site Visit	0.032729	I35E	123	Anoka
5	2079	Action Recommended / Site Visit	0.029711	US10	229	Anoka
6	2085	Action Recommended / Site Visit	0.027276	I35W	36	Anoka
7	2087	Action Recommended / Site Visit	0.024409	I35W	34	Anoka
8	2073	Action Recommended / Site Visit	0.02113	I35W	36	Anoka
9	2081	Action Recommended / Site Visit	0.017653	US10	230	Anoka
10	2098	Action Recommended / Site Visit	0.015954	MN610	11	Anoka
11	2101	Action Recommended / Site Visit	0.014102	MN47	12	Anoka
12	2117	Action Recommended / Site Visit	0.013061	I694	36	Anoka
13	2120	Action Recommended / Site Visit	0.011862	I694	37	Anoka
14	2104	Action Recommended / Site Visit	0.010399	MN65	10	Anoka
15	2077	Action Recommended / Site Visit	0.009585	US10	20	Anoka
16	2056	Action Recommended / Site Visit	0.009237	US10	226	Anoka
17	2070	Action Recommended / Site Visit	0.00904	US10	223	Anoka
18	2088	Action Recommended / Site Visit	0.008141	US10	231	Anoka
19	2075	Action Recommended / Site Visit	0.008033	US10	225	Anoka
20	2093	Action Recommended / Site Visit	0.007807	I35W	32	Anoka
21	2122	Action Recommended / Site Visit	0.007716	I694	37	Anoka

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
22	2095	Action Recommended / Site Visit	0.006857	US10	232	Anoka
23	2052	Action Recommended / Site Visit	0.006031	I35W	41	Anoka
24	2108	Action Recommended / Site Visit	0.005878	I35W	31	Anoka
25	2092	Action Recommended / Site Visit	0.005604	MN610	11	Anoka
26	2086	Action Recommended / Site Visit	0.005509	US10	230	Anoka
27	2042	Action Recommended / Site Visit	0.005328	MN47	29	Anoka
28	2063	Action Recommended / Site Visit	0.004938	US10	227	Anoka
29	2105	Action Recommended / Site Visit	0.004766	I35W	31	Anoka
30	2100	Action Recommended / Site Visit	0.004546	US10	234	Anoka
31	2115	Action Recommended / Site Visit	0.004372	MN47	37	Anoka
32	2071	Action Recommended / Site Visit	0.00343	I35W	39	Anoka
33	2048	Further Evaluation	0.018069	US10	219	Anoka
34	2097	Further Evaluation	0.012654	MN47	12	Anoka
35	2112	Further Evaluation	0.012626	MN65	8	Anoka
36	2110	Further Evaluation	0.010915	MN65	8	Anoka
37	2074	Further Evaluation	0.009986	MN47	225	Anoka
38	2049	Further Evaluation	0.008887	US10	219	Anoka
39	2106	Further Evaluation	0.007029	US10	236	Anoka
40	2121	Further Evaluation	0.005621	I694	38	Anoka
41	2061	Further Evaluation	0.004889	MN47	22	Anoka
42	2055	Further Evaluation	0.004801	MN47	23	Anoka
43	2076	Further Evaluation	0.004173	US169	225	Anoka
44	2125	Further Evaluation	0.003768	MN65	6	Anoka
45	4744	Further Evaluation	0.00346	US10	12	Anoka
46	4739	Further Evaluation	0.003206	I35W	35	Anoka
47	4743	Further Evaluation	0.003085	I35W	32	Anoka
48	2124	Further Evaluation	0.002728	I694	38	Anoka
49	4724	Further Evaluation	0.002621	MN47	22	Anoka
50	4731	Further Evaluation	0.002023	US10	229	Anoka
51	4752	Further Evaluation	0.002003	I694	37	Anoka
52	2068	Monitoring	0.024041	MN47	21	Anoka
53	2123	Monitoring	0.017524	MN47	6	Anoka
54	2026	Monitoring	0.016573	MN47	36	Anoka
55	2107	Monitoring	0.016298	MN65	5	Anoka
56	2103	Monitoring	0.015863	MN610	10	Anoka
57	2045	Monitoring	0.012282	MN47	27	Anoka
58	2058	Monitoring	0.011941	US10	222	Anoka
59	2022	Monitoring	0.01081	I694	36	Anoka
60	2050	Monitoring	0.010671	MN47	23	Anoka
61	2114	Monitoring	0.009833	MN65	8	Anoka
62	2116	Monitoring	0.009661	I694	0	Anoka
63	2047	Monitoring	0.009506	MN47	26	Anoka
64	2067	Monitoring	0.009491	US10	223	Anoka
65	2090	Monitoring	0.008878	US10	232	Anoka

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
66	2083	Monitoring	0.008405	US10	229	Anoka
67	2119	Monitoring	0.008293	I694	39	Anoka
68	2065	Monitoring	0.008256	MN47	22	Anoka
69	2118	Monitoring	0.008098	I694	38	Anoka
70	2091	Monitoring	0.007946	I35E	123	Anoka
71	2057	Monitoring	0.007777	US10	222	Anoka
72	2064	Monitoring	0.007458	US10	222	Anoka
73	2082	Monitoring	0.007324	US10	230	Anoka
74	2113	Monitoring	0.005838	MN47	9	Anoka
75	2109	Monitoring	0.00581	I694	39	Anoka
76	4748	Monitoring	0.00578	MN65	7	Anoka
77	2111	Monitoring	0.005733	MN65	8	Anoka
78	4734	Monitoring	0.005352	I35W	36	Anoka
79	2072	Monitoring	0.005243	US10	223	Anoka
80	2051	Monitoring	0.005118	MN65	18	Anoka
81	2053	Monitoring	0.005059	MN65	18	Anoka
82	2069	Monitoring	0.004816	US10	224	Anoka
83	2066	Monitoring	0.004631	MN47	22	Anoka
84	4757	Monitoring	0.004424	MN65	5	Anoka
85	2046	Monitoring	0.004422	MN47	27	Anoka
86	2084	Monitoring	0.004283	US10	230	Anoka
87	2060	Monitoring	0.004159	US10	221	Anoka
88	4733	Monitoring	0.004084	MN65	14	Anoka
89	2094	Monitoring	0.004037	MN610	11	Anoka
90	2089	Monitoring	0.003989	I35E	123	Anoka
91	4749	Monitoring	0.003921	MN65	7	Anoka
92	2078	Monitoring	0.003855	US10	229	Anoka
93	2054	Monitoring	0.003673	US10	219	Anoka
94	4732	Monitoring	0.003635	US10	230	Anoka
95	4755	Monitoring	0.003563	MN65	5	Anoka
96	2062	Monitoring	0.003468	MN47	22	Anoka
97	4723	Monitoring	0.00345	US10	222	Anoka
98	2059	Monitoring	0.003427	US10	221	Anoka
99	2126	Monitoring	0.003321	MN65	5	Anoka
100	4726	Monitoring	0.003318	US10	20	Anoka
101	4745	Monitoring	0.003245	MN610	10	Anoka
102	4742	Monitoring	0.003037	MN610	11	Anoka
103	4738	Monitoring	0.002911	I35W	35	Anoka
104	4740	Monitoring	0.00289	US10	231	Anoka
105	4753	Monitoring	0.00278	I694	39	Anoka
106	4728	Monitoring	0.002746	I35E	126	Anoka
107	2080	Monitoring	0.002503	US10	230	Anoka
108	4746	Monitoring	0.002497	US10	11	Anoka
109	4750	Monitoring	0.002444	I694	39	Anoka

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
110	4754	Monitoring	0.00244	I694	36	Anoka
111	4722	Monitoring	0.002409	MN47	27	Anoka
112	4729	Monitoring	0.002371	US169	146	Anoka
113	4747	Monitoring	0.002349	I35E	121	Anoka
114	4727	Monitoring	0.002322	US10	20	Anoka
115	4756	Monitoring	0.002176	MN47	6	Anoka
116	4751	Monitoring	0.002171	I694	38	Anoka
117	4725	Monitoring	0.002134	MN47	22	Anoka
118	4737	Monitoring	0.002089	I35W	36	Anoka
119	4730	Monitoring	0.002085	MN65	15	Anoka
120	4735	Monitoring	0.002085	I35W	36	Anoka
121	4718	Monitoring	0.002071	MN65	23	Anoka
122	4736	Monitoring	0.002034	US10	230	Anoka
123	4716	Monitoring	0.002012	MN65	23	Anoka
124	4741	Monitoring	0.002001	MN610	11	Anoka
125	7837	Monitoring	0.000163	US10	227	Anoka
1	2009	Action Recommended / Site Visit	0.042197	MN15	154	Benton
2	2013	Action Recommended / Site Visit	0.029963	MN23	0	Benton
3	2021	Action Recommended / Site Visit	0.026015	MN23	207	Benton
4	2010	Action Recommended / Site Visit	0.010818	MN95	1	Benton
5	2020	Action Recommended / Site Visit	0.01	US10	177	Benton
6	2014	Action Recommended / Site Visit	0.007902	MN95	1	Benton
7	2002	Action Recommended / Site Visit	0.00678	US10	171	Benton
8	1996	Further Evaluation	0.069851	US10	166	Benton
9	1998	Further Evaluation	0.058267	US10	168	Benton
10	2019	Further Evaluation	0.012449	US10	177	Benton
11	2006	Further Evaluation	0.012037	MN23	214	Benton
12	1995	Further Evaluation	0.010244	US10	166	Benton
13	1997	Further Evaluation	0.008705	US10	167	Benton
14	2011	Further Evaluation	0.008007	MN23	213	Benton
15	2015	Further Evaluation	0.005639	MN95	1	Benton
16	2007	Further Evaluation	0.005537	MN23	215	Benton
17	2001	Further Evaluation	0.005363	US10	170	Benton
18	2008	Further Evaluation	0.00438	MN15	155	Benton
19	1989	Further Evaluation	0.003667	US10	163	Benton
20	4684	Further Evaluation	0.003172	MN23	214	Benton
21	4677	Further Evaluation	0.002501	MN25	108	Benton
22	4669	Further Evaluation	0.002017	MN25	114	Benton
23	2012	Monitoring	0.011826	US10	177	Benton
24	2018	Monitoring	0.009629	MN95	1	Benton
25	1975	Monitoring	0.008963	US10	158	Benton
26	4685	Monitoring	0.006302	MN15	154	Benton
27	1994	Monitoring	0.005896	MN25	110	Benton
28	2005	Monitoring	0.005823	MN15	154	Benton

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
29	2000	Monitoring	0.005584	US10	170	Benton
30	2016	Monitoring	0.005469	MN95	1	Benton
31	1999	Monitoring	0.004733	US10	169	Benton
32	4687	Monitoring	0.004436	MN95	0	Benton
33	2003	Monitoring	0.004115	US10	174	Benton
34	4686	Monitoring	0.003708	US10	175	Benton
35	2017	Monitoring	0.003348	MN95	1	Benton
36	4682	Monitoring	0.002593	MN15	154	Benton
37	4688	Monitoring	0.002346	US10	177	Benton
38	4681	Monitoring	0.002326	MN15	155	Benton
39	4680	Monitoring	0.002089	US10	170	Benton
40	7799	Monitoring	0.000347	US10	166	Benton
1	1583	Action Recommended / Site Visit	0.926355	MN23	334	Carlton
2	1569	Action Recommended / Site Visit	0.652652	MN210	221	Carlton
3	1602	Action Recommended / Site Visit	0.234888	MN23	332	Carlton
4	1617	Action Recommended / Site Visit	0.186976	MN23	330	Carlton
5	1659	Action Recommended / Site Visit	0.166435	I35	218	Carlton
6	1541	Action Recommended / Site Visit	0.165315	I35	238	Carlton
7	1630	Action Recommended / Site Visit	0.149462	MN23	325	Carlton
8	1509	Action Recommended / Site Visit	0.149313	MN33	3	Carlton
9	1510	Action Recommended / Site Visit	0.139741	I35	2	Carlton
10	1621	Action Recommended / Site Visit	0.13682	MN23	326	Carlton
11	1663	Action Recommended / Site Visit	0.099411	MN23	319	Carlton
12	1643	Action Recommended / Site Visit	0.07838	MN23	322	Carlton
13	1560	Action Recommended / Site Visit	0.07074	I35	236	Carlton
14	1697	Action Recommended / Site Visit	0.04887	MN23	317	Carlton
15	1587	Action Recommended / Site Visit	0.045571	I35	234	Carlton
16	1701	Action Recommended / Site Visit	0.04222	MN23	315	Carlton
17	1695	Action Recommended / Site Visit	0.035992	MN23	317	Carlton
18	1555	Action Recommended / Site Visit	0.027924	MN210	198	Carlton
19	1565	Action Recommended / Site Visit	0.024262	MN210	204	Carlton
20	1626	Action Recommended / Site Visit	0.02287	MN23	327	Carlton
21	1584	Action Recommended / Site Visit	0.020393	I35	235	Carlton
22	1686	Action Recommended / Site Visit	0.019116	I35	216	Carlton
23	4386	Action Recommended / Site Visit	0.018256	MN23	322	Carlton
24	1699	Action Recommended / Site Visit	0.017022	MN23	317	Carlton
25	1558	Action Recommended / Site Visit	0.014634	MN210	194	Carlton
26	1685	Action Recommended / Site Visit	0.013847	MN27	247	Carlton
27	1596	Action Recommended / Site Visit	0.013059	I35	232	Carlton
28	1681	Action Recommended / Site Visit	0.011731	MN27	246	Carlton
29	4391	Action Recommended / Site Visit	0.010622	MN23	322	Carlton
30	1577	Action Recommended / Site Visit	0.008729	MN45	218	Carlton
31	1682	Action Recommended / Site Visit	0.008611	MN27	246	Carlton
32	1688	Action Recommended / Site Visit	0.008572	MN27	240	Carlton

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
33	1640	Action Recommended / Site Visit	0.007355	MN23	324	Carlton
34	1651	Action Recommended / Site Visit	0.006812	I35	220	Carlton
35	4315	Further Evaluation	0.085011	MN23	332	Carlton
36	1580	Further Evaluation	0.053763	MN210	221	Carlton
37	1624	Further Evaluation	0.050692	MN23	328	Carlton
38	1544	Further Evaluation	0.050221	MN33	1	Carlton
39	4373	Further Evaluation	0.044719	MN23	324	Carlton
40	1557	Further Evaluation	0.034453	MN45	1	Carlton
41	4254	Further Evaluation	0.027535	MN210	225	Carlton
42	1512	Further Evaluation	0.026634	MN33	2	Carlton
43	1691	Further Evaluation	0.021105	MN289	1	Carlton
44	1653	Further Evaluation	0.020659	MN23	322	Carlton
45	1570	Further Evaluation	0.017716	MN73	23	Carlton
46	1680	Further Evaluation	0.015135	MN73	8	Carlton
47	1660	Further Evaluation	0.01447	MN23	322	Carlton
48	1623	Further Evaluation	0.011786	MN23	328	Carlton
49	1605	Further Evaluation	0.010575	I35	231	Carlton
50	1575	Further Evaluation	0.01046	MN45	218	Carlton
51	4284	Further Evaluation	0.009911	MN23	333	Carlton
52	4233	Further Evaluation	0.008694	MN210	204	Carlton
53	1641	Further Evaluation	0.007974	MN23	324	Carlton
54	1586	Further Evaluation	0.006102	I35	233	Carlton
55	1523	Further Evaluation	0.006098	MN33	2	Carlton
56	1542	Further Evaluation	0.005439	I35	245	Carlton
57	1698	Further Evaluation	0.005391	MN23	317	Carlton
58	1704	Further Evaluation	0.005052	MN23	315	Carlton
59	4371	Further Evaluation	0.004889	MN23	324	Carlton
60	1672	Further Evaluation	0.004815	MN73	8	Carlton
61	1526	Further Evaluation	0.003986	MN33	2	Carlton
62	1636	Further Evaluation	0.003747	MN23	324	Carlton
63	4209	Further Evaluation	0.003585	MN33	0	Carlton
64	1547	Further Evaluation	0.003467	I35	245	Carlton
65	4238	Further Evaluation	0.002986	MN210	225	Carlton
66	4148	Further Evaluation	0.002822	MN33	3	Carlton
67	4290	Further Evaluation	0.00278	MN23	333	Carlton
68	4344	Further Evaluation	0.002756	MN23	326	Carlton
69	4236	Further Evaluation	0.002673	MN210	204	Carlton
70	1638	Further Evaluation	0.002507	MN23	324	Carlton
71	4226	Further Evaluation	0.002401	MN210	197	Carlton
72	4369	Further Evaluation	0.00236	MN23	324	Carlton
73	4439	Further Evaluation	0.002349	MN23	318	Carlton
74	4234	Further Evaluation	0.002259	MN210	206	Carlton
75	4382	Further Evaluation	0.002192	MN23	322	Carlton
76	7366	Monitoring	0.413248	MN23	334	Carlton

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
77	1632	Monitoring	0.108684	MN23	323	Carlton
78	4309	Monitoring	0.045376	MN23	332	Carlton
79	1620	Monitoring	0.045359	MN23	329	Carlton
80	4397	Monitoring	0.044009	MN23	322	Carlton
81	1600	Monitoring	0.037052	MN23	332	Carlton
82	1591	Monitoring	0.036336	MN23	335	Carlton
83	1634	Monitoring	0.03537	MN23	324	Carlton
84	1598	Monitoring	0.035152	MN23	333	Carlton
85	1706	Monitoring	0.033531	MN23	315	Carlton
86	1615	Monitoring	0.033341	MN23	331	Carlton
87	1671	Monitoring	0.025848	MN73	8	Carlton
88	1538	Monitoring	0.024422	MN33	1	Carlton
89	1610	Monitoring	0.019478	MN23	332	Carlton
90	1614	Monitoring	0.018028	MN23	331	Carlton
91	1616	Monitoring	0.017362	I35	230	Carlton
92	1532	Monitoring	0.016805	MN33	2	Carlton
93	4399	Monitoring	0.015329	MN23	322	Carlton
94	1647	Monitoring	0.014467	MN23	323	Carlton
95	1633	Monitoring	0.014066	MN23	324	Carlton
96	4264	Monitoring	0.013846	MN210	223	Carlton
97	1649	Monitoring	0.012929	MN23	323	Carlton
98	4282	Monitoring	0.012736	MN23	334	Carlton
99	1582	Monitoring	0.012528	MN45	216	Carlton
100	1581	Monitoring	0.011443	MN210	215	Carlton
101	4393	Monitoring	0.011061	MN23	322	Carlton
102	1696	Monitoring	0.011013	MN23	316	Carlton
103	1676	Monitoring	0.010897	MN73	8	Carlton
104	4378	Monitoring	0.009994	MN23	323	Carlton
105	1546	Monitoring	0.009514	I35	241	Carlton
106	4358	Monitoring	0.009506	MN23	325	Carlton
107	1556	Monitoring	0.009293	I35	237	Carlton
108	1571	Monitoring	0.009009	MN210	219	Carlton
109	1619	Monitoring	0.008807	I35	227	Carlton
110	1566	Monitoring	0.008698	MN210	206	Carlton
111	4188	Monitoring	0.008287	MN33	1	Carlton
112	1669	Monitoring	0.008151	I35	218	Carlton
113	1597	Monitoring	0.008096	MN23	334	Carlton
114	1673	Monitoring	0.007767	I35	217	Carlton
115	1573	Monitoring	0.007508	I35	231	Carlton
116	1654	Monitoring	0.00735	I35	220	Carlton
117	1562	Monitoring	0.007304	MN45	1	Carlton
118	1661	Monitoring	0.006801	MN23	321	Carlton
119	1599	Monitoring	0.0068	MN73	22	Carlton
120	1589	Monitoring	0.006464	MN73	23	Carlton

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
121	1613	Monitoring	0.006321	MN23	331	Carlton
122	7400	Monitoring	0.006042	MN23	332	Carlton
123	1644	Monitoring	0.005994	MN23	322	Carlton
124	1606	Monitoring	0.005906	MN23	332	Carlton
125	1629	Monitoring	0.005883	I35	223	Carlton
126	1592	Monitoring	0.005653	I35	235	Carlton
127	1588	Monitoring	0.005539	MN210	222	Carlton
128	1677	Monitoring	0.005493	MN27	246	Carlton
129	7560	Monitoring	0.005392	MN23	322	Carlton
130	1656	Monitoring	0.005276	I35	220	Carlton
131	4440	Monitoring	0.005154	MN23	318	Carlton
132	1568	Monitoring	0.004745	MN210	219	Carlton
133	1618	Monitoring	0.004713	I35	228	Carlton
134	4193	Monitoring	0.004666	MN33	1	Carlton
135	4250	Monitoring	0.004575	MN210	223	Carlton
136	1594	Monitoring	0.004523	MN23	333	Carlton
137	1692	Monitoring	0.004488	MN23	317	Carlton
138	1595	Monitoring	0.004449	MN27	233	Carlton
139	4338	Monitoring	0.004431	I35	227	Carlton
140	1657	Monitoring	0.004334	MN23	322	Carlton
141	4267	Monitoring	0.00433	MN210	220	Carlton
142	4422	Monitoring	0.004277	I35	217	Carlton
143	1665	Monitoring	0.004164	I35	219	Carlton
144	4129	Monitoring	0.00391	MN33	3	Carlton
145	4351	Monitoring	0.003885	MN23	325	Carlton
146	1689	Monitoring	0.003882	MN289	215	Carlton
147	1553	Monitoring	0.003643	I35	242	Carlton
148	4412	Monitoring	0.003604	I35	217	Carlton
149	4448	Monitoring	0.003598	MN289	1	Carlton
150	4381	Monitoring	0.003512	MN23	322	Carlton
151	4316	Monitoring	0.003511	MN23	332	Carlton
152	1684	Monitoring	0.003327	I35	216	Carlton
153	4447	Monitoring	0.003183	MN289	0	Carlton
154	4395	Monitoring	0.003112	MN23	322	Carlton
155	1564	Monitoring	0.003103	MN210	209	Carlton
156	4357	Monitoring	0.003055	MN23	324	Carlton
157	4260	Monitoring	0.003044	MN210	223	Carlton
158	4446	Monitoring	0.002996	MN289	0	Carlton
159	4329	Monitoring	0.002934	I35	228	Carlton
160	1585	Monitoring	0.002832	I35	234	Carlton
161	4210	Monitoring	0.00278	I35	0	Carlton
162	4339	Monitoring	0.002748	MN23	328	Carlton
163	4187	Monitoring	0.002744	MN33	1	Carlton
164	4195	Monitoring	0.00273	I35	245	Carlton

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
165	4139	Monitoring	0.002684	MN33	3	Carlton
166	4167	Monitoring	0.002655	MN33	2	Carlton
167	1559	Monitoring	0.002616	MN45	1	Carlton
168	4456	Monitoring	0.002612	MN23	315	Carlton
169	4273	Monitoring	0.002593	I35	234	Carlton
170	4219	Monitoring	0.002557	I35	237	Carlton
171	4242	Monitoring	0.002461	MN45	0	Carlton
172	4199	Monitoring	0.002328	MN33	1	Carlton
173	1518	Monitoring	0.002299	MN33	3	Carlton
174	4372	Monitoring	0.002291	MN23	324	Carlton
175	4204	Monitoring	0.002289	MN73	26	Carlton
176	4216	Monitoring	0.002265	MN45	1	Carlton
177	4262	Monitoring	0.002256	MN210	221	Carlton
178	4164	Monitoring	0.002249	MN33	2	Carlton
179	4253	Monitoring	0.002225	MN210	220	Carlton
180	4355	Monitoring	0.002204	MN23	325	Carlton
181	4218	Monitoring	0.002143	MN210	197	Carlton
182	4334	Monitoring	0.002098	I35	227	Carlton
183	4306	Monitoring	0.002092	I35	231	Carlton
184	7542	Monitoring	0.001593	MN23	322	Carlton
185	7414	Monitoring	0.000851	MN23	332	Carlton
186	7504	Monitoring	0.000448	MN23	324	Carlton
187	7537	Monitoring	0.000347	I35	220	Carlton
188	7250	Monitoring	0.000347	MN210	225	Carlton
189	7252	Monitoring	0.000347	MN210	225	Carlton
190	7543	Monitoring	0.000238	MN23	322	Carlton
191	7514	Monitoring	0.000222	MN23	324	Carlton
192	7472	Monitoring	0.000174	MN23	326	Carlton
193	7421	Monitoring	0.000142	MN23	332	Carlton
1	1225	Action Recommended / Site Visit	0.488548	MN6	49	Cass
2	1089	Action Recommended / Site Visit	0.272983	MN371	90	Cass
3	1243	Action Recommended / Site Visit	0.255307	MN84	24	Cass
4	1335	Action Recommended / Site Visit	0.099481	MN6	42	Cass
5	1087	Action Recommended / Site Visit	0.068543	MN34	103	Cass
6	1223	Action Recommended / Site Visit	0.051976	MN6	50	Cass
7	1132	Action Recommended / Site Visit	0.03943	MN200	144	Cass
8	770	Action Recommended / Site Visit	0.03179	US2	133	Cass
9	1142	Action Recommended / Site Visit	0.029259	MN200	136	Cass
10	1127	Action Recommended / Site Visit	0.025313	MN34	99	Cass
11	1083	Action Recommended / Site Visit	0.02445	MN371	92	Cass
12	853	Action Recommended / Site Visit	0.024237	US2	160	Cass
13	1140	Action Recommended / Site Visit	0.023669	MN200	136	Cass
14	1077	Action Recommended / Site Visit	0.019977	MN371	92	Cass
15	1099	Action Recommended / Site Visit	0.017423	MN6	60	Cass

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
16	1415	Action Recommended / Site Visit	0.016527	MN6	38	Cass
17	1366	Action Recommended / Site Visit	0.016374	MN84	10	Cass
18	1192	Action Recommended / Site Visit	0.016069	MN371	84	Cass
19	1248	Action Recommended / Site Visit	0.014757	MN84	24	Cass
20	1427	Action Recommended / Site Visit	0.014608	MN87	68	Cass
21	1065	Action Recommended / Site Visit	0.014267	MN371	94	Cass
22	1141	Action Recommended / Site Visit	0.014085	MN200	135	Cass
23	1172	Action Recommended / Site Visit	0.012932	MN34	97	Cass
24	1426	Action Recommended / Site Visit	0.011453	MN87	70	Cass
25	815	Action Recommended / Site Visit	0.011046	US2	132	Cass
26	1357	Action Recommended / Site Visit	0.009937	MN87	84	Cass
27	1161	Action Recommended / Site Visit	0.008221	MN34	98	Cass
28	1181	Action Recommended / Site Visit	0.007152	MN84	28	Cass
29	1341	Action Recommended / Site Visit	0.00686	MN87	84	Cass
30	1048	Action Recommended / Site Visit	0.006772	MN371	95	Cass
31	1058	Action Recommended / Site Visit	0.005925	MN371	95	Cass
32	1158	Action Recommended / Site Visit	0.005651	MN200	149	Cass
33	820	Action Recommended / Site Visit	0.005581	US2	133	Cass
34	1144	Action Recommended / Site Visit	0.005342	MN34	99	Cass
35	1108	Action Recommended / Site Visit	0.004887	MN371	89	Cass
36	1143	Action Recommended / Site Visit	0.00451	MN200	141	Cass
37	1345	Action Recommended / Site Visit	0.004031	MN6	42	Cass
38	1182	Action Recommended / Site Visit	0.003931	MN371	85	Cass
39	1238	Action Recommended / Site Visit	0.003265	MN371	82	Cass
40	1260	Further Evaluation	0.157231	MN84	23	Cass
41	1347	Further Evaluation	0.05858	MN6	41	Cass
42	1163	Further Evaluation	0.048608	MN34	97	Cass
43	1269	Further Evaluation	0.043416	MN84	21	Cass
44	1064	Further Evaluation	0.03938	MN371	94	Cass
45	1424	Further Evaluation	0.036811	MN87	70	Cass
46	1123	Further Evaluation	0.028599	MN200	130	Cass
47	1254	Further Evaluation	0.027156	MN371	80	Cass
48	1179	Further Evaluation	0.026092	MN371	84	Cass
49	1739	Further Evaluation	0.025227	MN210	114	Cass
50	1738	Further Evaluation	0.023215	MN210	113	Cass
51	1159	Further Evaluation	0.022531	MN34	97	Cass
52	1173	Further Evaluation	0.021221	MN34	97	Cass
53	1154	Further Evaluation	0.020179	MN34	97	Cass
54	1242	Further Evaluation	0.017668	MN84	25	Cass
55	817	Further Evaluation	0.016217	US2	133	Cass
56	1152	Further Evaluation	0.015923	MN200	30	Cass
57	1737	Further Evaluation	0.015388	MN210	113	Cass
58	1288	Further Evaluation	0.013432	MN84	20	Cass
59	3834	Further Evaluation	0.012677	MN84	24	Cass

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
60	1251	Further Evaluation	0.010823	MN84	24	Cass
61	3842	Further Evaluation	0.010694	MN84	24	Cass
62	1736	Further Evaluation	0.010526	MN210	113	Cass
63	1732	Further Evaluation	0.010281	MN210	110	Cass
64	1724	Further Evaluation	0.0099	MN210	0	Cass
65	1215	Further Evaluation	0.009626	MN371	83	Cass
66	510	Further Evaluation	0.009507	US2	133	Cass
67	1733	Further Evaluation	0.00949	MN210	113	Cass
68	3848	Further Evaluation	0.009143	MN84	24	Cass
69	3780	Further Evaluation	0.009048	MN84	27	Cass
70	1045	Further Evaluation	0.008892	MN371	96	Cass
71	1361	Further Evaluation	0.008419	MN87	83	Cass
72	1147	Further Evaluation	0.0084	MN34	99	Cass
73	3564	Further Evaluation	0.008303	MN371	93	Cass
74	1286	Further Evaluation	0.00752	MN6	46	Cass
75	4043	Further Evaluation	0.00747	MN87	69	Cass
76	1414	Further Evaluation	0.007268	MN371	69	Cass
77	1150	Further Evaluation	0.006963	MN200	143	Cass
78	3690	Further Evaluation	0.006657	MN200	130	Cass
79	1044	Further Evaluation	0.006528	MN371	96	Cass
80	1138	Further Evaluation	0.006213	MN200	130	Cass
81	3580	Further Evaluation	0.006188	MN371	92	Cass
82	1096	Further Evaluation	0.006177	MN371	90	Cass
83	3470	Further Evaluation	0.006118	MN371	100	Cass
84	1104	Further Evaluation	0.005646	MN6	60	Cass
85	1741	Further Evaluation	0.005498	MN210	110	Cass
86	1336	Further Evaluation	0.005482	MN6	42	Cass
87	1241	Further Evaluation	0.005472	MN84	25	Cass
88	1086	Further Evaluation	0.0054	MN371	92	Cass
89	1124	Further Evaluation	0.005069	MN200	133	Cass
90	3874	Further Evaluation	0.004741	MN84	23	Cass
91	3543	Further Evaluation	0.004572	MN6	66	Cass
92	1134	Further Evaluation	0.004432	MN200	133	Cass
93	1289	Further Evaluation	0.004424	MN84	19	Cass
94	1277	Further Evaluation	0.004248	MN6	47	Cass
95	1232	Further Evaluation	0.004153	MN371	82	Cass
96	1149	Further Evaluation	0.004042	MN200	135	Cass
97	1129	Further Evaluation	0.003945	MN200	139	Cass
98	1139	Further Evaluation	0.003942	MN200	133	Cass
99	3630	Further Evaluation	0.003918	MN371	89	Cass
100	3880	Further Evaluation	0.003709	MN84	23	Cass
101	1332	Further Evaluation	0.003554	MN6	43	Cass
102	1198	Further Evaluation	0.003514	MN371	84	Cass
103	4484	Further Evaluation	0.00348	MN210	0	Cass

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
104	3926	Further Evaluation	0.003397	MN84	20	Cass
105	1084	Further Evaluation	0.003396	MN371	103	Cass
106	3667	Further Evaluation	0.003262	MN200	131	Cass
107	3700	Further Evaluation	0.00292	MN200	141	Cass
108	3698	Further Evaluation	0.002896	MN200	143	Cass
109	1407	Further Evaluation	0.002891	MN6	38	Cass
110	4487	Further Evaluation	0.002757	MN210	105	Cass
111	3567	Further Evaluation	0.002685	MN371	93	Cass
112	3669	Further Evaluation	0.002679	MN200	130	Cass
113	3553	Further Evaluation	0.002508	MN6	65	Cass
114	3686	Further Evaluation	0.002444	MN200	133	Cass
115	3861	Further Evaluation	0.002362	MN371	80	Cass
116	3873	Further Evaluation	0.002258	MN371	80	Cass
117	3579	Further Evaluation	0.002127	MN371	92	Cass
118	3705	Further Evaluation	0.002024	MN371	86	Cass
119	3894	Further Evaluation	0.002021	MN371	79	Cass
120	3572	Further Evaluation	0.001987	MN371	92	Cass
121	1057	Monitoring	0.089664	MN34	101	Cass
122	997	Monitoring	0.078975	MN371	99	Cass
123	1176	Monitoring	0.070516	MN34	97	Cass
124	1250	Monitoring	0.052328	MN371	80	Cass
125	1041	Monitoring	0.045803	MN6	65	Cass
126	1156	Monitoring	0.034931	MN84	27	Cass
127	1323	Monitoring	0.030986	MN84	17	Cass
128	1133	Monitoring	0.0294	MN200	156	Cass
129	1214	Monitoring	0.027786	MN371	83	Cass
130	1112	Monitoring	0.026825	MN371	88	Cass
131	1208	Monitoring	0.024895	MN84	27	Cass
132	1126	Monitoring	0.023988	MN200	136	Cass
133	1249	Monitoring	0.023308	MN84	24	Cass
134	1276	Monitoring	0.022729	MN6	47	Cass
135	1109	Monitoring	0.021179	MN34	101	Cass
136	3925	Monitoring	0.020928	MN84	20	Cass
137	1267	Monitoring	0.017795	MN84	22	Cass
138	1428	Monitoring	0.016768	MN87	69	Cass
139	1405	Monitoring	0.015827	MN371	70	Cass
140	1240	Monitoring	0.015535	MN84	25	Cass
141	916	Monitoring	0.014993	MN371	106	Cass
142	1337	Monitoring	0.014942	MN6	41	Cass
143	1199	Monitoring	0.014915	MN371	84	Cass
144	1315	Monitoring	0.014497	MN6	43	Cass
145	1729	Monitoring	0.014384	MN210	0	Cass
146	1060	Monitoring	0.014315	MN371	93	Cass
147	1264	Monitoring	0.013016	MN84	23	Cass

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
148	1190	Monitoring	0.012479	MN200	162	Cass
149	1119	Monitoring	0.012457	MN371	128	Cass
150	1106	Monitoring	0.012291	MN6	60	Cass
151	1735	Monitoring	0.012276	MN210	113	Cass
152	1262	Monitoring	0.012171	MN371	79	Cass
153	1055	Monitoring	0.011727	MN200	95	Cass
154	1130	Monitoring	0.01163	MN34	99	Cass
155	1252	Monitoring	0.011294	MN6	48	Cass
156	1081	Monitoring	0.01088	MN371	92	Cass
157	1137	Monitoring	0.010699	MN34	100	Cass
158	1122	Monitoring	0.010538	MN34	99	Cass
159	1256	Monitoring	0.010483	MN6	46	Cass
160	3704	Monitoring	0.010344	MN34	98	Cass
161	1183	Monitoring	0.010159	MN34	96	Cass
162	3739	Monitoring	0.009863	MN34	97	Cass
163	1121	Monitoring	0.009829	MN34	99	Cass
164	3548	Monitoring	0.009673	MN6	65	Cass
165	1285	Monitoring	0.009252	MN84	21	Cass
166	1404	Monitoring	0.009248	MN6	39	Cass
167	1125	Monitoring	0.00908	MN200	139	Cass
168	1210	Monitoring	0.009059	MN84	27	Cass
169	1412	Monitoring	0.00902	MN6	38	Cass
170	819	Monitoring	0.008882	US2	129	Cass
171	3849	Monitoring	0.008644	MN84	24	Cass
172	1103	Monitoring	0.008609	MN371	90	Cass
173	1062	Monitoring	0.008356	MN371	94	Cass
174	1230	Monitoring	0.008184	MN371	82	Cass
175	1136	Monitoring	0.008164	MN200	156	Cass
176	1441	Monitoring	0.008117	MN6	37	Cass
177	1040	Monitoring	0.008017	MN371	96	Cass
178	1287	Monitoring	0.007881	MN84	20	Cass
179	1273	Monitoring	0.007856	MN6	47	Cass
180	869	Monitoring	0.007837	US2	159	Cass
181	1131	Monitoring	0.007751	MN200	130	Cass
182	3605	Monitoring	0.007652	MN34	90	Cass
183	1097	Monitoring	0.007592	MN371	90	Cass
184	1418	Monitoring	0.007434	MN64	29	Cass
185	1209	Monitoring	0.007347	MN371	83	Cass
186	3658	Monitoring	0.007306	MN34	100	Cass
187	3765	Monitoring	0.007279	MN371	84	Cass
188	1325	Monitoring	0.007094	MN371	75	Cass
189	1310	Monitoring	0.007055	MN84	18	Cass
190	3912	Monitoring	0.007004	MN371	79	Cass
191	1168	Monitoring	0.006998	MN84	28	Cass

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
192	1091	Monitoring	0.006836	MN371	92	Cass
193	932	Monitoring	0.006806	MN200	139	Cass
194	3610	Monitoring	0.006487	MN34	102	Cass
195	829	Monitoring	0.006482	US2	160	Cass
196	450	Monitoring	0.006371	US2	131	Cass
197	3696	Monitoring	0.006319	MN200	130	Cass
198	797	Monitoring	0.006315	MN371	97	Cass
199	1467	Monitoring	0.006258	MN84	6	Cass
200	1413	Monitoring	0.006221	MN87	69	Cass
201	1300	Monitoring	0.006118	MN371	77	Cass
202	733	Monitoring	0.006107	US2	132	Cass
203	1205	Monitoring	0.005915	MN84	27	Cass
204	1398	Monitoring	0.005847	MN6	39	Cass
205	1318	Monitoring	0.005821	MN84	17	Cass
206	4053	Monitoring	0.005812	MN87	74	Cass
207	1312	Monitoring	0.005777	MN6	45	Cass
208	1128	Monitoring	0.005702	MN200	156	Cass
209	1100	Monitoring	0.005518	MN34	102	Cass
210	3593	Monitoring	0.005453	MN34	103	Cass
211	3963	Monitoring	0.005387	MN6	42	Cass
212	3624	Monitoring	0.005382	MN371	89	Cass
213	1093	Monitoring	0.005303	MN34	103	Cass
214	850	Monitoring	0.005299	US2	144	Cass
215	1386	Monitoring	0.005278	MN6	40	Cass
216	1200	Monitoring	0.005224	MN371	84	Cass
217	3844	Monitoring	0.005192	MN6	49	Cass
218	1195	Monitoring	0.005101	MN371	84	Cass
219	1080	Monitoring	0.005092	MN6	60	Cass
220	1079	Monitoring	0.005091	MN6	60	Cass
221	1333	Monitoring	0.005029	MN84	13	Cass
222	1479	Monitoring	0.005022	MN371	65	Cass
223	4049	Monitoring	0.004988	MN6	38	Cass
224	1160	Monitoring	0.004891	MN371	86	Cass
225	3702	Monitoring	0.004874	MN200	143	Cass
226	3687	Monitoring	0.004866	MN200	136	Cass
227	789	Monitoring	0.004847	US2	127	Cass
228	3774	Monitoring	0.004705	MN371	84	Cass
229	3486	Monitoring	0.004655	MN371	99	Cass
230	4028	Monitoring	0.004654	MN6	38	Cass
231	3476	Monitoring	0.004631	MN371	100	Cass
232	1234	Monitoring	0.004603	MN371	82	Cass
233	3584	Monitoring	0.004517	MN371	92	Cass
234	1155	Monitoring	0.004429	MN200	134	Cass
235	3884	Monitoring	0.004374	MN84	23	Cass

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
236	3681	Monitoring	0.00435	MN200	135	Cass
237	3728	Monitoring	0.004292	MN34	97	Cass
238	3901	Monitoring	0.004285	MN371	79	Cass
239	3870	Monitoring	0.004245	MN84	23	Cass
240	3807	Monitoring	0.004215	MN371	82	Cass
241	796	Monitoring	0.004089	US2	127	Cass
242	1194	Monitoring	0.004052	MN84	28	Cass
243	1059	Monitoring	0.004041	MN371	95	Cass
244	1261	Monitoring	0.004032	MN6	48	Cass
245	3612	Monitoring	0.003998	MN34	102	Cass
246	1164	Monitoring	0.00397	MN84	29	Cass
247	4493	Monitoring	0.00396	MN210	110	Cass
248	1145	Monitoring	0.003959	MN200	131	Cass
249	3888	Monitoring	0.00391	MN84	23	Cass
250	3757	Monitoring	0.003909	MN371	84	Cass
251	3726	Monitoring	0.003861	MN34	98	Cass
252	1090	Monitoring	0.003844	MN200	139	Cass
253	1713	Monitoring	0.003834	MN210	105	Cass
254	1222	Monitoring	0.003808	MN200	164	Cass
255	3689	Monitoring	0.003786	MN200	140	Cass
256	1258	Monitoring	0.003756	MN84	23	Cass
257	1028	Monitoring	0.003753	MN6	67	Cass
258	3581	Monitoring	0.003731	MN371	92	Cass
259	1322	Monitoring	0.003719	MN6	43	Cass
260	1078	Monitoring	0.003717	MN371	92	Cass
261	1328	Monitoring	0.003693	MN6	43	Cass
262	1279	Monitoring	0.00368	MN84	15	Cass
263	3665	Monitoring	0.003667	MN200	130	Cass
264	1135	Monitoring	0.003651	MN34	99	Cass
265	3798	Monitoring	0.003635	MN371	83	Cass
266	1189	Monitoring	0.00362	MN84	28	Cass
267	1253	Monitoring	0.00357	MN371	80	Cass
268	1324	Monitoring	0.003562	MN87	75	Cass
269	3886	Monitoring	0.003508	MN371	79	Cass
270	3760	Monitoring	0.00345	MN371	84	Cass
271	3603	Monitoring	0.003397	MN371	90	Cass
272	4023	Monitoring	0.003372	MN6	39	Cass
273	3913	Monitoring	0.003363	MN371	79	Cass
274	807	Monitoring	0.003363	US2	128	Cass
275	3730	Monitoring	0.003337	MN34	98	Cass
276	1283	Monitoring	0.003337	MN84	21	Cass
277	1202	Monitoring	0.003241	MN84	26	Cass
278	1734	Monitoring	0.003215	MN210	113	Cass
279	4051	Monitoring	0.003103	MN87	70	Cass

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
280	1165	Monitoring	0.003074	MN84	29	Cass
281	3820	Monitoring	0.00307	MN371	82	Cass
282	3906	Monitoring	0.003061	MN371	79	Cass
283	1218	Monitoring	0.003034	MN200	164	Cass
284	3929	Monitoring	0.003024	MN84	20	Cass
285	849	Monitoring	0.002981	US2	145	Cass
286	3641	Monitoring	0.002959	MN34	100	Cass
287	3283	Monitoring	0.002946	US2	150	Cass
288	1166	Monitoring	0.002936	MN200	153	Cass
289	3732	Monitoring	0.00292	MN34	97	Cass
290	1213	Monitoring	0.002919	MN84	26	Cass
291	3845	Monitoring	0.002905	MN6	49	Cass
292	3249	Monitoring	0.002892	US2	134	Cass
293	3628	Monitoring	0.00288	MN371	89	Cass
294	3555	Monitoring	0.002876	MN6	64	Cass
295	3586	Monitoring	0.002856	MN371	103	Cass
296	3300	Monitoring	0.002797	US2	158	Cass
297	3829	Monitoring	0.002771	MN84	25	Cass
298	3670	Monitoring	0.002751	MN200	131	Cass
299	3937	Monitoring	0.00272	MN84	19	Cass
300	3839	Monitoring	0.002704	MN6	50	Cass
301	3892	Monitoring	0.002686	MN371	79	Cass
302	1146	Monitoring	0.002622	MN200	139	Cass
303	3695	Monitoring	0.002598	MN200	133	Cass
304	3607	Monitoring	0.002569	MN371	90	Cass
305	3840	Monitoring	0.002555	MN6	49	Cass
306	3621	Monitoring	0.002545	MN371	89	Cass
307	3235	Monitoring	0.00254	US2	132	Cass
308	3801	Monitoring	0.002529	MN84	26	Cass
309	3577	Monitoring	0.002522	MN371	103	Cass
310	3693	Monitoring	0.002517	MN200	133	Cass
311	3934	Monitoring	0.002516	MN84	20	Cass
312	3575	Monitoring	0.002512	MN371	103	Cass
313	3734	Monitoring	0.002502	MN200	150	Cass
314	3910	Monitoring	0.002466	MN371	79	Cass
315	1066	Monitoring	0.002462	MN371	94	Cass
316	3613	Monitoring	0.002446	MN6	60	Cass
317	3674	Monitoring	0.002434	MN200	130	Cass
318	3632	Monitoring	0.002424	MN371	88	Cass
319	3639	Monitoring	0.002413	MN34	101	Cass
320	1290	Monitoring	0.002403	MN6	46	Cass
321	3832	Monitoring	0.002369	MN84	24	Cass
322	3749	Monitoring	0.002329	MN371	85	Cass
323	3712	Monitoring	0.002303	MN200	147	Cass

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
324	3683	Monitoring	0.002235	MN34	99	Cass
325	4024	Monitoring	0.002203	MN6	39	Cass
326	3714	Monitoring	0.002192	MN200	155	Cass
327	3784	Monitoring	0.002183	MN371	83	Cass
328	3928	Monitoring	0.002159	MN84	20	Cass
329	4041	Monitoring	0.002129	MN87	69	Cass
330	3694	Monitoring	0.002085	MN34	99	Cass
331	4463	Monitoring	0.002085	MN64	4	Cass
332	3935	Monitoring	0.002085	MN84	20	Cass
333	3924	Monitoring	0.002058	MN84	21	Cass
334	3685	Monitoring	0.002019	MN200	141	Cass
335	3250	Monitoring	0.002014	US2	137	Cass
336	6980	Monitoring	0.000238	MN87	69	Cass
1	2041	Action Recommended / Site Visit	0.214233	MN95	85	Chisago
2	2028	Action Recommended / Site Visit	0.162096	US8	21	Chisago
3	2040	Action Recommended / Site Visit	0.13395	MN243	1	Chisago
4	2033	Action Recommended / Site Visit	0.041507	US8	78	Chisago
5	2035	Further Evaluation	0.197491	MN95	80	Chisago
6	2024	Further Evaluation	0.053053	MN95	74	Chisago
7	2029	Further Evaluation	0.046658	US8	19	Chisago
8	1899	Further Evaluation	0.032114	MN95	74	Chisago
9	2030	Further Evaluation	0.012384	US8	22	Chisago
10	2025	Further Evaluation	0.009625	MN95	74	Chisago
11	2027	Further Evaluation	0.008511	MN95	74	Chisago
12	4698	Further Evaluation	0.002954	MN95	74	Chisago
13	4715	Further Evaluation	0.002267	MN243	1	Chisago
14	4721	Further Evaluation	0.002191	MN95	86	Chisago
15	4702	Further Evaluation	0.002042	US8	21	Chisago
16	2037	Monitoring	0.025375	MN95	81	Chisago
17	2043	Monitoring	0.014082	MN95	84	Chisago
18	2023	Monitoring	0.012658	MN95	59	Chisago
19	2036	Monitoring	0.012246	MN95	80	Chisago
20	2039	Monitoring	0.011689	MN95	82	Chisago
21	2034	Monitoring	0.011505	MN95	79	Chisago
22	4699	Monitoring	0.008991	MN95	74	Chisago
23	2032	Monitoring	0.008975	US8	12	Chisago
24	2038	Monitoring	0.007543	MN95	81	Chisago
25	4697	Monitoring	0.006205	MN95	74	Chisago
26	2031	Monitoring	0.004595	US8	13	Chisago
27	4717	Monitoring	0.004559	US8	4	Chisago
28	4696	Monitoring	0.004075	MN95	74	Chisago
29	4701	Monitoring	0.003759	US8	22	Chisago
30	4705	Monitoring	0.003592	US8	19	Chisago
31	4720	Monitoring	0.003383	MN95	85	Chisago

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
32	4700	Monitoring	0.003356	MN95	22	Chisago
33	4719	Monitoring	0.003095	US8	4	Chisago
34	4692	Monitoring	0.002229	MN95	60	Chisago
35	4703	Monitoring	0.002057	US8	12	Chisago
36	4704	Monitoring	0.002026	US8	12	Chisago
1	11	Action Recommended / Site Visit	1.042873	MN61	147	Cook
2	132	Action Recommended / Site Visit	0.32851	MN61	125	Cook
3	202	Action Recommended / Site Visit	0.225441	MN61	118	Cook
4	362	Action Recommended / Site Visit	0.200077	MN61	96	Cook
5	145	Action Recommended / Site Visit	0.196192	MN61	124	Cook
6	222	Action Recommended / Site Visit	0.193237	MN61	114	Cook
7	524	Action Recommended / Site Visit	0.187694	MN61	77	Cook
8	514	Action Recommended / Site Visit	0.186081	MN61	81	Cook
9	298	Action Recommended / Site Visit	0.177915	MN61	105	Cook
10	65	Action Recommended / Site Visit	0.174315	MN61	134	Cook
11	483	Action Recommended / Site Visit	0.152624	MN61	83	Cook
12	190	Action Recommended / Site Visit	0.145876	MN61	119	Cook
13	61	Action Recommended / Site Visit	0.142582	MN61	135	Cook
14	337	Action Recommended / Site Visit	0.131835	MN61	102	Cook
15	340	Action Recommended / Site Visit	0.109246	MN61	100	Cook
16	25	Action Recommended / Site Visit	0.082708	MN61	146	Cook
17	384	Action Recommended / Site Visit	0.079272	MN61	93	Cook
18	455	Action Recommended / Site Visit	0.078727	MN61	86	Cook
19	394	Action Recommended / Site Visit	0.075292	MN61	90	Cook
20	82	Action Recommended / Site Visit	0.063811	MN61	129	Cook
21	464	Action Recommended / Site Visit	0.063097	MN61	85	Cook
22	250	Action Recommended / Site Visit	0.056185	MN61	112	Cook
23	281	Action Recommended / Site Visit	0.052748	MN61	107	Cook
24	223	Action Recommended / Site Visit	0.046897	MN61	117	Cook
25	126	Action Recommended / Site Visit	0.037388	MN61	128	Cook
26	372	Action Recommended / Site Visit	0.036308	MN61	94	Cook
27	499	Action Recommended / Site Visit	0.028821	MN61	79	Cook
28	587	Action Recommended / Site Visit	0.027029	MN61	75	Cook
29	64	Action Recommended / Site Visit	0.025142	MN61	136	Cook
30	343	Action Recommended / Site Visit	0.022692	MN61	99	Cook
31	599	Action Recommended / Site Visit	0.022276	MN61	74	Cook
32	46	Action Recommended / Site Visit	0.021595	MN61	139	Cook
33	441	Action Recommended / Site Visit	0.020413	MN61	88	Cook
34	52	Action Recommended / Site Visit	0.016663	MN61	137	Cook
35	330	Action Recommended / Site Visit	0.014806	MN61	103	Cook
36	305	Action Recommended / Site Visit	0.01455	MN61	106	Cook
37	589	Action Recommended / Site Visit	0.013756	MN61	75	Cook
38	369	Action Recommended / Site Visit	0.012589	MN61	95	Cook
39	537	Action Recommended / Site Visit	0.008398	MN61	78	Cook

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
40	291	Action Recommended / Site Visit	0.00822	MN61	108	Cook
41	56	Action Recommended / Site Visit	0.008159	MN61	137	Cook
42	282	Action Recommended / Site Visit	0.007615	MN61	108	Cook
43	34	Action Recommended / Site Visit	0.006954	MN61	144	Cook
44	335	Action Recommended / Site Visit	0.006195	MN61	103	Cook
45	393	Action Recommended / Site Visit	0.005979	MN61	91	Cook
46	69	Action Recommended / Site Visit	0.005861	MN61	135	Cook
47	447	Action Recommended / Site Visit	0.005394	MN61	88	Cook
48	164	Action Recommended / Site Visit	0.005251	MN61	124	Cook
49	154	Action Recommended / Site Visit	0.004772	MN61	125	Cook
50	275	Action Recommended / Site Visit	0.004685	MN61	109	Cook
51	655	Action Recommended / Site Visit	0.004051	MN61	71	Cook
52	48	Action Recommended / Site Visit	0.003006	MN61	138	Cook
53	33	Further Evaluation	0.090307	MN61	144	Cook
54	77	Further Evaluation	0.082415	MN61	131	Cook
55	412	Further Evaluation	0.070041	MN61	89	Cook
56	59	Further Evaluation	0.030217	MN61	137	Cook
57	582	Further Evaluation	0.028561	MN61	76	Cook
58	43	Further Evaluation	0.02369	MN61	139	Cook
59	2714	Further Evaluation	0.022344	MN61	96	Cook
60	663	Further Evaluation	0.021439	MN61	71	Cook
61	469	Further Evaluation	0.018928	MN61	85	Cook
62	536	Further Evaluation	0.018139	MN61	76	Cook
63	475	Further Evaluation	0.017737	MN61	85	Cook
64	2860	Further Evaluation	0.017046	MN61	86	Cook
65	262	Further Evaluation	0.013833	MN61	112	Cook
66	42	Further Evaluation	0.013226	MN61	139	Cook
67	361	Further Evaluation	0.0123	MN61	98	Cook
68	452	Further Evaluation	0.012082	MN61	88	Cook
69	2195	Further Evaluation	0.01197	MN61	146	Cook
70	2391	Further Evaluation	0.011798	MN61	126	Cook
71	245	Further Evaluation	0.011459	MN61	112	Cook
72	382	Further Evaluation	0.010489	MN61	93	Cook
73	294	Further Evaluation	0.010304	MN61	107	Cook
74	596	Further Evaluation	0.009874	MN61	75	Cook
75	2945	Further Evaluation	0.0093	MN61	78	Cook
76	378	Further Evaluation	0.009091	MN61	94	Cook
77	30	Further Evaluation	0.008631	MN61	142	Cook
78	68	Further Evaluation	0.007508	MN61	135	Cook
79	40	Further Evaluation	0.007215	MN61	141	Cook
80	44	Further Evaluation	0.006462	MN61	140	Cook
81	525	Further Evaluation	0.006178	MN61	80	Cook
82	2237	Further Evaluation	0.00591	MN61	137	Cook
83	41	Further Evaluation	0.005608	MN61	140	Cook

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
84	2223	Further Evaluation	0.005249	MN61	141	Cook
85	363	Further Evaluation	0.005161	MN61	97	Cook
86	39	Further Evaluation	0.00466	MN61	141	Cook
87	2258	Further Evaluation	0.004208	MN61	134	Cook
88	38	Further Evaluation	0.004183	MN61	142	Cook
89	2254	Further Evaluation	0.003403	MN61	135	Cook
90	2226	Further Evaluation	0.003377	MN61	139	Cook
91	2219	Further Evaluation	0.003328	MN61	142	Cook
92	2648	Further Evaluation	0.003188	MN61	105	Cook
93	2205	Further Evaluation	0.002964	MN61	145	Cook
94	2716	Further Evaluation	0.002855	MN61	96	Cook
95	2988	Further Evaluation	0.002683	MN61	75	Cook
96	2956	Further Evaluation	0.002654	MN61	77	Cook
97	2210	Further Evaluation	0.002653	MN61	144	Cook
98	2720	Further Evaluation	0.002439	MN61	96	Cook
99	2983	Further Evaluation	0.002222	MN61	76	Cook
100	2861	Further Evaluation	0.00218	MN61	85	Cook
101	2982	Further Evaluation	0.002129	MN61	76	Cook
102	2256	Further Evaluation	0.002105	MN61	135	Cook
103	2374	Further Evaluation	0.002085	MN61	126	Cook
104	2929	Further Evaluation	0.002037	MN61	79	Cook
105	2618	Further Evaluation	0.002025	MN61	107	Cook
106	26	Monitoring	0.075134	MN61	145	Cook
107	342	Monitoring	0.042083	MN61	97	Cook
108	5646	Monitoring	0.041737	MN61	77	Cook
109	5034	Monitoring	0.031722	MN61	125	Cook
110	32	Monitoring	0.031228	MN61	144	Cook
111	83	Monitoring	0.023915	MN61	131	Cook
112	31	Monitoring	0.021935	MN61	142	Cook
113	326	Monitoring	0.020245	MN61	98	Cook
114	47	Monitoring	0.017071	MN61	137	Cook
115	351	Monitoring	0.014485	MN61	98	Cook
116	37	Monitoring	0.014219	MN61	142	Cook
117	234	Monitoring	0.013836	MN61	113	Cook
118	218	Monitoring	0.012897	MN61	115	Cook
119	646	Monitoring	0.012289	MN61	71	Cook
120	114	Monitoring	0.011507	MN61	130	Cook
121	2181	Monitoring	0.011449	MN61	149	Cook
122	2193	Monitoring	0.01073	MN61	147	Cook
123	2185	Monitoring	0.010497	MN61	147	Cook
124	29	Monitoring	0.010487	MN61	143	Cook
125	2605	Monitoring	0.010282	MN61	108	Cook
126	266	Monitoring	0.010199	MN61	108	Cook
127	471	Monitoring	0.009865	MN61	85	Cook

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
128	408	Monitoring	0.009419	MN61	90	Cook
129	27	Monitoring	0.008999	MN61	146	Cook
130	304	Monitoring	0.00874	MN61	105	Cook
131	174	Monitoring	0.008162	MN61	121	Cook
132	448	Monitoring	0.008124	MN61	88	Cook
133	72	Monitoring	0.007414	MN61	132	Cook
134	2263	Monitoring	0.007406	MN61	134	Cook
135	195	Monitoring	0.00702	MN61	120	Cook
136	2209	Monitoring	0.006967	MN61	144	Cook
137	506	Monitoring	0.006809	MN61	82	Cook
138	609	Monitoring	0.006452	MN61	72	Cook
139	2848	Monitoring	0.006446	MN61	88	Cook
140	5358	Monitoring	0.006405	MN61	96	Cook
141	2327	Monitoring	0.006318	MN61	129	Cook
142	35	Monitoring	0.006174	MN61	143	Cook
143	22	Monitoring	0.006169	MN61	150	Cook
144	4780	Monitoring	0.006081	MN61	148	Cook
145	28	Monitoring	0.005991	MN61	146	Cook
146	119	Monitoring	0.005956	MN61	129	Cook
147	219	Monitoring	0.005873	MN61	117	Cook
148	2474	Monitoring	0.005638	MN61	122	Cook
149	3032	Monitoring	0.005612	MN61	74	Cook
150	2224	Monitoring	0.005527	MN61	141	Cook
151	328	Monitoring	0.00542	MN61	103	Cook
152	2595	Monitoring	0.005095	MN61	109	Cook
153	96	Monitoring	0.005054	MN61	131	Cook
154	92	Monitoring	0.004902	MN61	130	Cook
155	166	Monitoring	0.0049	MN61	123	Cook
156	2194	Monitoring	0.004839	MN61	146	Cook
157	2614	Monitoring	0.004828	MN61	107	Cook
158	295	Monitoring	0.004712	MN61	108	Cook
159	637	Monitoring	0.004703	MN61	72	Cook
160	2525	Monitoring	0.004662	MN61	117	Cook
161	299	Monitoring	0.004654	MN61	108	Cook
162	2183	Monitoring	0.004645	MN61	148	Cook
163	45	Monitoring	0.004639	MN61	138	Cook
164	2925	Monitoring	0.004636	MN61	79	Cook
165	84	Monitoring	0.004621	MN61	131	Cook
166	647	Monitoring	0.004597	MN61	72	Cook
167	327	Monitoring	0.004589	MN61	103	Cook
168	2556	Monitoring	0.004579	MN61	112	Cook
169	2719	Monitoring	0.004538	MN61	95	Cook
170	206	Monitoring	0.004526	MN61	118	Cook
171	474	Monitoring	0.004455	MN61	83	Cook

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
172	5020	Monitoring	0.004408	MN61	126	Cook
173	2709	Monitoring	0.004389	MN61	97	Cook
174	2291	Monitoring	0.004297	MN61	131	Cook
175	24	Monitoring	0.004213	MN61	149	Cook
176	2606	Monitoring	0.004201	MN61	107	Cook
177	2609	Monitoring	0.004169	MN61	107	Cook
178	2523	Monitoring	0.004094	MN61	117	Cook
179	172	Monitoring	0.004041	MN61	122	Cook
180	2220	Monitoring	0.004009	MN61	141	Cook
181	2701	Monitoring	0.003915	MN61	97	Cook
182	549	Monitoring	0.003817	MN61	78	Cook
183	98	Monitoring	0.003696	MN61	130	Cook
184	541	Monitoring	0.003669	MN61	78	Cook
185	512	Monitoring	0.003544	MN61	82	Cook
186	518	Monitoring	0.003522	MN61	80	Cook
187	616	Monitoring	0.003488	MN61	73	Cook
188	2481	Monitoring	0.003408	MN61	121	Cook
189	165	Monitoring	0.003399	MN61	122	Cook
190	2532	Monitoring	0.003176	MN61	114	Cook
191	2784	Monitoring	0.003135	MN61	91	Cook
192	2405	Monitoring	0.003059	MN61	125	Cook
193	2335	Monitoring	0.002932	MN61	129	Cook
194	2704	Monitoring	0.002925	MN61	96	Cook
195	2252	Monitoring	0.0029	MN61	134	Cook
196	2217	Monitoring	0.002888	MN61	142	Cook
197	2862	Monitoring	0.002847	MN61	85	Cook
198	2230	Monitoring	0.002818	MN61	138	Cook
199	2182	Monitoring	0.002752	MN61	148	Cook
200	2184	Monitoring	0.002752	MN61	148	Cook
201	2380	Monitoring	0.002684	MN61	126	Cook
202	2856	Monitoring	0.002669	MN61	86	Cook
203	2615	Monitoring	0.00264	MN61	107	Cook
204	3038	Monitoring	0.002629	MN61	73	Cook
205	2786	Monitoring	0.002614	MN61	91	Cook
206	2717	Monitoring	0.002593	MN61	96	Cook
207	2577	Monitoring	0.002584	MN61	111	Cook
208	2987	Monitoring	0.002567	MN61	76	Cook
209	2951	Monitoring	0.002565	MN61	77	Cook
210	2746	Monitoring	0.002552	MN61	93	Cook
211	2650	Monitoring	0.002529	MN61	105	Cook
212	2345	Monitoring	0.002524	MN61	128	Cook
213	2329	Monitoring	0.002501	MN61	129	Cook
214	2249	Monitoring	0.0025	MN61	135	Cook
215	292	Monitoring	0.002479	MN61	109	Cook

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
216	2504	Monitoring	0.002453	MN61	118	Cook
217	2526	Monitoring	0.002432	MN61	116	Cook
218	2875	Monitoring	0.002354	MN61	84	Cook
219	2548	Monitoring	0.002336	MN61	112	Cook
220	2677	Monitoring	0.00233	MN61	102	Cook
221	2568	Monitoring	0.002317	MN61	112	Cook
222	2723	Monitoring	0.002303	MN61	95	Cook
223	3085	Monitoring	0.002303	MN61	72	Cook
224	2247	Monitoring	0.002247	MN61	135	Cook
225	2382	Monitoring	0.002213	MN61	125	Cook
226	2643	Monitoring	0.00214	MN61	106	Cook
227	2188	Monitoring	0.002125	MN61	147	Cook
228	2239	Monitoring	0.002109	MN61	137	Cook
229	2235	Monitoring	0.002101	MN61	137	Cook
230	2673	Monitoring	0.00207	MN61	103	Cook
231	2984	Monitoring	0.002027	MN61	76	Cook
232	2986	Monitoring	0.002021	MN61	76	Cook
233	2248	Monitoring	0.002008	MN61	135	Cook
234	5352	Monitoring	0.001042	MN61	96	Cook
235	5362	Monitoring	0.000645	MN61	96	Cook
236	5522	Monitoring	0.000475	MN61	86	Cook
237	5275	Monitoring	0.000404	MN61	105	Cook
238	4833	Monitoring	0.000347	MN61	138	Cook
239	4851	Monitoring	0.000347	MN61	135	Cook
240	5354	Monitoring	0.000347	MN61	96	Cook
241	5526	Monitoring	0.000347	MN61	85	Cook
242	4830	Monitoring	0.000318	MN61	139	Cook
243	5517	Monitoring	0.000245	MN61	86	Cook
244	5516	Monitoring	0.000228	MN61	86	Cook
245	5360	Monitoring	0.000203	MN61	96	Cook
246	5366	Monitoring	0.000186	MN61	96	Cook
247	5019	Monitoring	0.000146	MN61	125	Cook
248	5514	Monitoring	0.000137	MN61	86	Cook
249	5008	Monitoring	0.000103	MN61	126	Cook
250	5368	Monitoring	0.000095	MN61	95	Cook
251	5525	Monitoring	0.000085	MN61	85	Cook
252	5357	Monitoring	0.000067	MN61	96	Cook
253	4801	Monitoring	0.000063	MN61	146	Cook
1	1809	Action Recommended / Site Visit	0.083028	MN371	15	Crow Wing
2	1717	Action Recommended / Site Visit	0.052058	MN210	122	Crow Wing
3	1726	Action Recommended / Site Visit	0.048835	MN371B	3	Crow Wing

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
4	1755	Action Recommended / Site Visit	0.022384	MN371	28	Crow Wing
5	1601	Action Recommended / Site Visit	0.006796	MN371	53	Crow Wing
6	1429	Action Recommended / Site Visit	0.00499	MN6	37	Crow Wing
7	1814	Further Evaluation	0.054365	MN371	14	Crow Wing
8	1652	Further Evaluation	0.033049	MN6	15	Crow Wing
9	1639	Further Evaluation	0.022318	MN6	15	Crow Wing
10	1666	Further Evaluation	0.018684	MN210	136	Crow Wing
11	1727	Further Evaluation	0.012826	MN371B	5	Crow Wing
12	1719	Further Evaluation	0.005213	MN210	122	Crow Wing
13	4481	Further Evaluation	0.002485	MN210	122	Crow Wing
14	4364	Further Evaluation	0.002085	MN6	16	Crow Wing
15	4275	Further Evaluation	0.002057	MN6	26	Crow Wing
16	1628	Monitoring	0.039593	MN210	136	Crow Wing
17	1604	Monitoring	0.024098	MN371	49	Crow Wing
18	1767	Monitoring	0.021451	US169	230	Crow Wing
19	1650	Monitoring	0.018188	MN210	139	Crow Wing
20	1658	Monitoring	0.017382	MN6	14	Crow Wing
21	1753	Monitoring	0.016638	MN371	28	Crow Wing
22	1455	Monitoring	0.015489	MN6	36	Crow Wing
23	1648	Monitoring	0.014967	MN6	15	Crow Wing
24	1820	Monitoring	0.013559	MN371	13	Crow Wing
25	1662	Monitoring	0.013511	MN210	137	Crow Wing

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
26	1667	Monitoring	0.010108	MN210	135	Crow Wing
27	1655	Monitoring	0.010069	MN6	14	Crow Wing
28	1622	Monitoring	0.0099	MN371	49	Crow Wing
29	1693	Monitoring	0.009325	MN210	133	Crow Wing
30	1723	Monitoring	0.009186	MN371B	6	Crow Wing
31	1664	Monitoring	0.009183	MN210	136	Crow Wing
32	1775	Monitoring	0.008152	US169	230	Crow Wing
33	1645	Monitoring	0.007192	MN6	15	Crow Wing
34	1711	Monitoring	0.006561	MN210	127	Crow Wing
35	1625	Monitoring	0.006461	MN371	48	Crow Wing
36	1756	Monitoring	0.006132	MN371	28	Crow Wing
37	1607	Monitoring	0.00607	MN371	52	Crow Wing
38	1702	Monitoring	0.005977	MN210	130	Crow Wing
39	1728	Monitoring	0.005688	MN371B	5	Crow Wing
40	4061	Monitoring	0.005486	MN6	37	Crow Wing
41	4278	Monitoring	0.004767	MN6	26	Crow Wing
42	4294	Monitoring	0.004402	MN371	53	Crow Wing
43	4337	Monitoring	0.004379	MN371	49	Crow Wing
44	4466	Monitoring	0.004261	MN6	4	Crow Wing
45	4468	Monitoring	0.00386	MN6	4	Crow Wing
46	1603	Monitoring	0.003677	MN371	53	Crow Wing
47	4293	Monitoring	0.00358	MN371	53	Crow Wing

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
48	1712	Monitoring	0.003542	MN6	3	Crow Wing
49	1642	Monitoring	0.003399	MN6	15	Crow Wing
50	4320	Monitoring	0.003348	MN371	52	Crow Wing
51	1670	Monitoring	0.00318	MN371	42	Crow Wing
52	4347	Monitoring	0.003065	MN371	46	Crow Wing
53	1690	Monitoring	0.003031	MN210	132	Crow Wing
54	4470	Monitoring	0.002489	MN210	126	Crow Wing
55	4331	Monitoring	0.002462	MN371	50	Crow Wing
56	4411	Monitoring	0.002441	MN210	135	Crow Wing
57	4475	Monitoring	0.002388	MN210	122	Crow Wing
58	4301	Monitoring	0.002335	MN371	53	Crow Wing
59	4406	Monitoring	0.002302	MN210	136	Crow Wing
60	4405	Monitoring	0.00228	MN210	136	Crow Wing
61	4403	Monitoring	0.002085	MN210	136	Crow Wing
62	4409	Monitoring	0.002041	MN210	142	Crow Wing
63	4404	Monitoring	0.002	MN210	136	Crow Wing
64	4297	Monitoring	0.001989	MN371	53	Crow Wing
1	865	Action Recommended / Site Visit	0.464985	US169	321	Itasca
2	799	Action Recommended / Site Visit	0.410927	MN65	327	Itasca
3	606	Action Recommended / Site Visit	0.275523	MN38	21	Itasca
4	893	Action Recommended / Site Visit	0.186023	US169	316	Itasca
5	883	Action Recommended / Site Visit	0.181813	US169	320	Itasca
6	945	Action Recommended / Site Visit	0.176694	US169	310	Itasca
7	1009	Action Recommended / Site Visit	0.11823	US169	303	Itasca
8	863	Action Recommended / Site Visit	0.110926	MN65	172	Itasca
9	951	Action Recommended / Site Visit	0.10818	US169	309	Itasca
10	920	Action Recommended / Site Visit	0.089503	US169	313	Itasca
11	389	Action Recommended / Site Visit	0.082266	MN6	114	Itasca

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
12	888	Action Recommended / Site Visit	0.07424	US169	318	Itasca
13	952	Action Recommended / Site Visit	0.066405	US169	310	Itasca
14	915	Action Recommended / Site Visit	0.055447	US169	314	Itasca
15	435	Action Recommended / Site Visit	0.049684	MN46	28	Itasca
16	942	Action Recommended / Site Visit	0.048365	MN65	168	Itasca
17	579	Action Recommended / Site Visit	0.047989	MN38	23	Itasca
18	941	Action Recommended / Site Visit	0.045208	US169	311	Itasca
19	225	Action Recommended / Site Visit	0.038582	MN1	207	Itasca
20	987	Action Recommended / Site Visit	0.037245	US2	186	Itasca
21	1177	Action Recommended / Site Visit	0.037233	US2	210	Itasca
22	313	Action Recommended / Site Visit	0.033639	MN65	204	Itasca
23	977	Action Recommended / Site Visit	0.031596	US2	186	Itasca
24	969	Action Recommended / Site Visit	0.030704	US2	182	Itasca
25	805	Action Recommended / Site Visit	0.028134	US169	331	Itasca
26	440	Action Recommended / Site Visit	0.023723	MN38	33	Itasca
27	694	Action Recommended / Site Visit	0.023312	MN38	18	Itasca
28	242	Action Recommended / Site Visit	0.023132	US71	345	Itasca
29	927	Action Recommended / Site Visit	0.022805	MN65	169	Itasca
30	976	Action Recommended / Site Visit	0.022696	US169	305	Itasca
31	966	Action Recommended / Site Visit	0.022632	MN65	166	Itasca
32	926	Action Recommended / Site Visit	0.020473	US169	313	Itasca
33	866	Action Recommended / Site Visit	0.020111	US169	322	Itasca
34	816	Action Recommended / Site Visit	0.018734	US169	330	Itasca
35	1162	Action Recommended / Site Visit	0.014967	US2	209	Itasca
36	634	Action Recommended / Site Visit	0.013978	MN38	20	Itasca
37	772	Action Recommended / Site Visit	0.013838	MN38	13	Itasca
38	804	Action Recommended / Site Visit	0.013716	US169	332	Itasca
39	917	Action Recommended / Site Visit	0.013676	US2	175	Itasca
40	595	Action Recommended / Site Visit	0.011926	MN38	22	Itasca
41	310	Action Recommended / Site Visit	0.011497	MN65	203	Itasca
42	689	Action Recommended / Site Visit	0.011126	MN38	18	Itasca
43	972	Action Recommended / Site Visit	0.01007	US169	307	Itasca
44	1027	Action Recommended / Site Visit	0.009985	US2	191	Itasca
45	944	Action Recommended / Site Visit	0.009264	US2	177	Itasca
46	561	Action Recommended / Site Visit	0.009248	MN38	24	Itasca
47	1035	Action Recommended / Site Visit	0.009084	US169	300	Itasca
48	749	Action Recommended / Site Visit	0.007721	MN38	14	Itasca
49	196	Action Recommended / Site Visit	0.007552	US71	348	Itasca
50	852	Action Recommended / Site Visit	0.007519	US169	325	Itasca
51	988	Action Recommended / Site Visit	0.007448	MN65	164	Itasca
52	892	Action Recommended / Site Visit	0.007289	US2	174	Itasca
53	845	Action Recommended / Site Visit	0.007153	MN46	2	Itasca
54	544	Action Recommended / Site Visit	0.00705	MN38	24	Itasca
55	1184	Action Recommended / Site Visit	0.006804	US2	209	Itasca

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
56	542	Action Recommended / Site Visit	0.00664	MN6	105	Itasca
57	823	Action Recommended / Site Visit	0.006398	US169	329	Itasca
58	519	Action Recommended / Site Visit	0.005171	MN65	190	Itasca
59	1107	Action Recommended / Site Visit	0.004898	MN65	152	Itasca
60	563	Action Recommended / Site Visit	0.003838	MN65	188	Itasca
61	827	Action Recommended / Site Visit	0.003722	US169	328	Itasca
62	417	Action Recommended / Site Visit	0.003238	MN38	33	Itasca
63	858	Action Recommended / Site Visit	0.003164	MN46	1	Itasca
64	239	Further Evaluation	0.199719	MN38	33	Itasca
65	887	Further Evaluation	0.111131	US169	317	Itasca
66	692	Further Evaluation	0.098163	MN38	14	Itasca
67	839	Further Evaluation	0.093661	US169	175	Itasca
68	810	Further Evaluation	0.091904	US169	330	Itasca
69	826	Further Evaluation	0.063769	MN65	175	Itasca
70	980	Further Evaluation	0.057199	US2	184	Itasca
71	936	Further Evaluation	0.03987	US169	311	Itasca
72	841	Further Evaluation	0.038676	US169	175	Itasca
73	929	Further Evaluation	0.035883	US169	312	Itasca
74	848	Further Evaluation	0.033139	US169	325	Itasca
75	808	Further Evaluation	0.03285	US169	332	Itasca
76	1016	Further Evaluation	0.028435	US2	189	Itasca
77	1018	Further Evaluation	0.024812	US2	189	Itasca
78	832	Further Evaluation	0.02466	US169	328	Itasca
79	1070	Further Evaluation	0.023149	US2	198	Itasca
80	981	Further Evaluation	0.022479	MN65	165	Itasca
81	1088	Further Evaluation	0.022029	US2	200	Itasca
82	575	Further Evaluation	0.021179	MN65	187	Itasca
83	857	Further Evaluation	0.020523	US169	325	Itasca
84	400	Further Evaluation	0.020464	MN6	114	Itasca
85	913	Further Evaluation	0.020094	MN38	4	Itasca
86	2831	Further Evaluation	0.019881	MN38	33	Itasca
87	802	Further Evaluation	0.019657	US169	331	Itasca
88	943	Further Evaluation	0.018681	MN38	2	Itasca
89	921	Further Evaluation	0.01864	US169	313	Itasca
90	359	Further Evaluation	0.017867	MN38	37	Itasca
91	954	Further Evaluation	0.017068	US169	310	Itasca
92	566	Further Evaluation	0.016689	MN38	24	Itasca
93	957	Further Evaluation	0.016158	MN65	166	Itasca
94	924	Further Evaluation	0.015904	US169	312	Itasca
95	478	Further Evaluation	0.015389	MN65	191	Itasca
96	1072	Further Evaluation	0.015379	US169	296	Itasca
97	811	Further Evaluation	0.015302	US169	332	Itasca
98	2993	Further Evaluation	0.014459	MN38	22	Itasca
99	925	Further Evaluation	0.01367	US169	312	Itasca

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
100	1031	Further Evaluation	0.013601	US169	300	Itasca
101	1042	Further Evaluation	0.012983	US169	300	Itasca
102	3043	Further Evaluation	0.012967	MN38	21	Itasca
103	764	Further Evaluation	0.012441	MN6	94	Itasca
104	3023	Further Evaluation	0.012089	MN38	22	Itasca
105	459	Further Evaluation	0.012016	MN6	111	Itasca
106	909	Further Evaluation	0.011832	MN38	6	Itasca
107	874	Further Evaluation	0.011368	US169	323	Itasca
108	505	Further Evaluation	0.011359	MN38	27	Itasca
109	1063	Further Evaluation	0.010307	MN65	158	Itasca
110	608	Further Evaluation	0.01006	MN38	21	Itasca
111	791	Further Evaluation	0.009827	US169	331	Itasca
112	1015	Further Evaluation	0.009695	MN65	162	Itasca
113	3018	Further Evaluation	0.009629	MN38	22	Itasca
114	868	Further Evaluation	0.008928	US169	323	Itasca
115	3131	Further Evaluation	0.007663	MN38	19	Itasca
116	978	Further Evaluation	0.007604	MN65	165	Itasca
117	950	Further Evaluation	0.007469	US169	310	Itasca
118	184	Further Evaluation	0.007244	MN1	193	Itasca
119	309	Further Evaluation	0.0072	MN65	205	Itasca
120	843	Further Evaluation	0.006771	US169	326	Itasca
121	3139	Further Evaluation	0.006734	MN38	18	Itasca
122	882	Further Evaluation	0.006588	US2	161	Itasca
123	730	Further Evaluation	0.006371	MN38	16	Itasca
124	1011	Further Evaluation	0.006337	US2	189	Itasca
125	593	Further Evaluation	0.006305	MN38	22	Itasca
126	3468	Further Evaluation	0.006224	MN65	164	Itasca
127	3382	Further Evaluation	0.005925	MN65	168	Itasca
128	2466	Further Evaluation	0.004887	US71	349	Itasca
129	964	Further Evaluation	0.004829	US2	180	Itasca
130	3450	Further Evaluation	0.004799	MN65	165	Itasca
131	971	Further Evaluation	0.004686	US2	198	Itasca
132	437	Further Evaluation	0.004622	MN38	33	Itasca
133	1071	Further Evaluation	0.00459	US2	199	Itasca
134	759	Further Evaluation	0.004588	MN38	14	Itasca
135	746	Further Evaluation	0.004449	MN46	11	Itasca
136	3304	Further Evaluation	0.004392	US2	164	Itasca
137	2721	Further Evaluation	0.004344	MN65	199	Itasca
138	905	Further Evaluation	0.004327	US169	317	Itasca
139	1002	Further Evaluation	0.004154	MN6	69	Itasca
140	2970	Further Evaluation	0.00413	MN38	23	Itasca
141	503	Further Evaluation	0.004123	MN65	190	Itasca
142	3191	Further Evaluation	0.004029	MN38	14	Itasca
143	410	Further Evaluation	0.004026	MN6	113	Itasca

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
144	644	Further Evaluation	0.003986	MN38	20	Itasca
145	1120	Further Evaluation	0.003895	US169	291	Itasca
146	2765	Further Evaluation	0.003849	MN6	114	Itasca
147	3070	Further Evaluation	0.003841	MN38	20	Itasca
148	861	Further Evaluation	0.003794	US169	324	Itasca
149	3451	Further Evaluation	0.003746	MN65	165	Itasca
150	419	Further Evaluation	0.003596	MN38	33	Itasca
151	831	Further Evaluation	0.003516	US169	328	Itasca
152	3177	Further Evaluation	0.00348	MN38	16	Itasca
153	2954	Further Evaluation	0.00338	MN38	24	Itasca
154	965	Further Evaluation	0.003337	US2	181	Itasca
155	872	Further Evaluation	0.003323	US169	322	Itasca
156	856	Further Evaluation	0.003156	US169	324	Itasca
157	3315	Further Evaluation	0.003069	US2	161	Itasca
158	1169	Further Evaluation	0.003042	US169	291	Itasca
159	3373	Further Evaluation	0.003032	MN65	169	Itasca
160	3003	Further Evaluation	0.002739	MN38	22	Itasca
161	3323	Further Evaluation	0.002663	US169	321	Itasca
162	3725	Further Evaluation	0.002583	MN65	151	Itasca
163	688	Further Evaluation	0.002561	MN38	18	Itasca
164	2776	Further Evaluation	0.002527	MN46	30	Itasca
165	2841	Further Evaluation	0.002475	MN38	33	Itasca
166	3341	Further Evaluation	0.002416	US169	316	Itasca
167	2755	Further Evaluation	0.002361	MN6	114	Itasca
168	3528	Further Evaluation	0.00229	MN6	67	Itasca
169	3231	Further Evaluation	0.002267	US169	332	Itasca
170	3488	Further Evaluation	0.002232	US169	303	Itasca
171	2969	Further Evaluation	0.002145	MN38	23	Itasca
172	2950	Further Evaluation	0.002095	MN38	24	Itasca
173	790	Monitoring	0.185803	US169	330	Itasca
174	900	Monitoring	0.146431	US169	312	Itasca
175	996	Monitoring	0.101598	US2	188	Itasca
176	591	Monitoring	0.06437	MN38	22	Itasca
177	891	Monitoring	0.063155	US169	320	Itasca
178	235	Monitoring	0.060779	MN1	200	Itasca
179	370	Monitoring	0.05715	MN38	32	Itasca
180	693	Monitoring	0.051507	MN38	18	Itasca
181	210	Monitoring	0.049828	MN1	207	Itasca
182	1025	Monitoring	0.048945	US169	302	Itasca
183	968	Monitoring	0.043196	MN65	166	Itasca
184	851	Monitoring	0.037485	US169	325	Itasca
185	914	Monitoring	0.032136	US169	315	Itasca
186	316	Monitoring	0.031867	MN46	36	Itasca
187	782	Monitoring	0.030164	US169	331	Itasca

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
188	1171	Monitoring	0.029586	US169	291	Itasca
189	908	Monitoring	0.029309	US169	315	Itasca
190	901	Monitoring	0.028726	US169	319	Itasca
191	3030	Monitoring	0.028606	MN38	22	Itasca
192	573	Monitoring	0.027705	MN38	21	Itasca
193	434	Monitoring	0.025788	MN38	33	Itasca
194	1037	Monitoring	0.02461	MN6	67	Itasca
195	890	Monitoring	0.022459	US169	320	Itasca
196	873	Monitoring	0.022159	MN65	172	Itasca
197	353	Monitoring	0.021494	MN38	37	Itasca
198	846	Monitoring	0.020692	US169	325	Itasca
199	569	Monitoring	0.020514	MN38	24	Itasca
200	855	Monitoring	0.020466	US169	324	Itasca
201	314	Monitoring	0.020242	MN65	204	Itasca
202	3326	Monitoring	0.019963	US169	319	Itasca
203	3487	Monitoring	0.018023	US2	188	Itasca
204	774	Monitoring	0.017828	MN46	3	Itasca
205	237	Monitoring	0.017509	MN1	200	Itasca
206	896	Monitoring	0.017141	US169	316	Itasca
207	1012	Monitoring	0.016666	MN65	162	Itasca
208	643	Monitoring	0.016056	MN38	20	Itasca
209	230	Monitoring	0.015345	MN1	200	Itasca
210	937	Monitoring	0.015211	US169	312	Itasca
211	508	Monitoring	0.015141	MN65	191	Itasca
212	837	Monitoring	0.015076	US169	326	Itasca
213	777	Monitoring	0.014988	MN38	13	Itasca
214	564	Monitoring	0.014749	MN38	24	Itasca
215	3090	Monitoring	0.014321	MN38	20	Itasca
216	902	Monitoring	0.014204	US169	319	Itasca
217	604	Monitoring	0.0139	MN38	21	Itasca
218	580	Monitoring	0.013775	MN38	23	Itasca
219	886	Monitoring	0.013606	US169	316	Itasca
220	656	Monitoring	0.013371	MN38	19	Itasca
221	387	Monitoring	0.013115	MN6	114	Itasca
222	3383	Monitoring	0.01292	US169	311	Itasca
223	935	Monitoring	0.012904	US169	311	Itasca
224	449	Monitoring	0.012887	MN6	112	Itasca
225	436	Monitoring	0.012805	MN6	113	Itasca
226	822	Monitoring	0.012746	US169	330	Itasca
227	562	Monitoring	0.012443	MN38	24	Itasca
228	889	Monitoring	0.012296	US169	321	Itasca
229	214	Monitoring	0.012173	MN1	198	Itasca
230	446	Monitoring	0.01209	MN6	112	Itasca
231	885	Monitoring	0.012072	US2	171	Itasca

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
232	955	Monitoring	0.012028	US169	309	Itasca
233	632	Monitoring	0.012007	MN38	20	Itasca
234	933	Monitoring	0.011878	US169	311	Itasca
235	830	Monitoring	0.011244	MN46	2	Itasca
236	3015	Monitoring	0.011218	MN38	22	Itasca
237	423	Monitoring	0.011069	MN46	28	Itasca
238	871	Monitoring	0.010921	MN65	172	Itasca
239	398	Monitoring	0.010894	MN6	114	Itasca
240	534	Monitoring	0.010785	MN65	188	Itasca
241	630	Monitoring	0.010731	MN38	20	Itasca
242	3335	Monitoring	0.01067	US169	316	Itasca
243	1102	Monitoring	0.010536	US169	294	Itasca
244	208	Monitoring	0.010483	MN1	212	Itasca
245	864	Monitoring	0.010408	MN65	324	Itasca
246	221	Monitoring	0.010123	MN1	207	Itasca
247	366	Monitoring	0.010114	MN38	34	Itasca
248	3174	Monitoring	0.010085	MN38	16	Itasca
249	3006	Monitoring	0.009702	MN38	22	Itasca
250	898	Monitoring	0.009675	US169	317	Itasca
251	331	Monitoring	0.009628	MN38	40	Itasca
252	982	Monitoring	0.009615	US2	183	Itasca
253	1068	Monitoring	0.009491	US2	200	Itasca
254	967	Monitoring	0.009442	MN38	1	Itasca
255	947	Monitoring	0.009327	US169	310	Itasca
256	859	Monitoring	0.009306	US169	324	Itasca
257	2530	Monitoring	0.009303	MN1	200	Itasca
258	1003	Monitoring	0.009283	US2	188	Itasca
259	1039	Monitoring	0.009166	US169	298	Itasca
260	1004	Monitoring	0.008723	MN65	163	Itasca
261	779	Monitoring	0.008532	MN38	13	Itasca
262	487	Monitoring	0.008492	MN38	29	Itasca
263	878	Monitoring	0.008364	US169	322	Itasca
264	176	Monitoring	0.008308	MN1	193	Itasca
265	956	Monitoring	0.008284	US169	309	Itasca
266	3332	Monitoring	0.008208	US169	317	Itasca
267	445	Monitoring	0.0082	MN6	112	Itasca
268	975	Monitoring	0.008182	MN65	166	Itasca
269	3234	Monitoring	0.008165	US169	331	Itasca
270	402	Monitoring	0.0081	MN38	34	Itasca
271	3392	Monitoring	0.008068	US169	310	Itasca
272	296	Monitoring	0.008049	MN38	42	Itasca
273	970	Monitoring	0.00802	US2	181	Itasca
274	1007	Monitoring	0.007997	US2	188	Itasca
275	607	Monitoring	0.007898	MN38	18	Itasca

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
276	403	Monitoring	0.00788	MN38	34	Itasca
277	443	Monitoring	0.007861	MN6	112	Itasca
278	918	Monitoring	0.00769	US169	314	Itasca
279	875	Monitoring	0.007587	US2	162	Itasca
280	386	Monitoring	0.007445	MN6	115	Itasca
281	3475	Monitoring	0.00742	US169	304	Itasca
282	1043	Monitoring	0.007377	US169	300	Itasca
283	814	Monitoring	0.007353	US169	329	Itasca
284	551	Monitoring	0.007351	MN65	189	Itasca
285	3374	Monitoring	0.007332	US169	312	Itasca
286	959	Monitoring	0.007319	MN65	167	Itasca
287	974	Monitoring	0.007245	US2	181	Itasca
288	1001	Monitoring	0.007223	US169	303	Itasca
289	907	Monitoring	0.007115	MN38	6	Itasca
290	1014	Monitoring	0.007012	US2	188	Itasca
291	516	Monitoring	0.00697	MN6	105	Itasca
292	567	Monitoring	0.006895	MN65	188	Itasca
293	860	Monitoring	0.006851	US169	324	Itasca
294	648	Monitoring	0.00685	MN38	20	Itasca
295	983	Monitoring	0.00682	US2	183	Itasca
296	993	Monitoring	0.006816	MN65	163	Itasca
297	476	Monitoring	0.006799	MN38	30	Itasca
298	899	Monitoring	0.006752	US169	317	Itasca
299	870	Monitoring	0.006601	US2	161	Itasca
300	3343	Monitoring	0.006515	US169	318	Itasca
301	3021	Monitoring	0.006503	MN38	22	Itasca
302	798	Monitoring	0.006413	MN46	8	Itasca
303	763	Monitoring	0.006406	MN38	13	Itasca
304	801	Monitoring	0.006325	MN65	177	Itasca
305	825	Monitoring	0.006295	US169	175	Itasca
306	3247	Monitoring	0.006286	US169	328	Itasca
307	3453	Monitoring	0.006263	MN65	165	Itasca
308	812	Monitoring	0.006249	US169	329	Itasca
309	3055	Monitoring	0.006184	MN38	21	Itasca
310	3342	Monitoring	0.006181	US169	317	Itasca
311	1024	Monitoring	0.006158	MN65	162	Itasca
312	960	Monitoring	0.006152	US169	308	Itasca
313	521	Monitoring	0.006106	MN38	26	Itasca
314	2772	Monitoring	0.006103	MN6	114	Itasca
315	388	Monitoring	0.006089	MN6	114	Itasca
316	842	Monitoring	0.006086	US169	327	Itasca
317	238	Monitoring	0.006043	MN1	199	Itasca
318	876	Monitoring	0.006003	US2	170	Itasca
319	3400	Monitoring	0.005822	US169	310	Itasca

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
320	729	Monitoring	0.005642	MN38	16	Itasca
321	3377	Monitoring	0.005635	US169	311	Itasca
322	912	Monitoring	0.005622	MN38	6	Itasca
323	3297	Monitoring	0.005591	MN65	324	Itasca
324	984	Monitoring	0.005562	MN65	164	Itasca
325	336	Monitoring	0.005553	MN65	199	Itasca
326	3320	Monitoring	0.005539	US169	320	Itasca
327	454	Monitoring	0.005532	MN38	32	Itasca
328	3239	Monitoring	0.005498	US169	331	Itasca
329	3081	Monitoring	0.005483	MN38	20	Itasca
330	3372	Monitoring	0.005463	US169	311	Itasca
331	1036	Monitoring	0.005442	US169	300	Itasca
332	1023	Monitoring	0.005361	MN6	68	Itasca
333	3255	Monitoring	0.005339	MN65	176	Itasca
334	840	Monitoring	0.005334	US169	327	Itasca
335	862	Monitoring	0.005316	US169	323	Itasca
336	3350	Monitoring	0.005222	US169	316	Itasca
337	3256	Monitoring	0.0052	MN65	176	Itasca
338	3244	Monitoring	0.005121	MN65	176	Itasca
339	3263	Monitoring	0.004981	MN65	175	Itasca
340	3375	Monitoring	0.00495	MN38	4	Itasca
341	2864	Monitoring	0.004923	MN38	30	Itasca
342	2486	Monitoring	0.004919	MN46	43	Itasca
343	416	Monitoring	0.004807	MN38	33	Itasca
344	556	Monitoring	0.004796	MN46	14	Itasca
345	3348	Monitoring	0.004741	US169	316	Itasca
346	923	Monitoring	0.004722	US169	314	Itasca
347	3340	Monitoring	0.004717	US169	315	Itasca
348	522	Monitoring	0.004684	MN38	26	Itasca
349	583	Monitoring	0.004678	MN65	187	Itasca
350	248	Monitoring	0.004674	MN65	203	Itasca
351	3526	Monitoring	0.004667	MN6	67	Itasca
352	897	Monitoring	0.004614	US169	318	Itasca
353	958	Monitoring	0.004557	US2	179	Itasca
354	3441	Monitoring	0.004519	US2	182	Itasca
355	3368	Monitoring	0.004467	US169	311	Itasca
356	867	Monitoring	0.004453	US169	323	Itasca
357	3063	Monitoring	0.004452	MN38	21	Itasca
358	1017	Monitoring	0.004428	MN65	162	Itasca
359	3093	Monitoring	0.004397	MN38	20	Itasca
360	349	Monitoring	0.004385	MN6	117	Itasca
361	2821	Monitoring	0.004341	MN38	33	Itasca
362	3387	Monitoring	0.004324	MN6	76	Itasca
363	502	Monitoring	0.004274	MN38	27	Itasca

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
364	312	Monitoring	0.004246	MN38	42	Itasca
365	2991	Monitoring	0.004214	MN38	22	Itasca
366	213	Monitoring	0.004213	MN46	41	Itasca
367	244	Monitoring	0.004176	MN1	205	Itasca
368	2702	Monitoring	0.004157	MN38	37	Itasca
369	2838	Monitoring	0.004137	MN6	112	Itasca
370	2808	Monitoring	0.004133	MN6	113	Itasca
371	3459	Monitoring	0.004128	MN65	165	Itasca
372	762	Monitoring	0.004125	MN46	10	Itasca
373	3425	Monitoring	0.00412	MN38	2	Itasca
374	3463	Monitoring	0.004079	MN65	164	Itasca
375	806	Monitoring	0.004022	MN65	177	Itasca
376	3472	Monitoring	0.004002	US169	304	Itasca
377	240	Monitoring	0.004	MN1	206	Itasca
378	352	Monitoring	0.003994	MN38	38	Itasca
379	1061	Monitoring	0.003989	US169	298	Itasca
380	946	Monitoring	0.003982	US169	310	Itasca
381	1013	Monitoring	0.003981	MN6	69	Itasca
382	341	Monitoring	0.003973	MN38	38	Itasca
383	2839	Monitoring	0.003956	MN38	33	Itasca
384	457	Monitoring	0.003919	MN38	31	Itasca
385	3017	Monitoring	0.003879	MN38	22	Itasca
386	3336	Monitoring	0.003842	US169	316	Itasca
387	2761	Monitoring	0.003822	MN46	31	Itasca
388	3364	Monitoring	0.003798	US169	314	Itasca
389	3414	Monitoring	0.003795	US2	179	Itasca
390	504	Monitoring	0.003756	MN38	28	Itasca
391	3329	Monitoring	0.003715	US169	319	Itasca
392	894	Monitoring	0.003715	US169	318	Itasca
393	3388	Monitoring	0.003692	US169	311	Itasca
394	2857	Monitoring	0.003663	MN6	111	Itasca
395	3077	Monitoring	0.003609	MN38	20	Itasca
396	979	Monitoring	0.00359	MN65	165	Itasca
397	3406	Monitoring	0.003576	US169	309	Itasca
398	3458	Monitoring	0.003566	MN65	165	Itasca
399	3318	Monitoring	0.003546	US169	320	Itasca
400	3396	Monitoring	0.003526	US169	310	Itasca
401	986	Monitoring	0.003519	US2	186	Itasca
402	2834	Monitoring	0.003483	MN38	33	Itasca
403	421	Monitoring	0.00343	MN38	33	Itasca
404	3394	Monitoring	0.003417	MN6	76	Itasca
405	3334	Monitoring	0.003368	US169	317	Itasca
406	3338	Monitoring	0.003316	US169	319	Itasca
407	2906	Monitoring	0.003232	MN38	27	Itasca

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
408	420	Monitoring	0.003218	MN46	28	Itasca
409	3361	Monitoring	0.003217	US169	313	Itasca
410	306	Monitoring	0.003207	MN38	42	Itasca
411	3232	Monitoring	0.003203	US169	329	Itasca
412	3092	Monitoring	0.003199	MN38	20	Itasca
413	3435	Monitoring	0.003198	MN38	1	Itasca
414	940	Monitoring	0.003198	US169	312	Itasca
415	3496	Monitoring	0.003189	US2	189	Itasca
416	3380	Monitoring	0.003165	US169	311	Itasca
417	1074	Monitoring	0.003159	US2	199	Itasca
418	3253	Monitoring	0.003139	US169	328	Itasca
419	3242	Monitoring	0.003131	US169	330	Itasca
420	2897	Monitoring	0.003126	MN38	28	Itasca
421	3437	Monitoring	0.003114	US2	181	Itasca
422	2902	Monitoring	0.003044	MN38	27	Itasca
423	931	Monitoring	0.003033	US169	310	Itasca
424	3357	Monitoring	0.003032	US169	314	Itasca
425	938	Monitoring	0.003009	US169	313	Itasca
426	1033	Monitoring	0.003005	MN65	161	Itasca
427	3286	Monitoring	0.002943	US169	325	Itasca
428	3457	Monitoring	0.002936	US169	305	Itasca
429	594	Monitoring	0.002934	MN38	22	Itasca
430	651	Monitoring	0.002863	MN38	20	Itasca
431	3337	Monitoring	0.002854	US169	320	Itasca
432	2707	Monitoring	0.002843	MN38	37	Itasca
433	3259	Monitoring	0.002706	US169	328	Itasca
434	3044	Monitoring	0.002687	MN38	21	Itasca
435	707	Monitoring	0.002671	MN38	18	Itasca
436	3241	Monitoring	0.002656	MN65	176	Itasca
437	3434	Monitoring	0.002639	US169	308	Itasca
438	3346	Monitoring	0.002599	US169	318	Itasca
439	3230	Monitoring	0.002595	US169	330	Itasca
440	3254	Monitoring	0.002594	US169	328	Itasca
441	3440	Monitoring	0.002594	US2	182	Itasca
442	2883	Monitoring	0.002588	MN38	29	Itasca
443	2836	Monitoring	0.002566	MN38	33	Itasca
444	2758	Monitoring	0.002557	MN6	114	Itasca
445	3271	Monitoring	0.002503	US169	326	Itasca
446	2739	Monitoring	0.002465	MN6	115	Itasca
447	3331	Monitoring	0.002455	US169	316	Itasca
448	2744	Monitoring	0.002437	MN6	115	Itasca
449	3412	Monitoring	0.00242	US169	309	Itasca
450	3402	Monitoring	0.002416	MN38	2	Itasca
451	3376	Monitoring	0.002407	US2	176	Itasca

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
452	3233	Monitoring	0.002405	US169	331	Itasca
453	3371	Monitoring	0.002404	US169	312	Itasca
454	3328	Monitoring	0.00236	US169	316	Itasca
455	2460	Monitoring	0.002352	MN1	193	Itasca
456	3221	Monitoring	0.00235	US169	331	Itasca
457	3454	Monitoring	0.002331	US2	183	Itasca
458	3236	Monitoring	0.002331	US169	332	Itasca
459	3404	Monitoring	0.00225	US169	310	Itasca
460	3324	Monitoring	0.002241	US169	320	Itasca
461	3416	Monitoring	0.002229	US2	179	Itasca
462	3345	Monitoring	0.002216	US169	316	Itasca
463	3385	Monitoring	0.002209	MN6	76	Itasca
464	3360	Monitoring	0.002203	US169	312	Itasca
465	3444	Monitoring	0.002172	US2	182	Itasca
466	3302	Monitoring	0.002167	US169	322	Itasca
467	3398	Monitoring	0.00216	US169	309	Itasca
468	3317	Monitoring	0.002132	US169	322	Itasca
469	2817	Monitoring	0.002117	MN6	113	Itasca
470	3268	Monitoring	0.002113	US169	175	Itasca
471	3389	Monitoring	0.002094	US169	311	Itasca
472	3490	Monitoring	0.002091	US169	303	Itasca
473	3533	Monitoring	0.002085	US169	300	Itasca
474	2843	Monitoring	0.002044	MN46	28	Itasca
475	3352	Monitoring	0.002043	US169	313	Itasca
476	3333	Monitoring	0.002042	US169	316	Itasca
477	3407	Monitoring	0.002028	US169	309	Itasca
478	3410	Monitoring	0.002018	US169	309	Itasca
479	3279	Monitoring	0.00201	US169	325	Itasca
480	3489	Monitoring	0.002009	US169	303	Itasca
481	6399	Monitoring	0.000772	MN65	168	Itasca
482	5693	Monitoring	0.000469	MN38	22	Itasca
483	5167	Monitoring	0.000347	US71	345	Itasca
484	6420	Monitoring	0.000347	US2	177	Itasca
485	6716	Monitoring	0.000347	MN65	151	Itasca
486	6717	Monitoring	0.000238	MN65	151	Itasca
487	5097	Monitoring	0.000238	US71	349	Itasca
488	6417	Monitoring	0.000223	US2	177	Itasca
1	1851	Further Evaluation	0.011573	MN27	197	Kanabec
2	4662	Further Evaluation	0.004145	MN23	253	Kanabec
3	1865	Monitoring	0.009999	MN65	79	Kanabec
4	1971	Monitoring	0.005671	MN65	62	Kanabec
5	1968	Monitoring	0.003781	MN65	65	Kanabec
6	1852	Monitoring	0.002905	MN27	191	Kanabec
1	470	Action Recommended / Site Visit	0.842344	MN1	347	Lake

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
2	963	Action Recommended / Site Visit	0.80624	MN61	49	Lake
3	910	Action Recommended / Site Visit	0.733296	MN61	54	Lake
4	773	Action Recommended / Site Visit	0.628729	MN61	62	Lake
5	818	Action Recommended / Site Visit	0.446096	MN1	345	Lake
6	472	Action Recommended / Site Visit	0.433196	MN61	68	Lake
7	577	Action Recommended / Site Visit	0.407584	MN61	50	Lake
8	666	Action Recommended / Site Visit	0.388513	MN61	69	Lake
9	1092	Action Recommended / Site Visit	0.313278	MN61	31	Lake
10	1069	Action Recommended / Site Visit	0.305022	MN61	34	Lake
11	368	Action Recommended / Site Visit	0.300273	MN1	309	Lake
12	205	Action Recommended / Site Visit	0.290347	MN1	304	Lake
13	399	Action Recommended / Site Visit	0.24848	MN1	314	Lake
14	1049	Action Recommended / Site Visit	0.213117	MN61	40	Lake
15	884	Action Recommended / Site Visit	0.187556	MN61	55	Lake
16	346	Action Recommended / Site Visit	0.155009	MN1	306	Lake
17	1008	Action Recommended / Site Visit	0.137165	MN61	43	Lake
18	272	Action Recommended / Site Visit	0.127804	MN1	302	Lake
19	1030	Action Recommended / Site Visit	0.099342	MN61	42	Lake
20	994	Action Recommended / Site Visit	0.076162	MN61	45	Lake
21	754	Action Recommended / Site Visit	0.074676	MN61	65	Lake
22	204	Action Recommended / Site Visit	0.072992	MN1	296	Lake
23	654	Action Recommended / Site Visit	0.065754	MN61	71	Lake
24	716	Action Recommended / Site Visit	0.064539	MN61	68	Lake
25	1196	Action Recommended / Site Visit	0.061973	MN61	24	Lake
26	60	Action Recommended / Site Visit	0.057971	MN169	416	Lake
27	1006	Action Recommended / Site Visit	0.055657	MN61	44	Lake
28	1067	Action Recommended / Site Visit	0.046414	MN61	37	Lake
29	415	Action Recommended / Site Visit	0.03922	MN1	318	Lake
30	379	Action Recommended / Site Visit	0.032603	MN1	310	Lake
31	1026	Action Recommended / Site Visit	0.032012	MN61	43	Lake
32	232	Action Recommended / Site Visit	0.027801	MN1	299	Lake
33	1053	Action Recommended / Site Visit	0.024687	MN61	37	Lake
34	301	Action Recommended / Site Visit	0.02407	MN1	303	Lake
35	835	Action Recommended / Site Visit	0.021837	MN61	60	Lake
36	1174	Action Recommended / Site Visit	0.021719	MN61	25	Lake
37	1153	Action Recommended / Site Visit	0.017888	MN61	28	Lake
38	1073	Action Recommended / Site Visit	0.016887	MN61	36	Lake
39	1193	Action Recommended / Site Visit	0.016768	MN61	25	Lake
40	463	Action Recommended / Site Visit	0.016594	MN1	326	Lake
41	765	Action Recommended / Site Visit	0.01493	MN61	64	Lake
42	247	Action Recommended / Site Visit	0.012825	MN1	299	Lake
43	461	Action Recommended / Site Visit	0.006984	MN1	325	Lake
44	333	Action Recommended / Site Visit	0.004736	MN1	304	Lake
45	1094	Action Recommended / Site Visit	0.003833	MN61	33	Lake

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
46	267	Action Recommended / Site Visit	0.002802	MN1	300	Lake
47	392	Further Evaluation	0.251512	MN1	313	Lake
48	347	Further Evaluation	0.083183	MN1	306	Lake
49	259	Further Evaluation	0.067949	MN1	300	Lake
50	357	Further Evaluation	0.067721	MN1	307	Lake
51	939	Further Evaluation	0.058949	MN61	52	Lake
52	1148	Further Evaluation	0.052014	MN61	28	Lake
53	348	Further Evaluation	0.048787	MN1	307	Lake
54	431	Further Evaluation	0.041803	MN1	316	Lake
55	828	Further Evaluation	0.041475	MN1	345	Lake
56	836	Further Evaluation	0.036856	MN1	347	Lake
57	776	Further Evaluation	0.03565	MN61	63	Lake
58	1175	Further Evaluation	0.033926	MN61	27	Lake
59	755	Further Evaluation	0.027935	MN61	65	Lake
60	1115	Further Evaluation	0.027557	MN61	30	Lake
61	216	Further Evaluation	0.02722	MN1	297	Lake
62	401	Further Evaluation	0.02566	MN1	312	Lake
63	742	Further Evaluation	0.025456	MN61	66	Lake
64	3367	Further Evaluation	0.023525	MN61	53	Lake
65	465	Further Evaluation	0.022322	MN1	326	Lake
66	414	Further Evaluation	0.021189	MN1	313	Lake
67	411	Further Evaluation	0.020403	MN1	318	Lake
68	1167	Further Evaluation	0.0201	MN61	27	Lake
69	1178	Further Evaluation	0.019464	MN61	26	Lake
70	3306	Further Evaluation	0.019136	MN61	57	Lake
71	3198	Further Evaluation	0.017352	MN61	64	Lake
72	278	Further Evaluation	0.017139	MN1	301	Lake
73	1117	Further Evaluation	0.017119	MN61	30	Lake
74	747	Further Evaluation	0.013438	MN61	66	Lake
75	253	Further Evaluation	0.013342	MN1	299	Lake
76	468	Further Evaluation	0.013291	MN1	326	Lake
77	3604	Further Evaluation	0.012858	MN61	33	Lake
78	741	Further Evaluation	0.012557	MN61	66	Lake
79	509	Further Evaluation	0.012499	MN1	328	Lake
80	3265	Further Evaluation	0.011644	MN1	346	Lake
81	2908	Further Evaluation	0.009538	MN1	329	Lake
82	1095	Further Evaluation	0.009236	MN61	33	Lake
83	317	Further Evaluation	0.008657	MN1	303	Lake
84	990	Further Evaluation	0.008635	MN61	46	Lake
85	761	Further Evaluation	0.008	MN61	64	Lake
86	3192	Further Evaluation	0.007297	MN61	65	Lake
87	930	Further Evaluation	0.00721	MN61	53	Lake
88	3273	Further Evaluation	0.006759	MN61	60	Lake
89	1038	Further Evaluation	0.006688	MN61	41	Lake

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
90	3629	Further Evaluation	0.006628	MN61	31	Lake
91	1114	Further Evaluation	0.006583	MN61	30	Lake
92	270	Further Evaluation	0.006515	MN1	301	Lake
93	928	Further Evaluation	0.006447	MN61	53	Lake
94	809	Further Evaluation	0.006189	MN1	344	Lake
95	2241	Further Evaluation	0.006092	MN169	416	Lake
96	1118	Further Evaluation	0.006035	MN61	29	Lake
97	1056	Further Evaluation	0.005942	MN61	38	Lake
98	1157	Further Evaluation	0.005759	MN61	28	Lake
99	2822	Further Evaluation	0.005545	MN1	314	Lake
100	54	Further Evaluation	0.005526	MN169	416	Lake
101	311	Further Evaluation	0.005416	MN1	303	Lake
102	1076	Further Evaluation	0.005332	MN61	36	Lake
103	1187	Further Evaluation	0.005291	MN61	26	Lake
104	58	Further Evaluation	0.005176	MN169	415	Lake
105	3267	Further Evaluation	0.00471	MN61	60	Lake
106	287	Further Evaluation	0.004627	MN1	301	Lake
107	2600	Further Evaluation	0.004624	MN1	302	Lake
108	3420	Further Evaluation	0.004403	MN61	50	Lake
109	3381	Further Evaluation	0.004362	MN61	52	Lake
110	3426	Further Evaluation	0.004039	MN61	50	Lake
111	3356	Further Evaluation	0.00381	MN61	53	Lake
112	1075	Further Evaluation	0.003743	MN61	37	Lake
113	753	Further Evaluation	0.003717	MN1	341	Lake
114	3285	Further Evaluation	0.003657	MN61	59	Lake
115	3823	Further Evaluation	0.003574	MN61	21	Lake
116	425	Further Evaluation	0.003573	MN1	314	Lake
117	760	Further Evaluation	0.003481	MN1	342	Lake
118	2567	Further Evaluation	0.003274	MN1	300	Lake
119	3422	Further Evaluation	0.003133	MN61	50	Lake
120	3642	Further Evaluation	0.003043	MN61	30	Lake
121	3311	Further Evaluation	0.002981	MN61	57	Lake
122	442	Further Evaluation	0.002897	MN1	317	Lake
123	3751	Further Evaluation	0.002835	MN61	26	Lake
124	2685	Further Evaluation	0.002776	MN1	306	Lake
125	2507	Further Evaluation	0.002775	MN1	294	Lake
126	3445	Further Evaluation	0.002744	MN61	48	Lake
127	2555	Further Evaluation	0.002719	MN1	300	Lake
128	3480	Further Evaluation	0.002678	MN61	45	Lake
129	3565	Further Evaluation	0.00263	MN61	36	Lake
130	2640	Further Evaluation	0.002592	MN1	303	Lake
131	2905	Further Evaluation	0.002509	MN1	329	Lake
132	2740	Further Evaluation	0.002415	MN1	310	Lake
133	3587	Further Evaluation	0.002382	MN61	34	Lake

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
134	2540	Further Evaluation	0.002358	MN1	299	Lake
135	2664	Further Evaluation	0.002259	MN1	304	Lake
136	3154	Further Evaluation	0.002238	MN61	69	Lake
137	3393	Further Evaluation	0.002165	MN61	51	Lake
138	3471	Further Evaluation	0.002133	MN61	46	Lake
139	3355	Further Evaluation	0.002099	MN61	53	Lake
140	2509	Further Evaluation	0.002093	MN1	294	Lake
141	2582	Further Evaluation	0.002069	MN1	300	Lake
142	5988	Monitoring	0.210628	MN61	69	Lake
143	6193	Monitoring	0.066078	MN1	59	Lake
144	999	Monitoring	0.050812	MN61	45	Lake
145	63	Monitoring	0.049678	MN169	416	Lake
146	439	Monitoring	0.043253	MN1	316	Lake
147	1021	Monitoring	0.036391	MN61	43	Lake
148	277	Monitoring	0.035019	MN1	305	Lake
149	409	Monitoring	0.032958	MN1	321	Lake
150	1170	Monitoring	0.032619	MN61	27	Lake
151	321	Monitoring	0.032053	MN1	303	Lake
152	254	Monitoring	0.03198	MN1	299	Lake
153	904	Monitoring	0.030096	MN61	55	Lake
154	1034	Monitoring	0.027662	MN61	40	Lake
155	6484	Monitoring	0.026945	MN61	49	Lake
156	344	Monitoring	0.025259	MN1	306	Lake
157	241	Monitoring	0.024924	MN1	299	Lake
158	422	Monitoring	0.022892	MN1	313	Lake
159	821	Monitoring	0.022834	MN61	61	Lake
160	334	Monitoring	0.020481	MN1	304	Lake
161	280	Monitoring	0.020256	MN1	302	Lake
162	720	Monitoring	0.02023	MN1	341	Lake
163	515	Monitoring	0.019975	MN1	329	Lake
164	1010	Monitoring	0.018357	MN61	44	Lake
165	477	Monitoring	0.018126	MN1	327	Lake
166	217	Monitoring	0.017585	MN1	296	Lake
167	813	Monitoring	0.016711	MN61	58	Lake
168	953	Monitoring	0.016292	MN61	50	Lake
169	1051	Monitoring	0.016044	MN61	40	Lake
170	200	Monitoring	0.015923	MN1	296	Lake
171	6185	Monitoring	0.015295	MN61	60	Lake
172	751	Monitoring	0.015086	MN1	341	Lake
173	433	Monitoring	0.0148	MN1	321	Lake
174	432	Monitoring	0.014576	MN1	317	Lake
175	1116	Monitoring	0.014455	MN61	28	Lake
176	345	Monitoring	0.014299	MN1	306	Lake
177	355	Monitoring	0.014267	MN1	307	Lake

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
178	418	Monitoring	0.013067	MN1	313	Lake
179	710	Monitoring	0.012958	MN1	341	Lake
180	365	Monitoring	0.012944	MN1	308	Lake
181	133	Monitoring	0.012629	MN1	296	Lake
182	667	Monitoring	0.012555	MN61	70	Lake
183	373	Monitoring	0.012446	MN1	310	Lake
184	3423	Monitoring	0.012176	MN61	50	Lake
185	307	Monitoring	0.012012	MN1	302	Lake
186	834	Monitoring	0.011683	MN1	345	Lake
187	429	Monitoring	0.011539	MN1	315	Lake
188	683	Monitoring	0.011531	MN61	70	Lake
189	744	Monitoring	0.011322	MN61	65	Lake
190	6466	Monitoring	0.01109	MN61	50	Lake
191	1186	Monitoring	0.010802	MN61	26	Lake
192	265	Monitoring	0.010668	MN1	301	Lake
193	226	Monitoring	0.010591	MN1	297	Lake
194	780	Monitoring	0.01053	MN61	62	Lake
195	51	Monitoring	0.010368	MN169	416	Lake
196	453	Monitoring	0.010344	MN1	326	Lake
197	854	Monitoring	0.010132	MN61	58	Lake
198	6475	Monitoring	0.009981	MN61	49	Lake
199	995	Monitoring	0.009938	MN61	46	Lake
200	12	Monitoring	0.009382	MN169	416	Lake
201	456	Monitoring	0.009339	MN1	325	Lake
202	705	Monitoring	0.009311	MN1	337	Lake
203	1022	Monitoring	0.009268	MN61	44	Lake
204	1029	Monitoring	0.009097	MN61	41	Lake
205	1082	Monitoring	0.009026	MN61	36	Lake
206	308	Monitoring	0.008802	MN1	303	Lake
207	50	Monitoring	0.008562	MN169	416	Lake
208	1019	Monitoring	0.008505	MN61	44	Lake
209	1047	Monitoring	0.008192	MN61	40	Lake
210	3158	Monitoring	0.007915	MN61	69	Lake
211	2806	Monitoring	0.007883	MN1	314	Lake
212	756	Monitoring	0.007761	MN61	65	Lake
213	3595	Monitoring	0.007726	MN61	34	Lake
214	6337	Monitoring	0.007616	MN61	54	Lake
215	3428	Monitoring	0.007544	MN61	50	Lake
216	320	Monitoring	0.007523	MN1	304	Lake
217	1105	Monitoring	0.007438	MN61	30	Lake
218	962	Monitoring	0.007425	MN61	49	Lake
219	315	Monitoring	0.00741	MN1	303	Lake
220	3274	Monitoring	0.007371	MN1	347	Lake
221	3152	Monitoring	0.007263	MN61	69	Lake

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
222	833	Monitoring	0.007209	MN61	60	Lake
223	427	Monitoring	0.007182	MN1	314	Lake
224	3659	Monitoring	0.007033	MN61	29	Lake
225	3439	Monitoring	0.006927	MN61	49	Lake
226	550	Monitoring	0.006912	MN1	331	Lake
227	1110	Monitoring	0.006885	MN61	31	Lake
228	1111	Monitoring	0.006596	MN61	31	Lake
229	6617	Monitoring	0.00659	MN61	35	Lake
230	3284	Monitoring	0.006587	MN61	59	Lake
231	413	Monitoring	0.006544	MN1	312	Lake
232	767	Monitoring	0.006544	MN1	342	Lake
233	426	Monitoring	0.006499	MN1	321	Lake
234	708	Monitoring	0.006328	MN61	68	Lake
235	405	Monitoring	0.006326	MN1	312	Lake
236	903	Monitoring	0.006324	MN61	55	Lake
237	1113	Monitoring	0.006309	MN61	30	Lake
238	2814	Monitoring	0.006304	MN1	318	Lake
239	1052	Monitoring	0.006251	MN61	39	Lake
240	1197	Monitoring	0.0062	MN61	25	Lake
241	62	Monitoring	0.006173	MN169	416	Lake
242	494	Monitoring	0.006164	MN1	328	Lake
243	3431	Monitoring	0.005831	MN61	49	Lake
244	500	Monitoring	0.005813	MN1	328	Lake
245	430	Monitoring	0.005809	MN1	319	Lake
246	3316	Monitoring	0.005783	MN61	57	Lake
247	3443	Monitoring	0.00572	MN61	48	Lake
248	300	Monitoring	0.005671	MN1	303	Lake
249	1191	Monitoring	0.005559	MN61	26	Lake
250	236	Monitoring	0.005518	MN1	298	Lake
251	3264	Monitoring	0.005509	MN1	346	Lake
252	3351	Monitoring	0.005484	MN61	54	Lake
253	406	Monitoring	0.005473	MN1	312	Lake
254	998	Monitoring	0.005435	MN61	46	Lake
255	745	Monitoring	0.005429	MN61	65	Lake
256	1085	Monitoring	0.005367	MN61	33	Lake
257	2803	Monitoring	0.005365	MN1	313	Lake
258	3207	Monitoring	0.005229	MN61	63	Lake
259	991	Monitoring	0.005213	MN61	45	Lake
260	911	Monitoring	0.005142	MN61	54	Lake
261	3395	Monitoring	0.005117	MN61	51	Lake
262	3411	Monitoring	0.005048	MN61	50	Lake
263	1050	Monitoring	0.005002	MN61	40	Lake
264	3602	Monitoring	0.00499	MN61	33	Lake
265	323	Monitoring	0.004971	MN1	304	Lake

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
266	1211	Monitoring	0.004946	MN61	23	Lake
267	3262	Monitoring	0.004914	MN61	60	Lake
268	3432	Monitoring	0.004898	MN61	49	Lake
269	740	Monitoring	0.00488	MN1	340	Lake
270	231	Monitoring	0.004862	MN1	297	Lake
271	2242	Monitoring	0.00486	MN169	416	Lake
272	444	Monitoring	0.004857	MN1	316	Lake
273	297	Monitoring	0.004843	MN1	303	Lake
274	3647	Monitoring	0.00484	MN61	30	Lake
275	2569	Monitoring	0.004838	MN1	300	Lake
276	3353	Monitoring	0.004779	MN61	53	Lake
277	527	Monitoring	0.004746	MN1	330	Lake
278	383	Monitoring	0.004706	MN1	320	Lake
279	1000	Monitoring	0.004497	MN61	44	Lake
280	283	Monitoring	0.004469	MN1	301	Lake
281	3626	Monitoring	0.004445	MN61	31	Lake
282	3163	Monitoring	0.004445	MN61	68	Lake
283	2725	Monitoring	0.004395	MN1	309	Lake
284	451	Monitoring	0.004395	MN1	330	Lake
285	215	Monitoring	0.004389	MN1	296	Lake
286	702	Monitoring	0.004265	MN1	337	Lake
287	703	Monitoring	0.004244	MN61	68	Lake
288	354	Monitoring	0.004219	MN1	307	Lake
289	492	Monitoring	0.004207	MN1	328	Lake
290	496	Monitoring	0.004176	MN1	328	Lake
291	3537	Monitoring	0.004111	MN61	41	Lake
292	2726	Monitoring	0.004016	MN1	309	Lake
293	2810	Monitoring	0.003919	MN1	319	Lake
294	3541	Monitoring	0.003877	MN61	40	Lake
295	3746	Monitoring	0.003862	MN61	25	Lake
296	3735	Monitoring	0.003852	MN61	27	Lake
297	338	Monitoring	0.003763	MN1	305	Lake
298	877	Monitoring	0.003742	MN61	57	Lake
299	2616	Monitoring	0.003687	MN1	302	Lake
300	973	Monitoring	0.003647	MN61	48	Lake
301	2511	Monitoring	0.003625	MN1	297	Lake
302	824	Monitoring	0.003587	MN61	61	Lake
303	424	Monitoring	0.003572	MN1	313	Lake
304	3165	Monitoring	0.003504	MN61	68	Lake
305	3347	Monitoring	0.003441	MN61	55	Lake
306	3278	Monitoring	0.003379	MN61	60	Lake
307	3539	Monitoring	0.00334	MN61	41	Lake
308	2792	Monitoring	0.003332	MN1	313	Lake
309	3162	Monitoring	0.00327	MN61	68	Lake

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
310	428	Monitoring	0.003255	MN1	318	Lake
311	3436	Monitoring	0.003229	MN61	49	Lake
312	758	Monitoring	0.003228	MN1	344	Lake
313	3397	Monitoring	0.003154	MN61	51	Lake
314	1098	Monitoring	0.003149	MN61	33	Lake
315	2828	Monitoring	0.003136	MN1	316	Lake
316	3822	Monitoring	0.003106	MN61	22	Lake
317	376	Monitoring	0.003093	MN1	310	Lake
318	2644	Monitoring	0.003086	MN1	303	Lake
319	1101	Monitoring	0.003076	MN61	32	Lake
320	3370	Monitoring	0.003049	MN61	53	Lake
321	2628	Monitoring	0.003025	MN1	303	Lake
322	2547	Monitoring	0.002986	MN1	300	Lake
323	3281	Monitoring	0.002979	MN61	59	Lake
324	3598	Monitoring	0.002978	MN61	33	Lake
325	2813	Monitoring	0.002946	MN1	318	Lake
326	3168	Monitoring	0.002905	MN61	67	Lake
327	2651	Monitoring	0.002875	MN1	303	Lake
328	2807	Monitoring	0.002874	MN1	314	Lake
329	3203	Monitoring	0.002857	MN61	64	Lake
330	3413	Monitoring	0.002773	MN61	50	Lake
331	2804	Monitoring	0.002747	MN1	314	Lake
332	3210	Monitoring	0.002693	MN61	63	Lake
333	3756	Monitoring	0.00268	MN61	25	Lake
334	2705	Monitoring	0.00264	MN1	308	Lake
335	2666	Monitoring	0.002639	MN1	304	Lake
336	3321	Monitoring	0.002636	MN61	56	Lake
337	3620	Monitoring	0.002626	MN61	32	Lake
338	2728	Monitoring	0.002626	MN1	309	Lake
339	3322	Monitoring	0.00261	MN61	56	Lake
340	2737	Monitoring	0.002607	MN1	310	Lake
341	2653	Monitoring	0.002604	MN1	304	Lake
342	736	Monitoring	0.002588	MN61	67	Lake
343	2687	Monitoring	0.002577	MN1	306	Lake
344	2545	Monitoring	0.002521	MN1	299	Lake
345	2713	Monitoring	0.002506	MN1	308	Lake
346	6190	Monitoring	0.002474	MN61	59	Lake
347	2542	Monitoring	0.002461	MN1	299	Lake
348	3208	Monitoring	0.002448	MN61	63	Lake
349	2681	Monitoring	0.002445	MN1	306	Lake
350	2593	Monitoring	0.002435	MN1	301	Lake
351	3391	Monitoring	0.002425	MN61	51	Lake
352	2505	Monitoring	0.002423	MN1	296	Lake
353	3012	Monitoring	0.002386	MN1	334	Lake

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
354	3314	Monitoring	0.002381	MN61	57	Lake
355	2941	Monitoring	0.002319	MN1	331	Lake
356	3767	Monitoring	0.00231	MN61	24	Lake
357	3291	Monitoring	0.002309	MN61	58	Lake
358	3405	Monitoring	0.002283	MN61	50	Lake
359	3359	Monitoring	0.002273	MN61	53	Lake
360	3327	Monitoring	0.00227	MN61	56	Lake
361	2710	Monitoring	0.002203	MN1	308	Lake
362	2599	Monitoring	0.002199	MN1	302	Lake
363	2783	Monitoring	0.002178	MN1	312	Lake
364	3568	Monitoring	0.002143	MN61	36	Lake
365	3280	Monitoring	0.002142	MN61	59	Lake
366	3546	Monitoring	0.00214	MN61	39	Lake
367	2625	Monitoring	0.002127	MN1	303	Lake
368	2596	Monitoring	0.002085	MN1	302	Lake
369	2621	Monitoring	0.002064	MN1	303	Lake
370	3666	Monitoring	0.002035	MN61	29	Lake
371	3755	Monitoring	0.002011	MN61	25	Lake
372	3619	Monitoring	0.002011	MN61	32	Lake
373	3442	Monitoring	0.002008	MN61	48	Lake
374	3189	Monitoring	0.001998	MN61	65	Lake
375	3362	Monitoring	0.00199	MN61	53	Lake
376	6620	Monitoring	0.001271	MN61	34	Lake
377	6464	Monitoring	0.000781	MN61	50	Lake
378	6156	Monitoring	0.000708	MN1	346	Lake
379	6615	Monitoring	0.000695	MN61	35	Lake
380	5940	Monitoring	0.000666	MN61	69	Lake
381	6360	Monitoring	0.000545	MN61	53	Lake
382	6474	Monitoring	0.000486	MN61	49	Lake
383	6232	Monitoring	0.000347	MN61	57	Lake
384	6233	Monitoring	0.000347	MN61	57	Lake
385	6237	Monitoring	0.000347	MN61	57	Lake
386	6472	Monitoring	0.000347	MN61	49	Lake
387	6461	Monitoring	0.00033	MN61	50	Lake
388	6356	Monitoring	0.000223	MN61	53	Lake
389	6098	Monitoring	0.000216	MN61	62	Lake
390	6161	Monitoring	0.00019	MN1	346	Lake
391	6616	Monitoring	0.000174	MN61	35	Lake
1	1839	Action Recommended / Site Visit	0.026575	US169	219	Mille Lacs
2	1781	Action Recommended / Site Visit	0.019079	US169	229	Mille Lacs
3	1835	Action Recommended / Site Visit	0.010967	US169	220	Mille Lacs
4	1844	Action Recommended / Site Visit	0.007895	US169	218	Mille Lacs
5	1780	Action Recommended / Site Visit	0.003088	US169	229	Mille Lacs
6	1867	Further Evaluation	0.031547	MN27	173	Mille Lacs

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
7	1836	Further Evaluation	0.03025	US169	220	Mille Lacs
8	1777	Further Evaluation	0.013399	US169	229	Mille Lacs
9	1847	Further Evaluation	0.010864	US169	218	Mille Lacs
10	1830	Further Evaluation	0.007234	MN27	188	Mille Lacs
11	1850	Further Evaluation	0.006487	MN27	184	Mille Lacs
12	1834	Further Evaluation	0.00471	US169	220	Mille Lacs
13	4508	Further Evaluation	0.002505	US169	229	Mille Lacs
14	4505	Further Evaluation	0.002005	US169	230	Mille Lacs
15	1828	Monitoring	0.033565	US169	222	Mille Lacs
16	1880	Monitoring	0.031289	US169	209	Mille Lacs
17	1837	Monitoring	0.028526	MN47	90	Mille Lacs
18	1790	Monitoring	0.022096	US169	228	Mille Lacs
19	1779	Monitoring	0.021235	US169	229	Mille Lacs
20	1826	Monitoring	0.020768	US169	222	Mille Lacs
21	1843	Monitoring	0.01641	US169	219	Mille Lacs
22	1974	Monitoring	0.014012	US169	196	Mille Lacs
23	1788	Monitoring	0.009806	US169	228	Mille Lacs
24	1869	Monitoring	0.008437	MN27	173	Mille Lacs
25	2004	Monitoring	0.008227	MN95	25	Mille Lacs
26	1842	Monitoring	0.007221	MN27	185	Mille Lacs
27	1784	Monitoring	0.005832	MN47	98	Mille Lacs
28	1823	Monitoring	0.005333	US169	222	Mille Lacs
29	1883	Monitoring	0.005188	US169	210	Mille Lacs
30	1832	Monitoring	0.004852	US169	221	Mille Lacs
31	4510	Monitoring	0.004584	US169	229	Mille Lacs
32	4519	Monitoring	0.003865	US169	228	Mille Lacs
33	1855	Monitoring	0.003783	US169	217	Mille Lacs
34	1846	Monitoring	0.003407	US169	219	Mille Lacs
35	4575	Monitoring	0.003174	US169	218	Mille Lacs
36	4587	Monitoring	0.002964	MN27	173	Mille Lacs
37	4577	Monitoring	0.002945	US169	217	Mille Lacs
38	4571	Monitoring	0.002942	US169	220	Mille Lacs
39	4578	Monitoring	0.002825	US169	217	Mille Lacs
40	4580	Monitoring	0.002605	US169	216	Mille Lacs
41	4579	Monitoring	0.002409	MN27	184	Mille Lacs
42	4514	Monitoring	0.002085	US169	229	Mille Lacs
43	4588	Monitoring	0.002	MN27	173	Mille Lacs
1	1872	Action Recommended / Site Visit	0.09688	US10	139	Morrison
2	1864	Action Recommended / Site Visit	0.037245	MN115	9	Morrison
3	1966	Action Recommended / Site Visit	0.030596	US10	153	Morrison
4	1956	Action Recommended / Site Visit	0.028022	MN25	128	Morrison
5	1882	Action Recommended / Site Visit	0.026588	US10	141	Morrison
6	1932	Action Recommended / Site Visit	0.02139	US10	144	Morrison
7	1943	Action Recommended / Site Visit	0.017976	US10	137	Morrison

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
8	1942	Action Recommended / Site Visit	0.016438	MN27	131	Morrison
9	1859	Action Recommended / Site Visit	0.014539	US10	135	Morrison
10	1831	Action Recommended / Site Visit	0.012159	US10	130	Morrison
11	1870	Action Recommended / Site Visit	0.01099	US10	138	Morrison
12	1840	Action Recommended / Site Visit	0.010359	US10	132	Morrison
13	1866	Action Recommended / Site Visit	0.009845	MN115	9	Morrison
14	1871	Action Recommended / Site Visit	0.009191	US10	138	Morrison
15	1952	Action Recommended / Site Visit	0.007794	US10	147	Morrison
16	1947	Action Recommended / Site Visit	0.006515	US10	146	Morrison
17	1929	Action Recommended / Site Visit	0.005816	US10	144	Morrison
18	1863	Action Recommended / Site Visit	0.005664	US10	136	Morrison
19	1841	Action Recommended / Site Visit	0.005368	US10	132	Morrison
20	1765	Action Recommended / Site Visit	0.00517	US10	119	Morrison
21	1935	Action Recommended / Site Visit	0.005157	US10	0	Morrison
22	1827	Further Evaluation	0.046143	MN27	164	Morrison
23	1878	Further Evaluation	0.04484	US10	140	Morrison
24	1945	Further Evaluation	0.044185	MN27	140	Morrison
25	1860	Further Evaluation	0.039628	MN115	2	Morrison
26	1953	Further Evaluation	0.037263	MN27	147	Morrison
27	1873	Further Evaluation	0.036676	MN27	159	Morrison
28	1885	Further Evaluation	0.029642	MN371	1	Morrison
29	1950	Further Evaluation	0.0225	MN27	146	Morrison
30	1856	Further Evaluation	0.013703	MN371	9	Morrison
31	1944	Further Evaluation	0.011391	MN27	135	Morrison
32	1833	Further Evaluation	0.010693	US10	131	Morrison
33	1964	Further Evaluation	0.010628	MN238	32	Morrison
34	1967	Further Evaluation	0.009391	US10	157	Morrison
35	1791	Further Evaluation	0.008188	US10	124	Morrison
36	1941	Further Evaluation	0.00795	MN27	132	Morrison
37	1958	Further Evaluation	0.007347	US10	147	Morrison
38	1936	Further Evaluation	0.00711	MN27	136	Morrison
39	4641	Further Evaluation	0.006761	MN27	131	Morrison
40	1910	Further Evaluation	0.006725	MN371	1	Morrison
41	1876	Further Evaluation	0.006378	MN27	159	Morrison
42	1848	Further Evaluation	0.006325	MN371	8	Morrison
43	1963	Further Evaluation	0.004823	MN238	32	Morrison
44	1822	Further Evaluation	0.004371	US10	129	Morrison
45	1970	Further Evaluation	0.004332	MN238	24	Morrison
46	4652	Further Evaluation	0.003078	US10	148	Morrison
47	4544	Further Evaluation	0.002707	US10	127	Morrison
48	1752	Further Evaluation	0.002611	US10	116	Morrison
49	4649	Further Evaluation	0.002249	MN27	146	Morrison
50	1881	Monitoring	0.060913	MN27	141	Morrison
51	1748	Monitoring	0.047716	US10	119	Morrison

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
52	1961	Monitoring	0.040709	MN238	31	Morrison
53	1877	Monitoring	0.023782	MN371	3	Morrison
54	1816	Monitoring	0.022712	US10	128	Morrison
55	1940	Monitoring	0.019778	MN27	131	Morrison
56	1785	Monitoring	0.01908	US10	123	Morrison
57	1813	Monitoring	0.017947	US10	127	Morrison
58	1954	Monitoring	0.017826	MN25	128	Morrison
59	1838	Monitoring	0.017587	MN115	2	Morrison
60	1810	Monitoring	0.016871	US10	126	Morrison
61	1854	Monitoring	0.016401	MN27	164	Morrison
62	1787	Monitoring	0.013548	US10	124	Morrison
63	1965	Monitoring	0.012804	MN238	30	Morrison
64	1812	Monitoring	0.011013	MN371	15	Morrison
65	1948	Monitoring	0.010936	MN27	135	Morrison
66	1759	Monitoring	0.010724	US10	118	Morrison
67	1821	Monitoring	0.010452	US10	128	Morrison
68	1861	Monitoring	0.010011	MN371	8	Morrison
69	1793	Monitoring	0.008728	US10	124	Morrison
70	1774	Monitoring	0.008604	US10	123	Morrison
71	1743	Monitoring	0.008043	MN210	111	Morrison
72	4520	Monitoring	0.007564	US10	124	Morrison
73	1939	Monitoring	0.007363	MN27	126	Morrison
74	1946	Monitoring	0.007241	MN27	144	Morrison
75	1783	Monitoring	0.00718	US10	123	Morrison
76	1858	Monitoring	0.007126	MN115	1	Morrison
77	1907	Monitoring	0.006368	MN371	1	Morrison
78	4547	Monitoring	0.005988	US10	128	Morrison
79	1962	Monitoring	0.005573	MN238	31	Morrison
80	1874	Monitoring	0.005462	MN371	4	Morrison
81	1853	Monitoring	0.005376	MN371	7	Morrison
82	4663	Monitoring	0.005253	US10	157	Morrison
83	1955	Monitoring	0.005036	MN27	146	Morrison
84	4533	Monitoring	0.004852	US10	125	Morrison
85	4597	Monitoring	0.004693	MN27	159	Morrison
86	1957	Monitoring	0.004643	MN27	145	Morrison
87	1972	Monitoring	0.004482	US10	157	Morrison
88	1868	Monitoring	0.004444	MN371	6	Morrison
89	4599	Monitoring	0.004381	US10	140	Morrison
90	1824	Monitoring	0.004306	US10	129	Morrison
91	1829	Monitoring	0.004282	US10	139	Morrison
92	1862	Monitoring	0.00413	MN115	9	Morrison
93	1906	Monitoring	0.003991	US10	143	Morrison
94	1782	Monitoring	0.003971	US10	123	Morrison
95	1845	Monitoring	0.003868	US10	131	Morrison

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
96	1811	Monitoring	0.003867	US10	127	Morrison
97	1959	Monitoring	0.003604	MN25	147	Morrison
98	1875	Monitoring	0.003595	MN371	4	Morrison
99	1857	Monitoring	0.003591	MN115	1	Morrison
100	4603	Monitoring	0.003451	MN371	3	Morrison
101	4560	Monitoring	0.003383	US10	129	Morrison
102	4628	Monitoring	0.003164	MN371	1	Morrison
103	4653	Monitoring	0.003125	US10	148	Morrison
104	4581	Monitoring	0.003096	MN115	2	Morrison
105	4596	Monitoring	0.003036	MN27	159	Morrison
106	4589	Monitoring	0.00297	MN371	6	Morrison
107	4605	Monitoring	0.002942	US10	141	Morrison
108	1949	Monitoring	0.002598	MN27	135	Morrison
109	4555	Monitoring	0.00259	US10	129	Morrison
110	4569	Monitoring	0.002568	US10	130	Morrison
111	4640	Monitoring	0.002548	MN27	131	Morrison
112	4549	Monitoring	0.002478	US10	128	Morrison
113	4598	Monitoring	0.002461	MN27	159	Morrison
114	4601	Monitoring	0.002273	MN371	3	Morrison
115	4639	Monitoring	0.002261	MN27	131	Morrison
116	4658	Monitoring	0.00221	MN238	31	Morrison
117	4558	Monitoring	0.002182	US10	129	Morrison
118	4586	Monitoring	0.002085	MN115	5	Morrison
119	4606	Monitoring	0.002085	MN371	2	Morrison
120	7736	Monitoring	0.000214	MN115	9	Morrison
1	1804	Action Recommended / Site Visit	0.35617	MN123	287	Pine
2	1786	Action Recommended / Site Visit	0.092426	I35	199	Pine
3	1789	Action Recommended / Site Visit	0.083606	MN18	76	Pine
4	1901	Action Recommended / Site Visit	0.080543	MN48	4	Pine
5	1981	Action Recommended / Site Visit	0.078943	MN70	26	Pine
6	1895	Action Recommended / Site Visit	0.058356	MN48	5	Pine
7	1807	Action Recommended / Site Visit	0.054746	MN23	292	Pine
8	1773	Action Recommended / Site Visit	0.052834	I35	200	Pine
9	1903	Action Recommended / Site Visit	0.045874	MN48	19	Pine
10	1894	Action Recommended / Site Visit	0.036531	MN48	23	Pine
11	1909	Action Recommended / Site Visit	0.033256	MN48	20	Pine
12	1769	Action Recommended / Site Visit	0.027323	MN23	301	Pine
13	1921	Action Recommended / Site Visit	0.026298	MN70	29	Pine
14	1937	Action Recommended / Site Visit	0.022408	I35	181	Pine
15	1992	Action Recommended / Site Visit	0.021693	MN70	14	Pine
16	1930	Action Recommended / Site Visit	0.021682	I35	182	Pine
17	1993	Action Recommended / Site Visit	0.014412	I35	165	Pine
18	1817	Action Recommended / Site Visit	0.013827	MN23	289	Pine
19	1892	Action Recommended / Site Visit	0.012731	MN48	23	Pine

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
20	1912	Action Recommended / Site Visit	0.012044	MN48	21	Pine
21	1991	Action Recommended / Site Visit	0.011032	MN70	20	Pine
22	1914	Action Recommended / Site Visit	0.010756	MN48	17	Pine
23	1709	Action Recommended / Site Visit	0.010503	MN23	314	Pine
24	1806	Action Recommended / Site Visit	0.007241	MN23	295	Pine
25	1879	Action Recommended / Site Visit	0.007199	I35	184	Pine
26	1915	Action Recommended / Site Visit	0.006891	MN48	9	Pine
27	1800	Action Recommended / Site Visit	0.006843	MN23	296	Pine
28	1745	Action Recommended / Site Visit	0.006329	I35	206	Pine
29	1917	Action Recommended / Site Visit	0.006161	MN48	13	Pine
30	1705	Action Recommended / Site Visit	0.005521	I35	213	Pine
31	1916	Action Recommended / Site Visit	0.004936	MN48	17	Pine
32	1801	Action Recommended / Site Visit	0.004926	MN18	73	Pine
33	1969	Action Recommended / Site Visit	0.004894	I35	171	Pine
34	1960	Action Recommended / Site Visit	0.004106	MN23	267	Pine
35	1982	Action Recommended / Site Visit	0.003935	MN70	29	Pine
36	1766	Action Recommended / Site Visit	0.003932	MN23	303	Pine
37	1818	Action Recommended / Site Visit	0.003017	MN23	291	Pine
38	1757	Further Evaluation	0.047275	MN18	70	Pine
39	1819	Further Evaluation	0.029636	MN23	291	Pine
40	1760	Further Evaluation	0.015657	MN23	305	Pine
41	1908	Further Evaluation	0.014678	MN48	9	Pine
42	1803	Further Evaluation	0.01239	I35	187	Pine
43	1980	Further Evaluation	0.011959	MN70	23	Pine
44	1987	Further Evaluation	0.011551	MN70	20	Pine
45	1715	Further Evaluation	0.011454	MN23	311	Pine
46	1905	Further Evaluation	0.011223	MN48	18	Pine
47	1761	Further Evaluation	0.010852	MN23	303	Pine
48	1792	Further Evaluation	0.009187	I35	198	Pine
49	1794	Further Evaluation	0.00885	MN18	69	Pine
50	1919	Further Evaluation	0.008599	MN48	23	Pine
51	1778	Further Evaluation	0.008426	MN23	299	Pine
52	1770	Further Evaluation	0.007753	MN23	301	Pine
53	1973	Further Evaluation	0.00768	I35	167	Pine
54	1926	Further Evaluation	0.006704	MN48	3	Pine
55	1913	Further Evaluation	0.005419	MN48	13	Pine
56	1703	Further Evaluation	0.005321	MN23	314	Pine
57	1776	Further Evaluation	0.005282	MN23	299	Pine
58	1978	Further Evaluation	0.005201	I35	167	Pine
59	1918	Further Evaluation	0.004953	MN48	18	Pine
60	1758	Further Evaluation	0.004843	MN23	305	Pine
61	1984	Further Evaluation	0.004781	MN70	23	Pine
62	1805	Further Evaluation	0.004725	MN23	295	Pine
63	1976	Further Evaluation	0.004584	I35	167	Pine

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
64	1707	Further Evaluation	0.004406	MN23	315	Pine
65	1911	Further Evaluation	0.004075	MN48	21	Pine
66	1742	Further Evaluation	0.003988	MN23	306	Pine
67	1797	Further Evaluation	0.003909	I35	198	Pine
68	1815	Further Evaluation	0.003687	MN23	291	Pine
69	4511	Further Evaluation	0.003462	I35	200	Pine
70	1744	Further Evaluation	0.003369	I35	207	Pine
71	1710	Further Evaluation	0.003241	MN23	314	Pine
72	4535	Further Evaluation	0.002909	MN23	295	Pine
73	4622	Further Evaluation	0.002766	MN48	18	Pine
74	4546	Further Evaluation	0.002694	MN23	291	Pine
75	4664	Further Evaluation	0.002581	I35	170	Pine
76	4618	Further Evaluation	0.002347	MN48	18	Pine
77	4614	Further Evaluation	0.002317	I35	0	Pine
78	4542	Further Evaluation	0.00214	MN23	292	Pine
79	4659	Further Evaluation	0.002087	I35	177	Pine
80	4522	Further Evaluation	0.001987	I35	198	Pine
81	1762	Monitoring	0.038473	MN48	20	Pine
82	1891	Monitoring	0.026074	MN48	19	Pine
83	1888	Monitoring	0.022229	MN48	13	Pine
84	1900	Monitoring	0.01931	MN48	21	Pine
85	1923	Monitoring	0.019249	MN48	18	Pine
86	1922	Monitoring	0.016891	MN48	23	Pine
87	1983	Monitoring	0.016049	MN70	26	Pine
88	1768	Monitoring	0.01402	MN48	19	Pine
89	1889	Monitoring	0.012749	MN48	21	Pine
90	1887	Monitoring	0.011896	MN48	23	Pine
91	1925	Monitoring	0.011374	MN48	19	Pine
92	1796	Monitoring	0.0109	MN18	69	Pine
93	1802	Monitoring	0.010083	I35	198	Pine
94	1904	Monitoring	0.009629	MN48	3	Pine
95	1884	Monitoring	0.009541	I35	184	Pine
96	1708	Monitoring	0.009039	I35	211	Pine
97	1896	Monitoring	0.008948	MN48	13	Pine
98	1928	Monitoring	0.008873	MN48	18	Pine
99	4545	Monitoring	0.008518	MN23	291	Pine
100	1951	Monitoring	0.008022	MN23	269	Pine
101	1808	Monitoring	0.007488	MN23	292	Pine
102	1986	Monitoring	0.007386	MN70	29	Pine
103	1746	Monitoring	0.007355	I35	206	Pine
104	1798	Monitoring	0.006977	I35	198	Pine
105	1985	Monitoring	0.006761	MN70	28	Pine
106	1938	Monitoring	0.006473	MN23	272	Pine
107	1902	Monitoring	0.006322	MN48	20	Pine

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
108	1890	Monitoring	0.006291	MN48	22	Pine
109	1886	Monitoring	0.005813	MN48	23	Pine
110	1897	Monitoring	0.005627	MN48	18	Pine
111	1990	Monitoring	0.005493	MN70	20	Pine
112	1931	Monitoring	0.005283	MN48	1	Pine
113	1977	Monitoring	0.005229	I35	167	Pine
114	1825	Monitoring	0.005117	MN23	288	Pine
115	1751	Monitoring	0.005113	I35	206	Pine
116	1747	Monitoring	0.004653	I35	207	Pine
117	1988	Monitoring	0.00457	MN70	23	Pine
118	4616	Monitoring	0.004515	I35	0	Pine
119	1927	Monitoring	0.004483	MN48	3	Pine
120	1799	Monitoring	0.004271	MN18	78	Pine
121	4621	Monitoring	0.004029	MN48	23	Pine
122	1763	Monitoring	0.003972	I35	204	Pine
123	1898	Monitoring	0.003965	MN48	11	Pine
124	1893	Monitoring	0.003907	MN48	4	Pine
125	4656	Monitoring	0.003805	MN23	266	Pine
126	4499	Monitoring	0.003674	MN23	306	Pine
127	4637	Monitoring	0.003616	I35	182	Pine
128	1849	Monitoring	0.003547	MN123	286	Pine
129	1933	Monitoring	0.003475	MN48	4	Pine
130	4673	Monitoring	0.003436	MN70	29	Pine
131	4672	Monitoring	0.003362	MN70	29	Pine
132	1700	Monitoring	0.003327	I35	213	Pine
133	1920	Monitoring	0.003247	MN48	21	Pine
134	4548	Monitoring	0.00316	MN23	291	Pine
135	1934	Monitoring	0.00315	MN48	3	Pine
136	1979	Monitoring	0.00315	I35	167	Pine
137	4666	Monitoring	0.002974	I35	167	Pine
138	4667	Monitoring	0.002864	MN70	23	Pine
139	4676	Monitoring	0.002625	MN70	20	Pine
140	4593	Monitoring	0.002605	I35	186	Pine
141	4617	Monitoring	0.002516	MN48	17	Pine
142	4670	Monitoring	0.002375	MN70	26	Pine
143	1924	Monitoring	0.002358	MN48	11	Pine
144	4674	Monitoring	0.002276	MN70	29	Pine
145	4671	Monitoring	0.002231	MN70	23	Pine
146	4462	Monitoring	0.002216	MN23	315	Pine
147	4668	Monitoring	0.002132	MN70	26	Pine
148	4590	Monitoring	0.00207	I35	187	Pine
149	4675	Monitoring	0.002048	MN70	22	Pine
150	7797	Monitoring	0.000469	MN70	20	Pine
151	7781	Monitoring	0.000347	MN107	17	Pine

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
152	7782	Monitoring	0.000347	MN107	17	Pine
1	1549	Action Recommended / Site Visit	2.985621	MN210	224	St. Louis
2	531	Action Recommended / Site Visit	1.137112	MN135	64	St. Louis
3	620	Action Recommended / Site Visit	0.718756	MN135	7	St. Louis
4	659	Action Recommended / Site Visit	0.608627	MN73	346	St. Louis
5	539	Action Recommended / Site Visit	0.398114	MN135	17	St. Louis
6	1567	Action Recommended / Site Visit	0.380675	MN23	338	St. Louis
7	1552	Action Recommended / Site Visit	0.362717	MN23	340	St. Louis
8	143	Action Recommended / Site Visit	0.32274	MN1	273	St. Louis
9	1457	Action Recommended / Site Visit	0.284553	US53	4	St. Louis
10	1513	Action Recommended / Site Visit	0.253138	MN23	249	St. Louis
11	131	Action Recommended / Site Visit	0.239534	MN1	276	St. Louis
12	74	Action Recommended / Site Visit	0.227692	MN169	414	St. Louis
13	675	Action Recommended / Site Visit	0.1937	US169	351	St. Louis
14	1470	Action Recommended / Site Visit	0.190886	US53	2	St. Louis
15	511	Action Recommended / Site Visit	0.176145	MN135	15	St. Louis
16	1447	Action Recommended / Site Visit	0.162463	I35	258	St. Louis
17	155	Action Recommended / Site Visit	0.152087	MN1	275	St. Louis
18	1469	Action Recommended / Site Visit	0.14155	I35	251	St. Louis
19	1506	Action Recommended / Site Visit	0.137938	US2	260	St. Louis
20	1327	Action Recommended / Site Visit	0.137771	US53	15	St. Louis
21	602	Action Recommended / Site Visit	0.135049	US53	63	St. Louis
22	752	Action Recommended / Site Visit	0.125766	US169	340	St. Louis
23	79	Action Recommended / Site Visit	0.123031	MN1	284	St. Louis
24	375	Action Recommended / Site Visit	0.122517	MN135	24	St. Louis
25	1188	Action Recommended / Site Visit	0.10861	MN39	1	St. Louis
26	1411	Action Recommended / Site Visit	0.096657	MN61	2	St. Louis
27	1530	Action Recommended / Site Visit	0.084184	I35	247	St. Louis
28	170	Action Recommended / Site Visit	0.083969	MN1	270	St. Louis
29	1338	Action Recommended / Site Visit	0.080626	US2	227	St. Louis
30	168	Action Recommended / Site Visit	0.076138	MN1	272	St. Louis
31	211	Action Recommended / Site Visit	0.074461	MN1	266	St. Louis
32	727	Action Recommended / Site Visit	0.067427	US169	343	St. Louis
33	624	Action Recommended / Site Visit	0.061149	MN135	5	St. Louis
34	95	Action Recommended / Site Visit	0.060054	MN1	282	St. Louis
35	1362	Action Recommended / Site Visit	0.057778	US2	239	St. Louis
36	1206	Action Recommended / Site Visit	0.049791	US53	28	St. Louis
37	1448	Action Recommended / Site Visit	0.049514	US2	253	St. Louis
38	1316	Action Recommended / Site Visit	0.048044	MN61	10	St. Louis
39	1459	Action Recommended / Site Visit	0.045403	MN194	17	St. Louis
40	1368	Action Recommended / Site Visit	0.045307	US2	239	St. Louis
41	1491	Action Recommended / Site Visit	0.044762	I35	254	St. Louis
42	397	Action Recommended / Site Visit	0.042133	US53	76	St. Louis
43	192	Action Recommended / Site Visit	0.040512	MN1	294	St. Louis

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
44	1314	Action Recommended / Site Visit	0.040293	MN33	13	St. Louis
45	1271	Action Recommended / Site Visit	0.038858	MN61	12	St. Louis
46	66	Action Recommended / Site Visit	0.038423	MN169	415	St. Louis
47	1237	Action Recommended / Site Visit	0.037773	MN33	24	St. Louis
48	73	Action Recommended / Site Visit	0.03648	US53	100	St. Louis
49	1439	Action Recommended / Site Visit	0.036405	US53	14	St. Louis
50	1409	Action Recommended / Site Visit	0.03572	MN61	3	St. Louis
51	153	Action Recommended / Site Visit	0.035358	MN1	274	St. Louis
52	713	Action Recommended / Site Visit	0.034085	US169	344	St. Louis
53	517	Action Recommended / Site Visit	0.033165	US53	70	St. Louis
54	1488	Action Recommended / Site Visit	0.031558	US2	263	St. Louis
55	1392	Action Recommended / Site Visit	0.030467	MN61	4	St. Louis
56	146	Action Recommended / Site Visit	0.030224	MN1	228	St. Louis
57	2	Action Recommended / Site Visit	0.029636	US53	126	St. Louis
58	1489	Action Recommended / Site Visit	0.028168	I535	0	St. Louis
59	1395	Action Recommended / Site Visit	0.028118	MN33	10	St. Louis
60	1540	Action Recommended / Site Visit	0.027171	I35	246	St. Louis
61	1521	Action Recommended / Site Visit	0.026678	I35	245	St. Louis
62	358	Action Recommended / Site Visit	0.024625	US53	82	St. Louis
63	576	Action Recommended / Site Visit	0.024439	MN135	15	St. Louis
64	289	Action Recommended / Site Visit	0.023101	MN1	254	St. Louis
65	1420	Action Recommended / Site Visit	0.021768	MN61	1	St. Louis
66	737	Action Recommended / Site Visit	0.021743	US169	342	St. Louis
67	88	Action Recommended / Site Visit	0.020921	MN1	284	St. Louis
68	743	Action Recommended / Site Visit	0.020464	US169	341	St. Louis
69	120	Action Recommended / Site Visit	0.019622	MN1	278	St. Louis
70	640	Action Recommended / Site Visit	0.018279	US169	357	St. Louis
71	473	Action Recommended / Site Visit	0.017002	MN169	372	St. Louis
72	243	Action Recommended / Site Visit	0.016982	MN1	263	St. Louis
73	460	Action Recommended / Site Visit	0.016651	MN73	97	St. Louis
74	1380	Action Recommended / Site Visit	0.016548	US2	246	St. Louis
75	1482	Action Recommended / Site Visit	0.016545	I35	255	St. Louis
76	178	Action Recommended / Site Visit	0.01638	MN1	270	St. Louis
77	1485	Action Recommended / Site Visit	0.016118	I535	1	St. Louis
78	258	Action Recommended / Site Visit	0.015964	MN1	260	St. Louis
79	572	Action Recommended / Site Visit	0.015136	MN135	16	St. Louis
80	288	Action Recommended / Site Visit	0.014442	MN1	246	St. Louis
81	175	Action Recommended / Site Visit	0.013754	MN1	270	St. Louis
82	228	Action Recommended / Site Visit	0.013596	MN1	264	St. Louis
83	227	Action Recommended / Site Visit	0.013466	MN1	262	St. Louis
84	1367	Action Recommended / Site Visit	0.013281	US2	239	St. Louis
85	1445	Action Recommended / Site Visit	0.011454	I35	259	St. Louis
86	1329	Action Recommended / Site Visit	0.01137	US53	17	St. Louis
87	1298	Action Recommended / Site Visit	0.011315	US2	221	St. Louis

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
88	407	Action Recommended / Site Visit	0.011126	US53	77	St. Louis
89	158	Action Recommended / Site Visit	0.010708	MN1	275	St. Louis
90	75	Action Recommended / Site Visit	0.01028	MN73	119	St. Louis
91	10	Action Recommended / Site Visit	0.010163	US53	120	St. Louis
92	1531	Action Recommended / Site Visit	0.009841	I35	246	St. Louis
93	1352	Action Recommended / Site Visit	0.009821	US2	227	St. Louis
94	641	Action Recommended / Site Visit	0.009412	US169	354	St. Louis
95	794	Action Recommended / Site Visit	0.009365	MN73	76	St. Louis
96	919	Action Recommended / Site Visit	0.00928	US53	48	St. Louis
97	879	Action Recommended / Site Visit	0.009105	US53	50	St. Louis
98	533	Action Recommended / Site Visit	0.00907	US53	68	St. Louis
99	1487	Action Recommended / Site Visit	0.008784	I35	254	St. Louis
100	635	Action Recommended / Site Visit	0.008343	US169	353	St. Louis
101	1263	Action Recommended / Site Visit	0.008143	US53	24	St. Louis
102	1478	Action Recommended / Site Visit	0.008059	I35	1	St. Louis
103	784	Action Recommended / Site Visit	0.007968	US169	335	St. Louis
104	1514	Action Recommended / Site Visit	0.007547	I35	250	St. Louis
105	293	Action Recommended / Site Visit	0.007501	MN1	251	St. Louis
106	1433	Action Recommended / Site Visit	0.007397	US53	13	St. Louis
107	274	Action Recommended / Site Visit	0.007386	MN1	246	St. Louis
108	638	Action Recommended / Site Visit	0.006887	MN135	6	St. Louis
109	1379	Action Recommended / Site Visit	0.00677	MN194	3	St. Louis
110	1340	Action Recommended / Site Visit	0.006718	US53	15	St. Louis
111	1438	Action Recommended / Site Visit	0.006705	US53	6	St. Louis
112	668	Action Recommended / Site Visit	0.006682	US169	351	St. Louis
113	20	Action Recommended / Site Visit	0.006565	US53	113	St. Louis
114	1502	Action Recommended / Site Visit	0.006316	I35	253	St. Louis
115	102	Action Recommended / Site Visit	0.006076	MN1	283	St. Louis
116	1377	Action Recommended / Site Visit	0.005981	US2	246	St. Louis
117	785	Action Recommended / Site Visit	0.005357	MN37	14	St. Louis
118	5	Action Recommended / Site Visit	0.005076	US53	124	St. Louis
119	115	Action Recommended / Site Visit	0.00486	MN1	278	St. Louis
120	1453	Action Recommended / Site Visit	0.004688	MN194	15	St. Louis
121	6	Action Recommended / Site Visit	0.004279	US53	123	St. Louis
122	1451	Action Recommended / Site Visit	0.003954	US2	252	St. Louis
123	664	Action Recommended / Site Visit	0.003446	US169	352	St. Louis
124	121	Action Recommended / Site Visit	0.003432	MN1	279	St. Louis
125	199	Action Recommended / Site Visit	0.003384	US53	91	St. Louis
126	1494	Action Recommended / Site Visit	0.003273	I35	254	St. Louis
127	497	Further Evaluation	0.505505	MN135	23	St. Louis
128	559	Further Evaluation	0.240015	MN135	13	St. Louis
129	739	Further Evaluation	0.223881	US169	342	St. Louis
130	661	Further Evaluation	0.210534	MN37	27	St. Louis
131	1537	Further Evaluation	0.142993	I35	246	St. Louis

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
132	735	Further Evaluation	0.118877	US169	342	St. Louis
133	1534	Further Evaluation	0.110659	MN23	342	St. Louis
134	699	Further Evaluation	0.110422	US53	24	St. Louis
135	103	Further Evaluation	0.108577	MN1	282	St. Louis
136	700	Further Evaluation	0.098913	MN37	26	St. Louis
137	233	Further Evaluation	0.088784	MN135	39	St. Louis
138	775	Further Evaluation	0.084544	US169	337	St. Louis
139	678	Further Evaluation	0.084457	US169	350	St. Louis
140	605	Further Evaluation	0.08067	US169	357	St. Louis
141	261	Further Evaluation	0.075758	MN135	38	St. Louis
142	1490	Further Evaluation	0.061051	I35	254	St. Louis
143	520	Further Evaluation	0.053464	MN135	20	St. Louis
144	374	Further Evaluation	0.04723	US53	80	St. Louis
145	339	Further Evaluation	0.045012	MN135	35	St. Louis
146	581	Further Evaluation	0.044305	MN135	17	St. Louis
147	783	Further Evaluation	0.041361	US169	336	St. Louis
148	1476	Further Evaluation	0.038248	US53	2	St. Louis
149	673	Further Evaluation	0.035733	US169	348	St. Louis
150	1527	Further Evaluation	0.034309	MN23	342	St. Louis
151	1374	Further Evaluation	0.033937	MN194	2	St. Louis
152	193	Further Evaluation	0.033725	MN1	269	St. Louis
153	124	Further Evaluation	0.032683	MN1	277	St. Louis
154	1382	Further Evaluation	0.032407	US2	246	St. Louis
155	532	Further Evaluation	0.031248	US169	361	St. Louis
156	523	Further Evaluation	0.0304	MN135	20	St. Louis
157	269	Further Evaluation	0.030086	MN135	38	St. Louis
158	649	Further Evaluation	0.029535	US169	350	St. Louis
159	1529	Further Evaluation	0.028259	MN23	343	St. Louis
160	1390	Further Evaluation	0.027047	US2	247	St. Louis
161	78	Further Evaluation	0.025836	MN169	413	St. Louis
162	548	Further Evaluation	0.024946	US53	68	St. Louis
163	629	Further Evaluation	0.023413	US53	3	St. Louis
164	574	Further Evaluation	0.022604	US169	361	St. Louis
165	1270	Further Evaluation	0.021515	MN73	45	St. Louis
166	1278	Further Evaluation	0.02079	MN33	16	St. Louis
167	1449	Further Evaluation	0.020363	MN194	16	St. Louis
168	555	Further Evaluation	0.019883	MN135	18	St. Louis
169	246	Further Evaluation	0.019823	MN135	39	St. Louis
170	748	Further Evaluation	0.01963	US53	58	St. Louis
171	652	Further Evaluation	0.019567	US53	62	St. Louis
172	633	Further Evaluation	0.01787	US169	356	St. Louis
173	385	Further Evaluation	0.017601	US53	80	St. Louis
174	1536	Further Evaluation	0.017145	MN23	342	St. Louis
175	1294	Further Evaluation	0.01711	US53	20	St. Louis

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
176	610	Further Evaluation	0.016918	MN135	11	St. Louis
177	189	Further Evaluation	0.016628	MN1	292	St. Louis
178	1446	Further Evaluation	0.016196	MN194	15	St. Louis
179	613	Further Evaluation	0.015387	MN135	11	St. Louis
180	985	Further Evaluation	0.01493	MN73	66	St. Louis
181	1486	Further Evaluation	0.014534	I35	254	St. Louis
182	1508	Further Evaluation	0.014514	I35	250	St. Louis
183	1545	Further Evaluation	0.014496	I35	245	St. Louis
184	21	Further Evaluation	0.014486	US53	111	St. Louis
185	268	Further Evaluation	0.014354	MN135	38	St. Louis
186	91	Further Evaluation	0.014212	MN1	283	St. Louis
187	1385	Further Evaluation	0.013635	MN194	4	St. Louis
188	81	Further Evaluation	0.013366	MN1	413	St. Louis
189	1303	Further Evaluation	0.013297	US53	20	St. Louis
190	251	Further Evaluation	0.013189	MN135	39	St. Louis
191	660	Further Evaluation	0.013168	US169	352	St. Louis
192	319	Further Evaluation	0.013151	US53	85	St. Louis
193	528	Further Evaluation	0.012493	MN135	20	St. Louis
194	490	Further Evaluation	0.011875	MN135	24	St. Louis
195	1410	Further Evaluation	0.011786	MN61	3	St. Louis
196	18	Further Evaluation	0.011544	US53	111	St. Louis
197	129	Further Evaluation	0.011343	MN1	277	St. Louis
198	367	Further Evaluation	0.011102	MN135	31	St. Louis
199	140	Further Evaluation	0.011068	MN1	220	St. Louis
200	260	Further Evaluation	0.010741	MN135	39	St. Louis
201	495	Further Evaluation	0.010591	US53	72	St. Louis
202	1381	Further Evaluation	0.010348	MN73	34	St. Louis
203	303	Further Evaluation	0.010337	US53	86	St. Louis
204	625	Further Evaluation	0.010158	US169	357	St. Louis
205	685	Further Evaluation	0.009797	US169	348	St. Louis
206	2285	Further Evaluation	0.009796	MN1	284	St. Louis
207	380	Further Evaluation	0.009641	US53	80	St. Louis
208	1561	Further Evaluation	0.009564	MN23	340	St. Louis
209	486	Further Evaluation	0.009555	US53	72	St. Louis
210	13	Further Evaluation	0.009465	US53	116	St. Louis
211	3048	Further Evaluation	0.00916	US53	63	St. Louis
212	1454	Further Evaluation	0.009147	US2	252	St. Louis
213	90	Further Evaluation	0.009114	MN1	283	St. Louis
214	285	Further Evaluation	0.00899	US53	87	St. Louis
215	838	Further Evaluation	0.008962	US53	53	St. Louis
216	116	Further Evaluation	0.00896	MN1	279	St. Louis
217	273	Further Evaluation	0.008847	MN1	256	St. Louis
218	578	Further Evaluation	0.008642	MN135	18	St. Louis
219	2564	Further Evaluation	0.008492	MN135	38	St. Louis

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
220	404	Further Evaluation	0.008467	US53	79	St. Louis
221	706	Further Evaluation	0.00843	US169	345	St. Louis
222	377	Further Evaluation	0.007884	MN135	31	St. Louis
223	844	Further Evaluation	0.007743	US53	51	St. Louis
224	4152	Further Evaluation	0.007659	I35	249	St. Louis
225	322	Further Evaluation	0.007599	MN135	35	St. Louis
226	7	Further Evaluation	0.007547	US53	122	St. Louis
227	118	Further Evaluation	0.007348	MN1	278	St. Louis
228	220	Further Evaluation	0.007331	MN1	266	St. Louis
229	93	Further Evaluation	0.007297	MN1	283	St. Louis
230	1528	Further Evaluation	0.007233	MN23	343	St. Louis
231	1387	Further Evaluation	0.00721	MN61	5	St. Louis
232	757	Further Evaluation	0.007193	US53	58	St. Louis
233	187	Further Evaluation	0.007133	MN1	292	St. Louis
234	1425	Further Evaluation	0.007125	US2	256	St. Louis
235	1378	Further Evaluation	0.007085	MN194	3	St. Louis
236	284	Further Evaluation	0.007074	MN1	250	St. Louis
237	97	Further Evaluation	0.006765	MN1	283	St. Louis
238	105	Further Evaluation	0.006506	MN1	281	St. Louis
239	1384	Further Evaluation	0.006327	MN194	3	St. Louis
240	4182	Further Evaluation	0.006061	I35	246	St. Louis
241	2422	Further Evaluation	0.006039	MN1	273	St. Louis
242	1372	Further Evaluation	0.006008	US53	12	St. Louis
243	639	Further Evaluation	0.005995	US169	355	St. Louis
244	597	Further Evaluation	0.005913	US169	359	St. Louis
245	738	Further Evaluation	0.005904	US53	58	St. Louis
246	1346	Further Evaluation	0.005829	US53	15	St. Louis
247	1284	Further Evaluation	0.005808	US2	219	St. Louis
248	1450	Further Evaluation	0.005784	MN194	15	St. Louis
249	2447	Further Evaluation	0.005735	MN1	270	St. Louis
250	4002	Further Evaluation	0.005647	MN194	3	St. Louis
251	1351	Further Evaluation	0.005632	US2	233	St. Louis
252	3022	Further Evaluation	0.005514	US53	64	St. Louis
253	3212	Further Evaluation	0.005509	MN37	16	St. Louis
254	4127	Further Evaluation	0.005478	I35	253	St. Louis
255	645	Further Evaluation	0.005392	US53	3	St. Louis
256	484	Further Evaluation	0.005375	MN73	97	St. Louis
257	3992	Further Evaluation	0.005324	US2	239	St. Louis
258	1519	Further Evaluation	0.005312	I35	247	St. Louis
259	4001	Further Evaluation	0.00505	MN194	3	St. Louis
260	2452	Further Evaluation	0.004956	MN1	270	St. Louis
261	325	Further Evaluation	0.00495	MN135	36	St. Louis
262	4237	Further Evaluation	0.004903	MN210	227	St. Louis
263	4150	Further Evaluation	0.004884	MN23	344	St. Louis

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
264	149	Further Evaluation	0.004816	MN1	276	St. Louis
265	167	Further Evaluation	0.004772	MN1	271	St. Louis
266	23	Further Evaluation	0.004762	US53	109	St. Louis
267	1452	Further Evaluation	0.004724	US2	252	St. Louis
268	2463	Further Evaluation	0.004599	MN1	270	St. Louis
269	3029	Further Evaluation	0.004579	US53	63	St. Louis
270	197	Further Evaluation	0.004534	MN1	269	St. Louis
271	724	Further Evaluation	0.004529	US53	24	St. Louis
272	1299	Further Evaluation	0.004313	US53	20	St. Louis
273	485	Further Evaluation	0.004251	MN135	24	St. Louis
274	1231	Further Evaluation	0.004202	US53	27	St. Louis
275	438	Further Evaluation	0.004131	MN169	373	St. Louis
276	1471	Further Evaluation	0.004108	I35	17	St. Louis
277	2978	Further Evaluation	0.003956	MN135	17	St. Louis
278	3007	Further Evaluation	0.003956	US169	363	St. Louis
279	3993	Further Evaluation	0.003954	US2	240	St. Louis
280	271	Further Evaluation	0.003914	MN1	257	St. Louis
281	1054	Further Evaluation	0.003806	MN73	61	St. Louis
282	4198	Further Evaluation	0.003734	MN23	342	St. Louis
283	2279	Further Evaluation	0.003465	MN1	285	St. Louis
284	2464	Further Evaluation	0.003384	MN1	269	St. Louis
285	4000	Further Evaluation	0.003375	US2	246	St. Louis
286	4	Further Evaluation	0.003368	US53	126	St. Louis
287	906	Further Evaluation	0.003258	US53	49	St. Louis
288	4166	Further Evaluation	0.003221	MN23	343	St. Louis
289	3027	Further Evaluation	0.003147	US53	64	St. Louis
290	1321	Further Evaluation	0.003122	US53	18	St. Louis
291	4154	Further Evaluation	0.003019	I35	249	St. Louis
292	2578	Further Evaluation	0.003018	MN135	38	St. Louis
293	948	Further Evaluation	0.003008	US53	47	St. Louis
294	4130	Further Evaluation	0.002905	I35	252	St. Louis
295	2438	Further Evaluation	0.002889	MN1	271	St. Louis
296	4186	Further Evaluation	0.002884	I35	245	St. Louis
297	8	Further Evaluation	0.002873	US53	121	St. Louis
298	1326	Further Evaluation	0.002851	US53	18	St. Louis
299	1265	Further Evaluation	0.002843	MN33	19	St. Louis
300	1465	Further Evaluation	0.002818	I35	257	St. Louis
301	67	Further Evaluation	0.002728	MN73	119	St. Louis
302	467	Further Evaluation	0.002726	MN169	373	St. Louis
303	2139	Further Evaluation	0.002724	US53	120	St. Louis
304	1403	Further Evaluation	0.002722	US53	8	St. Louis
305	3016	Further Evaluation	0.002598	US169	360	St. Louis
306	2662	Further Evaluation	0.002573	MN135	36	St. Louis
307	2319	Further Evaluation	0.002571	MN1	279	St. Louis

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
308	15	Further Evaluation	0.002544	US53	115	St. Louis
309	2494	Further Evaluation	0.002543	MN1	268	St. Louis
310	4177	Further Evaluation	0.002541	I35	246	St. Louis
311	1005	Further Evaluation	0.002536	US53	40	St. Louis
312	2433	Further Evaluation	0.002402	MN1	271	St. Louis
313	2418	Further Evaluation	0.002367	MN1	273	St. Louis
314	4004	Further Evaluation	0.002348	MN194	4	St. Louis
315	4156	Further Evaluation	0.002345	I35	249	St. Louis
316	2980	Further Evaluation	0.002278	MN135	14	St. Louis
317	2300	Further Evaluation	0.002216	MN1	281	St. Louis
318	4029	Further Evaluation	0.00221	US2	249	St. Louis
319	4134	Further Evaluation	0.002169	MN23	345	St. Louis
320	2376	Further Evaluation	0.002161	MN1	276	St. Louis
321	557	Further Evaluation	0.002157	US53	68	St. Louis
322	2389	Further Evaluation	0.002156	MN1	274	St. Louis
323	2533	Further Evaluation	0.002132	MN135	263	St. Louis
324	2570	Further Evaluation	0.002071	MN1	260	St. Louis
325	3114	Further Evaluation	0.002071	US169	350	St. Louis
326	2396	Further Evaluation	0.002069	MN1	274	St. Louis
327	3228	Further Evaluation	0.002024	MN37	6	St. Louis
328	3091	Further Evaluation	0.002017	MN135	8	St. Louis
329	3060	Further Evaluation	0.00201	MN135	3	St. Louis
330	5753	Monitoring	0.509457	US53	64	St. Louis
331	7337	Monitoring	0.491454	MN210	225	St. Louis
332	1574	Monitoring	0.235692	MN210	225	St. Louis
333	7246	Monitoring	0.186392	MN210	226	St. Louis
334	787	Monitoring	0.131364	US169	333	St. Louis
335	104	Monitoring	0.112444	MN1	278	St. Louis
336	626	Monitoring	0.090593	US169	354	St. Louis
337	698	Monitoring	0.087273	MN37	7	St. Louis
338	171	Monitoring	0.087133	MN1	267	St. Louis
339	1535	Monitoring	0.085625	MN23	342	St. Louis
340	529	Monitoring	0.079036	MN135	20	St. Louis
341	546	Monitoring	0.075558	MN135	13	St. Louis
342	106	Monitoring	0.074741	MN1	283	St. Louis
343	691	Monitoring	0.074408	US169	348	St. Louis
344	695	Monitoring	0.068168	US169	345	St. Louis
345	89	Monitoring	0.063531	MN1	282	St. Louis
346	86	Monitoring	0.063363	MN1	279	St. Louis
347	182	Monitoring	0.0605	MN1	269	St. Louis
348	142	Monitoring	0.060177	MN1	274	St. Louis
349	788	Monitoring	0.059564	US169	332	St. Louis
350	177	Monitoring	0.054374	MN1	270	St. Louis
351	612	Monitoring	0.050687	US169	350	St. Louis

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
352	507	Monitoring	0.04972	US53	68	St. Louis
353	715	Monitoring	0.049028	US53	24	St. Louis
354	113	Monitoring	0.048263	MN1	281	St. Louis
355	4211	Monitoring	0.04733	MN23	341	St. Louis
356	1391	Monitoring	0.047227	US2	247	St. Louis
357	721	Monitoring	0.046719	US169	344	St. Louis
358	1440	Monitoring	0.04534	US53	6	St. Louis
359	255	Monitoring	0.045286	MN135	38	St. Louis
360	1474	Monitoring	0.045114	I35	256	St. Louis
361	1389	Monitoring	0.044841	MN194	3	St. Louis
362	552	Monitoring	0.044484	US53	67	St. Louis
363	188	Monitoring	0.043244	MN1	268	St. Louis
364	122	Monitoring	0.041678	MN1	279	St. Louis
365	173	Monitoring	0.040793	MN1	269	St. Louis
366	1371	Monitoring	0.040314	MN194	3	St. Louis
367	135	Monitoring	0.040223	MN1	277	St. Louis
368	1360	Monitoring	0.039435	MN61	5	St. Louis
369	1505	Monitoring	0.039102	I35	252	St. Louis
370	600	Monitoring	0.038862	US169	360	St. Louis
371	681	Monitoring	0.038725	US169	352	St. Louis
372	1275	Monitoring	0.03836	US53	23	St. Louis
373	152	Monitoring	0.037975	MN1	276	St. Louis
374	687	Monitoring	0.037298	US169	349	St. Louis
375	53	Monitoring	0.036766	MN1	285	St. Louis
376	491	Monitoring	0.035799	US53	72	St. Louis
377	4100	Monitoring	0.035751	MN194	17	St. Louis
378	1480	Monitoring	0.032076	I535	1	St. Louis
379	136	Monitoring	0.031067	MN1	220	St. Louis
380	209	Monitoring	0.030506	MN1	266	St. Louis
381	481	Monitoring	0.030449	MN135	22	St. Louis
382	169	Monitoring	0.029436	MN1	273	St. Louis
383	530	Monitoring	0.028949	US53	69	St. Louis
384	989	Monitoring	0.028453	MN73	65	St. Louis
385	212	Monitoring	0.027542	MN1	267	St. Louis
386	662	Monitoring	0.027231	US169	351	St. Louis
387	1533	Monitoring	0.027094	I35	247	St. Louis
388	264	Monitoring	0.02606	MN1	259	St. Louis
389	614	Monitoring	0.024921	MN135	10	St. Louis
390	1400	Monitoring	0.02433	MN33	10	St. Louis
391	545	Monitoring	0.024317	US169	361	St. Louis
392	558	Monitoring	0.024284	US53	67	St. Louis
393	137	Monitoring	0.024117	MN1	219	St. Louis
394	1297	Monitoring	0.023933	MN61	12	St. Louis
395	57	Monitoring	0.023555	MN1	412	St. Louis

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
396	847	Monitoring	0.023459	US53	50	St. Louis
397	151	Monitoring	0.023226	MN1	265	St. Louis
398	653	Monitoring	0.023039	US169	352	St. Louis
399	1422	Monitoring	0.022088	I35	258	St. Louis
400	603	Monitoring	0.021795	MN135	12	St. Louis
401	1507	Monitoring	0.021104	MN23	345	St. Louis
402	125	Monitoring	0.020762	MN1	278	St. Louis
403	80	Monitoring	0.020422	US53	99	St. Louis
404	163	Monitoring	0.018455	MN1	270	St. Louis
405	181	Monitoring	0.018446	MN1	270	St. Louis
406	1334	Monitoring	0.018413	US53	16	St. Louis
407	482	Monitoring	0.01826	MN135	24	St. Louis
408	3	Monitoring	0.018086	US53	127	St. Louis
409	138	Monitoring	0.017485	MN1	226	St. Louis
410	1435	Monitoring	0.017408	I35	259	St. Louis
411	4085	Monitoring	0.017366	MN194	16	St. Louis
412	462	Monitoring	0.017328	MN73	98	St. Louis
413	1309	Monitoring	0.017298	US53	20	St. Louis
414	571	Monitoring	0.017275	MN73	91	St. Louis
415	191	Monitoring	0.017247	MN1	270	St. Louis
416	1504	Monitoring	0.016933	US2	263	St. Louis
417	2344	Monitoring	0.016608	MN1	277	St. Louis
418	458	Monitoring	0.016596	MN73	99	St. Louis
419	590	Monitoring	0.016574	US169	359	St. Louis
420	1207	Monitoring	0.016571	US53	28	St. Louis
421	1496	Monitoring	0.016523	I35	254	St. Louis
422	1579	Monitoring	0.016475	MN23	335	St. Louis
423	1430	Monitoring	0.015887	US2	255	St. Louis
424	493	Monitoring	0.015405	MN135	24	St. Louis
425	618	Monitoring	0.015252	MN135	10	St. Louis
426	4183	Monitoring	0.015105	MN23	342	St. Louis
427	657	Monitoring	0.015023	US169	348	St. Louis
428	2317	Monitoring	0.01464	MN1	281	St. Louis
429	714	Monitoring	0.014617	US169	342	St. Louis
430	585	Monitoring	0.014488	MN135	12	St. Louis
431	658	Monitoring	0.014364	US169	352	St. Louis
432	324	Monitoring	0.014329	MN135	36	St. Louis
433	130	Monitoring	0.014111	MN1	277	St. Louis
434	85	Monitoring	0.01411	MN1	282	St. Louis
435	1442	Monitoring	0.013655	US2	252	St. Louis
436	2292	Monitoring	0.013637	MN1	283	St. Louis
437	1355	Monitoring	0.013622	US2	227	St. Louis
438	159	Monitoring	0.013533	MN1	275	St. Louis
439	117	Monitoring	0.013411	MN1	277	St. Louis

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
440	203	Monitoring	0.013218	MN1	267	St. Louis
441	1401	Monitoring	0.013124	MN61	2	St. Louis
442	1548	Monitoring	0.013121	MN210	226	St. Louis
443	1295	Monitoring	0.013088	US53	21	St. Louis
444	207	Monitoring	0.013076	MN1	267	St. Louis
445	1417	Monitoring	0.013067	MN33	9	St. Louis
446	49	Monitoring	0.013018	MN1	285	St. Louis
447	781	Monitoring	0.012833	MN37	6	St. Louis
448	682	Monitoring	0.01281	US53	61	St. Louis
449	201	Monitoring	0.012714	MN1	268	St. Louis
450	922	Monitoring	0.012542	US53	46	St. Louis
451	76	Monitoring	0.012444	US53	99	St. Louis
452	538	Monitoring	0.011896	MN135	19	St. Louis
453	489	Monitoring	0.011862	US53	72	St. Louis
454	513	Monitoring	0.011742	MN135	18	St. Louis
455	1437	Monitoring	0.011734	MN33	9	St. Louis
456	332	Monitoring	0.011658	MN135	35	St. Louis
457	719	Monitoring	0.011654	US169	344	St. Louis
458	350	Monitoring	0.0116	MN73	105	St. Louis
459	1406	Monitoring	0.011549	MN61	2	St. Louis
460	186	Monitoring	0.011491	MN1	269	St. Louis
461	1363	Monitoring	0.011489	MN61	6	St. Louis
462	778	Monitoring	0.011433	US169	337	St. Louis
463	263	Monitoring	0.011302	MN1	258	St. Louis
464	127	Monitoring	0.01128	MN1	278	St. Louis
465	622	Monitoring	0.011279	US169	358	St. Louis
466	123	Monitoring	0.011217	MN1	277	St. Louis
467	2669	Monitoring	0.011156	MN135	35	St. Louis
468	554	Monitoring	0.011107	US53	68	St. Louis
469	2133	Monitoring	0.01097	US53	122	St. Louis
470	356	Monitoring	0.010925	MN73	104	St. Louis
471	36	Monitoring	0.010885	US53	104	St. Louis
472	1578	Monitoring	0.010821	MN23	335	St. Louis
473	895	Monitoring	0.010653	US53	49	St. Louis
474	621	Monitoring	0.010608	MN135	5	St. Louis
475	4135	Monitoring	0.010554	I35	251	St. Louis
476	601	Monitoring	0.010527	MN73	90	St. Louis
477	1431	Monitoring	0.010494	US2	252	St. Louis
478	1515	Monitoring	0.010488	MN23	344	St. Louis
479	540	Monitoring	0.010445	MN135	19	St. Louis
480	1373	Monitoring	0.010366	US2	233	St. Louis
481	1307	Monitoring	0.010173	US53	20	St. Louis
482	992	Monitoring	0.0101	MN73	65	St. Louis
483	677	Monitoring	0.0101	US169	349	St. Louis

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
484	1201	Monitoring	0.010075	US53	29	St. Louis
485	4220	Monitoring	0.010026	MN23	340	St. Louis
486	584	Monitoring	0.010024	MN135	14	St. Louis
487	701	Monitoring	0.00996	US169	348	St. Louis
488	592	Monitoring	0.009928	US169	361	St. Louis
489	2712	Monitoring	0.009867	US53	82	St. Louis
490	1550	Monitoring	0.009787	MN23	341	St. Louis
491	4217	Monitoring	0.009745	MN210	226	St. Louis
492	1293	Monitoring	0.009606	US53	21	St. Louis
493	4132	Monitoring	0.009576	I35	251	St. Louis
494	2989	Monitoring	0.009551	MN135	14	St. Louis
495	2972	Monitoring	0.009441	US53	67	St. Louis
496	565	Monitoring	0.009384	MN135	16	St. Louis
497	108	Monitoring	0.009343	MN1	280	St. Louis
498	112	Monitoring	0.009342	MN1	280	St. Louis
499	665	Monitoring	0.009307	US53	62	St. Louis
500	1472	Monitoring	0.009292	US53	3	St. Louis
501	2960	Monitoring	0.009213	US53	67	St. Louis
502	1369	Monitoring	0.009159	US2	241	St. Louis
503	2975	Monitoring	0.009102	MN135	17	St. Louis
504	690	Monitoring	0.009091	US169	345	St. Louis
505	800	Monitoring	0.009048	MN37	3	St. Louis
506	1247	Monitoring	0.009012	MN73	45	St. Louis
507	2204	Monitoring	0.008915	US53	107	St. Louis
508	723	Monitoring	0.008897	US169	344	St. Louis
509	4087	Monitoring	0.008887	MN194	16	St. Louis
510	949	Monitoring	0.008881	US53	46	St. Louis
511	619	Monitoring	0.008793	MN135	6	St. Louis
512	1402	Monitoring	0.008791	MN33	9	St. Louis
513	2150	Monitoring	0.008787	US53	116	St. Louis
514	1370	Monitoring	0.008575	US53	7	St. Louis
515	1375	Monitoring	0.008364	MN61	5	St. Louis
516	395	Monitoring	0.008275	MN169	377	St. Louis
517	750	Monitoring	0.008185	US169	341	St. Louis
518	669	Monitoring	0.008183	US169	347	St. Louis
519	1354	Monitoring	0.008174	US2	227	St. Louis
520	1444	Monitoring	0.008111	US2	252	St. Louis
521	4172	Monitoring	0.008102	MN23	343	St. Louis
522	2132	Monitoring	0.008074	US53	124	St. Louis
523	718	Monitoring	0.008006	US169	344	St. Louis
524	1554	Monitoring	0.007997	MN23	341	St. Louis
525	1517	Monitoring	0.00791	MN23	250	St. Louis
526	128	Monitoring	0.007897	MN1	277	St. Louis
527	711	Monitoring	0.007775	MN37	25	St. Louis

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
528	144	Monitoring	0.007697	MN1	275	St. Louis
529	466	Monitoring	0.00767	MN73	98	St. Louis
530	1551	Monitoring	0.007606	MN23	341	St. Louis
531	1436	Monitoring	0.007576	MN33	9	St. Louis
532	1365	Monitoring	0.007537	US2	241	St. Louis
533	5668	Monitoring	0.007513	MN135	17	St. Louis
534	139	Monitoring	0.007509	MN1	276	St. Louis
535	795	Monitoring	0.007489	US169	333	St. Louis
536	617	Monitoring	0.007376	US169	357	St. Louis
537	650	Monitoring	0.007363	MN135	5	St. Louis
538	371	Monitoring	0.007363	US53	80	St. Louis
539	1477	Monitoring	0.007353	US53	3	St. Louis
540	792	Monitoring	0.007336	MN37	7	St. Louis
541	670	Monitoring	0.007302	US169	349	St. Louis
542	2453	Monitoring	0.007301	MN1	270	St. Louis
543	71	Monitoring	0.0073	MN169	415	St. Louis
544	4200	Monitoring	0.007291	MN23	342	St. Louis
545	290	Monitoring	0.007271	MN1	246	St. Louis
546	726	Monitoring	0.007209	US169	344	St. Louis
547	636	Monitoring	0.007178	US169	355	St. Louis
548	480	Monitoring	0.007116	MN169	371	St. Louis
549	257	Monitoring	0.007105	MN1	260	St. Louis
550	396	Monitoring	0.007052	US53	77	St. Louis
551	156	Monitoring	0.00703	MN1	230	St. Louis
552	4065	Monitoring	0.006981	MN194	16	St. Louis
553	101	Monitoring	0.006971	MN1	284	St. Louis
554	1274	Monitoring	0.006952	US53	23	St. Louis
555	1393	Monitoring	0.00692	US2	1	St. Louis
556	1458	Monitoring	0.006885	MN194	16	St. Louis
557	194	Monitoring	0.00686	MN1	269	St. Louis
558	4107	Monitoring	0.006847	US53	2	St. Louis
559	256	Monitoring	0.006723	MN135	39	St. Louis
560	4165	Monitoring	0.006664	MN23	343	St. Louis
561	162	Monitoring	0.006594	MN1	229	St. Louis
562	2437	Monitoring	0.006558	MN1	271	St. Louis
563	1500	Monitoring	0.006551	I35	254	St. Louis
564	224	Monitoring	0.006541	MN1	264	St. Louis
565	100	Monitoring	0.006492	MN1	283	St. Louis
566	1421	Monitoring	0.00648	US53	7	St. Louis
567	881	Monitoring	0.006474	US53	49	St. Louis
568	598	Monitoring	0.006464	MN73	90	St. Louis
569	2756	Monitoring	0.006447	US53	80	St. Louis
570	623	Monitoring	0.006443	US169	358	St. Louis
571	704	Monitoring	0.006378	US169	343	St. Louis

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
572	157	Monitoring	0.006377	MN1	220	St. Louis
573	697	Monitoring	0.006374	MN37	26	St. Louis
574	3138	Monitoring	0.006373	MN37	26	St. Louis
575	2658	Monitoring	0.006324	MN135	36	St. Louis
576	674	Monitoring	0.006304	US169	349	St. Louis
577	671	Monitoring	0.006302	US169	352	St. Louis
578	961	Monitoring	0.006268	US53	45	St. Louis
579	1520	Monitoring	0.006256	MN23	344	St. Louis
580	1305	Monitoring	0.006244	US53	21	St. Louis
581	150	Monitoring	0.006237	MN1	275	St. Louis
582	19	Monitoring	0.00623	US53	114	St. Louis
583	1266	Monitoring	0.006224	MN33	18	St. Louis
584	3166	Monitoring	0.006183	US169	344	St. Louis
585	4145	Monitoring	0.006149	I35	250	St. Louis
586	1272	Monitoring	0.006098	MN61	17	St. Louis
587	2157	Monitoring	0.006042	US53	115	St. Louis
588	4059	Monitoring	0.006026	I35	259	St. Louis
589	364	Monitoring	0.006025	MN169	378	St. Louis
590	2153	Monitoring	0.005999	US53	116	St. Louis
591	1461	Monitoring	0.005998	MN194	16	St. Louis
592	627	Monitoring	0.005997	MN135	6	St. Louis
593	4080	Monitoring	0.005997	MN194	16	St. Louis
594	329	Monitoring	0.005993	MN135	35	St. Louis
595	560	Monitoring	0.005984	US53	68	St. Louis
596	4161	Monitoring	0.005974	MN23	343	St. Louis
597	4110	Monitoring	0.005967	US53	3	St. Louis
598	766	Monitoring	0.005931	US53	56	St. Louis
599	4074	Monitoring	0.00589	MN194	16	St. Louis
600	1460	Monitoring	0.005831	MN33	7	St. Louis
601	111	Monitoring	0.005796	MN1	279	St. Louis
602	615	Monitoring	0.005795	MN135	12	St. Louis
603	1308	Monitoring	0.005788	MN33	16	St. Louis
604	1484	Monitoring	0.005787	I535	1	St. Louis
605	2444	Monitoring	0.005762	MN1	272	St. Louis
606	3960	Monitoring	0.005699	US53	15	St. Louis
607	3082	Monitoring	0.005698	US169	352	St. Louis
608	1483	Monitoring	0.005696	I535	1	St. Louis
609	1501	Monitoring	0.005609	I35	252	St. Louis
610	709	Monitoring	0.0056	US169	342	St. Louis
611	4079	Monitoring	0.0056	MN194	16	St. Louis
612	1331	Monitoring	0.005598	US2	239	St. Louis
613	1576	Monitoring	0.00559	MN23	336	St. Louis
614	1020	Monitoring	0.005556	MN73	64	St. Louis
615	229	Monitoring	0.005536	MN1	265	St. Louis

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
616	696	Monitoring	0.005509	US169	348	St. Louis
617	479	Monitoring	0.005487	MN169	372	St. Louis
618	4157	Monitoring	0.005412	I35	250	St. Louis
619	1320	Monitoring	0.005372	US53	18	St. Louis
620	4243	Monitoring	0.005371	MN210	226	St. Louis
621	526	Monitoring	0.005365	US53	69	St. Louis
622	99	Monitoring	0.005349	MN1	284	St. Louis
623	2370	Monitoring	0.005318	MN1	276	St. Louis
624	793	Monitoring	0.005313	MN37	6	St. Louis
625	2442	Monitoring	0.0053	MN1	272	St. Louis
626	1388	Monitoring	0.005277	MN194	3	St. Louis
627	3213	Monitoring	0.005274	US169	336	St. Louis
628	4147	Monitoring	0.005253	MN23	344	St. Louis
629	611	Monitoring	0.005208	MN135	12	St. Louis
630	728	Monitoring	0.005195	US53	24	St. Louis
631	252	Monitoring	0.005193	MN1	263	St. Louis
632	631	Monitoring	0.005183	US169	354	St. Louis
633	686	Monitoring	0.005142	US169	351	St. Louis
634	1311	Monitoring	0.005095	MN61	13	St. Louis
635	2881	Monitoring	0.005085	MN135	24	St. Louis
636	680	Monitoring	0.00506	US169	352	St. Louis
637	803	Monitoring	0.005045	MN37	7	St. Louis
638	3465	Monitoring	0.005006	MN73	66	St. Louis
639	2341	Monitoring	0.004993	MN1	277	St. Louis
640	4176	Monitoring	0.004983	MN23	342	St. Louis
641	1511	Monitoring	0.004966	MN23	345	St. Louis
642	2138	Monitoring	0.004961	US53	120	St. Louis
643	498	Monitoring	0.004925	US53	72	St. Louis
644	4224	Monitoring	0.004921	MN210	226	St. Louis
645	4151	Monitoring	0.0049	MN23	250	St. Louis
646	543	Monitoring	0.004885	US53	68	St. Louis
647	1397	Monitoring	0.004875	US53	8	St. Louis
648	2768	Monitoring	0.004862	MN135	30	St. Louis
649	161	Monitoring	0.00486	MN1	275	St. Louis
650	679	Monitoring	0.004856	US169	348	St. Louis
651	1434	Monitoring	0.004852	I35	259	St. Louis
652	2286	Monitoring	0.004845	MN1	285	St. Louis
653	676	Monitoring	0.004809	US169	348	St. Louis
654	3001	Monitoring	0.004806	US169	362	St. Louis
655	249	Monitoring	0.004797	MN1	260	St. Louis
656	1376	Monitoring	0.004777	US2	230	St. Louis
657	712	Monitoring	0.004762	US169	344	St. Louis
658	110	Monitoring	0.004758	MN1	279	St. Louis
659	4047	Monitoring	0.004752	US53	6	St. Louis

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
660	107	Monitoring	0.004724	MN1	280	St. Louis
661	198	Monitoring	0.00472	US53	90	St. Louis
662	134	Monitoring	0.0047	MN1	276	St. Louis
663	2403	Monitoring	0.004695	MN1	274	St. Louis
664	4141	Monitoring	0.004694	I35	250	St. Louis
665	4206	Monitoring	0.004681	MN23	341	St. Louis
666	390	Monitoring	0.004654	US53	79	St. Louis
667	180	Monitoring	0.004646	MN1	291	St. Louis
668	1046	Monitoring	0.004642	MN73	61	St. Louis
669	2519	Monitoring	0.004637	MN1	266	St. Louis
670	4196	Monitoring	0.00462	MN23	342	St. Louis
671	684	Monitoring	0.004617	MN37	16	St. Louis
672	360	Monitoring	0.004616	MN135	33	St. Louis
673	2439	Monitoring	0.004566	MN1	272	St. Louis
674	2892	Monitoring	0.004562	MN135	23	St. Louis
675	771	Monitoring	0.00456	US53	57	St. Louis
676	94	Monitoring	0.004555	MN1	285	St. Louis
677	553	Monitoring	0.004539	US53	68	St. Louis
678	2427	Monitoring	0.004535	MN1	272	St. Louis
679	934	Monitoring	0.004534	US53	46	St. Louis
680	722	Monitoring	0.004513	US169	342	St. Louis
681	286	Monitoring	0.004512	MN135	37	St. Louis
682	4229	Monitoring	0.004503	MN23	340	St. Louis
683	70	Monitoring	0.004495	MN169	415	St. Louis
684	1383	Monitoring	0.004493	MN61	5	St. Louis
685	732	Monitoring	0.004472	US53	59	St. Louis
686	3501	Monitoring	0.00447	MN73	64	St. Louis
687	880	Monitoring	0.00446	US53	50	St. Louis
688	1313	Monitoring	0.004458	MN61	10	St. Louis
689	628	Monitoring	0.004452	US169	354	St. Louis
690	4184	Monitoring	0.004446	MN23	342	St. Louis
691	1522	Monitoring	0.004439	I35	250	St. Louis
692	4247	Monitoring	0.00443	MN23	339	St. Louis
693	183	Monitoring	0.004422	MN1	272	St. Louis
694	3803	Monitoring	0.004411	US53	27	St. Louis
695	2981	Monitoring	0.004411	MN135	17	St. Louis
696	185	Monitoring	0.0044	MN1	271	St. Louis
697	14	Monitoring	0.004386	US53	116	St. Louis
698	2429	Monitoring	0.004351	MN1	271	St. Louis
699	2597	Monitoring	0.004341	MN1	250	St. Louis
700	1524	Monitoring	0.004326	MN23	343	St. Louis
701	1525	Monitoring	0.004325	MN23	343	St. Louis
702	2278	Monitoring	0.004325	US53	99	St. Louis
703	2885	Monitoring	0.004311	MN135	24	St. Louis

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
704	4194	Monitoring	0.004302	MN23	342	St. Louis
705	318	Monitoring	0.004277	US53	86	St. Louis
706	731	Monitoring	0.004277	US169	344	St. Louis
707	9	Monitoring	0.00426	US53	121	St. Louis
708	2413	Monitoring	0.004254	MN1	273	St. Louis
709	1492	Monitoring	0.004229	I535	0	St. Louis
710	148	Monitoring	0.00422	MN1	220	St. Louis
711	717	Monitoring	0.004216	US169	344	St. Louis
712	2161	Monitoring	0.004211	US53	115	St. Louis
713	276	Monitoring	0.004198	MN1	250	St. Louis
714	381	Monitoring	0.004192	US53	80	St. Louis
715	4227	Monitoring	0.00418	MN210	227	St. Louis
716	179	Monitoring	0.004179	MN1	271	St. Louis
717	3028	Monitoring	0.004165	US53	63	St. Louis
718	2168	Monitoring	0.004157	US53	114	St. Louis
719	4113	Monitoring	0.004153	US53	2	St. Louis
720	2129	Monitoring	0.004136	US53	124	St. Louis
721	3958	Monitoring	0.00413	US53	15	St. Louis
722	1342	Monitoring	0.004124	US2	226	St. Louis
723	568	Monitoring	0.004113	MN135	16	St. Louis
724	4111	Monitoring	0.004103	US53	3	St. Louis
725	4062	Monitoring	0.004085	MN194	15	St. Louis
726	1464	Monitoring	0.004081	US53	4	St. Louis
727	4171	Monitoring	0.004079	MN23	343	St. Louis
728	1396	Monitoring	0.004064	US2	248	St. Louis
729	4143	Monitoring	0.004027	I35	249	St. Louis
730	1280	Monitoring	0.004027	US53	22	St. Louis
731	3039	Monitoring	0.00402	US53	63	St. Louis
732	4048	Monitoring	0.003994	US53	13	St. Louis
733	2411	Monitoring	0.003989	MN1	273	St. Louis
734	279	Monitoring	0.003988	MN1	250	St. Louis
735	160	Monitoring	0.003983	MN1	271	St. Louis
736	4240	Monitoring	0.003961	MN23	337	St. Louis
737	3089	Monitoring	0.003957	US53	62	St. Louis
738	2454	Monitoring	0.003938	MN1	270	St. Louis
739	2887	Monitoring	0.00392	MN135	24	St. Louis
740	768	Monitoring	0.003916	US53	57	St. Louis
741	1185	Monitoring	0.003915	US53	29	St. Louis
742	3056	Monitoring	0.003904	MN135	3	St. Louis
743	4208	Monitoring	0.003892	MN23	341	St. Louis
744	786	Monitoring	0.003884	MN37	6	St. Louis
745	725	Monitoring	0.003865	US53	24	St. Louis
746	4232	Monitoring	0.003837	MN210	227	St. Louis
747	2159	Monitoring	0.003816	US53	115	St. Louis

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
748	642	Monitoring	0.003815	US53	3	St. Louis
749	1416	Monitoring	0.00381	MN33	9	St. Louis
750	2127	Monitoring	0.003799	US53	126	St. Louis
751	4012	Monitoring	0.003781	MN61	5	St. Louis
752	3065	Monitoring	0.003779	US169	353	St. Louis
753	2963	Monitoring	0.003776	MN135	15	St. Louis
754	3035	Monitoring	0.00376	US53	63	St. Louis
755	2515	Monitoring	0.00374	MN1	266	St. Louis
756	4146	Monitoring	0.003733	I35	249	St. Louis
757	3217	Monitoring	0.003699	US169	336	St. Louis
758	3121	Monitoring	0.003689	US169	346	St. Louis
759	3047	Monitoring	0.003675	US53	64	St. Louis
760	4060	Monitoring	0.003645	I35	258	St. Louis
761	1432	Monitoring	0.003635	US53	6	St. Louis
762	87	Monitoring	0.003618	MN169	413	St. Louis
763	2364	Monitoring	0.003615	MN1	220	St. Louis
764	586	Monitoring	0.003591	MN135	14	St. Louis
765	147	Monitoring	0.003572	MN1	228	St. Louis
766	4019	Monitoring	0.003562	US2	248	St. Louis
767	4076	Monitoring	0.003553	MN194	4	St. Louis
768	141	Monitoring	0.00353	MN1	225	St. Louis
769	1282	Monitoring	0.003525	MN61	16	St. Louis
770	3349	Monitoring	0.003505	US53	49	St. Louis
771	672	Monitoring	0.003488	US169	348	St. Louis
772	2520	Monitoring	0.003488	MN1	264	St. Louis
773	3076	Monitoring	0.003477	US169	353	St. Louis
774	501	Monitoring	0.003452	US53	72	St. Louis
775	4136	Monitoring	0.003431	US2	260	St. Louis
776	1291	Monitoring	0.003399	MN61	15	St. Louis
777	1301	Monitoring	0.003358	US53	21	St. Louis
778	4168	Monitoring	0.003341	MN23	342	St. Louis
779	4155	Monitoring	0.003309	I35	249	St. Louis
780	4201	Monitoring	0.003288	MN23	342	St. Louis
781	4018	Monitoring	0.003286	US2	248	St. Louis
782	2524	Monitoring	0.003282	MN1	263	St. Louis
783	3183	Monitoring	0.003273	US53	59	St. Louis
784	3238	Monitoring	0.003264	MN37	6	St. Louis
785	4083	Monitoring	0.003236	MN194	16	St. Louis
786	4021	Monitoring	0.003222	MN61	3	St. Louis
787	2140	Monitoring	0.003207	US53	119	St. Louis
788	588	Monitoring	0.003202	US169	360	St. Louis
789	2997	Monitoring	0.003202	US169	361	St. Louis
790	4175	Monitoring	0.003188	MN23	342	St. Louis
791	4191	Monitoring	0.003176	MN23	342	St. Louis

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
792	4015	Monitoring	0.003153	US53	9	St. Louis
793	3216	Monitoring	0.00314	US169	333	St. Louis
794	4033	Monitoring	0.003137	US53	7	St. Louis
795	2479	Monitoring	0.003134	MN1	269	St. Louis
796	3066	Monitoring	0.003132	MN135	7	St. Louis
797	3225	Monitoring	0.003128	US169	336	St. Louis
798	2128	Monitoring	0.003112	US53	124	St. Louis
799	3998	Monitoring	0.003105	US2	0	St. Louis
800	4112	Monitoring	0.003104	US53	2	St. Louis
801	1356	Monitoring	0.003085	MN61	7	St. Louis
802	4235	Monitoring	0.003072	MN210	226	St. Louis
803	4105	Monitoring	0.00307	US53	3	St. Louis
804	2425	Monitoring	0.003054	MN1	272	St. Louis
805	1359	Monitoring	0.003049	US2	239	St. Louis
806	55	Monitoring	0.003048	MN169	415	St. Louis
807	547	Monitoring	0.003044	US53	68	St. Louis
808	4071	Monitoring	0.003038	US53	5	St. Louis
809	17	Monitoring	0.003038	US53	113	St. Louis
810	2282	Monitoring	0.003035	MN169	413	St. Louis
811	2550	Monitoring	0.003027	MN1	261	St. Louis
812	2754	Monitoring	0.003008	US53	80	St. Louis
813	4137	Monitoring	0.002994	US2	264	St. Louis
814	2500	Monitoring	0.002993	MN1	268	St. Louis
815	2134	Monitoring	0.002976	US53	121	St. Louis
816	2679	Monitoring	0.002968	MN73	106	St. Louis
817	1539	Monitoring	0.002914	I35	245	St. Louis
818	1	Monitoring	0.002886	US53	135	St. Louis
819	2482	Monitoring	0.002883	MN1	269	St. Louis
820	3136	Monitoring	0.002869	US53	61	St. Louis
821	3997	Monitoring	0.002869	US2	246	St. Louis
822	2974	Monitoring	0.002865	MN135	15	St. Louis
823	3223	Monitoring	0.002858	MN37	6	St. Louis
824	4189	Monitoring	0.002853	MN23	342	St. Louis
825	16	Monitoring	0.00284	US53	115	St. Louis
826	4057	Monitoring	0.002833	MN194	14	St. Louis
827	734	Monitoring	0.002822	US169	343	St. Louis
828	4008	Monitoring	0.002819	US2	246	St. Louis
829	4022	Monitoring	0.002809	MN61	3	St. Louis
830	2424	Monitoring	0.002808	MN1	272	St. Louis
831	1032	Monitoring	0.002806	US53	39	St. Louis
832	2397	Monitoring	0.002804	MN1	275	St. Louis
833	4101	Monitoring	0.002797	US53	3	St. Louis
834	2419	Monitoring	0.002784	MN1	273	St. Louis
835	109	Monitoring	0.002769	MN1	283	St. Louis

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
836	3071	Monitoring	0.002766	US53	3	St. Louis
837	488	Monitoring	0.002734	MN73	97	St. Louis
838	535	Monitoring	0.002731	US53	69	St. Louis
839	2324	Monitoring	0.002731	MN1	278	St. Louis
840	3042	Monitoring	0.002715	US53	63	St. Louis
841	3194	Monitoring	0.002713	US53	57	St. Louis
842	1281	Monitoring	0.002703	US2	220	St. Louis
843	2869	Monitoring	0.002694	MN73	97	St. Louis
844	2287	Monitoring	0.002692	MN1	285	St. Louis
845	2192	Monitoring	0.00269	US53	108	St. Louis
846	769	Monitoring	0.00269	US53	57	St. Louis
847	3218	Monitoring	0.002685	US169	333	St. Louis
848	3124	Monitoring	0.002682	US169	348	St. Louis
849	4084	Monitoring	0.00268	I35	257	St. Louis
850	2953	Monitoring	0.002667	US53	68	St. Louis
851	4149	Monitoring	0.002654	I35	249	St. Louis
852	4214	Monitoring	0.002645	MN23	341	St. Louis
853	2947	Monitoring	0.002635	US53	68	St. Louis
854	2288	Monitoring	0.00263	MN1	285	St. Louis
855	3981	Monitoring	0.002627	MN61	6	St. Louis
856	4102	Monitoring	0.002626	US53	2	St. Louis
857	4011	Monitoring	0.002623	MN194	4	St. Louis
858	2979	Monitoring	0.002619	MN135	16	St. Louis
859	2284	Monitoring	0.002614	MN169	413	St. Louis
860	4090	Monitoring	0.002607	MN194	16	St. Louis
861	4010	Monitoring	0.002606	MN194	3	St. Louis
862	3059	Monitoring	0.002606	US169	358	St. Louis
863	3519	Monitoring	0.002601	US53	40	St. Louis
864	2280	Monitoring	0.002599	MN1	286	St. Louis
865	2432	Monitoring	0.002594	MN1	271	St. Louis
866	4133	Monitoring	0.002592	I35	251	St. Louis
867	4114	Monitoring	0.002589	US53	3	St. Louis
868	3224	Monitoring	0.002576	US169	335	St. Louis
869	2787	Monitoring	0.002566	US53	79	St. Louis
870	4098	Monitoring	0.002558	MN194	17	St. Louis
871	3219	Monitoring	0.002535	MN37	6	St. Louis
872	4169	Monitoring	0.002532	MN23	342	St. Louis
873	3112	Monitoring	0.002525	US169	347	St. Louis
874	3008	Monitoring	0.002508	US169	362	St. Louis
875	4088	Monitoring	0.002498	MN194	16	St. Louis
876	4178	Monitoring	0.002483	MN23	342	St. Louis
877	2339	Monitoring	0.002483	MN1	277	St. Louis
878	4066	Monitoring	0.00247	US2	252	St. Louis
879	4125	Monitoring	0.002464	I35	251	St. Louis

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
880	2178	Monitoring	0.002449	US53	109	St. Louis
881	2955	Monitoring	0.002445	US53	67	St. Louis
882	4030	Monitoring	0.002445	US2	249	St. Louis
883	3971	Monitoring	0.002441	US53	15	St. Louis
884	4097	Monitoring	0.002432	MN194	17	St. Louis
885	2591	Monitoring	0.002432	MN1	256	St. Louis
886	4128	Monitoring	0.002432	US2	253	St. Louis
887	2272	Monitoring	0.002425	MN1	285	St. Louis
888	3920	Monitoring	0.002424	US2	219	St. Louis
889	4202	Monitoring	0.002424	MN23	342	St. Louis
890	3061	Monitoring	0.002422	US169	353	St. Louis
891	391	Monitoring	0.00242	MN135	30	St. Louis
892	2170	Monitoring	0.002416	US53	113	St. Louis
893	302	Monitoring	0.00241	MN169	384	St. Louis
894	4108	Monitoring	0.002407	US53	2	St. Louis
895	4153	Monitoring	0.002405	I35	250	St. Louis
896	3237	Monitoring	0.002401	US169	333	St. Louis
897	4014	Monitoring	0.002391	US53	9	St. Louis
898	3938	Monitoring	0.002391	US53	21	St. Louis
899	4230	Monitoring	0.00239	MN23	340	St. Louis
900	4086	Monitoring	0.002381	US53	4	St. Louis
901	2176	Monitoring	0.002376	US53	110	St. Louis
902	2668	Monitoring	0.002363	MN135	35	St. Louis
903	2171	Monitoring	0.002357	US53	112	St. Louis
904	3200	Monitoring	0.00235	US169	340	St. Louis
905	4118	Monitoring	0.002344	I35	1	St. Louis
906	3175	Monitoring	0.002344	US53	59	St. Louis
907	3226	Monitoring	0.002342	US169	338	St. Louis
908	3941	Monitoring	0.00234	US53	20	St. Louis
909	2443	Monitoring	0.00234	MN1	270	St. Louis
910	2164	Monitoring	0.002336	US53	114	St. Louis
911	4104	Monitoring	0.002334	US53	2	St. Louis
912	3494	Monitoring	0.002325	MN73	64	St. Louis
913	3108	Monitoring	0.002324	US169	350	St. Louis
914	3004	Monitoring	0.002322	US169	361	St. Louis
915	4138	Monitoring	0.002322	US2	251	St. Louis
916	4093	Monitoring	0.002321	US2	254	St. Louis
917	4263	Monitoring	0.002317	MN23	338	St. Louis
918	4034	Monitoring	0.002314	MN61	2	St. Louis
919	4067	Monitoring	0.002309	MN194	15	St. Louis
920	2174	Monitoring	0.002308	US53	111	St. Louis
921	4123	Monitoring	0.002306	US2	263	St. Louis
922	4192	Monitoring	0.002305	I35	245	St. Louis
923	2175	Monitoring	0.002295	US53	111	St. Louis

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
924	3119	Monitoring	0.002293	US53	61	St. Louis
925	2992	Monitoring	0.002291	US169	361	St. Louis
926	4144	Monitoring	0.002287	I35	250	St. Louis
927	4231	Monitoring	0.002278	MN23	340	St. Louis
928	2141	Monitoring	0.002277	US53	119	St. Louis
929	570	Monitoring	0.002277	US53	67	St. Louis
930	3095	Monitoring	0.002277	MN135	8	St. Louis
931	3150	Monitoring	0.002268	US169	345	St. Louis
932	4124	Monitoring	0.00226	I35	253	St. Louis
933	4126	Monitoring	0.002258	I35	252	St. Louis
934	2283	Monitoring	0.002248	MN1	284	St. Louis
935	2306	Monitoring	0.002246	US53	97	St. Louis
936	4091	Monitoring	0.002246	US53	4	St. Louis
937	4197	Monitoring	0.002237	MN23	342	St. Louis
938	4122	Monitoring	0.002234	I35	252	St. Louis
939	2801	Monitoring	0.002227	US53	76	St. Louis
940	3178	Monitoring	0.002223	US169	342	St. Louis
941	2271	Monitoring	0.002222	MN1	285	St. Louis
942	4078	Monitoring	0.002212	MN73	34	St. Louis
943	2748	Monitoring	0.00219	US53	80	St. Louis
944	3009	Monitoring	0.002189	US169	361	St. Louis
945	3497	Monitoring	0.002183	MN73	64	St. Louis
946	3999	Monitoring	0.002178	MN61	5	St. Louis
947	3128	Monitoring	0.002176	US169	348	St. Louis
948	3206	Monitoring	0.002172	US169	340	St. Louis
949	3996	Monitoring	0.002169	US2	246	St. Louis
950	3898	Monitoring	0.002169	MN73	45	St. Louis
951	3149	Monitoring	0.002168	US53	61	St. Louis
952	4109	Monitoring	0.002164	US53	2	St. Louis
953	3098	Monitoring	0.00215	US53	62	St. Louis
954	7020	Monitoring	0.002148	MN194	17	St. Louis
955	4207	Monitoring	0.002147	MN23	341	St. Louis
956	3078	Monitoring	0.002141	US169	355	St. Louis
957	2770	Monitoring	0.002135	US53	79	St. Louis
958	4099	Monitoring	0.00213	MN194	17	St. Louis
959	2703	Monitoring	0.002114	US53	82	St. Louis
960	4142	Monitoring	0.002111	I35	249	St. Louis
961	4025	Monitoring	0.002111	MN61	2	St. Louis
962	3199	Monitoring	0.002087	US169	340	St. Louis
963	2607	Monitoring	0.002087	US53	87	St. Louis
964	3137	Monitoring	0.002085	MN37	25	St. Louis
965	2281	Monitoring	0.002085	MN169	413	St. Louis
966	2163	Monitoring	0.002084	US53	114	St. Louis
967	4082	Monitoring	0.002075	MN194	16	St. Louis

Rank	ID	Action	Area (mi^2)	TH	Ref.	County
968	3190	Monitoring	0.002075	US53	58	St. Louis
969	4255	Monitoring	0.002065	MN23	0	St. Louis
970	4068	Monitoring	0.002051	MN194	15	St. Louis
971	3145	Monitoring	0.002047	MN37	27	St. Louis
972	3126	Monitoring	0.002045	US53	61	St. Louis
973	2796	Monitoring	0.002043	US53	78	St. Louis
974	3965	Monitoring	0.002041	US53	15	St. Louis
975	3988	Monitoring	0.002039	US2	240	St. Louis
976	2401	Monitoring	0.002037	MN1	275	St. Louis
977	4140	Monitoring	0.00203	I35	250	St. Louis
978	2489	Monitoring	0.002024	MN1	293	St. Louis
979	2958	Monitoring	0.002024	US53	67	St. Louis
980	2268	Monitoring	0.00202	MN169	414	St. Louis
981	4056	Monitoring	0.00202	I35	259	St. Louis
982	2936	Monitoring	0.002017	US53	68	St. Louis
983	2966	Monitoring	0.002012	MN135	14	St. Louis
984	4063	Monitoring	0.002012	US2	252	St. Louis
985	3072	Monitoring	0.00201	MN135	7	St. Louis
986	4042	Monitoring	0.002004	US53	7	St. Louis
987	3010	Monitoring	0.001998	US169	360	St. Louis
988	3182	Monitoring	0.001995	US169	342	St. Louis
989	4095	Monitoring	0.001994	US53	4	St. Louis
990	5745	Monitoring	0.001699	US53	63	St. Louis
991	7013	Monitoring	0.00133	MN194	257	St. Louis
992	7228	Monitoring	0.001166	MN210	227	St. Louis
993	7069	Monitoring	0.001151	US2	260	St. Louis
994	5071	Monitoring	0.00102	MN1	272	St. Louis
995	4884	Monitoring	0.000717	MN1	284	St. Louis
996	5086	Monitoring	0.000604	MN1	270	St. Louis
997	7059	Monitoring	0.000519	I35	263	St. Louis
998	7063	Monitoring	0.000347	I35	253	St. Louis
999	7082	Monitoring	0.000347	MN23	344	St. Louis
1000	4880	Monitoring	0.000347	US53	99	St. Louis
1001	5805	Monitoring	0.000347	MN135	4	St. Louis
1002	7227	Monitoring	0.000321	MN210	227	St. Louis
1003	7060	Monitoring	0.000315	I35	263	St. Louis
1004	7065	Monitoring	0.000223	I35	252	St. Louis
1005	6021	Monitoring	0.000217	US169	343	St. Louis
1006	7233	Monitoring	0.000177	MN210	227	St. Louis
1007	6921	Monitoring	0.000176	US53	16	St. Louis
1008	5755	Monitoring	0.000147	US53	63	St. Louis