

# CREP Prioritization: Mapping Sediment Loading Risk in the Saginaw Bay Basin

## Background

Michigan State University Extension (MSUE) is collaborating with the State of Michigan and local stakeholders to re-establish the Conservation Reserve Enhancement Program (CREP) in Michigan. To aid in prioritizing lands eligible for CREP enrollment, the Institute of Water Research (IWR) at MSU developed township-scale maps of sediment loading risk for the Saginaw Bay basin. This book organizes those maps at the township scale.

## Data

The maps are based upon data from the United States Geological Survey's (USGS) SPATIally Referenced Regression On Watershed attributes (SPARROW) model\*. The model uses observations, land use characteristics, and statistical relationships, among other variables, to estimate pollutant loads to streams and rivers. The data in this map book represents incremental sediment load contribution for each small catchment in the basin (see image at right), i.e. the amount of sediment load that originated in a particular area (not the total, accumulated amount moving through the stream in that area).

## Contacts

Please direct questions about MSUE's project to:

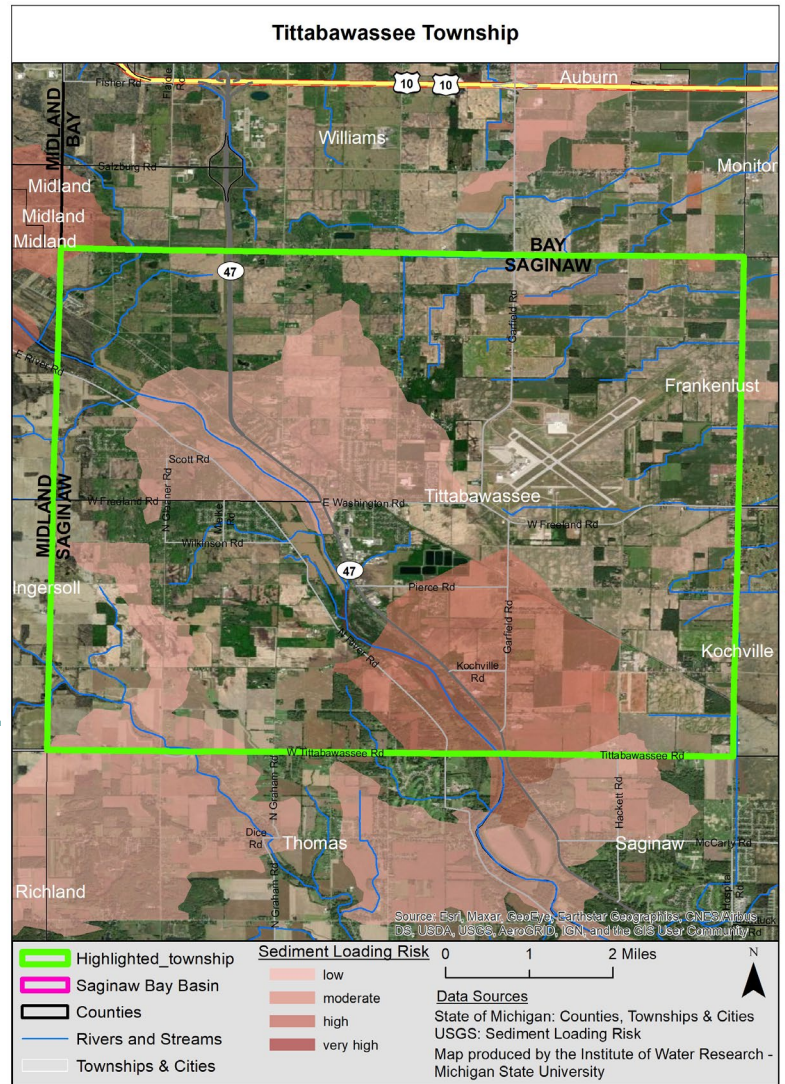
**Sarah Fronczak**

Environmental Management Educator  
Michigan State University Extension  
[froncz3@msu.edu](mailto:froncz3@msu.edu)

Please use the URL below to learn more about the SPARROW model, and direct questions about the maps to:

**Glenn O'Neil**

Environmental Scientist  
Institute of Water Research - Michigan State University  
[oneilg@msu.edu](mailto:oneilg@msu.edu)



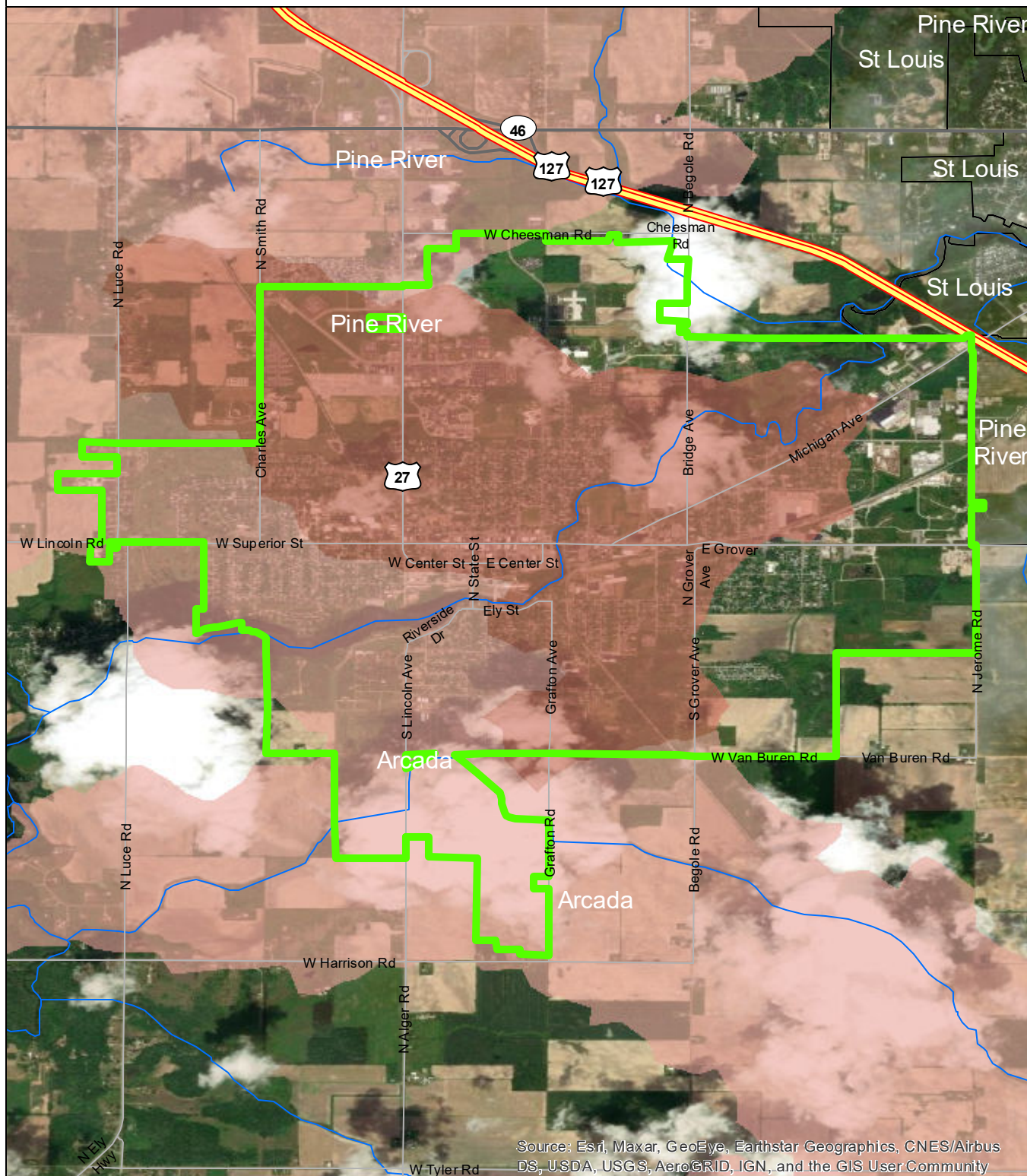
\* <https://www.sciencebase.gov/catalog/item/5cbf5150e4b09b8c0b700df3>

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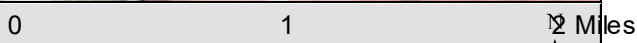
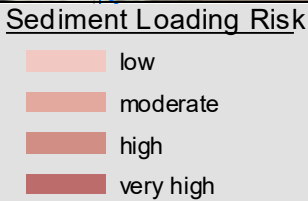
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# City of Alma



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

- City of Alma
- Saginaw Bay Basin
- Counties
- Rivers and Streams
- Townships & Cities

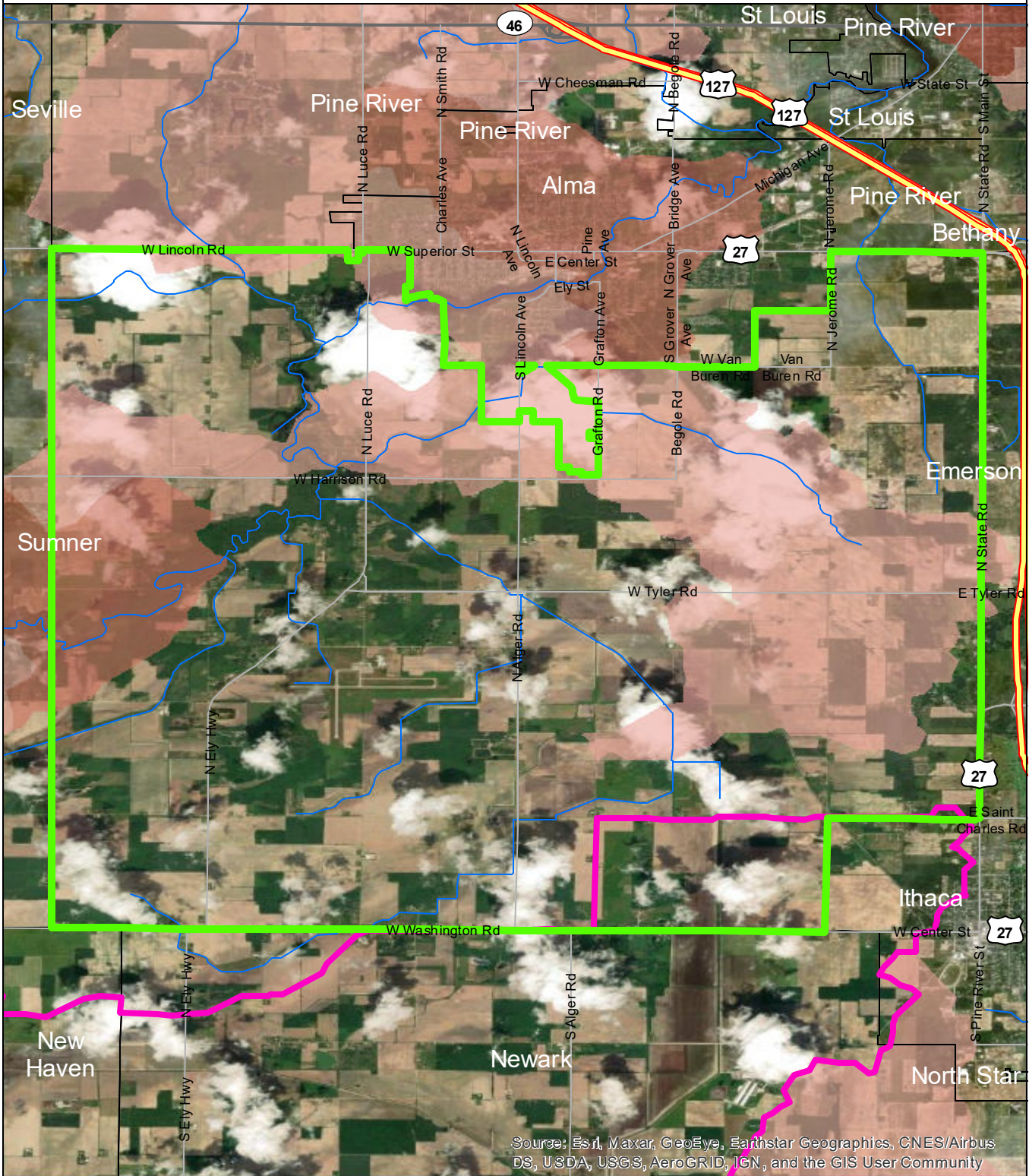


**Data Sources**

State of Michigan: Counties, Townships & Cities  
 USGS: Sediment Loading Risk

Map produced by the Institute of Water Research - Michigan State University

# Arcada Township

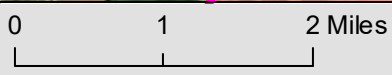


Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

- Arcada Township
- Saginaw Bay Basin
- Counties
- Rivers and Streams
- Townships & Cities

### Sediment Loading Risk

- low
- moderate
- high
- very high

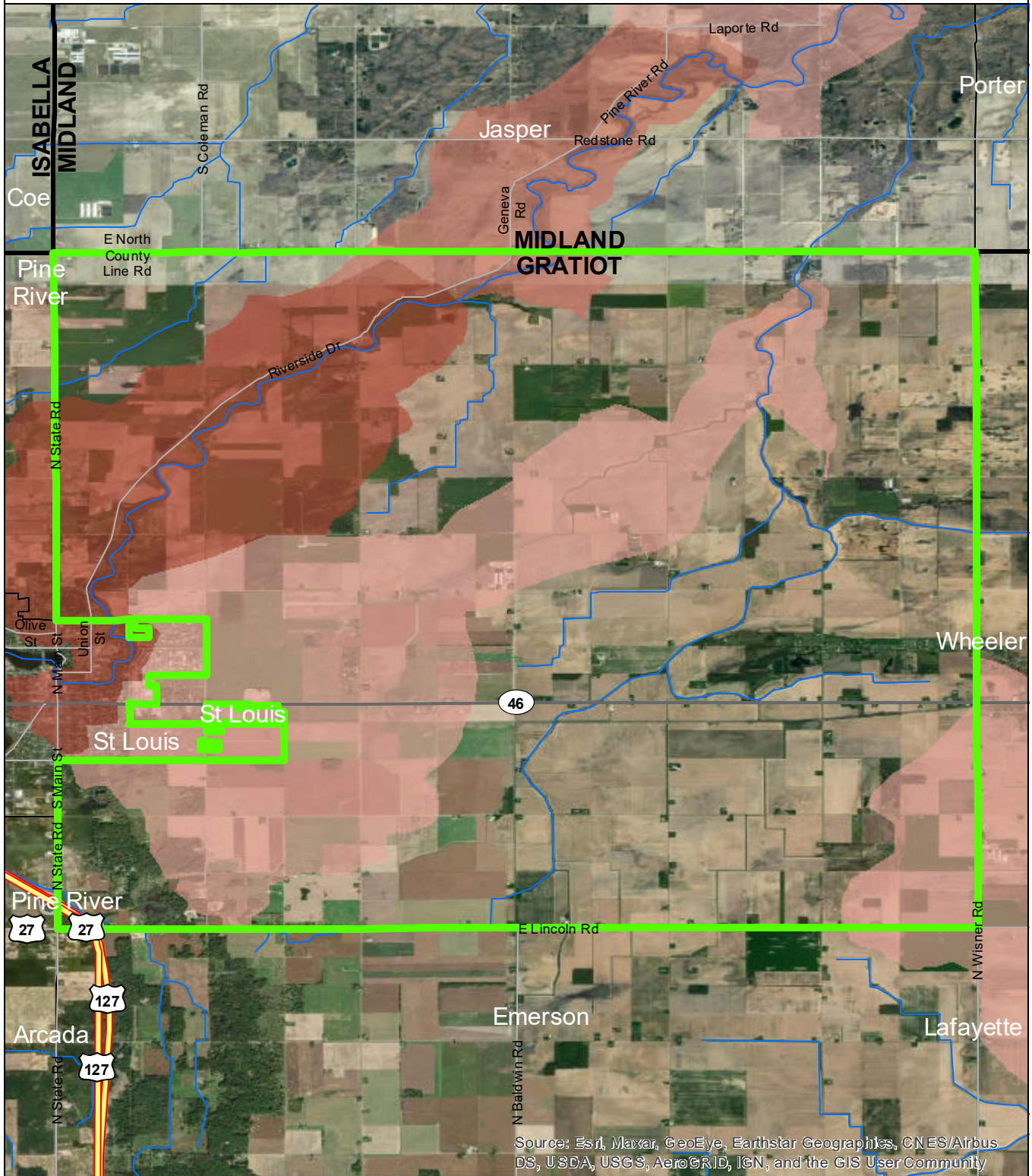


### Data Sources

State of Michigan: Counties, Townships & Cities  
 USGS: Sediment Loading Risk  
 Map produced by the Institute of Water Research - Michigan State University



# Bethany Township

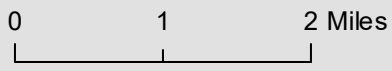


Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

- Bethany Township
- Saginaw Bay Basin
- Counties
- Rivers and Streams
- Townships & Cities

### Sediment Loading Risk

- low
- moderate
- high
- very high



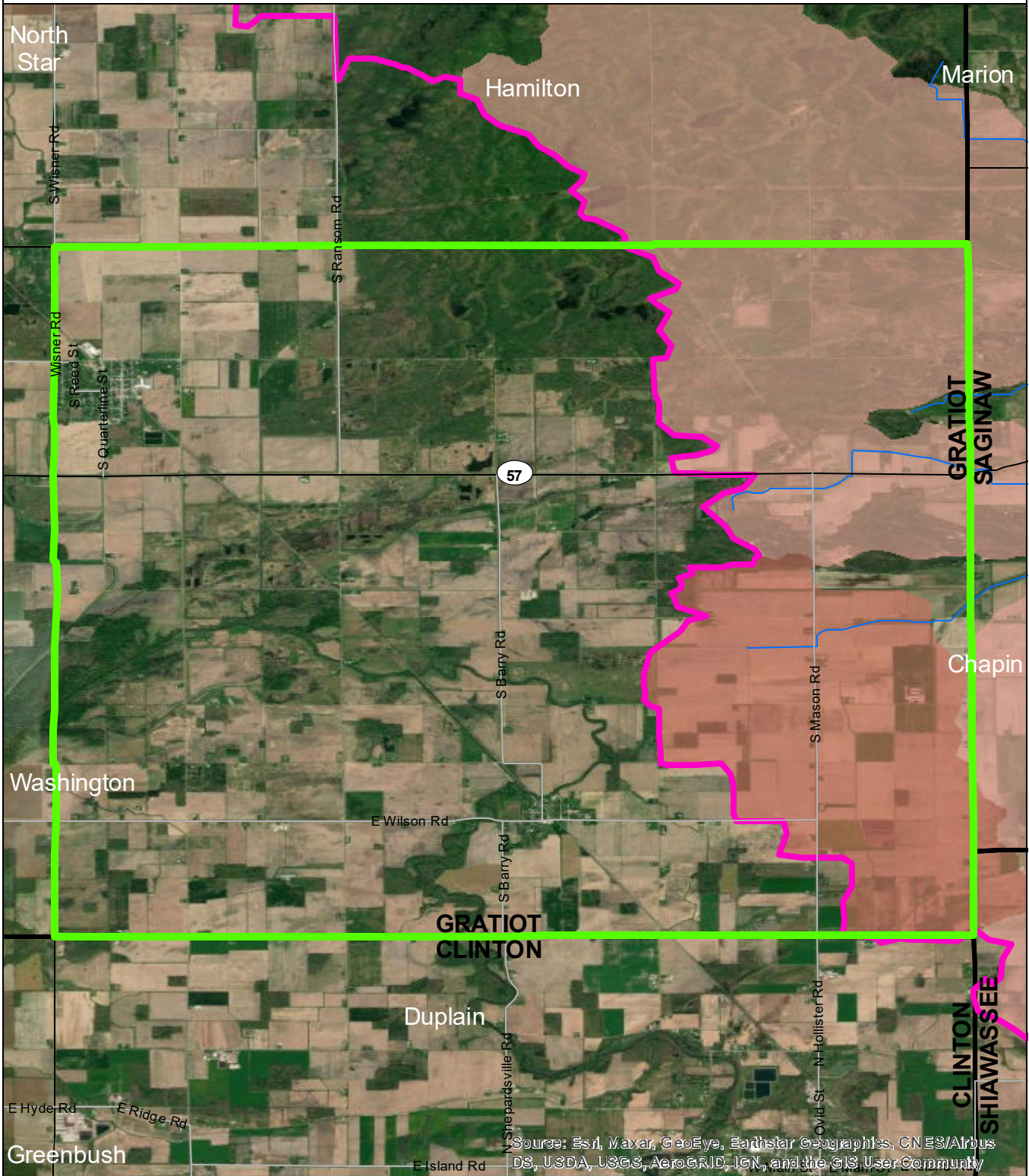
### Data Sources

State of Michigan: Counties, Townships & Cities  
 USGS: Sediment Loading Risk



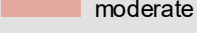
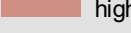







Map produced by the Institute of Water Research - Michigan State University



# Elba Township

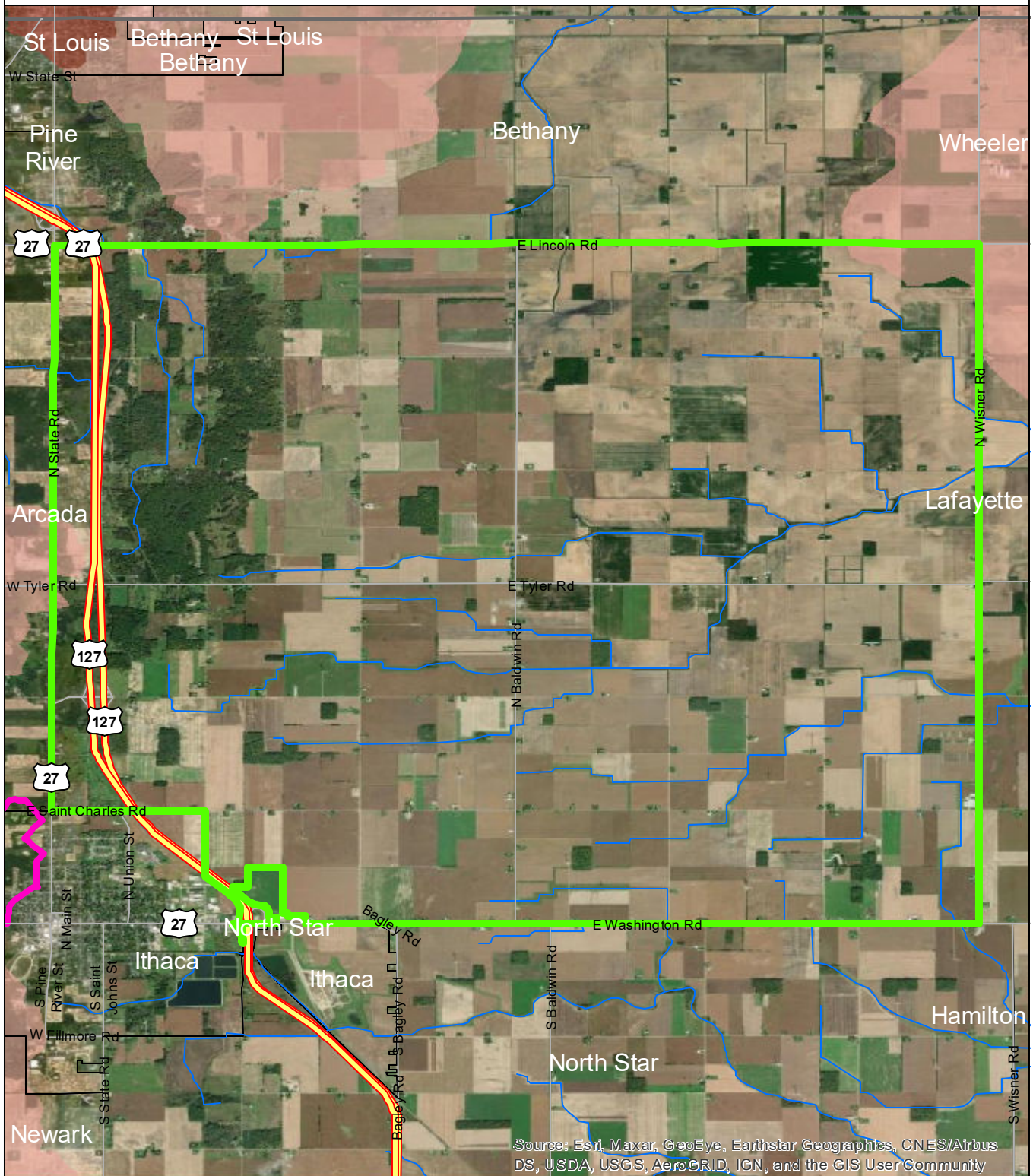


Source: Esri, Maxar, GeoEye, Earthstar Geographics, CN ES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

	Elba Township	<b>Sediment Loading Risk</b>  low  moderate  high  very high	0      1      2 Miles 	N 
	Saginaw Bay Basin			
	Counties			
	Rivers and Streams			
	Townships & Cities			

**Data Sources**  
 State of Michigan: Counties, Townships & Cities  
 USGS: Sediment Loading Risk  
 Map produced by the Institute of Water Research - Michigan State University

# Emerson Township

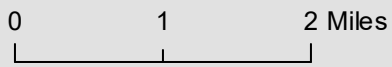


Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

- Emerson Township
- Saginaw Bay Basin
- Counties
- Rivers and Streams
- Townships & Cities

### Sediment Loading Risk

- low
- moderate
- high
- very high



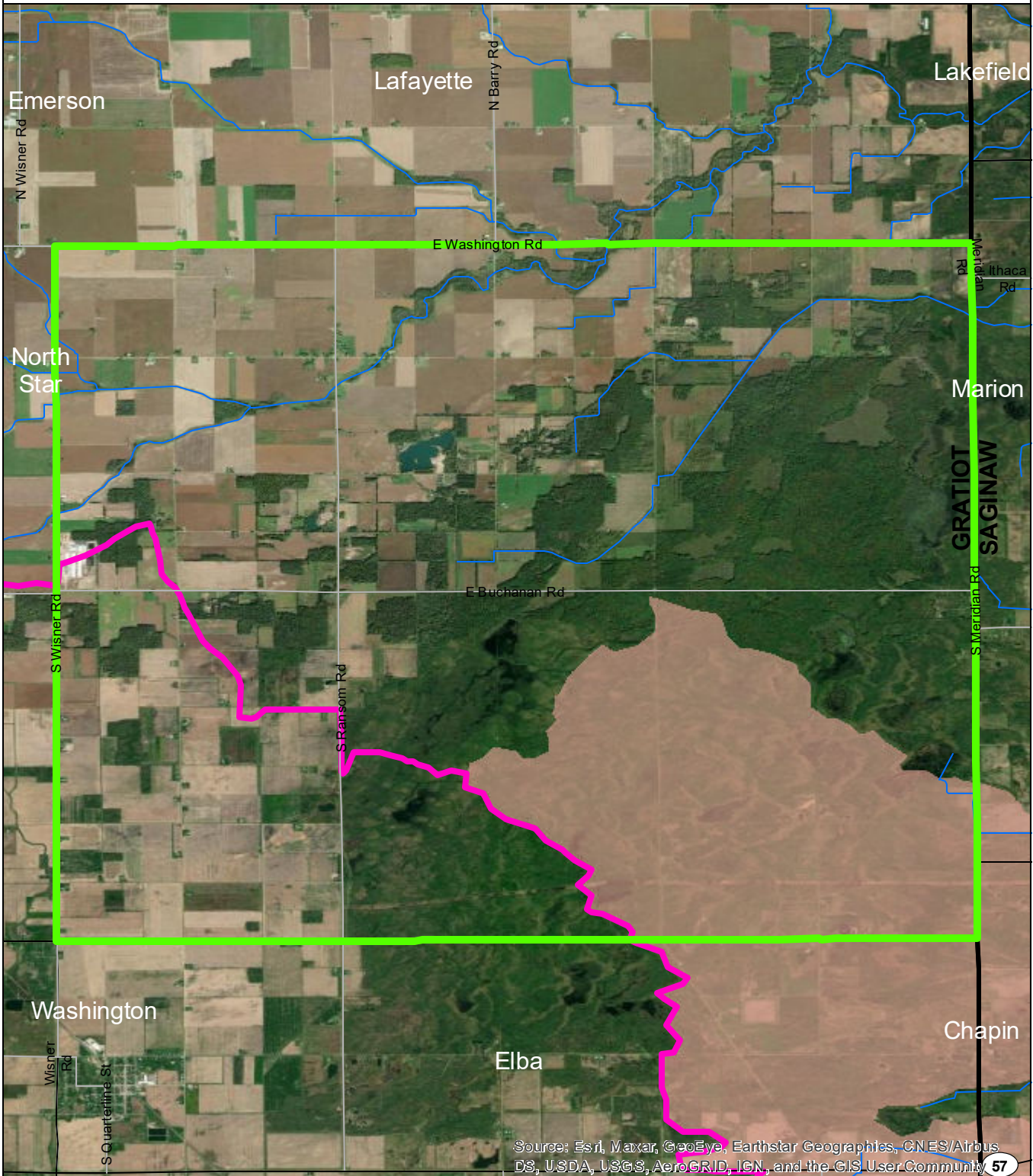
### Data Sources

State of Michigan: Counties, Townships & Cities  
 USGS: Sediment Loading Risk

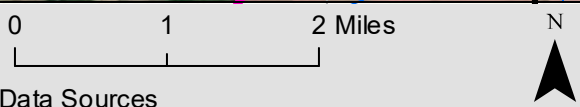
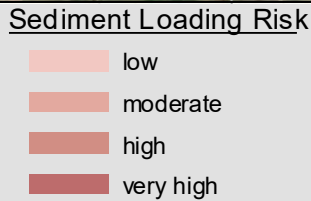
Map produced by the Institute of Water Research - Michigan State University



# Hamilton Township



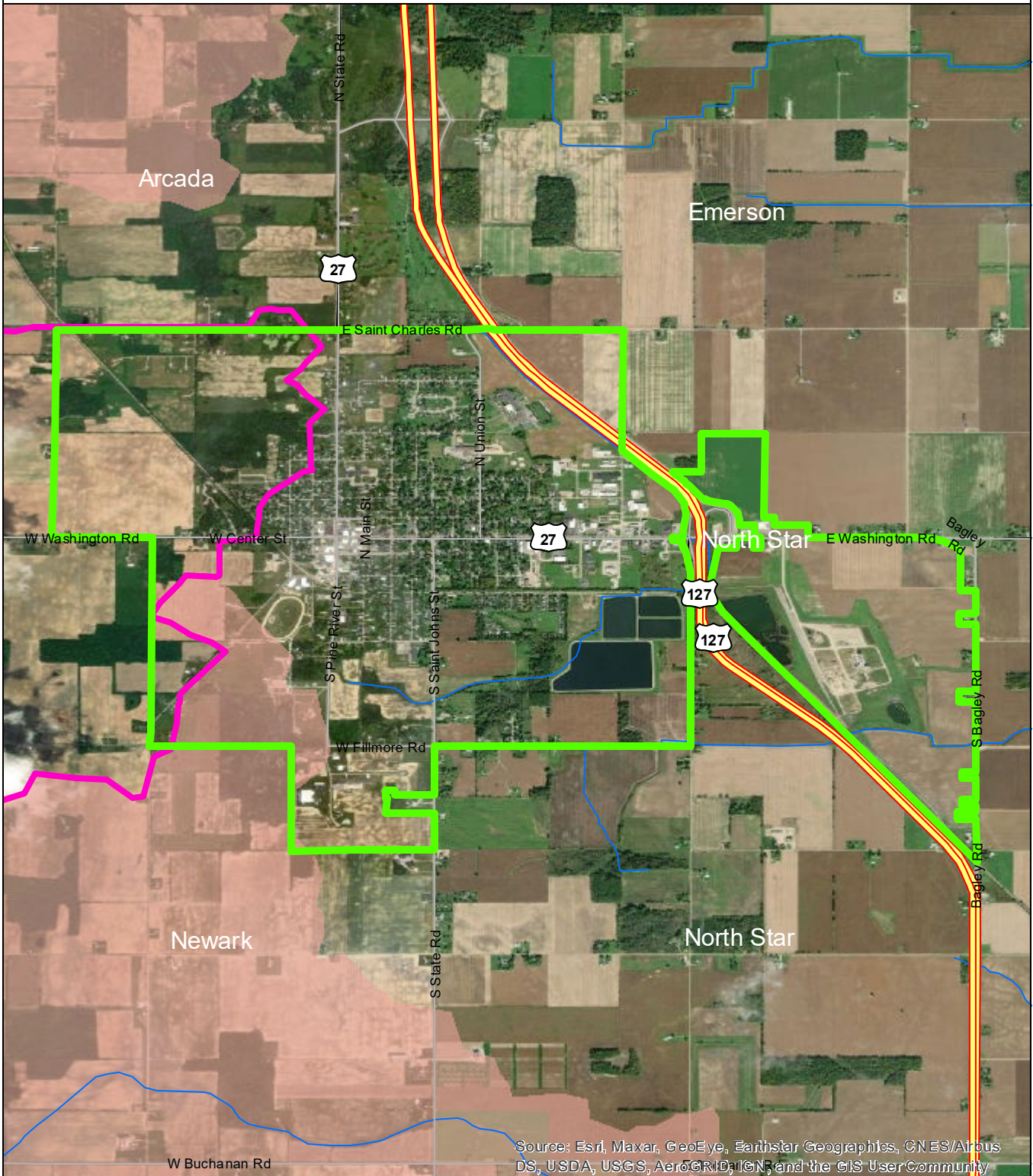
- Hamilton Township
- Saginaw Bay Basin
- Counties
- Rivers and Streams
- Townships & Cities



Data Sources  
 State of Michigan: Counties, Townships & Cities  
 USGS: Sediment Loading Risk  
 Map produced by the Institute of Water Research - Michigan State University

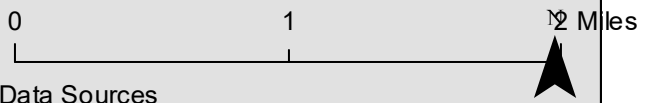
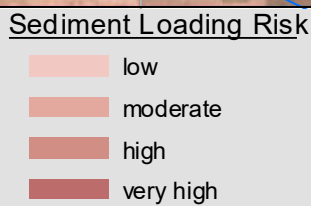


# City of Ithaca



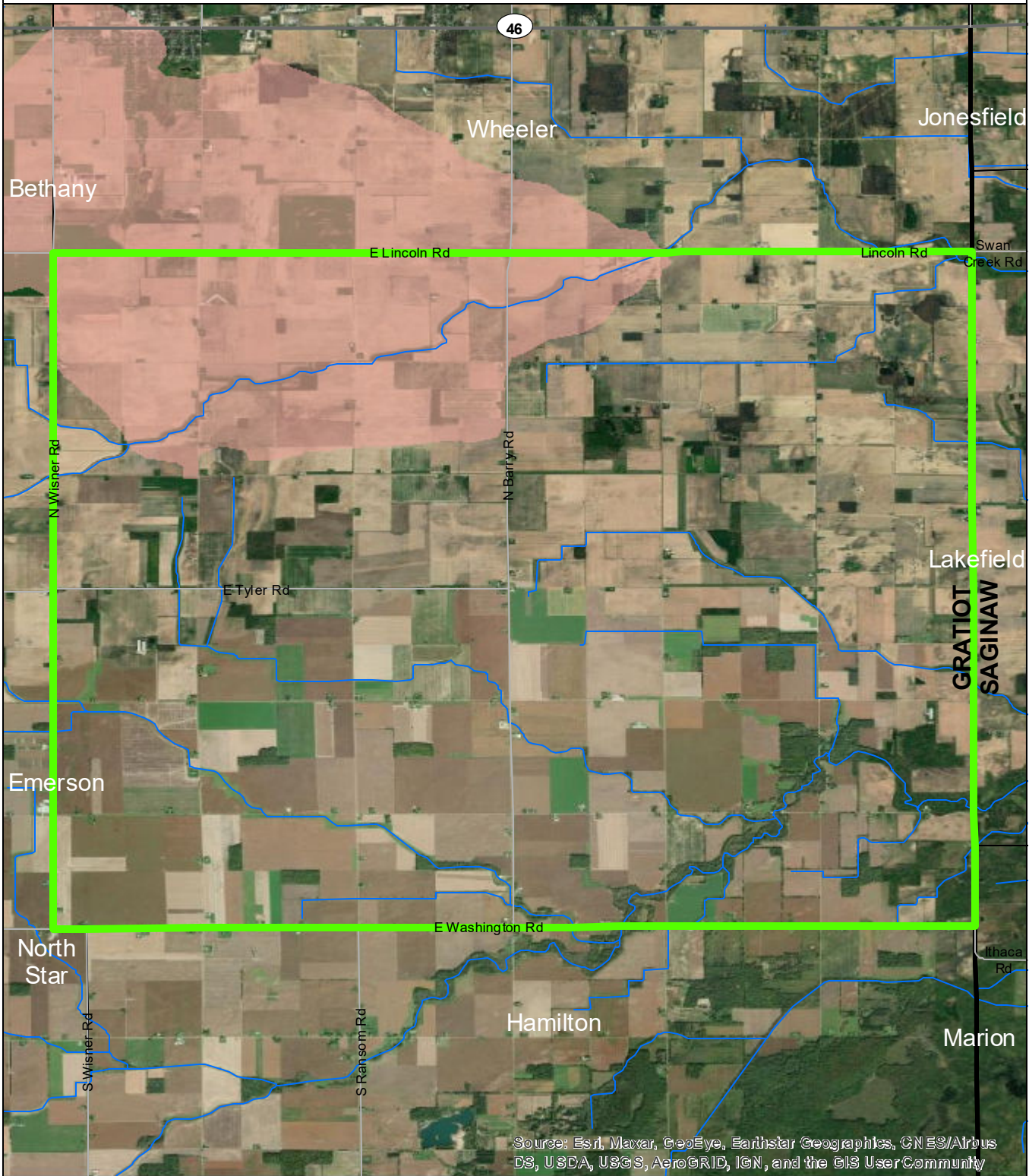
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

- City of Ithaca
- Saginaw Bay Basin
- Counties
- Rivers and Streams
- Townships & Cities



State of Michigan: Counties, Townships & Cities  
 USGS: Sediment Loading Risk  
 Map produced by the Institute of Water Research - Michigan State University

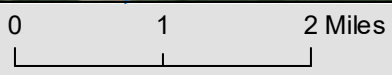
# Lafayette Township



- Lafayette Township
- Saginaw Bay Basin
- Counties
- Rivers and Streams
- Townships & Cities

### Sediment Loading Risk

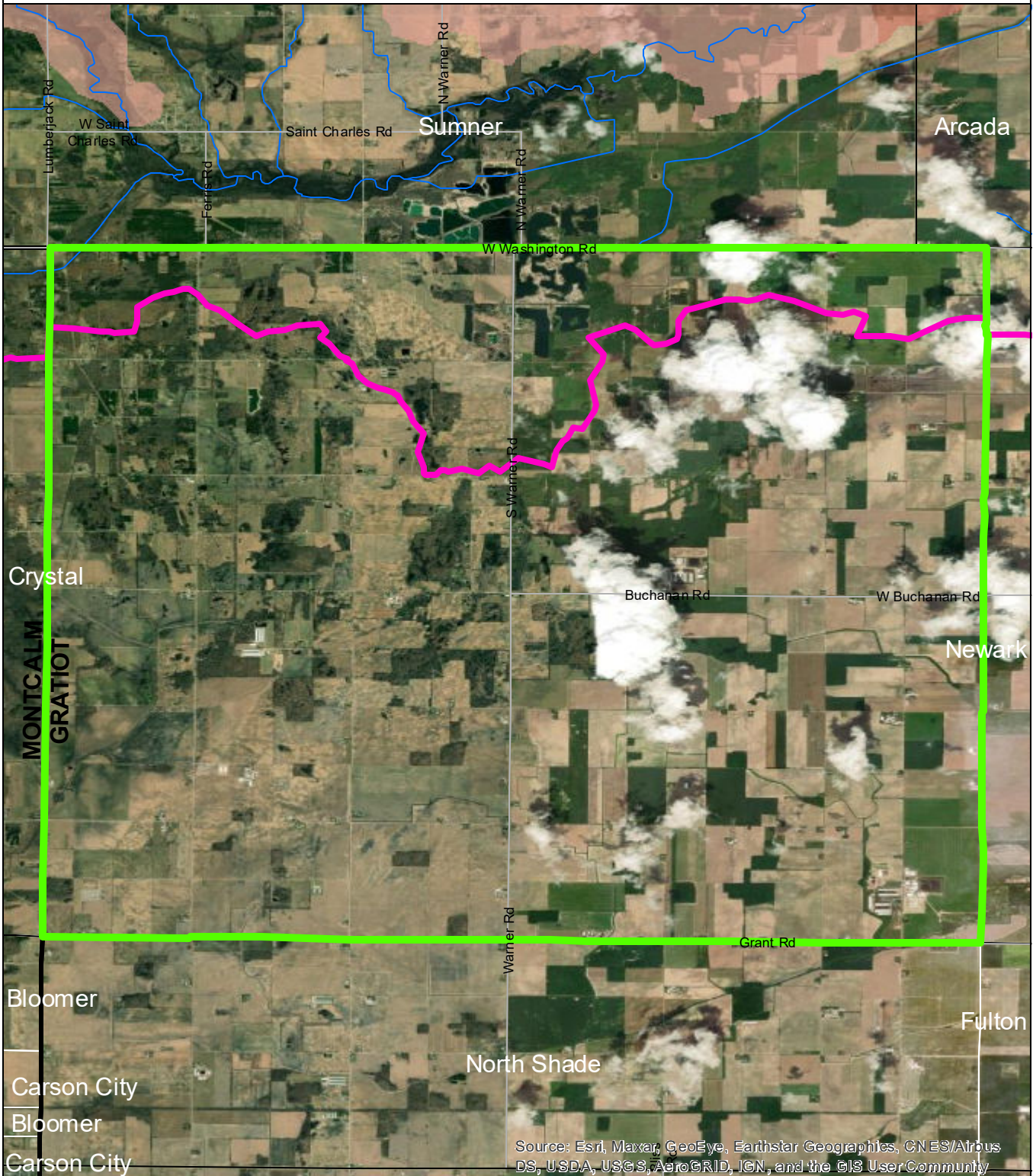
- low
- moderate
- high
- very high





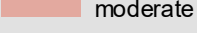
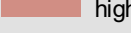







### Data Sources

State of Michigan: Counties, Townships & Cities  
 USGS: Sediment Loading Risk  
 Map produced by the Institute of Water Research - Michigan State University

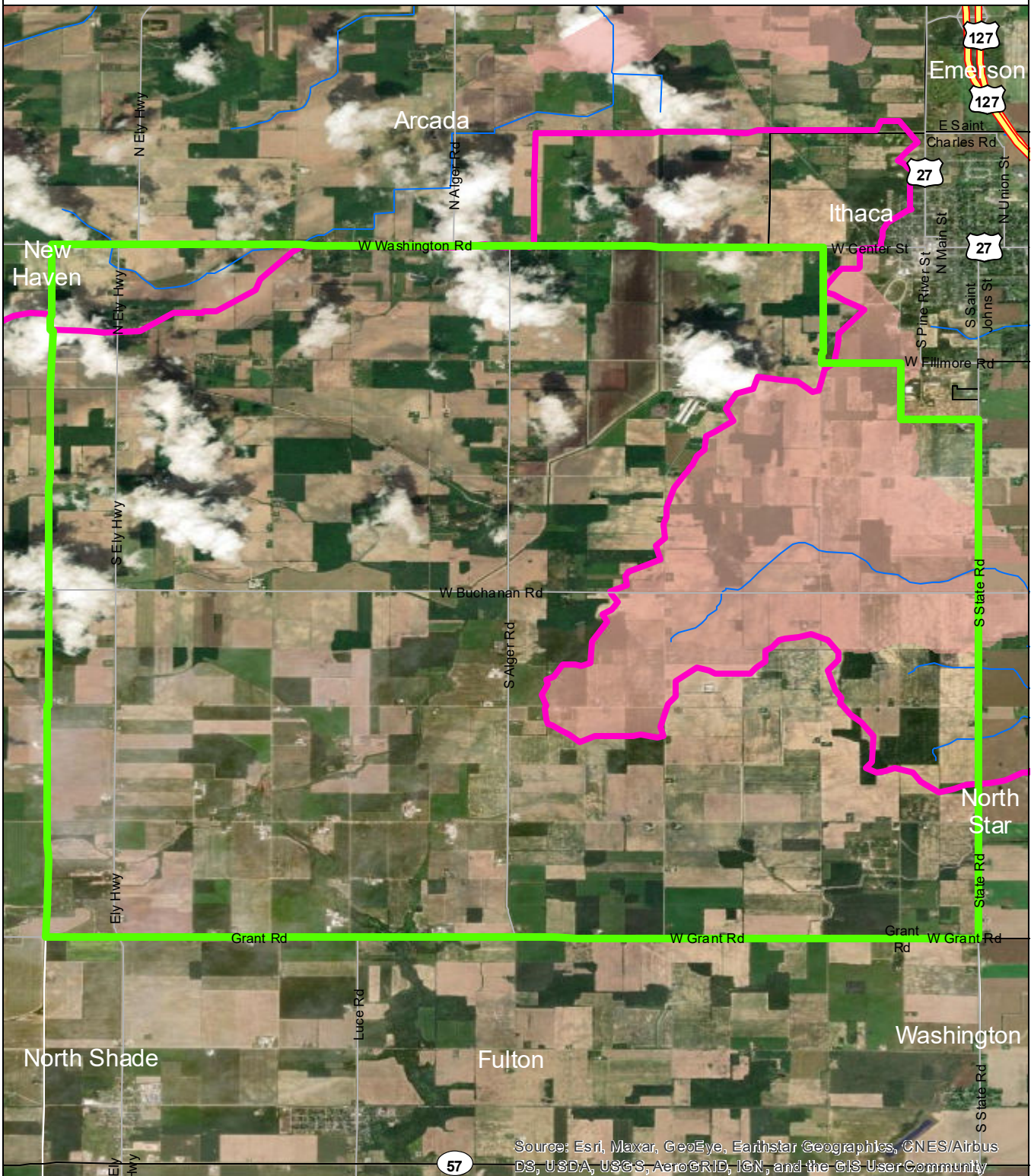
# New Haven Township



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

	New Haven Township	<b>Sediment Loading Risk</b>  low  moderate  high  very high	0      1      2 Miles 	
	Saginaw Bay Basin			
	Counties			
	Rivers and Streams			
	Townships & Cities	<b>Data Sources</b> State of Michigan: Counties, Townships & Cities USGS: Sediment Loading Risk Map produced by the Institute of Water Research - Michigan State University		

# Newark Township

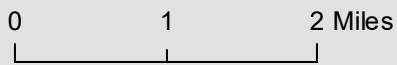


Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS UserCommunity

- Newark Township
- Saginaw Bay Basin
- Counties
- Rivers and Streams
- Townships & Cities

### Sediment Loading Risk

- low
- moderate
- high
- very high

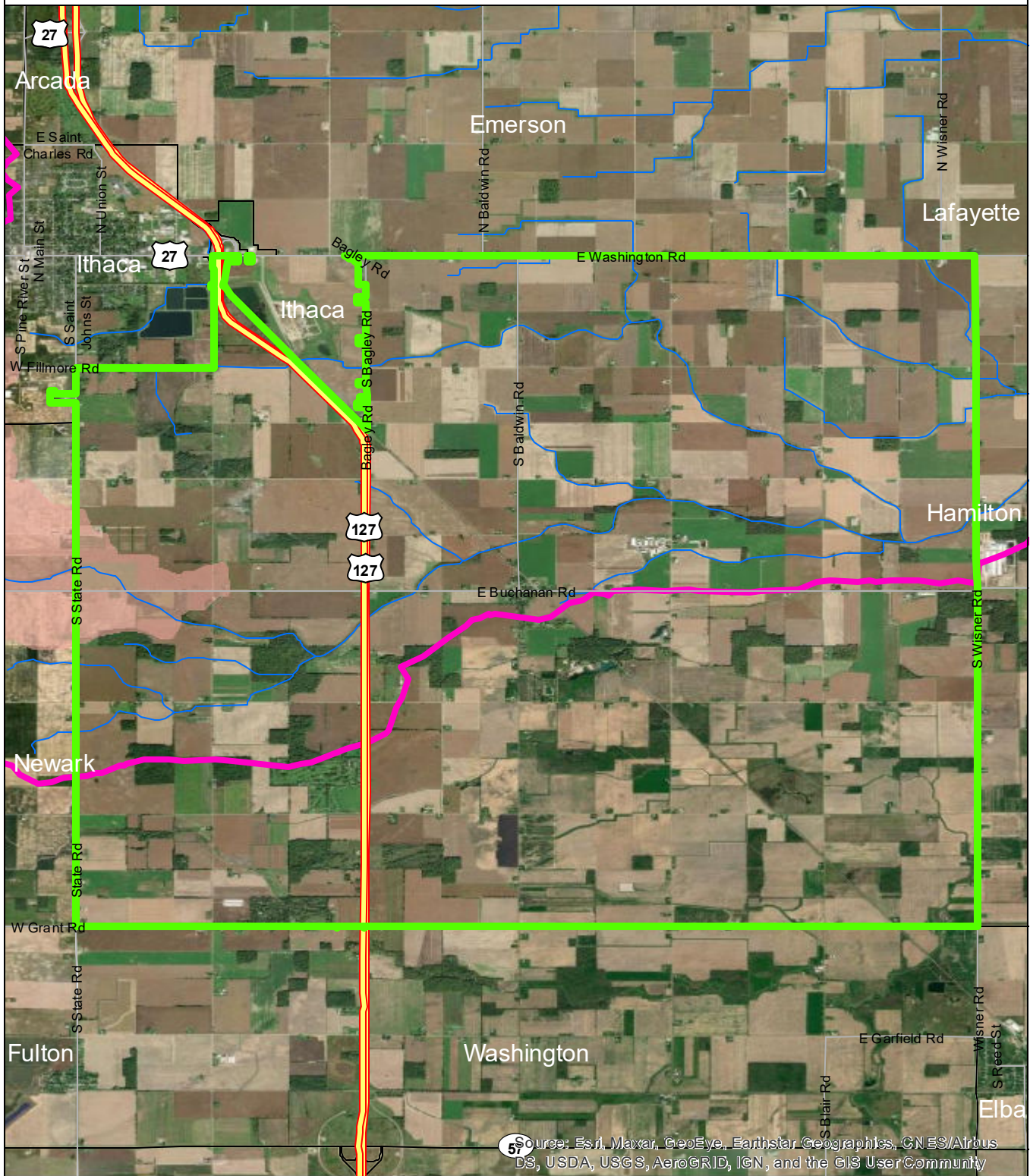


### Data Sources

State of Michigan: Counties, Townships & Cities  
 USGS: Sediment Loading Risk

Map produced by the Institute of Water Research - Michigan State University

# North Star Township

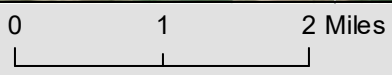


Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

- North Star Township
- Saginaw Bay Basin
- Counties
- Rivers and Streams
- Townships & Cities

### Sediment Loading Risk

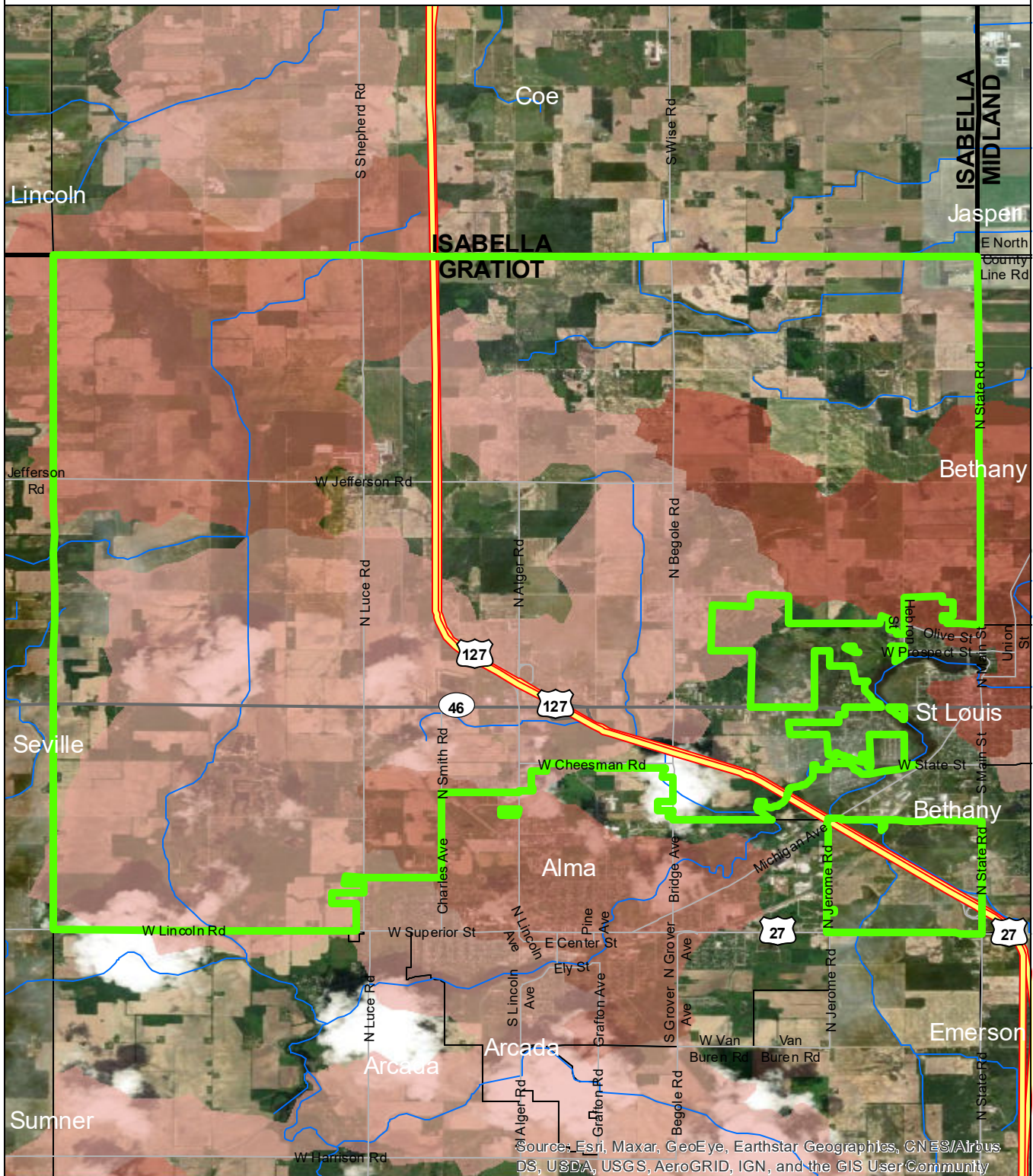
- low
- moderate
- high
- very high



### Data Sources

State of Michigan: Counties, Townships & Cities  
 USGS: Sediment Loading Risk  
 Map produced by the Institute of Water Research - Michigan State University

# Pine River Township

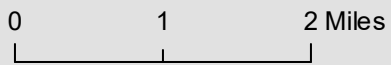


Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

- Pine River Township
- Saginaw Bay Basin
- Counties
- Rivers and Streams
- Townships & Cities

### Sediment Loading Risk

- low
- moderate
- high
- very high



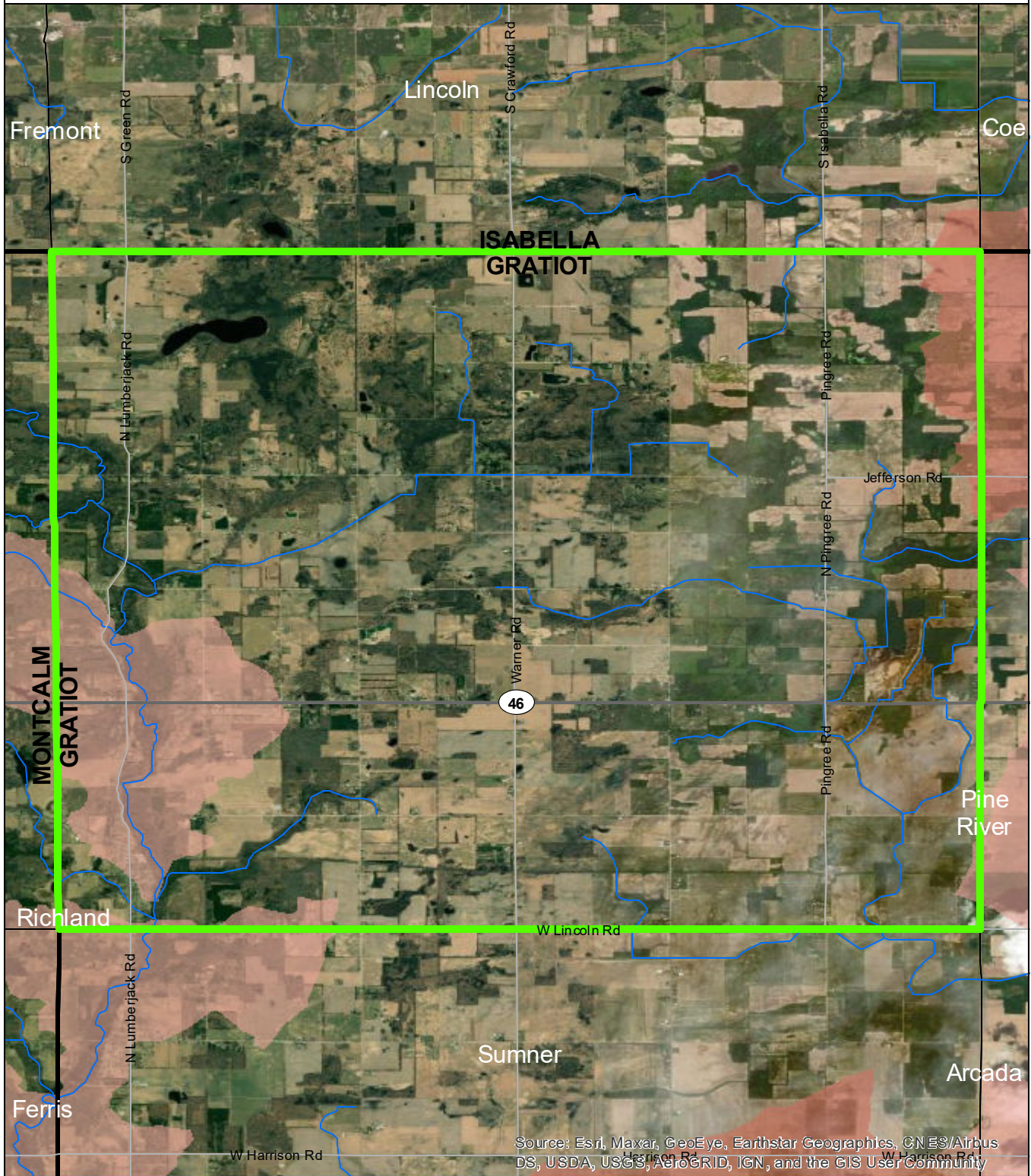
### Data Sources

State of Michigan: Counties, Townships & Cities  
 USGS: Sediment Loading Risk

Map produced by the Institute of Water Research - Michigan State University



# Seville Township

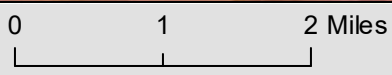


Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

- Seville Township
- Saginaw Bay Basin
- Counties
- Rivers and Streams
- Townships & Cities

### Sediment Loading Risk

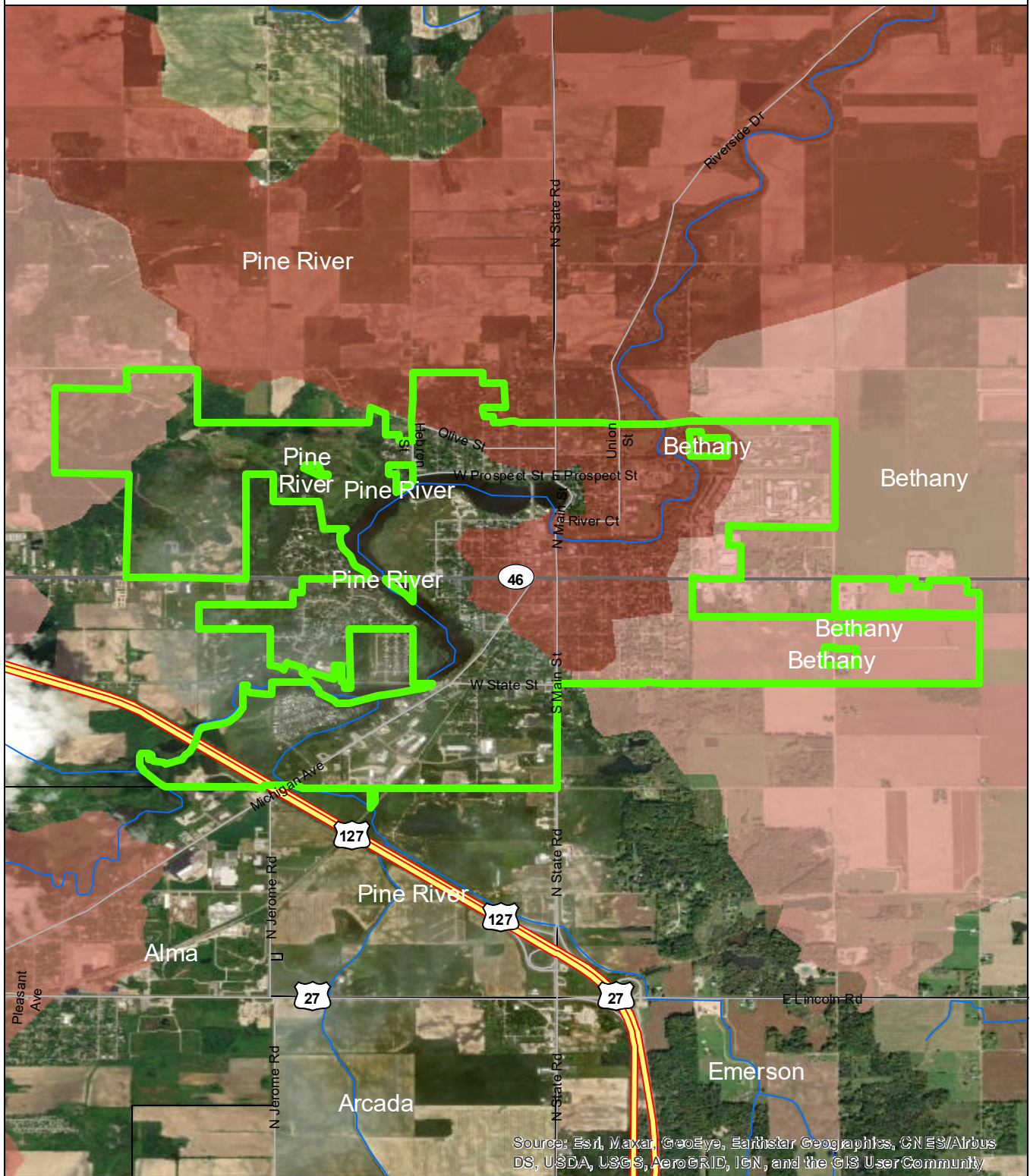
- low
- moderate
- high
- very high



### Data Sources

State of Michigan: Counties, Townships & Cities  
 USGS: Sediment Loading Risk  
 Map produced by the Institute of Water Research - Michigan State University

# City of St Louis

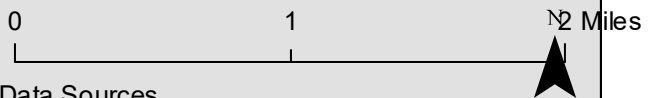


Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

- City of St Louis
- Saginaw Bay Basin
- Counties
- Rivers and Streams
- Townships & Cities

### Sediment Loading Risk

- low
- moderate
- high
- very high

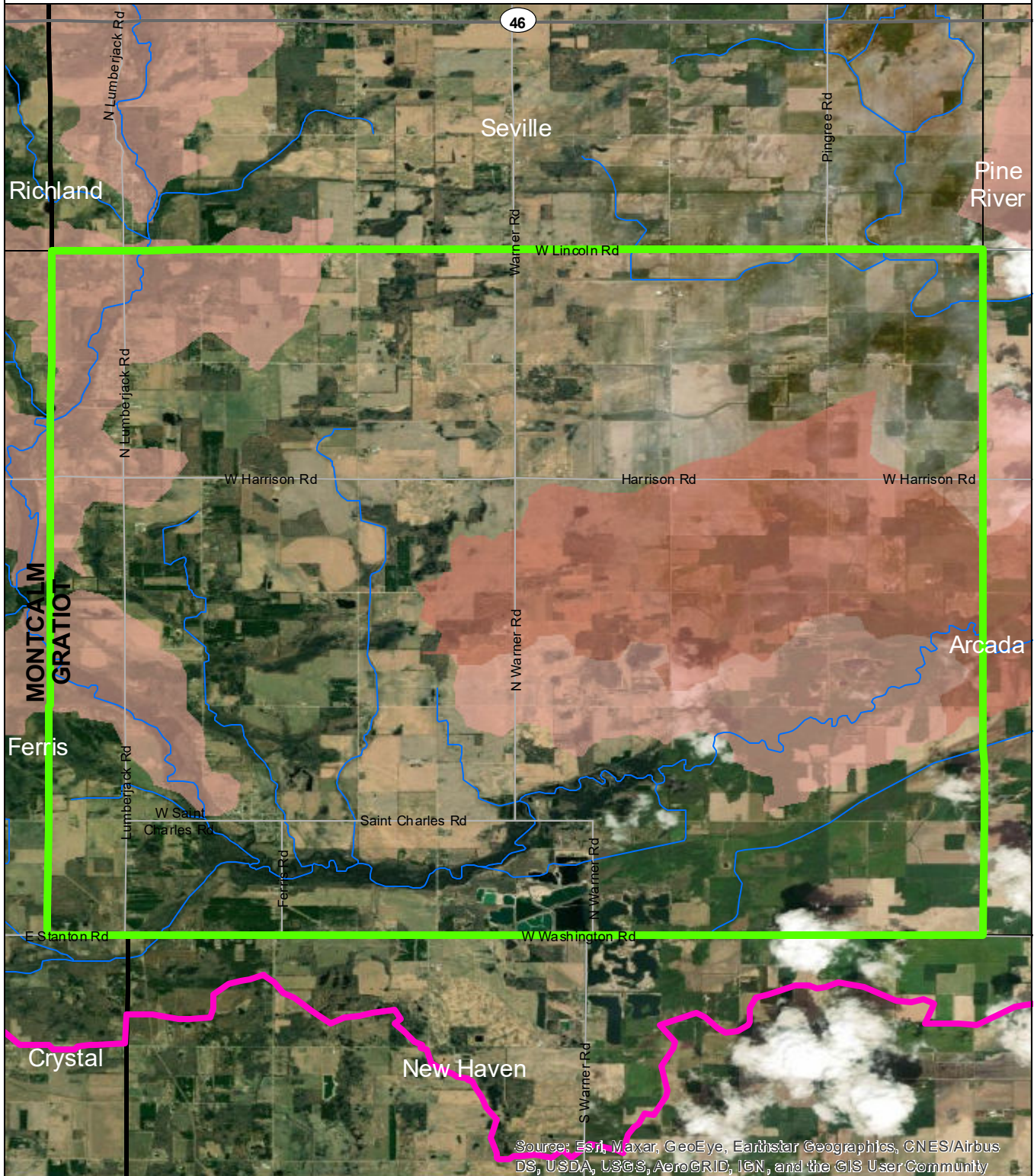


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




State of Michigan: Counties, Townships & Cities  
 USGS: Sediment Loading Risk  
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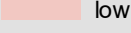
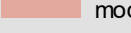
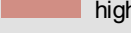



# Sumner Township

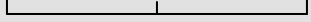


Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

-  Sumner Township
-  Saginaw Bay Basin
-  Counties
-  Rivers and Streams
-  Townships & Cities

- Sediment Loading Risk**
-  low
  -  moderate
  -  high
  -  very high

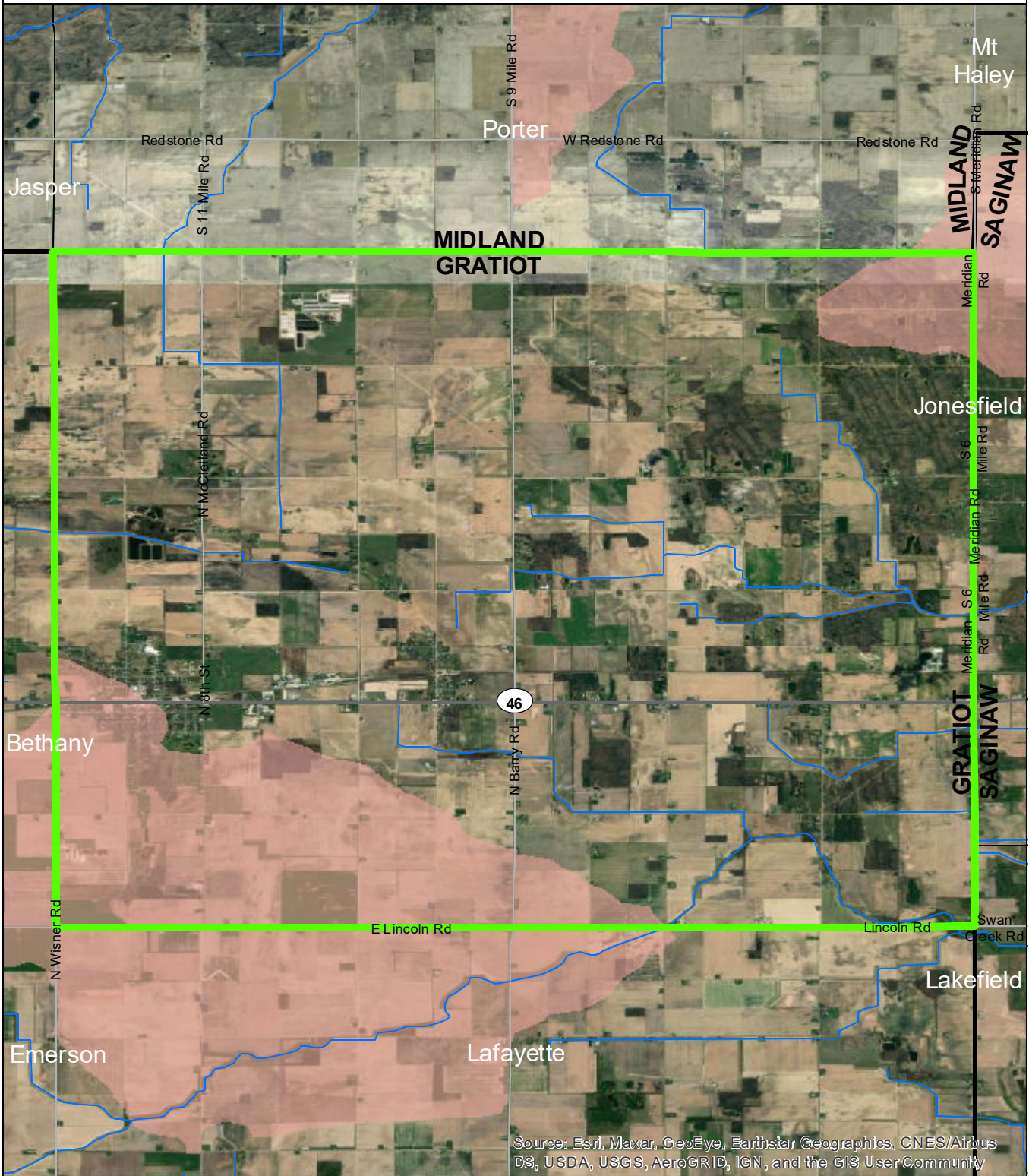
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
**Data Sources**  
 State of Michigan: Counties, Townships & Cities  
 USGS: Sediment Loading Risk

Map produced by the Institute of Water Research - Michigan State University





# Wheeler Township

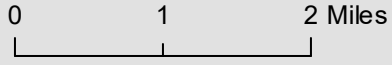


Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

-  Wheeler Township
-  Saginaw Bay Basin
-  Counties
-  Rivers and Streams
-  Townships & Cities

### Sediment Loading Risk

-  low
-  moderate
-  high
-  very high



### Data Sources

State of Michigan: Counties, Townships & Cities  
 USGS: Sediment Loading Risk  
 Map produced by the Institute of Water Research - Michigan State University