

# 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.

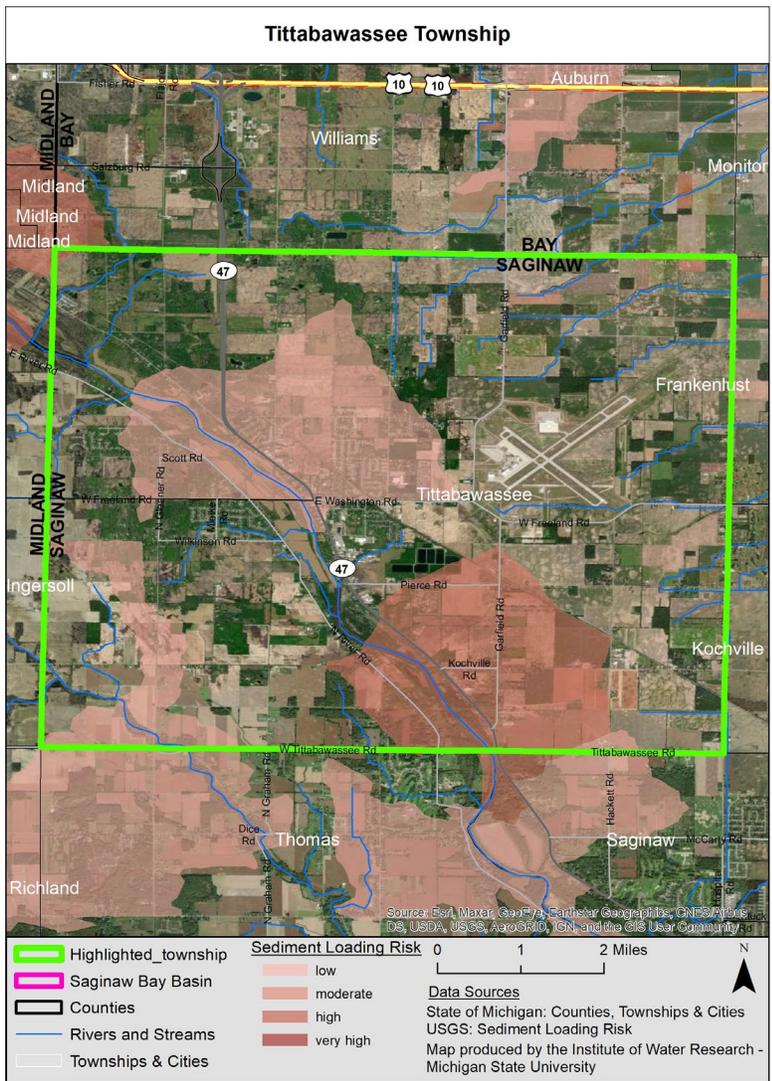
## Data

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)



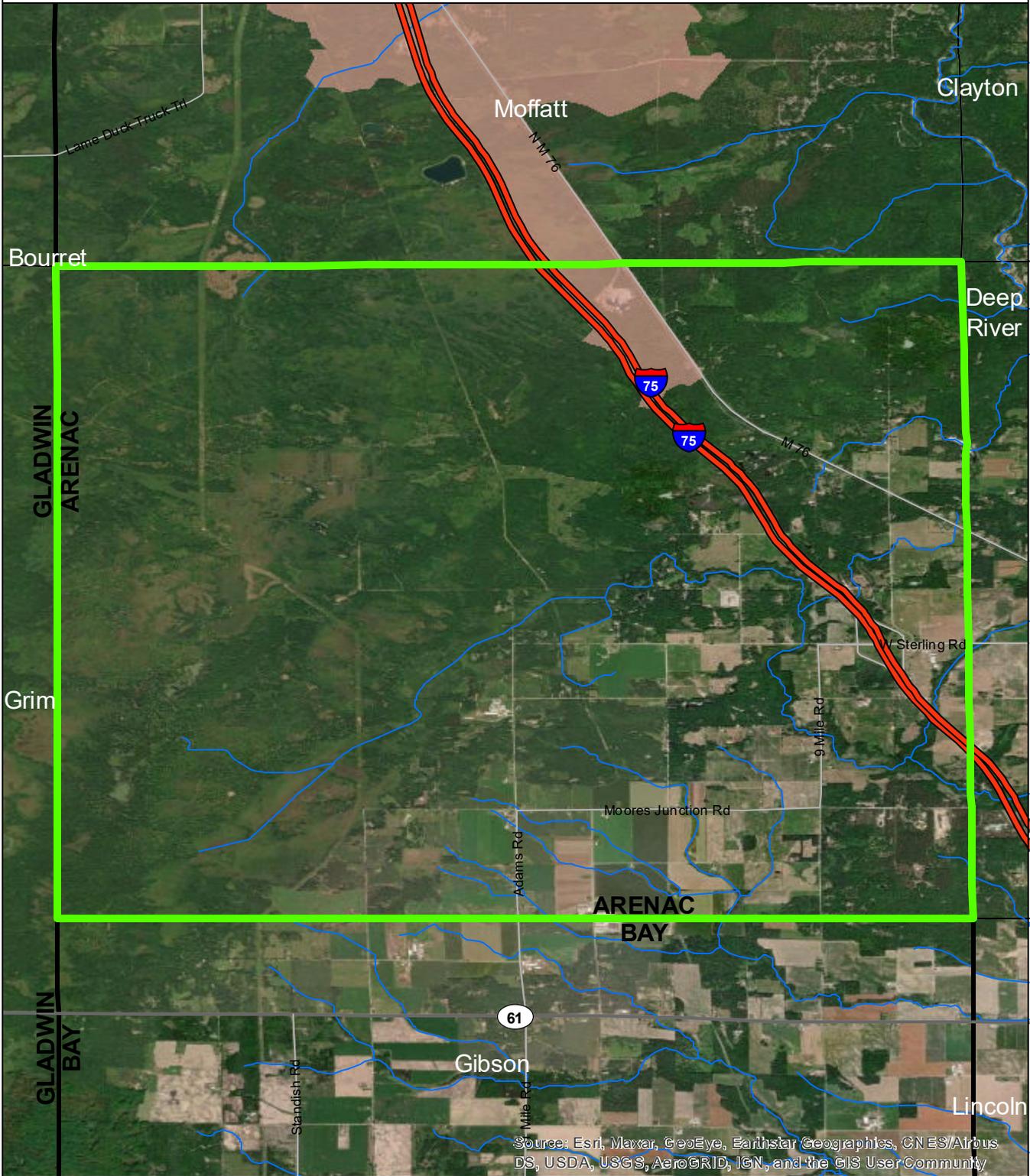
\* <https://www.sciencebase.gov/catalog/item/5cbf5150e4b09b8c0b700df3>

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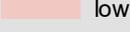
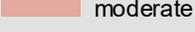
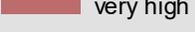
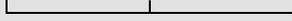
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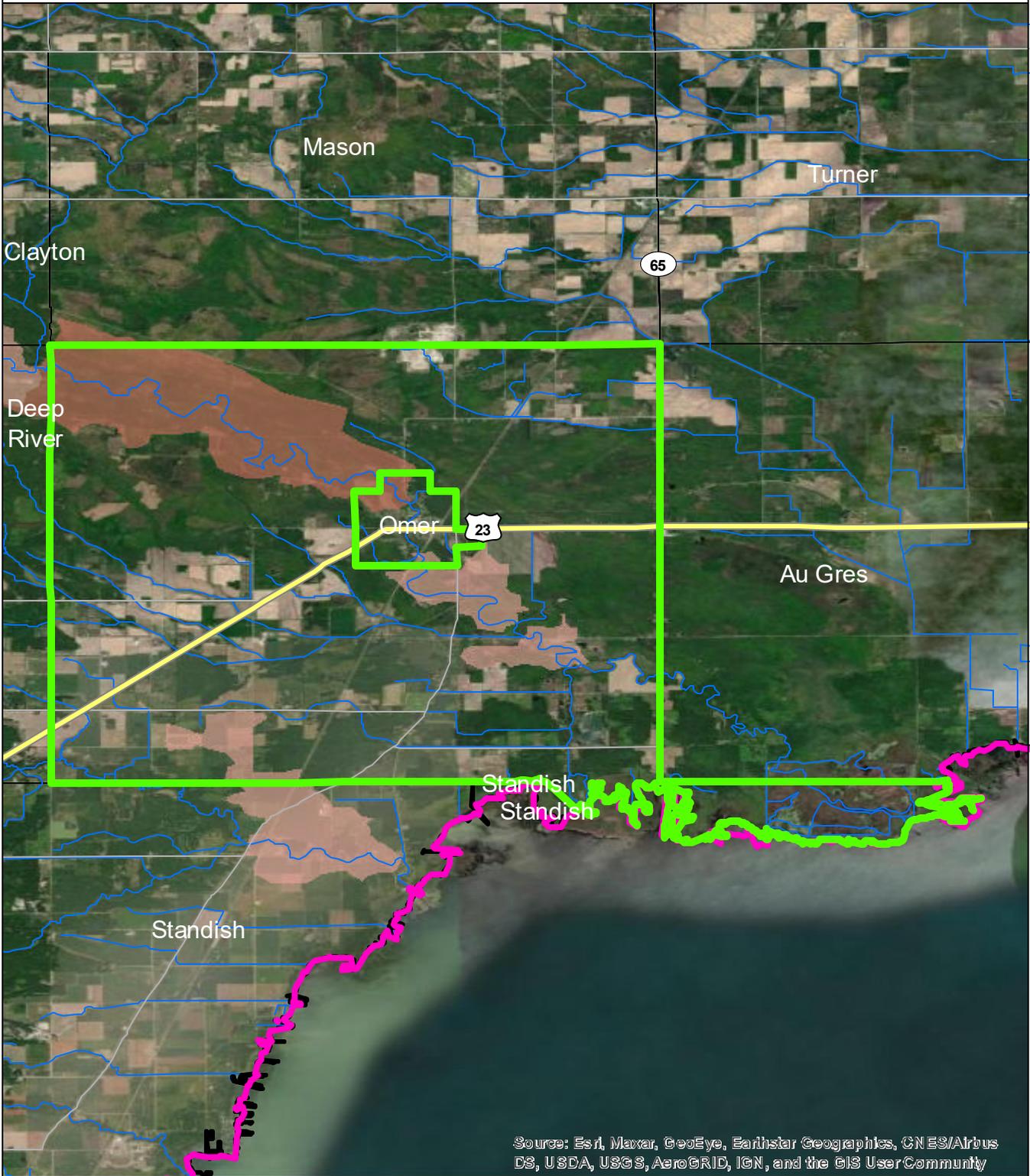
# Adams Township



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

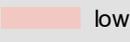
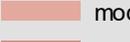
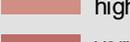
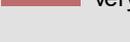
	Adams Township	<b>Sediment Loading Risk</b>  low  moderate  high  very high	0      1      2 Miles 	N 
	Saginaw Bay Basin			
	Counties			
	Rivers and Streams			
	Townships & Cities	<b>Data Sources</b> State of Michigan: Counties, Townships & Cities USGS: Sediment Loading Risk Map produced by the Institute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

# Arenac Township



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

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

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

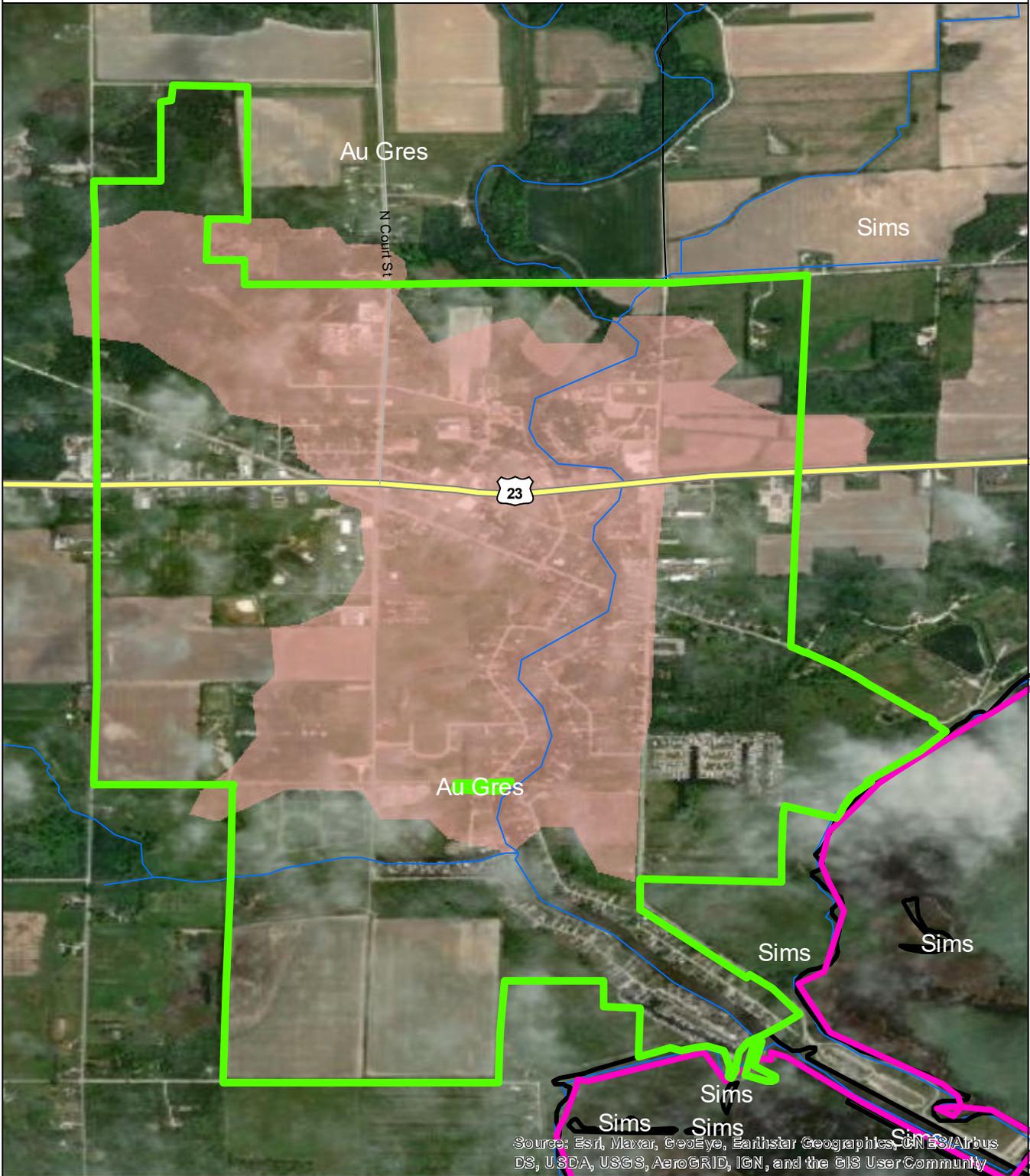


**Data Sources**

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



# City of Au Gres



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

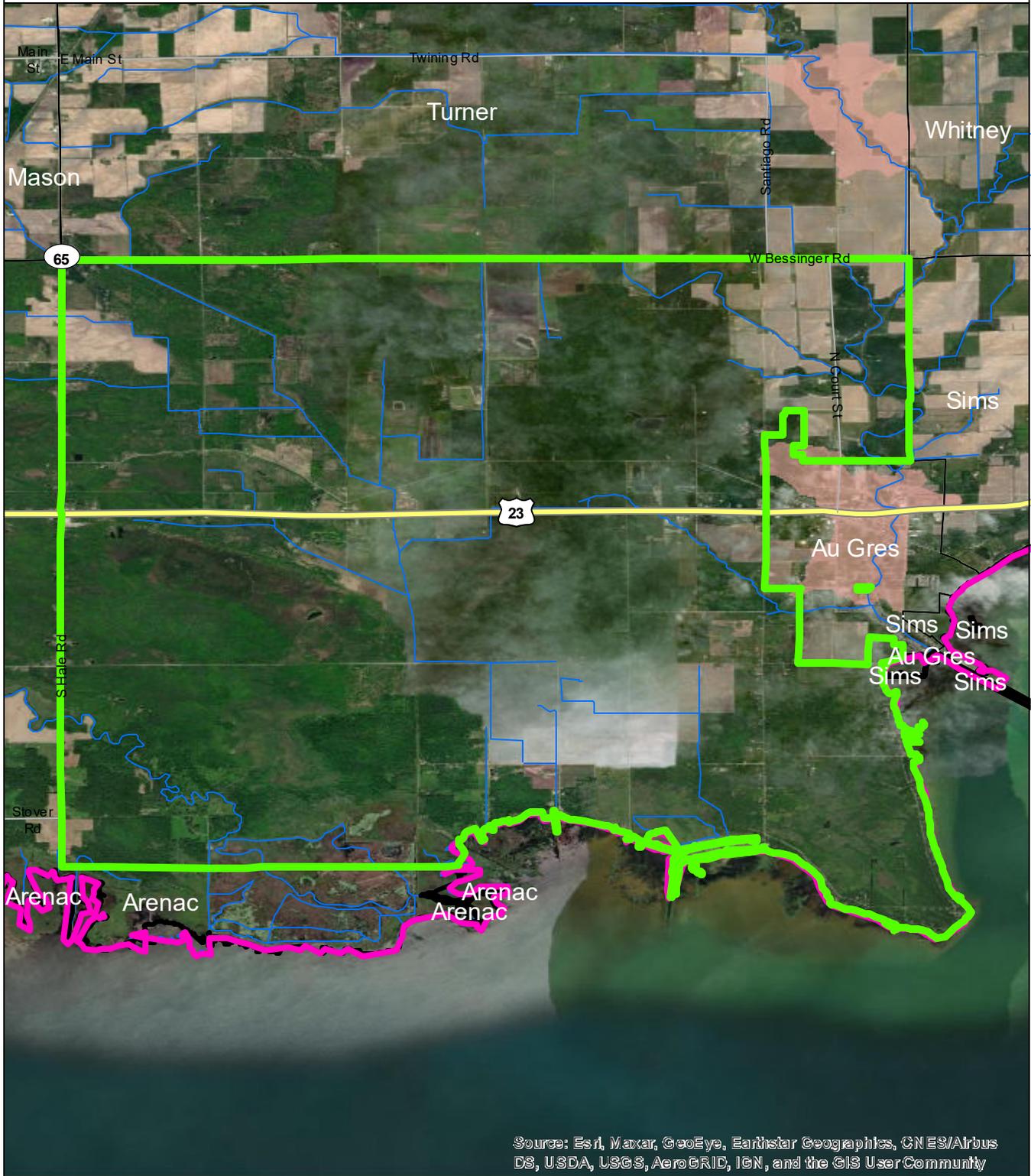
- City of Au Gres
- Saginaw Bay Basin
- Counties
- Rivers and Streams
- Townships & Cities

- Sediment Loading Risk**
- 0 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

# Au Gres Township



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

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

### Sediment Loading Risk

- low
- moderate
- high
- very high

0 1 2 Miles

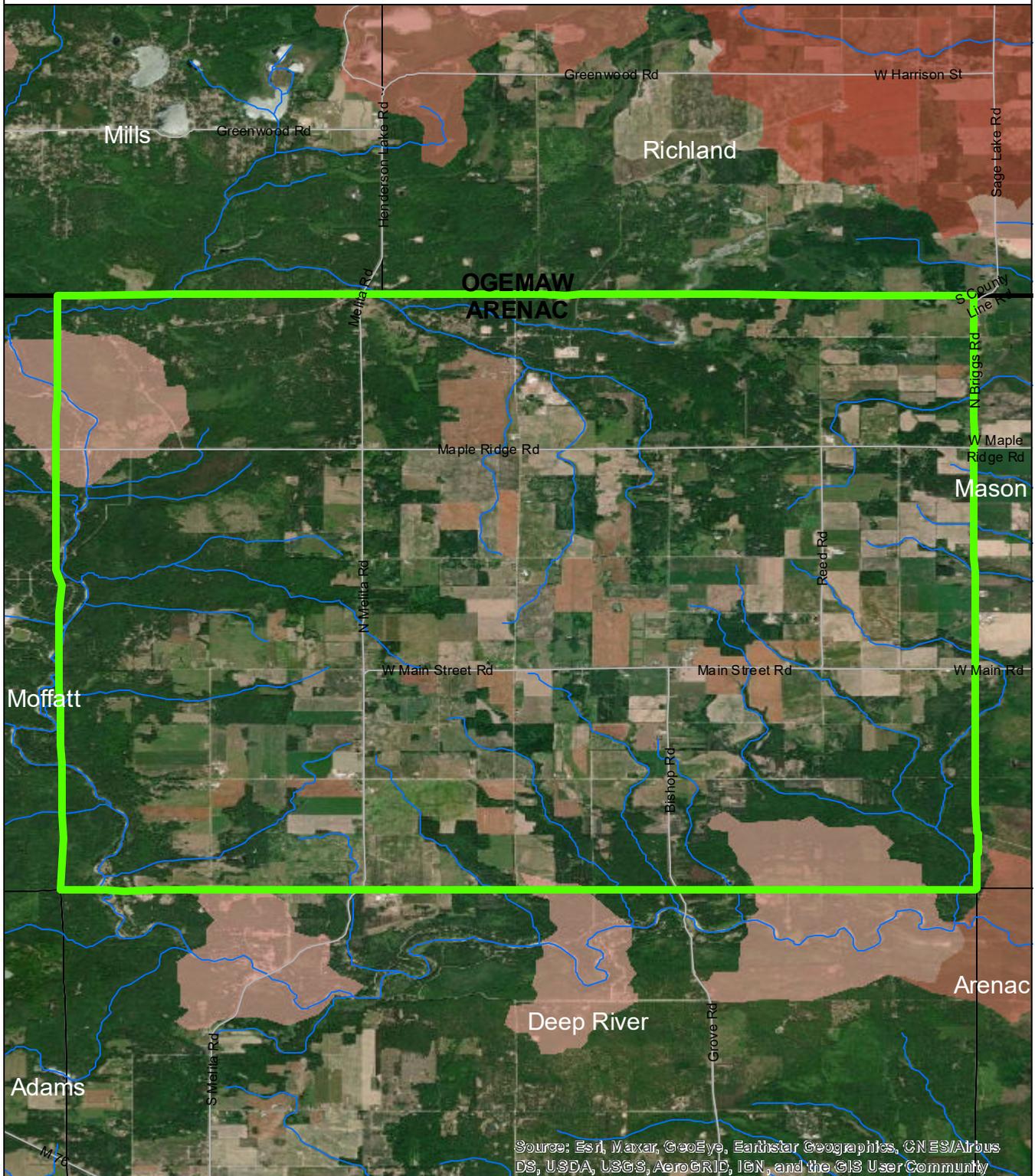
### Data Sources

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

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

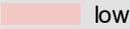
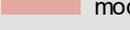
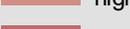
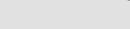


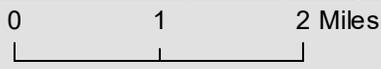
# Clayton Township



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

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

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

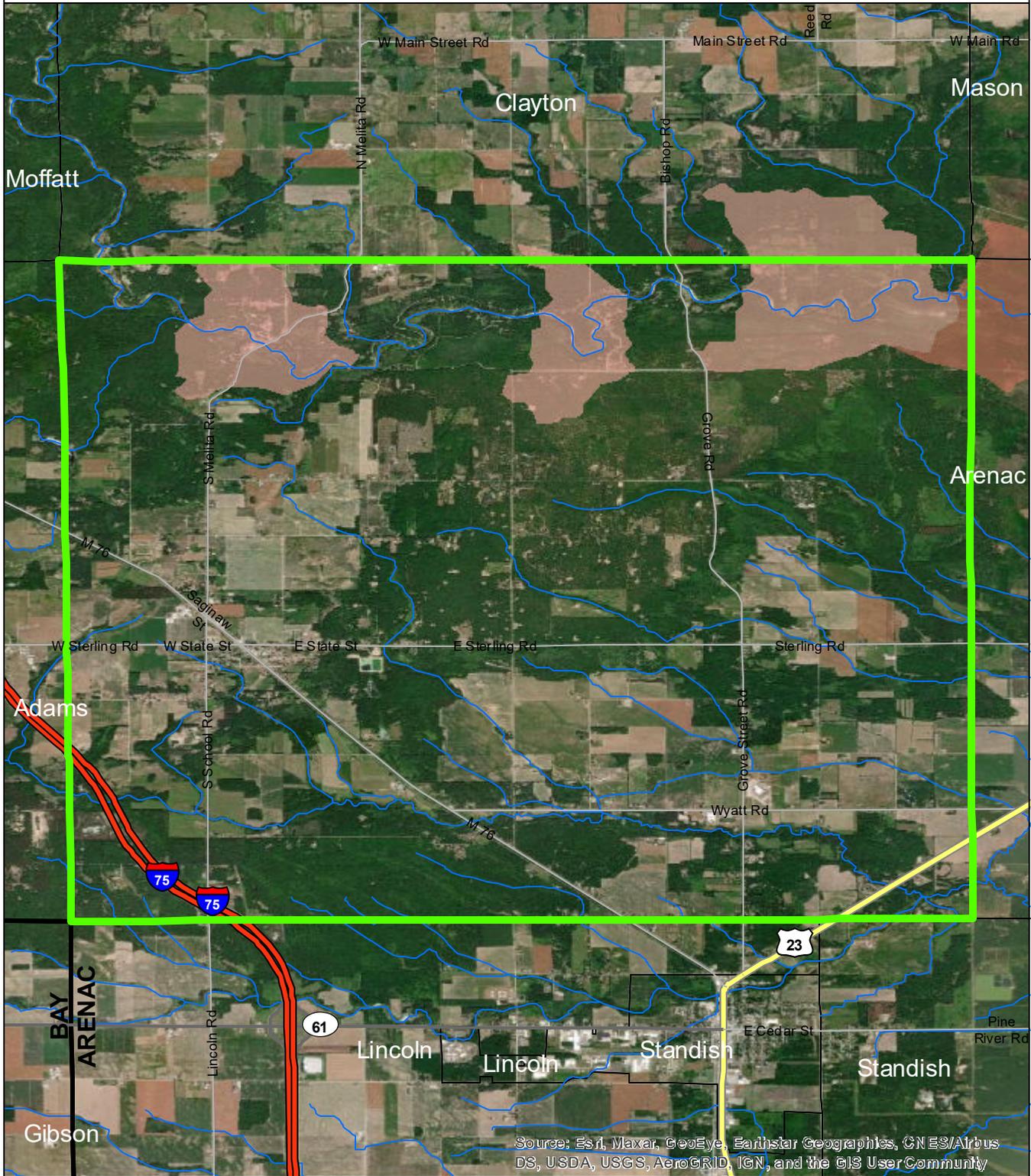


**Data Sources**

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

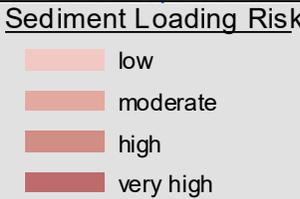
Map produced by the Institute of Water Research - Michigan State University

# Deep River Township



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

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

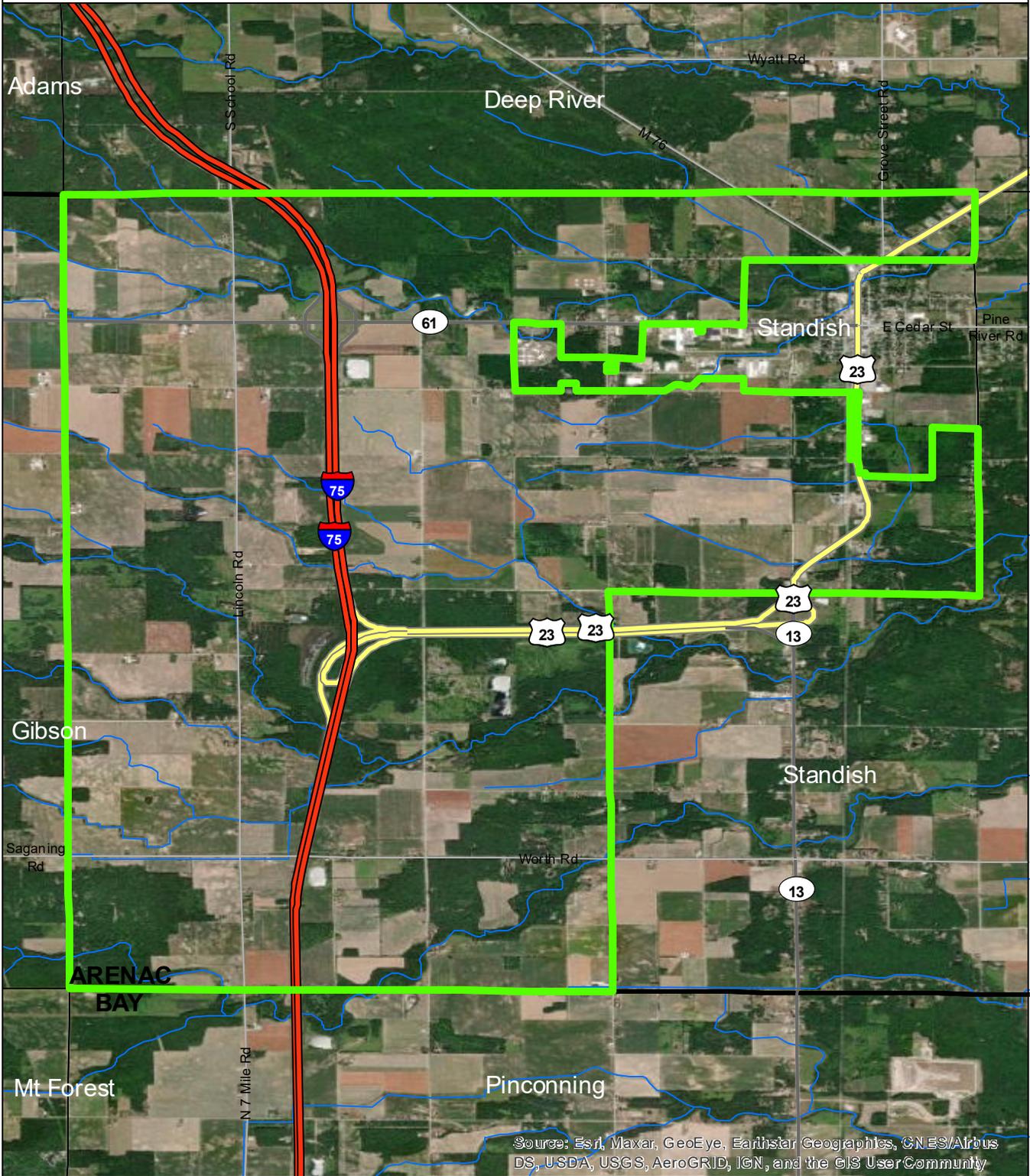


Data Sources

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

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

# Lincoln Township



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

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

### Sediment Loading Risk

- low
- moderate
- high
- very high

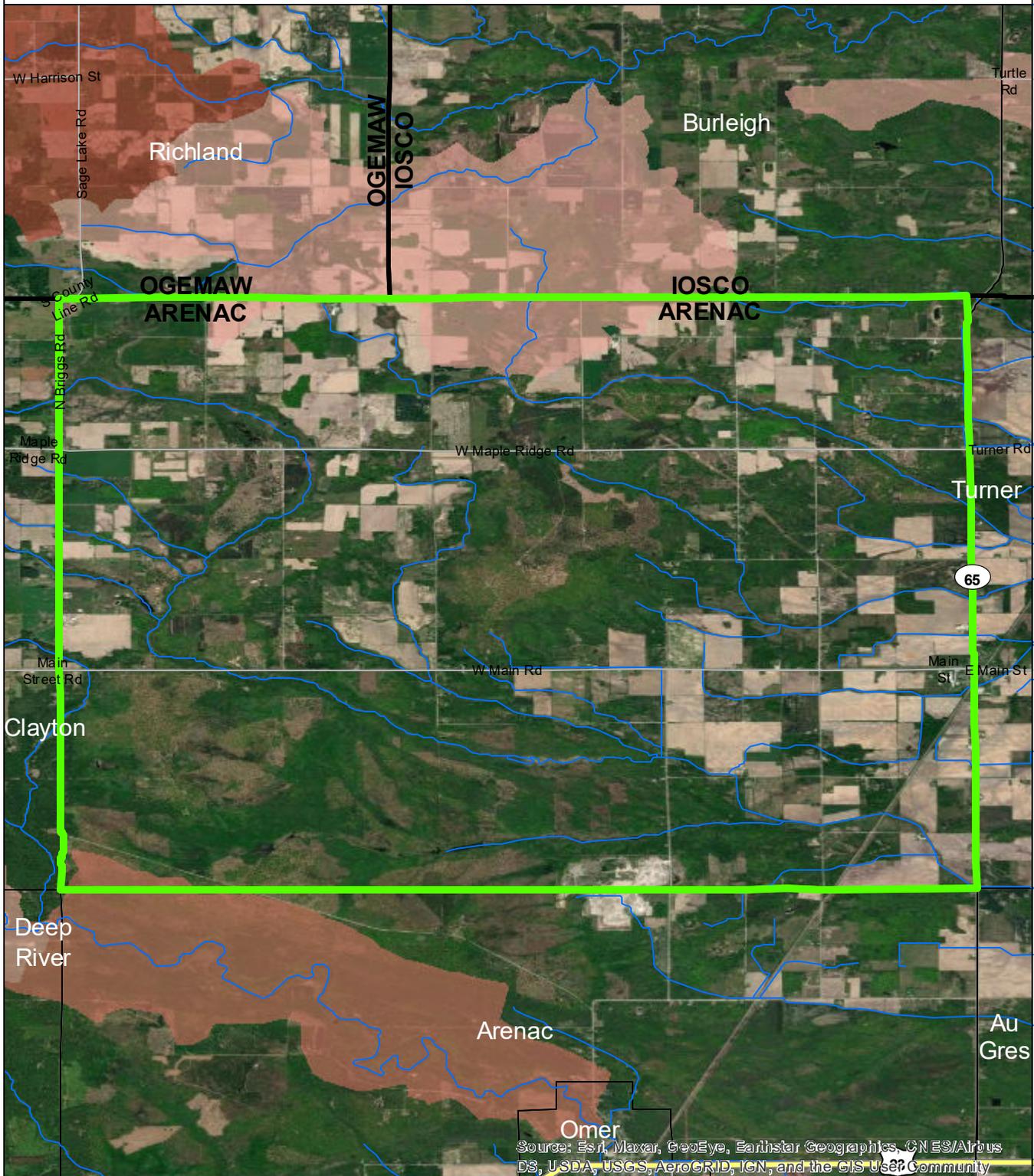


### Data Sources

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

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

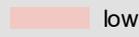
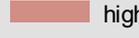
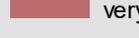
# Mason Township



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

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

### Sediment Loading Risk

-  low
-  moderate
-  high
-  very high

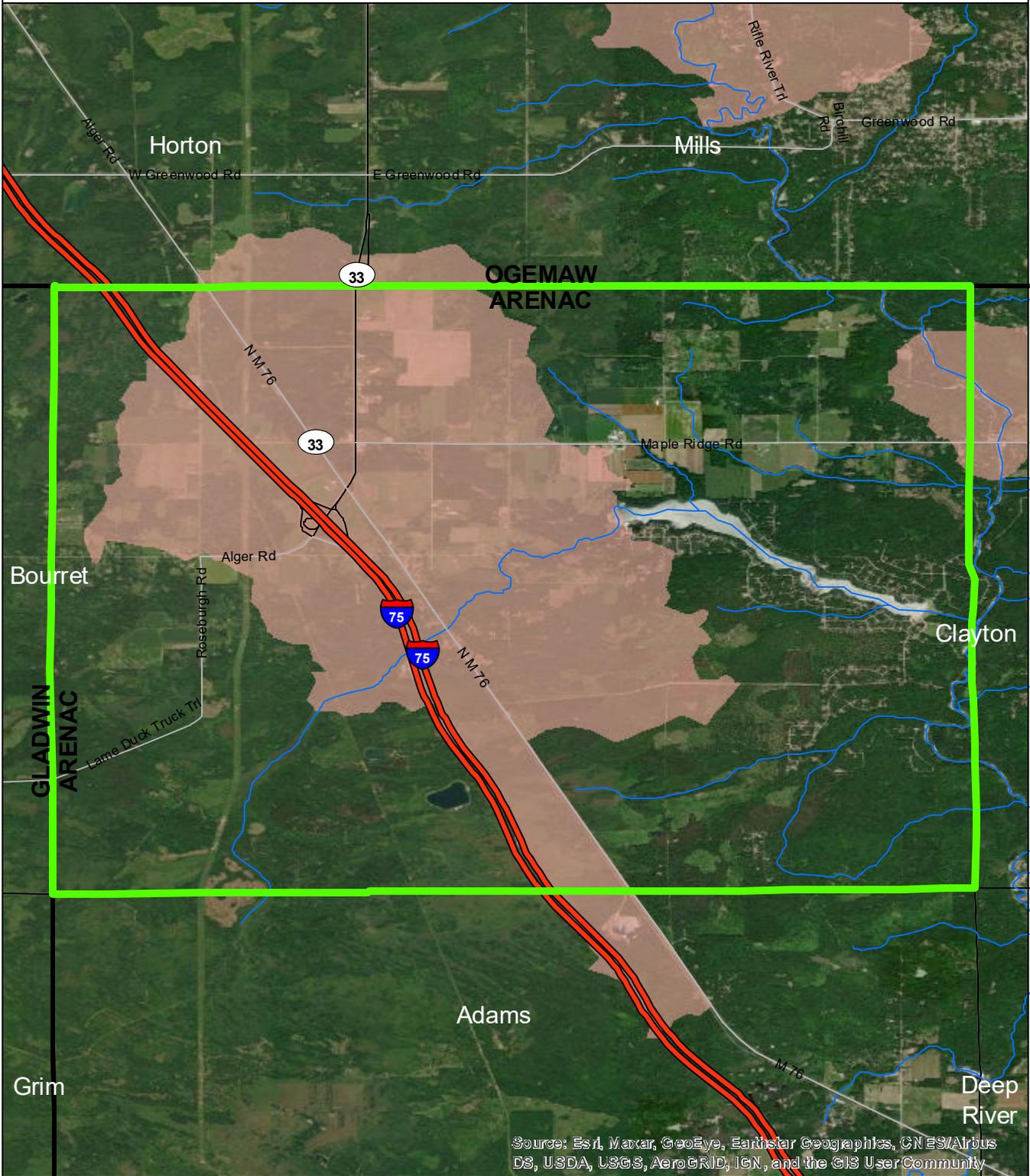


### Data Sources

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

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

# Moffatt Township



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

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

**Sediment Loading Risk**

	low
	moderate
	high
	very high

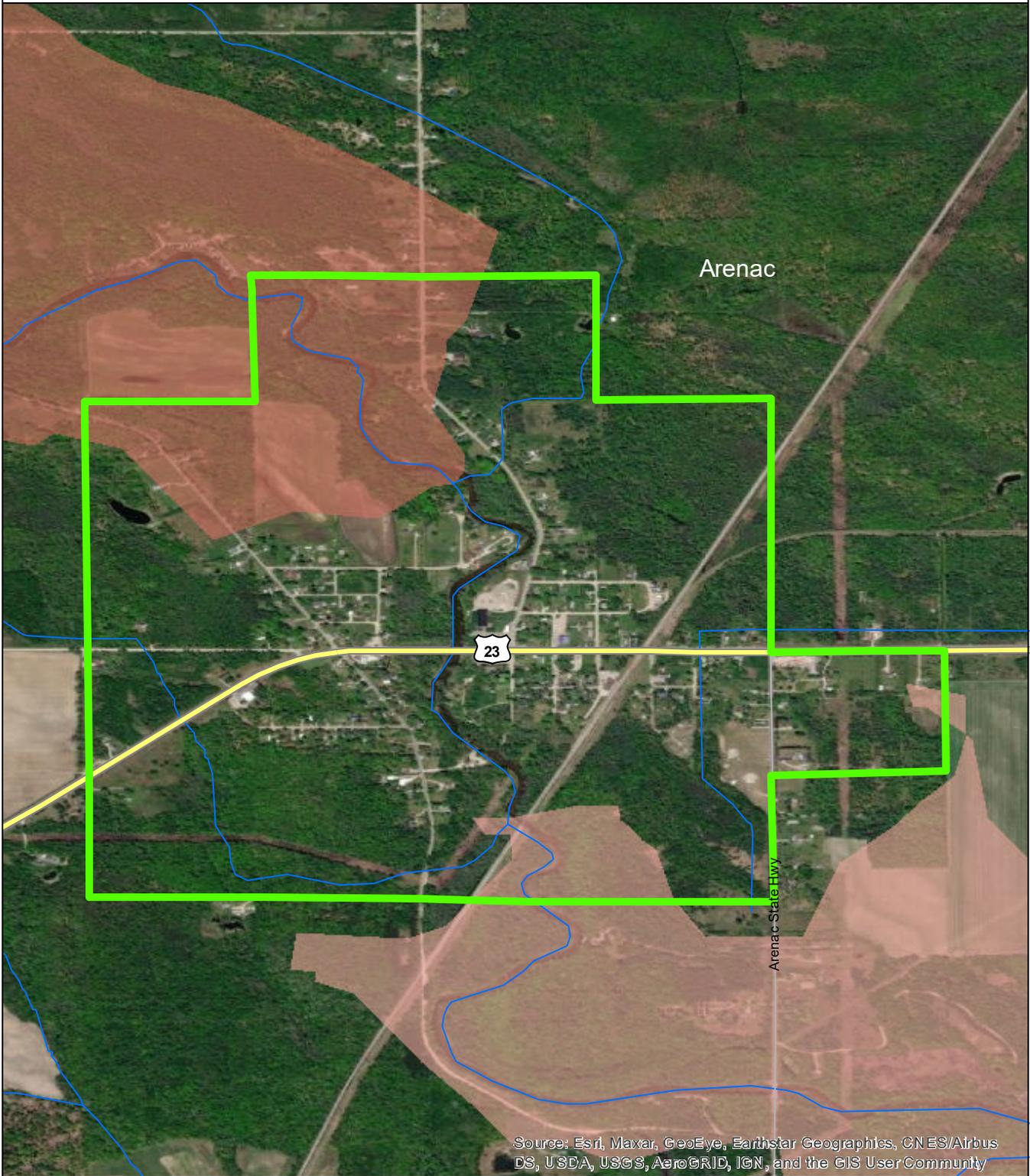


**Data Sources**

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



# City of Omer



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

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

### Sediment Loading Risk

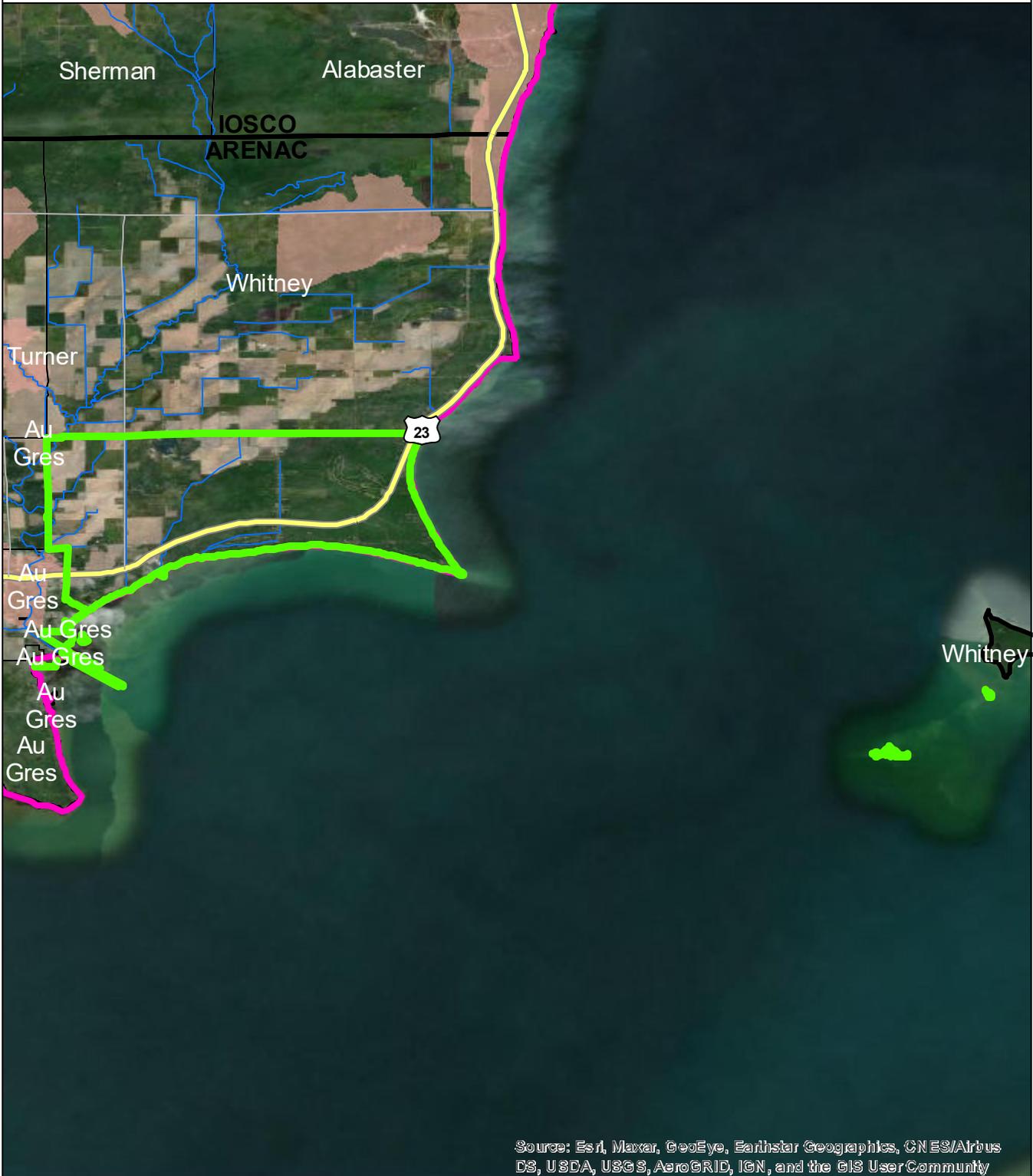
- low
- moderate
- high
- very high



### Data Sources

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



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

- Sims Township
- Saginaw Bay Basin
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**Sediment Loading Risk**

- low
- moderate
- high
- very high

0 1 2 Miles

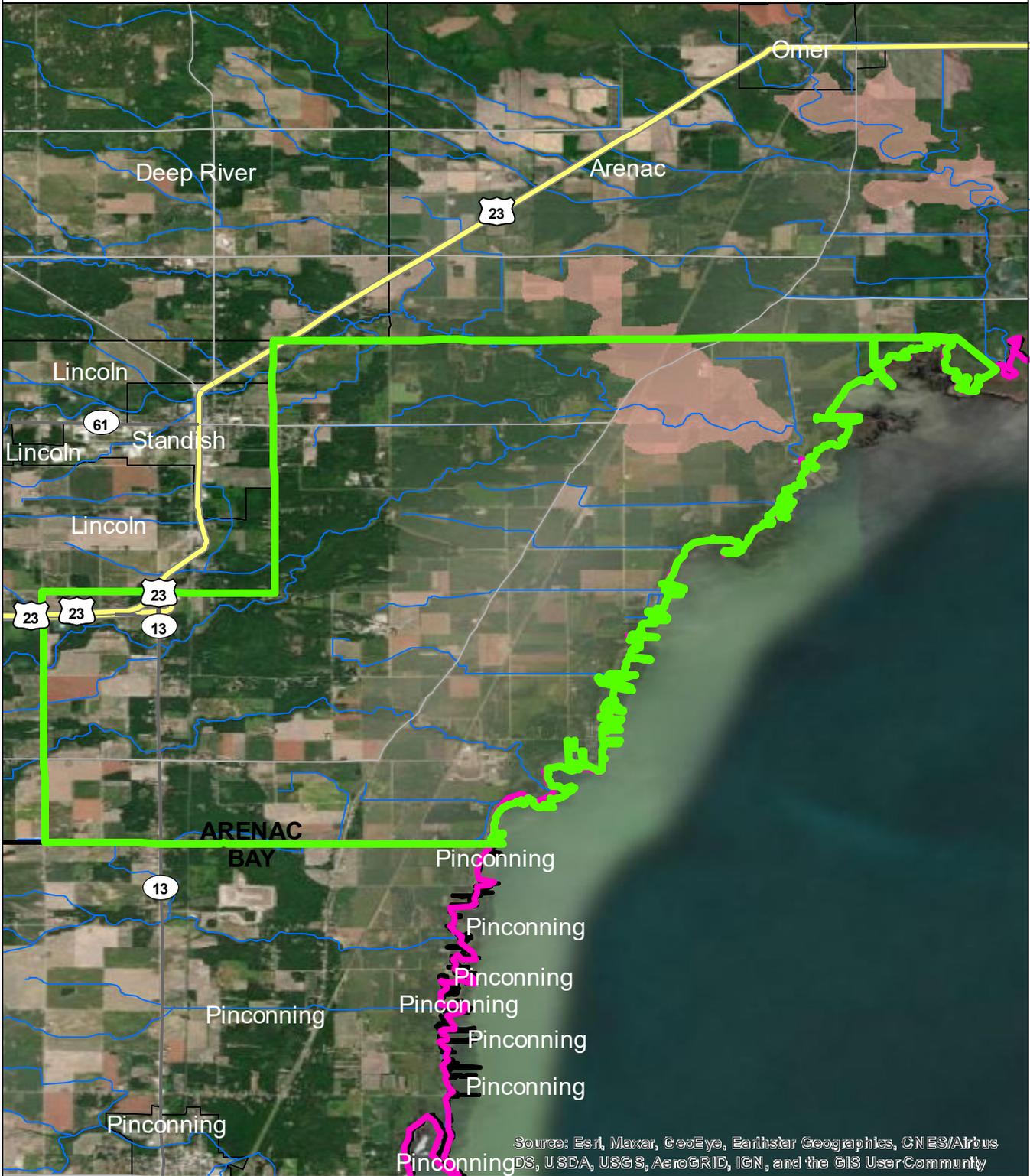
Data Sources

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

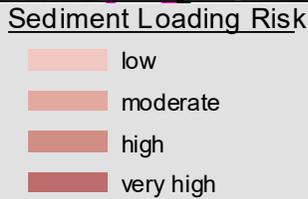
Map produced by the Institute of Water Research - Michigan State University



# Standish Township



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



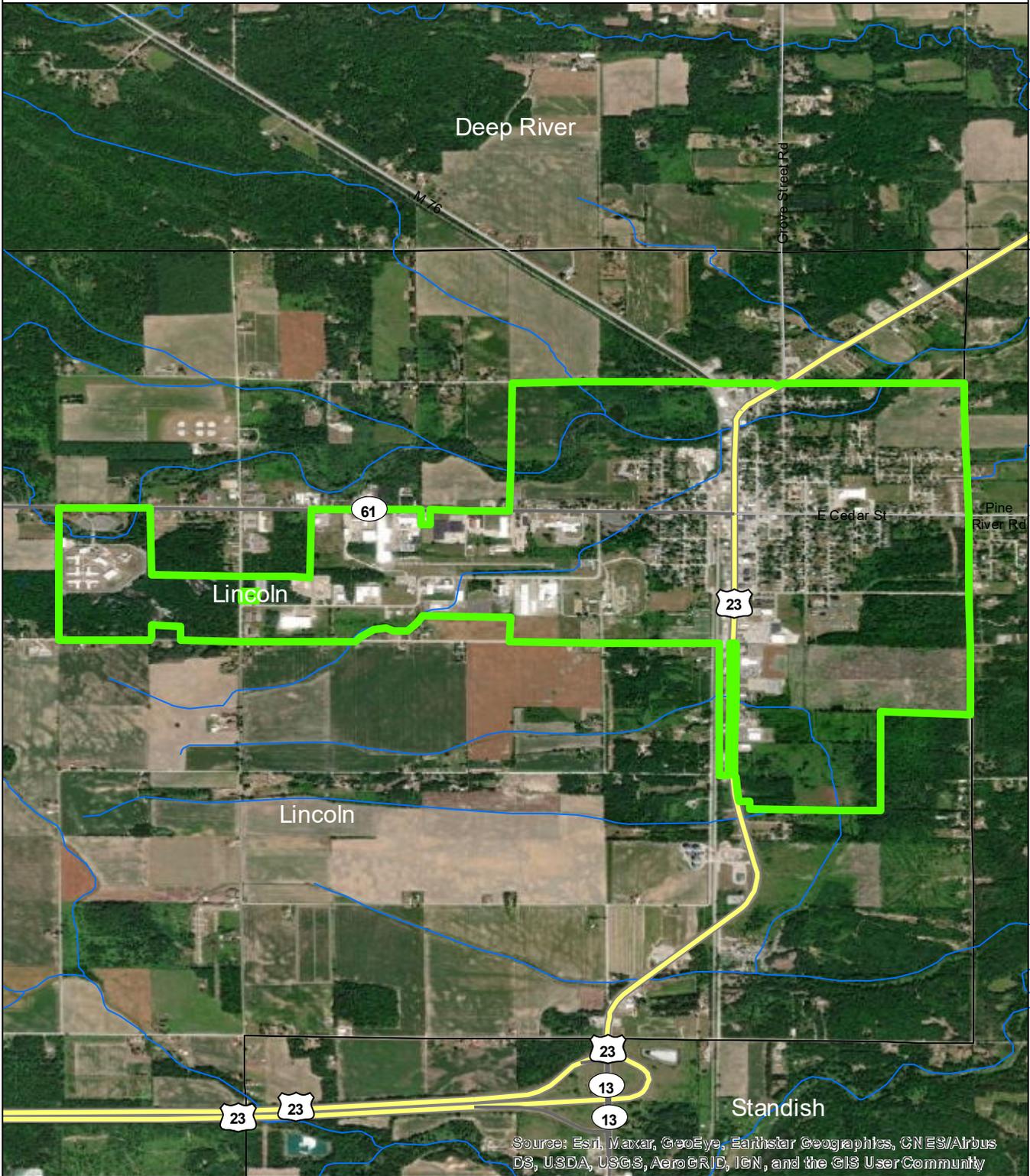
Data Sources

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

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

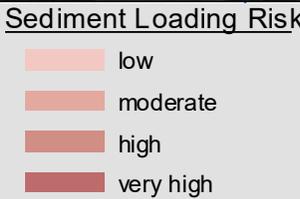


# City of Standish



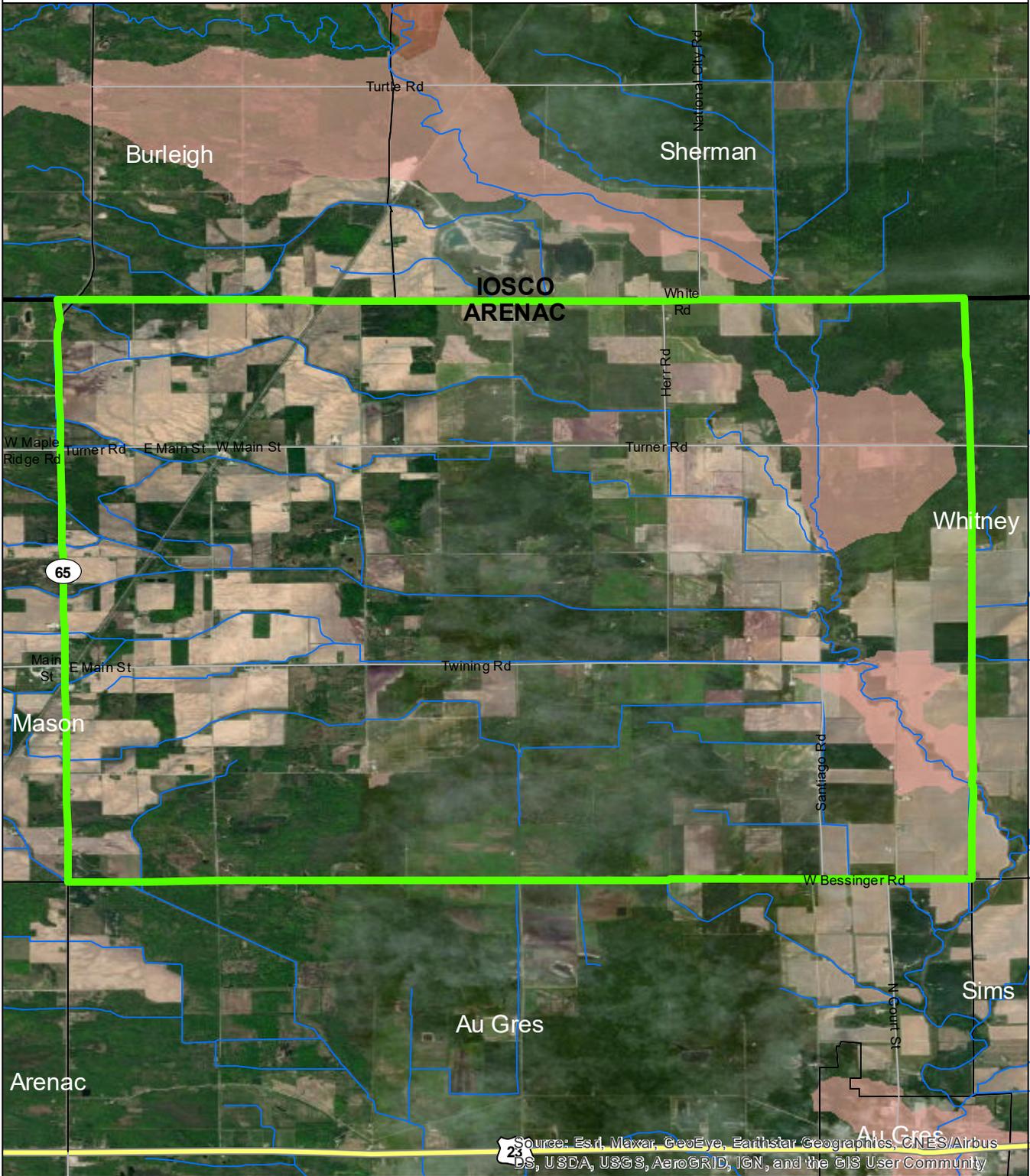
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

- City of Standish
- Saginaw Bay Basin
- Counties
- Rivers and Streams
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**Data Sources**  
 State of Michigan: Counties, Townships & Cities  
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 Map produced by the Institute of Water Research - Michigan State University

# Turner Township



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

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

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

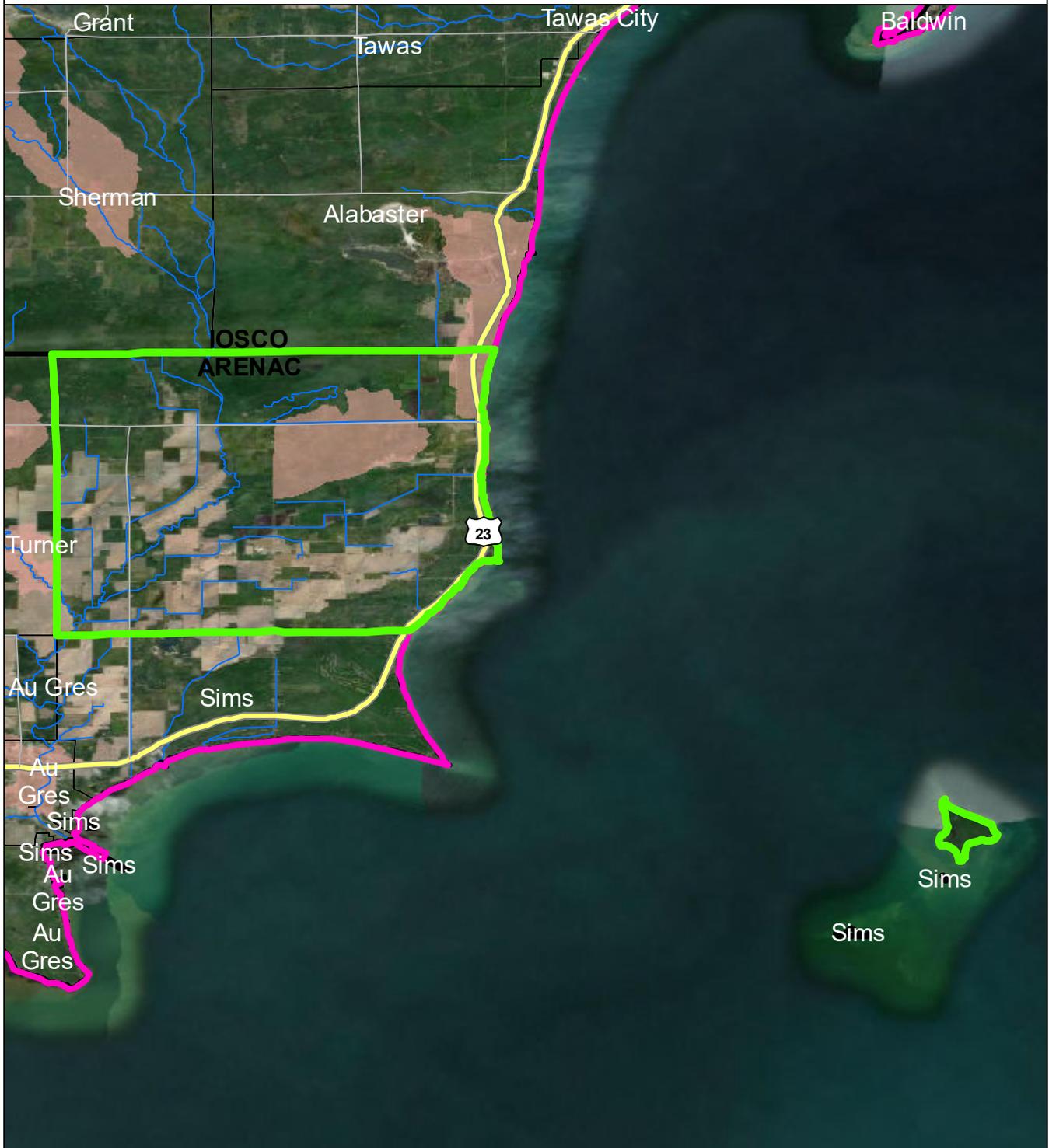
0 1 2 Miles

**Data Sources**

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

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

# Whitney Township



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

- Whitney 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

