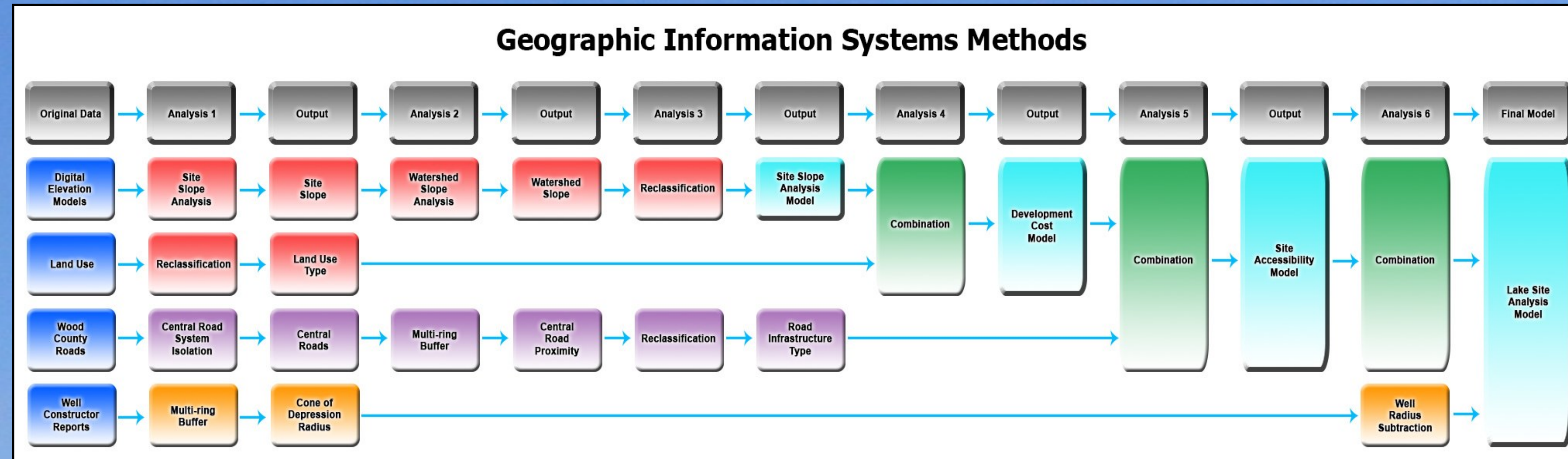


Abstract

A number of factors influence the location and creation of artificial lakes. These include geology, topography, hydrology, and infrastructure. Using the principles of ecological planning and Geographical Information Systems (GIS) modeling, we identified three of the most ideal and optimal sites for a man-made lake within a three mile radius of the city of Marshfield, Wisconsin. We then determined the feasibility of the three sites to sustain an artificial lake using a matrix analysis of factors such as costs, proximity to municipal wells, and soil types.



Methodology

We first began this project by exploring various types of lakes and how an artificial lake is made. We then looked at the Marshfield area to determine what factors were present for the construction of a lake. We determined that a drained lake would be the only feasible way to create a lake within the Marshfield area. With the factors now in mind, we set out using ARC GIS to execute an overlay geographic analysis based on the factors that we had determined earlier. Using the tools in ARC GIS, various datasets were manipulated and overlain to produce the analysis and determine three sites that possessed all the factors needed to create a manmade lake.

GIS Factors

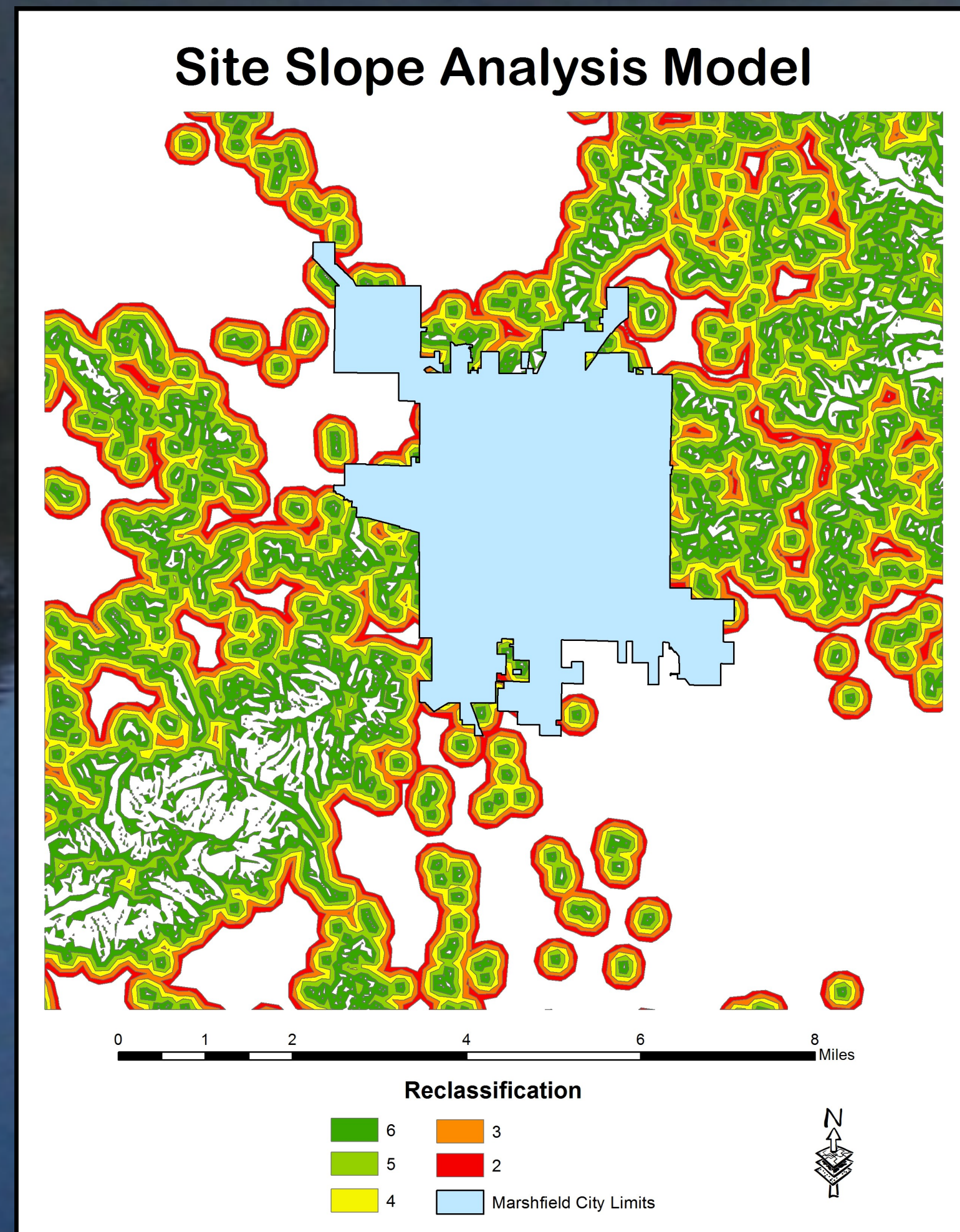
	Ideal	Moderate	Poor
Slope	0-3%	3-5%	>5%
Watershed slope	5-10%	10-15%	>15%
Proximity to high capacity well	1 mile	N.A	N.A
Road access	Within 500ft	500-2000ft	>2000
Land cover	Agriculture	Forest/wetland	Commercial/Residential

Site Rankings

	3 Excellent	2 Fair	1 Poor	Site A	Site B	Site C
Size (acres)	>200 acres	200-150	<150	3	2	2
Soils	High clay	Moderate clay	Well drained	3	3	3
Distance to amenities (golf courses, parks, etc)	Within 1 mile	Within 2 miles	Within 3 miles	1	2	2
Land use	Agriculture	Wooded	Built up	3	3	3
Water table elevation (based on best well)	Within 15ft	Within 25ft	>25ft to surface	1	3	1
Total				11	13	11

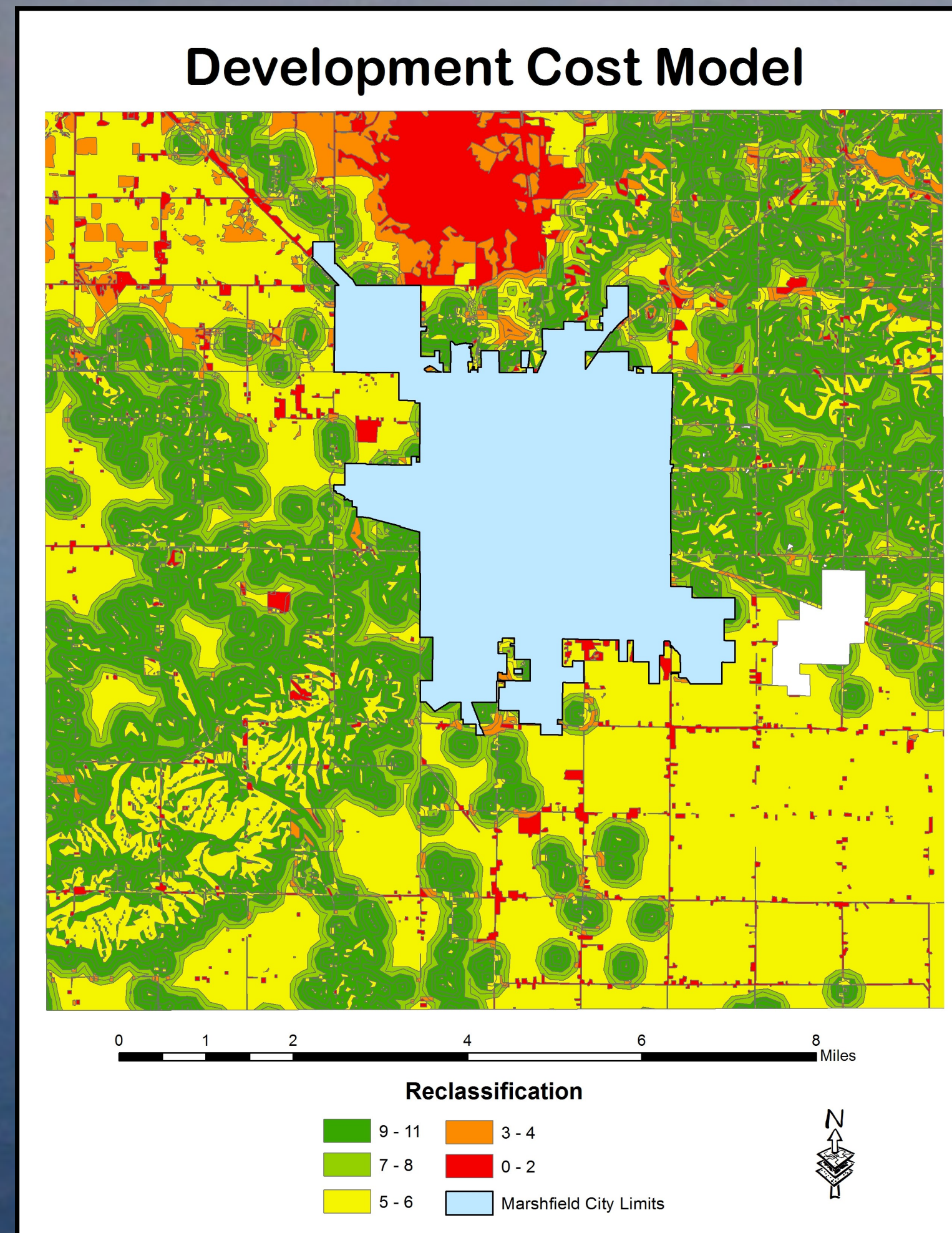
References

GIS Data. (n.d.). Retrieved, 2014, from City of Marshfield
 GIS Data. (n.d.). Retrieved, 2014, from \\oasis\GIS
 Marshfield Well reports. (n.d.). Retrieved, 2014, from http://datcpgis.wi.gov/SilverlightViewer_1_10/index.html
 View-er=WellConstructorReportsViewer=WellConstructorReports
 Poster Background. (n.d.). Retrieved, 2014, from <http://wallbase.cc/home>



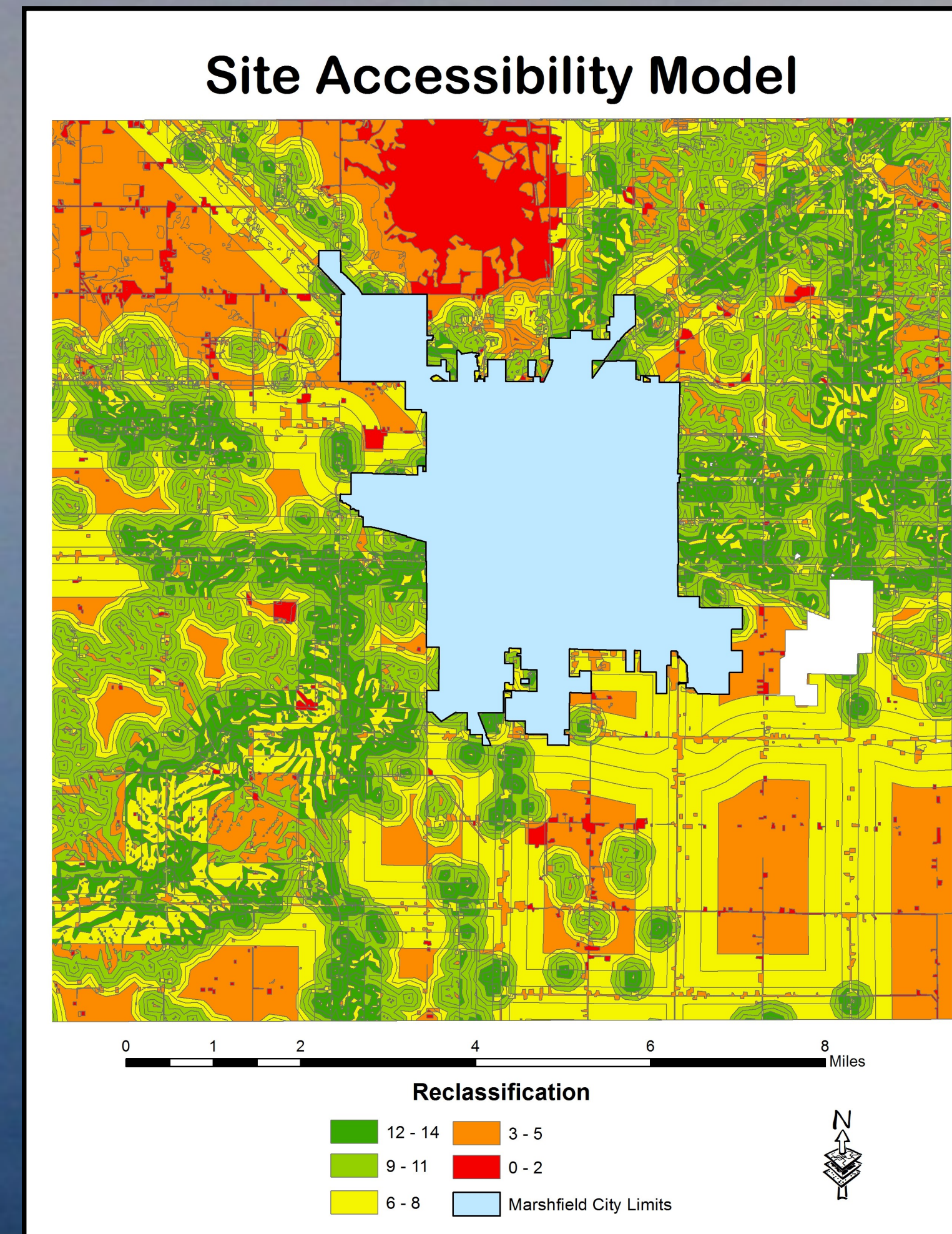
Site Slope Analysis

This map shows the topography of the Marshfield area. The high values on the map show a site that has a suitable slope to construct a lake as well as slope that is suitable for a surrounding watershed.



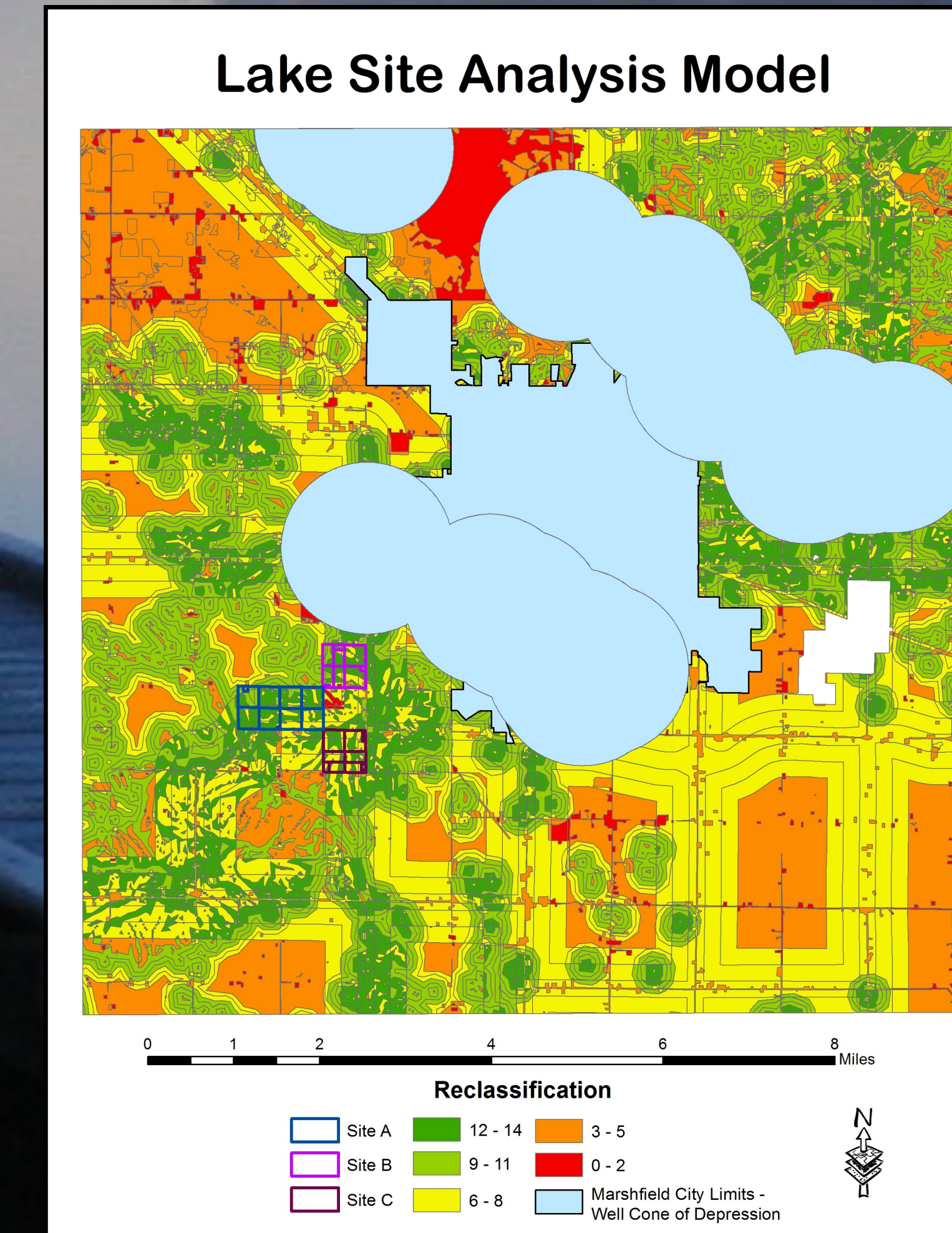
Development Cost

This map shows the combination of both site slope and land use as weighted variables. The high values on the map indicate areas in which there is both suitable slope and appropriate land cover for an ideal lake site.



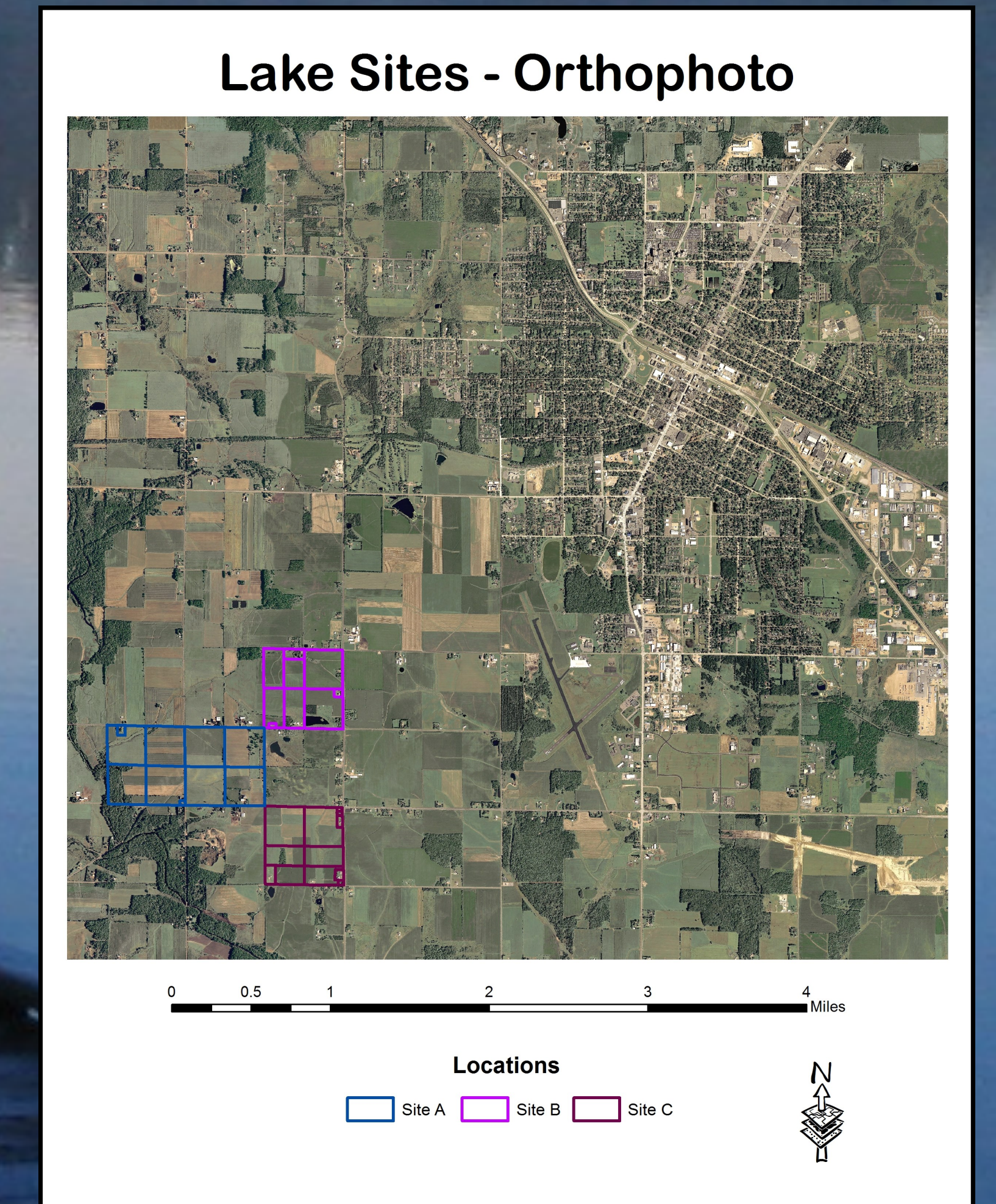
Site Accessibility

This map shows the combination of three variables, those being topography, road access, and land use. The high values on the map indicate areas in which there is appropriate slope and land use as well as ease of access from a nearby road.



Lake Site Analysis

This map is a combination of topography, land use, roads, wells and final sites. This map indicates ideal areas in the Marshfield area for the placement of an artificial lake. Those areas that have all the appropriate above factors are indicated by the indicated sites.



Lake Site Orthophoto

The map above is an orthographic image of the three selected lake sites. The three sites were selected using the GIS analysis procedures previously described.

