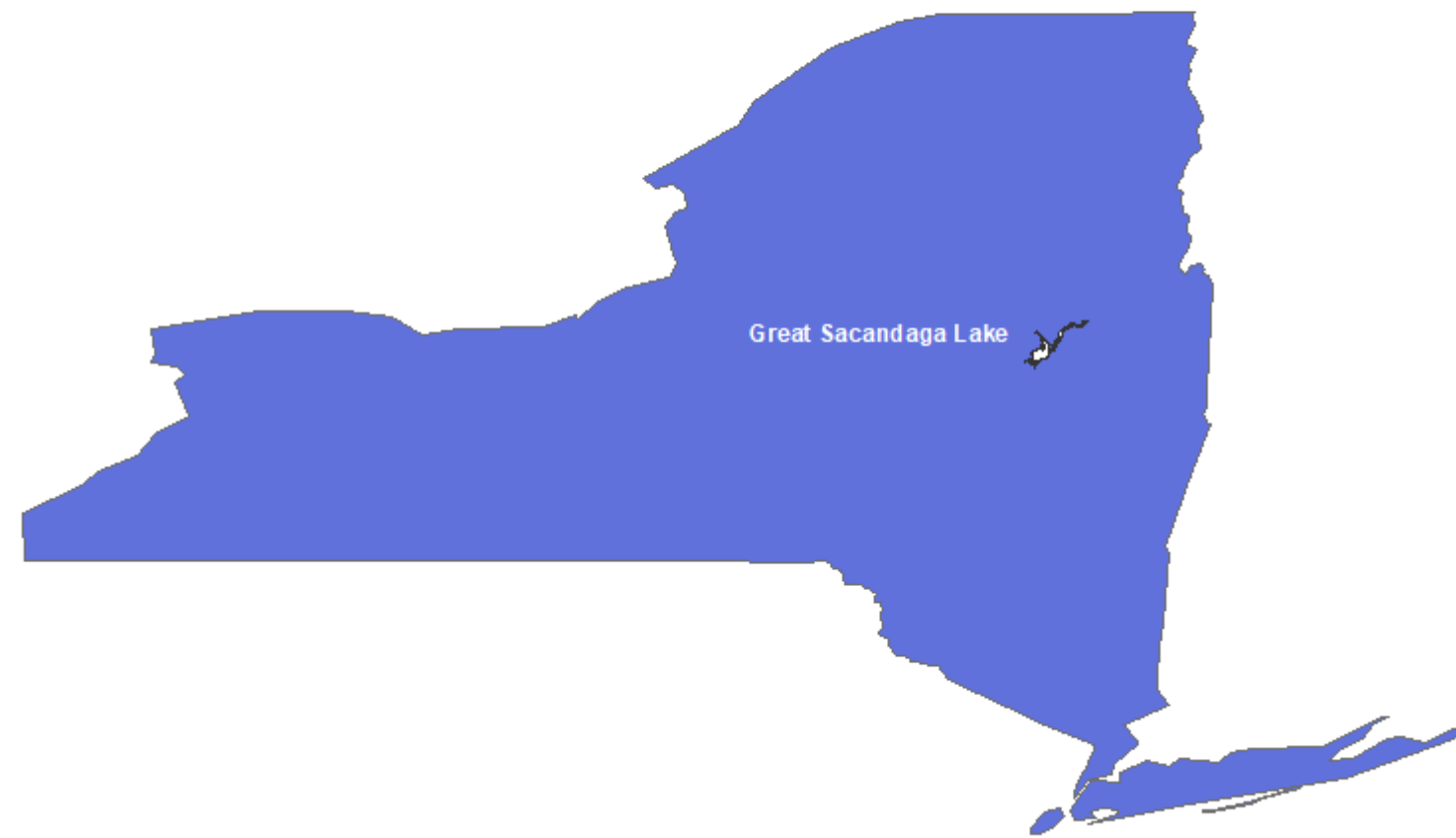


Do Not Wreck Your Boat:

An Analysis of Safe Locations for Watersports on Great Sacandaga Lake



Introduction

As a child, I spent nearly every summer swimming and boating on New York's Great Sacandaga Lake in the Adirondack Mountains. The lake is a summer destination for thousands of vacation-goers and sees constant boat traffic annually from May through September. The lake was originally man-made and features a plethora of islands and shallow areas that make it difficult to find safe areas for boating, especially during the summer. In this project, I wanted to analyze boating obstacles (both above water and below water) to find Great Sacandaga Lake's safest locations for watersports.

Research Question: What areas of Great Sacandaga Lake are safest for watersports?

Criteria for Deeming an Area "Safe for Watersports"

- At least 100 feet from shoreline and islands
- Water depth at least 10 feet
- At least 50 feet from marker buoys

Methodology

To determine which areas of the lake are safest for watersports, I needed to first identify potential boating hazards. These included above-water hazards, such as docks and buoys, as well as below-water hazards such as shallow areas and rocks. To find above-water hazards, I used a database containing the XY coordinates of the lake's serial-marked buoys. Great Sacandaga Lake has over 200 buoys that are used to mark shallow areas, rocks, and navigation channels. The locations of every buoy are displayed in Figure 1 below. New York State also allows lakeside landowners to install docks up to 40 feet from the shore, so I also deemed any area within 100 feet of the shoreline as being unsafe for watersports. Water depth is also a key factor in watersports safety, so I needed to incorporate lake depth data into my analysis. The New York State Office of Parks and Recreation recommends a depth of at least 10 feet for operating a motorboat, so I identified areas of the lake that were 0-10 feet, 10-

20 feet, and 20+ feet deep (shown in Figure 2). Any areas of water that were under 10 feet deep were deemed as being unsafe, areas of 10-20 feet were deemed as being relatively safe, and areas of 20+ feet were considered as being the safest.

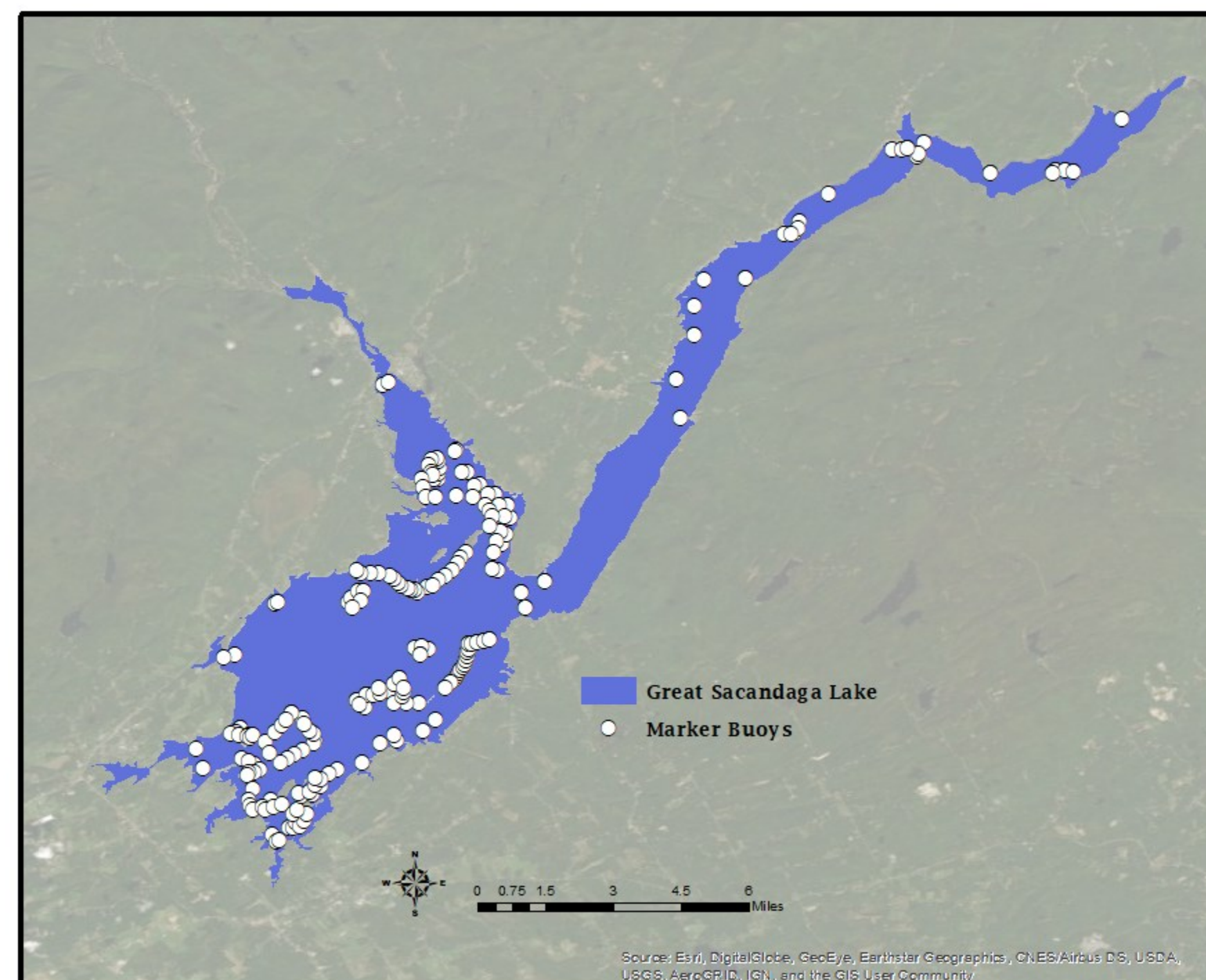


Figure 1: Locations of Great Sacandaga Lake Marker Buoys

Limitations/Sources of Error

One major limitation of this analysis was a lack of available lake-depth raster data. I was not able to find any raster data for the depth of the lake, and instead I relied on printed maps to draw vector polygons to match lake-depth contours. As a result, the lake depth is not mapped perfectly, but Figure 2 gives a sufficient visual approximation of the lake's depth.

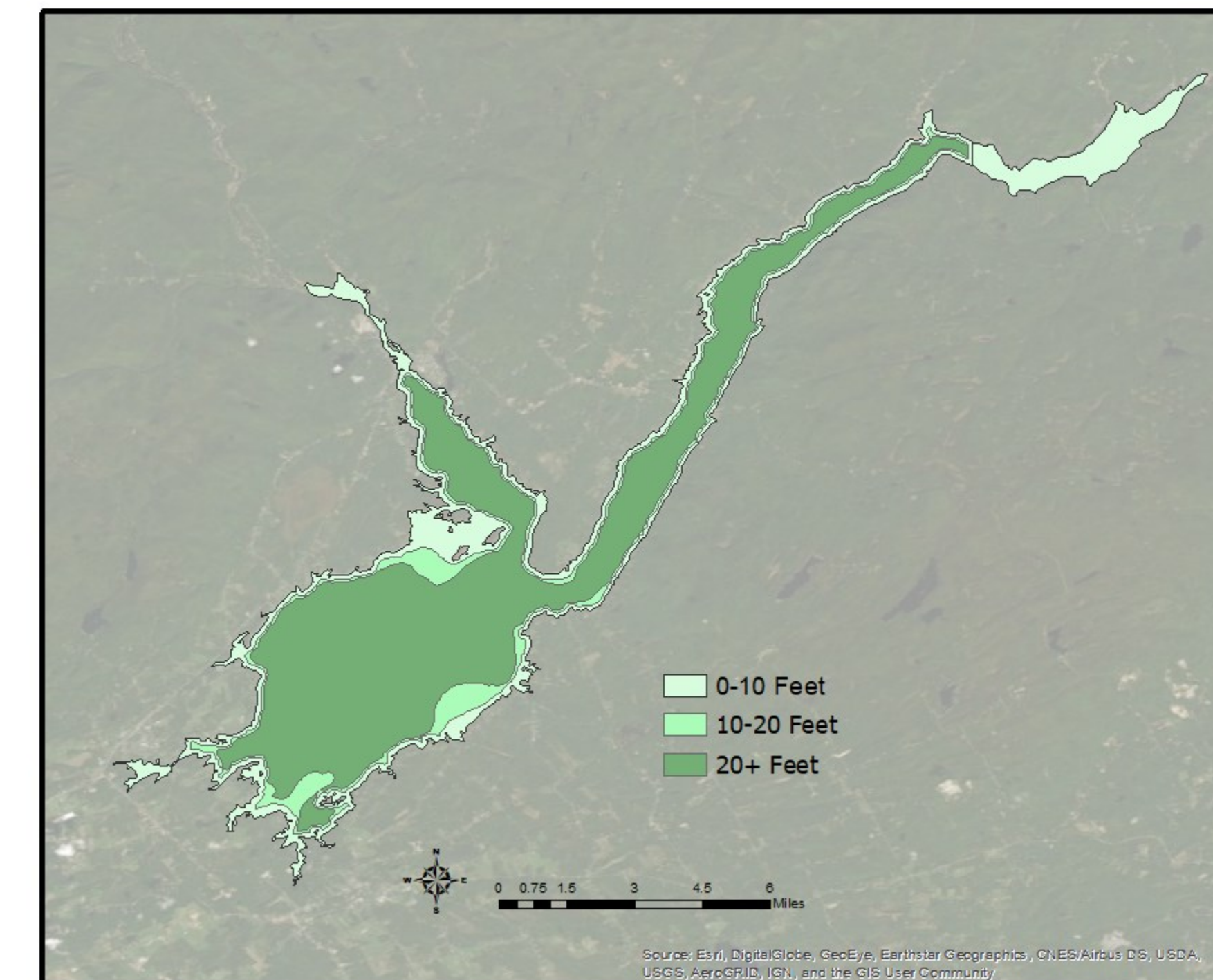
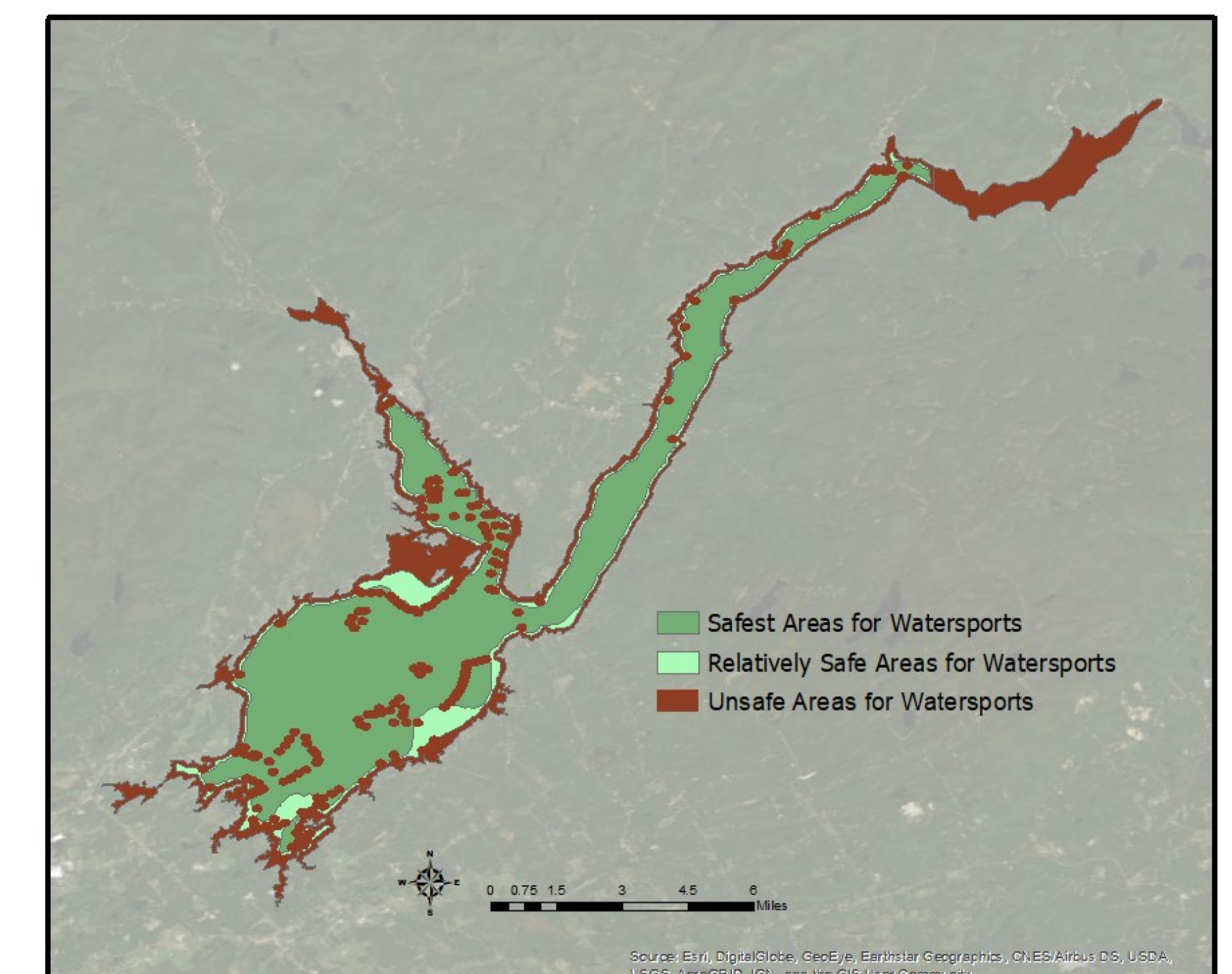


Figure 2: Great Sacandaga Lake Depth Map

Results

The results of my analysis are shown in Figure 3 below. After creating a final map of unsafe areas, relatively safe areas, and safest areas, the results are about what I expected. The dark green areas of the lake are the safest, the light green areas are relatively safe, and brown areas are completely unsafe. The lake is shaped in such a way that it includes two "arms" that extend north and northeast from the middle of the lake, and this creates a lack of large, wide-open expanses of water. There are also chains of islands in the southern parts of the lake that create obstacles for boaters, as well as a chain of islands known as the "Trap Islands" shown by the largest brown area in the north-central part of the lake. These areas are the most unsafe for watersports, whereas the most central part of the lake and the arm that extends to the lake's northeast were deemed to be the most safe. In general, it was discovered that most of the lake is free of obstacles such as buoys and docks and has sufficiently deep water, but this research provided valuable analysis in finding which areas to avoid when operating a motorboat for watersports.



Tufts

Created by Carston Kopf

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GIS 101 Fall 2019

Professor Rebecca Shakespeare
Coordinate System: GCS WGS 1984

Projection: Lambert Conformal Conic

Data Sources: ESRI, Mayfield Yacht Club, MassGIS, Digital-Globe, NYS Office of Parks and Recreation

