Where Do Women Face Risks?

Assessment of Reproductive Health Vulnerability in Sierra Leone
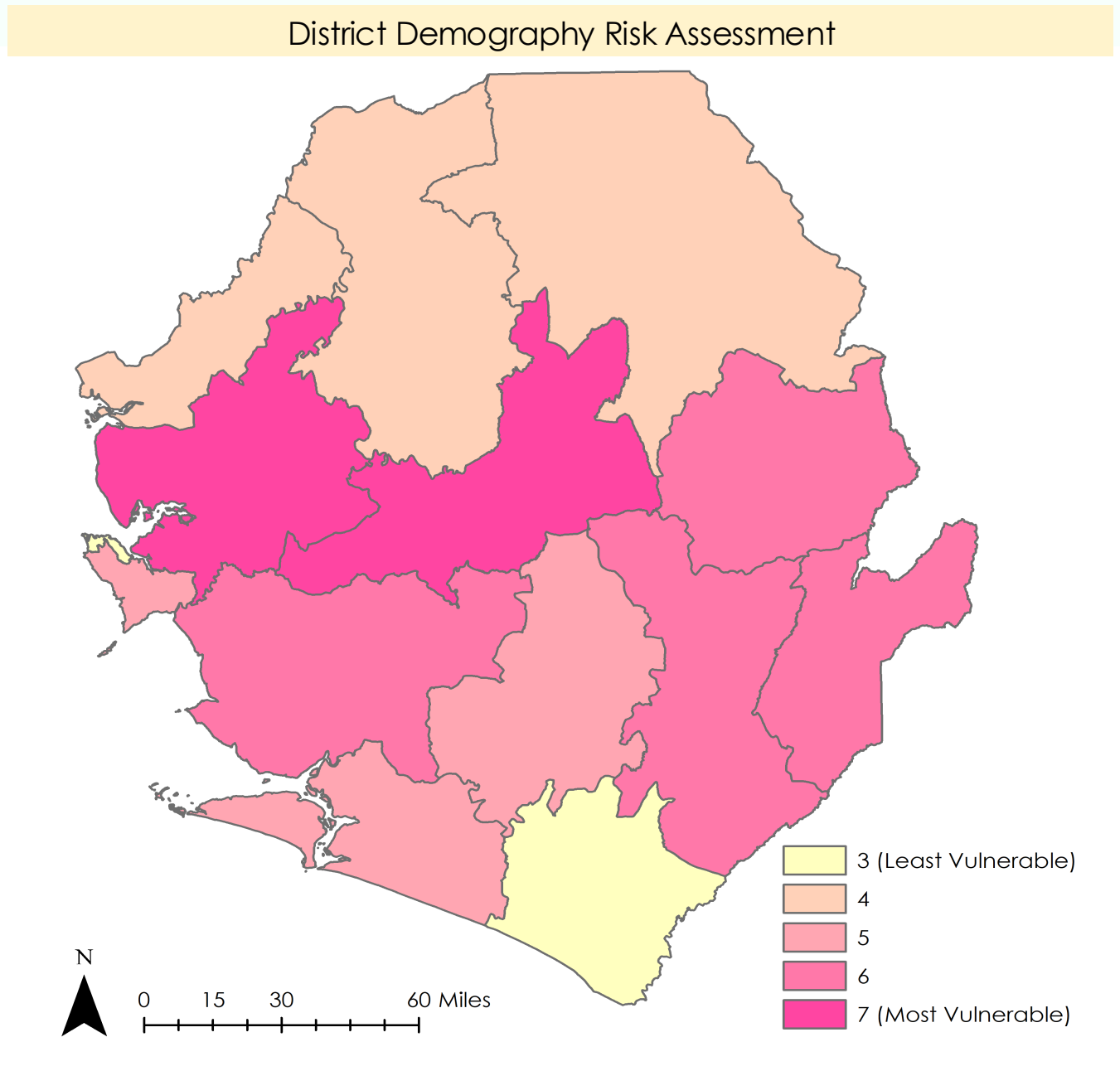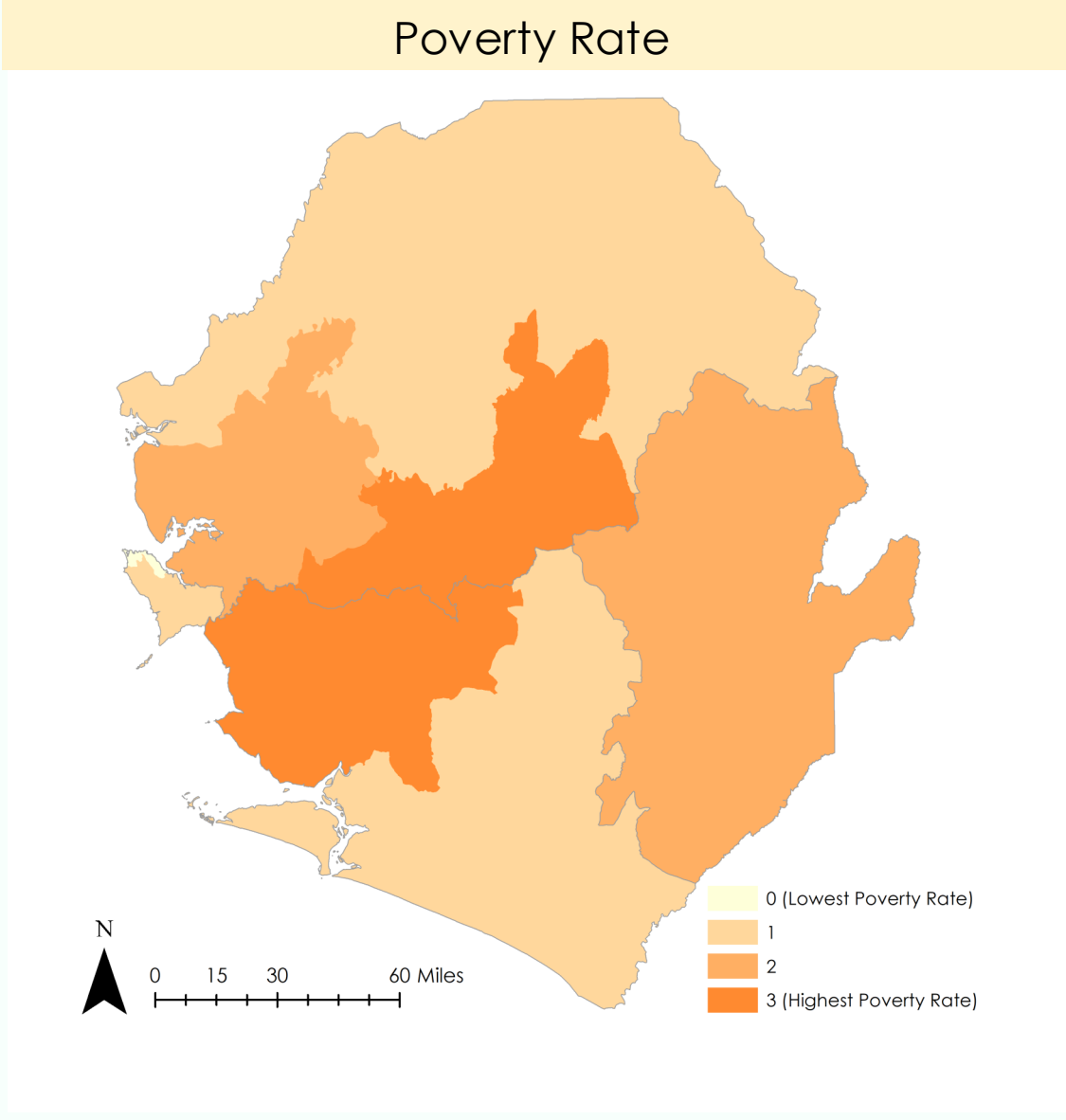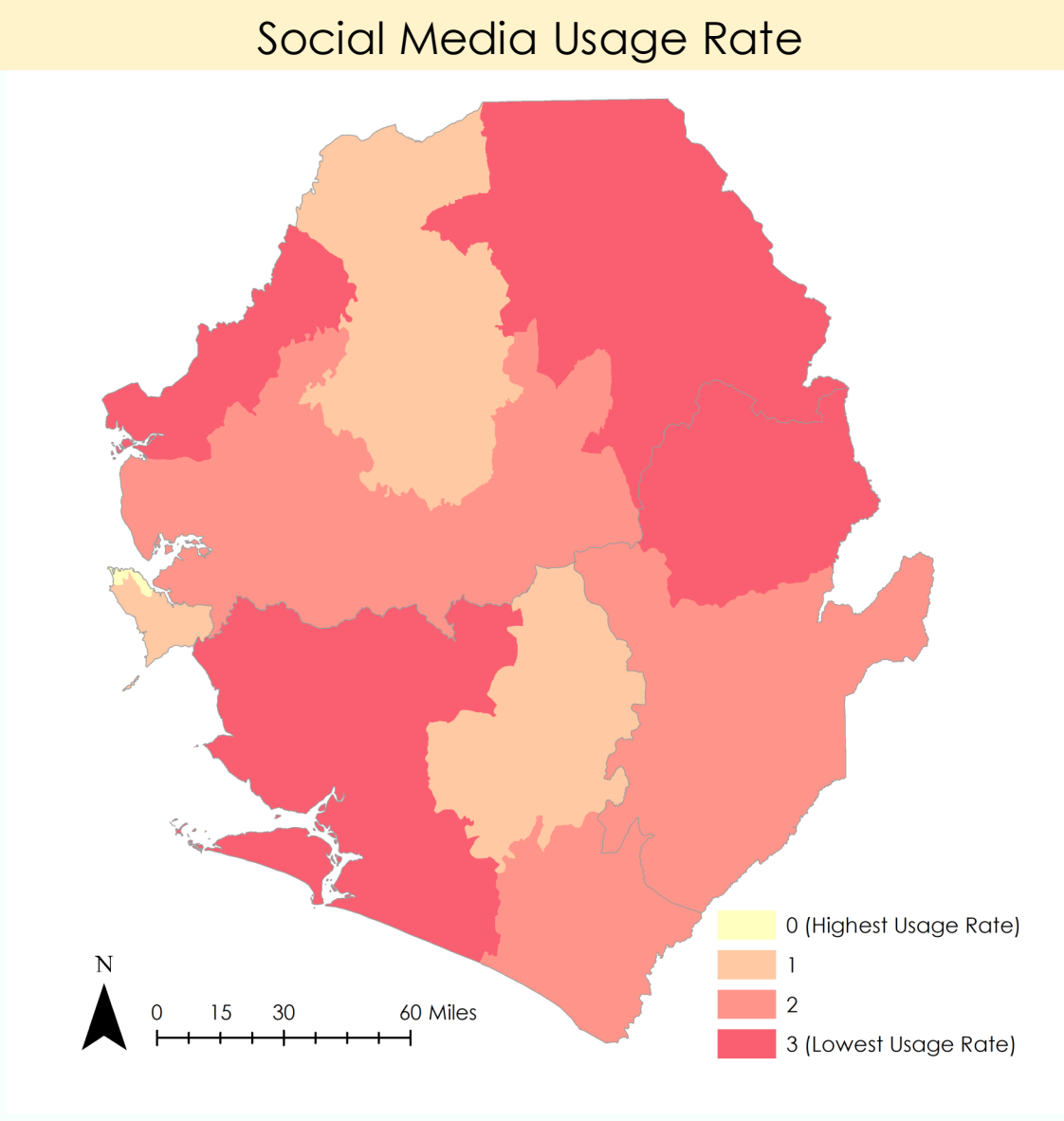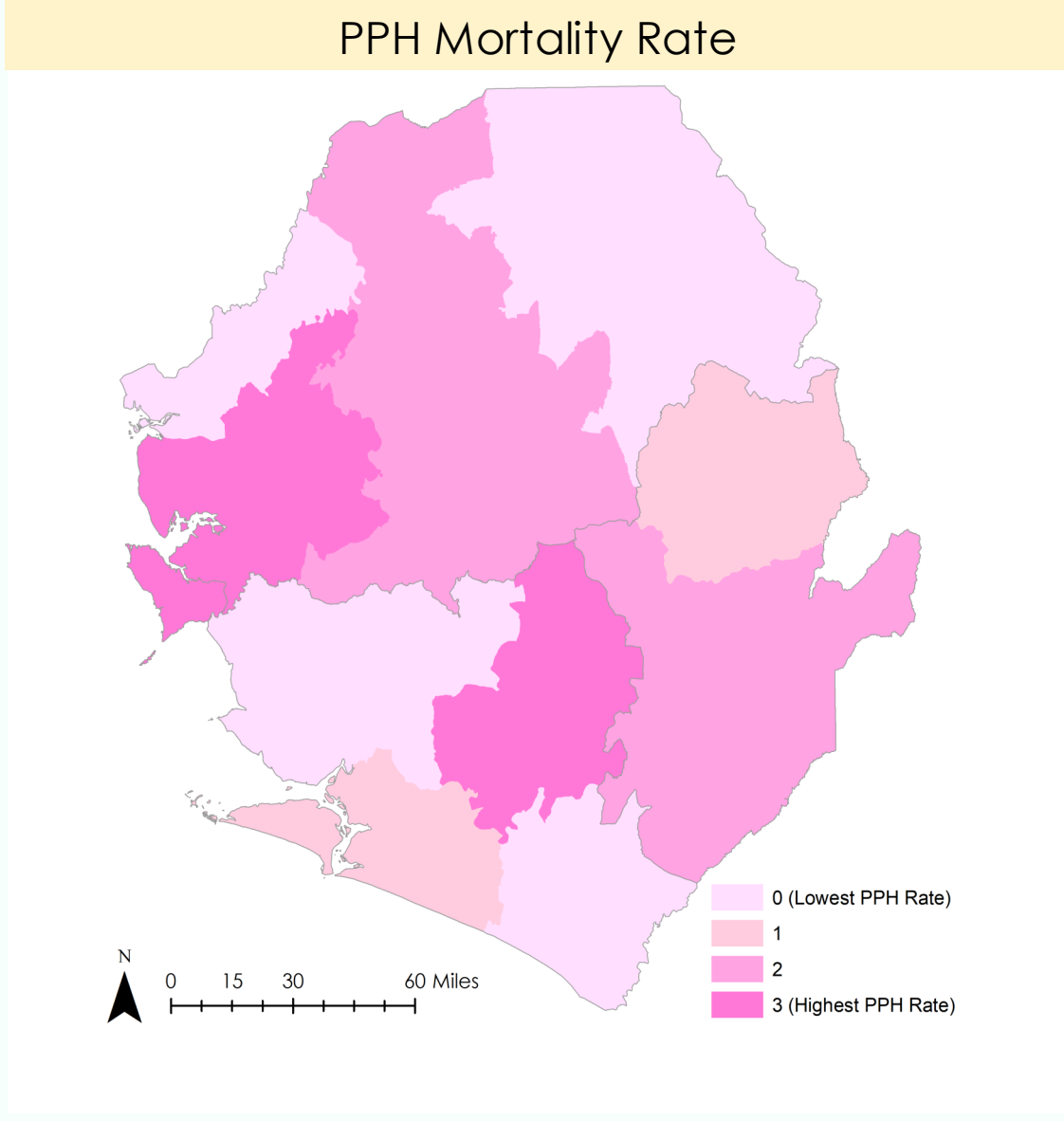
Objective: The purpose of this project is to assess reproductive health vulnerability in Sierra Leone, which has one of the highest maternal mortality rates in the world (1,120 / 100,000) as of 2017. As a conclusion, this project proposes where and how many women need help to prevent their maternity death the most. The demographical analysis assesses various factors in Sierra Leone, such as maternal mortality caused by postpartum bleeding (PPH), poverty rate, and social media usage rate. PPH is the highest cause of maternal mortality in Sierra Leone, and assessing social media usage rate is important for women to be up-to-date on maternal risks and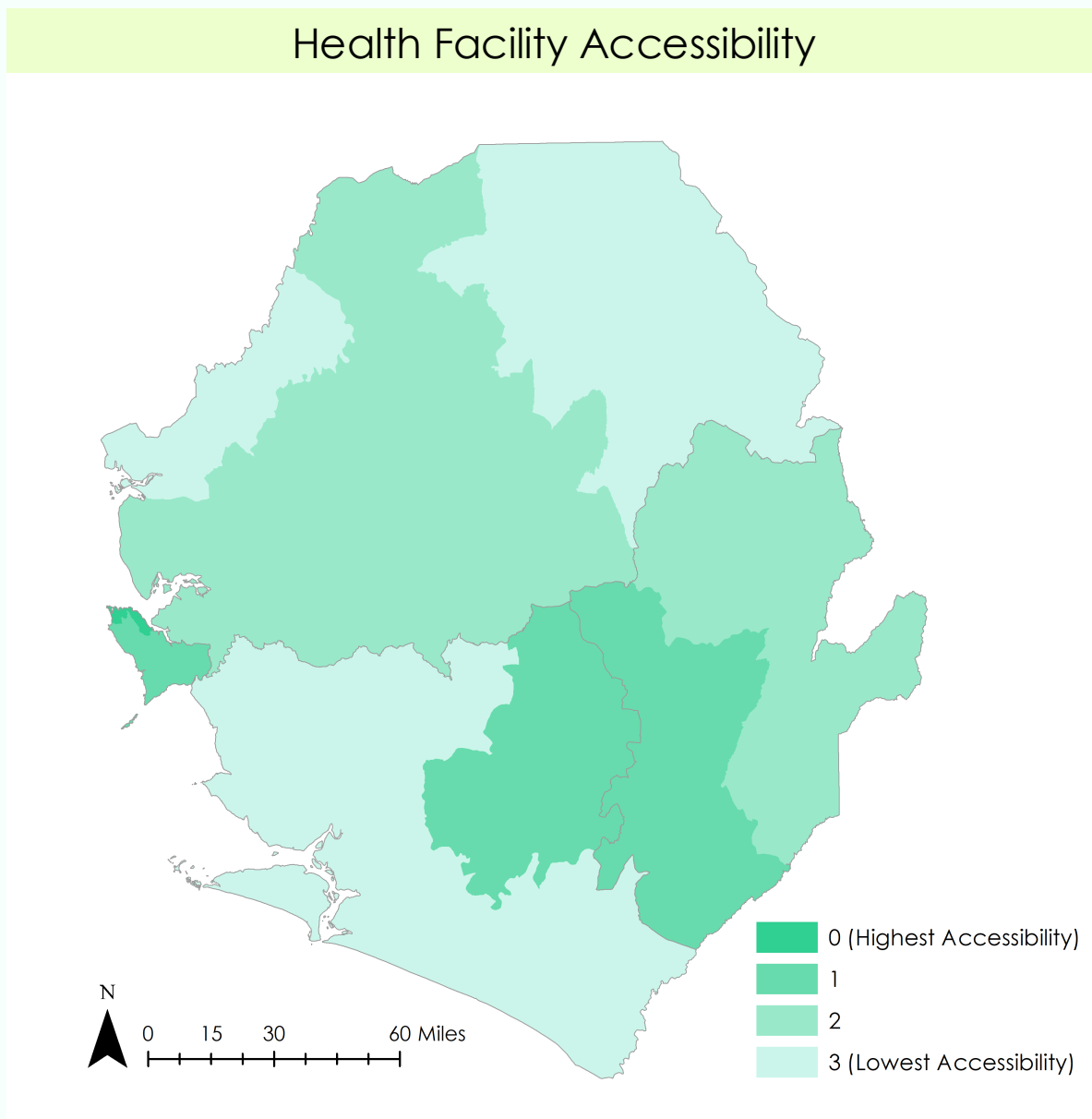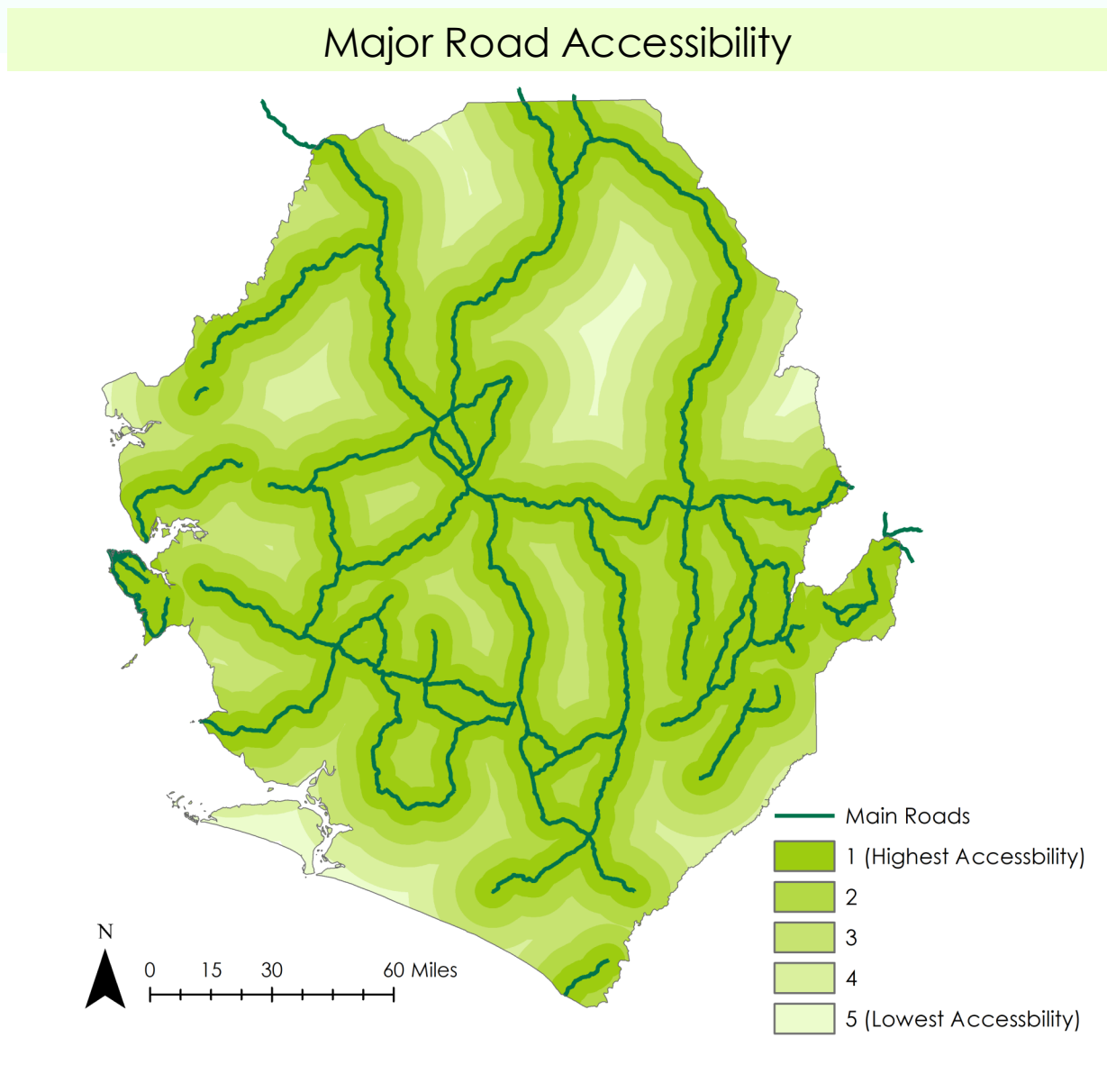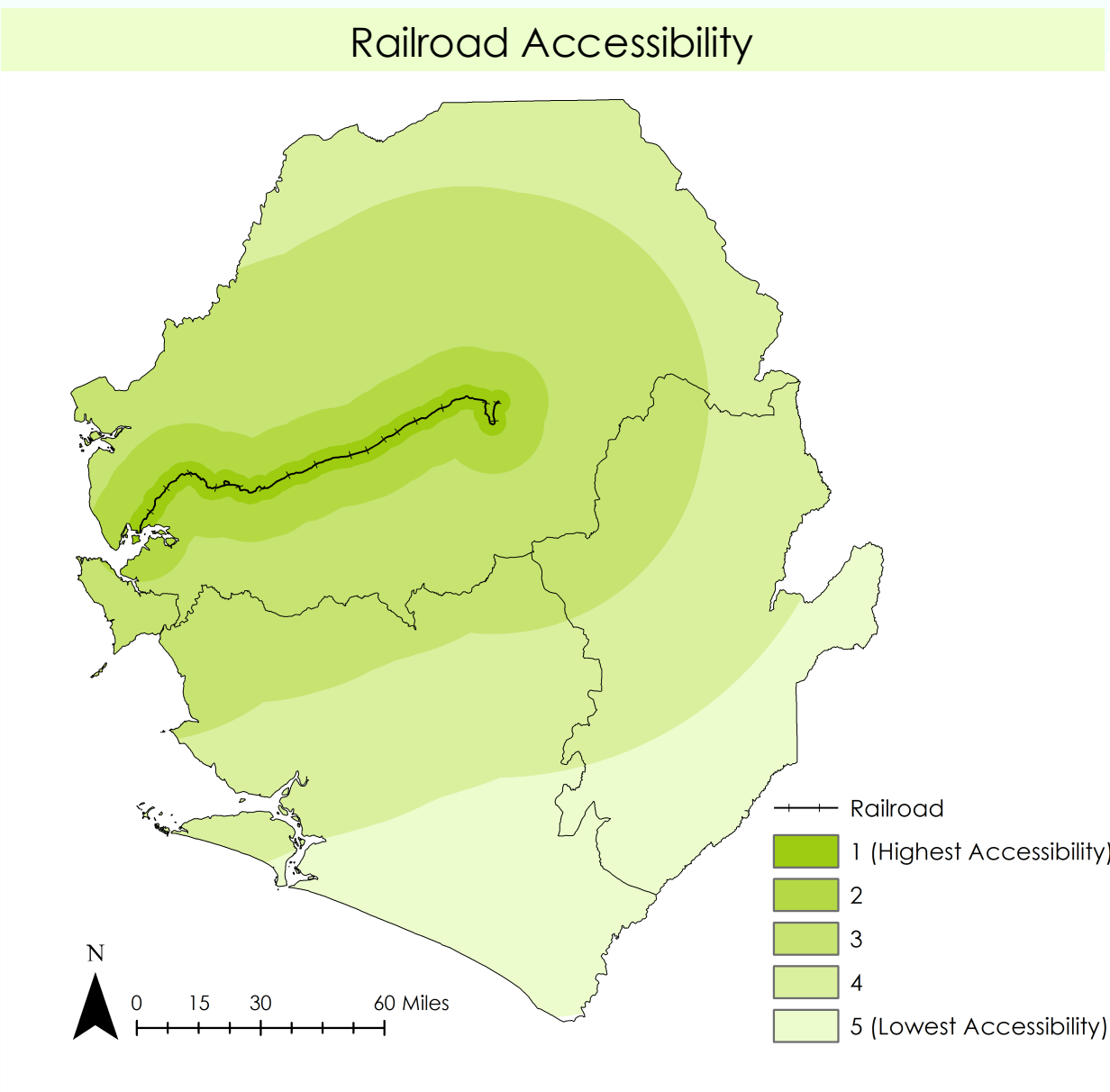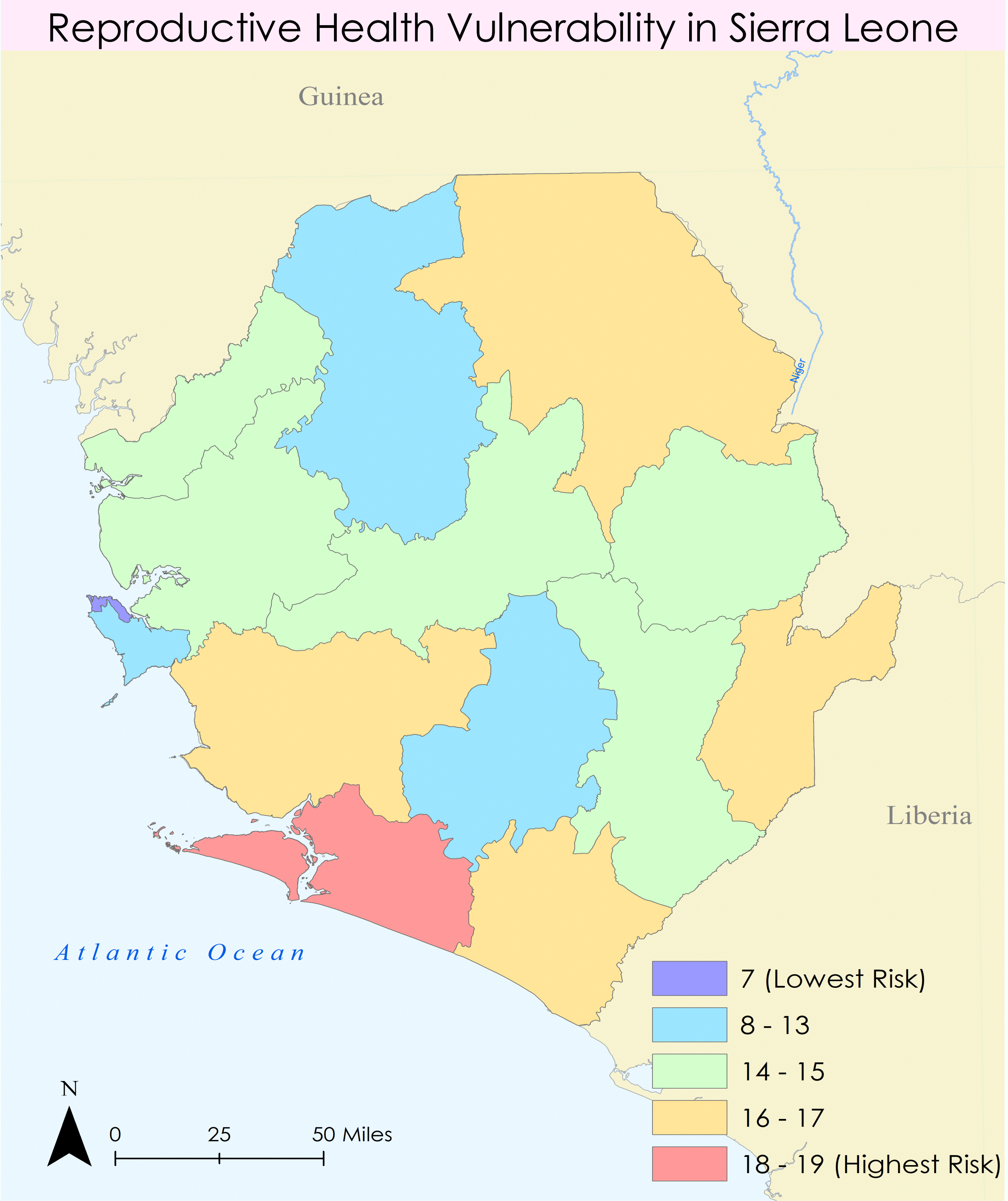 preventions. Analysis of accessibility is conducted to take a look at how accessible existing health-related facilities are. It focused on accessibility to hospitals including health centers, water sources, major roads, and railroad. It is believed that access to those facilities is vital in preventing most of the maternal mortality in Sierra Leone.

Methodology: I first assessed risk factors by evaluating statistical data available from the 2015 Sierra Leone Census and other health-related researches published by academic institutions. The demography risk factors consist of three areas: maternal mortality due to PPH, social media usage, and poverty. The score of 0 to 3 were given for each district, reflecting a different level of vulnerability for each factor. The score of 3 represents higher vulnerability whereas the score of 0 represents relatively better environment in relation to each factor. The scores from the three areas were combined in the 'District Demography Risk Assessment' map to reflect the comprehensive risk factor in each district. The field calculator was heavily used in order to assign each district with different scores. The second step focused on accessibility. This analysis focused on how far hospitals including health centers, water source, major roads and railroad are from different parts of Sierra Leone. Just like the risk factors analysis, the high score was given for low accessibility, and low score was given for higher accessibility. In order to better reflect differences and importance, different distances were weighted in score scales. Based on the census data, I calculated the number of households walkable (less than 1 mile) by the district to health facilities and water sources. For accessibility to the major roads and railroad, Euclidean distance tool, reclassification, zonal statistics by table, and field calculator were heavily used.

Finally, all scores from accessibilities were added together, projecting the comprehensive 'District Accessibility' Map that reflects a different level of accessibility in Sierra Leone. The District Risk Assessment map and the Accessibility Map were then combined to reflect overall reproductive rights vulnerability in the 'Reproductive Health Vulnerability in Sierra Leone' Map. This was done by a joint tool and field calculator provided in a Spatial Analyst Toolbox. The five most vulnerable districts were noted by means of combined scores. The five most vulnerable districts based on scores are Pujehun, Bonthe, Kailahun, Koinadugu, Moyamba. Women in Bonthe are found to be at risk the most. I created a table based on the score to present population distribu-

Result: According to the findings, more than 25% of women in Sierra Leone are facing severe risks of maternity death. It is not surprising that the Western Area Urban, which the capitol locates showed the best accessibility and the quality of health. However, only 14.7% of women are benefitted by such relatively safer environment. Women from most of the areas are facing difficulties to prevent their maternity death. The result shows that even though urbanized areas in Sierra Leone are showing progress in improving the quality of health, rural areas still lack basic access to health care, water, or information. It is important to note that not all possible factors are presented in this map. Even though the seven different indicators were considered to analyze the risk of women in Sierra Leone, other factors, such as ed-

Distribution of Population in Sierra Leone based on Vulnerability Score

Population Score	Total Population	Female Population	Distribution of Female population
7	1,055,964	527,757	14.7%
8-13	1,626,292	827,689	23%
14-15	2,608,276	1,223,197	34%
16-17	1,600,800	813,148	22.6%
18-19	200,781	101,767	2.8%

Reproductive Health Vulnerability in Sierra Leone

- 7 (Lowest Risk)
- 8 - 13
- 14 - 15
- 16 - 17
- 18 - 19 (Highest Risk)

Railroad Accessibility

Major Road Accessibility

Health Facility Accessibility

Water Accessibility

District Accessibility

PPH Mortality Rate

Social Media Usage Rate

Poverty Rate

District Demography Risk Assessment

Cartographer: Koto Takashima

The Fletcher School of Law and Diplomacy

Course: DHP P207 GIS for International Applications

Date: December 17, 2019

GIS Data source: Statistics of Sierra Leone, Humanitarian Open Street Map, OCHA, Standby Task Force

Coordinate System: Africa Albers Equal Area Conic

THE FLETCHER SCHOOL
TUFTS UNIVERSITY