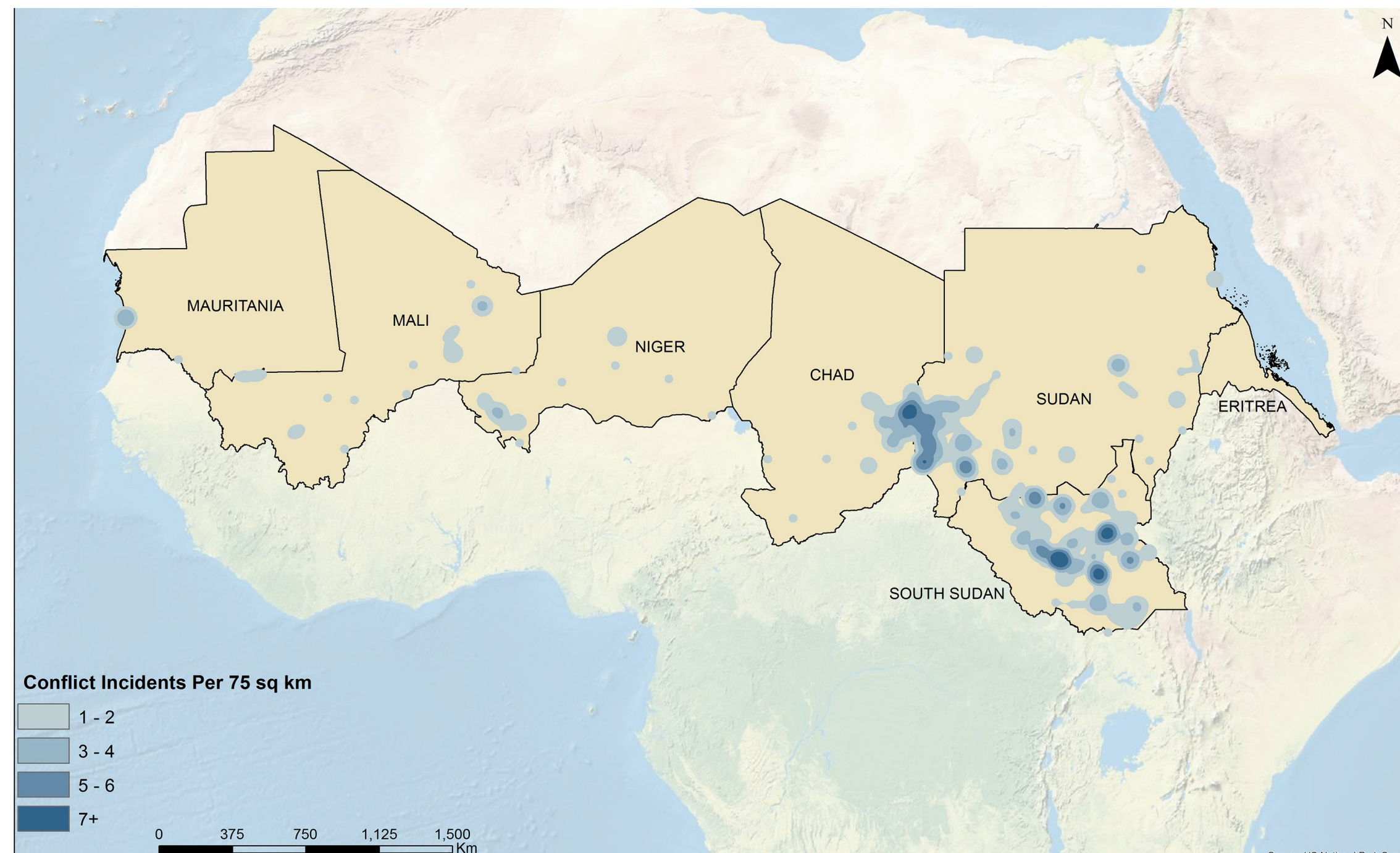


The African Sahel: Identifying Potential Drought Related Ethnic Conflict

Background

For years, scientists have warned that changing climatic conditions can complicate existing security problems: wars, refugee flows, and ethnic conflict. Africa's Sahel region, dividing the Sahara Desert from the continent's tropics, is especially vulnerable. Inhabited largely by pastoralists and farmers from myriad ethnic and cultural groups, at least 315 incidents of dry season violent ethnic conflict have been recorded since 1997.

Dry Season Violent Ethnic Conflict: 1997 - 2013



While the circumstances behind the factors that drive violent ethnic conflict are specific to the incidents themselves, long-term drought environments can intensify existing crises. Over the past several decades, the Sahel has experienced a series of droughts and famines. Identifying areas where drought may have played a role in exacerbating conflict offers the opportunity to study past conflict mitigation approaches and adapt lessons learned to similar ongoing and future conflicts.

Spatial questions: Is there a geospatial relationship between long-term drought conditions and ethnic conflict? Where are the geographic areas in which drought conditions could have contributed to persistent violent ethnic conflict?

Limitations

This project demonstrates methods of spatial analysis that can be used to identify correlation between long-term causal variables (to include drought) and ethnic conflict. Without using regression analysis, it is not possible to identify the relationship between short-term drought incidents and ethnic conflict. This analysis is dependent upon the accuracy and completeness of data from numerous sources: accurate maps of roads and primary water sources, up-to-date census data of ethnic boundaries, and conflict data that identifies not only the actors involved in violent incidents but also correctly classifies the cause of conflict between actors of different ethnic groups.

Cartographer: Justinas Sileikis

Date: May 4 2014

Course: GIS for International Applications

Projection: Africa Albers Equal Area Conic

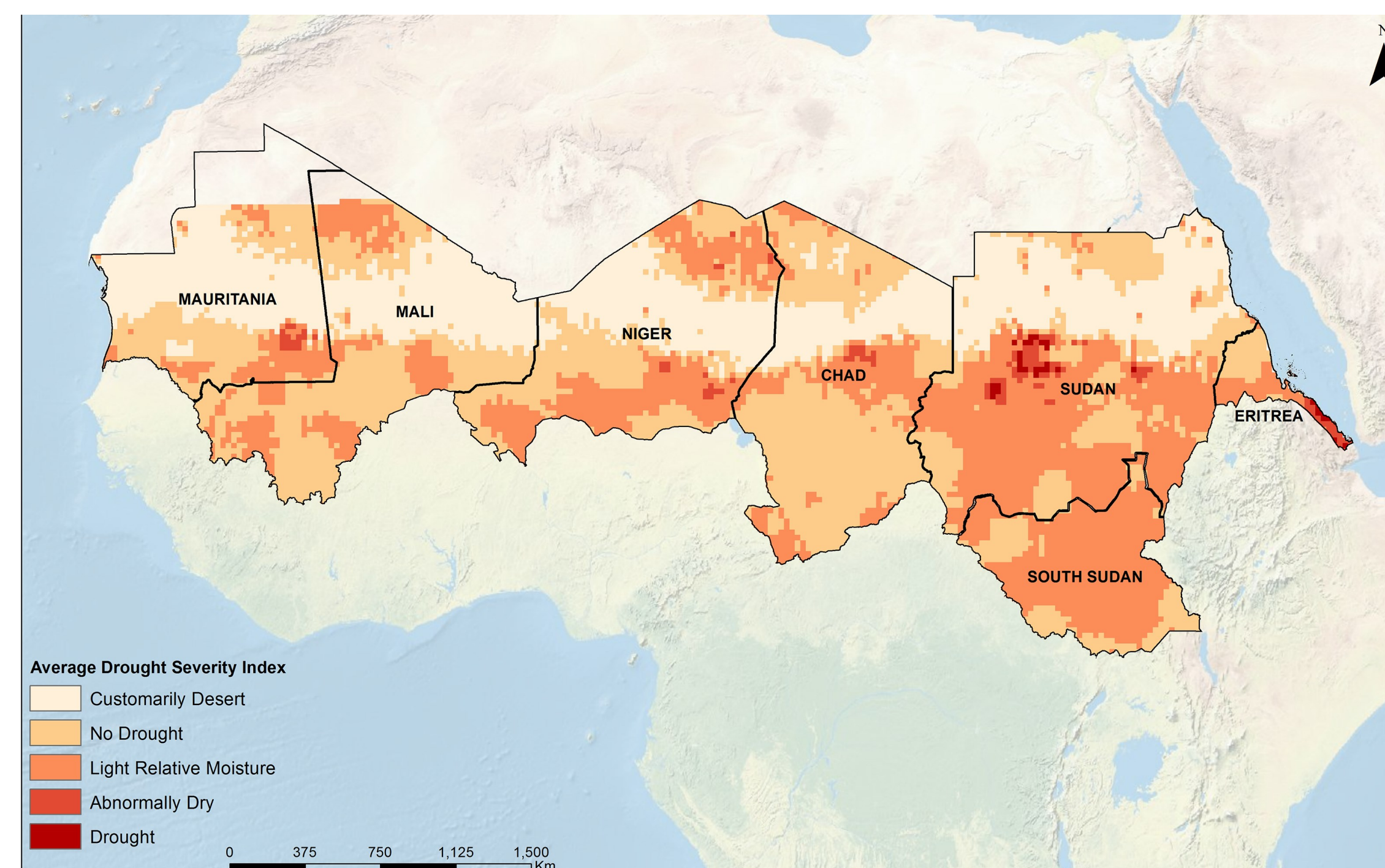
Sources: Armed Conflict Location and Event Data Project (ACLED) All Africa Version Four, African Flood and Drought Monitor monthly drought index (Jan. 1997 - Dec. 2013), Humanitarian Response: Common and Fundamental Operational Datasets Registry, DIVA - GIS, Tufts M Drive

Methodology

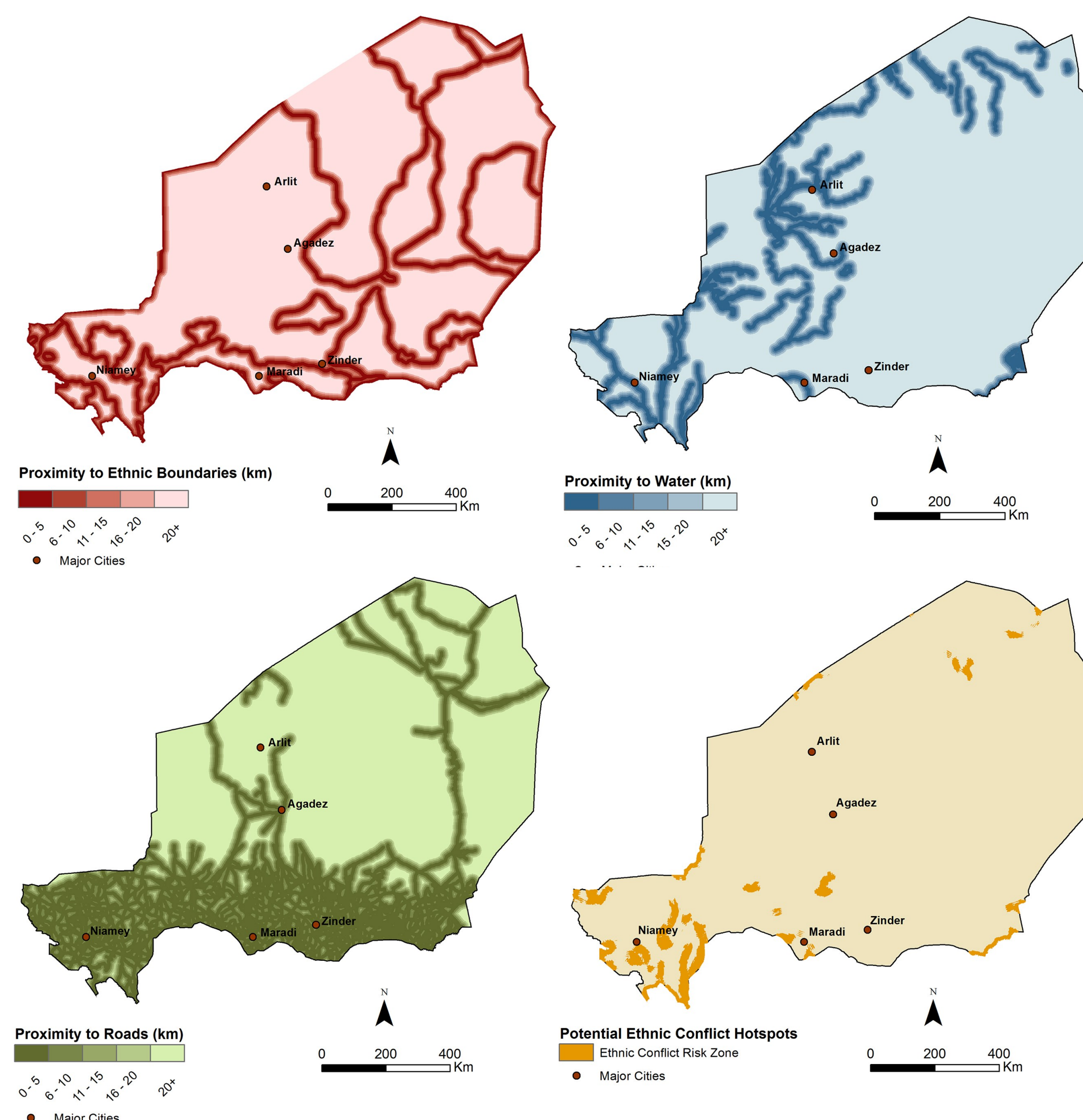
In order to spatially identify areas in which long-term drought conditions could have contributed to violent ethnic conflict (conflict between tribal groups or conflict over livestock/pastoral concerns and/or water access), a two-level conflict vulnerability and drought framework was constructed.

Step 1: Utilizing monthly drought severity index information from 1997 - 2013, soil moisture data of all dry season months (October through May) was averaged via spatial analysis and reclassified to identify long-term regional drought trends.

Average Monthly Drought Severity: 1997 - 2013



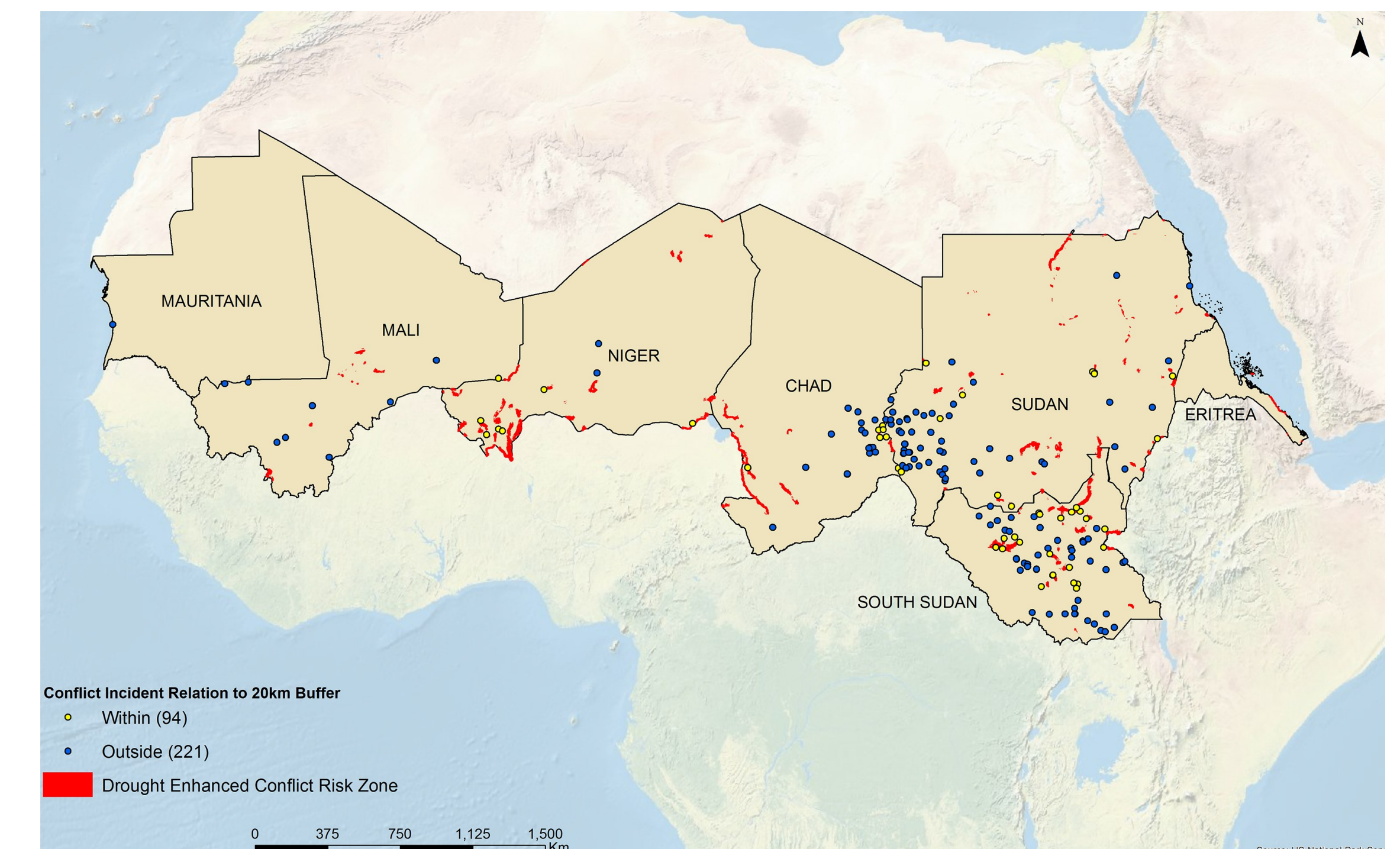
Step 2: Euclidian distance spatial analysis of causal variables of ethnic conflict (proximity to populated areas, proximity to water sources, and proximity to ethnic boundaries), was calculated and reclassified to identify areas in which the three variables overlap to within 20 kilometers to create an "ethnic conflict risk zone."



Analysis and Conclusions

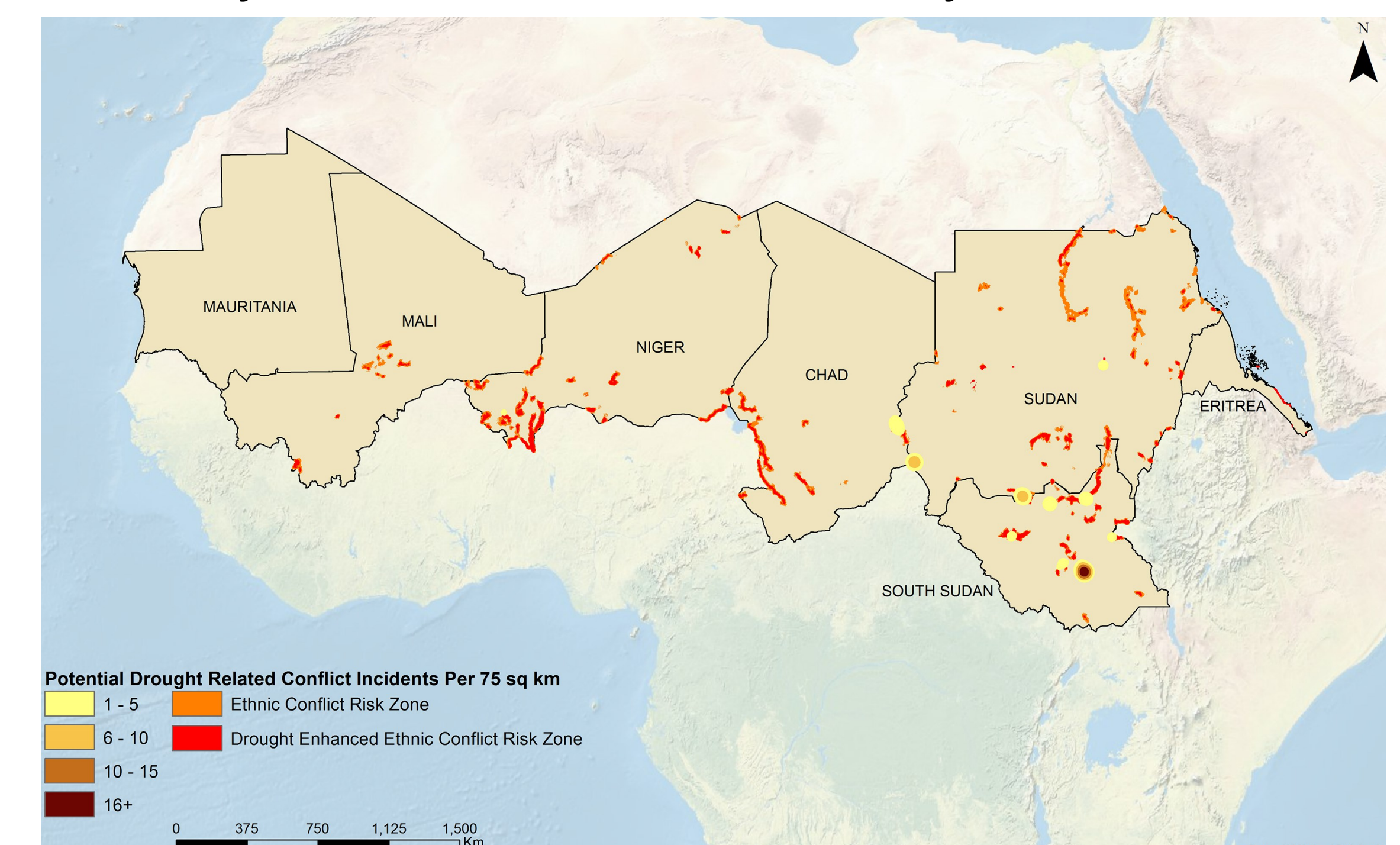
Following the use of spatial analyst calculating tools to combine the ethnic conflict risk zone matrix with average drought severity index information, output was reclassified to create a spatial representation of "drought enhanced conflict risk zones."

Conflict Locations and Vulnerability Areas: 1997 - 2013



Analysis shows that there is not necessarily a correlation between the location of potential ethnic conflict hotspots susceptible to long-term drought conditions and the location of ethnic conflict. Of the 315 incidents of violent conflict from 1997 - 2013, only 94 took place within 20km of areas identified as drought enhanced ethnic conflict risk zones (30%).

Density of Conflict Incidents Near Vulnerability Areas: 1997 - 2013



However, kernel density analysis indicates that in some areas, there may be some correlation between the long-term density of ethnic conflict and drought-susceptible ethnic conflict hotspot areas. As these regions have been plagued with traditional ethnic conflict for years (Darfur, the border region between Sudan and South Sudan, and parts of South Sudan), further research into identifying the degree that drought has played in these areas can potentially help in the design of approaches to mitigate underlying causes of localized ethnic conflict.