

Analyzing Drought Vulnerability Analysis : United States

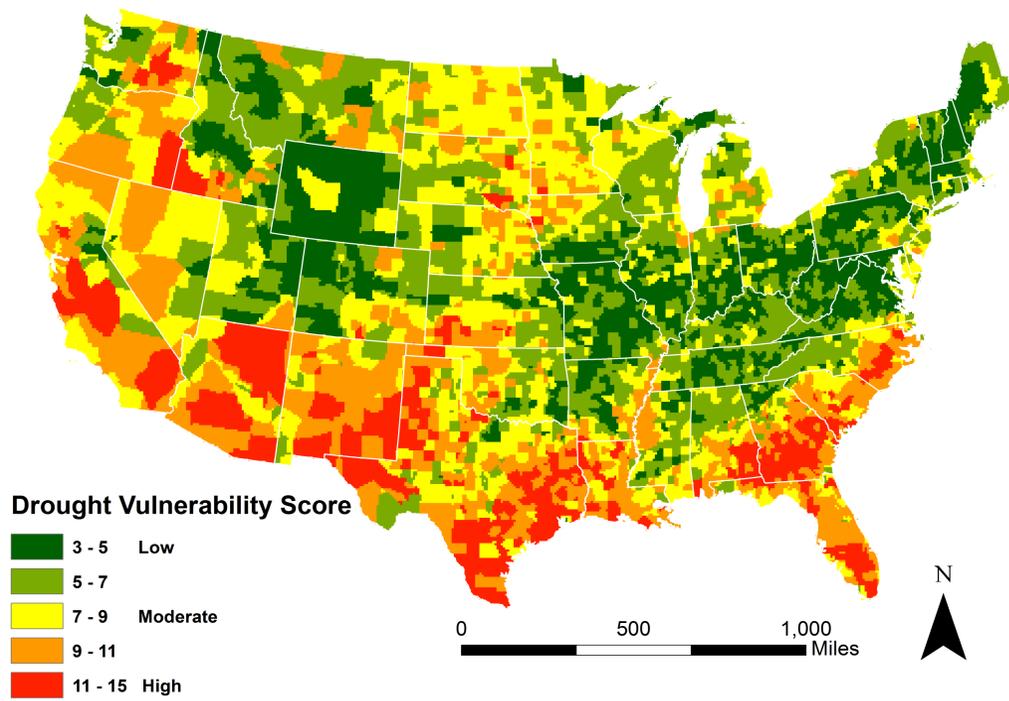
Introduction

Vulnerability is defined by the various factors that classify an individual, community, or population as susceptible to the impacts of a hazard. The most commonly noted are: social, economic, and environmental elements. Studies have shown that in the event of disasters, it is vulnerable populations that suffer the most unfavorable effects. Thus, it remains crucial that these populations are identified in order to mitigate the impacts experienced in the event of a disaster.

Methodology

This analysis involved aggregating ten indicators to produce a final drought vulnerability map using 2012 data. The final map is a compilation of 10 individual data sets that were rasterized, reclassified on a 1 – 5 vulnerability score and they were overlaid. All information was categorized by quantile and ranked low to high on a 1 – 5 scale. Two exceptions: Dams and domestic served by public water supply were ranked in reverse because those with more dams and water supply were less vulnerable to drought. In addition, drought data was reclassified and ‘no data’ locations were accounted for.

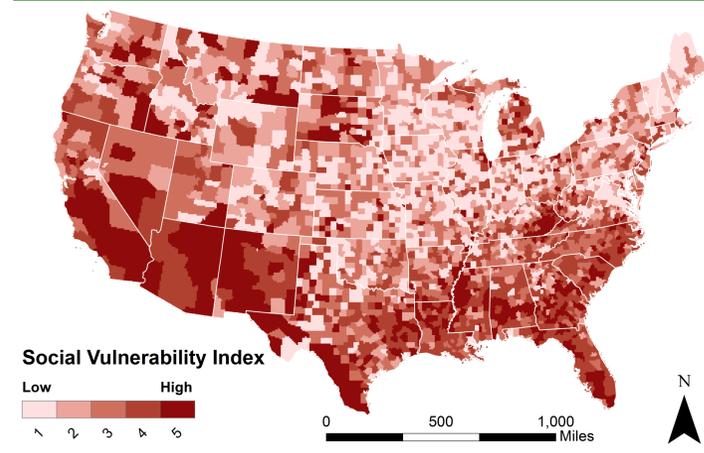
2012 Final Drought Vulnerability Map



Conclusions

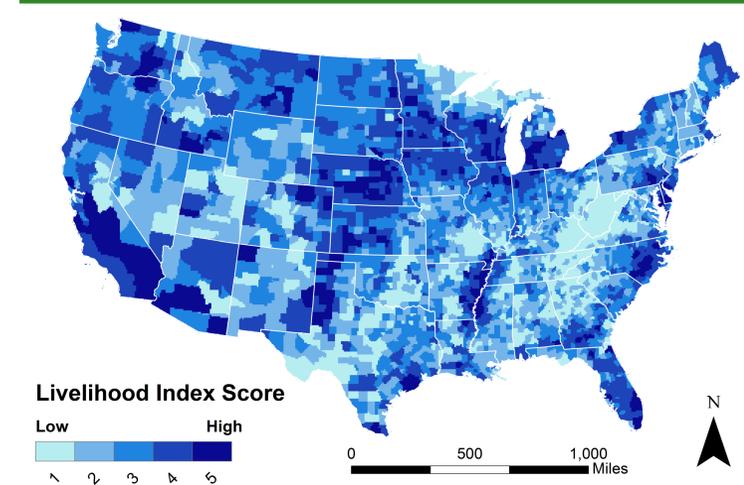
As indicated in the final drought vulnerability map, which aggregates 2012 vulnerability data, the most affected areas were along the coast. The majority of California displayed moderate-high score; however, the Bay Area and locations further south were even more drastically affected. In addition, most of Arizona scored high and thus was exceptionally vulnerable. New Mexico, too, was moderately high throughout most of the state. There are several pockets of elevated vulnerability throughout Texas, such as Austin and Houston, and also in Louisiana and Alabama. However, southern Georgia was highly impacted, as was most of Florida; the latter completely scored moderate – high. As for South and North Carolina, the coastal areas were more affected in comparison to inland locations. Overall, the Northeast and Midwest are less vulnerable. An area of interest is the red fragment in southwestern Idaho and southeastern Oregon; it is highly vulnerable even though the rest of Idaho was relatively low. Overall, the impacts of the 2012 drought were clearly widespread across the southern states of the nation, whereas the northeast showed less signs of vulnerability. By analyzing the three (social, livelihood and drought) index maps, the northeast is significantly less at risk, with an exception to the livelihood index, where some states like Pennsylvania and New York display variations of vulnerability. The effects of drought have certainly changed over the past two years. Currently, the majority of California is experiencing critical water shortage, as are northern areas of Texas. Since drought records are constantly fluctuating, using recent data would provide a significantly different spatial representation. Further research is recommended to expand the variables and indicators used for examining populations that are vulnerable to disasters. The information gathered can be used to prepare drought mitigation strategies and disaster management programs for future occurrences, which can reduce the impacts felt by vulnerable populations.

Social Vulnerability Index



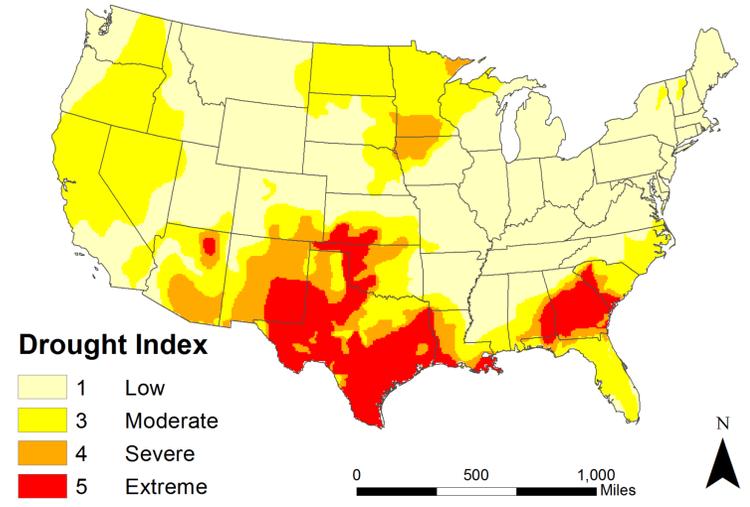
Social Vulnerability was taken from the CDC's Agency for Toxic Substances and Disease Registry's Geospatial Research, Analysis and Services Program (GRASP). 15 factors that were related to social vulnerability to disasters were taken from the Census and then grouped into four main categories: socioeconomic status, household composition, minority status, and household and transportation status. Once it was grouped into the aforementioned four categories, that data was ranked and a final SVI is tabulated. Census tract level data was used (SF1 100% count)

Livelihood Index



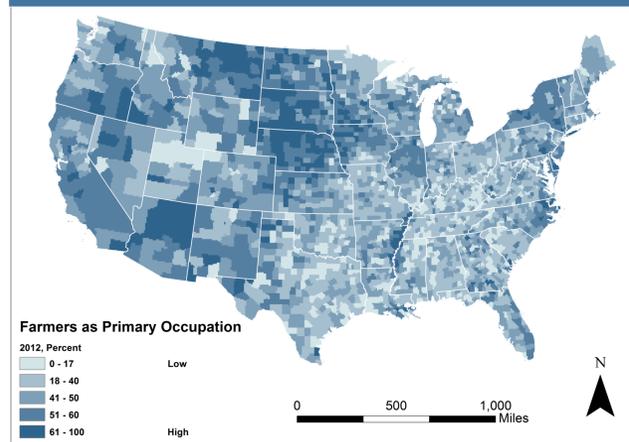
Livelihood Index was based on eight factors: farmers as primary occupation, percent of irrigated land of total farmland, domestic water public waters supply, dam locations, the population with occupations related to agriculture, farming, fishing or forestry, percent of cropland of total land, total water withdrawals for livestock, and power generated in gigawatt/hour. The first four factors are displayed below. (Agriculture Census, U.S. Geological Survey, NOAA/NWS/NCEP/CPC).

Drought Index

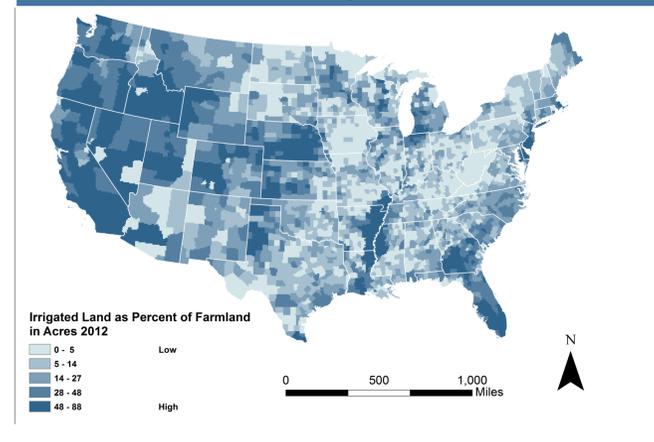


Data was retrieved from the National Drought Mitigation Center. This image provides specific drought data for the week of July 24, 2012, as this is referenced as the hottest week of the year. National Drought Monitor NO-

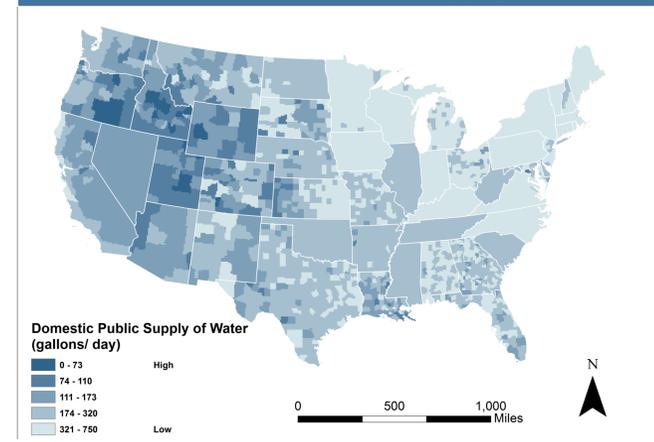
Farmers



Acres of Irrigated Land



Domestic Water Supply



Dams by Location

