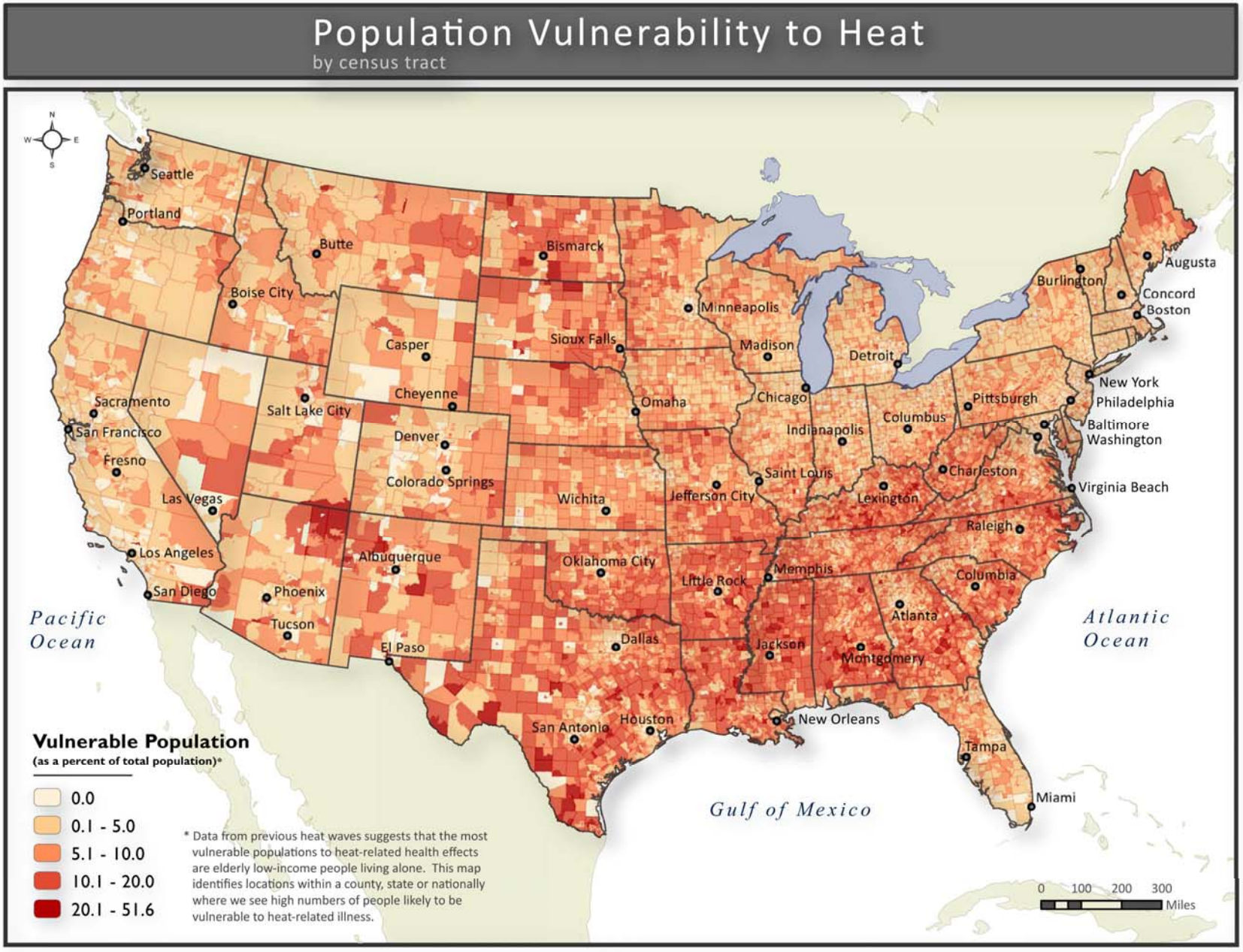
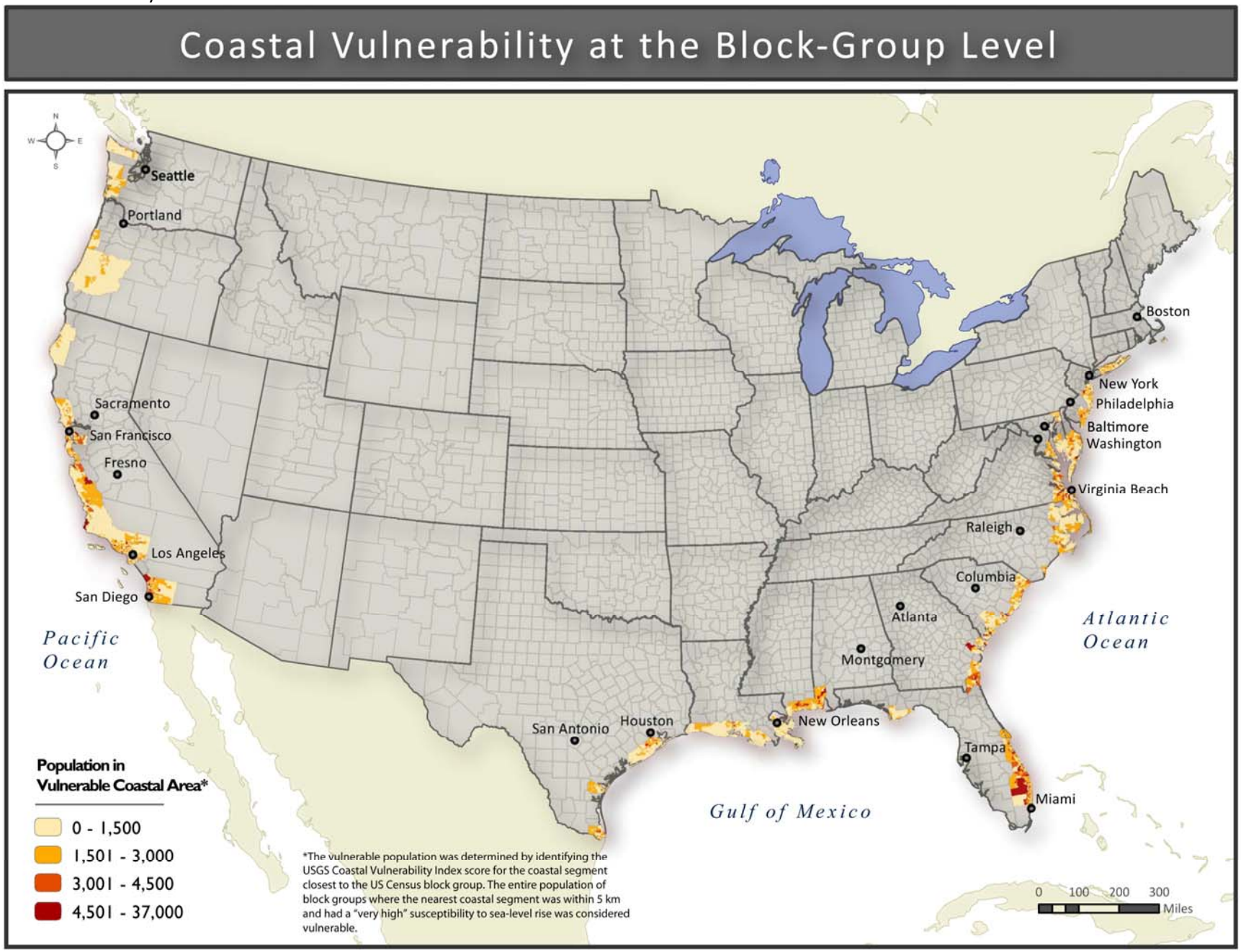
Final Maps
Related to Indicators

Population Vulnerability



Coastal Vulnerability

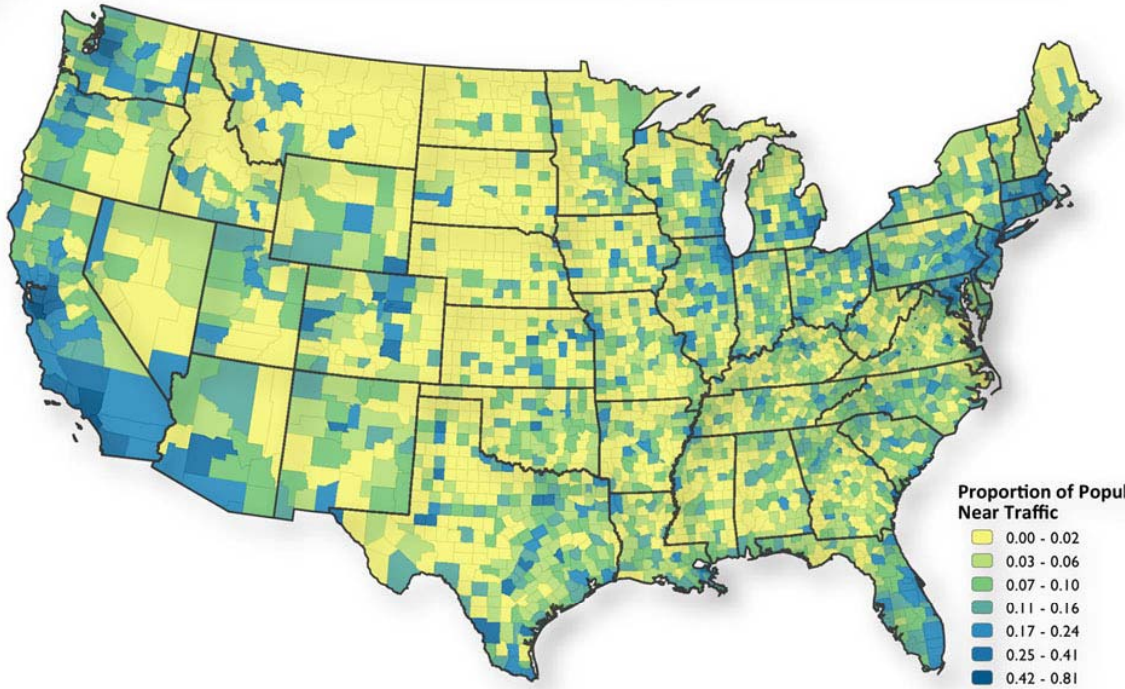


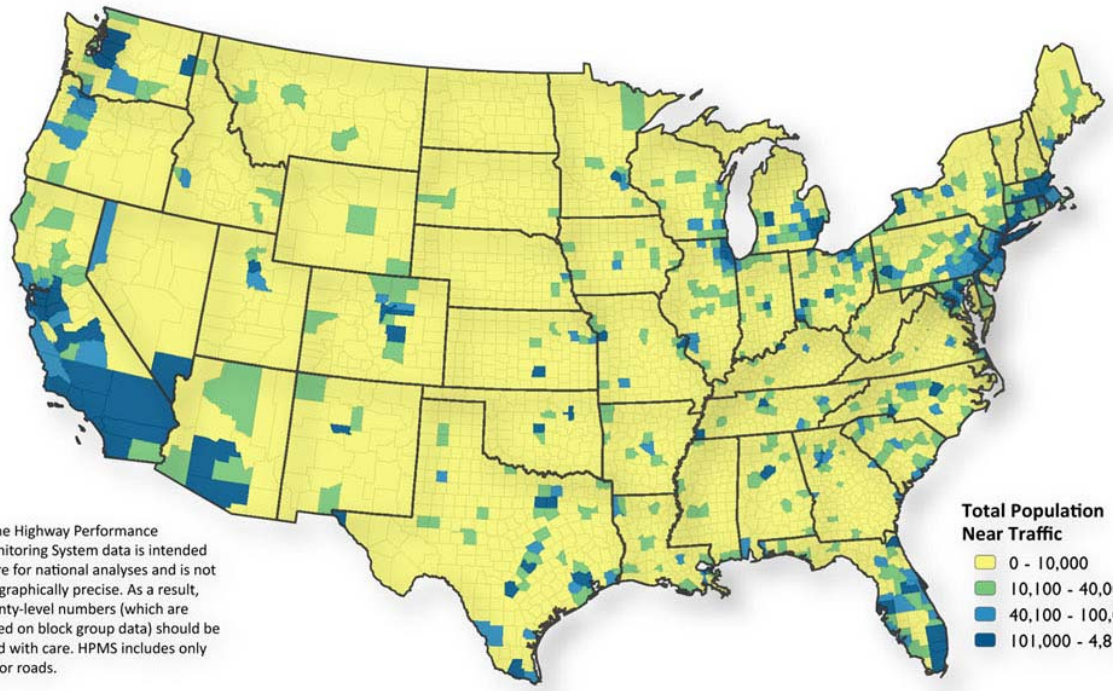
Traffic

Population Near High Traffic Roads

at the County-Level

*Population in the county within 300 meters of roads with 10,000 or more of annual average daily traffic based on the US Department of Transportation's Highway Performance Monitoring System**



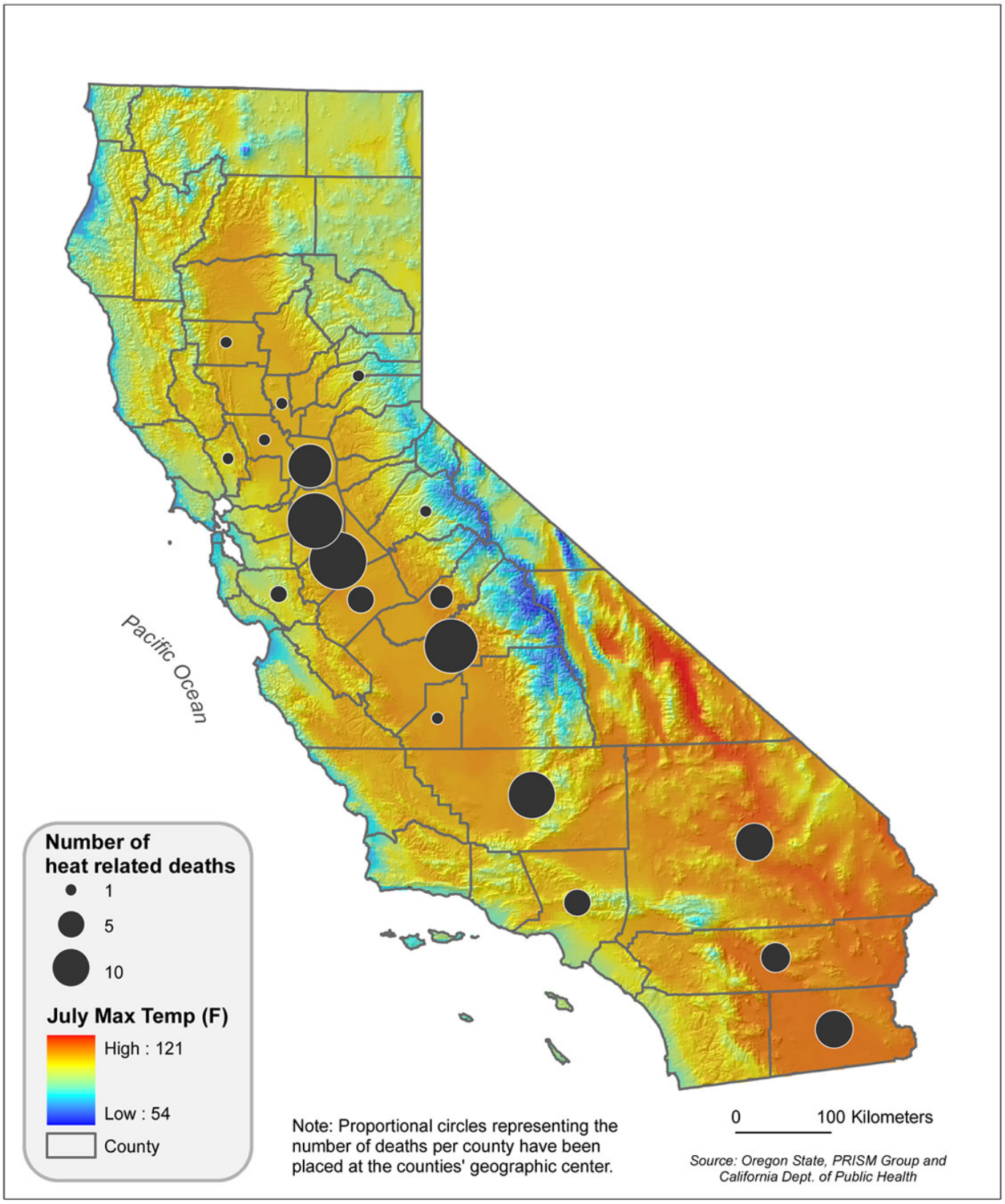


* The Highway Performance Monitoring System data is intended more for national analyses and is not geographically precise. As a result, county-level numbers (which are based on block group data) should be used with care. HPMS includes only major roads.

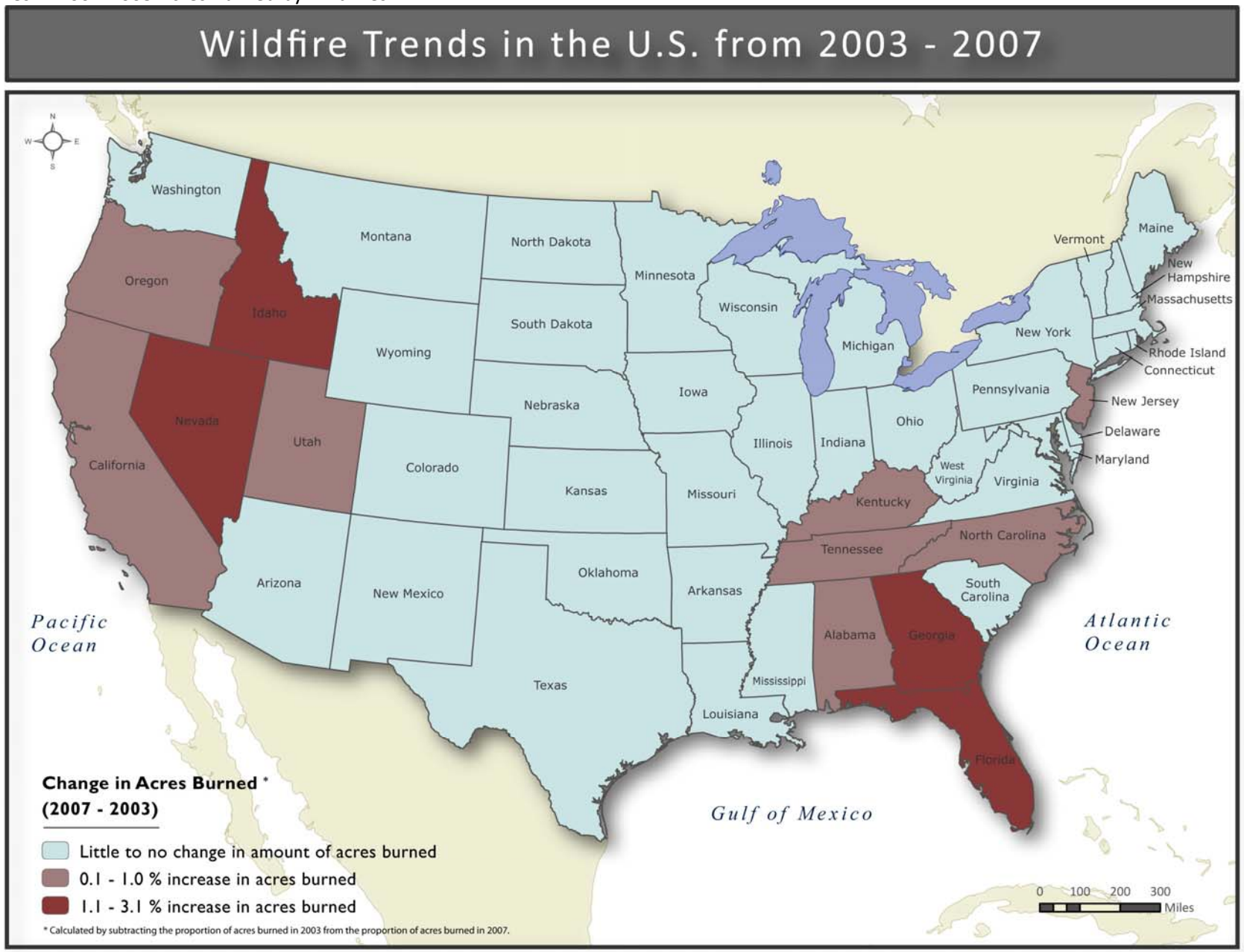
Final Maps
Not Related to Indicators

California Heat Deaths

California Heat-Related Deaths by County July 2006

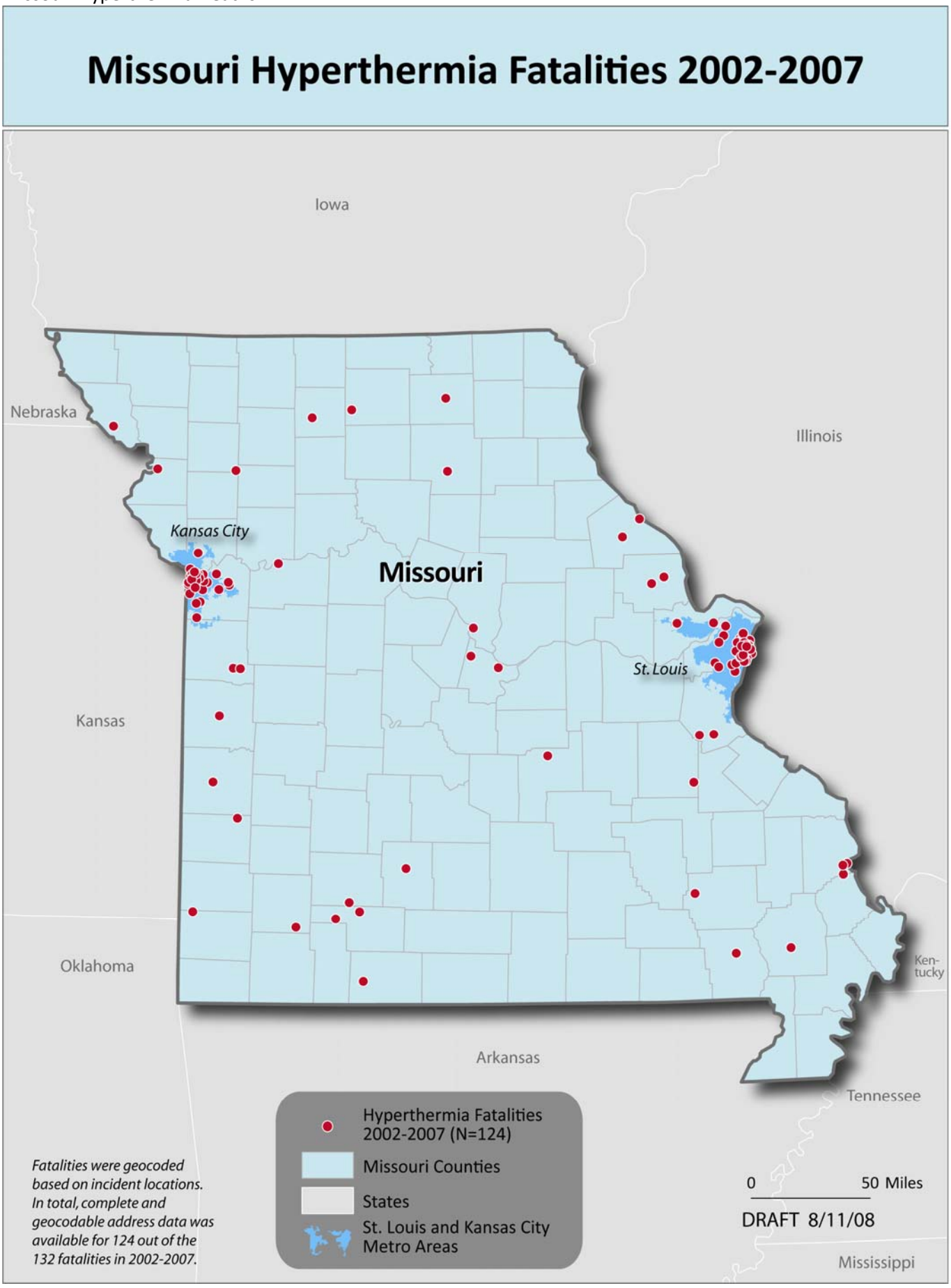


Fires 1: 2007-2003 Acres Burned by Wildfires



Fires 2: Average Yearly Increase in Acres Burned

Missouri Hyperthermia Deaths



Two Indicator Templates

STATE ENVIRONMENTAL HEALTH INDICATORS COLLABORATIVE (SEHIC) AIR QUALITY INDICATORS

Indicator: XX: Coastal Vulnerability

Measure(s): XX: Coastal vulnerability index by block group

MEASURE DESCRIPTION

XX: Coastal vulnerability index by block group	
Last updated:	August, 2008
Measurement units:	Meters
Geographic scale:	Coastal Census block groups for the contiguous U.S.
Time scale:	Coastal Vulnerability Index 2001, Census Data 2000
Significance/background:	Rising sea levels has the potential to affect significant portions of coastal United States, threatening health, infrastructure and industry.
Rationale:	Identifying affected areas and affected populations is a critically important first step in the development of management plans and mitigation strategies.
Limitations:	This measure provides a general indication of the population living in close proximity to high risk areas but does not reflect any individuals true exposure.
Data resources:	Block group data: **http://www.census.gov/geo/www/cob/bg2000.html;** Coastal vulnerability data: **http://pubs.usgs.gov/dds/dds68/** Fact sheet on coastal vulnerability: http://pubs.usgs.gov/fs/fs76-00/fs076-00.pdf
Data limitations:	Data is several years old. Area based population measures such as block groups do not permit finer assessment of where, specifically, people live within a block group.
Related data:	XX
Related SEHIC measures:	XX
Related Indicators (from other projects):	XX
Recommendations:	XX

STATE ENVIRONMENTAL HEALTH INDICATORS COLLABORATIVE (SEHIC) AIR QUALITY INDICATORS
Indicator: **XX: Coastal Vulnerability**
Measure(s): **XX: Coastal vulnerability index by block group**

HOW-TO GUIDE: XX

Determine the number of vulnerable persons by block group:

1. Obtain US Census data by visiting factfinder.census.gov. Click on "get data" under "Getting Detailed Data"/"Decennial Census". Click on Census 2000 Summary File 3 (SF 3) - Sample Data and then on "Detailed Tables". Click on the tab at the top called "geo within geo". Under "Show me all" choose "……Census Tracts", Under "Within" choose the state or county you're interested in and then, when the "Select one or more…." gets populated chose "All Block Groups". Click add and then click Next.
2. On the next screen on the tab "show all tables" select P1 (Total Population) and Add to the current table selection, then click on "Show Result".
3. Once it shows you the results, click on "Print/Download" at the top and chose "Download". In the pop-up box where it says "database compatible" choose "Microsoft Excel" and leave clicked "include descriptive data element names". Click on OK and download the file.
4. Find the file you just downloaded called output.zip and unzip the file. This file includes total population numbers for each block group you selected.
5. If you decide you want to aggregate by county, you will need the state/county FIPS code which is buried within the GEO_ID2 field. You create a new column to hold the state/county FIPS and populate that column by typing =MID(B3,1,5) where B3 represents the column ("B") and cell ("3") holding the GEO_ID2. The 1 is the starting point and the 5 is the number of characters. To find the name associated with the state/county FIPS code download the file: www.census.gov/popest/geographic/**codes**02.xls
6. The "Coastal Vulnerability to Sea-Level Rise" data can be found at: http://pubs.usgs.gov/dds/dds68/
7. Click on "GIS Data files" and scroll down to "Link to Zip File". Here you should download and unzip the "CVI.zip" file which contains shapefiles of the atlantic, pacific, and gulf coasts.
8. Bring the 3 CVI shapefiles into GIS along with the Block Group data (Block Group data will need to be joined to an existing Block Group shapefile based on the FIPS code) .
9. Next, using the free GIS extension, Hawth's Tools (http://www.spatialecology.com/htools/), generate the centroids of the block group polygons using the "Generate Polygon Centroid Points" under the "Vector Editing Tools". This will create a new point shapefile of the centroid locations for each block group.
10. Merge the 3 coastal shapefiles into one using the "Merge" tool under "Data Management Tools/General/Merge".
11. We are only interested in block group centroids within 5km of the coast; therefore in GIS, go to "Selection/Select By Location". Check your centroid shapefile and we want "are within a distance of" the coastal data shapefile. Check the box "Apply a buffer …" and put in the distance 5 kilometers. This will give you a selection of the centroids that are located within 5km of the coast. Export this selection of centroids and name it something meaningful in your project folder.
12. Right-click on the new centroid shapefile and go to "Joins and Relates" and "Joins…". Under "What do you want to join to this layer?", click on "Join data from another layer based on spatial location". Under step 2, choose the bottom selection "Each point will be given all the attributes of the point…". This will append the corresponding

CVI data to the centroid data along with a distance field.

13. Once the CVI data is appended to the centroid data, join the centroid data to the block group shapefile by FIPS code. This will allow you to view the number of people in each block group along with that block group's CVI risk score. You can now limit to those block groups whose closest coastal segment is very high risk (CVI="Very").

STATE ENVIRONMENTAL HEALTH INDICATORS COLLABORATIVE (SEHIC) AIR QUALITY INDICATORS

Indicator: XX: Population Vulnerability

Measure(s): XX: Number of low-income persons 65 years of age or older living alone by census tract

MEASURE DESCRIPTION

XX: Number of low-income persons 65 years of age or older living alone by census tract	
Last updated:	August, 2008
Measurement units:	Persons
Geographic scale:	Tracts
Time scale:	2000
Significance/background:	Data from previous heat waves suggests that the most vulnerable populations to heat related health effects are elderly low-income people living alone.
Rationale:	This measure will identify locations within a county, state or nationally where we see high numbers of people likely to be vulnerable to heat-related illness.
Limitations:	This measure is only an aggregate measure of population vulnerability and does not include individual-level effect modifiers such as illness or other socioeconomic variables.
Data resources:	Census data: factfinder.census.gov
Data limitations:	This data is several years old.
Related data:	
Related SEHIC measures:	XX
Related Indicators (from other projects):	XX
Recommendations:	

STATE ENVIRONMENTAL HEALTH INDICATORS COLLABORATIVE (SEHIC) AIR QUALITY INDICATORS

Indicator: XX: Population Vulnerability

Measure(s): XX: Number of low-income persons 65 years of age or older living alone by census tract.

HOW-TO GUIDE: XX

Determine the number of vulnerable persons by tract:

14. Obtain US Census data by visiting factfinder.census.gov. Click on “get data” under “Getting Detailed Data”/”Decennial Census”. Click on Census 2000 Summary File 3 (SF 3) - Sample Data and then on “Detailed Tables”. Click on the tab at the top called “geo within geo”. Under “Show me all” choose “……Census Tracts”, Under “Within” choose the state or county you’re interested in and then, when the “Select one or more….” gets populated chose “All Census Tracts”. Click add and then click Next.

15. On the next screen on the tab “show all tables” scroll down to PCT55. Poverty Status in 1999 of Unrelated Individuals by Sex by Age by Householder Status (Including Living Alone) then click on “Show Result”.
16. Once it shows you the results, click on “Print/Download” at the top and chose “Download”. In the pop-up box where it says “database compatible” choose “Microsoft Excel” and leave clicked “include descriptive data element names”. Click on OK and download the file.
17. Find the file you just downloaded called output.zip and unzip the file. Open the Excel file called dt_dec_2000_sf3_u_data1.xls. We will clean up and simplify by deleting ALL the columns EXCEPT PCT055001, PCT055021,PCT055026, PCT055047, PCT055052. Now you have the total population (PCT055001), males 65-74 in poverty and living alone, males 75 and up in poverty and living alone, females 65-74 in poverty and living alone and females 75 and up in poverty and living alone.
18. Add a new column called vuln_pop and sum the data in PCT055021,PCT055026, PCT055047, PCT055052. Then add one more new column called prop_vuln (vulnerable population as a proportion of total population) and calculate vuln_pop/PCT055001. This will give you the vulnerable population as a proportion of total population by tract.
19. This gives you the proportion of the population that is 65 years or older, below the poverty line and living alone.
20. If you decide you want to aggregate by county, you will need the state/county FIPS code which is buried within the GEO_ID2 field. You create a new column to hold the state/county FIPS and populate that column by typing =MID(B3,1,5) where B3 represents the column (“B”) and cell (“3”) holding the GEO_ID2. The 1 is the starting point and the 5 is the number of characters. To find the name associated with the state/county FIPS code download the file: www.census.gov/popest/geographic/**codes**02.xls
21. Once you have the county code you can sum vuln_pop by county, sum PCT055001 by county and then divide the summed vuln_pop by the summed PCT055001.

Short Written Description of Each Map for the SEHIC Indicator Website (Draft)

INDICATOR MAPS

Coastal Vulnerability

A significant proportion of the American population lives along the Atlantic, Pacific and Gulf Coasts. In addition to population-related infrastructure, coastal areas support a wide range of activities including tourism, agriculture and fishing. It is likely that the results of climate change including, for example, a rise in sea level and warmer oceans could deeply affect these activities in coastal areas. While a complete assessment of the affected areas is beyond the scope of this analysis, the map presented here involves combining Census maps with existing maps of coastal vulnerability from the United States Geological Survey to tabulate total population in at risk areas.

Population Vulnerability

Climate change presents a significant threat to the health of vulnerable populations worldwide. While some health effects, such as injuries related to major storms and floods, are more direct, one of the most significant threats to vulnerable populations in the United States is related to heat-related illness and mortality. Heat waves in California, Chicago, Missouri and elsewhere have illustrated the dangers associated with prolonged high temperatures. Subsequent research into population-related vulnerability in these heat waves has identified age, social isolation and poverty as significant factors. These maps, therefore, portray the geographic distribution of Census data characterizing these three factors. In particular, we mapped the number of persons 65 and older with incomes under the 1999 poverty level living alone as a percent of total population.

Traffic

Residence near busy roads has been associated with a variety of health effects. This is likely due to the relatively high levels of air pollutants such as fine particulate matter, nitrogen oxides and other air contaminants in areas with high pollution. Not surprisingly, many studies have found, for example, a strong association between traffic volume and air pollutants. Given that some air pollutants can be found in significantly higher concentration during warmer months it is likely that climate change will affect air quality. But air quality measurement is expensive and measurements are not available in all areas. We produced this map as a general proxy for exposure to traffic-related air pollution. We used Census and traffic data for highways nationwide to calculate the county-level total population and proportion of population living near high traffic roads (defined as those with 10,000 or more of annual average daily traffic).

NON-INDICATOR MAPS

California and Missouri Heat Deaths

We used data provided by the California Department of Public Health and the Missouri Department of Health and Senior Services to identify and map the locations of heat related deaths from the heat wave in July 2006 (California) and for all time periods 2002-2007 (Missouri). These maps provide a preliminary look at where the deaths are occurring. While the maps do not portray rates and thus will be focused on areas with high population they can help identify areas where focus and resources should be directed and they can help visually identify areas with higher mortality than would be expected based on population alone.

St. Louis Flood Map

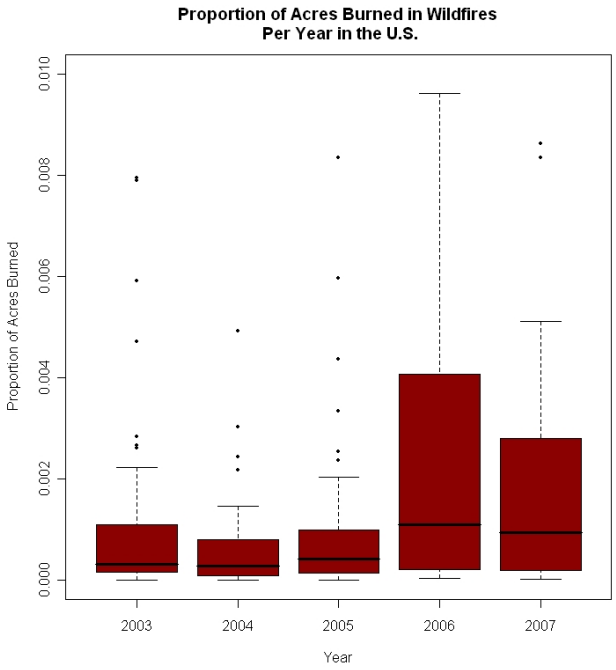
Warmer temperatures may cause many of the nation's rivers to carrier a heavier flow during wet months potentially increasing the risk of flooding. While there is no nationwide flood risk map, the Federal Emergency Management Agency makes available digital flood maps that were developed by scanning existing Flood Insurance Rate Maps (called Q3 Flood Data). The data can be many years old and is not available for all counties nationwide but can be a

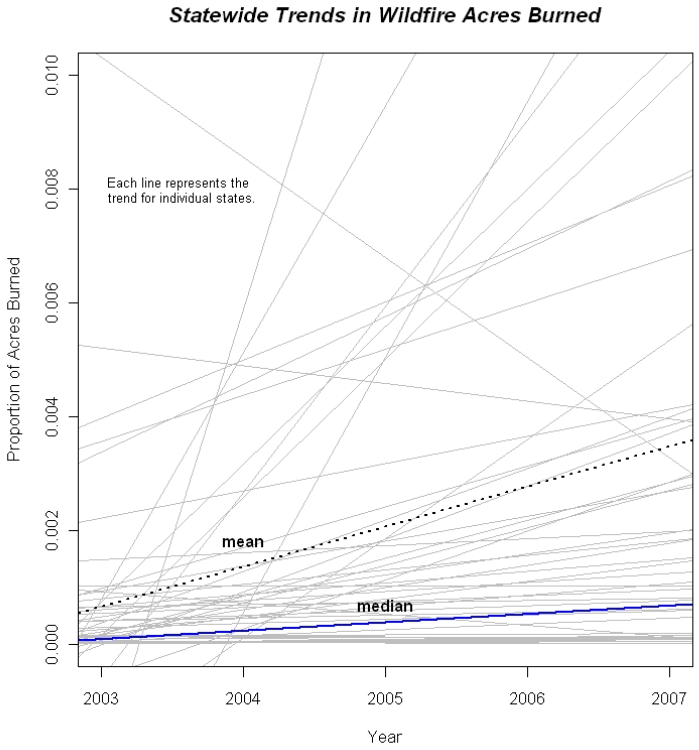
useful resource in areas with these maps. Here we have produced an example focused on the St. Louis, Missouri area.

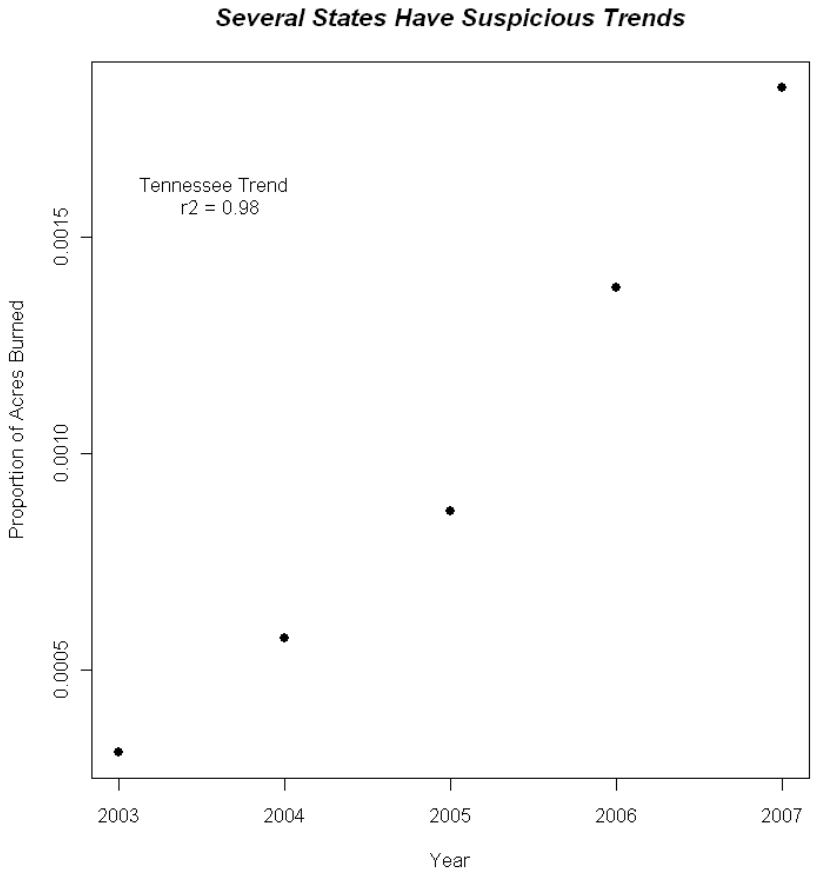
Fire Trends Maps

Researchers have suggested that global warming could "foster the creation of faster, hotter fires that would be difficult to contain and therefore affect larger areas" (Fried 2004). The lack of availability of detailed historical fire data for the country as a whole limits our capacity to look at long term trends. Nevertheless, the National Interagency Fire Center, provides state-level estimates of acres burned by wildfires and this data can provide a preliminary look at trends over a short time window. We produced two maps using this data. The first map shows the change in wildfire acres burned by state by subtracting the total acres burned in 2007 by the total acres burned in 2003. The second map is an attempt to look at the trends 2003-2007 more quantitatively. We looked at the average yearly increase in the proportion of acres burned by state. We find that for most states there is a very significant amount of variation in acres burned from year to year making it hard to decipher patterns. On average, however, we do find that there is a yearly increase in acres burned. Note that we have used the data without adjustment and the maps do not account for any possible differences in reporting requirements or cultural trends that might lead to either the appearance of more fires or an actual increase in fires.

Fried, J.S., M.S. Torn, and E. Mills. 2004. The impact of climate change on wildfire severity: a regional forecast for Northern California. Climatic Change 64:169-191.







FYI: This is the data for Tennessee. Most data is much noisier and it's hard to believe that this data for Tennessee is really correct. The linear trend is nearly perfect.