Fire Occurrence and Extent

There are many ways to look at fire, but the NSAT needed a few core fire datasets to be able to consistently look at five across the five main themes. The datasets needed to address several key issues:

- What do we know about fire that is comparable nationwide?
- How is fire impacting things we care about?
- How can we analyze different options to control the severity and extent of the fire?

This section will discuss the approach to develop these datasets and a description of the key final datasets.

There were three different data sets consolidated for years 2002-2011. Each of these datasets have limitations, but combined they provide the best look we have a fire statistics. These three data sets are:

- Federal Fire Occurrence Data (FODfd) – *short description*
- NASF – State Foresters *short description*
- NFIRS – National Fire Info Recording System. *short description*

National Fire Occurence Data - All Sources
Area-weighted Summaries
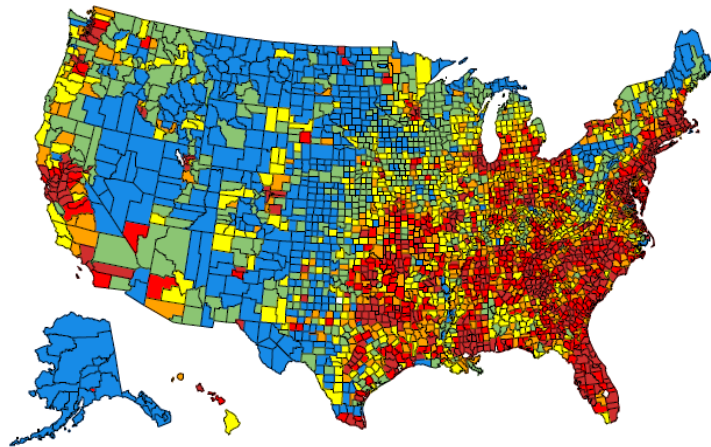
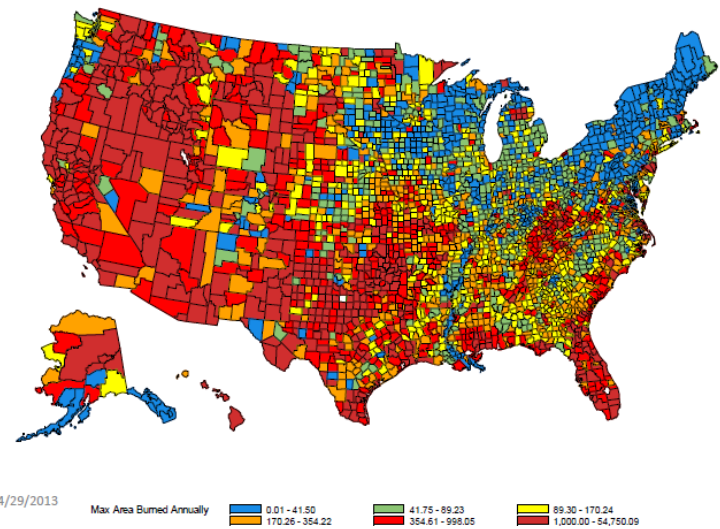4/29/2013   Max Annual Incident Reports   0 - 5   5 - 10   10 - 17
                                          17 - 27   27 - 48   48 - 10,977
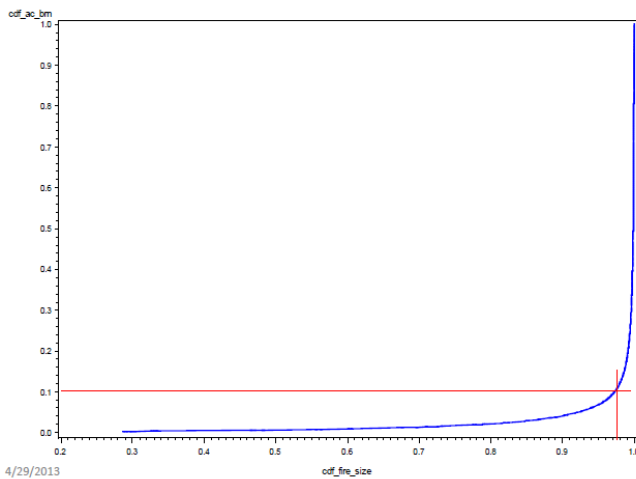
Two key maps were constructed from the summation of these data sets. The first map shows the number of instances per county per year (Max Annual Incident Reports). This map has a very clear correlation with population density, illustrating that there is a direct link between the number of people and the number of fires. In other words, most fires are caused by humans, not by natural events like lighting.

National Fire Occurence Data - All Sources
Area-weighted Summaries

The second map shows the number of acres burned (Max Area Burned: Normalized).   Compared to the first map, there is not a strong correlation between where people live and where fire burns the most acres. The two maps show that most fires are small and quickly contained by local response, but that fires that are not quickly contained have the ability to burn large amounts of acres.

4/29/2013   Max Area Burned Annually

0.01 - 41.50	89.30 - 170.24
41.75 - 89.23	170.26 - 354.22
354.61 - 998.05	1,000.00 - 54,750.09

### Fire Size Cumulative Distributions for All Incidents

4/29/2013

When we are looking at problematic fires, are we talking about 10,000 responses or 10,000 acres burned? You would want to ask the question a different way based on the thing you care about. For instance, the maps show that there are a lot of fires in the east, but most of them are small and do not burn very many acres due to a variety of factors including rapid response, lower burn probability, etc. The fires in the west, although fewer in number, burn a larger number of acres. From this data set, we can see that 2.5% of the fires burn 90% of the acres. This two-fold reality (1)There are lots of small fires, 2) There are fewer fires that are very large) means that we have to address both of these issues differently in this study.

The same datasets can be used to determine the number of fires caused by accidental ignitions and the associated area burned.

Estimates of Rx Fire Occurrence: Area Normalized
Based on 2008-2011 fire data and hotspots, excluding LWF

4/29/2013   est_rx_nrm2   -1.45 - -0.49   -0.49 - -0.22   -0.22 - -0.04   15
-0.04 - 0.17   0.17 - 0.36   0.36 - 1.05
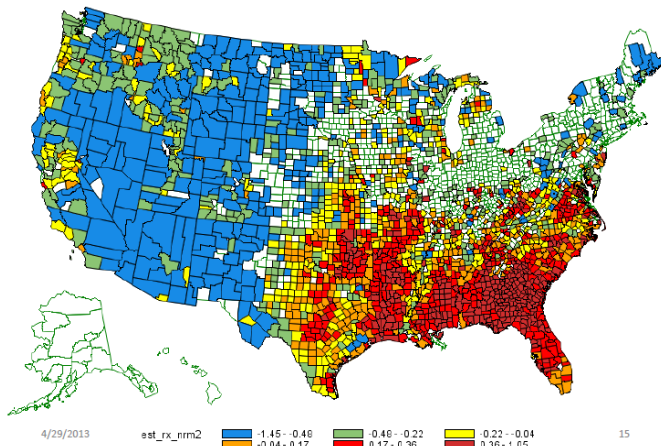
There is not a consistent, high quality prescribed fire data set. This is a critical dataset for our analysis, so a statistical estimate was achieved by comparing the 2008-2011 fire data with MODIS hotspots (est_rx_nrm2). This data was normalized by area to construct the map. The largest concentration of prescribed fire is in the southeast, but the west coast and northwest areas of the map are also important.

Ratio of Wildfire to Prescribed Fire
Based on 2008-2011 fire data and hotspots

4/29/2013   wf_rx_ratio   -2.06 - 0.64   0.64 - 1.17   1.17 - 1.61   17
1.61 - 2.11   2.11 - 2.61   2.61 - 5.12
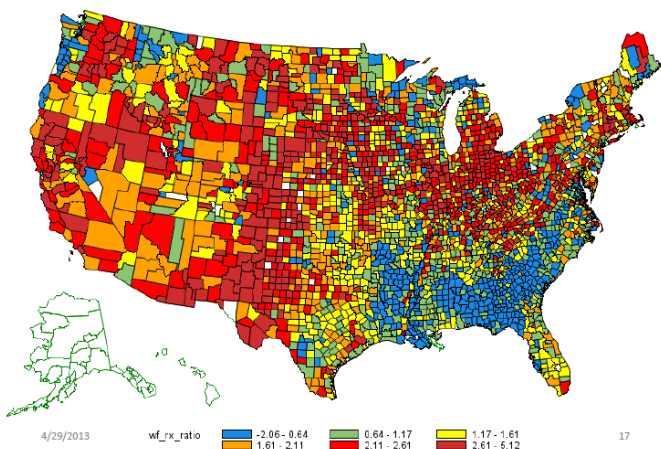
 The final step in this part of the analysis was to then construct a ration of wildfire to prescribed fire nationwide. The inset maps shows again the large amount of prescribed fire in the southeast (shown in blue) vs. the dominance of wildfire across the majority of the west.