

# UNDERSTANDING AND FORECASTING THE PROBABILITY OF LARGE WILDLAND FIRES ON ALL LAND IN THE CONTERMINOUS U.S.

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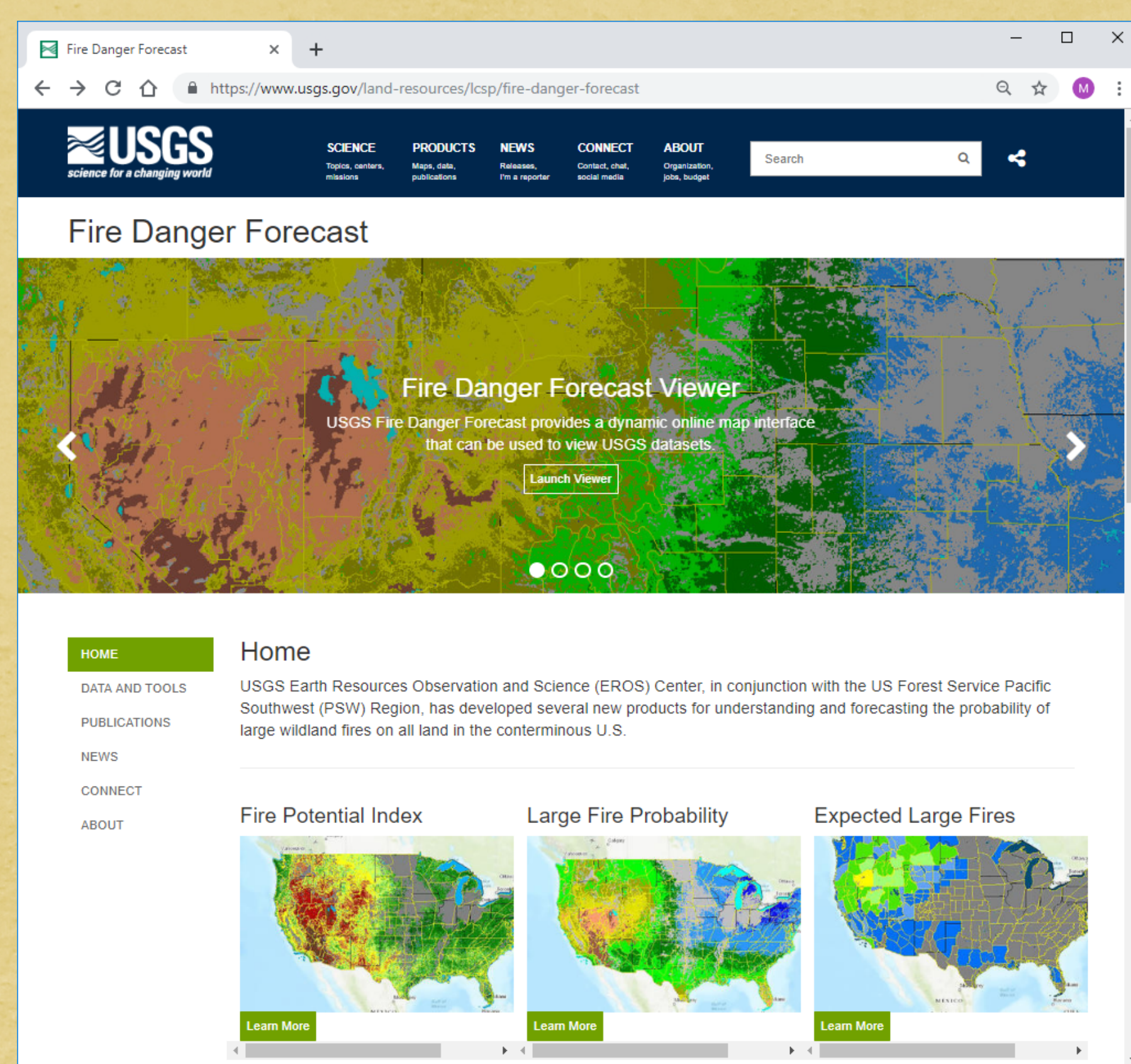
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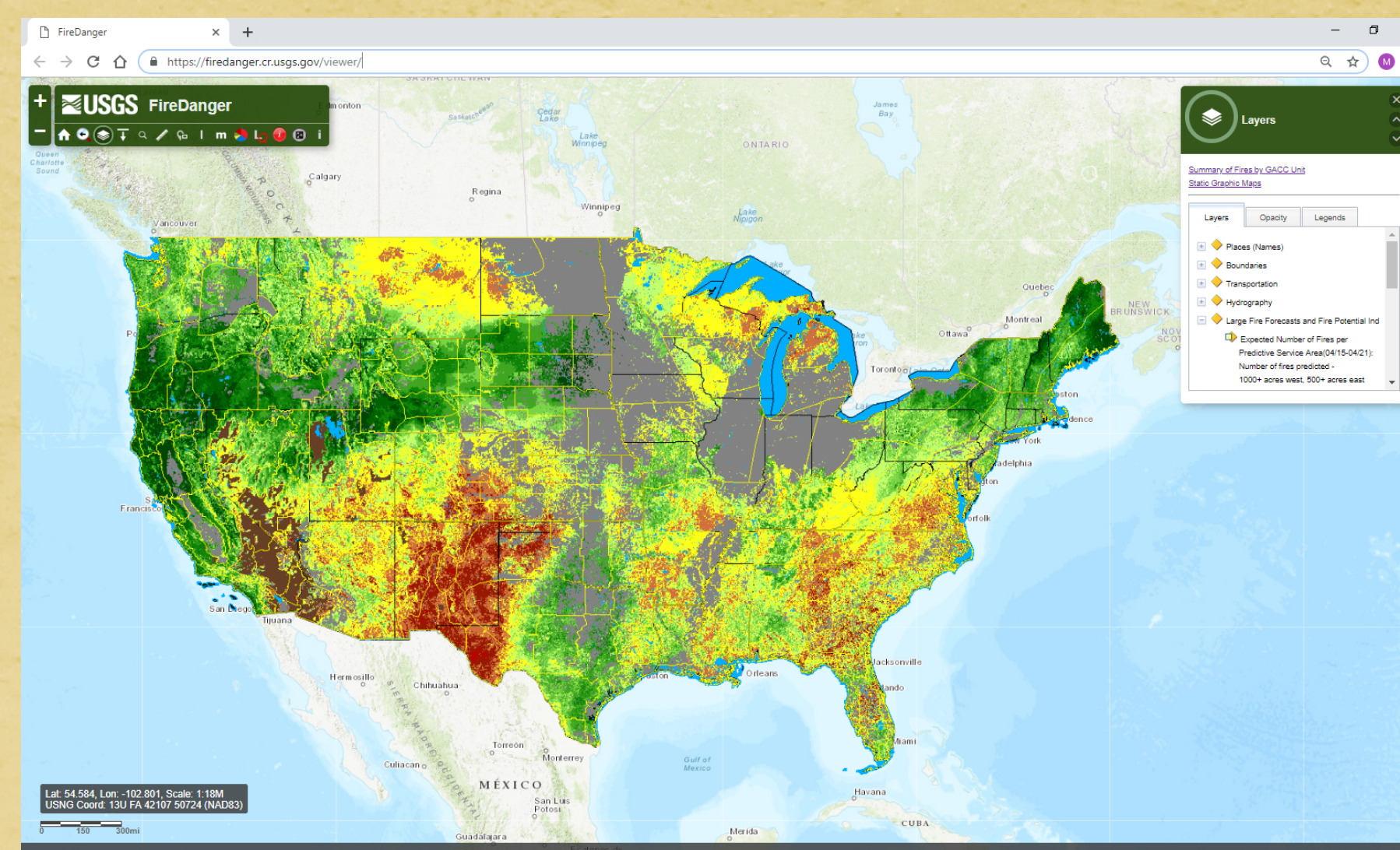
## THE INTRODUCTION

USGS Earth Resources Observation and Science Center, in conjunction with the US Forest Service, has developed several new products for understanding and forecasting the probability of large wildland fires on all land in the conterminous U.S. These products are available through the Fire Danger website at:

<http://www.usgs.gov/firedanger>



The USGS FireDanger website.

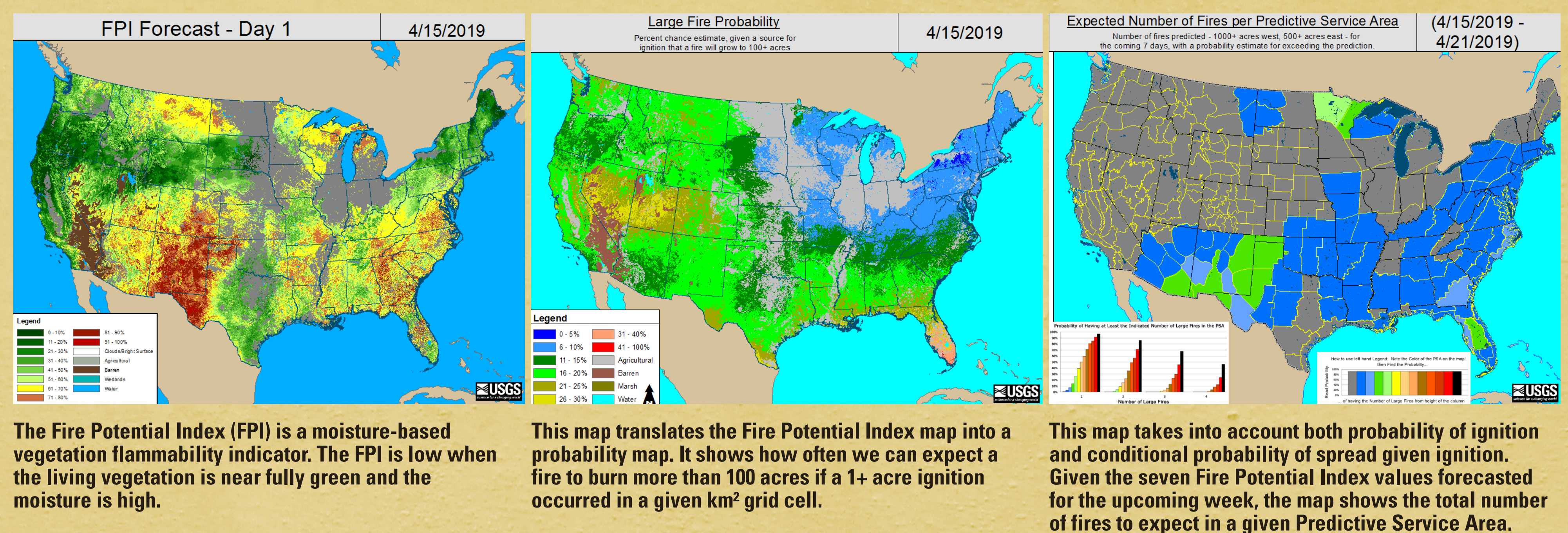


The FireDanger viewer provides a dynamic, zoomable view of a wide variety of Fire Danger products, including daily updates of Fire Potential Index, Large Fire Probability, and Expected Number of Fires, and weekly and biweekly updates of NDVI Greenness and Relative Greenness.

## FIRE DANGER PRODUCTS

Moderate resolution satellite data are used to assess live fuel conditions and compare them with 23 years of vegetation condition measurements to determine the relative greenness of current fuels. Vegetation with low relative greenness are susceptible to fire ignition. The relative greenness is combined with weather information to produce Fire Potential Index maps, which are a quantitative measure of fire ignition risk. All of these data are made freely available through the Fire Danger website at <http://www.usgs.gov/firedanger>

### UPDATED DAILY

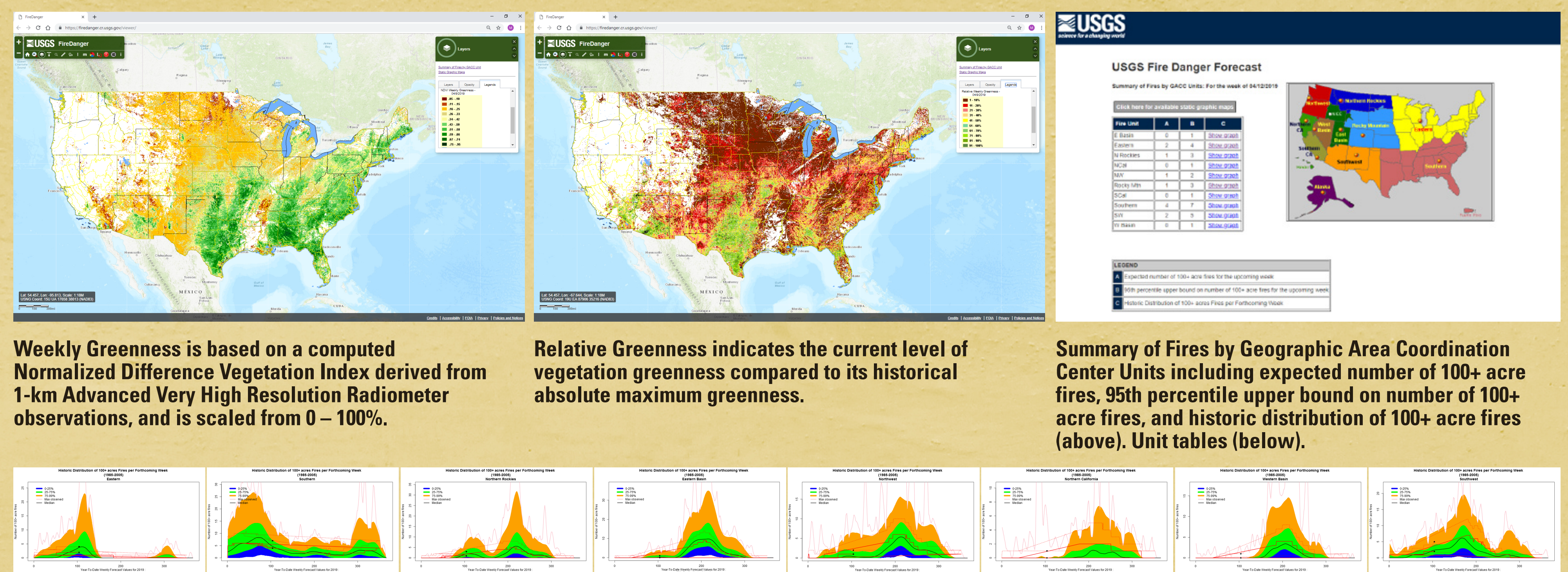


The Fire Potential Index (FPI) is a moisture-based vegetation flammability indicator. The FPI is low when the living vegetation is near fully green and the moisture is high.

This map translates the Fire Potential Index map into a probability map. It shows how often we can expect a fire to burn more than 100 acres if a 1+ acre ignition occurred in a given km<sup>2</sup> grid cell.

This map takes into account both probability of ignition and conditional probability of spread given ignition. Given the seven Fire Potential Index values forecasted for the upcoming week, the map shows the total number of fires to expect in a given Predictive Service Area.

### UPDATED WEEKLY



Weekly Greenness is based on a computed Normalized Difference Vegetation Index derived from 1-km Advanced Very High Resolution Radiometer observations, and is scaled from 0 – 100%.

Relative Greenness indicates the current level of vegetation greenness compared to its historical absolute maximum greenness.

Summary of Fires by Geographic Area Coordination Center Units including expected number of 100+ acre fires, 95th percentile upper bound on number of 100+ acre fires, and historic distribution of 100+ acre fires (above). Unit tables (below).

## CURRENT ACTIVITIES

### NEW SOURCE OF DATA

Fire Danger satellite imagery will soon be transitioned from Advanced Very High Resolution Radiometer data to the enhanced Moderate Resolution Imaging Spectroradiometer collection, based on the Moderate Resolution Imaging Spectroradiometer data acquired by the National Aeronautics and Space Administration's Earth Observing System.

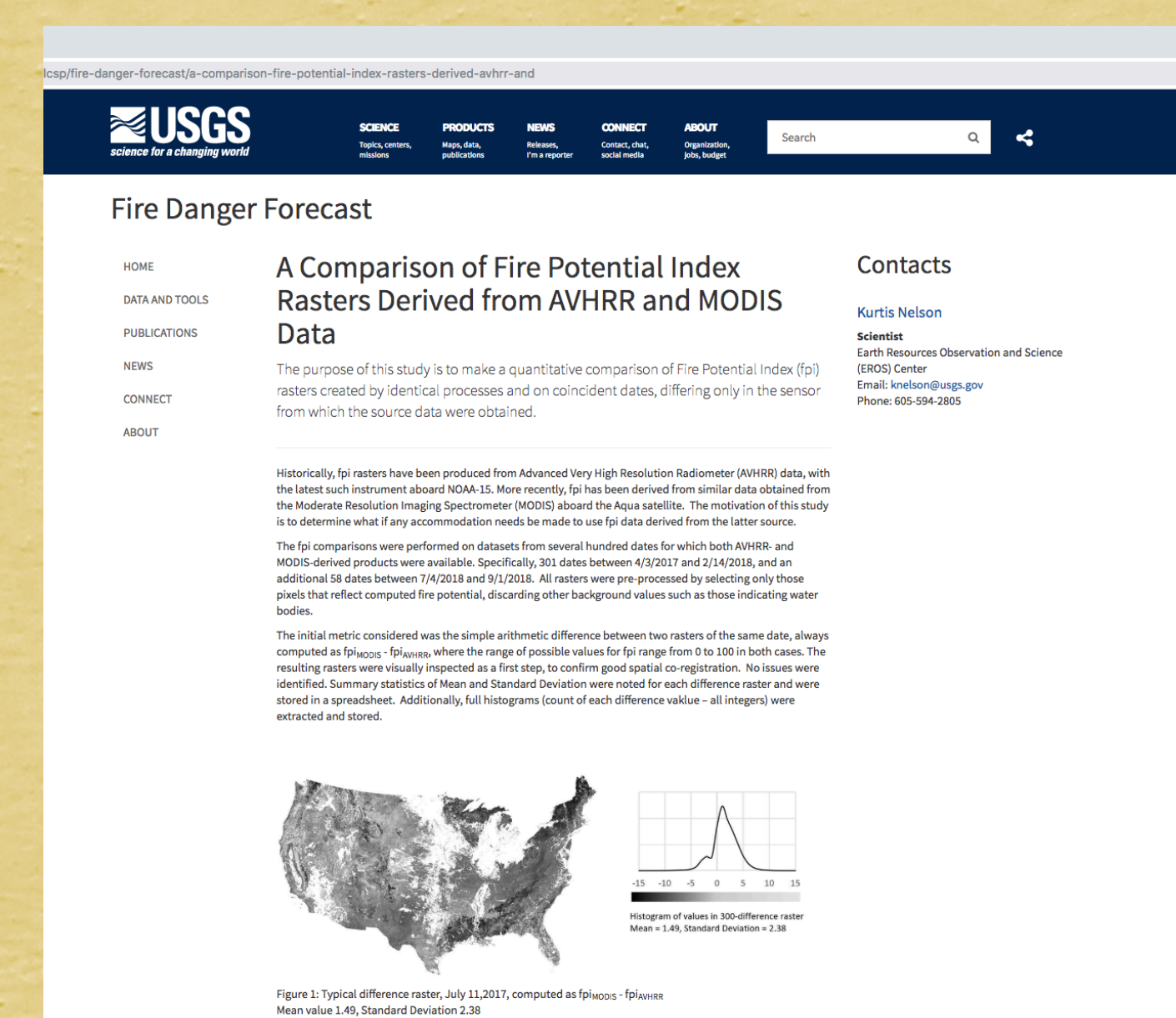
### COMPARISON OF SOURCE DATA

A study was undertaken to evaluate the effects of changing source data on derived Fire Potential Indices. The study compared several hundred days of Fire Potential Index results computed from both AVHRR and eMODIS data. Ideally, the results for a given day would be identical. In practice, it was determined that the eMODIS-based FPI returns slightly

higher values, on the order of 1.5 units, within a possible range 0 to 100. The correspondence between AVHRR and eMODIS were thus determined to be acceptable. The full report of the comparison is available under the Publications tab of the FireDanger website.

### AN ENHANCED FPI MODEL AND VALIDATION OF RESULTS

The computation of Fire Potential Index is being enhanced with the addition of meteorological data, such as temperature, wind speed and precipitation. Upon full implementation of the updated model, a validation effort will be undertaken. Initial plans for the validation call for the comparison of FPI computed from historical data to the locations and extents of known historic fires, such as are documented by the Monitoring Trends in Burn Severity program. ([www.mtbs.gov](http://www.mtbs.gov))



The full report of the source data comparison is available under the Publications tab of the FireDanger website.