



Forecasting Severe Wildfire Weather Potential

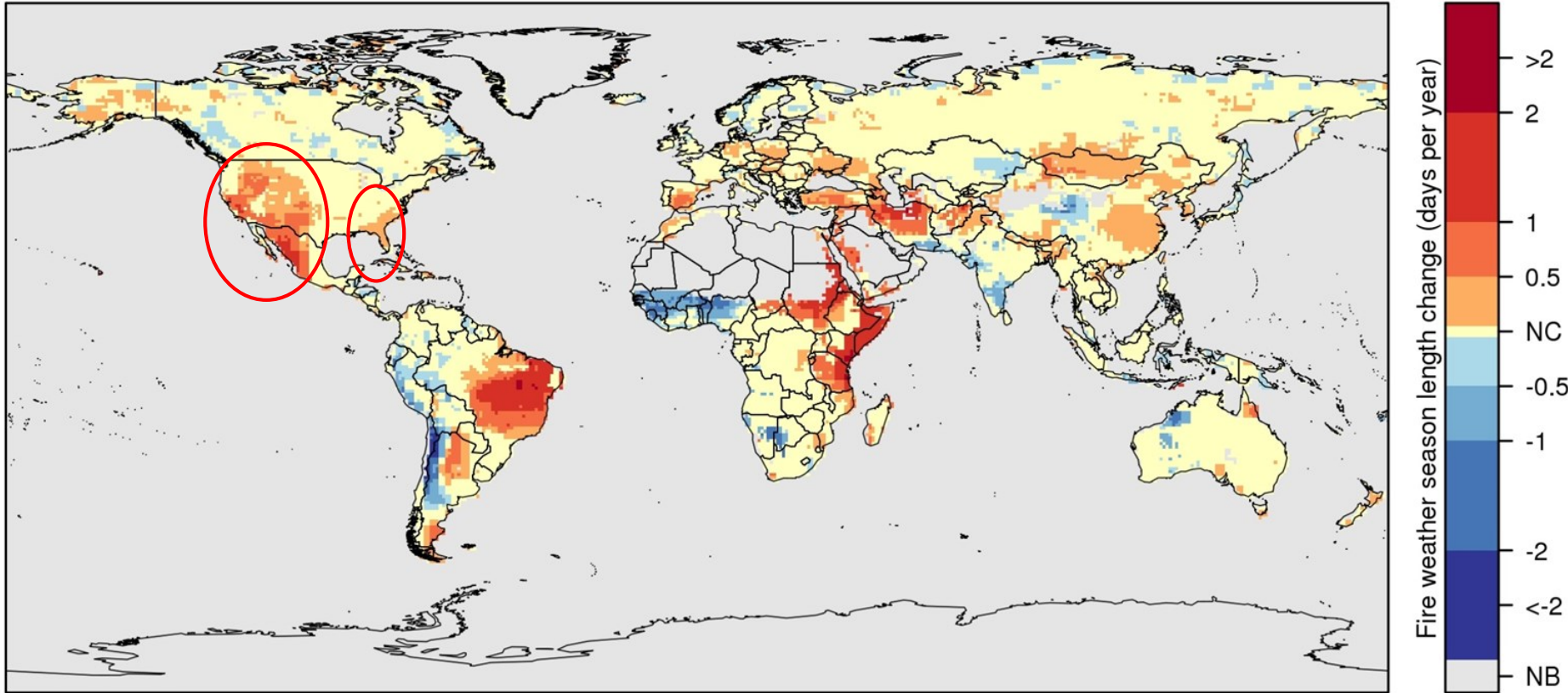
W. MATT JOLLY, PHD, USFS, RMRS, MISSOULA FIRE SCIENCES LABORATORY

WILDFIRE TECHNOLOGY INNOVATION SUMMIT, 20 MARCH 2019



Fire weather conditions are changing

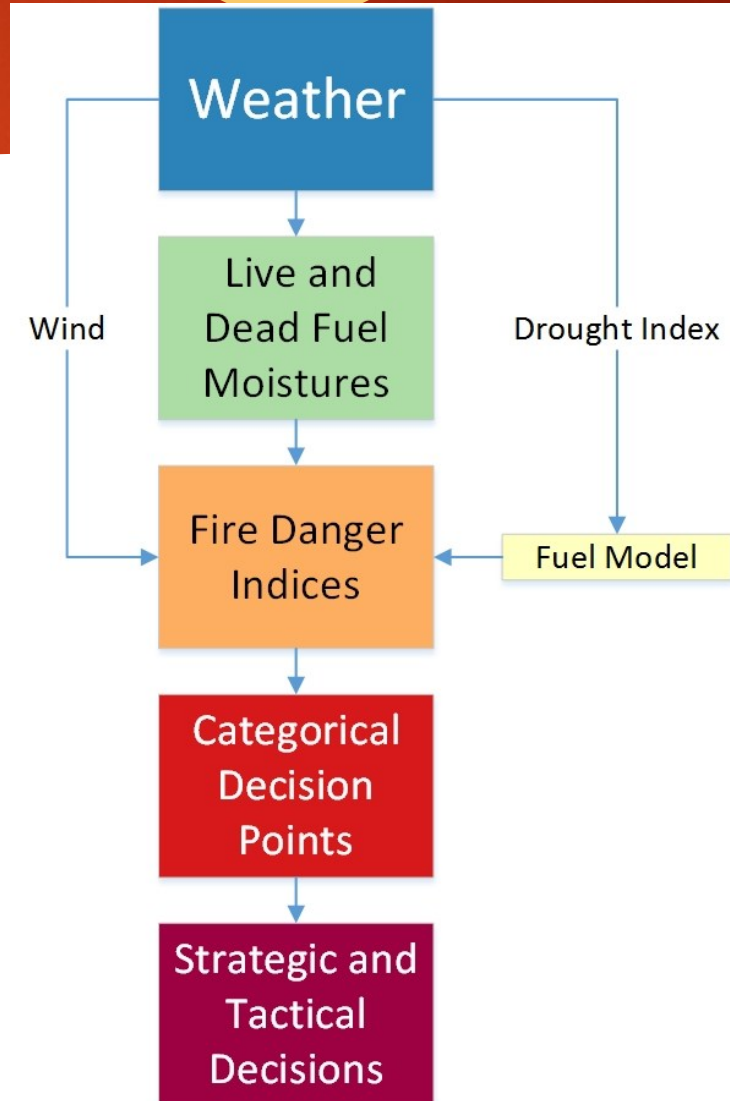
A




Fire weather seasons have lengthened across 29.6M km² (25.3%) of the Earth's vegetated surface. (Jolly et al 2015, Nature Communications)

The US National Fire Danger Rating System

- ▶ Collects hourly data from ~2200 Remote Automated Weather Stations
- ▶ Calculates a range of live and dead fuel moistures (now hourly)
- ▶ Uses fuel moistures to calculate a suite of wildfire potential-related indices
- ▶ Data support decision-making both before and during wildfires
- ▶ Currently releasing first NFDRS revision in 40 years





Towards a gridded
forecast of Severe Fire
Weather Potential

Weather Forecasts

NWS National Digital Forecast Database (NDFD)

WFAS
Spatial Fire Danger Rating Forecast System

WFAS / WIMS Observed 100hr and 1000hr FM

Daily Energy Release Component Forecast

Gridded Fire Danger Climatology (1979-2015)

Daily Burning Index Forecast

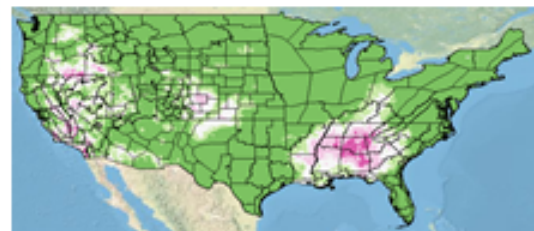
Spatial Preparedness Level Forecast



- SPL-I
- SPL-II
- SPL-III
- SPL-IV
- SPL-V

Classified Energy Release Component Percentile Forecast

Classified Burning Index Percentile Forecast

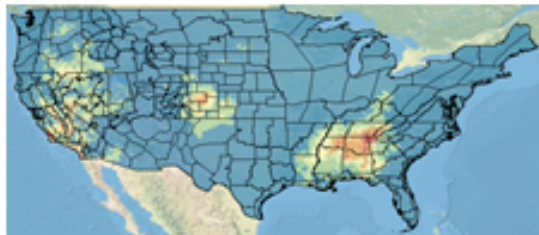


Spatial Preparedness Level (SPL)

Severe Fire Weather Potential

Fire Behavior Potential (FBP)

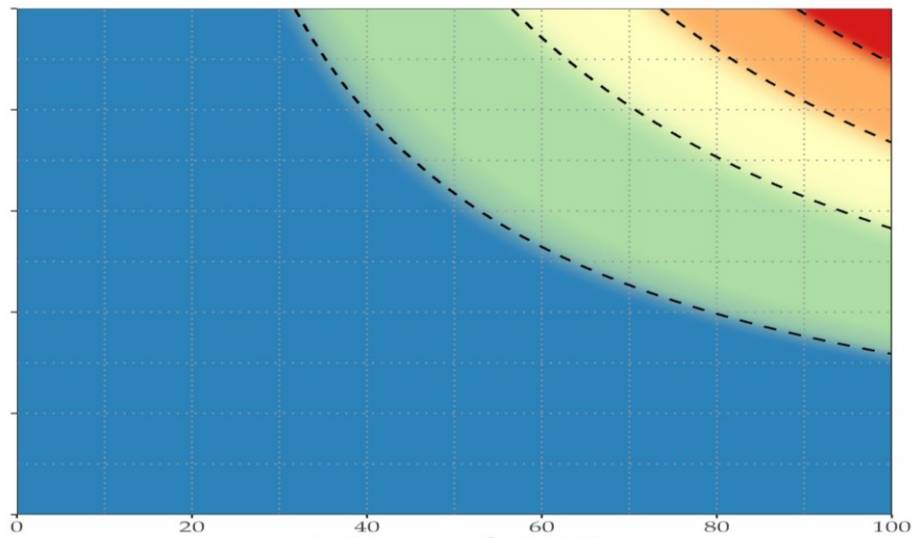
Severe Fire Weather Potential Forecast



- Low
- Moderate
- High
- Very High
- Severe

Spatial Fire Behavior Potential Forecast

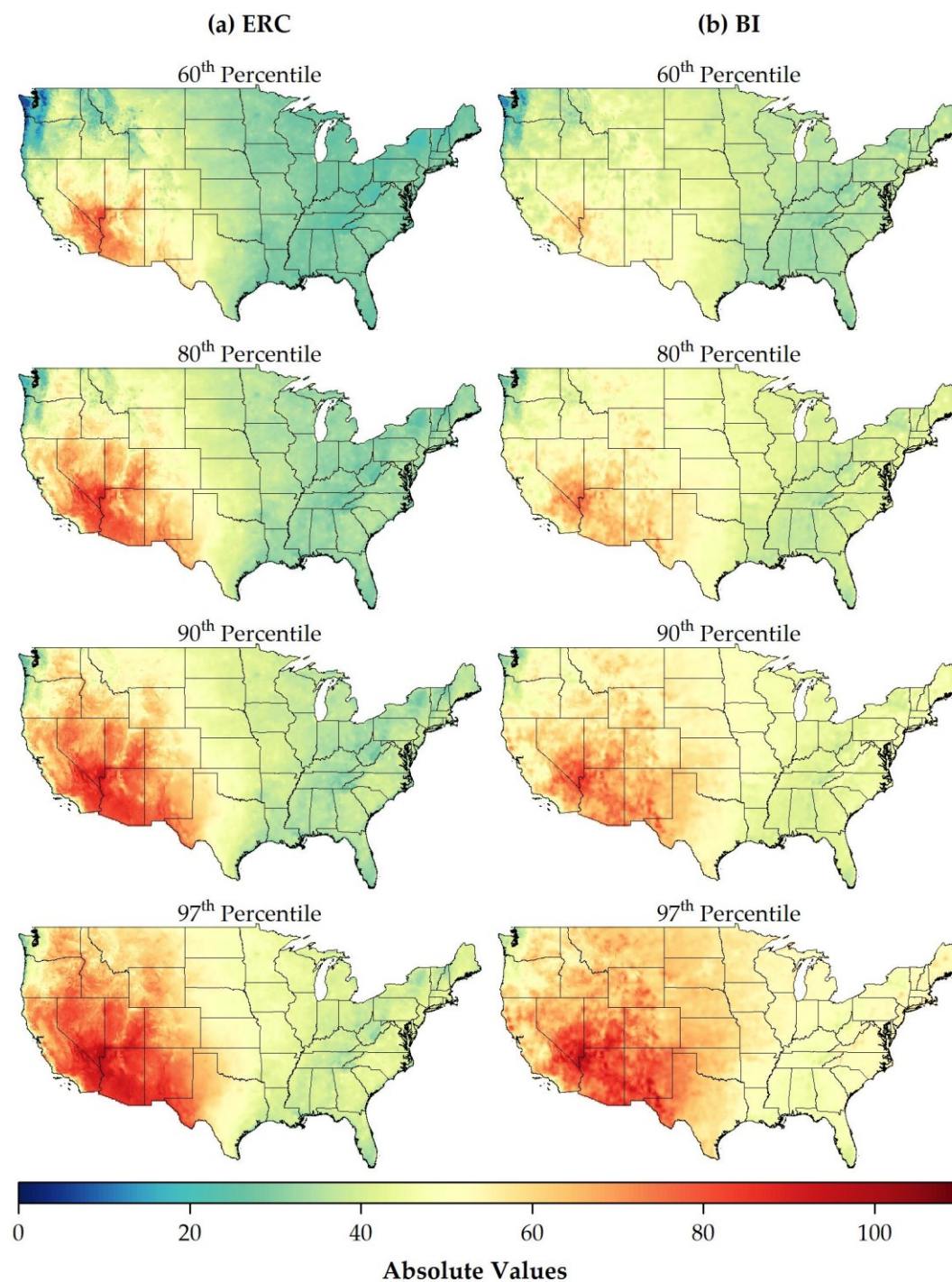
- FBP-I
- FBP-II
- FBP-III
- FBP-IV
- FBP-V

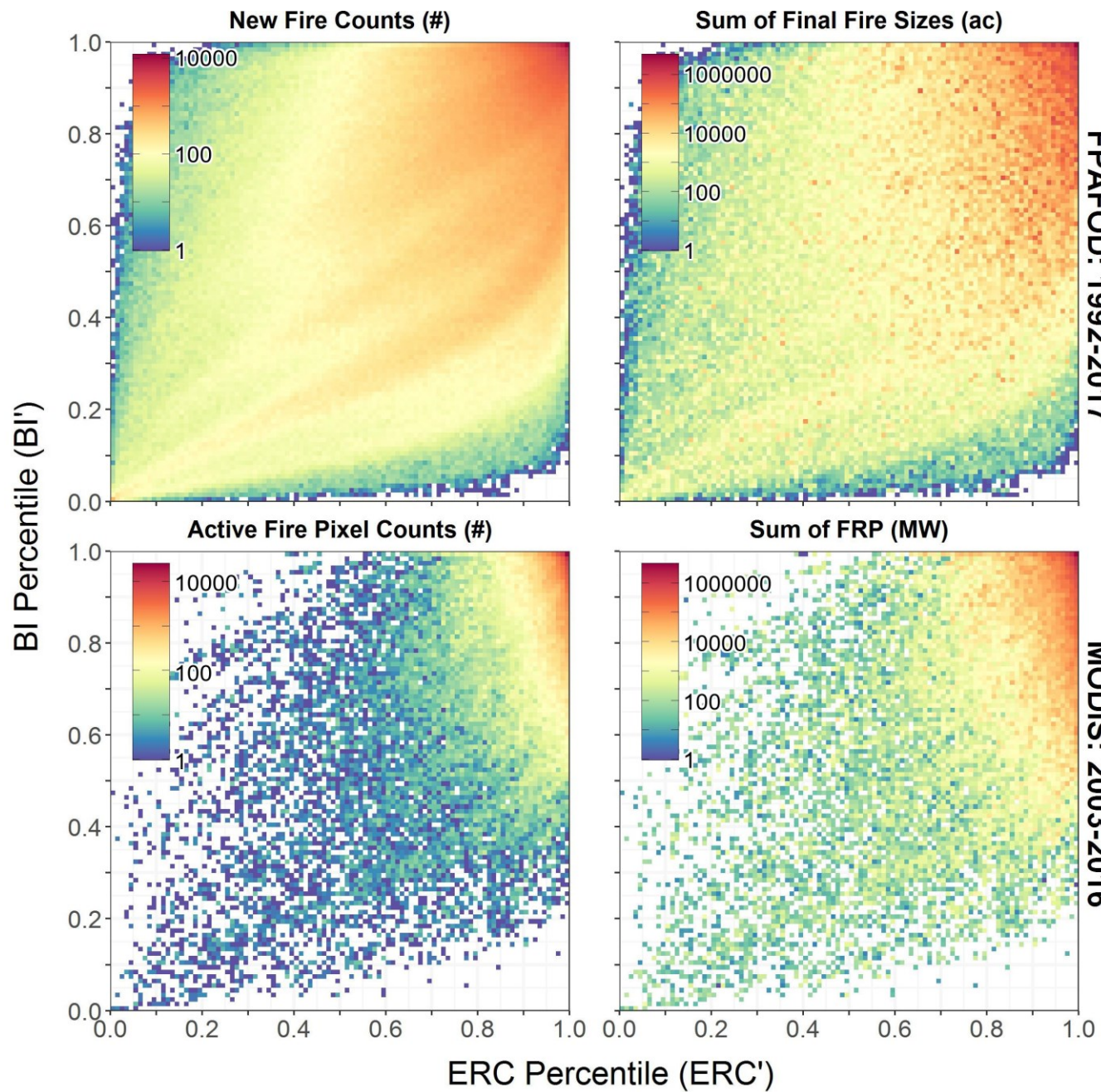


- Low
- Moderate
- High
- Very High
- Severe

Severe Fire Weather Potential (SFWP)

Fire danger indices must be normalized based on climatology (1979-2017)





FPAFOD: 1992-2017

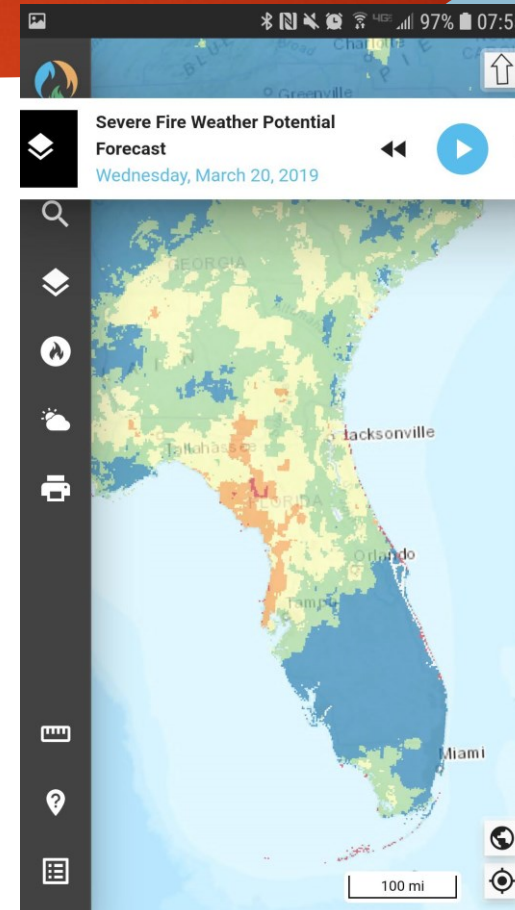
MODIS: 2003-2016



Fire Danger components (ERC and BI) are strongly related to fire activity from both fire reports (TOP) and MODIS active fire measurements (Bottom) across CONUS

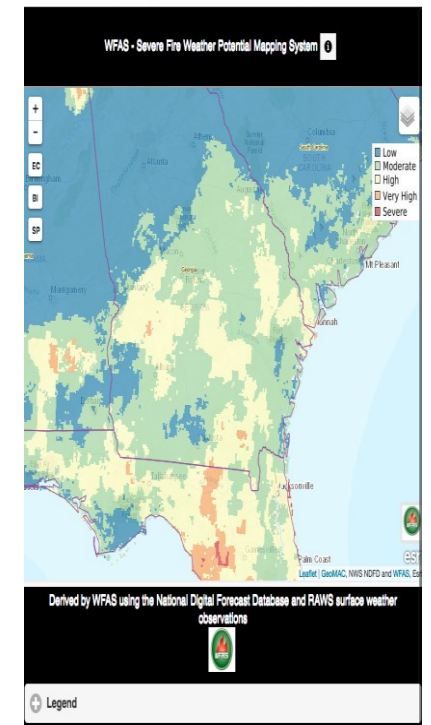
Partnering with Technosylva to make real-time products more accessible

- ▶ WildfireSAFE app
 - ▶ SAFE: Situational Assessment of the Fire Environment
 - ▶ Integrates with real-time fire reporting system (IRWIN)
 - ▶ Provides information about: Weather, Fuels, Terrain, and Values-at-Risk
 - ▶ Provides on-site information for a single fire and summaries for all fires on a local unit
- ▶ Prototype app has been running on the USFS Wildland Fire Assessment System for 3 years: <https://m.wfas.net>



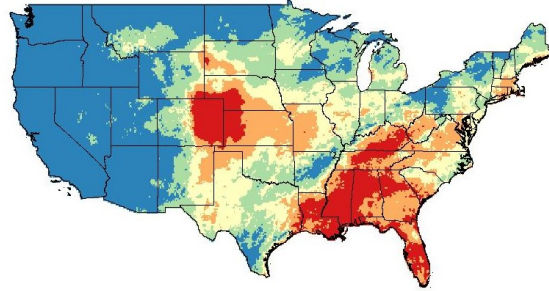
WildfireSAFE App

WFAS mobile app
<https://m.wfas.net>

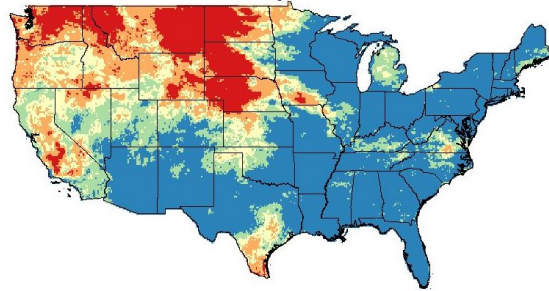


SFWP_p

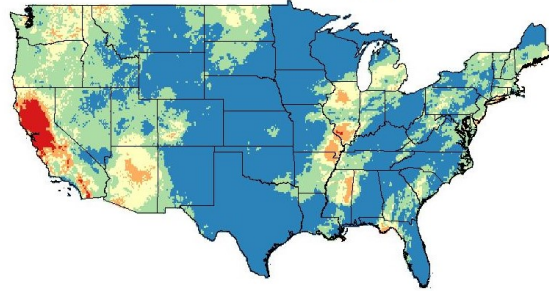
06 Mar 2017



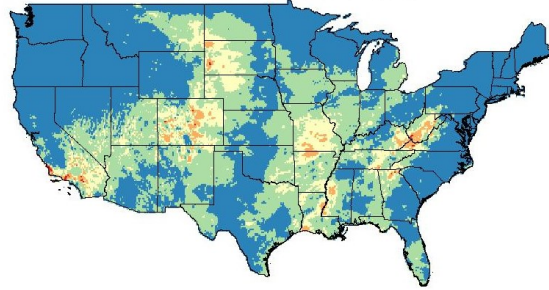
24 July 2017



08 October 2017

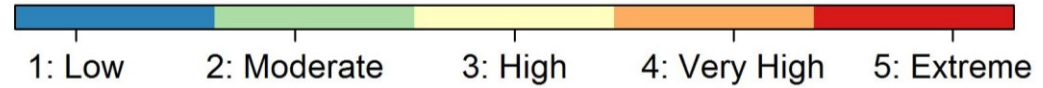


04 December 2017

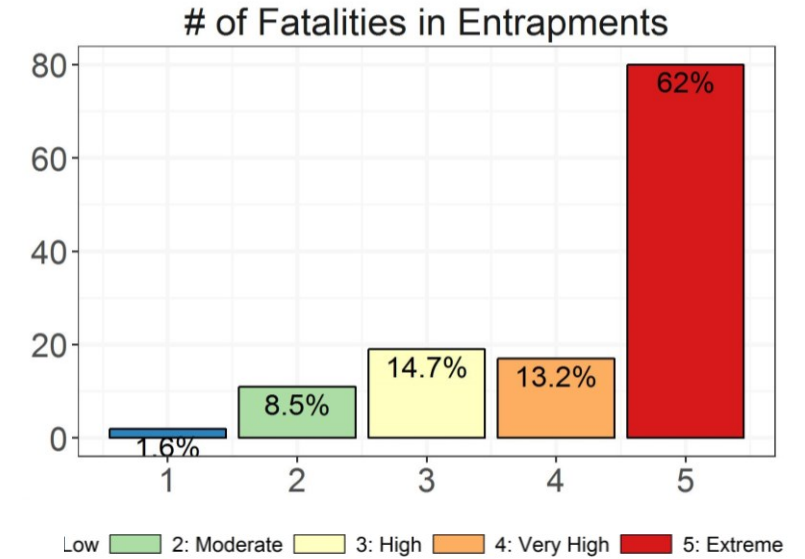
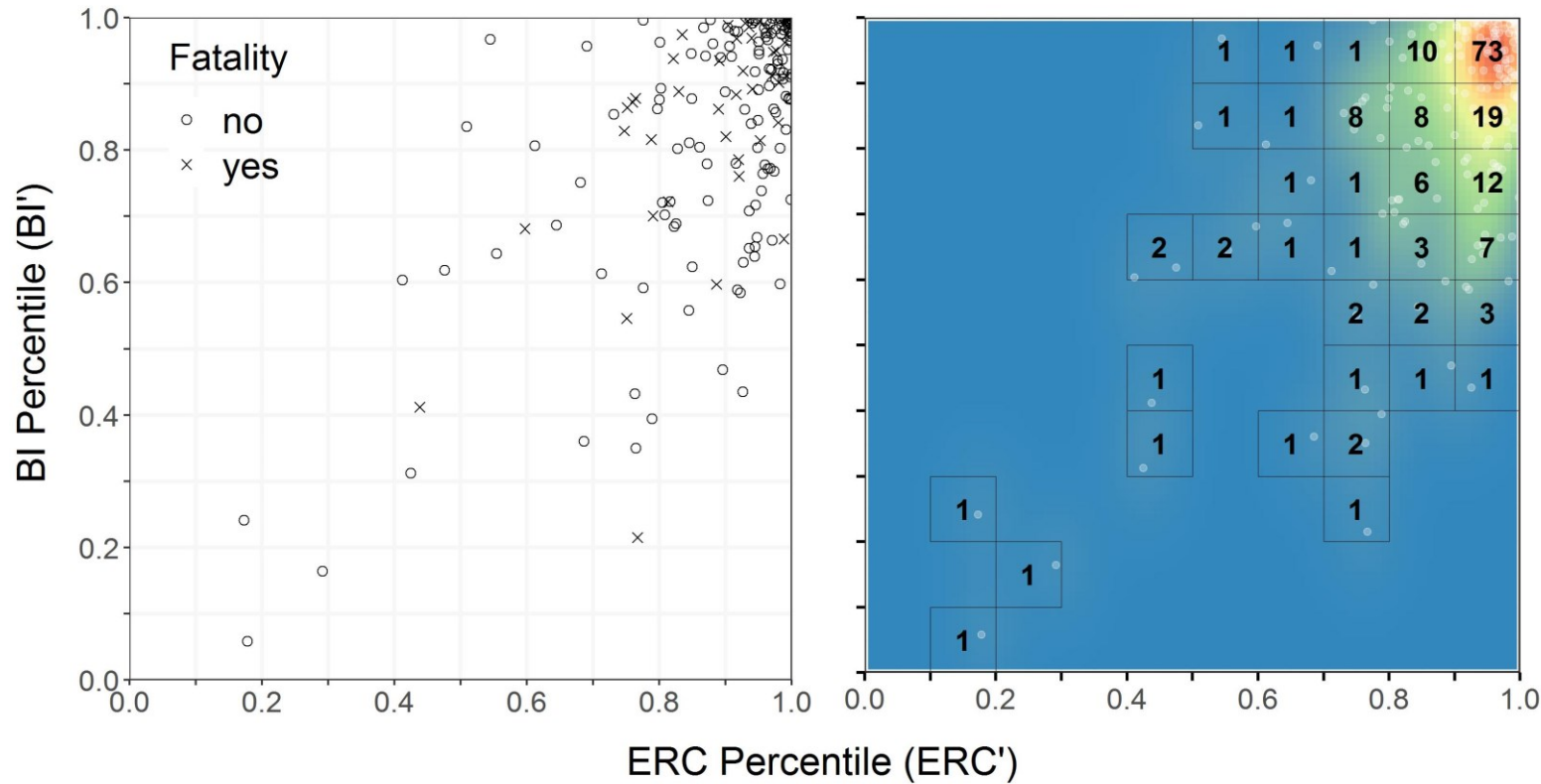


Severe fire weather potential
for important events in 2017

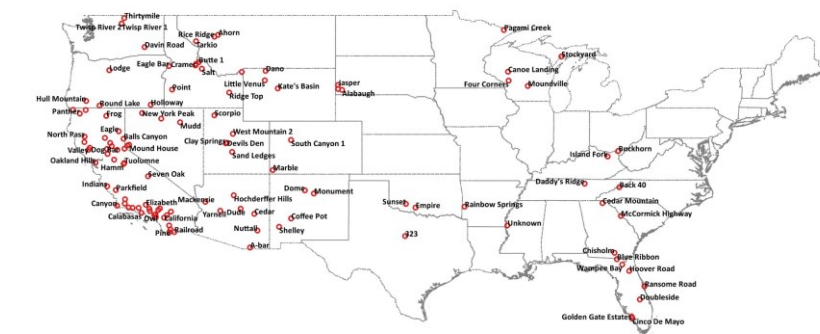
Severe Fire Weather Potential index



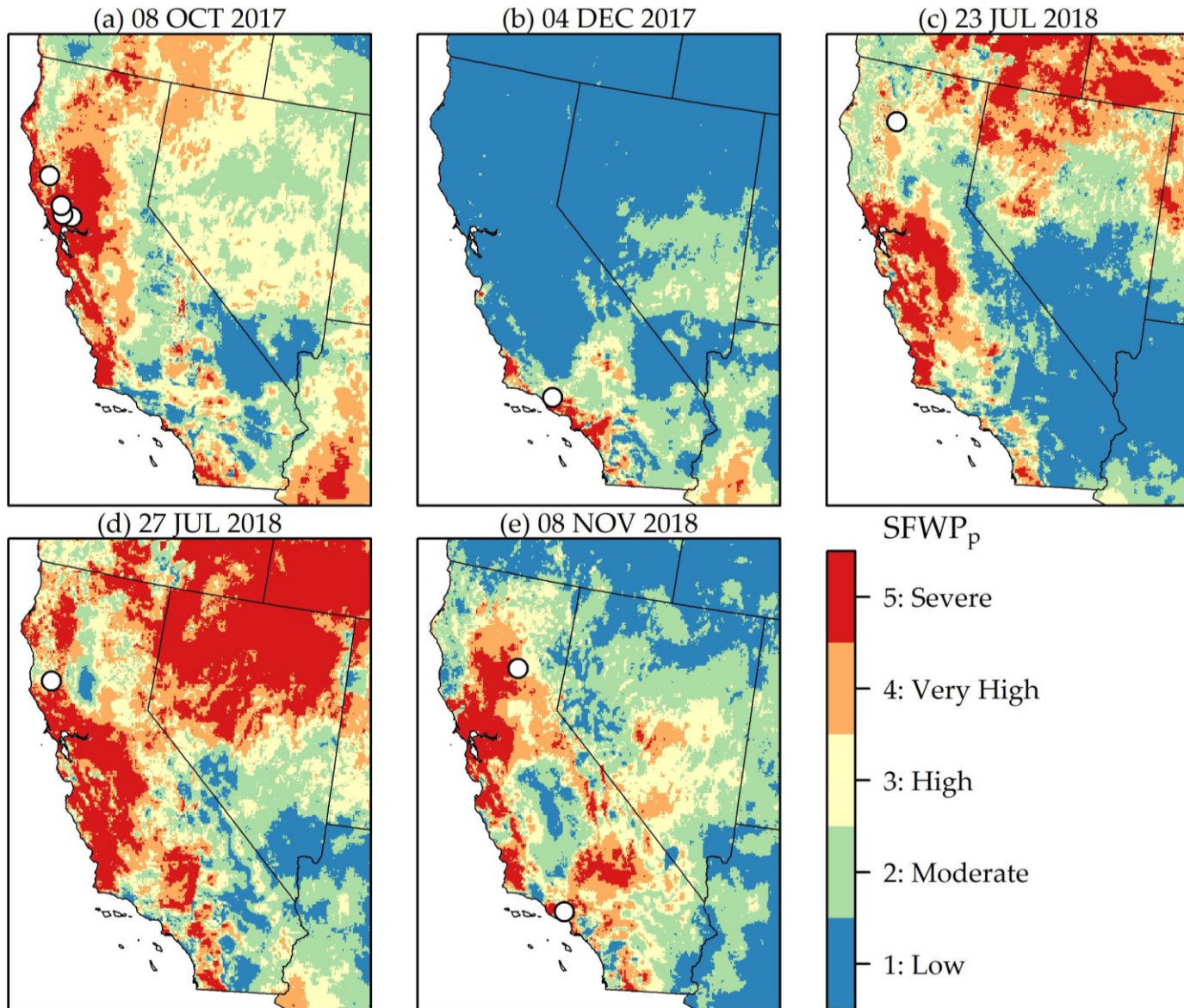
Relationships between fire danger components and firefighter entrapments



178 entrapments (1979-2017)



128 events occurred above either the ERC or BI 90th percentile



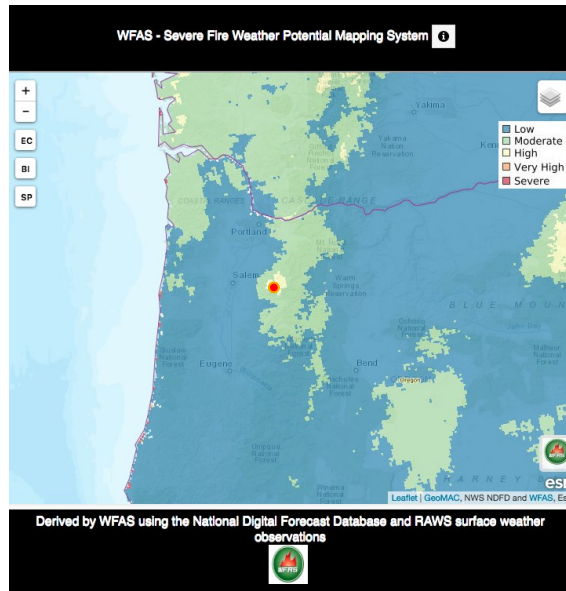
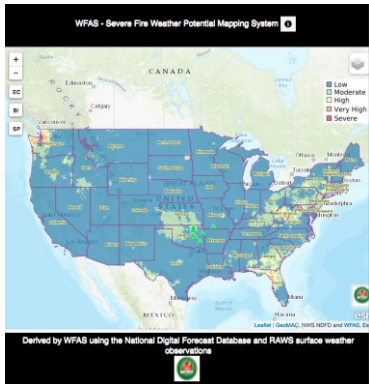
Forecast Severe Fire
Weather Potential
for significant fire events
across California (2017 –
2018)

Thank You!

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Santiam Park Fire (Today)

20 Mar 2019



Fire is burning off Hwy 22 near North Santiam State Recreational Area

By: Kohr Harlan | KOIN 6 News Staff

Posted: Mar 19, 2019 10:10 PM PDT

Updated: Mar 20, 2019 11:51 AM PDT



<https://www.koin.com/news/wildfires/evacuations-ordered-amid-santiam-park-fire/1862352692>