An Introduction to OK-FIRE: An Operational Decision-Support System for Wildland Fire Management in Oklahoma

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Wildfires
Prescribed Burns
Smoke
Joint Fire Science Program (2005)

OK-FIRE: A weather-based decision support system for wildland fire managers in Oklahoma. USDI/USDA Joint Fire Science Program, JFSP # 05-2-1-81, $320,926
Statement of Work: Project Description

• Develop a comprehensive suite of operational products incorporating a forecast component for fire weather, fire danger, and smoke dispersion

• Develop a dedicated OK-FIRE website to act as the delivery mechanism

• Offer regional training and customer support to users
Building Blocks Prior to OK-FIRE
12th Conference on Fire and Forest Meteorology
Oct. 26-28, 1993

“Using the Oklahoma Mesonet as a Fire Management Tool”
Building Blocks Prior to OK-FIRE

- Oklahoma Mesonet (1994)
- Oklahoma Fire Danger Model (1996)
- Oklahoma Dispersion Model (late 1990s to early 2000s)
- Nelson Dead Fuel Moisture Model (late 1990s to mid 2000s)
A Program of the Oklahoma Mesonet
What is “OK-FIRE”?

- Suite of weather-based products developed for wildland fire management in Oklahoma
- Wildland fire management website module
- Regional training and support for users
Subject Areas in OK-FIRE

- Fire Weather
- Fire Danger
- Smoke Dispersion
- Other Areas (e.g., Satellite and Radar Maps)
Types of Products

- MAPS, including animation and zooming
- Site-specific CHARTS
- Site-specific TABLES
Time Modes of Products

- PAST (all going back 30 days; many, 1 year)
- CURRENT (most recent)
- FORECAST (through 84-hr forecast period)
TRAINING
OK-FIRE User Groups

- US Forest Service
- Bureau of Indian Affairs
- US Army Corps of Engineers
- National Park Service
- US Fish and Wildlife Service
- Natural Resources Conservation Service
- Oklahoma Forestry Services
- Oklahoma Dept. of Wildlife Conservation
- The Nature Conservancy
- Fire Departments / Emergency Managers
- Private Landowners
Data Sources for OK-FIRE
The OKLAHOMA MESONET
(current and past weather conditions)
84-h Output from the NAM Model
(forecast weather conditions)
Suomi-NPP Satellite

Daily Past 7-Day 500-m NDVI Composites
The Oklahoma Fire Danger Model
Greenness (0-100%) relative to 10.5 year historical range (2012-2022) of NDVI values for each 500-m pixel
Relative Greenness

Relative Greenness

Weather: Solar Radiation, RH, Temp, Rainfall

KBDI

Fuel Model

Relative Greenness

Live Fuel Moisture (Herb, Woody)

Dead Fuel Moisture (1-, 10-, 100-, 1000-h)

Live and Dead Fuel Loads (tons/acre)

Weather: Temp, WS

OKLAHOMA FIRE DANGER MODEL (NFDRS Indices)

Energy Release Component (ERC)

Spread Component (SC)

Ignition Component (IC)

Burning Index (BI)
The OKLAHOMA MESONET
(current and past weather conditions)
84-h Output from the NAM Model (forecast weather conditions)
Relative Greenness

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Oklahoma Fuel Models

Default Fuel Model

IMPACTS of OK-FIRE
Over 2000 trained in OK-FIRE workshops
Average of 5600 users per month
Wildfire Preparation and Suppression

“OK-FIRE is an excellent program we use daily to determine manning levels for our fire personnel and planning prescribed burns”

- Chris Parrington, Oklahoma Forestry Services

“I think the OK-FIRE program is an awesome tool. I as fire chief use it regularly – to not be able to use this tool would be detrimental to all firefighters and emergency managers.

- Michael Petty, Fort Supply Fire Dept.

“We have used OK-FIRE for three years and have found it as useful as a fire truck. We used it heavily on April 2009. Thank you for your continued support in OK-FIRE and helping to keep our communities better prepared”

- Rob Hill, Stillwater Emergency Management
“I have a great deal of experience with prescribed fires, but even with all my experience I won’t consider burning before using the information that is now available to us. The OK-FIRE system is just as important as a drip torch and backpack fire pumps”

– Steve Sanders, US Army Corps of Engineers

“OK-FIRE is invaluable for monitoring conditions immediately before and during prescribed fires. It has also aided in the planning stages.”

- Doug Jobes, National Park Service

“OK-FIRE is the first tool I use to plan a prescribed burn and check on wildfire conditions daily”

- Paul Clark, NRCS
“I have been a fan since the day I came to Oklahoma and find OK-FIRE a tool I reference daily – several times per day in truth. I could go on with accolades, but the truth of the matter is the best way to predict fire behavior is to have accurate and broad reaching observations to build from. Rock on!”

- Drew Daily, Fire Staff Forester, Oklahoma Forestry Services

“I think the work you guys have done on fire danger for Oklahoma has been a “game changer”. I remember the days when we had very few stations to get NFDRS data for Oklahoma and how we tried to get by on RH, temp, and wind speeds from the Mesonet. Back in those dark days, even the NWS in Oklahoma was “hands off” concerning fire danger. All of that has changed for the better. Thanks!”

- Pat McDowell, WUI/Wildfire Prevention Specialist, Bureau of Indian Affairs