

A large wildfire is burning in a field of dry grass and trees. The fire is intense, with bright orange and yellow flames rising from the ground. The background shows a hazy, overcast sky. The text is overlaid on the image in a bold, yellow font with a black outline.

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

**Dr. J. D. Carlson, Fire Meteorologist
Biosystems & Agricultural Engineering
OK-FIRE Program Manager
Oklahoma State University**

Wildland Fire



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)**

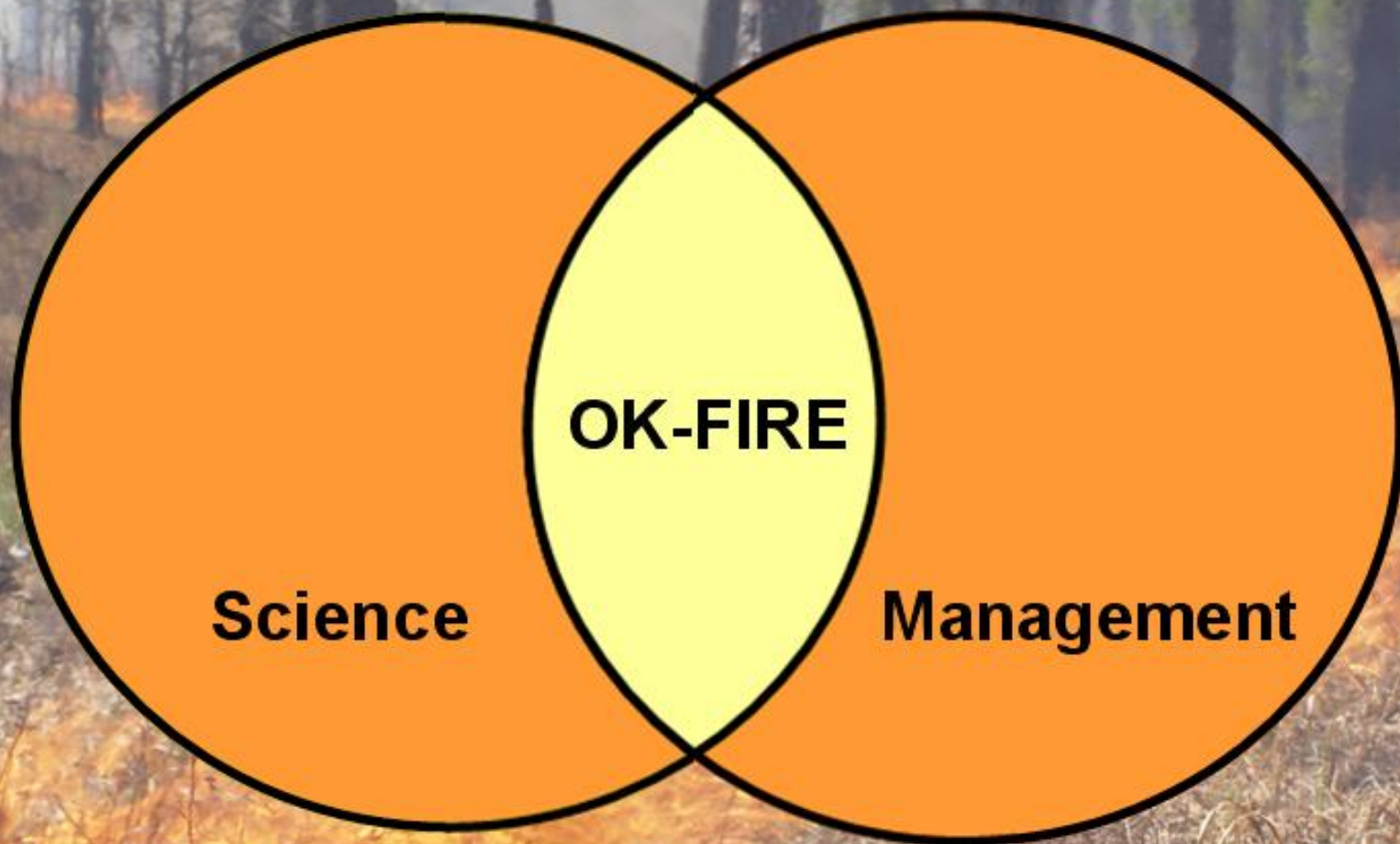


The logo for OK-FARE is displayed in a bold, italicized, golden-yellow font. The letter 'A' in 'FARE' is replaced by a stylized flame icon. The logo is set against a dark, rectangular background.

OK-FARE

The background of the slide is a sunset scene. The sun is a bright yellow-orange orb on the left side, partially obscured by the dark silhouettes of evergreen trees. In the distance, on the right side, a small fire is visible, rising above the tree line and emitting a plume of smoke.

A Program of the Oklahoma Mesonet



Science

OK-FIRE

Management

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

A large fire is burning in a field of tall grass and trees. The fire is intense, with bright orange and yellow flames rising from the ground. The background shows a line of trees, some of which are dark green, while others are bare. The sky is a pale, overcast blue. The word "PRODUCTS" is overlaid in the center of the image in a bold, yellow, sans-serif font with a black outline.

PRODUCTS

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)



A large fire is burning in a field of tall grass and trees. The fire is bright orange and yellow, with thick black smoke rising from it. The word "WEBSITE" is overlaid in yellow text in the center of the image.

WEBSITE

<https://www.mesonet.org/index.php/okfire>

OK-FIRE Website Module

Mesonet Home About Research Programs Contact Help Oklahoma Climatological Survey

Weather Climate Forecast K-12 Education Agriculture Public Safety **Fire Management** Past Data Search

Current Station Conditions >
Current Maps >
Past & Forecast Animated Maps>
Past & Forecast Charts/Tables >
Fire Prescription Planner >
NWS Forecast Chart (Stillwater)>
NWS Forecast Table (Stillwater)>
Relative Greenness Zoom Map >
Default Fuel Model Zoom Map >
Fire Advisories and Outlooks >
3.9 μ Infrared Satellite Map >
Recent Lightning Activity >
Oklahoma Burn Bans >
Additional Resources >
Contact and Product Information >
News >

Current Fuel Model for Stillwater
T-Tallgrass with brush
Default is T
Station Fuel Model Options

OK-FIRE

Current Relative Humidity and Wind Direction

Current Burning Index

Station:	Stillwater	Bristow
Weather	Sun 1/21/18 11:00 pm CST	Sun 1/21/18 11:00 pm CST
Relative Humidity:	48%	18%
Past 1-hr RH Change:	+29%	+3%
10-m Wind:	W 14 mph	WSW 13 mph
Max Wind Gust:	24 mph	18 mph
Temperature:	49°F Wind Chill: 44°F	59°F
24-hr Rainfall:	0.00 in	0.00 in
Dispersion:	Moderately Good	Moderately Good
Sunrise / Sunset:	7:36 am / 5:44 pm	7:33 am / 5:41 pm
Fire Danger	Sun 1/21/18 10:00 pm CST	Sun 1/21/18 10:00 pm CST
Current Fire Danger:	HIGH	HIGH
Burning Index:	56	43
Spread Component:	44	12
Ignition Component:	31%	45%
NFDRS Fuel Model:	T	R
1-hr Fuel Moisture:	5%	6%
10-hr Fuel Moisture:	11%	12%
Soil Moisture:	-%	93%
KBDI:	114	194
Relative Greenness:	25%	21%

A large fire is burning in a field of tall grass and trees. The fire is bright orange and yellow, with thick black smoke rising from it. The word "TRAINING" is overlaid in the center of the image in a bold, yellow, sans-serif font. The background shows a clear blue sky with some light clouds. The foreground is filled with tall, dry grass and some green shrubs.

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







EMERGENCY
MANAGEMENT



A landscape photograph showing a dense forest in the foreground, silhouetted against a sunset sky. In the distance, a large, dark plume of smoke or fire rises from the horizon, partially obscuring the sun. The sky transitions from a deep orange near the horizon to a pale blue at the top. The text "Data Sources for OK-FIRE" is overlaid in the center in a bold, yellow font with a black outline.

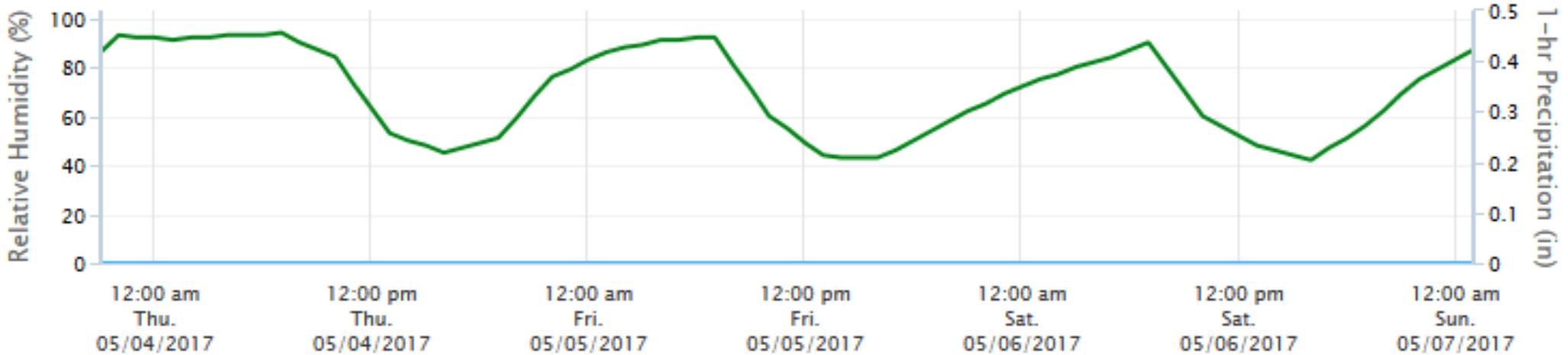
Data Sources for OK-FIRE

The OKLAHOMA MESONET

(current and past weather conditions)



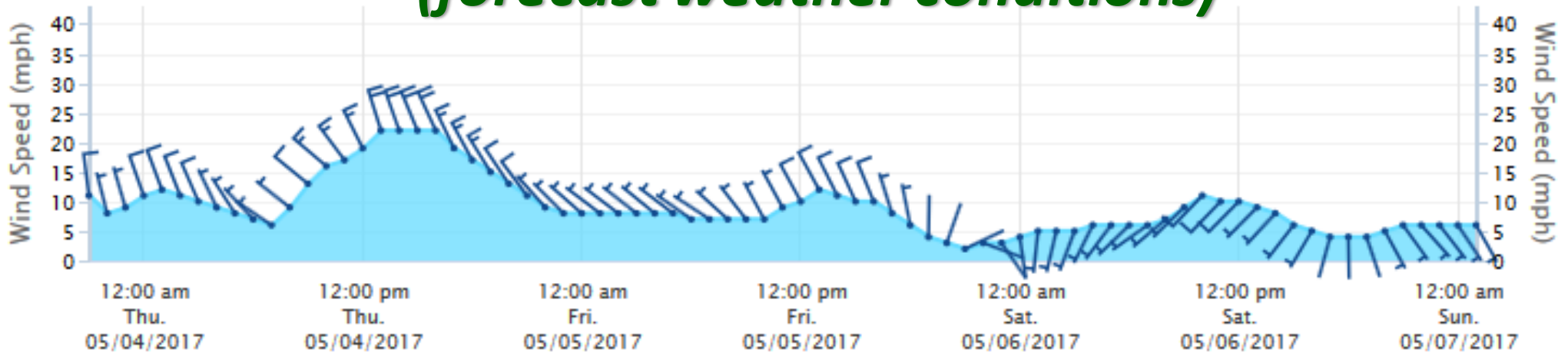
Forecast Meteogram Chart for Stillwater



— Relative Humidity ● 1-hr Precipitation

84-h Output from the NAM Model *(forecast weather conditions)*

www.mesonet.org



● Wind Speed ● Wind Barbs

Suomi-NPP Satellite

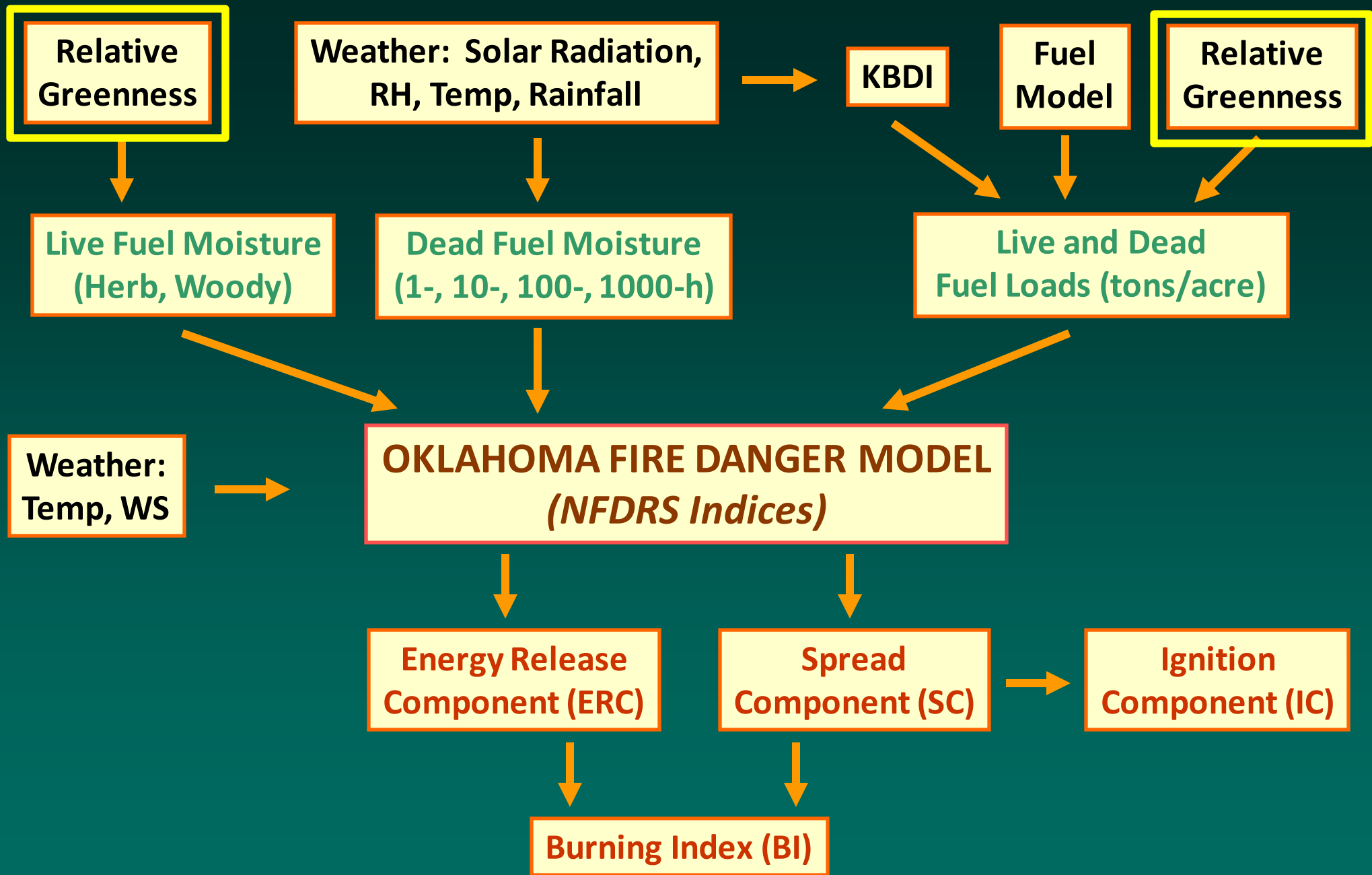


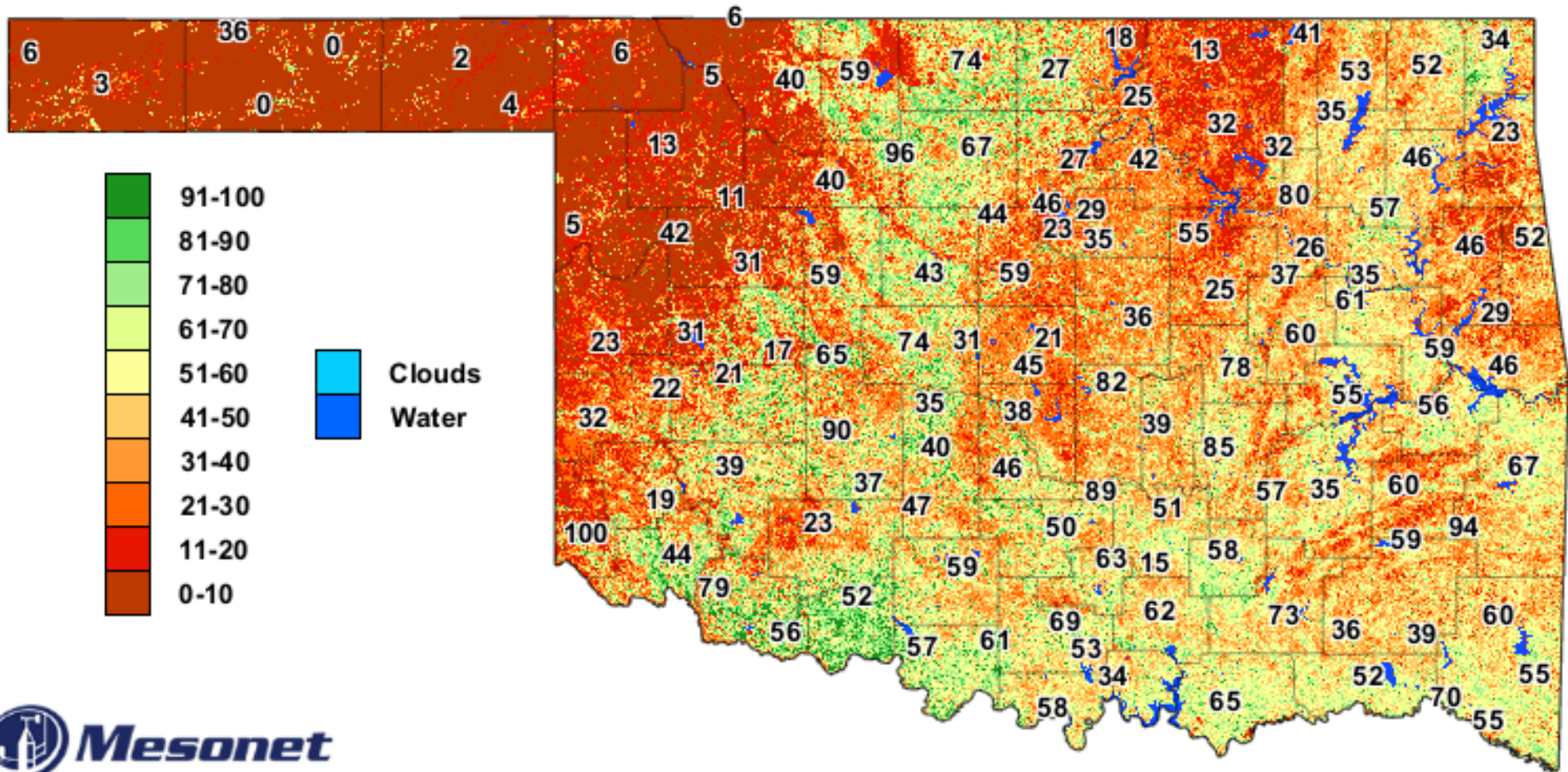
VIIRS

Daily Past 7-Day 500-m NDVI Composites

The Oklahoma Fire Danger Model





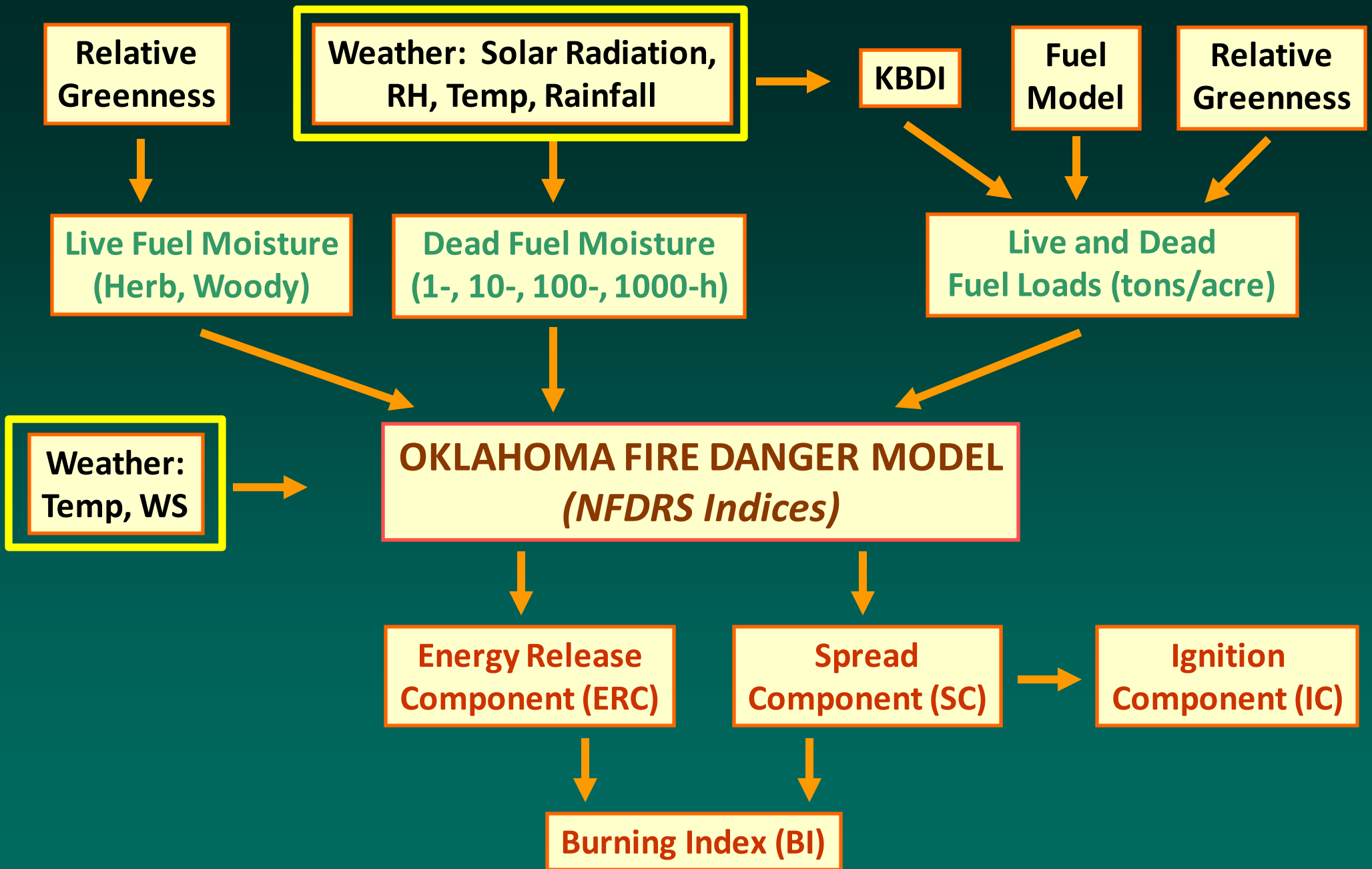


Relative Greenness (%)

Week ending April 12, 2023

Created 1:00:39 AM April 14, 2023 CDT. Copyright 2023

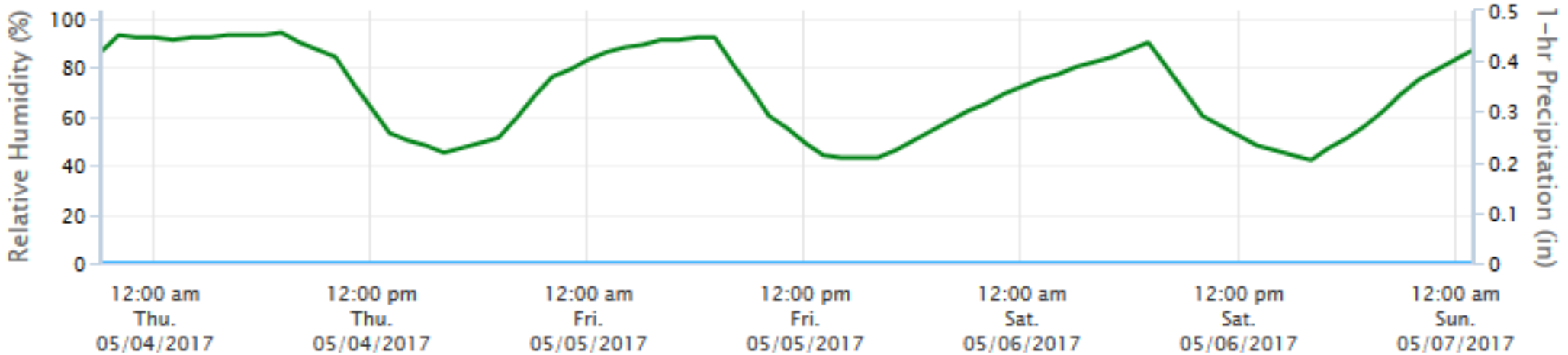
Greenness (0-100%) relative to 10.5 year historical range (2012-2022) of NDVI values for each 500-m pixel



A tall, slender weather observation tower stands in a rural landscape. The tower is a lattice structure with various instruments at different heights, including a wind vane and a solar panel. It is situated in a grassy field with a wire fence in the foreground. In the background, there are rolling hills and a larger, rounded hill under a blue sky with scattered white clouds.

The OKLAHOMA MESONET
(current and past weather conditions)

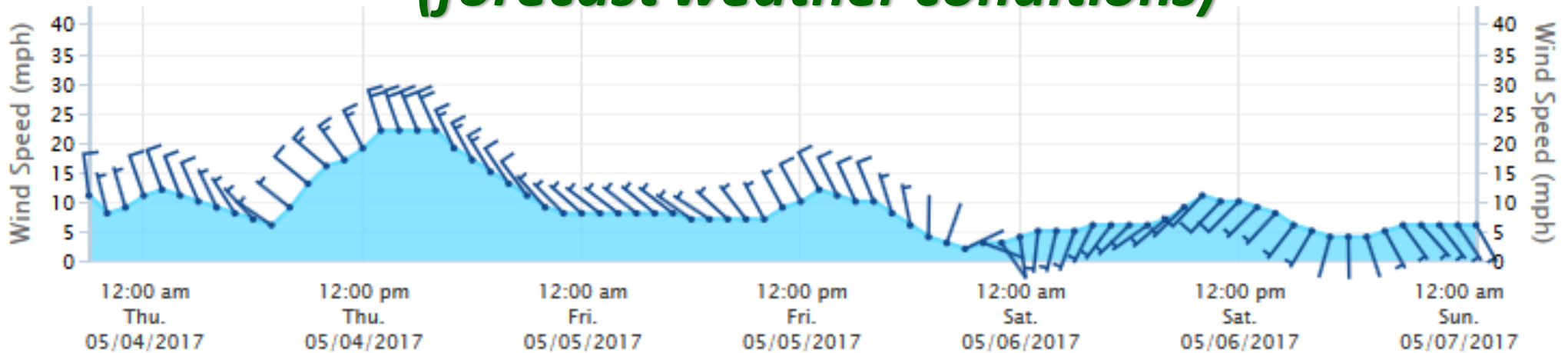
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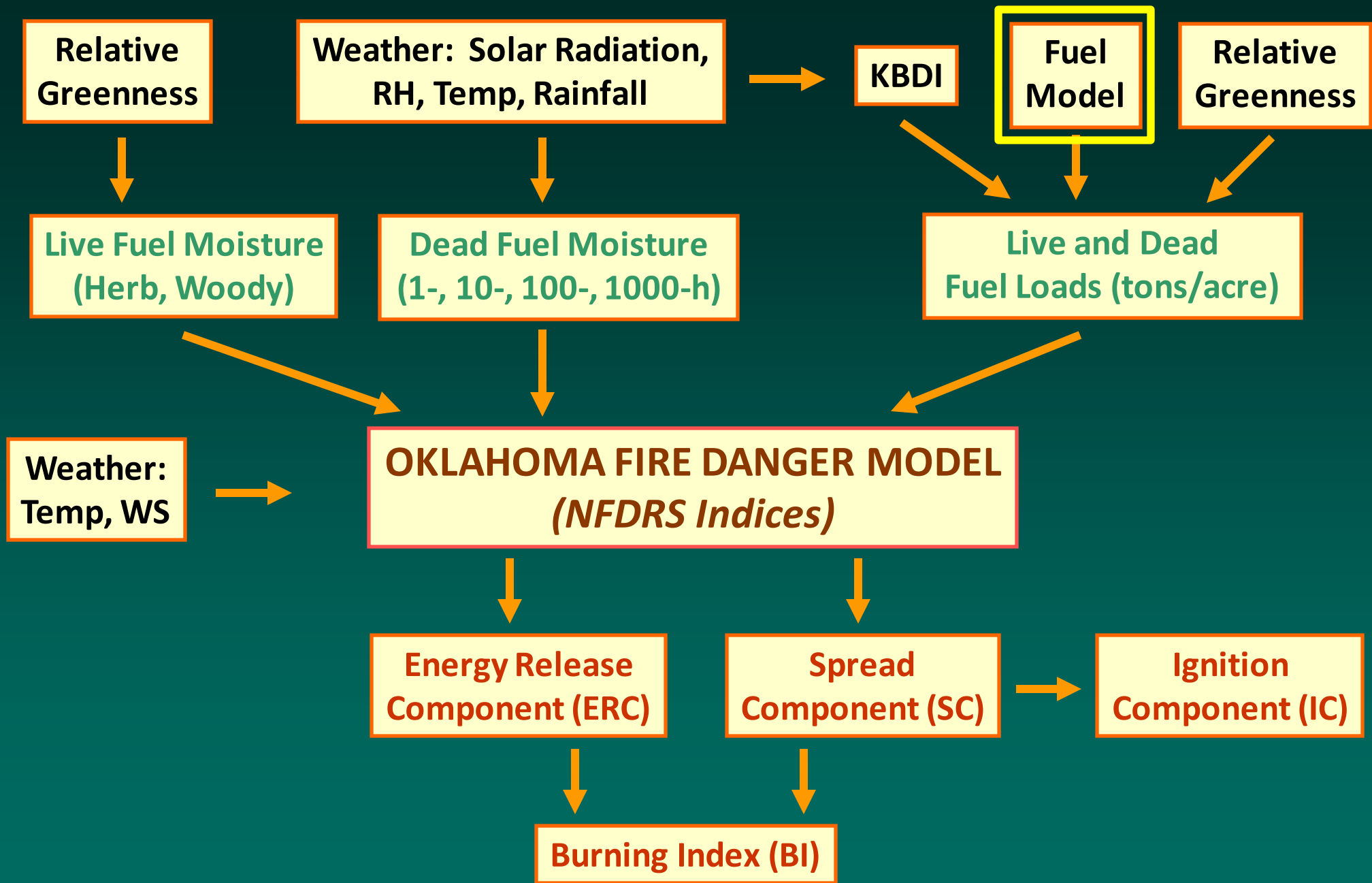
— Relative Humidity ● 1-hr Precipitation

84-h Output from the NAM Model *(forecast weather conditions)*

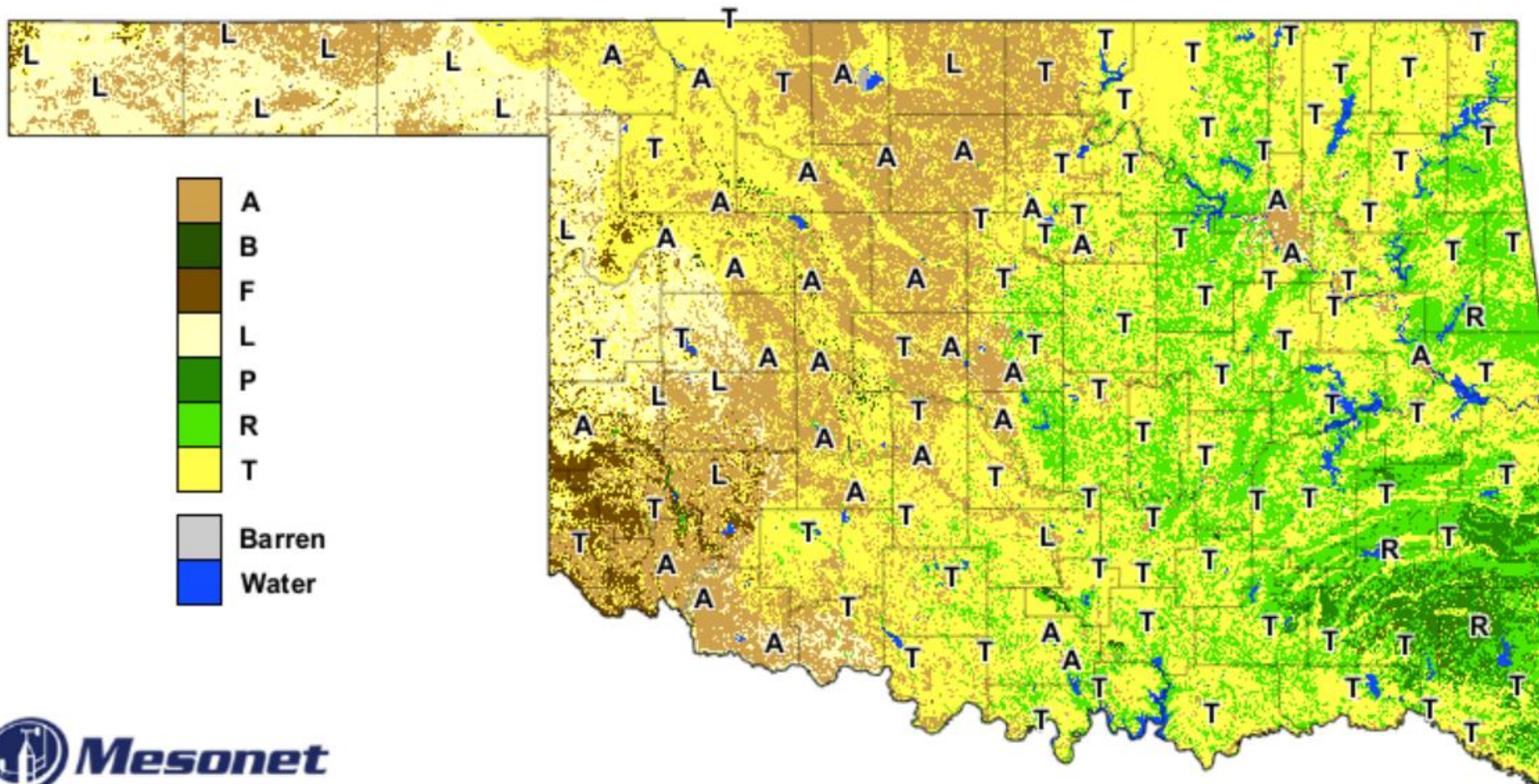
www.mesonet.org



● Wind Speed ● Wind Barbs



Oklahoma Fuel Models



 **Mesonet**
Default Fuel Model

Created 12:30:33 PM February 10, 2024 CST. Copyright 2024

IMPACTS of OK-FIRE



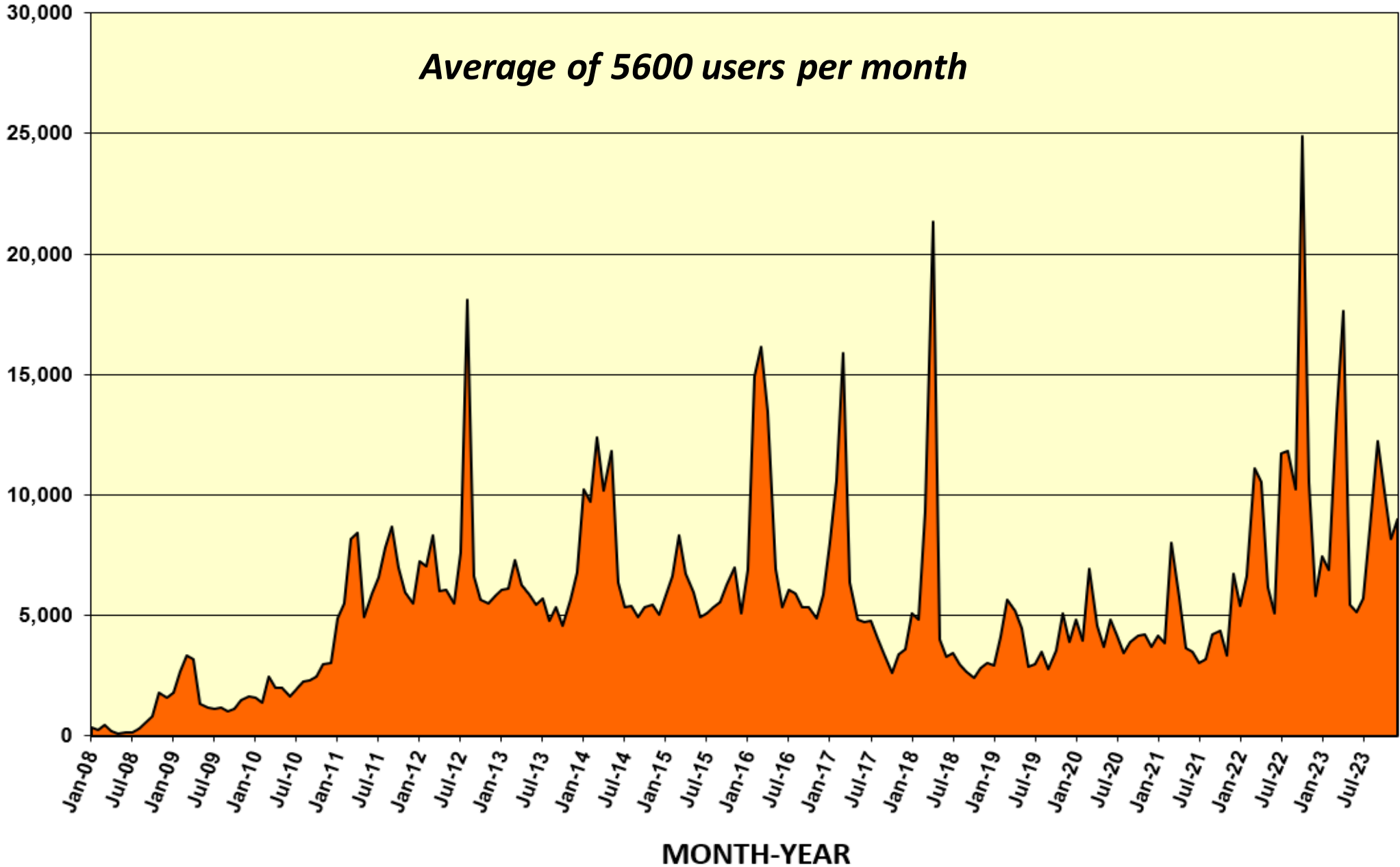


Over 2000 trained in OK-FIRE workshops

OK-FIRE Website Usage Since 2008

Average of 5600 users per month

MONTHLY UNIQUE VISITORS



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

Prescribed Fire Planning and Execution

“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”

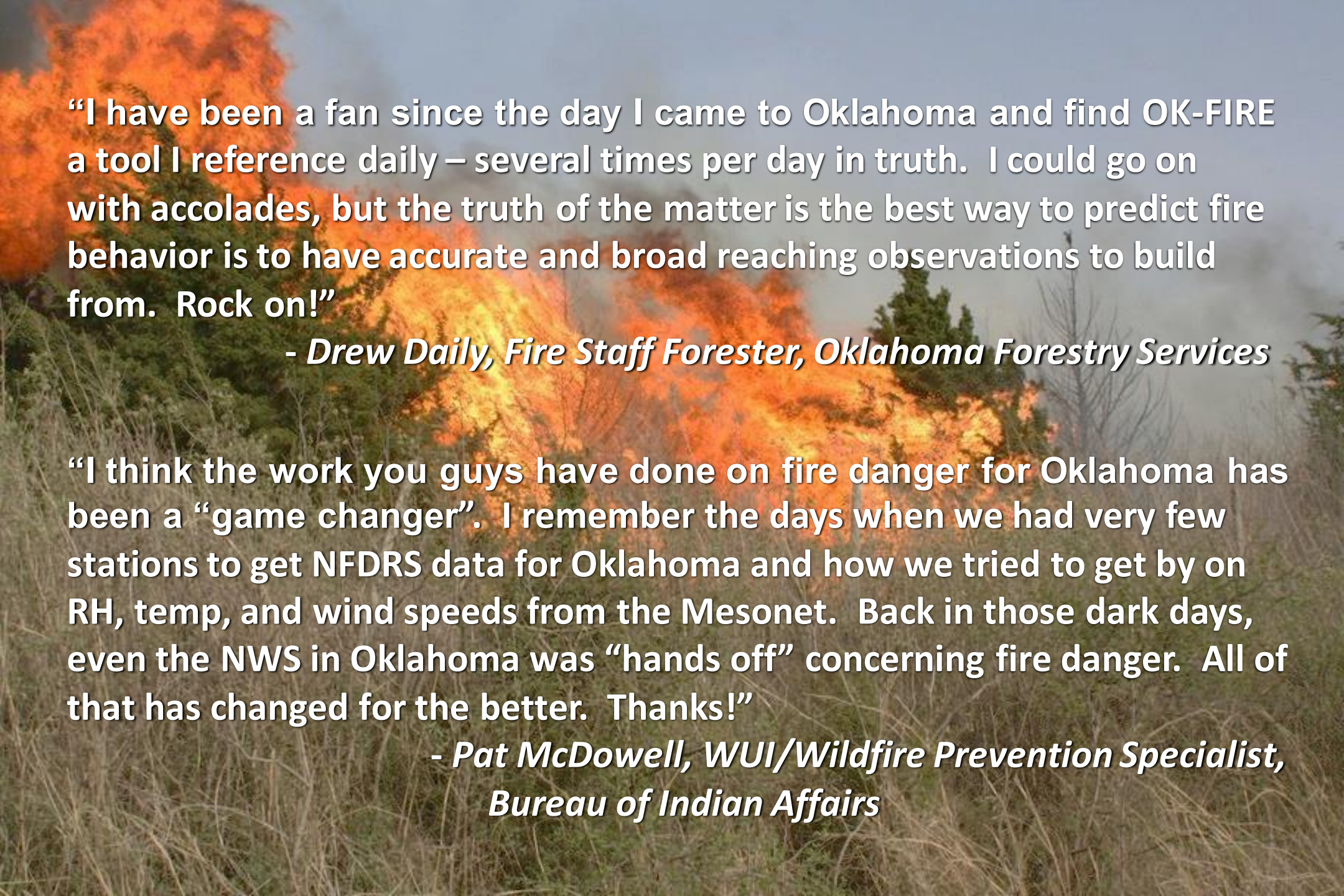
– *Steve Sanders, US Army Corps of Engineers*

“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***

A large fire is burning in a field of tall grass and trees. The fire is intense, with bright orange and yellow flames rising from the ground. The background shows a line of trees, some of which are also on fire. The sky is a pale, overcast blue. The text "Brief OK-FIRE Website Demo" is overlaid in the center of the image in a bold, yellow font with a black outline.

Brief OK-FIRE Website Demo