Partnered Power: Connecting Science and Operations in Real Time

CIWRO Workshop on Fire Weather & Forecasting

Drew Daily
Deputy Fire Management Chief – Operations/Preparedness
Oklahoma Forestry Services
“If an agency stays only within its jurisdictional boundaries, it will fail...[we must] address how fire really exists, and not how select sciences can handle it”

-Dr. Stephen J. Pyne
Where our mission statements intersect...

Protect Life, Property and Resources
Interdisciplinary Forecast Funnel

Seasonal Variation & Environmental Fuelscape

Episodic Drying & Fire Trends

Synoptic Weather Systems

Fire-effective Weather on High Risk Fuels

Months

Weeks

Days

Hours

Temporal Scale

Climate Fire Regime

Ignitions

Wildfire

Weather

Topography

Vegetation

Oxygen

Heat

Fuel

Fuel

Flame
Example 12-13 April 2018 Firestorm

Seasonal Variation & Environmental Fuelscape

- Warm season rains
- Herbaceous response
- Developing La Niña
- State Forestry/EM leadership briefing – 14 December 2017
Example 12-13 April 2018 Firestorm

- 30-day precipitation deficits
- ERC trends toward ‘crisis’
- Observed fire trends
- Multi-agency Fuels & Fire Behavior Advisory – 7 March
- OFS/NWS joint EM briefing – 15 March 2018
Example 12-13 April 2018 Firestorm

- 7 Apr – “Wed-Fri next week could be interesting with an escalating trend each day.”
- 8 Apr – “Strong fire wx possible Thur & Fri. High end critical/extreme conditions Fri with some similarities to SGPWO patterns.”
- 9 Apr – “Potentially very active period of wildland fire on the Southern Plains.”
- 10 Apr – “Extreme conditions over a small area lending toward potential predictable fire episode [and] dangerous fire situation Friday.”
Example 12-13 April 2018 Firestorm

• 11 Apr – “Dangerous fire episode on the Southern Plains Thu-Fri. Greatest concern is for ignition of significant fire Thursday afternoon in vicinity of the Panhandles/nw OK which will be hit by strong wind shift during peak burning period Friday.”

• 12 Apr – “Dangerous—potentially life threatening—wildfire episode expected to begin today. Most favored area for dangerous wildfires is taking shape from the Flint Hills southwestward to central/western-central OK.”
Example 12-13 April 2018 Firestorm

- 40 fires
- 425,408 acres
- 2 killed, 11 injured
- 50 homes lost

“That fire behavior forecast should scare the hell out of you”
Pieces of a Probabilistic Puzzle

- Energy Release Component
- Red Flag Threat Index
- Burning Index
- CIPS Analog Guidance
- Weather+Fuel Parameter Space
The Probabilistic Puzzle

- Energy Release Component
- Red Flag Threat Index
- Wildland Fire Assessment System

Prototype probability of ≥5,000 acre fire 1st guess

5 Days in Advance!
Science to Operations

- Cooperation - Collaboration – Partnership

- Direct Connection to Operations
  - To the Incident Responder
  - To the Public

\[(\text{Fuels}) + (\text{Weather}) + (\text{Topography}) = \text{Fire Behavior}\]

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\underline{\text{Values at Risk}}
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- Duty, Respect & Integrity
Fire is not listening to our whining, rhetorical windiness, and data presentations. It speaks a language of wind, fuel, drought, and terrain, and it will ignore anything that does not translate its conceptions into such media.