OKLAHOMA FORESTRY SERVICES
Department of Agriculture, Food and Forestry
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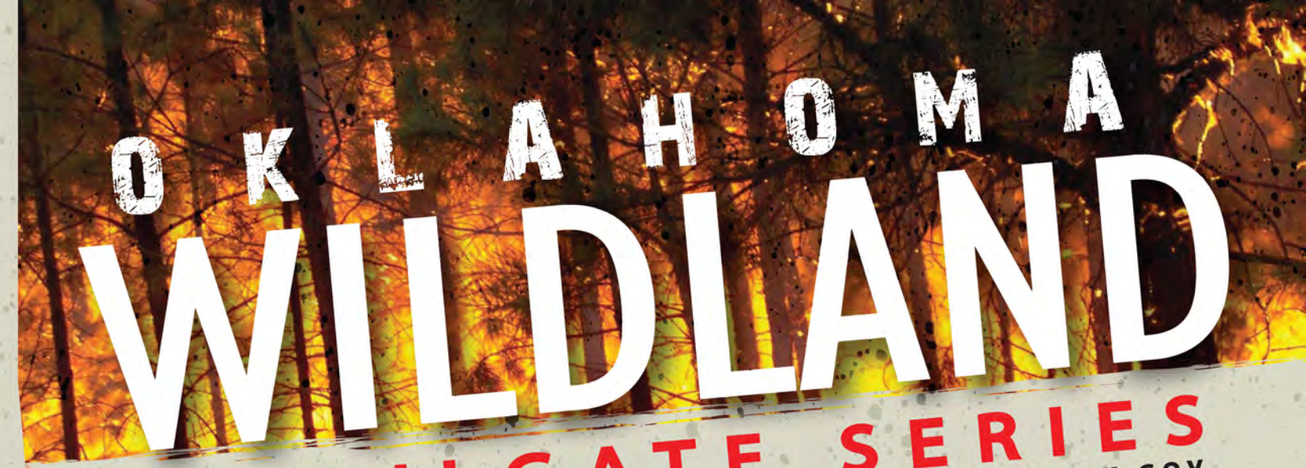
MEET OUR FIREFIGHTING TEAM

Ryan Baldrachi, GIS Specialist

When OFS firefighters need maps, they turn to Ryan Baldrachi, our Geographical Information System (GIS) Specialist. Utilizing the Collector App, Ryan maps fires, refines data provided from the field, performs geospatial analysis and provides critical information to all levels of the firefighting effort. Quality maps are essential tools for communication on growing fires, providing on the ground fire personnel with access and travel routes, structures needing protection (including homes), fuels and topography information and a myriad of other specialized information. When there are not urgent needs for fire maps, Ryan also supports OFS by providing maps, analyzing data and developing apps to collect and track information for its many other services and programs. Ryan works out of OFS' headquarters in Oklahoma City.

Ryan has a Bachelor's Degree from the University of Arkansas and a Master's Degree from Ohio University, both in Psychology. He received a GIS Certificate from Eastern Washington University and worked as a GIS Technician and Mapping Analyst in the Oil and Gas Industry for the past eight years, before joining the OFS team in December 2015. In his spare time, Ryan participates in competitive rowing at the OKC Boathouse District.

For questions or comments contact Drew Daily, fire management staff forester, at drew.daily@ag.ok.gov or call 405-522-6158.
To sign up for our email list, suggest topics for future issues or download Oklahoma Wildland Tailgate issues visit forestry.ok.gov/tailgate.



OKLAHOMA WILDLAND

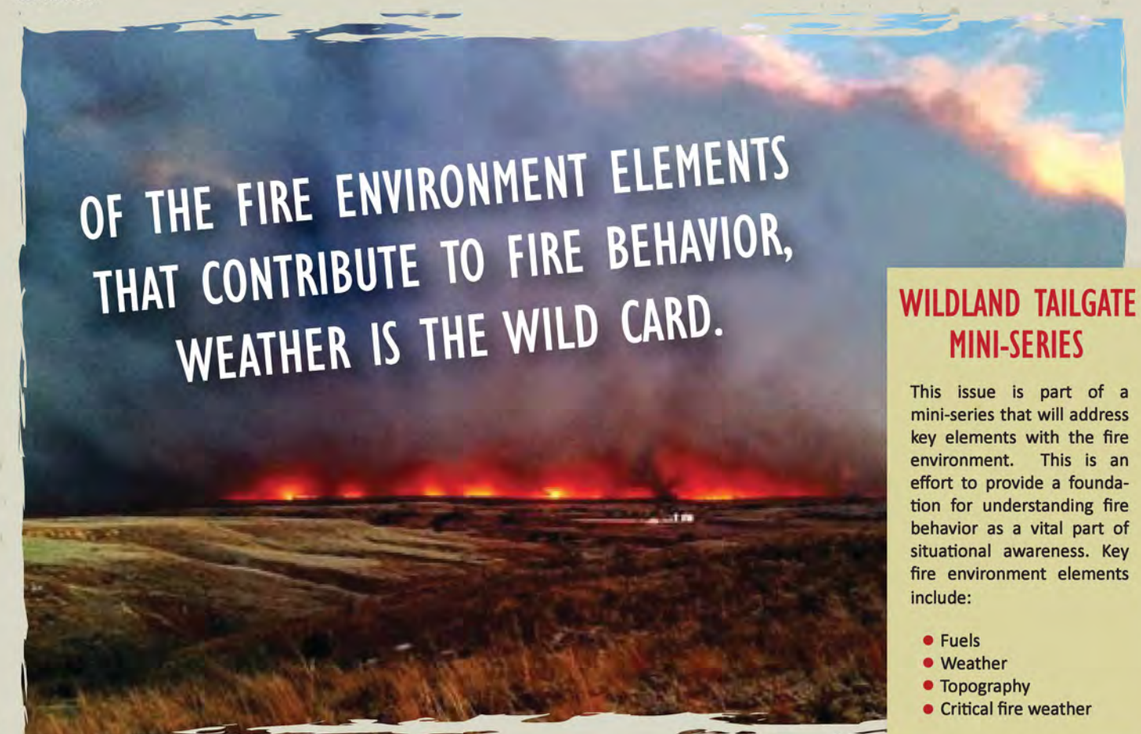
TAILGATE SERIES

JULY 2016 | EDITION 8 | WWW.FORESTRY.OK.GOV

Oklahoma Forestry Services developed this training tool for fire departments as a supplement to formal firefighter training. Watch for a new message quarterly to use in formal safety meetings or in small "tailgate" groups as an effective way to increase preparedness and improve safety. The Tailgate Series is available at www.forestry.ok.gov

FIRE ENVIRONMENT WEATHER

Weather, fuels and topography are the three elements of the fire environment contributing to wildland fire behavior. Defined as short-term variations in the atmosphere, weather is the most variable over time and difficult to predict element in the fire environment. This is the second issue in a mini-series addressing each of the key elements of fire behavior.



WILDLAND TAILGATE MINI-SERIES

This issue is part of a mini-series that will address key elements with the fire environment. This is an effort to provide a foundation for understanding fire behavior as a vital part of situational awareness. Key fire environment elements include:

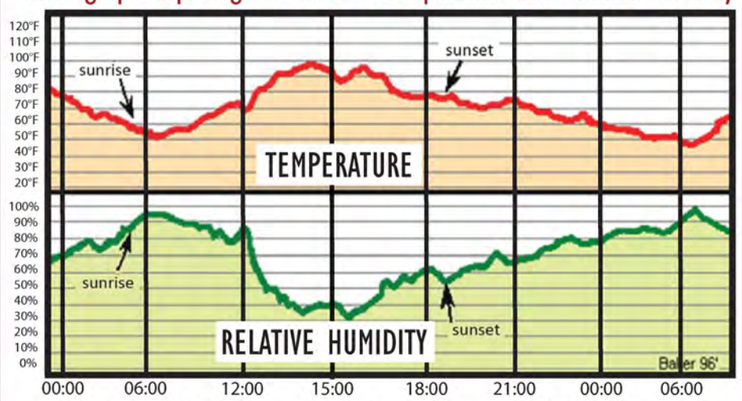
- Fuels
- Weather
- Topography
- Critical fire weather

WHAT YOU NEED TO KNOW

WEATHER ELEMENTS:

- Air Temperature is simply the degree of hotness or coldness of the air. Higher air temperatures pre-heat fuels nearer to the ignition temperature, making them more susceptible to ignition and sustained burning.
- Relative Humidity is the amount of moisture in the air compared to the amount of moisture that the air could hold when saturated. Light fuels (grasses/leaves/needles) release or absorb moisture rapidly with changes in relative humidity. Heavy fuels (large limbs/downed logs) change much more slowly.
- Temperature / Relative Humidity Relationship have inverse relationships. When temperature increases relative humidity decreases.
- Precipitation, in either liquid or solid form, is water particles that originate in the atmosphere and fall to the earth's surface. Both air and wildland fuels absorb some of this moisture making it more difficult to ignite and burn.
- Atomospheric Stability is the degree to which vertical motion is either enhanced or suppressed.
  - Stable atmospheric conditions resist upward motion limiting fire intensity.
  - Unstable atmospheric conditions encourage upward lift. Atmospheric instability allows development of a strong convection column and indraft, lofting firebrands, dust devils (fire whirls) and gusty surface winds.
- Wind is the horizontal movement of air relative to the earth's surface. Wind is the most critical factor affecting both direction and rate of fire spread. Wind is always referenced by the direction from which the wind is blowing (ex. A north wind is blowing from the north). Wind supplies oxygen, dries fuels and carries firebrands ahead of the fire.

Thermograph depicting 24 hours of temperature and relative humidity



Note the relationship between temperature and relative humidity.

ON THE FIREGROUND

APPLYING WHAT YOU'VE LEARNED

THE SITUATION

Fire season is winding up in your area, and there are ample dormant fuels following a very good growing season last year. Precipitation has not been regular and your crew is getting anxious about the potential for fire activity given the weather forecast for the next few days.

Q: What are the four primary weather elements that affect fire behavior?

A: Temperature, Relative Humidity, Wind and Atomospheric Stability.

You begin your morning repairing the pump motor on your engine, and have to run to town to pick up a few parts. On the way back you notice a dust devil racing across the grocery store parking lot.

Q: What does this tell you about the fire environment for today?

A: Dust devils are an indicator of an unstable atmosphere. If you are on a fire you would expect rapidly rising smoke columns, potential for fire whirls and the possibility of spotting if firebrands are lofted into the column.

Your crew is dispatched to a fire right at sunset that is burning in hardwood leaf litter. Winds have laid down and the temperature is dropping as the sun sets.

Q: What do you expect the relative humidity to do over the course of the next few hours?

A: It will gradually increase as temperature decreases.

Q: How will the decreasing temperature and increasing relative humidity affect fire behavior?

A: Fire behavior should decrease. Loss of sunlight and cooling temperatures will move fuels further away from the temperature of ignition and fuel moisture will begin to rise along with the relative humidity.

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