

# Evaluating Your Burn Unit

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*The Longleaf Alliance*  
*NRCS Staff Fire Training*



# Why Prescribe Fire?

- To control competition
- To reduce risk from wildfire
- To attract wildlife and improve/maintain ecosystem
- To keep a tradition alive
- Know you need to/ought to....but not sure why?

## OBJECTIVES



# Is Rx Fire the Right Practice Right Now?

- Young longleaf
- Fine fuels present
- Dormant season Rx



# Is Rx Fire the Right Practice Right Now?

- Heavy hardwood component
- Low fire behavior
- Mechanical/chemical before prescribing fire



# Properly Prescribed Chemical/Fire – Photo Point

2019  
1 yr rough



# Prescription Parameters

- Weather and Fuels: acceptable ranges
  - *Wind direction and speed, temperature, rH, fuel moisture, overnight conditions, days since rain, etc.*
- Is weather compatible with your desired fire behavior?
- Specific objectives can also guide your parameters
  - burning young longleaf
  - burning deep duff areas
  - for flowering responses



# Components of a Burn Plan (\*Considerations)

**PRESCRIBED BURN PLAN**

Site: \_\_\_\_\_ Acres: \_\_\_\_\_ Unit: \_\_\_\_\_ Date: \_\_\_\_\_  
 County: \_\_\_\_\_ Region: \_\_\_\_\_ Prepared by: \_\_\_\_\_ Signature: \_\_\_\_\_  
 GFC County Phone & Response Time: \_\_\_\_\_ Permit #: \_\_\_\_\_  
 Burn Boss: \_\_\_\_\_ Signature: \_\_\_\_\_ Telephone: \_\_\_\_\_  
 Local Fire: \_\_\_\_\_ Law Enforcement: \_\_\_\_\_  
 Directions to Hospital: \_\_\_\_\_

**A. PREBURN FACTORS**

1. Crew Size: \_\_\_\_\_ Equipment Needs: \_\_\_\_\_  
 2. Adjacent landowners to notify: \_\_\_\_\_  
 3. Show following on burn map: a. Plowed firebreaks b. Natural firebreaks c. Helipad (if needed)  
 d. Powerlines e. Smoke sensitive or other critical areas  
 4. List smoke sensitive areas and critical targets: \_\_\_\_\_  
 5. Special precautions: \_\_\_\_\_

**B. RECORD OF PREVIOUS BURN**

Date: \_\_\_\_\_ Fire Type: \_\_\_\_\_ Results: \_\_\_\_\_

**C. DESCRIPTION OF STAND:**

1. Overstory: Forest type, density (BA), size (Avg DBH): \_\_\_\_\_  
 2. Understory: type, density, height: \_\_\_\_\_ Crown height (bottom) \_\_\_\_\_  
 3. Dead fuels: type, volume \_\_\_\_\_

**D. OBJECTIVES OF BURN:** \_\_\_\_\_  
*(ecological, fuel or hazard reduction, training; also specify quantitative: litter reduction, hardwood kill, etc.)*

**E. WEATHER FACTORS**

	Desired Range	Predicted	Actual
1. Surface Wind (20' speed and direction):	5 – 10 mph		
2. Transport Wind (speed and direction):	10 – 25 mph		
3. Minimum Mixing Height:	1500 ft.		
4. Relative Humidity:	30 – 55 %		
5. Temperature:	<70 F		
6. 10 Hour Fuels:	>6%		
7. KBDI (Drought Index):	<400		
8. Turner Stability Index:	2 - 5		
9. LVORl:	<7		
10. Dispersion Index:	40 – 100		
11. Days Since Rain:	>2		

**F. FIRE FACTORS:**

1. Target Months to Burn: \_\_\_\_\_ 2. Type Fire: \_\_\_\_\_  
 3. Firing Method: \_\_\_\_\_ 4. Fire Intensity: \_\_\_\_\_  
 5. Time Start: \_\_\_\_\_ Estimated Burn Time: \_\_\_\_\_ Amount of Litter to Leave: \_\_\_\_\_

**G: Additional Considerations:** \_\_\_\_\_

- General Information
- Pre-burn Factors
- Record of Previous Burns
- Description of Stand
- Objectives of Burn
- Weather Factors
- Detailed Unit Description
- Fire Factors
- Smoke Management
- Burn Management
- Contingencies
- Map



# General Information

## PRESCRIBED BURN PLAN

Site: \_\_\_\_\_ Acres: \_\_\_\_\_ Unit: \_\_\_\_\_ Date: \_\_\_\_\_

County: \_\_\_\_\_ Region: \_\_\_\_\_ Prepared by: \_\_\_\_\_ Signature: \_\_\_\_\_

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Directions to Hospital: \_\_\_\_\_





# Description of Stand

## C. DESCRIPTION OF STAND:

1. Overstory: Forest type, density (BA), size (Avg DBH): \_\_\_\_\_
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3. Dead fuels: type, volume \_\_\_\_\_



# Objectives of Burn

## **D. OBJECTIVES OF BURN:** \_\_\_\_\_

*(ecological, fuel or hazard reduction, training; also specify quantitative: litter reduction, hardwood kill, etc.)*

- Usually pertaining to immediate goal(s) of this fire event



# Goals and Objectives of Burn Management

- **Short term goals of managing with fire (burn to burn)**
  - *Ex. Fuel loading reduction*
  - *Ex. Top kill hardwood*
  - *Ex. Keep unit on regular burn rotation*
- **Long term goals of managing with fire (multiple fires later)**
  - *Ex. Provide quality habitat quality for NOBO*
  - *Ex. Maintain an open longleaf pine stand with minimal midstory with Rx fire only*
  - *Ex. Restore native understory grasses and legumes*

Assuming a young longleaf stand, a shift in fire seasonality will need to occur to meet long term goals



# Seasonality

## Dormant Season (Dec-Feb)

- Predictable Forecasts
- Dependable Moisture
  - Passing wet, cold fronts
- Lower rates of evapotranspiration
- Cooler ambient temps
- Favors forbs

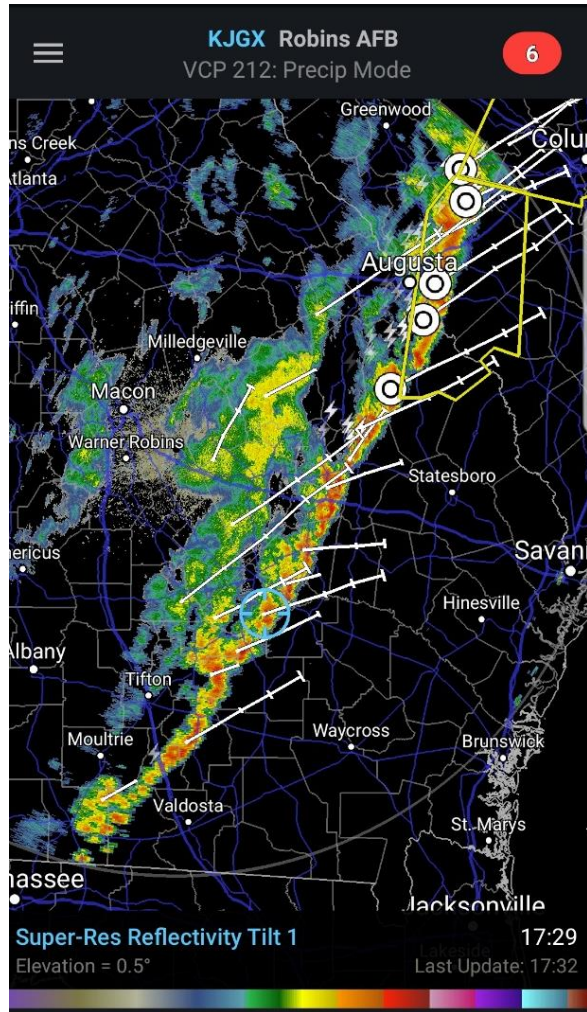
## Growing Season (Mar-July)

- Forecasts not as predictable
- Sporadic rain events
  - Convective storms
- Higher ambient temps
- Warmer ambient temps
- Favors grasses

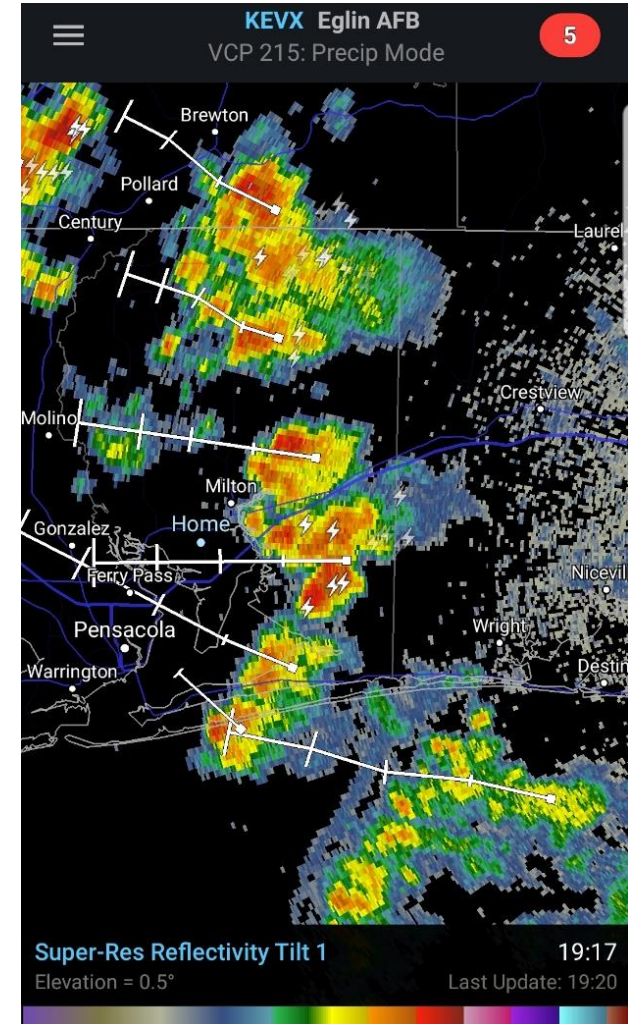


# Seasonality

## Dormant Season (Dec-Feb)



## Growing Season (Mar-July)



# Weather Factors

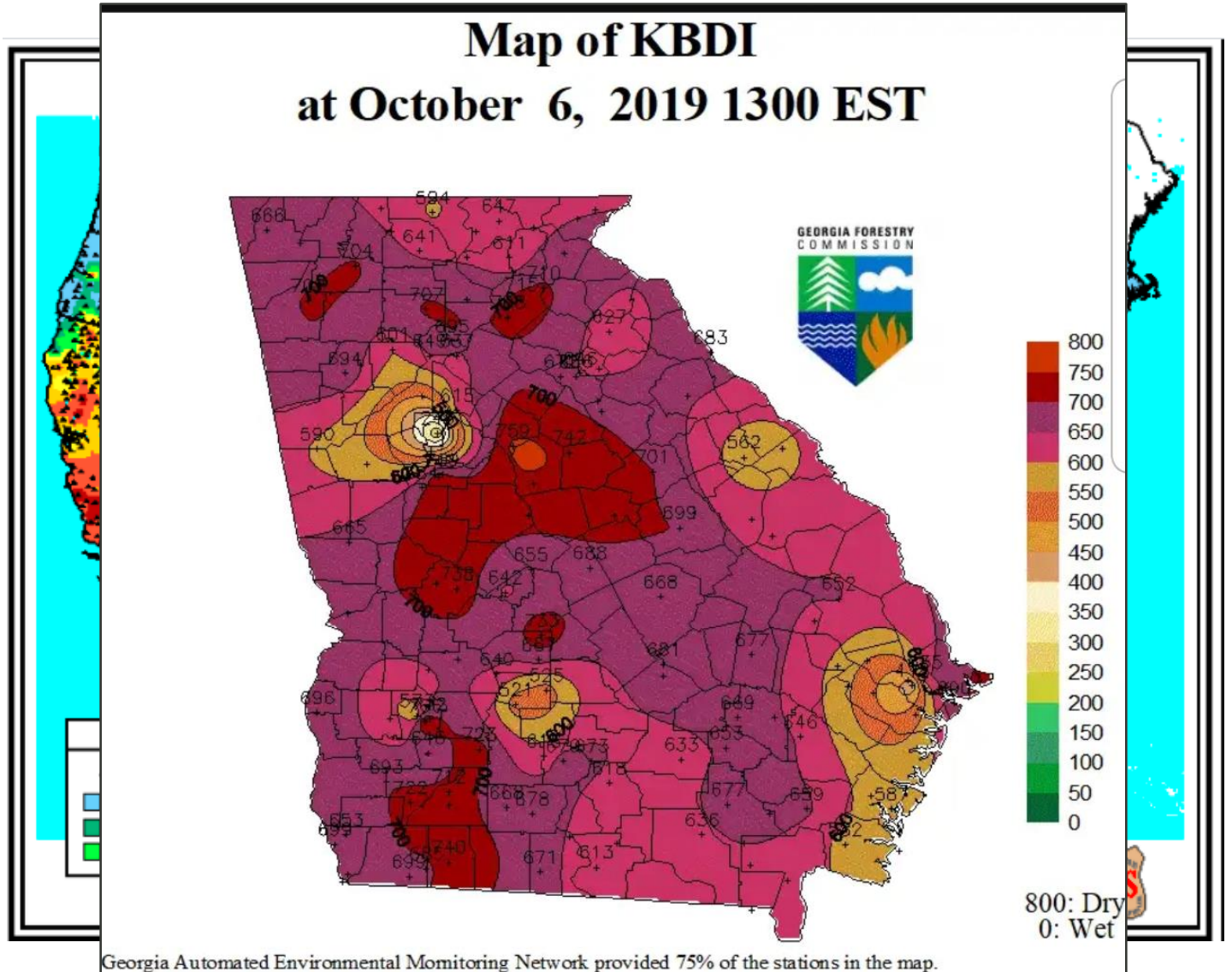
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# Weather Factors-Keetch Byram Drought Index

- Measures top 8" of soil's moisture
- 0-800 scale; 0 being saturated



# Weather Factors (Predictions/Forecasts)

- Pull multiple predictions (if possible)
- NWS spot weather has been the most accurate, in my opinion
- Other weather prediction services: State Forestry Commissions, Weather Channel, etc



# Weather Factors-NWS Spot Weather

The screenshot shows the National Weather Service website. At the top, the NWS logo and "NATIONAL WEATHER SERVICE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION" are visible. A navigation bar includes links for HOME, FORECAST, PAST WEATHER, SAFETY, INFORMATION, EDUCATION, NEWS, SEARCH, and ABOUT. Below the navigation bar, there is a search box for local forecasts, which is circled in red. The search results show "32583, Milton, FL, USA" and "32583, Pace, FL, USA". To the right of the search box, there are "News Headlines" with links to "Discontinuation of Hydrologic Statements (RVS/RVD)", "Beach Bound? Learn More About RIP CURRENTS - The #1 Weather Related Killer Along Gulf Coast Beaches", "Current Risk & UV Indices", and "June 2021 Climate Summaries Mobile/Pensacola". Below the news headlines, there is a "MY FORECAST" section for "Mobile Regional Airport AL" showing a "Thunderstorm" and a temperature of "86°F" (30°C). To the right of the forecast, there is a "Weather Forecast Office Mobile/Pensacola" section with a navigation bar for "Current Hazards", "Current Conditions", "Radar", "Forecasts", "Rivers and Lakes", "Climate and Past Weather", and "Local Programs". Below this, there are tabs for "Localized Flash Flooding Today", "Rip Current", "Today", "Tonight", and "Tuesday". The "Localized Flash Flooding Today" tab is active, showing a "Flooding Possible" alert through the evening, issued by the Weather Forecast Office Mobile/Pensacola on July 19, 2021 at 5:03 AM CT. The alert includes a map of the area around Butler, AL, with a "LIMITED" warning that "Numerous to widespread showers and storms will" occur.



# Weather Factors-NWS Spot Weather

High: 86 °F

Low: 75 °F

High: 86 °F

Low: 74 °F

High: 87 °F

Low: 75 °F

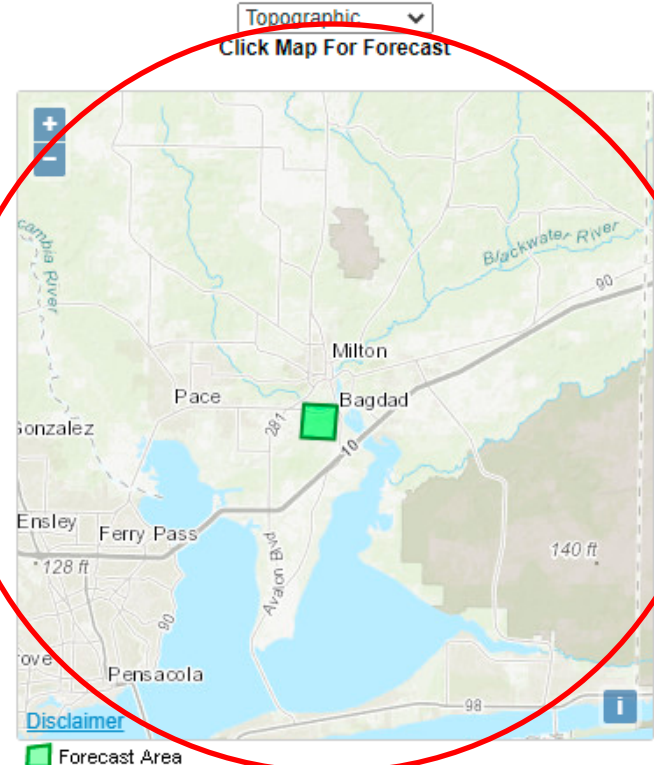
High: 90 °F

Low: 75 °F

High: 91 °F

## Detailed Forecast

<b>This Afternoon</b>	Showers and thunderstorms. Some of the storms could produce heavy rainfall. High near 86. South wind around 10 mph. Chance of precipitation is 80%. New rainfall amounts between a tenth and quarter of an inch, except higher amounts possible in thunderstorms.
<b>Tonight</b>	Showers and thunderstorms likely, mainly after 1am. Mostly cloudy, with a low around 75. Southwest wind around 5 mph becoming calm in the evening. Chance of precipitation is 60%. New rainfall amounts between a tenth and quarter of an inch, except higher amounts possible in thunderstorms.
<b>Tuesday</b>	Showers and thunderstorms. High near 86. Light southwest wind becoming south 5 to 10 mph in the morning. Chance of precipitation is 90%. New rainfall amounts between a quarter and half of an inch possible.
<b>Tuesday Night</b>	Showers likely and possibly a thunderstorm. Mostly cloudy, with a low around 74. South wind around 5 mph becoming calm in the evening. Chance of precipitation is 60%.
<b>Wednesday</b>	Showers and thunderstorms. High near 87. Light southwest wind becoming south 5 to 10 mph in the morning. Chance of precipitation is 80%.
<b>Wednesday Night</b>	A 30 percent chance of showers and thunderstorms, mainly after 1am. Partly cloudy, with a low around 75. South wind around 5 mph becoming calm after midnight.
<b>Thursday</b>	Showers and thunderstorms likely, mainly after 1pm. Mostly sunny, with a high near 90. Light west wind becoming southwest 5 to 10 mph in the morning. Chance of precipitation is 60%.
<b>Thursday Night</b>	A 30 percent chance of showers and thunderstorms, mainly after 1am. Partly cloudy, with a low around 75. Southwest wind around 5 mph becoming calm in the evening.
<b>Friday</b>	Showers and thunderstorms likely, mainly after 1pm. Mostly sunny, with a high near 91. West wind 5 to 10 mph. Chance of precipitation is 60%.
<b>Friday Night</b>	A 30 percent chance of showers and thunderstorms, mainly after 1am. Partly cloudy, with a low around 75.
<b>Saturday</b>	A 50 percent chance of showers and thunderstorms. Mostly sunny, with a high near 91.



**Point Forecast:** Bagdad FL  
30.59°N 87.05°W (Elev. 69 ft)

**Last Update:** 3:45 am CDT Jul 19, 2021

**Forecast Valid:** 2pm CDT Jul 19, 2021-6pm CDT Jul 25, 2021

[Forecast Discussion](#)



# Weather Factors-NWS Spot Weather

	High: 85 °F	Low: 75 °F	High: 86 °F	Low: 75 °F	High: 86 °F	Low: 74 °F	High: 90 °F	Low: 75 °F	High: 91 °F
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Topographic ▼  
[Click Map For Forecast](#)

**Point Forecast:** 4 Miles WSW Bagdad FL  
30.57°N 87.1°W (Elev. 131 ft)

**Last Update:** 3:45 am CDT Jul 19, 2021

**Forecast Valid:** 2pm CDT Jul 19, 2021-6pm CDT Jul 25, 2021

[Forecast Discussion](#)



# Weather Factors-NWS Spot Weather

## [ZONE AREA FORECAST FOR SANTA ROSA INLAND, FL](#)

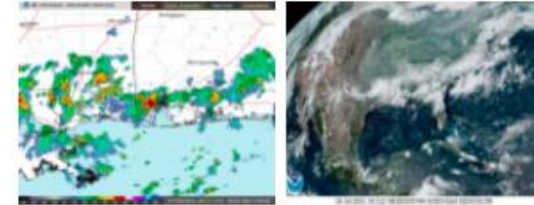
[Forecast Discussion](#)  
[Printable Forecast](#)  
[Text Only Forecast](#)

[Hourly Weather Forecast](#)  
[Tabular Forecast](#)  
  
[About WFO Mobile](#)  
[Hazardous Weather Outlook](#)  
[Local Climatology](#)  
[Marine Weather](#)

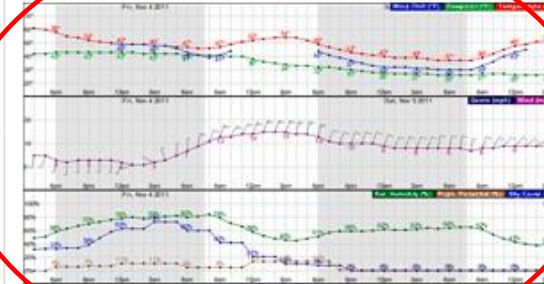
[Air Quality Forecasts](#)  
[International System of Units](#)  
  
[Beach Forecast](#)  
[Fire Weather](#)  
[River Data and Forecasts](#)  
[Aviation Weather](#)

[Tropical Weather](#)  
[NWS Mobile Home](#)  
[Outlooks](#)  
[Submit Storm Report](#)

## Radars & Satellite Image



## Hourly Weather Forecast



## National Digital Forecast Database




[High Temperature](#)



[Chance of Precipitation](#)



# Weather Factors-NWS Spot Weather

 **National Weather Service Forecast Office** weather.gov

## Mobile/Pensacola

Home      News      Organization      Search for:   NWS  All NOAA

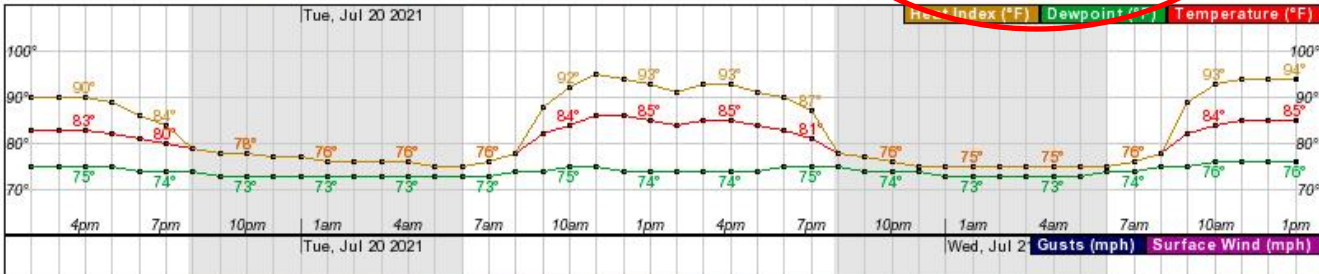
Point Forecast: 4 Miles WSW Bagdad FL  
30.57N 87.1W (Elev. 131 ft) Last Update: 3:45 am CDT Jul 19, 2021

### Hourly Weather Forecast Graph

[dashes/dots] | [b/w] | [hide menu]

Weather Elements	Weather/Precipitation	Fire Weather
<input checked="" type="checkbox"/> Temperature (°F) <input checked="" type="checkbox"/> Dewpoint (°F) <input checked="" type="checkbox"/> Heat Index (°F)  <input checked="" type="checkbox"/> Surface Wind <input type="text" value="mph"/> <input checked="" type="checkbox"/> Sky Cover (%) <input checked="" type="checkbox"/> Precipitation Potential (%) <input checked="" type="checkbox"/> Relative Humidity (%)	<input checked="" type="checkbox"/> Rain <input checked="" type="checkbox"/> Thunder <input type="checkbox"/> Fog	<input type="checkbox"/> Mixing Height <input type="text" value="x100ft"/> <input type="checkbox"/> Haines Index <input type="checkbox"/> Lightning Activity Level <input type="checkbox"/> Trans. Wind <input type="text" value="mph"/> <input type="checkbox"/> 20ft Wind <input type="text" value="mph"/> <input type="checkbox"/> Vent Rate (x1000 mph-ft) <input type="checkbox"/> Dispersion Index <input type="checkbox"/> Low Visibility Occurrence Risk Index <input type="checkbox"/> Turner Stability Index <input type="checkbox"/> Red Flag Threat Index

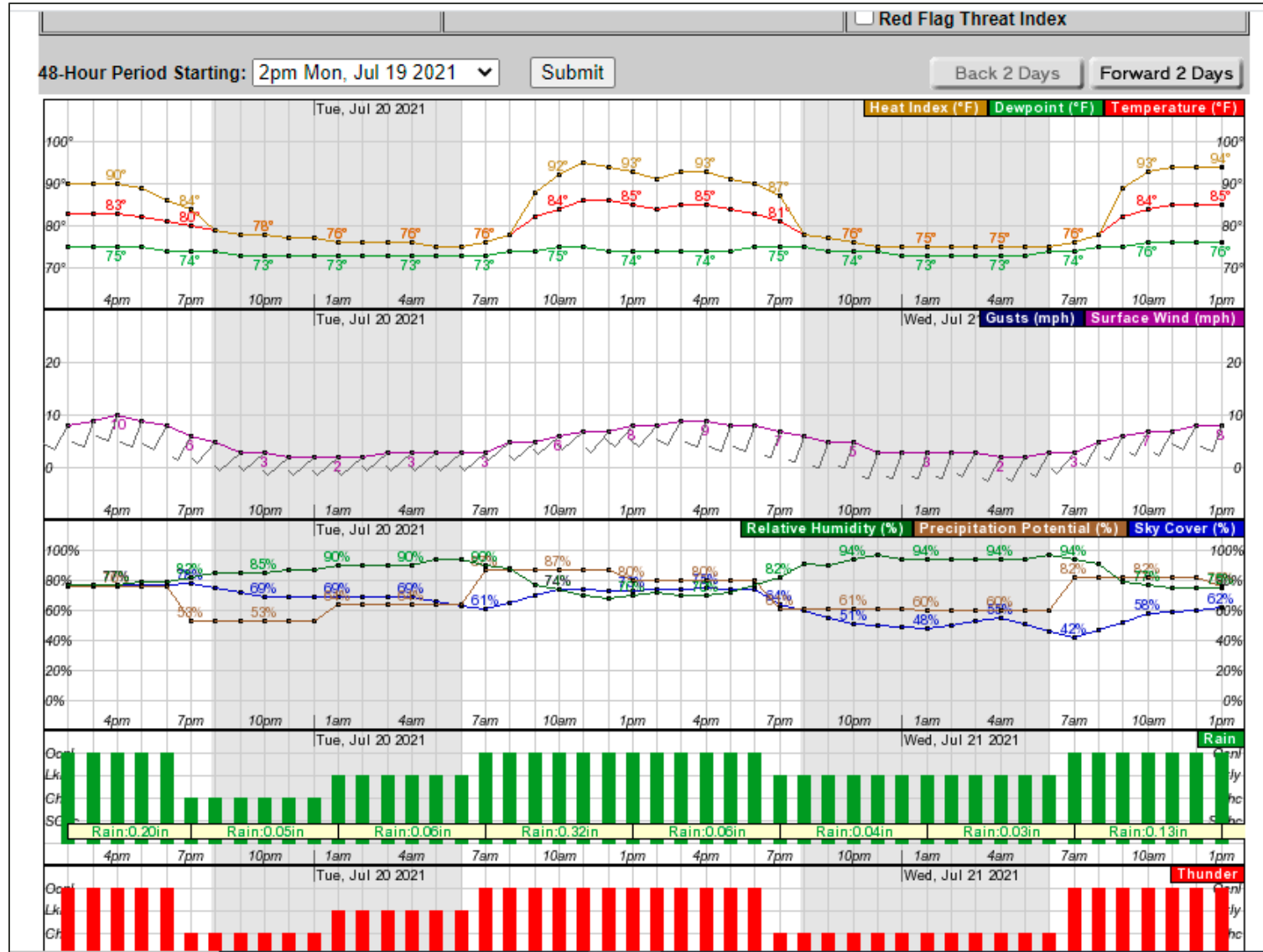
48-Hour Period Starting:



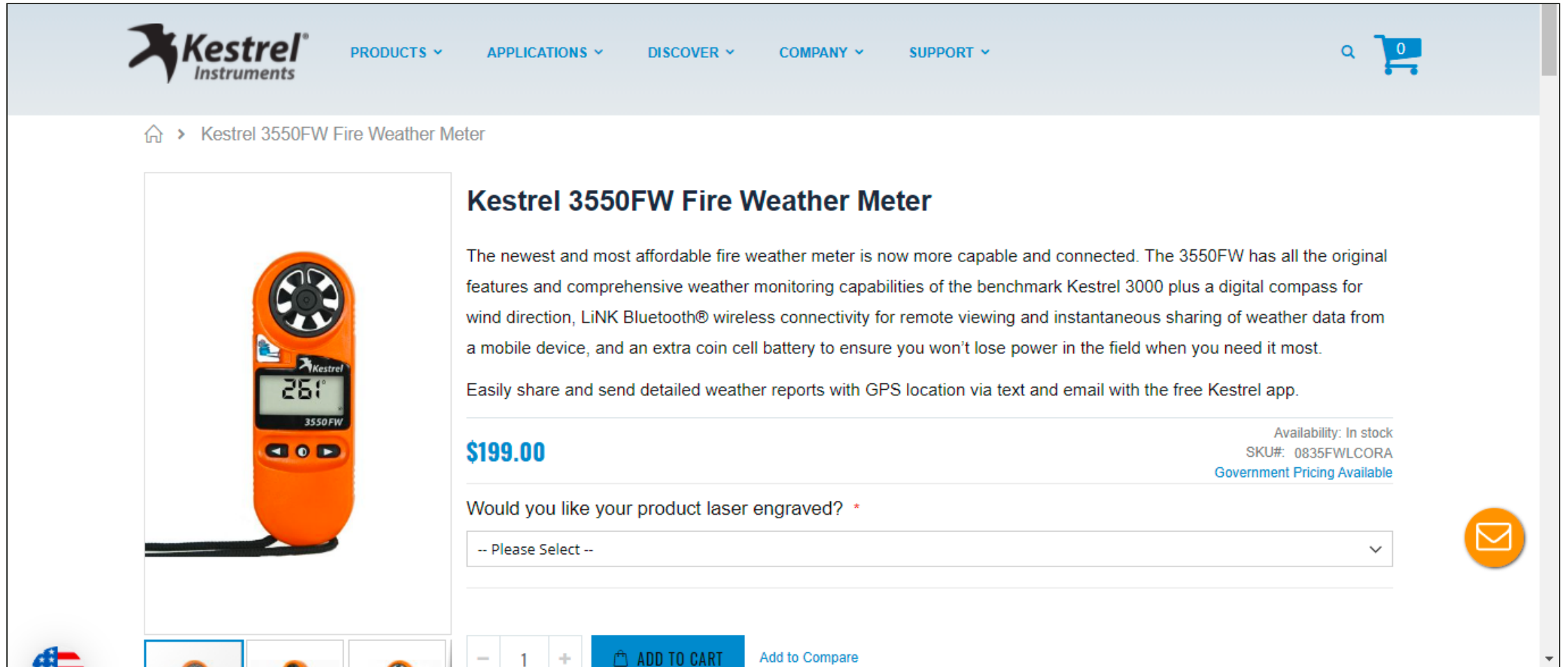
Tue, Jul 20 2021		Wed, Jul 21 2021	
4pm	7pm	10am	1pm
83°	80°	93°	85°
75°	74°	75°	76°
83°	80°	93°	85°



# Weather Factors-NWS Spot Weather



# Weather Factors-Measuring Current Factors



The screenshot displays the Kestrel Instruments website interface. At the top, the Kestrel Instruments logo is on the left, and navigation links for PRODUCTS, APPLICATIONS, DISCOVER, COMPANY, and SUPPORT are in the center. A search icon and a shopping cart icon with a '0' are on the right. Below the navigation bar, a breadcrumb trail shows a home icon followed by 'Kestrel 3550FW Fire Weather Meter'. The main content area features a large image of the orange Kestrel 3550FW Fire Weather Meter on the left. The meter's digital display shows '26.1'. To the right of the image, the product title 'Kestrel 3550FW Fire Weather Meter' is displayed in bold. Below the title, a descriptive paragraph states: 'The newest and most affordable fire weather meter is now more capable and connected. The 3550FW has all the original features and comprehensive weather monitoring capabilities of the benchmark Kestrel 3000 plus a digital compass for wind direction, LiNK Bluetooth® wireless connectivity for remote viewing and instantaneous sharing of weather data from a mobile device, and an extra coin cell battery to ensure you won't lose power in the field when you need it most.' Below this, another paragraph says: 'Easily share and send detailed weather reports with GPS location via text and email with the free Kestrel app.' The price '\$199.00' is shown in large blue text. To the right of the price, the availability status is 'Availability: In stock', the SKU is 'SKU#: 0835FWLCORA', and a link for 'Government Pricing Available' is provided. Below the price, a question asks 'Would you like your product laser engraved? \*' with a dropdown menu currently set to '-- Please Select --'. At the bottom of the product page, there are navigation controls including minus, plus, and a quantity of '1', followed by 'ADD TO CART' and 'Add to Compare' buttons. A circular orange icon with a white envelope symbol is located on the right side of the page.



# Detailed Unit Description

- Firebreaks
- Access
- Overstory/understory
- Fuels inside & outside of unit
- Fuels of Concern
  - Jackpots, Snags, Ladder Fuels



# Fire Factors-Fire Behavior Narrative

- Describe predicted fire behavior
- Flame lengths
- Rates of spread
- Expected scorch and mortality



# Smoke Management

- Identify nearby smoke sensitive areas
- Highlight downwind & down-drainage smoke sensitive areas
- Utilize smoke prediction tools

The screenshot shows the YSmoke web application interface. At the top, there are navigation links for FCAMMS, SHRMC, Smoke, and YSmoke. The main heading is "Estimating Prescribed Fire Smoke Impacts". On the right side, there is a "Fire & Weather Info" section with an "Explanation" header. Below this, there are four numbered sections: 1. Location (with latitude and longitude input fields), 2. Fire Size (with acres, duration, and ignition method input fields), 3. Fuel Load (with fuel type and tons/acre input fields), and 4. Fuel Consumption (with fuel moisture scenario and percentage consumed input fields). The central part of the interface is a map showing a satellite view of a rural area with a red location pin and a yellow smoke plume prediction overlay. The map includes a search box, map controls, and a "Download KML File" link at the bottom.



# Burn Management

- Test Fire
- Firebreak Inspection and preparation
- Potential hazards
- Describe ignition pattern plan
- Mop-up



# Contingency Plans:

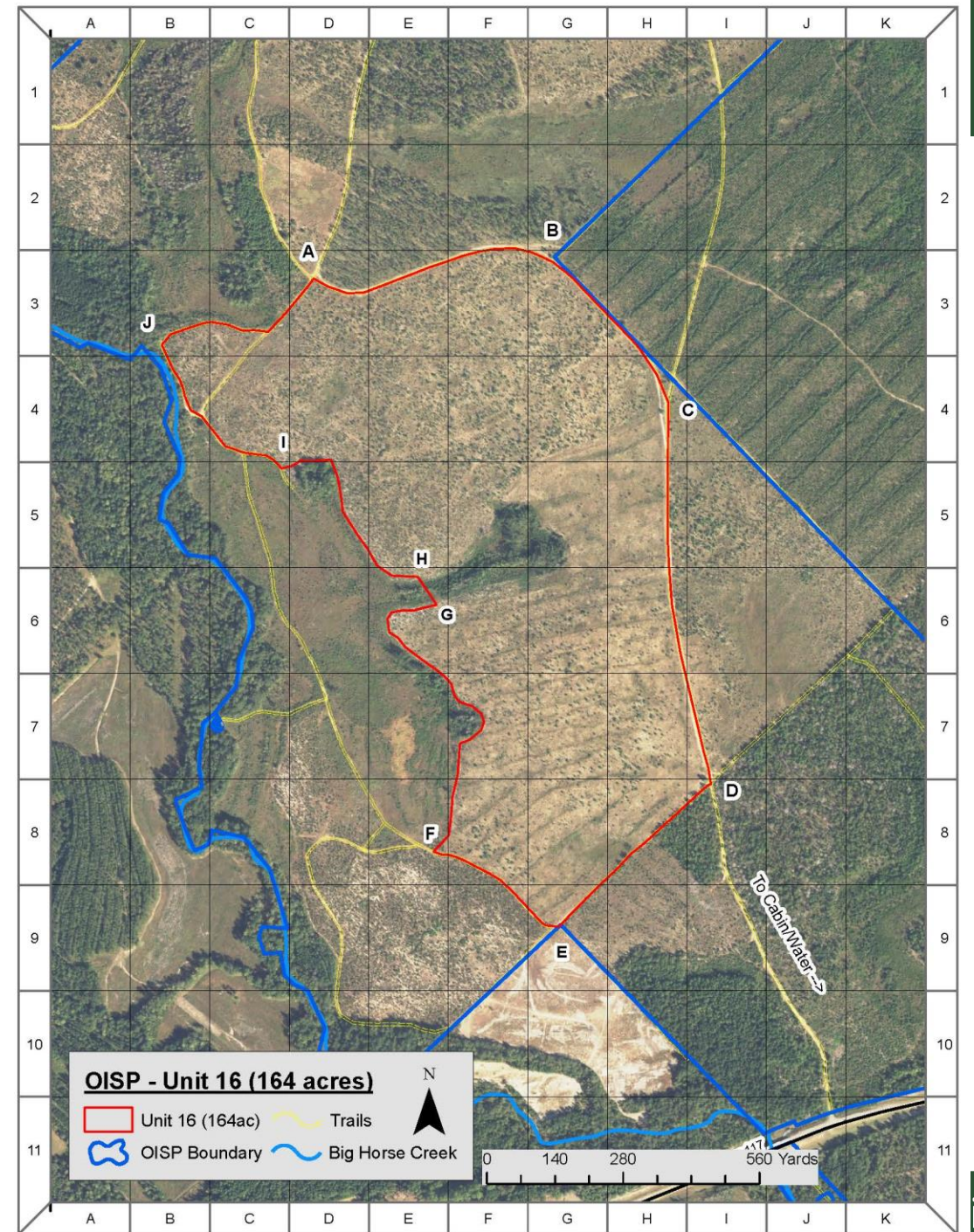
## Preparing for “what if!”

- **What is the plan if:**
  - it gets out of the box?
  - the hydrants/water sources are dry?
  - crew member gets hurt?
- **What resources are available?**
  - How will you make those calls?
  - Forestry, VFD, Fire & Police



# Attributes of Quality Maps

- Legend
- North Arrow
- Scale
- Defining Features (drop points/grids)



# Resources

- Start with what you have, then what you can modify
  - bobcat-type equipment
  - water handling vehicles
  - tractors
  - 4x4 ATVs
  - hand tools
- Contractors
- Pull from neighbors, co-ops, PBA friends, state resources
- Learn and Burn Programs



# There is a reason for all of this.



Hard hat

Sunglasses/  
safety glasses

Neck shroud

Radio, phone

Nomex shirt  
and pants

Leather gloves

Fire shelter

Leather boots

JAN 31 2007



The  
NRC

r Burn Unit

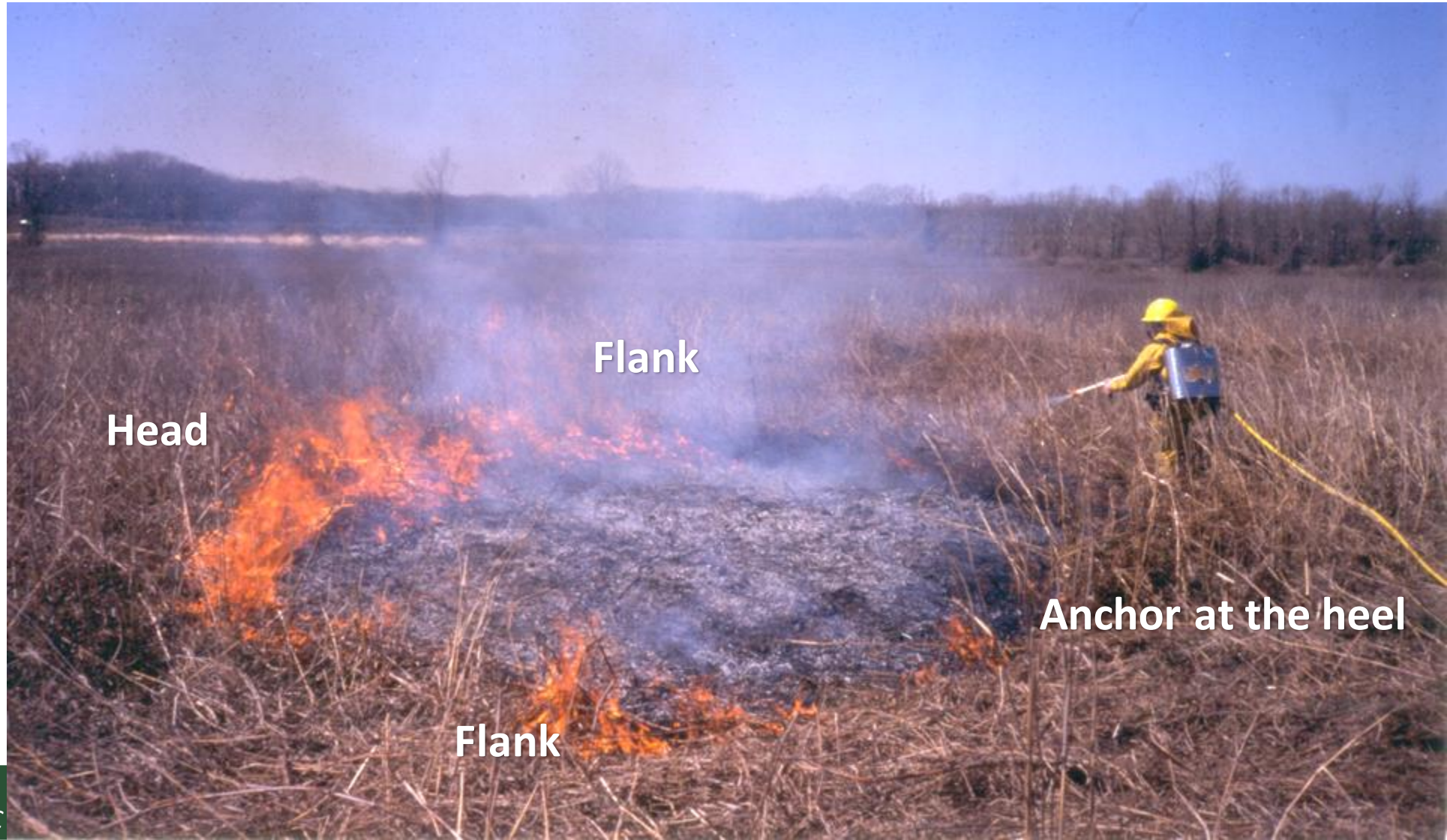
# Personal Protective Equipment (PPE)

## The basics:

- Choose natural fibers, NO Synthetics!
- All cotton jeans, work pants, long-sleeved shirts
- Leather gloves
- Leather work boots
- Eye protection: sun/safety glasses
- Head protection: hard hat, esp if overhead hazards are present



# Spot Fires: fires outside of the unit that are ignited by embers from the main fire



# What if all else fails....



- Plan for it!
- Have help on hand
- Take a “Know how to light it, know how to fight it” approach-TRAINING and PLANNING
- Trigger points: know when it’s out of your control and time to call it in



# Monitoring

- During the burn:
  - **Weather, clouds**
  - **Fire Behavior**
  - **Fire Effects**
- Overnight and next day:
  - **Wind direction—where is smoke going to settle?**
  - **Overnight dispersion and visibility—high LVORI?**



# Monitoring-Fire Effects



# Post-burn Activities

- Ensure fuels are consumed--diligent with unburned fuel against the line
- Stay with the burn through the peak of the day, as long as needed
- Mop-Up standards described in the plan



# After Action Review



*Plan*  
*Leadership*  
*Obstacles*  
*Weaknesses*  
*Strengths*

*On the best days, the dozer never gets off the transport!*



# Conclusions:

## What makes for a good plan?

- Defined objectives
- Comprehensive
- Compatible with your objectives (& realistic)
- Flexible
- Recognizes the role of uncertainty



# Take home messages

- Know your site, your fuels, your surroundings, weather and seasons—take it back to your objectives
- It costs nothing to plan ahead!





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*The Longleaf Alliance  
NRCS Staff Fire Training*

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