For changes or additional needs relating to this document please contact:

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Suggestions and comments are always welcome. Please send additional forms and checklists or modifications to those provided in this guide that field users find helpful in doing their day-to-day job of monitoring. These will be reviewed for possible inclusion in future versions of this guide.
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Introduction

The Interagency Fire Use Module Field Guide originated from an identified need at the 2001 Fire Use Module meeting. In collaboration with the National Park Service, US Forest Service and the US Fish and Wildlife Service this field guide has been developed to help standardize Fire Use Module (FUM) products and provide the opportunity to produce consistent, quality, fire use documentation.

As can be expected, not all forms or summaries will meet all needs, the key is to remain flexible and consistent. When incident personnel request specific products they must contain all fields in standard format, used or not. When additional data is required, it can easily be collected and added to the form or summary. The form data and summaries are the minimum requirements for FUM activity documentation.

In agreement with the Fire Use Teams and FUM’s this field guide is subject to annual review and revision. If a form or summary does not meet the needs of the teams and/or FUM’s, it will be changed during the annual review (at the FUM meeting).
What is a FIRE USE MODULE?

The mission of the Fire Use Module Program is to develop and provide national self-sufficient, multi-skilled fire professionals with a primary commitment to fire use operations and planning.¹

Fire Use Modules are composed of experienced and trained fire personnel working within a cohesive team. From highly experienced ignition specialists, to the gold standard in fire behavior observations and mapping, Module members are proficient in filling independent roles on minimally scouted fire operations in remote locations. Each module is equipped with a standard complement of equipment necessary to implement most aspects of fire planning, operations and prescribed fire implementation. Western, intermountain, and some midwest modules are also equipped with the necessary equipment to be self-sufficient in backcountry operations with very minimal logistical support from any level of incident organization.

As a national interagency resource, the modules are available throughout the fire season. Ordering is outlined in the national mobilization guide and regional mobilization guides. Each module will be staffed at a four-member minimum standard for each assignment and up to eight (NPS) or ten (USFS, FWS) depending on agency. Order modules with additional module positions as per agency above the four-member minimum.

¹ Fire use is the combination of wildland fire use and prescribed fire application to meet resource objectives. Wildland fire use is the management of naturally ignited Wildland fires to accomplish specific pre-stated resource management objectives in predefined geographic areas outlined in Fire Management Plans (Wildland and Prescribed Fire Management Policy, 1998).
INSTRUCTIONS & NOTES

1. **Fire Name:** Self explanatory.
2. **Date:** Self explanatory.
3. **Observers:** Primary monitor and assistant(s).
4. **Time:** 24 hr format.
5. **Location:** This should be a referenced map point, i.e., 200 yards east of Rat Point T14 R15 S32 SE/NE or junction of Hwy 20 and Cones Road. List UTM’s, Lat./Long. Or local coordinate system.
6. **Elevation:** Should be in feet.
7. **Aspect:** Cardinal direction, N, NE, E, SE, S, SW, W, NW.
8. **% Slope:** Self explanatory.
9. **Fire Type:** Backing, Flanking, Head.
10. **Flame Length:** In feet or inches (note which one).
11. **Flame Zone Depth:** In feet or inches (note which one).
12. **ROS:** In chains per hour, Feet per minute, or Feet per hour. Note the units you’re using.
13. **Primary Carrier:** The fuel that is carrying the current fire spread.
14. **Fuel Model:** Should be based on the Primary Carrier. Model(s) 1-13.
15. **Comments:** Any observation that may be useful for reference in the future, photos taken, public contacted, aircraft observed, size of fuels and estimates of consumption, etc.
INSTRUCTIONS & NOTES

1. **Fire Name**: Self explanatory.
2. **Date**: Self explanatory.
3. **Observers**: Primary monitor and assistant(s).
4. **Time**: 24 hr format.
5. **Location**: This should be a referenced map point, i.e., 200 yards east of Cat Point T14 R15 S32 SE/NE or junction of Hwy 12 and Cook Creek Road. List UTM’s, Lat./Long. Or local coordinate system.
6. **Elevation**: Should be in feet.
7. **Wind Direction**: Cardinal direction, N, NE, E, SE, S, SW, W, NW.
8. **Wind Speed**: In miles per hour. It is the AVERAGE of the monitored wind, the longer your monitoring time (up to 10 minutes), the more accurate your average. A GUST is the highest wind speed outside your average, recorded during the monitoring period.
9. **Dry Bulb**: Self explanatory.
10. **Wet Bulb**: Self explanatory.
11. **Relative Humidity**: As a percent (%).
12. **Dew Point**: Self explanatory.
13. **Aspect**: Cardinal direction, N, NE, E, SE, S, SW, W, NW.
14. **% Slope**: Self explanatory.
15. **% Cloud Cover**: Estimate of cloud cover.
16. **% Canopy Cover**: Estimate of canopy cover shading fuels.
17. **Reference Fuel Moisture**: Determine from table Appendix D.
18. **Exposed / Shaded**: Determine whether fine dead fuels ahead of the projection point are EXPOSED(<50%) or SHADED(>50%) from solar radiation. This can be due to cloud cover and/or canopy cover.
19. **Fine Dead Fuel Moisture**: As a percent.
20. **Prob. Of Ignition**: From 0-100%.
21. **Comments**: Any observation that may be useful for reference in the future, photos taken, public contacted, aircraft observed.
### Interagency Fire Use Module Field Guide

**FIRE NAME:**

**INTERAGENCY FIRE USE MODULE**

**FIRE WEATHER OBSERVATIONS**

**DATE:**

**OBSERVER(S):**

<table>
<thead>
<tr>
<th>TIME</th>
<th>LOCATION</th>
<th>FUEL TYPE</th>
<th>FUEL LOAD</th>
<th>HUMIDITY</th>
<th>VISIBILITY</th>
<th>WIND TRANSPORT</th>
<th>WIND DIRECTION</th>
<th>WIND SPEED</th>
<th>PRECIP</th>
<th>RAINFALL</th>
<th>PLACID</th>
<th>METHOD OF SHUTDOWN</th>
<th>COMMENTS (PRECIP, LOCAL INFLUENCES, ETC.)</th>
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Smoke Observations

Instructions & Notes

Smoke observations should be taken during all fire use activities.

1. **Fire Name**: Self explanatory
2. **Observers**: Primary monitor and assistant(s)
3. **Date**: Self explanatory
4. **Time**: 24 hr format
5. **Location**: This should be a referenced map point, i.e., 200 yards east of Rat Point T14 R15 S32 SE/NE or Junction of Hwy 12 and Tom Creek Road. List UTM’s, Lat./ Long. or local coordinate system.
6. **Elevation**: Should be in feet.
7. **Wind Direction**: Cardinal direction, N, NE, E, SE, S, SW, W, NW.
8. **Wind Speed / Gusts**: Wind speed should be in miles per hour. (See wx obs directions for details).
9. **Approximate Altitude of Smoke Column above ground**: Should be in feet. Estimate to the best of your ability column height. Reference off of geographic features, cloud base, etc. Note whether above ground level or as an elevation.
10. **Other Observations**: List anything that might be of future reference, i.e. Smoke dispersed into Pigeon Forge. Smoke lifting to transport height with little drift. Column blowing over (shearing) directly into Bend. Closed road from 1600 to 1720 hrs due to visibility.
11. **Smoke Sensitive Areas**: Any area of possible concern, complaint or potential impact. I.e. A retirement community, hospital, local residence, agency buildings, trails, roads. Almost anywhere, the key is to identify them beforehand.
12. **Forecasted Transport Winds**: Record what the forecasted and observed winds are doing. Feedback to the NWS is critical.
13. **Haines index**: Record what the Haines index or other local fire growth predictions are estimated.
**Interagency Fire Use Module Field Guide**

### Fire Behavior Observations Summary Sheet

<table>
<thead>
<tr>
<th>FIRE BEHAVIOR OBSERVATIONS</th>
<th>INTERAGENCY FIRE USE MODULES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire Name:</td>
<td>Fire #:</td>
</tr>
<tr>
<td>Management Unit:</td>
<td>Date:</td>
</tr>
<tr>
<td>Current Fire Size:</td>
<td>Time:</td>
</tr>
<tr>
<td>Observation Location (map grid/elev etc.):</td>
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</tbody>
</table>

Attach current map indicating active fire perimeter, spread direction and other significant information.

Fuel Model/Vegetation Type (of active area):

Fire Activity: Creeping, Running, Torching, or Crowning.

- Rate of Spread
- Type of spread (Head Flanking Backing Average (select any that apply))
- Perimeter growth
- chains, direction
- Growth Rate (chains/time)
- Percent of perimeter actively burning?
- Location(s)
- Max temprtime
- Min temprtime
- Min RHttime
- Max RHttime
- Wind: Max sustained dir/time
- Smoke: (describe column: color, shape, etc.)
- Distance to MMA, Trigger Points, other values at risk (note on attached map also)

**Other notes (i.e. influencing factors - topography, shading, etc. potential fuel model changes, resistance to control efforts, structures if applicable, more on observations above):**

<table>
<thead>
<tr>
<th>Prepared by:</th>
<th>Name, Module, and Qualification</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reviewed by:</td>
<td>Name, Module, and Qualification</td>
<td>Date</td>
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</tbody>
</table>

**Attached Products:** (check)

- FIRE BEHAVIOR OBSERVATIONS
- SMOKE OBSERVATIONS
- SPOT WEATHER FORECAST REQUEST
- FIRE PERIMETER/ AREA MAP
- FIRE WEATHER OBSERVATIONS
- FUEL MOISTURE SAMPLING SHEET
- ICS 214 UNIT LOG
- PHOTO LOG

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Fuel moisture sampling should be accomplished using accepted and local standards. Fuel moisture has a direct correlation with fire spread and consumption. Sampling procedures within the below listed publications are some of the accepted sources for protocols.

Publications that contain Fuel Moisture Sampling Information:

- Measuring Fuel Moisture Content in Alaska: Standard Methods and Procedures
- Measuring Moisture Content in Living Chaparral: a field user’s manual
  Clive M. Countryman and William A. Dean, 1979
- Gain and Loss of Moisture in Large Forest Fuels
  Arthur P. Brackebusch, 1975
- South Canyon Fire.
  James M. Saveland, Ph.D.

Additional Notes: Consistency is the key to success with Fuel Moisture Sampling. The best use of Fuel Moisture data will be attained as fire behavior observations and Fuel Moisture Observations are compared!
## Interagency Fire Use Module Field Guide

### FIRE NAME:  
INTERAGENCY FIRE USE MODULE  
FUEL MOISTURE SAMPLING SHEET  
DATE:

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<tr>
<th>OBSERVATIONS</th>
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<td>DATE COLLECTED</td>
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<td>TIME COLLECTED</td>
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<th>SPECIES/MATERIAL</th>
<th>ELEV</th>
<th>ASPECT</th>
<th>LOCATION</th>
<th>CANISTER</th>
<th>WET WT</th>
<th>DRY WT</th>
<th>% MOIST</th>
<th>COMMENTS</th>
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**WEATHER OBS:**  
Dew Point  
Cloud Type:
Wind Direction/Mph:  

**Dew Bulb:**  
Humidity:
10 Hour FMIT Stock:
Depression/Mph:

**Wet Bulb:**  
% Cloud Cover:
% Canopy Cover:

*FUEL MOISTURE CALCULATION FORMULA:*

\[
\text{Wet Bulb} = \left(1 + \frac{\text{Dew Point} - \text{Dew Bulb}}{100}\right) \times \text{Wet Bulb} \\
\text{FMC} = \frac{\text{Wet Bulb}}{\text{Dew Bulb}} \\
\]

Revised: 07/11/09

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Spot Weather Forecast

Instructions & Notes

Spot Weather Forecasts should be requested for fires that will exceed initial attack, have potential for extreme fire behavior, or are located in areas where Red Flag Warnings or Fire Weather Watches have been issued. This form is primarily for field use documentation of weather observations and/or forecasts; whenever possible, a copy of the actual Fire Weather Forecast should be used for operational briefings and/or included in the fire documentation.

1. **Name of Fire/Incident:** Use Incident or project name.
2. **Control Agency:** Agency with primary responsibility for managing the incident.
3. **Request Made:** Fill in time and date.
4. **Location:** Use an on-site legal description specific to the nearest ¼ section.
5. **Drainage Name:** Use the closest drainage name or landmark from a topographical map.
6. **Exposure:** Use one of the 8 cardinal points (N, SE, NW, etc.) to designate general aspect.
7. **Size of Project:** In acres.
8. **Elevation:** In feet.
9. **Fuel Type:** Use a fuel model name or description.
10. **Project On:** Project may be on ground or crowning.
11. **Weather Conditions at Project or from Nearby RAWS Stations:** In the place column, put On-site (which refers to the legal description used in number 4); if the observations are taken off-site, specify the Township, Range, and Section to the nearest ¼ section or the location of the RAWS used. In the elevation column, put the actual elevation for the observations (may or may not be the same as in number 8).
12. **Send Forecast To:** Specify how the forecast will be broadcast or sent, especially if it differs from the normal radio relay or faxing procedures (i.e., having copies faxed to mobile units, office, or
stations), and also the name of the contact who will be receiving
the request (may differ from the person making the forecast).

13. **Forecast and Outlook:** Document name of forecaster and the
office forecast originated from.

14. **Forecast Received:** Document name of person receiving forecast,
date, time, and location and received (to verify or update
information in Number 12).

**Additional Notes:**
As NOAA assumes responsibility for fire weather forecasting, a few items
should be noted. First, all offices will be using the online spot weather
forecast request. This should be standardized between all their offices.
They (and your dispatcher) really appreciate if you can provide them with
the 7.5 min. USGS quad name, Legal, and the Lat. /Long i.e., 37.86888N
119.67822W. This makes the process much easier if done before you
request the spot. For the online version, use the remarks section to provide
feedback on previous spots, and as a method of communication between
the field and the forecaster.

Second, under the remarks section (or column in number 11), put the
estimated ignition time for RX projects. For RX projects, fire weather
forecasters can work with you ahead of time and either do some
“practice” forecasts or provide you with weather information for
planning. Get the forecasters on board and familiar as early as possible.

For better service, do not send a request just prior to RX ignition (turn-
around time is typically 1 to 2 hours). Most fire weather forecasters work
early shifts to prepare for the workday, and usually leave anywhere from
16:00 to 17:00.
Spot Weather Forecast

If the fire weather forecaster does not hear from you, they assume the forecast was accurate. If the forecast does not match up with what is actually occurring, let the fire weather forecaster know.

Feedback is crucial for improving the forecast accuracy. If at any time you do not understand what the forecast is telling you, or you have questions about its content for whatever reason, do not hesitate to call the fire weather forecaster and discuss the matter.
## Spot Weather Forecast

### FIRE WEATHER SPECIAL FORECAST REQUEST

<table>
<thead>
<tr>
<th>Place</th>
<th>Elevation</th>
<th>Time</th>
<th>Weather Conditions</th>
<th>Remarks</th>
</tr>
</thead>
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### Synopsis:

<table>
<thead>
<tr>
<th>Start Period</th>
<th>Sky Cover</th>
<th>Temperature</th>
<th>Humidity</th>
<th>Wind</th>
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### Outlook for Today:

- Mostly Sunny/Cloudy
- High/Low
- Range

### Remarks:

- Indicate wind, thunderstorms, etc.
- Line wind conditions and heights of cloud cover.

---

**NAME OF FIRE WEATHER FORECASTER:**

**FIRE WEATHER OFFICE:**

**REQUESTING AGENCY WILL COMPLETE UPON RECEIPT OF FORECAST**

**FORECAST RECEIVED:**

<table>
<thead>
<tr>
<th>Time</th>
<th>Date</th>
<th>Name</th>
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# Interagency Fire Use Module Field Guide

## Unit Log

<table>
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<tr>
<th>UNIT LOG</th>
<th>1. INCIDENT NAME</th>
<th>2. DATE PREPARED</th>
<th>3. TIME PREPARED</th>
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</thead>
<tbody>
<tr>
<td>4. UNIT NAME/DESRIGNATOR</td>
<td>5. UNIT LEADER (NAME AND POSITION)</td>
<td>6. OPERATIONAL PERIOD</td>
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### PERSONNEL PDFRERED ASSIGNED

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<th>NAME</th>
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### ACTIVITY LOG (CONTINUED ON reverse)

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<th>TMHs</th>
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## Unit Log

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TCS-214  
05-94  
3. PREPARED BY (NAME AND POSITION)

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Appendices

A. Relative Humidity – Dew Point Tables
B. Fuel Model Key
C. Fuel Model Descriptions
D. Fine Dead Fuel Moisture Tables
E. Live Fuel Moisture Estimates
F. Slope Calculation
G. Wind Adjustment Factors
### Elevations between 0 and 500 feet

<table>
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<tr>
<th>Dry Bulb Temperatures 41 to 60 F (Read Across)</th>
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## Interagency Fire Use Module Field Guide – Appendix A – RH Tables

### Elevations between 0 and 500 feet

#### Dry Bulb Temperatures

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## Elevations between 0 and 500 feet

### Wet Bulb Temperatures

50 to 90°F (Read Down)

### Dry Bulb Temperatures

81 to 100°F (Read Across)

---

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Elevations between 0 and 500 feet

Wet Bulb Temperatures, 58 to 95 F

(Read Down)

|   | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 |
|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 101 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 |
| 102 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 |
| 103 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 |
| 104 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 |
| 105 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 |
| 106 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 |
| 107 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 |
| 108 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 |
| 109 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 |

Dry Bulb Temperatures

101 to 119 F

(Read Across)
### Elevations between 501 and 1,900 feet

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#### Dry Bulb Temperatures

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### Elevations between 501 and 1,900 feet

| Elevation | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
|-----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
|           |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| 61        | 55 | 54 | 53 | 52 | 51 | 50 | 49 | 48 | 47 | 46 | 45 | 44 | 43 | 42 | 41 | 40 | 39 | 38 | 37 | 36 | 35 | 34 | 33 |
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| 65        | 59 | 58 | 57 | 56 | 55 | 54 | 53 | 52 | 51 | 50 | 49 | 48 | 47 | 46 | 45 | 44 | 43 | 42 | 41 | 40 | 39 | 38 | 37 |
| 66        | 60 | 59 | 58 | 57 | 56 | 55 | 54 | 53 | 52 | 51 | 50 | 49 | 48 | 47 | 46 | 45 | 44 | 43 | 42 | 41 | 40 | 39 | 38 |
| 67        | 61 | 60 | 59 | 58 | 57 | 56 | 55 | 54 | 53 | 52 | 51 | 50 | 49 | 48 | 47 | 46 | 45 | 44 | 43 | 42 | 41 | 40 | 39 |
| 68        | 62 | 61 | 60 | 59 | 58 | 57 | 56 | 55 | 54 | 53 | 52 | 51 | 50 | 49 | 48 | 47 | 46 | 45 | 44 | 43 | 42 | 41 | 40 |
| 69        | 63 | 62 | 61 | 60 | 59 | 58 | 57 | 56 | 55 | 54 | 53 | 52 | 51 | 50 | 49 | 48 | 47 | 46 | 45 | 44 | 43 | 42 | 41 |
| 70        | 64 | 63 | 62 | 61 | 60 | 59 | 58 | 57 | 56 | 55 | 54 | 53 | 52 | 51 | 50 | 49 | 48 | 47 | 46 | 45 | 44 | 43 | 42 |

### Wet Bulb Temperature

39 to 80 F

(Red Down)

**Dry Bulb Temperatures**

61 to 80 F

(Read Across)
Interagency Fire Use Module Field Guide – Appendix A – RH Tables

Elevations between 501 and 1,900 feet

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Wet Bulb Temperature
49 to 91 F
(Fixed Down)

Dry Bulb Temperatures
81 to 100 F
(Fixed Across)

Page 28
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Elevations between **501 and 1,900 feet**

Wet Bulb Temperatures, 58 to 95 F

|    | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 101| 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 |
| 102| 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 |
| 103| 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 |
| 104| 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 |
| 105| 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 |
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| 108| 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 |

Dry Bulb Temperatures

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101 to 119 F

(Read Across)

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## Elevations between 1,901 and 3,900 feet

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### Elevations between 1,901 and 3,900 feet

#### Wet Bulb Temperatures, 57 to 90 F

(Read Down)

|   | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 101 | -1 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 44 | 46 | 48 | 50 | 52 | 54 | 56 | 58 | 60 | 62 | 64 |
| 102 | -2 | 3 | 5 | 7 | 9 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 25 | 27 | 29 | 31 | 33 | 35 | 37 | 39 | 41 | 43 | 45 | 47 | 49 | 51 | 53 | 55 | 57 | 59 | 61 | 63 | 65 |
| 103 | -3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 44 | 46 | 48 | 50 | 52 | 54 | 56 | 58 | 60 | 62 | 64 | 66 |
| 104 | -4 | 5 | 7 | 9 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 25 | 27 | 29 | 31 | 33 | 35 | 37 | 39 | 41 | 43 | 45 | 47 | 49 | 51 | 53 | 55 | 57 | 59 | 61 | 63 | 65 | 67 |
| 105 | -5 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 44 | 46 | 48 | 50 | 52 | 54 | 56 | 58 | 60 | 62 | 64 | 66 | 68 |
| 106 | -6 | 7 | 9 | 11 | 13 | 15 | 17 | 19 | 21 | 23 | 25 | 27 | 29 | 31 | 33 | 35 | 37 | 39 | 41 | 43 | 45 | 47 | 49 | 51 | 53 | 55 | 57 | 59 | 61 | 63 | 65 | 67 | 69 |

#### Dry Bulb Temperatures

101 to 119 F

(Read Across)
### Elevations between 3,901 and 6,100 feet

| 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |    |    |    |

### Wet Bulb Temperatures
38 to 79 F
(Read Down)

### Dry Bulb Temperatures
61 to 80 F
(Read Across)
### Elevations between 3,901 and 6,100 feet

#### Wet Bulb Temperatures, 55 to 90 F

| Elevations | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
|------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 101        | 32 | 36 | 39 | 41 | 44 | 46 | 49 | 51 | 54 | 56 | 59 | 62 | 64 | 66 | 67 | 69 | 70 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 102        | -3 | 2  | 12 | 19 | 24 | 29 | 33 | 37 | 40 | 43 | 46 | 50 | 52 | 55 | 57 | 60 | 62 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 |
| 103        | -2 | 3  | 13 | 20 | 25 | 29 | 33 | 37 | 40 | 43 | 46 | 50 | 52 | 55 | 57 | 60 | 62 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 |
| 104        | -5 | 7  | 14 | 23 | 29 | 33 | 37 | 40 | 43 | 46 | 50 | 52 | 55 | 57 | 60 | 62 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 |
| 105        | 10 | 21 | 29 | 33 | 37 | 40 | 43 | 46 | 49 | 52 | 55 | 58 | 60 | 62 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 | 63 |
| 106        | 25 | 34 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 |

#### Dry Bulb Temperatures

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**Elevations between 6,101 and 8,500 feet**

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**Wet Bulb Temperatures**

42 to 81 F
(Read Down)

**Dry Bulb Temperatures**

71 to 90 F
(Read Across)

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Interagency Fire Use Module Field Guide – Appendix A – RH Tables

Elevations between 6.101 and 8.500 feet

Wet Bulb Temperatures, 50 to 85 F

(Read Down)

|       | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 |
|-------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
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| 93    | -2 | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
| 94    | -3 | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
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| 96    | -2 | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
| 97    | -2 | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
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(Read Across)

Dry Bulb Temperatures

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### Elevations between 8,501 and 11,000 feet

#### Wet Bulb Temperatures

19 to 50 F

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### Elevations between 8,501 and 11,000 feet

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### Dry Bulb Temperatures

**51 to 70 F**

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Primary carrier of the fire is GRASS.
A. Grass is fine structured, generally below knee level, and cured or primarily dead. Grass is essentially continuous.
   See FM 1
B. Grass is coarse structured, above knee level (averaging about 3 ft.) and is difficult to walk through.
   See FM 3
C. Grass is usually under an open timber or brush overstory. Litter from the overstory is involved, but grass is the carries the fire. Expected spread rate is less than FM 1 and intensity is less than FM 3.
   See FM 2

Primary carrier of the fire is BRUSH or litter beneath brush.
A. Vegetative type is southern rough or low pocosin. Brush is generally 2 to 4 ft. high.
   See FM 7
B. Live fuels are absent or sparse. Brush averages 2 to 4 ft. in height. Brush requires moderate winds to carry fire.
   See FM 6
C. Live fuels have a significant effect on fire behavior.
   1. Brush is about 2 ft. high, with light loading of brush litter underneath. Litter may carry the fire, especially at low wind speeds.
      See FM 5
   2. Brush is head height (6 ft), with heavy loadings of dead (woody) fuel. Very intense fire with high spread rates expected.
      See FM 4
   3. Vegetation type is high pocosin.
      See FM 4

Primary carrier of the fire is litter beneath a TIMBER stand.
A. Surface fuels are mostly foliage litter. Large fuels are scattered and lie on the foliage litter; that is, large fuels are not supported above the litter by their branches. Green fuels are scattered enough to insignificant to fire behavior.
   1. Dead foliage is tightly compacted, short needle (2 in. or less) conifer or hardwood litter.
      See FM 8
   2. Dead foliage litter is loosely compacted long needle pine or hardwoods.
      See FM 9
Interagency Fire Use Module Field Guide
Appendix B – Fuel Model Key

B. There is a significant amount of larger fuels with attached branches and twigs, or has rotted enough that it is splintered and broken. The larger fuels are fairly well distributed over the area. Some green fuel may be present. Overall depth of the fuel is primarily below knees, but some fuel may be higher.
See FM 10

Primary carrier of the fire is LOGGING SLASH.

A. Slash is aged and overgrown.
   1. Slash is from hardwood trees. Leaves have fallen and cured. Considerable vegetation (tall weeds) has grown in amid the slash and has cured and dried out.
      See FM 6
   2. Slash is from conifers. Needles have fallen and considerable vegetation (tall weeds and some shrubs) has overgrown the slash.
      See FM 10

B. Slash is fresh (0 to 3 years) and not overly compacted.
   1. Slash is not continuous. Needle litter or small amounts of grass or shrubs must be present to carry the fire, but primary carrier is still slash. Live fuels are absent or do not play a significant role in fire behavior.
      See FM 11
   2. Slash generally covers the ground (heavier loadings than FM 11), though there may be some bare spots or areas of light coverage. Average slash depth is about 2'. Slash is not excessively compacted. Approximately ½ of the needles may still be on the branches but are not red. Live fuels are absent, or are not expected to affect fire behavior.
      See FM 12
   3. Slash is continuous or nearly so (heavier loadings than FM 12). Slash is not extremely compacted and has an average depth of 3'. Approximately ½ of the needles are still present and are red, or all the needles are still on the branches and but are green. Live fuels are not expected to influence fire behavior.
      See FM 13
   4. Same as 3, EXCEPT all the needles are attached and are red.
      See FM 4
Interagency Fire Use Module Field Guide
Appendix C – Fuel Model Descriptions

Grass Group

**Fuel Model 1** – Fire spread is governed by fine herbaceous fuels that have cured or are nearly cured. Fires are surface fires that move rapidly through cured grass and associated material. Very little shrub or timber is present, generally less than 1/3 of the area.

Grasslands and savanna are represented along with stubble, grass tundra, and grass-shrub combinations that meet the above area constraint. Annual and perennial grasses are included in this fuel model.

**Fuel Model 2** – Fire spread is primarily through the fine herbaceous fuels, either curing or dead. These are surface fires where the herbaceous material, besides litter and dead-down stem-wood from the open shrub or timber overstory, contribute to the fire intensity. Open shrublands and pine stands or scrub oak stands that cover 1/3 to 2/3 of the area may generally fit this model but may include clumps of fuels that generate higher intensities and may produce firebrands. Some piñon-juniper may be in this model.

**Fuel Model 3** – Fires in this fuel are the most intense of the grass group and display high rates of spread under the influence of wind. The fire may be driven into the upper heights of the grass stand by the wind and cross over standing water. Stands are tall, averaging about 3', but considerable variation may occur. Approximately 1/3 of the stand is considered dead or cured and maintains the fire.

Shrub Group

**Fuel Model 4** – Fire intensity and fast spreading fires involve the foliage and live and dead fine woody material in the crowns of a nearly continuous secondary overstory. Examples are stands of mature shrub, 6' or more tall, such as California mixed chaparral, the high pocosins along the East Coast, the pine barrens of New Jersey or the closed jack pine stands of the north central states. Besides flammable foliage, there is dead woody material in the stand that significantly contributes to the fire intensity. Height of the stands qualifying for this model varies with local conditions. There may be also a deep litter layer that confounds suppression efforts.

**Fuel Model 5** – Fire is generally carried in the surface fuels made up of litter cast by the shrubs and grasses or forbs in the understory. Fires are generally not very intense as surface fuel loads are light, the shrubs are young with little dead material, and the foliage contains little volatile material. Shrubs are generally not tall, but nearly cover the entire area. Young, green stands with little or no deadwood such as laurel, vine maple, alder, or even chaparral, manzanita, or chamise are examples.

**Fuel Model 6** – Fires carry through the shrub layer where the foliage is more flammable than fuel model 5, but require moderate winds (>8 mph) at midflame height. Fire will drop to the ground at low wind speeds or openings in the stand. Shrubs are older, but not as tall as shrub types of model 4, nor do they contain as much fuel as model 4. A broad range of shrub conditions is covered by this model. Typical examples include intermediate stands of chamise, chaparral, oak brush, low pocosin, Alaskan black spruce...
Interagency Fire Use Module Field Guide
Appendix C – Fuel Model Descriptions

Taiga, and shrub tundra. Pinon-juniper shrub-lands may fit, but may over predict rate-of-
spread except at high winds, e.g. 20 mph at the 20' level.

**Fuel Model 7** – Fire burns through the surface and shrub strata equally. Fire can occur
at higher dead fuel moisture contents due to the flammable nature of live foliage. Shrubs
are generally 2 to 6' high. Examples are palmetto-gallberry understory-pine overstory sites,
low pocosins, and Alaskan black spruce-shrub combinations.

**Timber Group**

**Fuel Model 8** – Slow burning ground fires with low flame heights are generally the
case, although an occasional "jackpot" or heavy fuel concentration may cause a flare up.
Only under severe weather conditions do these fuels pose fire problems. Closed-canopy
stands of short needle conifers of hardwoods that have leaved out support fire in the
compact litter layer. This layer is mainly needles, leaves, and some twigs since little
undergrowth is present in the stand. Representative conifer types are white pine,
lodgepole pine, spruce, true firs and larches.

**Fuel Model 9** – Fires run through the surface litter faster than model 8 and have higher
flame height. Both long needle conifer and hardwood stands, especially the oak-hickory
types are typical. Fall fires in hardwoods are representative, but high winds will actually
cause higher rates of spread than predicted because of spotting caused by rolling and
blowing leaves. Closed stands of long needle pine like ponderosa, Jeffery, and red oines or
southern pine plantations are grouped in this model. Concentrations of dead-down
woody material will contribute to possable torching out of trees, spotting, and crowning
activity.

**Fuel Model 10** – The fires burn in the surface and ground fuels with greater fire
intensity than other timber litter models. Dead down fuels include greater quantities of 3" or
larger limb wood resulting from over-maturity or natural events that create a large load of
dead material on the forest floor. Crowning out, spotting, and torching of individual trees
are more frequent in this fuel situation leading to potential control difficulties. Any forest
type may be considered when heavy down materials are present; examples are insect or
diseased stands, wind thrown stands, over-mature situations with deadfall, and cured light
thinning or partial cut slash.

**Logging Slash Group**

**Fuel Model 11** – Fires are fairly active in the slash and herbaceous material
intermixed with the slash. The spacing of the rather light fuel load, shading from the
overstory, or the aging of the fine fuels can contribute to limiting the fire potential. Light
partial cuts or thinning operations in mixed conifer stands, hardwood stands and southern
pine harvests are considered. Clear-cut operations generally produce more slash than
represented here, The <3" material load is less than 12 tons per acre. The > 3" material is
represented by not more than 10 pieces; 4" in diameter along a 50' transect.

**Fuel Model 12** – Rapidly spreading fires with high intensities capable of generating
firebrands can occur. When fire starts, it is generally sustained until a fuel break or change
in fuels is encountered. The visual impression is dominated by slash and much of it is <3"
in diameter. These fuels total less than 35 tons per acre and seem well distributed. Heavily
thinned conifer stands, clear-cuts and medium or heavy partial cuts are represented. The
>3" material is represented by encountering 11 pieces, 6" in diameter along a 50' transect.

**Fuel Model 13** – Fire is generally carried by a continuous layer of slash. Large
quantities of >3" material are present. Fires spread quickly through the fine fuels and
intensity builds up as the large fuels start burning. Active flaming is sustained for long
periods and a wide variety of firebrands can be generated. These contribute to spotting
problems, as the weather conditions become more severe. Clear-cuts and heavy partial
cuts in mature and over-mature stands are depicted where slash the slash load is
dominated by >3" material. The total load may exceed 200 tons per acre, but the 3" fuel is
generally only 10% of the total load. Situations where slash still has “red” needles
attached, but the total load is lighter like a model 12, can be represented because of the
earlier high intensity and faster rate of spread.
Interagency Fire Use Module Field Guide
Appendix E – Fine Dead Fuel Moisture Tables

Reference Fuel Moisture
Day Time
0800 - 1959

| Relative Humidity (%) | 0% | 5% | 10% | 15% | 20% | 25% | 30% | 35% | 40% | 45% | 50% | 55% | 60% | 65% | 70% | 75% | 80% | 85% | 90% | 95% | 100%
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Dead Fuel Moisture Content Corrections
May June July

Exposed - Less than 50% shading of surface fuels

<table>
<thead>
<tr>
<th>Species</th>
<th>0000 to 1600</th>
<th>1600 to 1800</th>
<th>1800 to 2000</th>
</tr>
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<tbody>
<tr>
<td>N</td>
<td></td>
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<tr>
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<td>S</td>
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<td></td>
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</tr>
<tr>
<td>W</td>
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Exposed - Greater than 50% shading of surface fuels

<table>
<thead>
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<th>0000 to 1600</th>
<th>1600 to 1800</th>
<th>1800 to 2000</th>
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<tbody>
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<tr>
<td>W</td>
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Dead Fuel Moisture Content Corrections

Exposed - Less than 50% shading of surface fuels

<table>
<thead>
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<th>Species</th>
<th>0000 to 1600</th>
<th>1600 to 1800</th>
<th>1800 to 2000</th>
</tr>
</thead>
<tbody>
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<tr>
<td>W</td>
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</table>

Exposed - Greater than 50% shading of surface fuels

<table>
<thead>
<tr>
<th>Species</th>
<th>0000 to 1600</th>
<th>1600 to 1800</th>
<th>1800 to 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td></td>
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<tr>
<td>E</td>
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<td></td>
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<tr>
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<td></td>
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<tr>
<td>W</td>
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</tr>
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### Interagency Fire Use Module Field Guide
Appendix E – Fine Dead Fuel Moisture Tables

#### Dead Fuel Moisture Content Corrections

<table>
<thead>
<tr>
<th>Az</th>
<th>Slope</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
</tr>
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<tbody>
<tr>
<td>N</td>
<td>0 - 30%</td>
<td>4</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>31%+</td>
<td>4</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>E</td>
<td>0 - 30%</td>
<td>4</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>31%+</td>
<td>4</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>S</td>
<td>0 - 30%</td>
<td>4</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>31%+</td>
<td>4</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>W</td>
<td>0 - 30%</td>
<td>4</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>31%+</td>
<td>4</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

#### Reference Fuel Moisture

**Night Time**

<table>
<thead>
<tr>
<th>Dry Bulb Temp. (°F)</th>
<th>Relative Humidity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 5</td>
<td>10 - 20</td>
</tr>
<tr>
<td>10 - 20</td>
<td>0 - 5</td>
</tr>
</tbody>
</table>

| 2000 - 0759         | 2000 - 0759            |

#### Dead Fuel Moisture Corrections

**Night Time**

<table>
<thead>
<tr>
<th>Aspect</th>
<th>2000 to</th>
<th>2200 to</th>
<th>2400 to</th>
<th>0200 to</th>
<th>0400 to</th>
<th>0600 to</th>
</tr>
</thead>
<tbody>
<tr>
<td>N &amp; E</td>
<td>11 11 1</td>
<td>13 12 1</td>
<td>16 16 2</td>
<td>17 17 1</td>
<td>18 18 1</td>
<td>16 16 2</td>
</tr>
<tr>
<td>S &amp; W</td>
<td>0 0 1</td>
<td>14 14 1</td>
<td>16 16 2</td>
<td>17 17 0</td>
<td>18 18 0</td>
<td>18 18 0</td>
</tr>
</tbody>
</table>
### Interagency Fire Use Module Field Guide

**Appendix E – Fine Dead Fuel Moisture Tables**

<table>
<thead>
<tr>
<th>Shading (%)</th>
<th>Dry Bulb Temperature (F)</th>
<th>Fine Dead Fuel Moisture (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Unshaded &lt;50%</td>
<td>110+</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>100 - 109</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>90 - 99</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>80 - 89</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>70 - 79</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>60 - 69</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>50 - 50</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>40 - 49</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>30 - 39</td>
<td>90</td>
</tr>
</tbody>
</table>

| Shaded >50%| 110+                    | 100| 90 | 80 | 70 | 60 | 50 | 40 | 30 | 30 | 20 | 20 | 20 | 20 | 20 | 20 |
|            | 100 - 109               | 100| 90 | 80 | 70 | 60 | 50 | 40 | 30 | 30 | 20 | 20 | 20 | 20 | 20 | 20 |
|            | 90 - 99                 | 100| 90 | 80 | 70 | 60 | 50 | 40 | 30 | 30 | 20 | 20 | 20 | 20 | 20 | 20 |
|            | 80 - 89                 | 100| 90 | 80 | 70 | 60 | 50 | 40 | 30 | 30 | 20 | 20 | 20 | 20 | 20 | 20 |
|            | 70 - 70                 | 90 | 90 | 80 | 70 | 60 | 50 | 40 | 30 | 30 | 20 | 20 | 20 | 20 | 20 | 20 |
|            | 60 - 69                 | 90 | 90 | 80 | 70 | 60 | 50 | 40 | 30 | 30 | 20 | 20 | 20 | 20 | 20 | 20 |
|            | 50 - 59                 | 90 | 90 | 80 | 70 | 60 | 50 | 40 | 30 | 30 | 20 | 20 | 20 | 20 | 20 | 20 |
|            | 40 - 49                 | 90 | 90 | 80 | 70 | 60 | 50 | 40 | 30 | 30 | 20 | 20 | 20 | 20 | 20 | 20 |
|            | 30 - 39                 | 90 | 90 | 80 | 70 | 60 | 50 | 40 | 30 | 30 | 20 | 20 | 20 | 20 | 20 | 20 |

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Guidelines for estimating live fuel (foliage) moisture content. Live fuel moisture is required for fuel models 2, 4, 5, 7, and 10. If data are unavailable for estimating live fuel moisture the following rough estimates can be used.

<table>
<thead>
<tr>
<th>Stage of vegetative development</th>
<th>Moisture content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh foliage, annuals developing, early in growing cycle</td>
<td>300%</td>
</tr>
<tr>
<td>Maturing foliage, still developing with full turgor</td>
<td>200%</td>
</tr>
<tr>
<td>Mature foliage, new growth complete and comparable to older perennial foliage</td>
<td>100%</td>
</tr>
<tr>
<td>Entering dormancy, coloration starting, some leaves may have dropped from stem</td>
<td>50%</td>
</tr>
<tr>
<td>Completely cured</td>
<td>Less than 30%, treat as a dead fuel</td>
</tr>
</tbody>
</table>
Interagency Fire Use Module Field Guide
Appendix F – Slope Calculation

Slope = \frac{\text{Rise}}{\text{Run}} \times 100\%

Field Measuring

Rough estimates of slope can be made in the field. A clinometer is more accurate than most rough estimates. Estimates are still usually accurate enough for fire behavior calculations.

Map Measurements

Slope can be measured on a topographic map. The following steps can be used.

- **Determine Contour Interval** - Can be found in the bottom center of most topographic maps, or determined by counting contours lines between 2 known contours and dividing by the number of contour lines.
- **Determine Map Scale** - Usually found at the bottom center of most topographic maps.
- **Determine Map Conversion Factor** - Can be confusing. It is a factor to change inches measured on a map to feet on the ground. The following factors can be used for the map scales listed:
  - 7.5 min. 1:24,000 2000 ft/in
  - 15 min. 1:62,500 5280 ft/in
- **Determine Rise** - Count spaces between contour intervals for a fixed distance and multiply by the contour interval.
- **Determine Run** - Measure the same distance you counted contour intervals and multiply it by the conversion factor.
- **Determine Slope** - Plug the numbers into the above formula to get the slope %.
## Wind Adjustment for Exposure of Fuels to Wind

![Diagram showing wind exposure categories]

<table>
<thead>
<tr>
<th>Fuel Exposure</th>
<th>Fuel Model</th>
<th>Adjustment Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposed Fuels</td>
<td>4</td>
<td>0.6</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>All Others*</td>
<td>0.4</td>
</tr>
<tr>
<td>Partially Sheltered Fuels</td>
<td>All Fuel Models</td>
<td>0.3</td>
</tr>
<tr>
<td>Fully Sheltered Fuels</td>
<td>All Fuel Models</td>
<td>0.2 Open Stands</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.1 Dense Stands</td>
</tr>
</tbody>
</table>

*Fuel Models 2 and 7 are usually partially sheltered
Fuel models 8, 9 and 10 are usually fully sheltered
## Probability of Ignition Table

<table>
<thead>
<tr>
<th>Shading (Percent)</th>
<th>Dry-Bulb Temp. (°F)</th>
<th>FINE DEAD FUEL MOISTURE (PERCENT)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>110+</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>100-109</td>
<td>100</td>
<td>90</td>
</tr>
<tr>
<td>90-99</td>
<td>100</td>
<td>90</td>
</tr>
<tr>
<td>80-89</td>
<td>100</td>
<td>90</td>
</tr>
<tr>
<td>Unshaded &lt;50%</td>
<td>100</td>
<td>90</td>
</tr>
<tr>
<td>70-79</td>
<td>100</td>
<td>80</td>
</tr>
<tr>
<td>60-69</td>
<td>90</td>
<td>80</td>
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<tr>
<td>50-59</td>
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<td>80</td>
</tr>
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<td>40-49</td>
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<td>80</td>
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<tr>
<td>30-39</td>
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<td>110+</td>
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<td>100-109</td>
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<td>100</td>
<td>90</td>
</tr>
<tr>
<td>Shaded &gt;50%</td>
<td>100</td>
<td>90</td>
</tr>
<tr>
<td>70-79</td>
<td>100</td>
<td>90</td>
</tr>
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<td>60-69</td>
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<td>50-59</td>
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<td>40-49</td>
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<td>90</td>
</tr>
<tr>
<td>30-39</td>
<td>100</td>
<td>90</td>
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</tbody>
</table>
## CONDUCTING AFTER ACTION REVIEWS

<table>
<thead>
<tr>
<th>Dos</th>
<th>Don'ts</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Schedule AARs shortly after the completion of an activity.</td>
<td>- Conduct AARs without planning.</td>
</tr>
<tr>
<td>- Make reviews routine.</td>
<td>- Conduct reviews infrequently or irregularly.</td>
</tr>
<tr>
<td>- Collect objective data whenever possible.</td>
<td>- Allow debates to bog down when establishing the facts.</td>
</tr>
<tr>
<td>- Use trained facilitators.</td>
<td>- Allow dominating leaders to run AARs.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Establish clear ground rules:</th>
<th>Encourage candor and openness.</th>
<th>Base performance evaluations or promotions on mistakes admitted in AARs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Proceed systematically.</td>
<td>- Focus on things that can be fixed.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Keep discussions confidential.</td>
<td></td>
</tr>
<tr>
<td>- What did we set out to do?</td>
<td>- What actually happened?</td>
<td>Permit unstructured, meandering, disorganized discussions.</td>
</tr>
<tr>
<td>- Why did it happen?</td>
<td>- What are we going to do next time?</td>
<td></td>
</tr>
<tr>
<td>- Involve all participants in discussions.</td>
<td></td>
<td>- Allow senior managers or facilitators to dominate discussions.</td>
</tr>
<tr>
<td>- Probe for underlying cause-and-effect relationships.</td>
<td></td>
<td>- Criticize or fault individual behavior or performance.</td>
</tr>
<tr>
<td>- Identify activities to be sustained as well as avoided.</td>
<td></td>
<td>- Conclude without a list of learnings to be applied in the future.</td>
</tr>
</tbody>
</table>
Fire Name: ___________________________ Fire #: ___________________________

Management Unit: ___________________ Date: ____________ Time: ____________

Current Fire Size: ___________________ Observation Location (map grid/elev/etc.): __________________________

Attach current map indicating active fire perimeter, spread direction and other significant information.

Fuel Model/Vegetation Type (of active area): ________________________________________________________

Fire Activity: Creeping, Running, Torching, or Crowning.

- Rate of Spread ________ ch/h  Type of spread Head Flanking Backing Average (select any that apply)
- Perimeter growth __________ chains, direction __________ Growth Rate (chains/time)
- Percent of perimeter actively burning? __________ Location(s) ____________________________
- Max temp/time _____ Min temp/time _____ Min RH/time _____ Max RH/time ____________
- Wind: Max sustained dir/time __________________
- Smoke: (describe column: color, shape, etc) ________________________________________________
- Distance to MMA, Trigger Points, other values at risk (note on attached map also)____________

Other notes (i.e. influencing factors – topography, shading, etc., potential fuel model changes, resistance to control efforts, structures (if applicable), more on observations above.)

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

Prepared by: ___________________________ Date: ____________

Reviewed by: ___________________________ Date: ____________

Attached Products: (check)
- FIRE BEHAVIOR OBSERVATIONS
- SMOKE OBSERVATIONS
- SPOT WEATHER FORECAST REQUEST
- FIRE PERIMETER/ AREA MAP
- FIRE WEATHER OBSERVATIONS
- FUEL MOISTURE SAMPLING SHEET
- ICS 214 UNIT LOG
- PHOTO LOG
## FIRE WEATHER SPECIAL FORECAST REQUEST

### I. REQUESTING AGENCY WILL FURNISH:

1. **NAME OF FIRE OR OTHER PROJECT**
2. **CONTROL AGENCY**
3. **REQUEST MADE**
   - **TIME**
   - **DATE**

4. **LOCATION (By 1/4 Sec-Sec-Twp-Range)**
5. **DRAINAGE NAME**
6. **EXPOSURE (NE, E, SE, etc.)**

7. **SIZE OF PROJECT (Acres)**
8. **ELEVATION***
   - **TOP**
   - **BOTTOM**
9. **FUEL TYPE**
10. **PROJECT ON:**
    - **GROUND CROWNING**

### II. WEATHER CONDITIONS AT PROJECT OR FROM NEARBY STATIONS

<table>
<thead>
<tr>
<th>PLACE</th>
<th>ELEVATION</th>
<th>OB TIME</th>
<th>WIND DIR.VEL</th>
<th>TEMP.</th>
<th>DRY</th>
<th>WET</th>
<th>RH</th>
<th>DP</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(Indicate rain, thunderstorms, etc. Also wind conditions and 10hrs of cloud cover)</td>
</tr>
</tbody>
</table>

### II. FIRE WEATHER FORECASTER WILL FURNISH:

13. **FORECAST AND OUTLOOK:**
   - **SPECIFY Wind – 20 foot or Eye Level**
   - **TIME AND DATE:**

**Synopsis:**

<table>
<thead>
<tr>
<th>Burn Period</th>
<th>Sky Cover</th>
<th>Temperature</th>
<th>Humidity</th>
<th>Wind Eye-Level</th>
<th>Wind 20-Foot</th>
<th>Indices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mostly Sunny/Clear</td>
<td>🍀°F</td>
<td>🍀%</td>
<td>🍀 Upl</td>
<td>🍀 Upl</td>
<td>Haines:</td>
</tr>
<tr>
<td></td>
<td>Fair</td>
<td>🍀°F</td>
<td>🍀%</td>
<td>🍀 Dwn</td>
<td>🍀 Dwn</td>
<td>LAL:</td>
</tr>
<tr>
<td></td>
<td>Partly Cloudy</td>
<td>🍀°F</td>
<td>🍀%</td>
<td>🍀 Upl</td>
<td>🍀 Upl</td>
<td>BI:</td>
</tr>
<tr>
<td></td>
<td>Mostly Cloudy</td>
<td>🍀°F</td>
<td>🍀%</td>
<td>🍀 Dwn</td>
<td>🍀 Dwn</td>
<td>CI:</td>
</tr>
<tr>
<td></td>
<td>Cloudy</td>
<td>🍀°F</td>
<td>🍀%</td>
<td>🍀 Upl</td>
<td>🍀 Upl</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Variable Clouds</td>
<td>🍀°F</td>
<td>🍀%</td>
<td>🍀 Dwn</td>
<td>🍀 Dwn</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>🍀°F</td>
<td>🍀%</td>
<td>🍀 Upl</td>
<td>🍀 Upl</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>🍀°F</td>
<td>🍀%</td>
<td>🍀 Dwn</td>
<td>🍀 Dwn</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>🍀°F</td>
<td>🍀%</td>
<td>🍀 Upl</td>
<td>🍀 Upl</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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- **FIRE WEATHER OFFICE**

### III. REQUESTING AGENCY WILL COMPLETE UPON RECEIPT OF FORECAST

IV. **FORECAST RECEIVED:**
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   - **NAME**
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| SCOUR HEIGHT, % CONSUMPTION, SPOTTING DISTANCE, FLAME CONTINUITY AND ARRANGEMENT, ETC. |