

CHAPTER 6

WEATHER

OBJECTIVES

- 1) Describe the various types of wind and how wind influences fire behavior.
- 2) Understand the temperature/humidity relationship.
- 3) Define stability, inversion, mixing height, dispersion index and transport wind speed.
- 4) List the methods by which heat is transferred, and the effects of weather.
- 5) Explain the sea breeze process and the possible effects on prescribed fires.
- 6) Describe the passage of a typical cold front in Florida, particularly as it relates to wind and temperature.
- 7) List the influences of thunderstorms on fire behavior.
- 8) Understand the differences and usages of the daily planning, spot, red flag event and other weather forecasts.
- 9) Use a belt weather kit to take a representative weather observation
- 10) Discuss the steps in obtaining a spot weather forecast.

INTRODUCTION

Knowledge of weather and its effects on fire behavior are crucial to the proper and safe conduct of prescribed burns and management of the resulting smoke. While we cannot hope to manipulate or control the elements, we can explore some weather factors which influence fire. To understand how these factors affect fire, we must first discuss the basic weather principles pertaining to fire along with emphasis on Florida climate.

BASIC FLORIDA WEATHER PRINCIPLES

FRONTS

A front is defined as a boundary separating two air masses of contrasting density. An air mass is a broad region of air with fairly uniform temperature and humidity. Stable air masses have relatively higher surface pressure at their center. High pressure can be thought of as an invisible ridge of air with winds spiraling out from the center in a general clockwise direction. Presence of high pressure over an area usually leads to fair weather with no precipitation. Low pressure systems, or lows, are the opposite with counter-clockwise general wind flow. Lows are associated with changing weather conditions, including precipitation and the passage of fronts. Frontal systems dictate most of the changing weather conditions in the state of Florida during the autumn and winter months. Cold fronts develop when a mass of cold (denser) air forces warmer

moist air aloft. Greater temperature differentials and moisture content disparities generally produce more active fronts.

With the approach and passage of a cold front in Florida important changes occur. First, ***surface wind direction will change in a clockwise (veering) fashion*** and secondly, with the passage of the front ***it will get colder and it will typically become drier over time.***

Other changes which **typically** occur with a cold front passage are: decrease in temperature of 5 to 30 F, increase in wind speed of up to 20 mph, and a change in wind direction anywhere from 90 to 180 degrees. Changes in relative humidity may be somewhat delayed depending on how dry the new air mass is but it is not too uncommon to see a decrease in humidity readings of 20 to 40%.

Cold air being heavier and overtaking the warm air, moves forward by sliding underneath the warm air, forcing the warm air mass upward off the ground. Precipitation may or may not be associated with passage of a cold front depending upon the amount of moisture present, density difference between the two air masses, and other weather factors.

The Bermuda high is a large area of semi-permanent high pressure, usually situated off the southeast US Atlantic coast. This high many times will extend westward across the southeast or the state of Florida during the summer. Cold fronts usually approach Florida every 5 to 7 days during the winter but they are not strong enough to displace the typically robust Bermuda High during the summer. Cold fronts usually move over most of Florida in the winter, often stall over the state in spring and fall, but infrequently reach the state at all in summer. Prescribed burning is not recommended **during** the passage of a cold front.

Warm fronts denote a warmer, moist and less dense air mass replacing a relatively cooler/drier air mass. Passing warm fronts are usually accompanied by a band of clouds and some precipitation. Good prescribed burning weather conditions are seldom associated with passage of a warm front.

WIND

Wind is defined as the movement of air, the direction and speed of which is determined by the relative distribution of pressure centers, local topography and geography. **Wind direction is always expressed as the direction from which the wind is coming.** Wind is the **most difficult** weather variable to forecast (which is one reason on-site weather readings are requested when asking for a spot-weather forecast). Once a fire is ignited, wind is the **most important** weather variable governing fire behavior. Wind character, more than any other factor can cause erratic fire behavior. Wind gusts and/or sudden changes in direction are responsible for most prescribed fire escapes.

It is imperative that the winds on a prescribed burn closely match those predicted in order to:

- 1) maintain control of the burn,
- 2) achieve the desired fire effects, and
- 3) satisfy smoke management constraints.

Fire managers need to recognize the two main types of wind – **general** (or gradient) and **local** – although in practice, it may be difficult to always separate them. For the purpose of this discussion, general winds are those affecting a relatively large geographic area such as a state. **General winds** are usually from the southeast over peninsular Florida, especially during the spring and summer due to the position and seasonal strength of the Bermuda High, and more variable in direction and speed during the autumn and winter due to movements of highs/lows and fronts near the state.

General wind ahead of an approaching cold front is usually from the southwest. Such winds are often used in prescribed burning when smoke management constraints require this component. Predictable southwest winds for favorable smoke transport may only occur in the central or south portions of the state during the autumn and winter. Crown scorch is more likely, however, because ambient temperatures in Florida are generally higher with a southerly wind flow. Extreme care should be exercised when utilizing pre-frontal winds to make sure the burn is completed before arrival of the front. If rain accompanies the front, smoldering fuels are likely to be extinguished thereby eliminating residual smoke problems.

Local winds occur on a much smaller scale and are modified or generated by local influences such as temperature differences, especially between land and large bodies of water, topographic features, or on occasion by outflow from thunderstorms. Wind tends to change direction and speed as the airstream flows around and over ridges, swamps, lakes and other waterways. Winds are also influenced by urban areas, large obstructions or constant heat sources such as airports and parking lots.

Because many local effects on wind are predictable they may be used in assessing weather factors for a prescribed burn on a specific area. Local wind patterns should be considered during the planning of fire lines and burn unit boundaries and throughout ignition and mop up. Most dormant-season burning in the northern part of Florida is associated with post-passage of a cold front. As winds shift in a clockwise direction during passage of a cold front their speed and gustiness increase. Deviations in wind direction of plus or minus 30 degrees can be expected even in post-frontal winds. As wind speed decreases, deviations in direction are more likely and the range of these deviations is likely to widen as well.

Types of local wind

Surface Wind: Surface winds are defined as those winds measured by commissioned National Weather Service equipment at the 10 meter level (33ft) above the ground. Surface winds are used in weather forecasts typically disseminated by media and the official NWS public weather forecasts and are **not** used in routine and SPOT weather forecasts in Florida.

20 Foot Wind: The forecast wind speed in both routine and SPOT fire weather forecasts is 20 feet above any vegetative obstruction including the tree canopy in forest areas. For primary grasses the 20 foot wind will be usually measured at eye level and are generally lower than the forecast surface wind due to obstructions. In forests, stand density, height to the bottom of the overstory canopy, and understory density influence in-stand wind speed. A rough estimate of in-stand wind speed can be obtained by multiplying the 20-foot forecast wind by 0.1 in dense pole-size stands with a dense understory, by 0.3 in mature open longleaf stands with an herbaceous ground cover, and by 0.2 for most situations in between. In large open fields eye level winds will be less affected by obstructions. Burning when the 20-foot wind speed exceeds 20 mph is very likely to cause fire containment problems.

Mid-Flame Wind: The speed of the wind measured at the mid-height of the flame is considered to be most representative wind directly and locally affecting fire behavior.

Wind influences fire behavior by: 1) accelerating evaporation, thereby hastening the drying of fuels, 2) carrying heat from a fire into unburned fuels, preheating them and driving off moisture, 3) bending flames toward unburned fuels in heading and flanking fires, 4) guiding the direction of fire spread, 5) determining rate-of-spread on level ground, 6) bringing oxygen to the fire, thereby increasing the rate of combustion, 7) increasing flame length, 8) affecting ignition of ladder fuels and sustaining crown fires, 9) encouraging fire brand formation and transport, and 10) dissipating rising heat, thereby reducing crown scorch.

When prescribed burning in hilly terrain, topography and fuel character can be used in no-wind situations to govern fireline intensity, upslope movement producing heading fire and down slope movement resulting in backing fire. Slopes may have a “diurnal” or day-night character of local wind flow which is independent of the general wind direction. This wind flow is down slope on still nights because of radiational cooling (see the section on stability), but switches to upslope as solar radiation heats the same slope the next morning.

SEA-BREEZES

A sea-breeze is the horizontal flow of air from a large body of water towards the land. Because land warms faster than water, a circulation is set up when a parcel of air over land is heated by solar radiation, expands, becomes less dense, and rises. Nearby cooler, moist marine air moves in to replace the warm air, is itself heated, rises, and is replaced by more cool, moist air. The greater the difference in surface – vs- ocean temperatures, the stronger the winds are apt to be. Sea breezes are best developed in the spring and early summer under clear skies, however they can occur at any time of the year under the right conditions. Sea breezes generally begin around mid-day and persist into late afternoon. Sea-breeze boundaries can travel well inland, or in some cases show limited movement inland based on the larger scale general wind direction and strength. When the general flow is onshore a sea-breeze boundary will move inland much faster

and may cross peninsular Florida. The sea breeze along the Atlantic Coast coupled with a prevailing SE wind can be especially strong.

As the sun sets, land cools faster than water and the direction of wind flow can reverse. Fire managers should be aware of the possibility that smoke from a prescribed fire can be vented out to sea, get caught in this circulation pattern and come back across the coast at ground level. Sea-breezes result in a decrease in temperature, an increase in RH, a change in wind speed, and a *sometimes* predictable change in wind direction.

Typical changes in weather parameters associated with passage of a sea-breeze front (when a seabreeze overcomes a general offshore wind): Decrease in temperature of 5 to 15 F, increase in RH of 5 to 30%, increase in wind speed of 2 to 10 mph, and a change in wind direction of up to 180 degrees.

Significant fire behavior impacts can also occur when general winds oppose the seabreeze and overcome the seabreeze front. When this occurs ambient temperatures may remain higher and relative humidity may remain lower resulting in more dramatic fire behavior (*East Fork fire, 2004*). Another potential hazard comes with the possibility for thunderstorms to develop along the leading edge of the sea breeze, which can carry threats of frequent lightning and strong, erratic winds.

TEMPERATURE

Temperature is simply a measure of the hotness or coldness of something. In a standard atmosphere air temperature decreases with height unless an inversion exists (which by definition signifies an increase in temperature with height). Because of its properties warm air can hold more moisture than cold air.

High temperatures increase the probability of crown scorch during a fire because higher temperatures require less heat to elevate the live foliage temperature above its lethal threshold (considered to be almost instantaneous at 145 F).

Twice the amount of heat is needed to raise a fuel to its lethal threshold of 145 F when the ambient temperature is 45 F versus an ambient temperature of 95 F.

Avoiding the unsightly appearance of excessive crown scorch is often a major consideration, especially when conducting growing-season burns. At the other end of the spectrum, burning when the ambient temperature is below about 29 F requires additional heat to melt the icy crystals that have formed in plant cells (live and dead) before this moisture can be evaporated. Freezes are infrequent in much of Florida. However, when one does occur it can significantly increase dead fuel loading for 2 to 3 years.

DEWPOINT TEMPERATURE

Dewpoint is simply the temperature that is required for a parcel of air to cool until saturated, or when the water vapor in the air parcel turns from vapor (gas) to liquid water. Water vapor also has the ability to go from the vapor (gaseous) phase to solid (frost) through a process called sublimation.

WET-BULB TEMPERATURE

The minimum temperature that a parcel of air may be cooled to through evaporation is known as the Wet Bulb Temperature. The Wet Bulb Temperature is most commonly calculated in the field with a Sling Psychrometer in order to derive Relative Humidity using the Belt Weather Kit.

RELATIVE HUMIDITY

Relative humidity (RH) is a measure of the amount of water vapor a parcel of air contains expressed as a percentage of the amount it would contain at saturation. It is the single most important weather measurement when considering drying of one to ten hour fuels.

Warm air holds more moisture at saturation than does cold air. Thus RH decreases as the temperature of a given parcel of air increases. **For every 20 F increase in temperature, the RH will be reduced by about one-half.** Conversely, the RH roughly doubles with every 20 F decrease in temperature until the air becomes saturated. Predicted RH is always included in fire weather forecasts but general text weather forecasts do not include this prediction. Because RH is near 100% whenever frost or dew occurs at daybreak, the above rule of thumb can be used to estimate the minimum RH for the day. Simply use the current early morning temperature, the predicted high from the forecast and the above-mentioned relationship to calculate the minimum RH. The minimum RH is generally reached in the early afternoon and usually coincides with the maximum temperature. The RH can be estimated at other times during the day by checking the temperature and applying this rule of thumb. Note that when either moisture or dry air is being brought in to an area by winds, this rule does not hold.

Saturated air and stable conditions are the major reasons fires are easier to control early in the morning. Relative humidity can therefore be used to help regulate fuel consumption through its effect on fine-fuel moisture content. As the RH exceeds 60%, a patchy burn should be expected, especially in hardwood fuels. On the other hand, under low RH conditions, moisture in the fuel is absorbed by the air rendering the fuels more flammable. The RH is generally higher in Florida during both day and night than in many other regions because of surrounding relatively warmer ocean waters which provide moisture.

The lower the RH, the better the burning conditions. Spotting can become a concern when the RH drops below 35% and a major problem as the RH drops below 30% partially because there is no longer enough moisture in the air to extinguish small fire brands, but mainly because the top layer of litter becomes increasingly dry and receptive to ignition. Florida law states it is the landowner's responsibility to have adequate resources on hand to control a prescribed fire, so burns are seldom conducted when the RH is predicted to drop below 30%.

Subsidence is the settling of air from high levels in the atmosphere. As this air descends to the surface, it warms, thereby decreasing its RH even more. This phenomenon usually occurs when high pressure is centered over an area for several days. In the south high winds, do not usually accompany subsidence, but fuel moisture will drop resulting in an increase in fire intensity.

STABILITY

Stability is defined as the resistance of the atmosphere to vertical motion. Vertical motion is commonly caused by heating a parcel of air which then rises because it is less dense than the surrounding cooler air. As this heated air rises, it cools until it reaches the temperature of the air it is passing through. Higher air temperature near the earth's surface (in relation to the air above it), creates a more unstable parcel of air. Thus sunny days usually result in greater instability near the ground. This is the process that produces upslope winds on sunny days where topography is present. Good visibility, vertical cloud development and dust-devils are indicators of unstable conditions and result in tall convective smoke plumes, a high spotting potential and somewhat unpredictable fire behavior.

As the sun sets, radiational cooling lowers the temperature of the earth's surface and, in turn, the adjacent air. This cooler air hugs the ground flowing downslope along drainages to lower elevations. Conditions, such as these, result in an increase in temperature with height which is called an **inversion**. An inversion by definition describes stable conditions. Inversions are often strongest during cold, clear winter nights. In the South, stable conditions should be expected every night, except right after passage of a cold front. The next day solar heating of the earth's surface warms the adjacent air which then rises breaking the nocturnal inversion, usually by mid-morning.

Be careful when prescribed burning large blocks (>100 acres) in the morning before the nighttime inversion layer has fully dissipated. Inversions act as a lid to limit smoke rise. If a smoke plume punches through an inversion, it acts like a chimney venting the hot combustion products into the cooler air above where it will rise rapidly. This will result in a rapid increase in fire intensity likely causing damage and/or control problems.

As the air heated by solar radiation rises, it displaces cooler air which sinks, setting up a vertical circulation pattern. The height from the surface to where vigorous mixing due to convection occurs is called the **mixing height**. In general, the more unstable the atmosphere, the higher the mixing height will be. The minimum mixing

height advocated for prescribed burning is 1,700 feet (500 meters). Mixing heights of 4 to 6 thousand feet are common in the southeastern U.S. during the summer and 2 to 4 thousand feet in the winter. For purposes of later discussion in this section **Transport Wind** is the average wind speed and direction from the surface up to mixing height

The **Dispersion Index (DI)** is a forecast tool that estimates both daytime and nighttime stability. The dispersion index is a better indicator of stability than the Ventilation Factor (the product of the mixing height times the transport wind speed) because it incorporates the rate of dispersion within the mixing layer. The Main components of DI are Mixing Height and Transport Wind. The higher the DI the better the dispersion, but the more unstable the atmosphere. A doubling of the DI results in a doubling of the amount of smoke the airshed can hold. Many prescriptions have dispersion limits within the 41-60 range. Some prescribed burns may be acceptable with a DI as low as 30 but only when burn unit size and proximity of SSA's minimize smoke management concerns. As the DI increases, so do fire control problems. Prudent prescribed burners double check fire behavior calculations and indices as the DI approaches 70 due to increasing probability of resource damage and/or fire escape (See Table 2 next page). Prescriptions with values outside the preferred range should be verified by past results and/or other experienced burners.

LVORI Index

The **Low Visibility Occurrence Risk Index (LVORI)** is a measure of the risk of low visibility occurring. The risk dramatically increases when RH is very high (near saturation) and Dispersion Index is low. This index is useful in qualitatively estimating the likelihood of a vehicle accident occurring under a given set of conditions. This index is currently available from the NWS and can also be ascertained by using the predicted nighttime DI, maximum RH, and the LVORI table. LVORI is most commonly used operationally by various fire and public safety agencies during the overnight hours to determine the potential for the development of extremely low visibility due to the combination of smoke and fog (Super Fog). Many episodes of Super Fog have been documented around the state over the past 30 years and have in some instances contributed to mass vehicle pileup occurrences. Table 1 on the next page lists the cross reference for determining LVORI using forecast relative humidity and dispersion.

TABLE 1: LVORI Calculation Table

Relative humidity	Dispersion Index											
	> 40	40-31	30-26	25-17	16-13	12-11	10-9	8-7	6-5	4-3	2	1
< 55	1	1	2	2	2	2	2	2	2	2	2	2
55-59	1	1	2	2	2	2	2	3	3	3	3	3
60-64	1	1	2	2	2	2	3	3	3	3	3	3
65-69	1	3	3	3	3	3	3	3	3	3	3	4
70-74	3	3	3	3	3	3	3	3	3	3	3	4
75-79	3	3	3	3	4	4	4	4	4	4	4	4
80-82	3	3	3	3	4	4	4	4	4	5	5	6
83-85	4	4	4	4	4	4	4	4	5	5	5	6
86-88	4	4	4	4	4	5	5	5	5	6	6	6
89-91	4	4	4	4	5	5	5	5	6	6	7	7
92-94	4	4	4	5	5	5	6	6	6	6	7	8
95-97	4	4	4	5	5	6	6	6	7	8	8	9
> 97	4	4	4	5	5	7	8	8	9	9	10	10

TABLE 2: RELATIONSHIP OF DISPERSION INDEX TO SMOKE AND FIRE MANGEMENT CONDITIONS

Atmospheric Dispersion Index

Atmospheric dispersion is the process by which the atmosphere mixes and transports particulates, such as smoke, away from their source. The Atmospheric Dispersion Index (DI) was developed by the U.S. Forest Service to assess the impact of prescribed burning activity on atmospheric smoke concentrations and air quality. The same processes responsible for good smoke dispersion also contribute to erratic fire behavior and may present very hazardous conditions.

Interpretation of Daytime DI Values

DI	DESCRIPTION
0-20	Poor dispersion, stagnant if persistent.
21-40	Poor to fair, stagnation may be indicated if accompanied by low wind speeds.
41-60	Generally Good (For most prescribed fires)
61-80	Very good dispersion, Control problems likely.
80 +	Excellent dispersion, Control problems expected.

Interpretation of Nighttime DI Values

DI	DESCRIPTION
0-2	Poor
3-4	Poor to Fair
5-8	Good
8 +	Very Good

PRECIPITATION/DROUGHT

Drought is a measure of the relative dryness of an area. Long term drought conditions are not surprisingly associated with increased wildfire activity across the state. When drought conditions are occurring they are measured routinely by state and federal agencies. For fire agencies around the state the Florida Forest Service routinely calculates the **Energy Release Component** (ERC) a measure of the state of dryness of fuels available to burn. ERC in combination with current and forecast relative humidity is used by the Florida Forest Service to determine the **Fire Danger Index** (FDI). The current FDI as well as the forecast day two FDI is released daily by the Florida Forest Service. For additional information on ERC and the FDI see the Florida Forest Service website: http://flame.fl-dof.com/fire_danger/wims-report.html

The **Keetch/Byram Drought Index (KBDI)** is also used in Florida. It depicts the degree of drought on a scale that ranges from 0 to 800. It assumes vegetation on an area will be at its wilting point when the index is 800 and that the area will reach field capacity with an effective rainfall of 8 inches. The index increases each rainless day, the amount depending upon the maximum ambient temperature reached, and decreases each rainy day, the amount depending upon the rainfall received during the 24 hour period.

Summer forecasts of probability of precipitation and precipitation amounts by the National Weather Service should be considered educated guesses. The majority of the annual precipitation in Florida occurs in summer showers and thunderstorms. The KBDI therefore is site specific. In the absence of an onsite measurement the KBDI may be estimated. The Florida Forest Service maintains a calculation of the KBDI across the state based on radar estimated rainfall and rain gauge data throughout the state. The KBDI is calculated for each county and also within each county based on a 4 km grid.

Moisture in the lower litter and upper soil protects tree roots and soil microorganisms. When the KBDI exceeds 400, consider putting off scheduled burns where a duff layer is present. As a duff layer develops (in 4 or 5 years without fire on good sites with a closed canopy) tree roots quickly colonize it. Fires that consume this layer kill the feeder roots within it and often damage those roots just below the soil surface as well. Young, fast-growing trees can generate a new feeder root system fairly

quickly but as a tree matures this process takes longer and mortality becomes more likely. Those areas that have well established burn programs and short fire return intervals may have conditions that will accommodate burns with higher KBDI's. Burn managers may proceed with caution when local knowledge and experience indicate that these conditions are suitable.

Don't be fooled by a brief, hard shower when the KBDI is over about 500. Fire danger will be temporarily reduced but the interiors of large diameter fuels will still be very dry. After a day or two of sunshine, these fuels will be much drier than normal and are likely to ignite and could cause significant residual smoke.

The most important fire control concern when planning to burn vegetation growing on organic (peat/muck) soils such as a fresh-water marsh, is depth to the water table. It should be very close to, or above the surface to keep the organic soil from igniting. Once ignited, organic soils can cause significant nighttime smoke management problems and are extremely difficult to extinguish.

THUNDERSTORMS

Thunderstorms develop from cumulus clouds. Thunderstorms are steered by winds aloft (usually around 10,000 feet above sea level. On days with light winds through the atmosphere, storm development and motion may be erratic. As a thunderstorm passes near a burn in progress, fire managers should be prepared to deal with the likelihood of erratic winds and downdrafts. Downdrafts are air currents that descend from the base of a thunderhead. When they hit the ground they blow out away from the thunderhead in all directions resulting in sudden temporary changes in surface wind direction. They are extremely gusty sometimes reaching speeds of 50 to 60 mph. They are called a gust front once they move away from the thunderstorm. The only visual indicator sometimes present is a continuous line of small cumulus clouds called a shelf cloud. They do not show up in forecasts. The rapid approach of a line of ragged-looking cumulus clouds with a thunderstorm in the distance in the late afternoon is a strong indicator of such a front. Near the coast, this may also be a sea-breeze front which often triggers thunderstorms. It is worth noting that Florida records more thunderstorm days than any place else in North America.

When burning with southwest winds in the warm sector ahead of a cold front, watch out for thunderstorms which often form lines and move along the front at right angles to it. Because of their frequent occurrence, thunderstorms can be considered a local feature 10 to 15 miles inland from a cape or neck of land where sea-breeze fronts converge.

FORECASTS

Weather forecasts are a necessary prerequisite for any burn because they allow the fire manager to determine if the desired conditions are likely to materialize and persist

long enough to complete the burn. Fire weather forecasts are available online from the National Weather Service (see example forecast on pages 6-18 & 6-19), and the Florida Forest Service (FFS) website. Getting a forecast for today, tonight, and tomorrow will help keep you from being surprised and thus out of trouble. Because the general forecast is for a wide area, prudent prescribed burners often ask for a site-specific forecast called a spot weather forecast. An automated spot weather forecast is available on the FFS website. For state and federal agencies another spot weather forecast source is available from the National Weather Service. Information can be entered on the NWS Spot Forecast Internet page. On-site weather observations are not required but they are preferred (See the On-site Weather Observation section below). The National Weather Service also transmits continuous weather information on NOAA Weather Radio. Some portable radios are programmable and allow you to add the National Weather Service frequency. An alternative is an inexpensive battery-operated weather radio. Numerous wireless sources of weather information are also available via smart phones and other wireless devices which are too many to mention here.

Utilize the variety of information sources that are readily available but remember, a **forecast is just that** – a forecast. If on-site conditions are not good, then **do not burn** regardless of the forecast. Weather at the burn site may be appreciably different and it **will** change over the course of the burn. Invest in a belt weather kit and a more reliable wind sensor (such as the hooded kind found in many forestry-supply catalogs) rather than the one that comes with the kit. **Take on-site observations prior to ignition to verify your weather forecast, and then periodically during the burn and at its completion to help assess fire effects.**

ON-SITE WEATHER OBSERVATIONS

When taking on-site weather observations, the measurements should be taken in the stand to be burned, not on a road, or in an area with obvious understory or overstory density or height differences. Use a weather observations form (See page 6-14) and don't forget to record the time. Hold the anemometer at about eye-level facing into the wind and at arms length so your body does not interfere with the measurement. Do not stand directly behind a large shrub or tree bole that will block the wind. Hold the anemometer up for several minutes and mentally note the high, low, and average wind speed. Record these values in the units read (e.g., miles per hour or meters per second). Do not just take a reading when the wind is gusting, although gust maximums should be part of the observation. Change direction as needed to face the anemometer directly into the wind. Note the range and average wind direction; check with a compass as necessary.

When taking wet and dry bulb readings, make sure the wet bulb wick is fully saturated with clear water (not from a roadside ditch). Do not handle the wick as the oils from your hands will affect its evaporative characteristics. Replace the wick when it becomes dirty (with a piece of white cotton shoelace if real wicking is not available). Use thread to tie it on and below the thermometer, and make sure it has about a ½ inch tail. Sling the psychrometer in an area typical of the burn unit facing into the wind. Use

wrist action to rotate the sling at a good pace but not anywhere near as fast as you can. Be careful in rotating the sling so you don't break one of the glass bulbs against a jacket button, hardhat or other obstacle. Sling the instrument for about a minute, read the wet bulb thermometer, sling again for about another minute and take another reading. Continue this sequence until the reading is the same or higher than the previous one. Then read the dry bulb thermometer and record the wet and dry bulb readings. Do not record the dry bulb reading when you first remove the psychrometer from its protective case because the reading will not be accurate.

Use the slide rule provided with the sling psychrometer to calculate the RH. Kestrels are now in common use on prescribed burns. Kestrel weather sensors should be checked frequently for accuracy as some RH sensors need to be calibrated annually. Kestrels should not be the only weather instruments on a burn. The sling psychrometer and belt weather kit can verify Kestrel readings. Estimate the percentage of the sky filled with clouds. Determine and record the estimated fine-fuel moisture using the table in Chapter 7 or Appendix E.

Continue to take observations at intervals (One hour intervals are often used) throughout the burn. Once the burn is underway, make sure observations are taken some distance upwind of the fire to assure the readings are not affected by indrafts, or by air warmed by fire or smoke.

FOREST _____		FIRE-WEATHER OBSERVATIONS						DATE _____	
COUNTY _____		FIRE _____							
LOCATION	ELEV.	LOCAL TIME	TEMP.			RH	WIND mi/hr		REMARKS
			DRY	WET	DP		DIR.	SP.	

AGENCY _____
OBSERVER _____

Table 2A-1: PRESSURE 30 INCHES OF MERCURY (to calculate RH)

WET BULB TEMPERATURES

21	22	23	24	25	26	27	28	29	30
30	31	32	33	34	35	36	37	38	39
31	32	33	34	35	36	37	38	39	40
32	33	34	35	36	37	38	39	40	41
33	34	35	36	37	38	39	40	41	42
34	35	36	37	38	39	40	41	42	43
35	36	37	38	39	40	41	42	43	44
36	37	38	39	40	41	42	43	44	45
37	38	39	40	41	42	43	44	45	46
38	39	40	41	42	43	44	45	46	47
39	40	41	42	43	44	45	46	47	48
40	41	42	43	44	45	46	47	48	49
41	42	43	44	45	46	47	48	49	50
42	43	44	45	46	47	48	49	50	51
43	44	45	46	47	48	49	50	51	52
44	45	46	47	48	49	50	51	52	53
45	46	47	48	49	50	51	52	53	54
46	47	48	49	50	51	52	53	54	55
47	48	49	50	51	52	53	54	55	56
48	49	50	51	52	53	54	55	56	57
49	50	51	52	53	54	55	56	57	58
50	51	52	53	54	55	56	57	58	59
51	52	53	54	55	56	57	58	59	60
52	53	54	55	56	57	58	59	60	61
53	54	55	56	57	58	59	60	61	62
54	55	56	57	58	59	60	61	62	63
55	56	57	58	59	60	61	62	63	64
56	57	58	59	60	61	62	63	64	65
57	58	59	60	61	62	63	64	65	66
58	59	60	61	62	63	64	65	66	67
59	60	61	62	63	64	65	66	67	68
60	61	62	63	64	65	66	67	68	69

DRY BULB TEMPERATURES

21	22	23	24	25	26	27	28	29	30
30	31	32	33	34	35	36	37	38	39
31	32	33	34	35	36	37	38	39	40
32	33	34	35	36	37	38	39	40	41
33	34	35	36	37	38	39	40	41	42
34	35	36	37	38	39	40	41	42	43
35	36	37	38	39	40	41	42	43	44
36	37	38	39	40	41	42	43	44	45
37	38	39	40	41	42	43	44	45	46
38	39	40	41	42	43	44	45	46	47
39	40	41	42	43	44	45	46	47	48
40	41	42	43	44	45	46	47	48	49
41	42	43	44	45	46	47	48	49	50
42	43	44	45	46	47	48	49	50	51
43	44	45	46	47	48	49	50	51	52
44	45	46	47	48	49	50	51	52	53
45	46	47	48	49	50	51	52	53	54
46	47	48	49	50	51	52	53	54	55
47	48	49	50	51	52	53	54	55	56
48	49	50	51	52	53	54	55	56	57
49	50	51	52	53	54	55	56	57	58
50	51	52	53	54	55	56	57	58	59
51	52	53	54	55	56	57	58	59	60
52	53	54	55	56	57	58	59	60	61
53	54	55	56	57	58	59	60	61	62
54	55	56	57	58	59	60	61	62	63
55	56	57	58	59	60	61	62	63	64
56	57	58	59	60	61	62	63	64	65
57	58	59	60	61	62	63	64	65	66
58	59	60	61	62	63	64	65	66	67
59	60	61	62	63	64	65	66	67	68
60	61	62	63	64	65	66	67	68	69

OVHD-2a

OVHD-2a

TABLE 2A-2: PRESSURE 30 INCHES OF MERCURY
(ELEVATIONS 0 - 500 FEET ABOVE SEA LEVEL)

WET BULB TEMPERATURES

	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
61	-21	-19	-17	-15	-13	-11	-9	-7	-5	-3	-1	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29
62	-19	-17	-15	-13	-11	-9	-7	-5	-3	-1	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31
63	-17	-15	-13	-11	-9	-7	-5	-3	-1	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33
64	-15	-13	-11	-9	-7	-5	-3	-1	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35
65	-13	-11	-9	-7	-5	-3	-1	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37
66	-11	-9	-7	-5	-3	-1	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39
67	-9	-7	-5	-3	-1	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	41
68	-7	-5	-3	-1	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	41	43
69	-5	-3	-1	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45
70	-3	-1	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47
71	-1	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49
72	1	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
73	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
74	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
75	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
76	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
77	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
78	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
79	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
80	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
81	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
82	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	71
83	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65	67	69	71	73
84	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65	67	69	71	73	75
85	27	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65	67	69	71	73	75	77
86	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65	67	69	71	73	75	77	79
87	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65	67	69	71	73	75	77	79	81
88	33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65	67	69	71	73	75	77	79	81	83
89	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65	67	69	71	73	75	77	79	81	83	85
90	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65	67	69	71	73	75	77	79	81	83	85	87

DRY BULB
TEMPERATURES

DP
RH

OVHD - 26

WET BULB TEMPERATURES

TABLE 2A-3: PRESSURE 30 INCHES OF MERCURY																																																																																																																																	
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																																																																																								
-34	-33	-32	-31	-30	-29	-28	-27	-26	-25	-24	-23	-22	-21	-20	-19	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	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	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	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200																				
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	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	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95																																			
106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200																																			
106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200																																			
106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200																																			
106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200																																			
106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200																																			
106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200																																			
106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200																																			
106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200																																			
106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200																																			
106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200																																			
106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200																																			
106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200																																			
106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162																																																																									

DRY BULB
TEMPERATURES

Example of a morning fire weather planning forecast

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FNUS52 KTAE 240803
FWTAE

FIRE WEATHER PLANNING FORECAST FOR NORTH FLORIDA...SOUTHWEST
GEORGIA...AND SOUTHEAST ALABAMA
NATIONAL WEATHER SERVICE TALLAHASSEE FL
403 AM EDT WED AUG 24 2011

.DISCUSSION...HURRICANE IRENE WILL MOVE FROM THE BAHAMAS LATER TODAY
TO OFF THE COAST OF NORTHEAST FLORIDA FRIDAY AFTERNOON. DRY NORTHEAST
WINDS ON ITS WEST SIDE WILL INDUCE SINKING AIR WHICH WILL OVERSPREAD
THE LOCAL AREA SUPPRESSING RAINFALL FOR ALL BUT THE EASTERN MOST
COUNTIES DURING THE NEXT FEW DAYS. IRENE WILL ALSO GENERATE HIGH
DISPERSIONS ON THURSDAY AND ESPECIALLY FRIDAY...MAINLY EAST OF THE
APALACHICOLA RIVER. HOWEVER...MINIMUM RELATIVE HUMIDITY VALUES WILL
REMAIN BETWEEN 35 AND 45 PERCENT THROUGH THE WEEKEND THUS RED FLAG
CONDITIONS ARE NOT EXPECTED.

FLZ007>017-026-027-242115-
INLAND WALTON-CENTRAL WALTON-HOLMES-WASHINGTON-JACKSON-INLAND BAY-
CALHOUN-INLAND GULF-INLAND FRANKLIN-GADSDEN-LEON-LIBERTY-
INLAND WAKULLA-
403 AM EDT WED AUG 24 2011 /303 AM CDT WED AUG 24 2011/

	TODAY	TONIGHT	THU
CLOUD COVER	PCLDY	MCLEAR	PCLDY
CHANCE PRECIP (%)	0	0	0
WEATHER TYPE	NONE	NONE	NONE
TEMP	95	70	96
RH %	39	99	39
20FT WND MPH(AM)	E 3		NE 3
20FT WND MPH(PM)	E 6	E 4	NE 6
PRECIP DURATION	0	0	0
PRECIP BEGIN			
PRECIP END			
PRECIP AMOUNT	0.00	0.00	0.00
LAL	1	1	1
MIXING HGT(FT-AGL)	5500	200	4900
TRANSPORT WND (MPH)	NE 8	E 3	NE 9
DISPERSION INDEX	50	3	55
MAX LVORI	4	8	4

REMARKS...NONE.

.FORECAST FOR DAYS 3 THROUGH 5...

.THURSDAY NIGHT...MOSTLY CLEAR. LOWS IN THE LOWER 70S. WEST WINDS
AROUND 5 MPH.

.FRIDAY...PARTLY SUNNY. SLIGHT CHANCE OF SHOWERS AND
THUNDERSTORMS. HIGHS IN THE UPPER 90S. NORTHEAST WINDS AROUND
5 MPH.

.FRIDAY NIGHT...PARTLY CLOUDY. LOWS IN THE MID 70S. WEST WINDS
AROUND 5 MPH.

.SATURDAY...MOSTLY SUNNY. HIGHS IN THE UPPER 90S. WEST WINDS
AROUND 10 MPH.

.SATURDAY NIGHT...MOSTLY CLEAR. LOWS IN THE LOWER 70S. WEST WINDS
AROUND 5 MPH.

.SUNDAY...MOSTLY SUNNY. HIGHS IN THE MID 90S. NORTHWEST WINDS
AROUND 5 MPH.

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Example of an afternoon fire weather planning forecast

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FNUS52 KTAE 231910

FWFTAE

FIRE WEATHER PLANNING FORECAST FOR NORTH FLORIDA...SOUTHWEST
GEORGIA...AND SOUTHEAST ALABAMA
NATIONAL WEATHER SERVICE TALLAHASSEE FL
310 PM EDT TUE AUG 23 2011

.DISCUSSION...

NO CRITICAL FIRE WEATHER CONDITIONS ARE EXPECTED ACROSS THE AREA
FOR THE NEXT FIVE DAYS. THE WEATHER PATTERN SHOULD BE FAIRLY
BENIGN WITH ONLY SOME ISOLATED THUNDERSTORMS IN THE AFTERNOON AND
EARLY EVENING HOURS. GENERALLY DRY CONDITIONS ARE EXPECTED...DUE
IN PART TO SINKING AIR AROUND THE PERIPHERY OF HURRICANE IRENE
UNDER HIGHER PRESSURE. THEREFORE ANY RAIN WOULD BE BRIEF AND
LOCALIZED. MINIMUM RELATIVE HUMIDITY VALUES EACH AFTERNOON WILL
LIKELY BE BETWEEN 35 AND 45 PERCENT.

FLZ017>019-027>029-034-240915-

LEON-INLAND JEFFERSON-MADISON-INLAND WAKULLA-INLAND TAYLOR-
LAFAYETTE-INLAND DIXIE-

310 PM EDT TUE AUG 23 2011

	TONIGHT	WED	WED NIGHT	THU
CLOUD COVER	PCLDY	PCLDY	PCLDY	PCLDY
CHANCE PRECIP (%)	30	30	0	20
WEATHER TYPE	TSTMS	TSTMS	NONE	TSTMS
TEMP	71	95	71	96
RH %	100	42	100	44
20FT WND MPH (AM)		NE 3		NE 4
20FT WND MPH (PM)	SE 4	NE 6	E 4	NE 6
PRECIP DURATION	1	1	0	1
PRECIP BEGIN	CONTINUING	12 PM		12 PM
PRECIP END	2 AM	6 PM		6 PM
PRECIP AMOUNT	0.02	0.01	0.00	0.02
LAL	3	3	1	2
MIXING HGT (FT-AGL)	200	5200	200	4900
TRANSPORT WND (MPH)	N 5	NE 7	E 7	NE 10
DISPERSION INDEX	2	42	4	64
MAX LVORI	6	3	5	2

REMARKS...NONE.

.FORECAST FOR DAYS 3 THROUGH 5...

.THURSDAY NIGHT...PARTLY CLOUDY. LOWS IN THE LOWER 70S. NORTH
WINDS AROUND 5 MPH.

.FRIDAY...MOSTLY SUNNY. HIGHS IN THE MID 90S. NORTH WINDS AROUND
10 MPH.

.FRIDAY NIGHT...PARTLY CLOUDY. LOWS IN THE MID 70S. NORTHWEST
WINDS AROUND 5 MPH.

.SATURDAY...MOSTLY SUNNY. SLIGHT CHANCE OF SHOWERS AND
THUNDERSTORMS. HIGHS IN THE MID 90S. WEST WINDS AROUND 10 MPH.

.SATURDAY NIGHT...PARTLY CLOUDY. LOWS IN THE MID 70S. WEST WINDS
AROUND 10 MPH.

.SUNDAY...MOSTLY SUNNY. SLIGHT CHANCE OF SHOWERS AND
THUNDERSTORMS. HIGHS IN THE MID 90S. WEST WINDS AROUND 10 MPH.

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National Weather Service Red Flag Warning Criteria

In coordination with land management agencies, **the State of Florida is divided into two geographic areas for Red Flag Criteria.** The two areas are North Florida and Peninsula Florida. North Florida will include all areas within the Jacksonville, Tallahassee, and Mobile, AL forecast office County Warning Areas. The southernmost counties in the North Florida area are: Dixie, Gilchrist, Alachua, Marion, Putnam, and Flagler. All areas south of these counties will be known as Peninsula Florida.

Red Flag Warning: Updated 3/1/13

A Red Flag Warning is issued to warn of an impending or ongoing red flag event. A Red Flag Warning will be issued immediately when red flag conditions are either imminent, occurring, or when there is a high level of confidence that the conditions will develop within the next 24 hours.

In coordination with the land management agencies, the two areas of Florida will be considered to be experiencing a Red Flag event whenever any one of the following criteria are met: **(NOTE: Dispersion is no longer a criteria for a Red Flag Warning.)**

Minimum **North** Florida Red Flag criteria under the above guidelines:

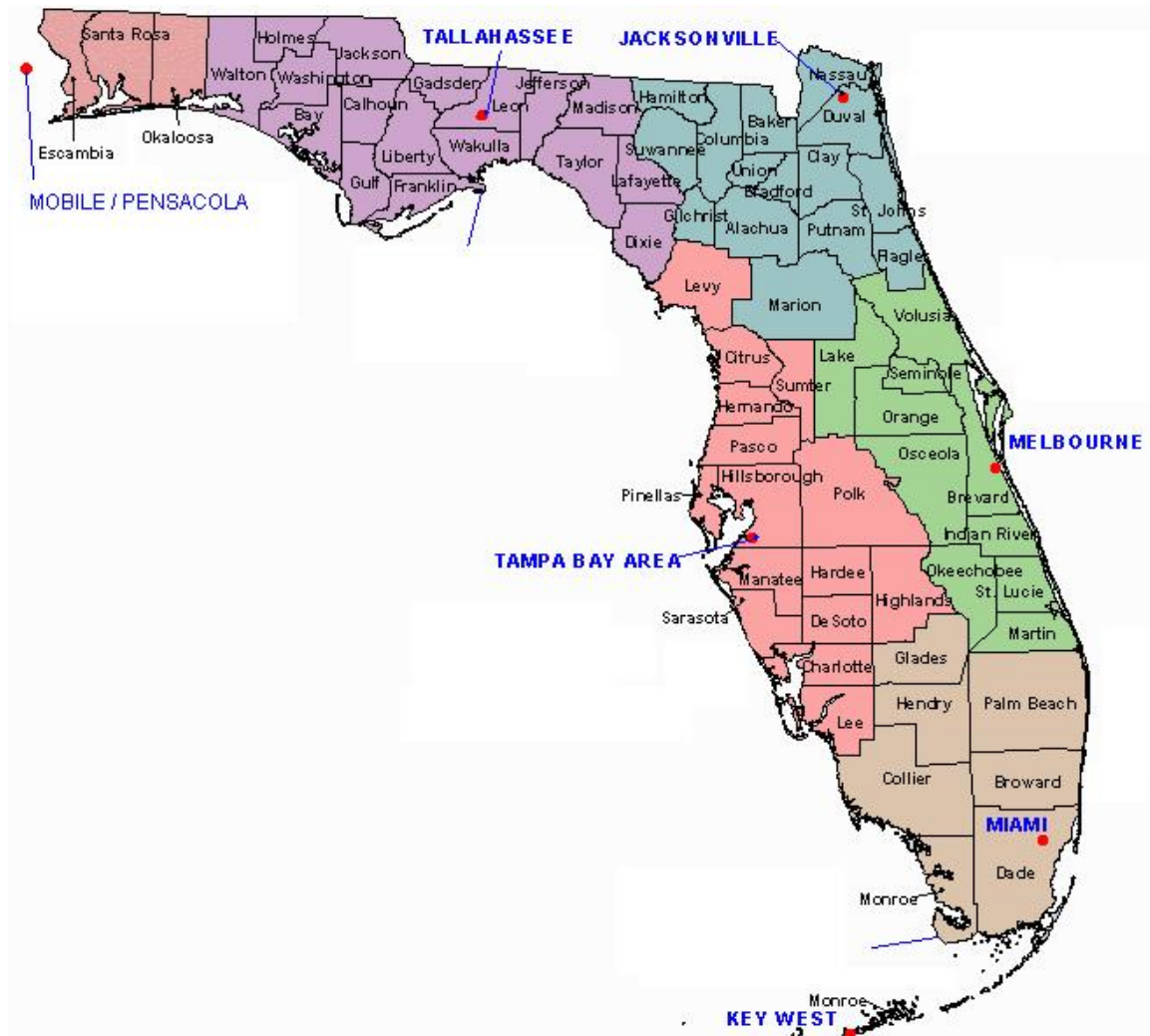
1. Relative humidity less than 28 percent for four consecutive hours or more along with Energy Release Component (Fuel Model G) of 37 or greater.
2. Relative humidity less than 28 percent and sustained 20 foot wind speeds of 15 mph or more, along with Energy Release Component (Fuel Model G) of 26 or greater.

Minimum **Peninsula** Florida Red Flag criteria under the above guidelines:

1. Relative humidity less than 35 percent for four consecutive hours or more along with Energy Release Component (Fuel Model G) of 37 or greater.
2. Relative humidity less than 35 percent and sustained 20 foot wind speeds of 15 mph or more, along with Energy Release Component (Fuel Model G) of 27 or greater.

Having a NWS Red Flag Warning or Fire Danger Statement in effect for an area does not necessarily prevent the issuance of a burn permit. Final discretion for issuance of a permit resides with your local Florida Forest Service district office.

Florida Counties and their corresponding National Weather Service Offices



Internet references

[Florida Forest Service Fire Danger](http://flame.fl-dof.com/fire_danger/wims-report.html) http://flame.fl-dof.com/fire_danger/wims-report.html
[National NWS Fire Weather Page](http://www.srh.noaa.gov/ridge2/fire/) <http://www.srh.noaa.gov/ridge2/fire/>
[Florida Agricultural Weather Network \(FAWN\)](http://fawn.ifas.ufl.edu/) | <http://fawn.ifas.ufl.edu/>
[Florida RAWS Observations](http://www.wrcc.dri.edu/wraws/flF.html) <http://www.wrcc.dri.edu/wraws/flF.html>
[Florida Forest Service](http://www.floridaforestservice.com/wildfire/information.html) <http://www.floridaforestservice.com/wildfire/information.html>
[National Drought Monitor](http://droughtmonitor.unl.edu/) <http://droughtmonitor.unl.edu/>
[National Observed Fire Danger](http://www.fs.fed.us/land/wfas/fd_class.png) http://www.fs.fed.us/land/wfas/fd_class.png
[National Live Fuels Map](http://www.fs.fed.us/land/wfas/mo1panel.png) <http://www.fs.fed.us/land/wfas/mo1panel.png>
[National Haines Index Map](http://www.fs.fed.us/land/wfas/haines.png) <http://www.fs.fed.us/land/wfas/haines.png>
[NIFC Daily Situation Report](http://www.nifc.gov/nicc/sitreprt.pdf) | <http://www.nifc.gov/nicc/sitreprt.pdf>
[Florida Active Wildfire Mapping](http://flame.fl-dof.com/wildfire/tools_fmis) http://flame.fl-dof.com/wildfire/tools_fmis
[WFAS Wildland Fire Assessment System](http://www.wfas.net/) <http://www.wfas.net/>
[Florida Satellite Fire Monitoring](http://www.ssd.noaa.gov/PS/FIRE/fires-fl.html) <http://www.ssd.noaa.gov/PS/FIRE/fires-fl.html>
[FFS Keetch-Byram Index](http://currentweather.freshfromflorida.com/kbdi_index.html) http://currentweather.freshfromflorida.com/kbdi_index.html
[FFS SPOT Forecast](http://spotweather.freshfromflorida.com/) <http://spotweather.freshfromflorida.com/>

National Weather Spot Forecast Program

The National Weather Service will provide upon request, specialized site specific spot forecasts for wildfires, prescribed burns, particulate dispersal or aerial spray projects, hazardous materials incidents and other treats to public safety.

A request may be made at any time and are for site specific locations. Spot forecasts provide a more detailed breakdown of weather forecasted elements into one or two hour segments of time. Spot forecasts are initially made for a 12 hour period with a 12 to 24 hour outlook.

The National Weather Service will provide spot forecast support and service upon request of any federal, state, tribal, or local official who represents the spot forecast is required to support a wildfire.

For non-wildfire purposes, resources permitting, the National Weather Service will provide spot forecast support and service under the following circumstances and conditions:

- A. Upon the request of any federal official who represents that the spot forecast is required under the terms of the *Interagency Agreement for Meteorological Services*.
- B. Upon request of any state, tribal, or local official who represents that the spot forecast is required to carry out their wildland fire management responsibilities in coordination with any federal land management agency participating in the Interagency Agreement for Meteorological Services.
- C. Upon request of any public official who represent the spot forecast is essential to public safety, e.g. due to the proximity of population centers or critical infrastructure. A “public safety official” is an **employee or contract agent** of a government agency at any level (federal, state, local, tribal, etc.) charged with protecting the public from hazards including wildland fires and/or other hazards influenced by weather conditions such as hazardous material releases.
- D. Upon request of any public official for natural resource protection and/or in support of Homeland Security Presidential Directive 5 related activities.

Internet based NWS Spot program is used for requesting and issuing spot forecasts and should be used when possible. In times when Internet access is hindered or not possible, spot forecasts may be requested and disseminated by telephone or fax.

Spot forecasts should normally be available within 30 minutes of request with typically no more than a 45 minute deadline. However under adverse weather conditions, spot forecast requests will be processed within a myriad of ongoing weather concerns. If the spot request is for wildfire, the forecaster should assign a higher priority for forecast preparation. For the safety of fire crews and operations, a spot request for wildfire will be prioritized similar to the expediency given severe weather.