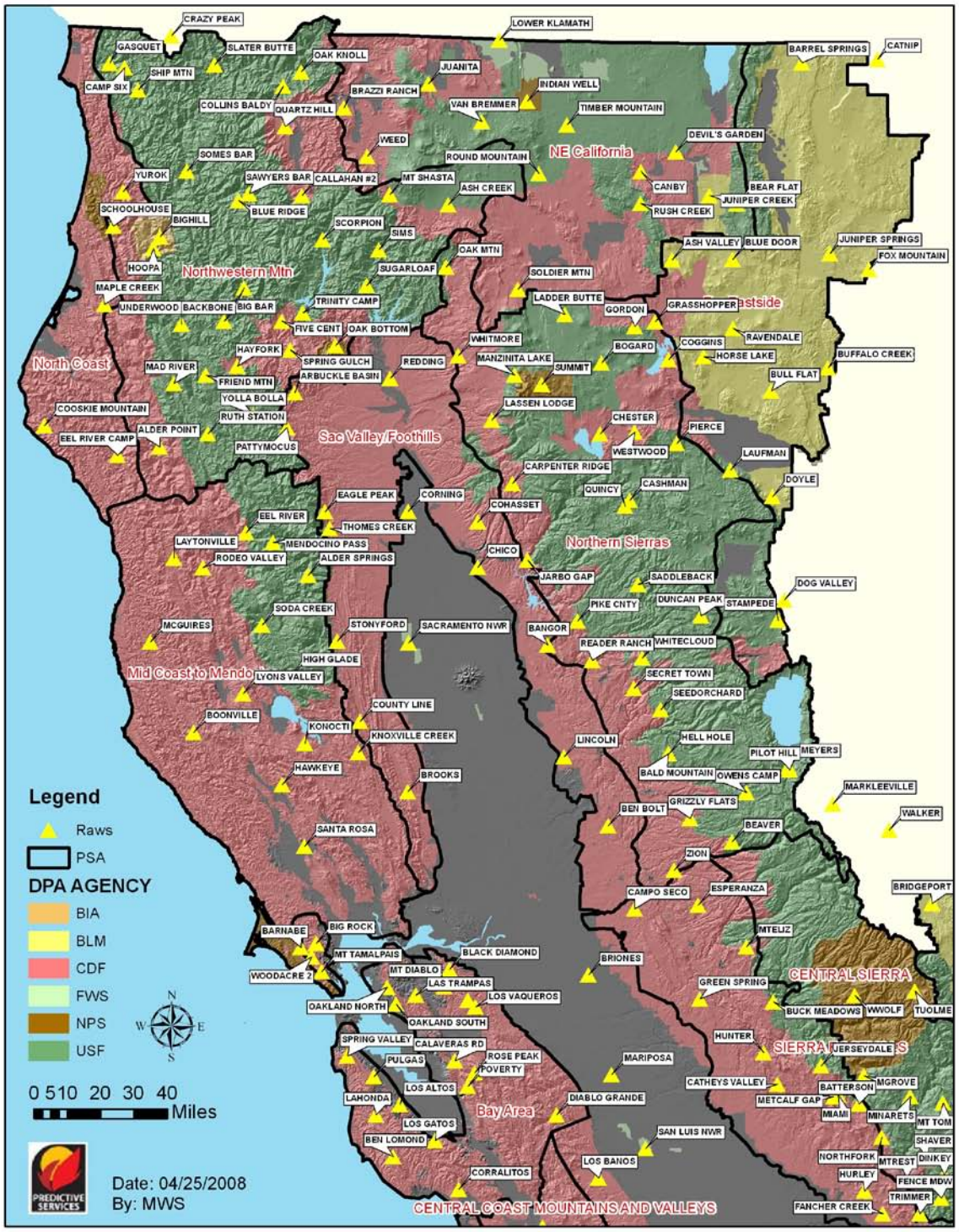
Incident Meteorologist Briefing Packet

National Weather Service Eureka, California

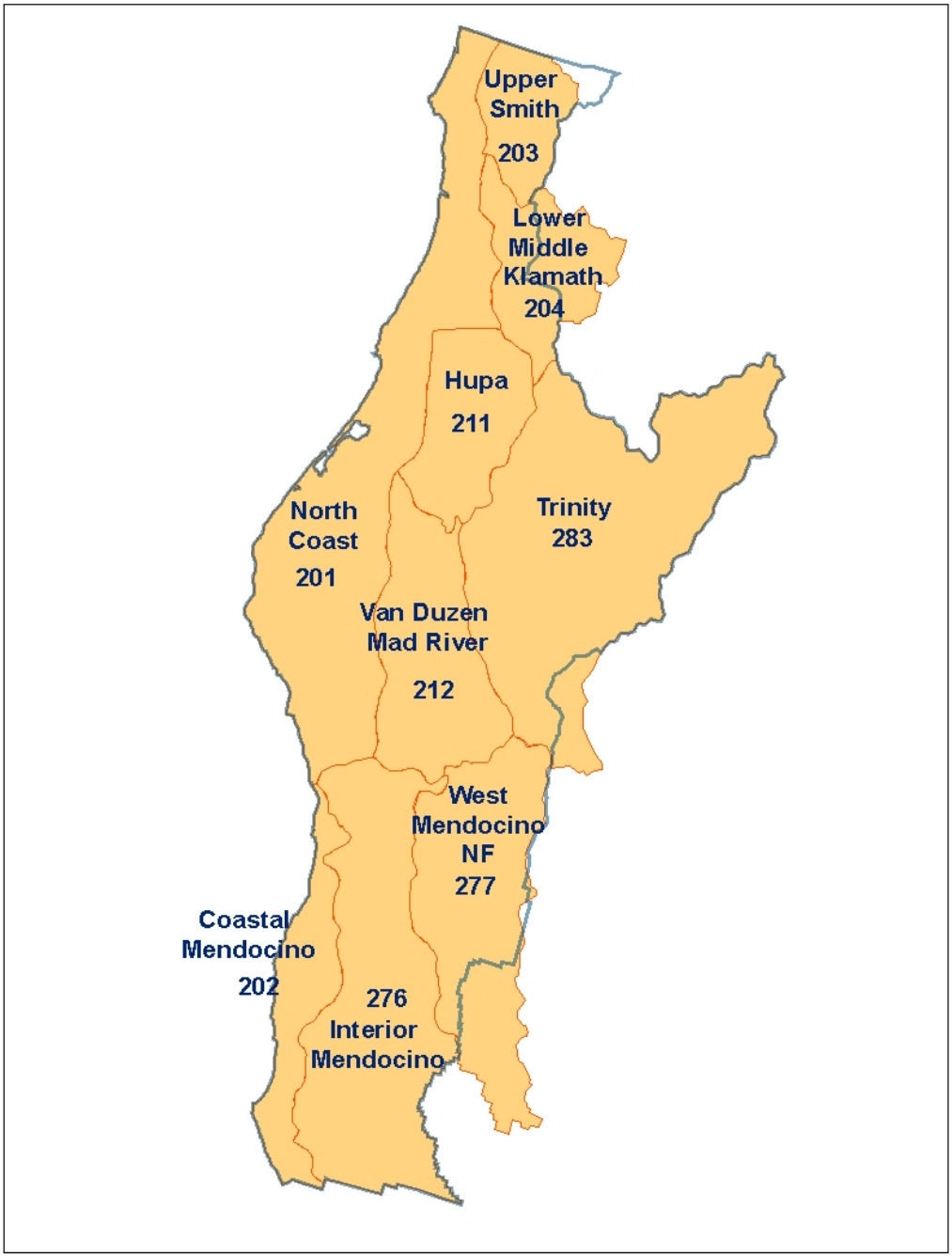
2009/2010 Edition

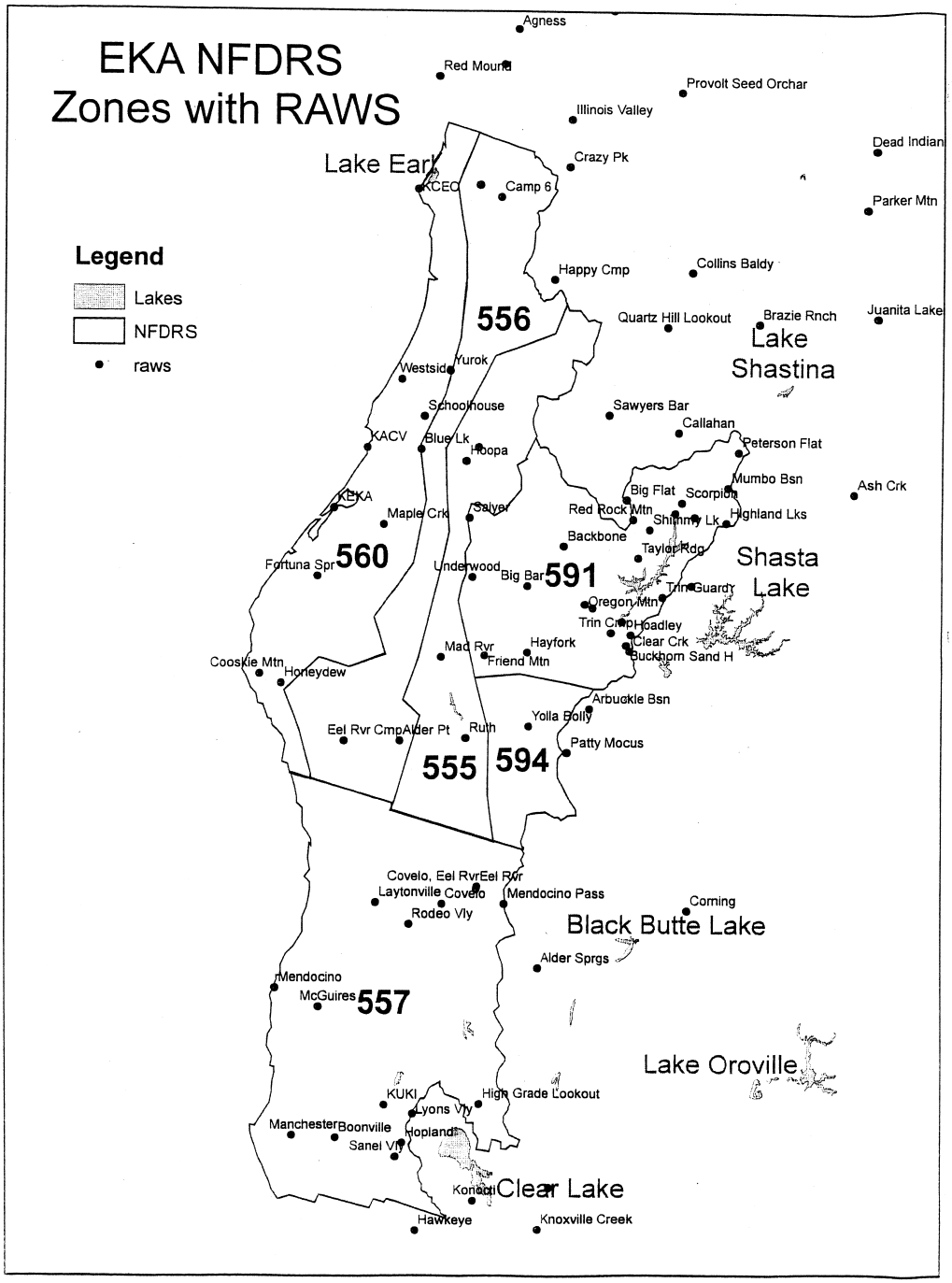
Protection Responsibility and Selected RAWS



The Eureka Fire Weather Zones

WFO Eureka provides fire weather forecasts for nine fire weather zones: CAZ201, CAZ202, CAZ203, CAZ204, CAZ211, CAZ212, CAZ277, CAZ283, and CAZ276. Portions of CAZ204 are located in WFO Medford's public forecast area of responsibility; portions of CAZ277 and CAZ283 are located in WFO Sacramento's public forecast area of responsibility.




EKA NFDRS
Zones with RAWS
Legend
Lakes
NFDRS
raws
Agness
Red Mound
Provolt Seed Orchar
Illinois Valley
Dead Indian
Crazy Pk
Lake Earl
KCEC
Camp 6
Parker Mtn
Happy Cmp
Collins Baldy
556
Quartz Hill Lookout
Brazie Rnch
Juanita Lake
Lake Shastina
Westside
Yurok
Schoolhouse
Sawyers Bar
Callahan
KACV
Blue Lk
Hoopa
Peterson Flat
Mumbo Bsn
Ash Crk
Big Flat
Scorpion
KEKA
Maple Crk
Salyer
Red Rock Mtn
Shimmy Lk
Highland Lks
Backbone
Taylor Rdg
Shasta Lake
Fortuna Spr
560
Underwood
Big Bar
591
Trin Guardy
Oregon Mtn
Trin Cmp
Hoadley
Clear Crk
Buckhorn Sand H
Mad Rvr
Hayfork
Friend Mtn
Cooskie Mtn
Honeydew
Arbuckle Bsn
Yolla Bolly
Eel Rvr Cmp
Alder Pt
Ruth
Patty Mocus
555
594
Covelo, Eel Rvr
Eel Rvr
Laytonville
Covelo
Mendocino Pass
Corning
Rodeo Vly
Black Butte Lake
Alder Sprgs
Mendocino
McGuires
557
Lake Oroville
KUKI
High Grade Lookout
Lyons Vly
Manchester
Boonville
Hopland
Sanel Vly
Konocti
Clear Lake
Hawkeye
Knoxville Creek

Eureka Fire Weather Forecasting Tips

Late summer – mid spring

It is during this time of year upper level troughs, surface fronts and surface high pressure systems regularly influence northwest California. The risk for wind-induced red flag conditions is high from late summer through the middle of fall, before the first significant rains arrive. These winds can be very substantial along the ridges, with much lesser influence through the river valleys.

As nights become increasingly long during the fall, nighttime humidity recoveries for valley and drainage locations become increasingly good; often, thermal inversions will have great difficulty in fully scouring out in our inland valleys, especially Trinity county. This often results in much warmer and drier conditions (during the day and night) at midslope and ridge locations than in the lower elevation valley bottoms. Above the inversions, winds will typically be stronger along the ridges this time of year, with winds in the valleys highly influenced by the strength of the surface pressure gradient. Upslope/downslope terrain-driven winds will be noticeably weaker this time of year, given the low sun angle, strong inversions, and the transient, but significantly greater, effects of upper level disturbances. Thus, wording of "variable" winds (with speeds generally 5 mph or less) may be appropriate for lower elevation sites this time of year absent any significant storm system.

Under clear skies and offshore flow, higher elevation sites exposed to the wind will register their lowest humidity (and highest winds) late at night or early in the morning. With the return of sunshine, moisture trapped in the colder valleys will mix higher into the atmosphere and thus higher dewpoints (and humidities) will result for ridge sites during the afternoon, while decreasing for lower elevation sites.

Benign weather (mainly clear, weak to strong surface pressure gradient):

	Valleys	Ridges
Nighttime	Colder Good humidity recovery Weak or calm winds*	Warmer Poor humidity recovery Moderate to strong winds
Daytime	Cool-mild temperatures Moderate-high relative humidity Weak winds*	Mild-warm temperatures Low relative humidity Decreasing winds

* During especially strong pressure gradient episodes (approaching storm or strong offshore events), west-east oriented valleys will experience stronger winds.

Stormy weather (mainly cloudy, moderate to strong surface pressure gradient):

	Valleys	Ridges
Nighttime	Milder Very good humidity recovery Moderate to strong winds	Colder Excellent humidity recovery Strong winds
Daytime	Cool-mild temperatures Moderate-high relative humidity Moderate to strong winds	Cold temperatures High relative humidity Strong winds

Late spring – mid summer

Red flag events in the Eureka area of responsibility are normally the result of thunderstorm activity, rather than wind concerns. The area is seasonally dominated by upper level high pressure with fairly weak winds aloft. The onshore tendency of the surface pressure gradient typically results in locally higher southwest to west winds through the main river valleys during the afternoon and early evening hours, before they again become light and primarily downslope later in the night. The higher sun angle, more intense heating, and longer days allows thermal inversions to mix more effectively. However, when strong high pressure is overhead and stagnant, smoke and/or thermal inversions may still be difficult to fully eradicate for the interior valleys, especially in Trinity county. Thunderstorm episodes are triggered by monsoonal moisture surging north on the backside of the Four Corners upper high, combined with a weak upper level trough or closed low off the coast. Thunderstorm outbreaks will be more significant with a closed upper low southwest of Eureka, as upper level diffluence, strong surface heating, and abundant moisture add buoyancy to the atmosphere. Even if thunderstorms produce copious rain, wildfire starts are almost assured due to the critically dry fuels common this time of year.

The normal routine is for cooler afternoon and nighttime temperatures for higher elevations, accompanied by higher humidities, compared to most lower elevation sites (especially midslope). Some valley bottoms may experience relatively high humidities and cool temperatures at night, but only under ideal radiative conditions. Relative humidities will often drop quickly for lower elevation sites in the hours after sunrise, with a more gradual fall for the higher terrain. The addition of monsoonal moisture will tend to increase humidities preferentially for higher elevation sites.

Benign weather (mainly clear, weak to strong surface pressure gradient):

	Valleys	Ridges
Nighttime	Mild Moderate-Poor humidity recovery Weak or calm winds	Cooler Moderate humidity recovery Weak or calm winds
Daytime	Hot temperatures Very low relative humidity Gusty afternoon/evening winds	Warm temperatures Low relative humidity Light winds

Other Hints

Sunny weather during the warm season brings locally strong upcanyon winds to all large river valleys with exposure to the ocean (e.g., Trinity, Eel, and Klamath). These typically commence in the mid to late afternoon and persist through early evening, with westerly eye-level winds of 6-12 mph and gusts up to 20 mph common. A deep coastal marine layer accompanied by strong onshore gradients and warmer than average temperatures in the Central Valley will make this effect even more pronounced.

Higher ridges of the interior (Trinity and eastern Mendocino counties, in particular), will often experience an easterly component to the winds much of the year, even without obvious gradient and/or synoptic support. Obviously, increasing gradient and synoptic support will result in enhancement of these winds.

Central Valley-facing slopes in the Mendocino NF and, to a lesser extent, the Shasta-Trinity NF will often experience a “downslope” (westerly) wind during hot summer afternoons due to intense surface heating of the Central Valley. BE ESPECIALLY AWARE OF THIS, AS MANY FIREFIGHTERS HAVE LOST THEIR LIVES in the coastal mountains of California due to this effect, which tends to occur abruptly and goes against their basic training of wind behavior.

-Mark Burger, IMET, 2009

Wind/RH RFW Decision Matrix for Northern California West of the Cascade/Sierra Crest

- Matrix assumes daytime 10-hour fuel moisture (NFDRS obs time) is ≤ 6%, annual grasses have cured, and no wetting rain (greater than 0.10 inch) has fallen in the past 24 hours.
- The sustained wind refers to the standard 20-foot, 10 minute average fire weather wind speed.
- The wind event should be expected to last for at least 8 hours to qualify for a Red Flag warning. [This guidance was developed for foehn wind events, which normally exceed 12 hours duration, and may last as much as 3-5 days].
- a **'W'** in the matrix indicates that the forecaster should consider a warning.

Relative Humidity	**Sustained Wind 6-11 mph**	**Sustained Wind 12-20 mph**	**Sustained Wind 21-29 mph**	**Sustained Wind 30+ mph**
Daytime Minimum RH 29-42% and/or Nighttime Maximum RH 60-80%				**W**
Daytime Minimum RH 19-28% and/or Nighttime Maximum RH 46-60%			**W**	**W**
Daytime Minimum RH 9-18% and/or Nighttime Maximum RH 31-45%		**W**	**W**	**W**
Daytime Minimum RH < 9% and/or Nighttime Maximum RH < 31%	**W**	**W**	**W**	**W**

Definition of Dry Lightning Event

A thunderstorm event that is not accompanied by enough precipitation to significantly wet the fuels.

Significant precipitation is defined as a range from:

.05 inches or greater for grass or brush fuels.
To
.15 inches or greater for closed canopy timber/heavy fuels

The following matrix is available to California meteorologists as an aid in making warning decisions involving dry lightning:

Percentage of Strikes that are Dry

Percentage of warned-for area affected by thunder-storms	0-25	26-50	51-75	76-100
< 30	No	No	M	W
30-70	No	M	M	W
> 70	No	M	W	W

Wetter ⟷ Drier

W = Warning
M = Marginal
No = No warning

Useful Fire Weather Web Links

North Ops GACC/California Annual Operating Plan:

http://gacc.nifc.gov/oncc/predictive/weather/

National Weather Service – Eureka Fire Weather:

http://www.wrh.noaa.gov/firewx/?wfo=eka

National Weather Service – Eureka Local WRF Model:

http://www.wrh.noaa.gov/eka/forecasts/wrf/

Very good for humidity and wind magnitude trends.

SPC Fire Weather:

http://www.spc.noaa.gov/products/fire_wx/overview.html

Day 1-8 fire weather outlook graphics and discussions, along with archives of these data back to June 2002. This site also provides higher resolution model data from the NAM, including 2 meter relative humidity and temperature. Haines index and frontal analyses are also provided. This is an especially good site to consult when the potential for red flag conditions arises.

USDA Large Incident Map:

http://activefiremaps.fs.fed.us/

Updated daily, this is a map showing large national incidents, including wildland fire use fires and suppression wildfires. The country is divided up by Geographic Area Coordination Center (GACC).

Northern California 7-Day Significant Fire Potential:

http://gacc.nifc.gov/oncc/predictive/weather/Fire_Potential.html

Provides graphics and discussion of fuel moisture and weather trends which may influence fire development and behavior.

Northern California Daily Weather Outlook (Predictive Services):

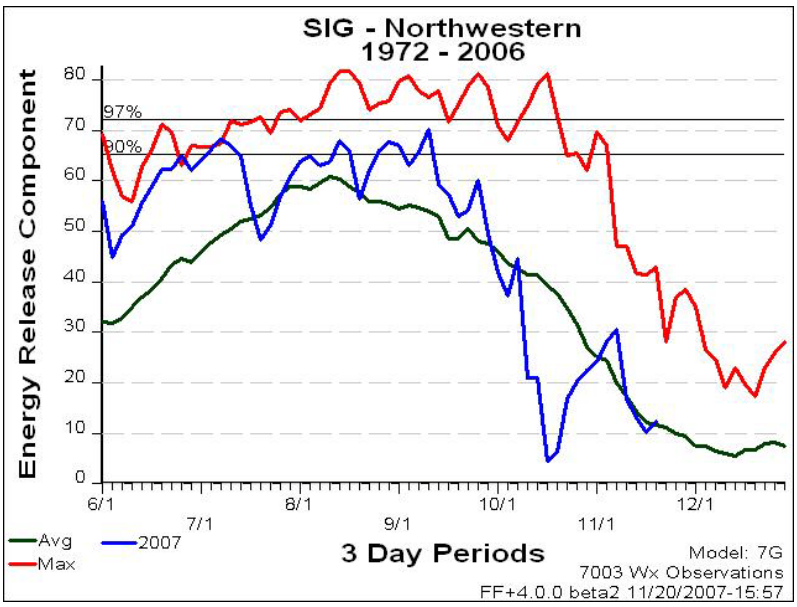
http://gacc.nifc.gov/oncc/predictive/weather/DailyOutlook.html

Provides graphics and discussion of fire-relevant weather concerns.

Energy Release Component (ERC) Graphics:

http://gacc.nifc.gov/oncc/predictive/fuels_fire-danger/psac/erc/index.htm (by area)
http://gacc.nifc.gov/oncc/predictive/fuels_fire-danger/yrsc/erc/index.htm (by station)

This is an excellent site for assessing the dryness of fuels, relative to the historical average and worst-case scenario. Provides data in a graphical format for the past several months. ERC is a NFDRS-derived index related to how hot a fire could theoretically burn; it directly corresponds to the 24-hour, worst case situation, of total available energy (BTUs) per unit area within the flaming front at the head of the fire. ERCs that are above the 90th percentile, and particularly above the 97th percentile, imply critically dry fuels which can carry fire especially well.



1000-Hour Dead Fuel Moisture:

http://www.fs.fed.us/land/wfas/fm_1000.gif

This is a national-level graphic showing current dead fuel moistures for fuels between 3 and 8 inches in diameter and is indicative of largely seasonal trends.

Departure From Average Greenness:

http://www.fs.fed.us/land/wfas/da1panel.gif

This chart is updated weekly and is developed from satellite analysis. It indicates how green fuels are compared to the historical norm, by percent of normal.

Lightning Ignition Efficiency:

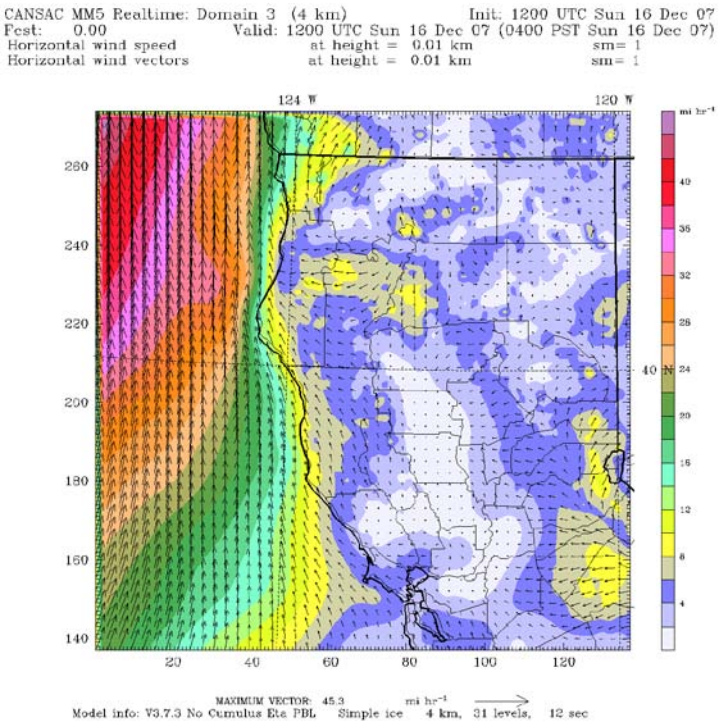
http://www.fs.fed.us/land/wfas/ltng_pi.gif

This graphic indicates the theoretical chance that a lightning strike would result in a new fire start.

MM5 CANSAC Model:

http://www.cefa.dri.edu/COFF/cansac_output.php

High resolution meteorological data for California, with 4 kilometer resolution images out to 72 hours. These data are particularly well suited for wind forecasts for potential red flag events. Also, the 12 km Totals High (Total Totals index from 700-500 mb) has shown some promise in convective forecasting.



Palmer (long-term) Drought Index:

http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif

National graphic is updated weekly and indicates drought severity as measured by the Palmer Drought Index.

Long Term Outlook:

http://www.cpc.noaa.gov/

Graphical temperature and precipitation outlooks beginning 6 days out and continuing to seasonal projections.

Mesowest:

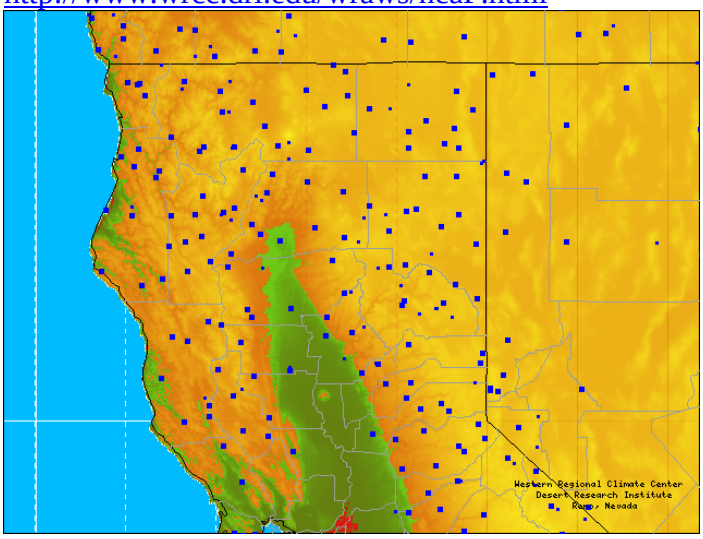
http://www.met.utah.edu/jhorel/html/mesonet/

Current and past conditions from ASOS, AWOS, RAWS, SNOTEL, private weather stations, and other sites. Information can be displayed in tabular or graphical form. Also contains 24-hour trend information for basic meteorological parameters.

Archived RAWS Data:

On occasion, WFO Eureka may be requested to provide RAWS data from within the CWA. This information originates from the Desert Research Institute of the Western Regional Climate Center and can be accessed at the following URL:

http://www.wrcc.dri.edu/wraws/ncaF.html



Opening web-page for archived RAWS data.

Click on the station you are interested in accessing. From the screen which then appears, you will find the months and years (colored in red) for which at least some meteorological data are available. On the left margin, you can select daily data (tabulated by hour), monthly summaries (tabulated by day), and other descriptive statistics.

As an example, if you are looking for the daily highs and maximum wind speed for each day at School House during the month of November 2007, click on the School House RAWS on the map, select Monthly Summary, and from the pull down menus, select the time in question.

National Situation Report:

http://www.nifc.gov/nicc/sitreprt.pdf

Produced by 0600 MDT daily during fire season (0800 MDT on Sundays) and weekly during off-season, this provides information on large fires (at least 100 acres in timber and at least 300 acres on rangeland) as well as incidents of national significance, such as hurricanes or floods. This includes the name of the incident, state, entity (forest/park, BLM, Cal-Fire, etc.) responsible, acreage and acreage change in the past day, percent containment, estimated containment date, resources committed and resource change in the past day, structures lost, fuel type, incident commander, and a brief narrative. This information is compiled from observations (the so-called "209") transmitted from the incident or by the unit responsible. Additionally, information on the national preparedness level (ranging from 1 to 5, 5 being most severe) is given, along with the

number of fires/acres burned in each state for the season. The "Sit Report" is the standard communication concerning ongoing fire activity.

Inciweb:

http://www.inciweb.org/

This page is updated throughout the day based on information submitted by fire teams or the unit managing them, and is often the first "official" information regarding a new incident. It is also much more comprehensive than the National Situation Report, with additional information regarding evacuations, intended strategies, and maps of the area. Information is also archived on this site, and can be accessed as far back as one year.

Wildland Fire Hotlist:

http://www.wildlandfire.com/

From this site, click the HOTLIST *button at the top of the page. On the page that next appears, you can access information from recent fire starts by clicking on the* INITIAL ATTACK *link and then clicking on the incident name of interest (or if you do not know the name, by the name of the state and unit responsible). Incidents that are ongoing may be located by clicking on the* MAJOR FIRES/INCIDENTS *link. This site will almost always be the first to contain information on a new incident. However, since this is a blog, most entries are from firefighters who have heard "through the grapevine" of pending dispatches, and information included should not be used for decision-making. This is not an official site!!*

MODIS Maps of Burned/Burning Areas:

http://activefiremaps.fs.fed.us/activefiremaps.php

These topographical maps use remotely-sensed satellite data to plot actively burning areas along with areas which have burned so far during the calendar year. From the map of the United States, click on the area of interest. On the right side of the page, you may select the most current JPEG *or* PDF *of active/recent burn areas. Or, you may select the* MAP ARCHIVE *option to look at maps from several months back. Actively burning areas (open flame within the last 12 hours) are color-coded red, with orange areas indicating open flame within the previous 24 hours, followed by yellow areas, which have burned since January 1 of the current year.*

National Interagency Fire Center Incident Specific Data (not always available):

ftp://ftp.nifc.nifc.gov/Incident_Specific_Data
This FTP site allows access to daily Incident Action Plans (IAPs) for most incidents. Telephone numbers and staff assignments, maps, fire behavior and weather forecasts can be viewed from these plans. This site is useful to ensure weather coordination between IMETs and the local office, as well as for retrieving archived data from past incidents.

Incident Meteorologist (IMET) Status:

BOIFWABOI (AWIPS PIL)

This product can be viewed on AWIPS or from the IMET Dispatch Status Page on the Eureka Intranet. It is updated irregularly, but typically once per day during fire season and/or times of heavy IMET dispatch. This site shows which IMETs are currently dispatched, what office they are from, what WFO area of responsibility they are in, the name and approximate location of the incident they are assigned to, as well as arrival dates and estimated release dates.

Contact Information

Note: For privacy concerns, contact information for incident management teams, GACCs, forests, emergency command/dispatch centers, and NWS is omitted from this online version. Please make inquiries directly through the Eureka NWS office.