

Mudd Fire Staff Ride



Leader's Intent

- ▣ Through a PowerPoint presentation participants will have a broad understanding of the Nevada fire situation during August, 2006 thereby beginning the process of gaining Situational Awareness to be used in development of an evolving Risk Analysis process.

WELCOME TO AN INTERACTIVE LEARNING EXPERIENCE

What do I need to bring with me?

- Student Workbook
- IRPG
- Writing Utensil
- Water
- Backpack
- Hiking Boots
- GPS Unit
- Course Map
- Radio or Mobile Phone
- 4WD Vehicle
- Positive Attitude!

Introduction:

The Mudd fire started on August 23, 2006 at approximately 14:59 PST. Interagency suppression forces were dispatched to the reported fire, 10 miles North of Elko, NV along State Route 225. Rapid fire growth and rugged topography dictated the need for several access routes into the emerging incident. With ground resources rendezvousing at different points around the fire, coordination of suppression tactics became increasingly difficult. The conditions and events that occurred during the Initial Attack phase of the Mudd Fire would, in the end, lead to a fire entrapment situation.

Stand #1



Stand #3



Stand #2



Sagehen St Dr

Elko via
5th Street





Elko "Sno-Bowl"



Highway 225



Stand #1 Parking



© 2013 Google

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Stand #3

Elko "Sno-Bowl"

Stand #2 Parking

© 2013 Google
Image © 2013 TerraMetrics

© 2010 Google



Imagine you were there!

* Note any pertinent details relevant to your improved Situational Awareness.

* Identify possible hazards and think of ways to mitigate these hazards.

* Continually update your complexity analysis as new information is gathered.

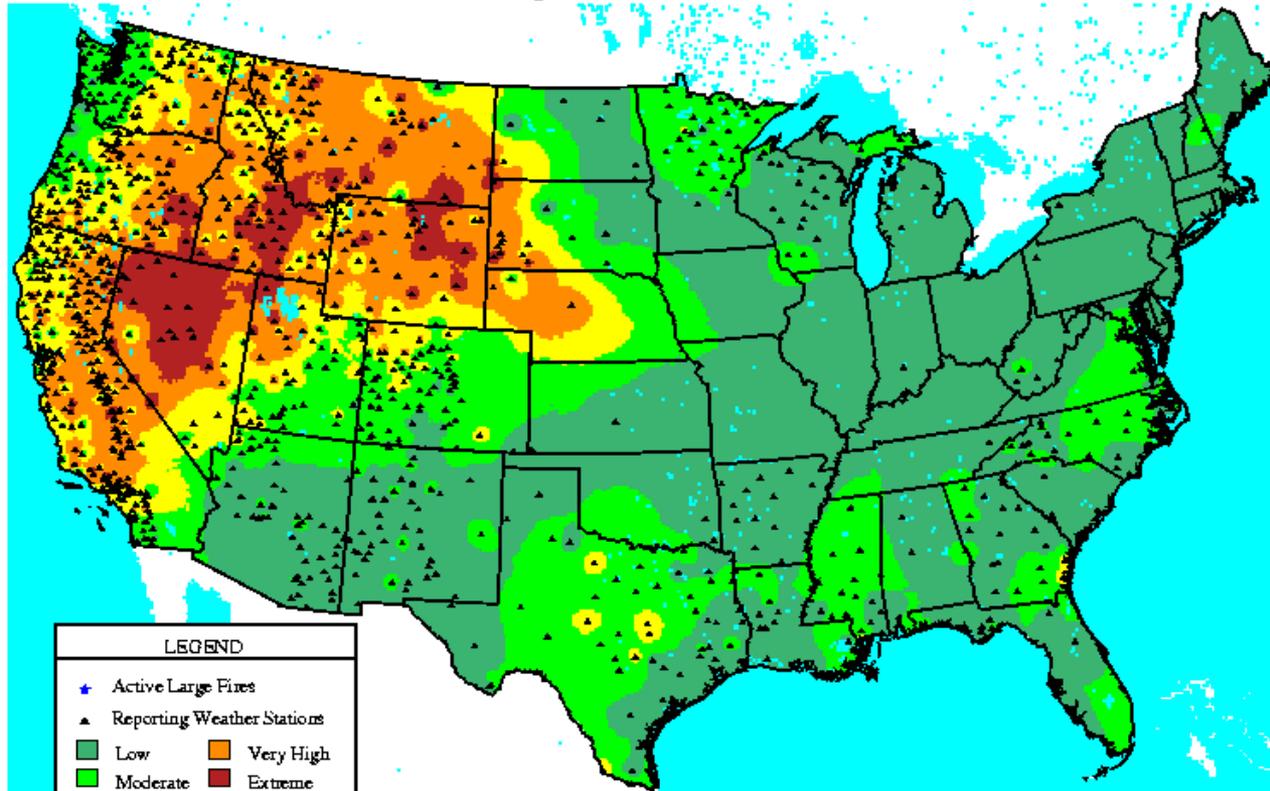
SITUATIONAL AWARENESS SUMMATION

| | | | | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|--|------------|-----------|
| <ul style="list-style-type: none"> ➤ NOTES SECTION (FACILITATOR VERBAL DESCRIPTIONS AND QUOTES FROM INVESTIGATION REPORT) ➤ STAND DESCRIPTION WITH WRITTEN DATA/TIMELINE/DISPATCH COMMUNIQUE FOR THAT STAND ➤ BULLETS; CRITICAL DECISIONS, MOVEMENTS, ETC (FACILITATOR REMINDERS FOR DISCUSSION POINTS) ➤ | | | | | | | |
| TRACK IMPROVED SITUATIONAL AWARENESS FACTORS <i>List any pertinent information or observations made in this stand</i> | | | | | | | |
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| Identified Hazards | | | Mitigations | | | | |
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| | | | | | | | |
| Incident Complexity Analysis (Type 3, 4, 5) | | | | | | | |
| Fire Behavior | | Yes | No | Organization (continued) | | Yes | No |
| Fuels extremely dry and susceptible to long-range spotting or you are currently experiencing extreme fire behavior. | | | | Unable to properly staff air operations. | | | |
| Weather forecast indicating no significant relief or worsening conditions. | | | | Limited local resources available for Initial Attack. | | | |
| Current or predicted fire behavior dictates indirect control strategy with large amounts of fuel within planned perimeter. | | | | Heavy commitment of local resources to logistical support. | | | |
| Firefighter Safety | | | | Existing forces worked for 24 hours without success. | | | |
| Performance of firefighting resources affected by cumulative fatigue. | | | | Resources unfamiliar with local conditions and tactics. | | | |
| Overhead overextended mentally and/or physically. | | | | Values to be protected | | | |
| Communication ineffective with tactical resources or dispatch. | | | | Urban interface, structures, developments, recreational facilities, or potential for evacuation. | | | |
| Organization | | | | Fire burning or threatening more than one jurisdiction and potential for unified command with different or conflicting management objectives. | | | |
| Operations are at the limit of span of control. | | | | Unique natural resources, special designation areas, critical municipal watershed, T&E species habitat, cultural value sites. | | | |
| Incident action plans, briefings, etc. missing or poorly prepared. | | | | Sensitive political concerns, media involvement or controversial fire policy | | | |
| Variety of specialized operations, support personnel or equipment. | | | | <i>If you have checked "Yes" on 3 or more analysis boxes – consider next level of incident management support.</i> | | | |

National, State and Local Fire and Weather Situation

Fire Danger

Observed Fire Danger Class: 23-AUG-06



LEGEND

- ★ Active Large Fires
- ▲ Reporting Weather Stations
- Low
- Moderate
- High
- Very High
- Extreme
- Water

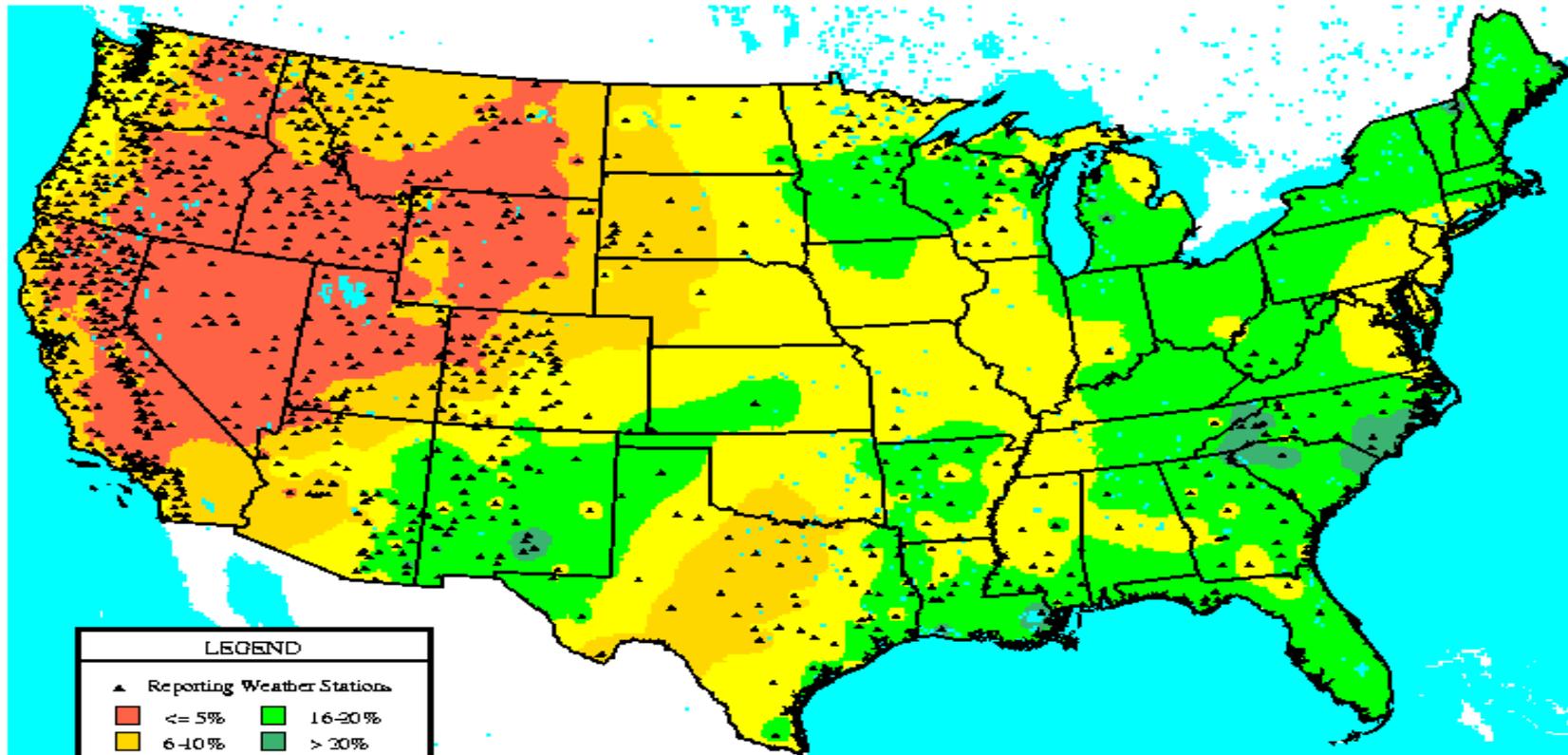
(Inv. Dist.² Interp.)

WFAS-MAPS Graphics FIRE BEHAVIOR RESEARCHII - MISSOULA, MT



100 Hour Fuels

Obs. 100-Hour FM: 23-AUG-06



(Inv. Dist.² Interp.)

WFAS-MAPS Graphics FIRE BEHAVIOR RESEARCH II - MISSOULA, MT



Nevada Fire Situation

- In June, spring rains ended. The jet stream retreated north and a ridge of high pressure took its place. Nevada had what the National Weather Service called a “heat wave”, with Reno setting a record of 102 degrees on June 25th. The ridge persisted through July with well above normal temperatures creating a very unstable atmosphere...and consequently numerous occasions of lightning. Unusually high temperatures and several lightning outbreaks combined for over a million burned acres by the end of the season. (Western Great Basin 2006 Season Summary)
- After 5 straight years of drought (winter 1998- summer 2004), Nevada had two years of exceptionally wet winters: 2004-2005 and 2005-2006. As a result, the U.S. Drought Monitor showed virtually all of Nevada out of drought classification for the entire 2006 fire season. (Western Great Basin 2006 Season Summary)

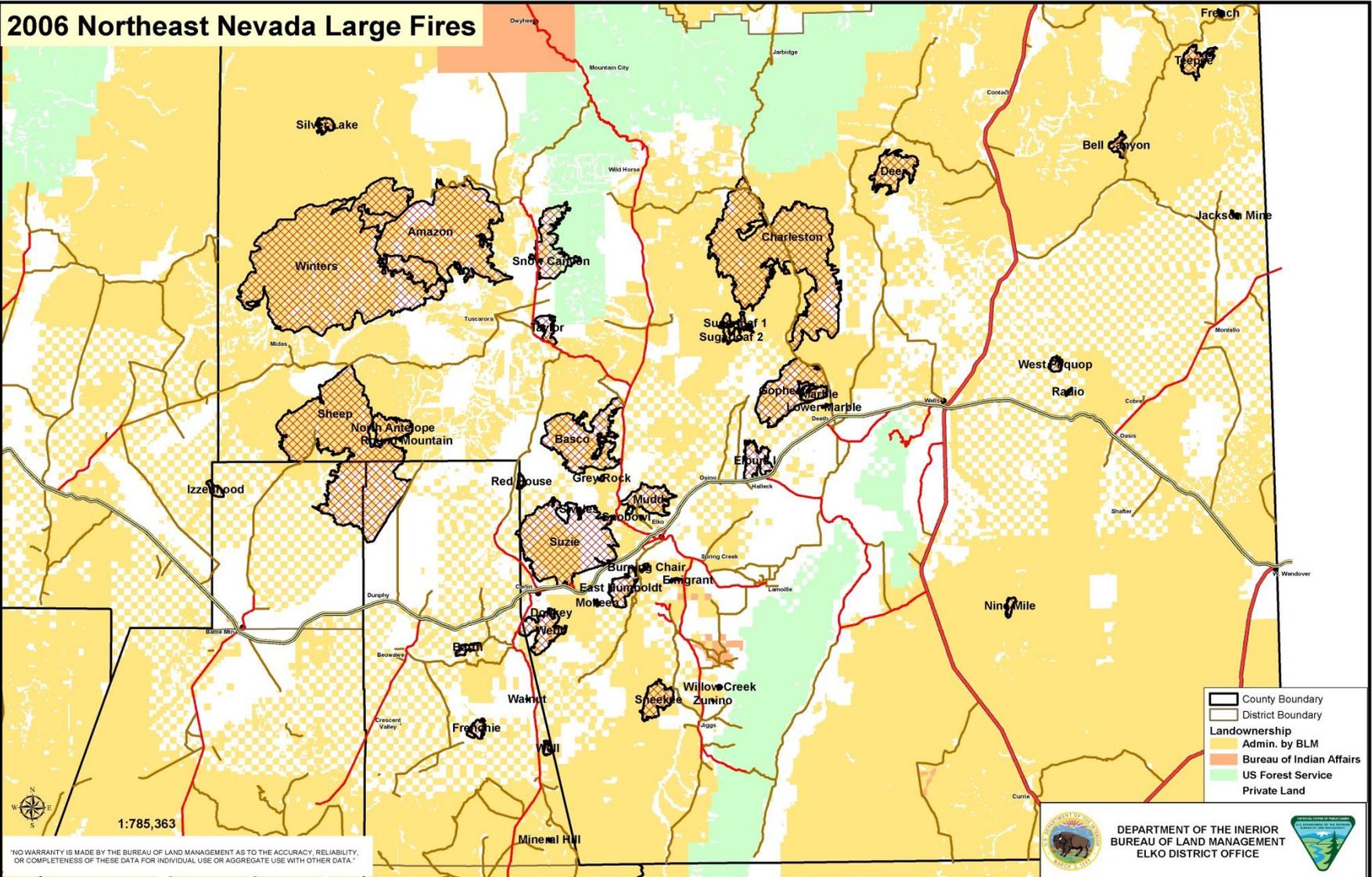
Nevada Fire Situation

- The Western Great Basin (WGB) set a new wildland fire record in 2006. 135 large fires were reported, 2.5 times the 10 year average of 54, surpassing the previous record of 113 large fires set in 1999. 20 of those large fires were over 10,000 acres each. Initial attack efforts were successful about 91% of the time factoring in the number of large fires that were contained within 24 hours. The five year average for IA efficiency is 95% based on number of large (>300 acres) compared to total number of fires. (Western Great Basin 2006 Season Summary)
- The total of 1,348,871 acres burned in the WGB represented 13% of the total acres burned nationally, second only to the Southern Area which accounted for 26% of all acres burned. Those acres burned are historically second in number for the WGB only to the 1.6M+ acres that burned in 1999*. (Western Great Basin 2006 Season Summary)
- *Recall the Sadler Fire in 1999

Northeast Nevada Fire Situation

- ▣ Elko County took the brunt of the fire season with 235 fires (19% of the state's fires) and nearly 1,000,000 acres burned (68% of the state's acres and 10% of the national total).
(Western Great Basin 2006 Season Summary)

Northeast Nevada Fire Situation



Fire Behavior

Fire Behavior Forecast for the East Humboldt Complex for 8/23/2006.
(37 miles to the ESE)

1 Hour Fuels = 2%
10 Hour Fuels = 3%
100 Hour Fuels = 5%



| FIRE BEHAVIOR FORECAST | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| FORECAST NUMBER 1 | TYPE OF INCIDENT: Wildland Fire |
| INCIDENT NAME: East Humboldt | OPERATIONAL PERIOD: Day shift 8/23/06 |
| DATE ISSUED: 22 August 2006 | TIME ISSUED: 2100 |
| UNIT: Elko FO BLM | SIGNED: Ken Loda, FBAN |
| INPUTS | |
| <p>WEATHER SUMMARY We got a cool low temperature but fair to poor relative humidity recovery overnight, which continues the trend of the previous few days. Today is a transition to a new pattern with a strong low pressure system beginning to move through the area. Skies should start mostly sunny then become partly cloudy. High temperatures should be around 94° in the valleys and 90° on the ridges. Minimum RH should be about 5% in the valleys, 8% at the ridge tops. Today's Haines index is 5 (moderate). Eye level wind will be light upslope/ upvalley early in the day. About 1000 we expect them to become southwest 10 to 15 mph with gusts to 30 mph. Ridgetop winds will be west 20 to 30 mph. Expect significant surface instability (widespread and large dust devils) to begin developing about 1000.</p> | |
| <p>FUELS CONDITIONS Fine fuel loadings are higher than normal.</p> <p>Fuel moisture: One-hour fuel moisture can be expected to be about 8% at 0500. In the valleys that will go to 2% after 1000 through the end of the shift. At higher elevations and north aspects it should bottom-out at about 3%. The 10- and 100-hour fuels are about 3% and 5% respectively.</p> <p>Live fuel moisture: The live fuel moisture is extremely low, around 88% for sage and 110% for juniper.</p> | |
| OUTPUTS | |
| <p>GENERAL FIRE BEHAVIOR There is a Red Flag Warning today for high winds and low relative humidity. Fine fuels likely did not reach moisture of extinction overnight. There is abundant burned Juniper, as well as 100- and 1000-hour fuels, to hold heat through the night. In the forecast weather conditions, if anything gets started the rates of spread are expected to average about 70 chains per hour, but individual runs may move at 100 chains per hour or more. Flame lengths should be about 2' in backing fires in light fuels, 7' - 9' at the flaming front in grass and shrubs. Torching juniper would produce flame lengths of 20' to 30'.</p> <p>Spotting: Spotting from a running fire or torching juniper up to 1000' is likely with the predicted winds. Dust-devils could pick up hot material anywhere near the perimeter and carry it over our lines. The probability of ignition will be 80% or higher through most of the day, and 100% during peak burning conditions.</p> | |
| <p>SPECIFIC FIRE BEHAVIOR With our forecast winds, there is the opportunity for active behavior on Divisions A, B, and Z. Terrain may diminish the winds some on A and B,</p> | |

Sagebrush – Live Fuel Moisture @ 88% (Adobe Creek)

75%-100% - Fires will exhibit EXTREME FIRE BEHAVIOR. Extreme rates of spread and moderate to long range spotting will occur. Engines and dozers may be best used to back up firing operations, and to protect structures. Indirect attack must be used to control these fires. Fires will burn actively through the night. Air turbulence caused by the fire will cause problems for air operations.

NEVADA

N1B ADOBE CREEK

DISTRICT: ELKO

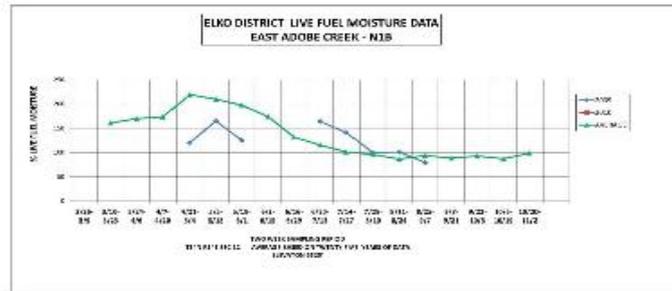
TOWNSHIP: 34 N RANGE: 54 E SEC: 12

ELEVATION: 5525'

SAMPLE DATE: APRIL 12, 2010

| % LIVE FUEL MOISTURE | PREVIOUS | CHANGE | 2009 | AVERAGE | BEHAVIOR |
|----------------------|----------|--------|------|---------|----------|
| 199 | - | - | 120 | 174 | VERY LOW |

NR = NO REPORT



FIRE BEHAVIOR AND TACTICS

Live Fuel Moisture

181% & Above - Fires will exhibit **VERY LOW FIRE BEHAVIOR** with difficulty burning. Residual fine fuels from the previous year may carry the fire. Foliage will remain on the stems following the burn. Fires can generally be attacked at the head or flanks by persons using hand tools. Hand line should hold fire without any problems. Fires will normally go out as soon as wind dies down.

151%-180% - Fires will exhibit **LOW FIRE BEHAVIOR** with fire beginning to be carried in the live fuels. Both foliage and stem material up to 1/4 inch in diameter will be consumed by the fire. Burns will be generally patchy with many unburned islands. Engines may be necessary to catch fires at the head and handling will be more difficult to construct, but should hold at the head and the flanks.

126%-150% - Fires will exhibit **MODERATE FIRE BEHAVIOR** with a fast continuous rate of spread that will consume stem material up to 2 inches in diameter. These fires may be attacked at the head with engines but may require support of dozers and retardant aircraft. Handline will become ineffective at the fire head, but should still hold at the flanks. Under high winds and low humidity, indirect line should be given considerations.

101%-125% - Fires will exhibit **HIGH FIRE BEHAVIOR** leaving no material unburned. Head attack with fire engines and dozers will be nearly impossible on large fires, but may still be possible on smaller, developing fires. Retardant aircraft will be necessary on all these fires. Flanking attack by engines and indirect attack ahead of the fire must be used. Spotting should be anticipated. Fires will begin to burn through the night, calming down several hours before sunrise.

75%-100% - Fires will exhibit **EXTREME FIRE BEHAVIOR**. Extreme rates of spread and moderate to long range spotting will occur. Engines and dozers may be best used to back up firing operations, and to protect structures. Indirect attack must be used to control these fires. Fires will burn actively through the night. Air turbulence caused by the fire will cause problems for air operations.

74% & Below - Fires will have **ADVANCED FIRE BEHAVIOR** with high potential to control their environment. Large acreage will be consumed in a very short time period. Backfiring from indirect line, roads, etc. must be considered. Aircraft will need to be cautious of hazardous turbulence around the fire.

Last update: 04-30-2008

Fire WX Forecast

RED FLAG WARNING FOR
GUSTY WINDS AND LOW RH

TEMPERATURES 84 - 94
HUMIDITY 6 - 11%

WINDS 15 - 20
GUSTS 35 - 45
HAINES - 6

National Weather Service Forecast Office

Elko, NV

FIRE WEATHER ZONE FORECAST
NATIONAL WEATHER SERVICE ELKO NV

500 AM PDT WED AUG 23 2006

RED FLAG WARNING IN EFFECT TODAY FOR FIRE WEATHER ZONES 451 452 454 455 AND 457 FOR GUSTY WINDS AND LOW RELATIVE HUMIDITIES...

DISCUSSION...AS A LOW PRESSURE SYSTEM PASSES THROUGH THE REGION TODAY..STRONG GUSTY WINDS WILL MIX DOWN TO THE SURFACE AND COMBINE WITH LOW RELATIVE HUMIDITIES TO CREATE HAZARDOUS FIRE WEATHER CONDITIONS. STRONGEST WINDS ARE EXPECTED ACROSS NORTHERN NEVADA. ISOLATED DRY LIGHTNING IS ALSO POSSIBLE TODAY OVER ZONES 455 457 AND AREAS EAST OF THE RUBY MOUNTAINS IN ZONE 452.

TODAY...

SKY/WEATHER.....MOSTLY SUNNY THEN BECOMING PARTLY CLOUDY.
ISOLATED DRY THUNDERSTORMS IN THE AFTERNOON
EAST OF THE RUBY MOUNTAINS.

MAX TEMPERATURE.....
VALLEYS.....84-94.
MID SLOPE.....82-90.
24 HR TREND.....4 DEGREES COOLER.

MIN HUMIDITY.....
VALLEYS.....6-11%.
MID SLOPE.....11-16%.
24 HR TREND.....4% WETTER.

20-FOOT WINDS.....
VALLEYS/SLOPE.....UPSLOPE 3 TO 7 MPH BECOMING WEST 10 TO 20 MPH
WITH GUSTS 35 TO 45 MPH IN THE AFTERNOON.
RIDGE TOP.....SOUTHWEST 20 TO 30 MPH.

HAINES INDEX.....6.
L&L.....1 EXCEPT 2 EAST OF THE RUBY MOUNTAINS.
MIXING HEIGHT.....17000 FT MSL.
TRANSPORT WINDS.....SOUTHWEST 20 TO 30 MPH.
CHC WETTING RAIN.....0%.

TONIGHT...

SKY/WEATHER.....PARTLY CLOUDY THEN BECOMING MOSTLY CLEAR.
ISOLATED DRY THUNDERSTORMS IN THE EVENING
EAST OF THE RUBY MOUNTAINS.

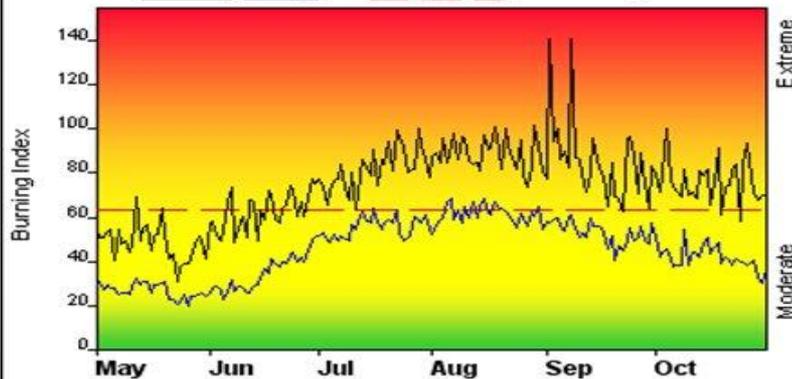
MIN TEMPERATURE.....
VALLEYS.....45-55.
MID SLOPE.....50-60.
24 HR TREND.....2 DEGREES COOLER.

MAX HUMIDITY.....
VALLEYS.....48-56%.

Burning Index (KEKO) 102 on 8/23/2006

FIRE DANGER -- Eiko District

Maximum, Average, and 80th Percentile, based on 14 years data



Fire Danger Area:

- ◆ Elko County
- ◆ NWS Zones 468, 469, 470
- ◆ 260305, 260310, 260314
- * Meets NWCG Wx Station Standards



Fire Danger Interpretation:



- EXTREME** -- Use extreme caution
- (Caution)** -- Watch for change
- Moderate** -- Lower Potential, but always be aware

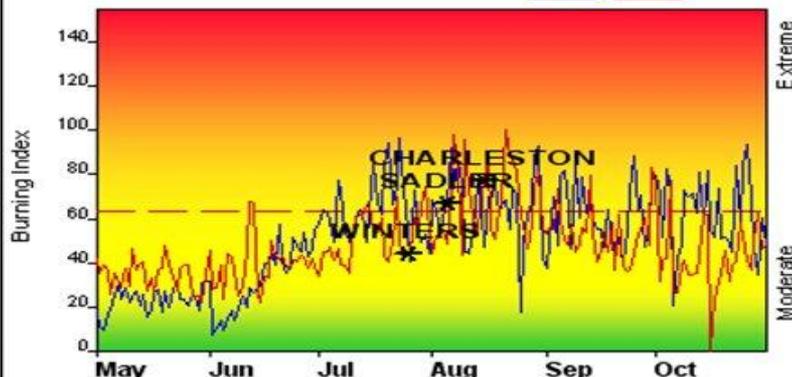
Maximum -- Highest Burning Index by day for 1997 - 2010

Average -- shows peak fire season over 14 years (2538 observations)

80th Percentile -- Only 20% of the 2538 days from 1997 - 2010 had an Burning Index above 63

Local Thresholds - Watch out: Combinations of any of these factors can greatly increase fire behavior:
20' Wind Speed over 19 mph, RH less than 15%,
Temperature over 90, 10-Hour Fuel Moisture less than 10

Years to Remember: 1999 2006



Fuel Model: A - Western Annual Grasses

Remember what Fire Danger tells you:

- ✓ Burning Index gives day-to-day fluctuations calculated from 2 pm temperature, humidity, wind, daily temperature & rh ranges, and precip duration.
- ✓ Wind is part of BI calculation.
- ✓ Watch local conditions and variations across the landscape -- Fuel, Weather, Topography.
- ✓ Listen to weather forecasts -- especially WIND.

Past Experience:

- Red Flag Criteria: gusts of 30 mph or more for 3+ hours.
- TSTM downdrafts over existing fires have caused fire growth over 10,000 acres in one burning period.
- Dry cold front passage will bring strong winds and low RH.
- Dry lightning, or any lightning after a protracted hot, dry period.

LOOKOUTS - COMMUNICATIONS - ESCAPE ROUTES - SAFETY ZONES

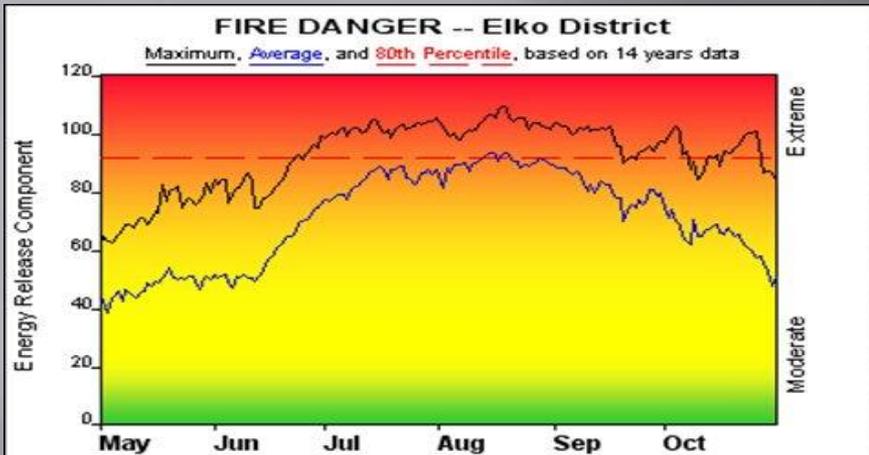
Responsible Agency: BLM

FF+4.0 05/17/2011-13:24 (Z:\Predictive Services\Fire Family Database\W...2011_BI_FM_A)

Design by NWCG Fire Danger Working Team

Energy Release Component (KEKO)

92 on 8/23/2006



Fire Danger Area:

- ◆ Elko County
- ◆ Weather Zones 469, 470
- ◆ 260305, 260310, 260314
- * Meets NWCG Wx Station Standards



Fire Danger Interpretation:



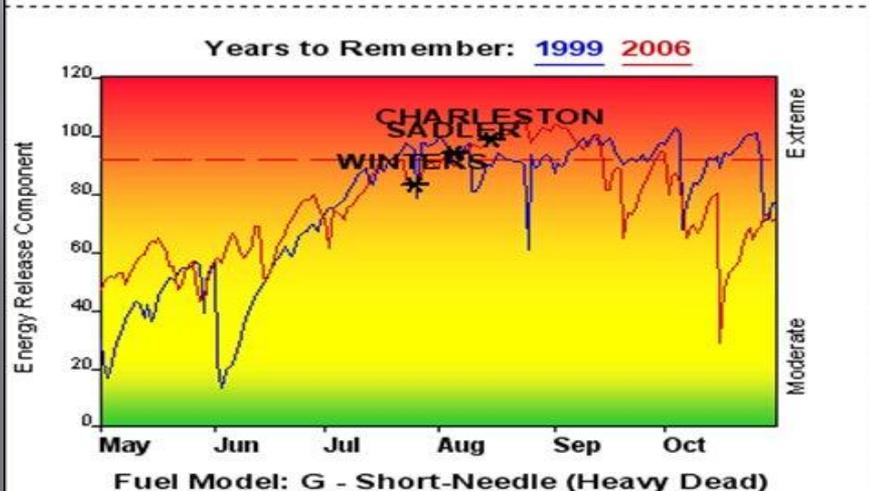
- EXTREME** -- Use extreme caution
- (Caution)** -- Watch for change
- Moderate** -- Lower Potential, but always be aware

Maximum -- Highest Energy Release Component by day for 1997 - 2010

Average -- shows peak fire season over 14 years (2538 observations)

80th Percentile -- Only 20% of the 2538 days from 1997 - 2010 had an Energy Release Component above 91

Local Thresholds - Watch out: Combinations of any of these factors can greatly increase fire behavior:
 20' Wind Speed over 19 mph, RH less than 15%,
 Temperature over 90, 10-Hour Fuel Moisture less than 10



Remember what Fire Danger tells you:

- ✓ Energy Release Component gives seasonal trends calculated from 2 pm temperature, humidity, daily temperature & rh ranges, and precip duration.
- ✓ Wind is NOT part of ERC calculation.
- ✓ Watch local conditions and variations across the landscape -- Fuel, Weather, Topography.
- ✓ Listen to weather forecasts -- especially WIND.

Past Experience:

Most large fires in this area happen above ERC = 82.

Red Flag Criteria: gusts of 30 mph for 3+ hours.

TSTM downdrafts over existing fires have caused fire growth over 10,000 acres in one burning period.

Dry cold front passage will bring strong winds and low RH.

Dry lightning, or any lightning after a protracted hot, dry period.

LOOKOUTS - COMMUNICATIONS - ESCAPE ROUTES - SAFETY ZONES

Responsible Agency: BLM

FF+4.0 05/17/2011-13:21 (Z:\Predictive Services\Fire Family Database...\2011_ERC_FM_G)

Design by NWCG Fire Danger Working Team

Initial Attack

As the fire spread in an east to southeast direction generally towards the City of Elko, initial attack resources were directed into what is known as the “Snow-Bowl” area of Elko. These resources included a group of four Bureau of Land Management engines without a designated

task force leader. The Bureau of Land Management engines included a Carlin, NV Type 4 heavy engine E1947, a Carson City, NV Type 4 heavy engine E3943, a Bakersfield, CA Type 6 light engine E3144, and a Kingman, AZ Type 6 light engine E263 accompanied with a chase vehicle.