2004 Seasonal Wildland Fire Assessment
Northern Rockies Geographic Area
2004 Fire Season Update
August 11, 2004

Executive Summary

This assessment is designed to focus on comparative differences among current and historical conditions. There are a myriad of factors affecting the total number of fires, acres and firefighting resources utilized which either cannot be predicted, or cannot be predicted with any confidence this far in advance.

Neutral El Nino/La Nina conditions across the Pacific Ocean continue and are expected to have minimal influence on weather patterns that affect the Northern Rockies for the remainder of the fire season. Drought conditions have affected the Northern Rockies Geographic Area since the fall of 1998 and continue to moderate some, but long-term precipitation deficits continue in most areas of the Geographic Area from northern Idaho to North Dakota. Rainfall during May, June and July moderated conditions across the Geographic Area such that fire dangers were slow to move above normal values. Temperatures in mid July tended to dry all fuel classes and move fire dangers above normal but wet thunderstorm activity took the edge off with fires exhibiting minimal spread.

Land management agencies have significant concerns about the severity of the 2004 fire season and the implications as the season progresses. These concerns include potential for extreme fire behavior, firefighter safety, risk to communities and public expectations.

Introduction and Objectives

The intent of the fire season outlook is to provide a scientifically based look at factors affecting the potential severity of the Northern Rockies Area fire season. This involves using a quantitative assessment of existing conditions and a combination of quantitative and subjective forecast methodologies to arrive at a subjective assessment of fire potential. It is important to note that fire season severity in this outlook can only be discussed with regard to potential.

The objectives of the long-range fire assessment for the Northern Rockies Area are:

- Review the overall severity of the wildland fire situation in the Northern Rockies
- Compare the on-going fire potential with historical situation
- Develop implications for the 2004 fire season in the Northern Rockies

Current Conditions

Fuel loadings and low fuel moistures continue to be a concern throughout the Area. The drought has caused 1000-hr fuels to start out the season at record low levels. Some moderation in fuel moistures occurred with spring and summer rains in most locations while below normal fuel conditions continued across southeast Montana. The 1000-hr fuels can be expected to approach near record levels during August.

Fuel loadings have increased dramatically over the past few decades in all timber types. Recent beetle mortality is increasing in many areas. Red crowns are easier to ignite and lead to torching and crowning. Past mortality has led to heavy accumulations of ground fuels, particularly in lodgepole stands. Some of these loadings are in excess of 100 tons/acre. These heavy fuel loads increase fire intensity and resistance to control.

Without a significant change in weather, most beetle infestations will continue to increase in both extent and intensity throughout the coming year.

Douglas-fir encroachment in dry site ponderosa pine stands has led to abundant ladder fuels. In addition, drought conditions have led to low live fuel moistures. This combination enables fires to readily climb these ladder fuels into the crowns of the larger trees. Spotting will be common. This will increase fire intensity and resistance to control.

Eastern Montana /North Dakota

- Sixth consecutive year of drought resulting in live fuels showing signs of significant stress
- Mountain pine beetle, spruce budworm, and Douglas-fir bark beetle outbreak increasing and expected to expand
- 1000-hr fuels 10-14% southeast Montana and southwest North Dakota and 13-18% elsewhere

Western Montana

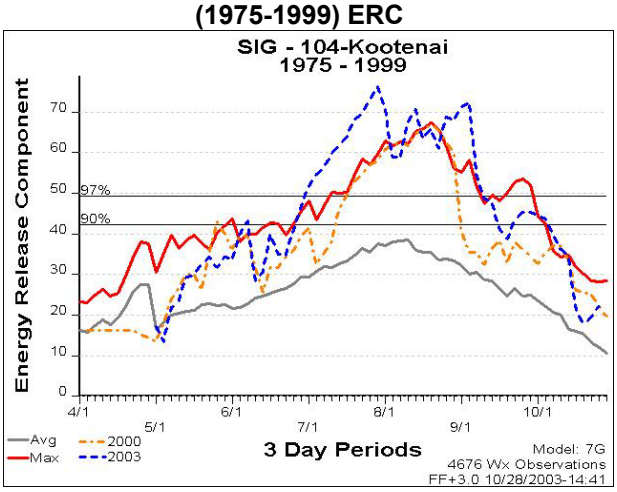
- Sixth consecutive year of drought resulting in moderate to dry soil moistures, with live fuels showing signs of significant stress
- 1000-hr fuels 11-15%
- Mountain pine beetle, spruce budworm, and Douglas-fir bark beetle outbreak increasing and expected to expand

North Idaho

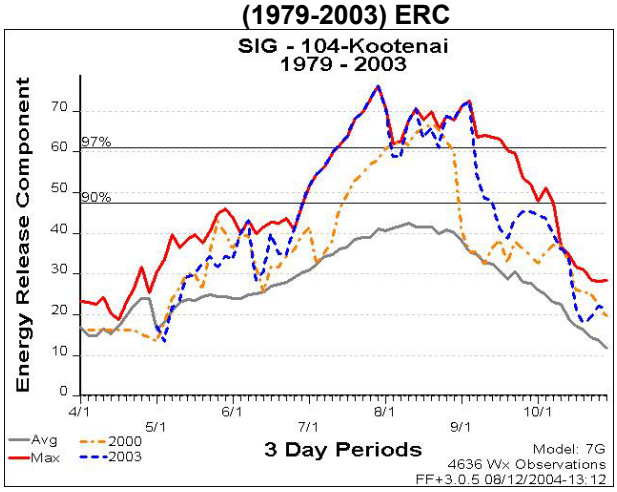
- Sixth consecutive year of drought; conditions less pronounced than remainder of Geographic Area
- 1000-hr fuels 11-16%
- Douglas-fir bark beetle infestation increasing and expected to expand

In previous assessments, we had been comparing data for the period 1975-1999 against data for the period 1979-2003. As shown by the 2 ERC graphs below, the last few years of drought has changed the distribution increasing the 90th and 97th percentiles. The representative graphs on the next pages compare the same data (1979-2003).

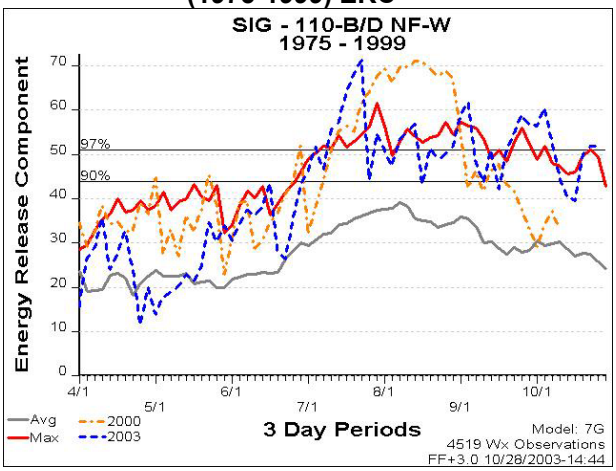
KOOTENAI: 2003
(1975-1999) ERC



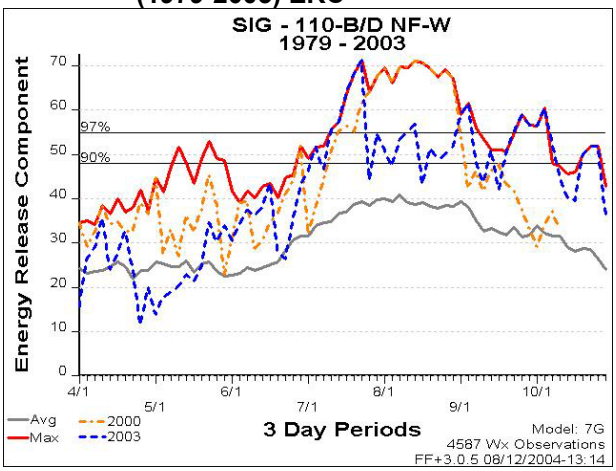
KOOTENAI: 2003
(1979-2003) ERC



WEST BEAVERHEAD-DEERLODGE: 2003
(1975-1999) ERC

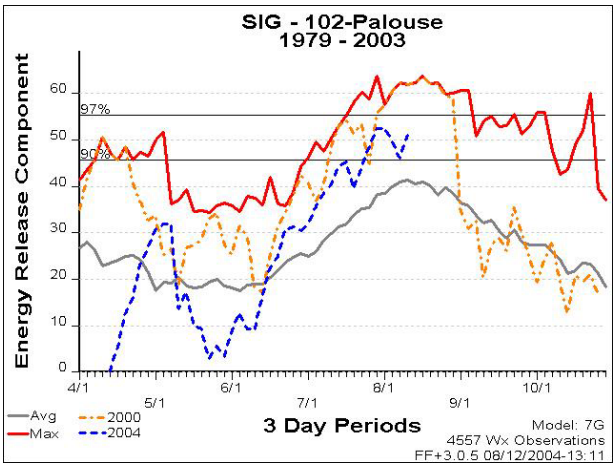


WEST BEAVERHEAD-DEERLODGE: 2003
(1979-2003) ERC

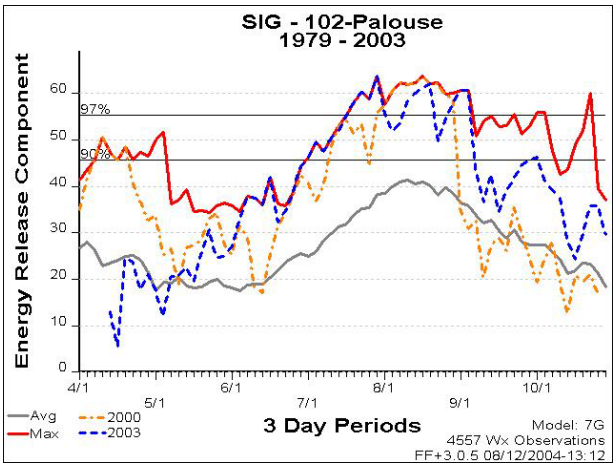


Following are representative ERC and 1000-hr fuel moisture charts for 2004 compared to 2003. Maximum and minimum values are based on the 25-year period 1978-2003. Note that 2004 graphics are current through August 11, 2004.

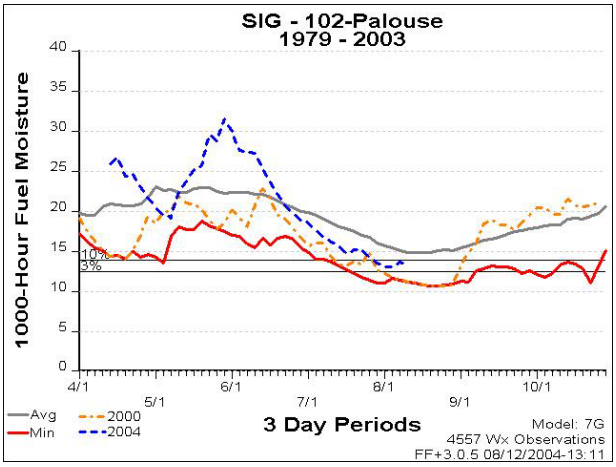
PALOUSE: 2004
ERC



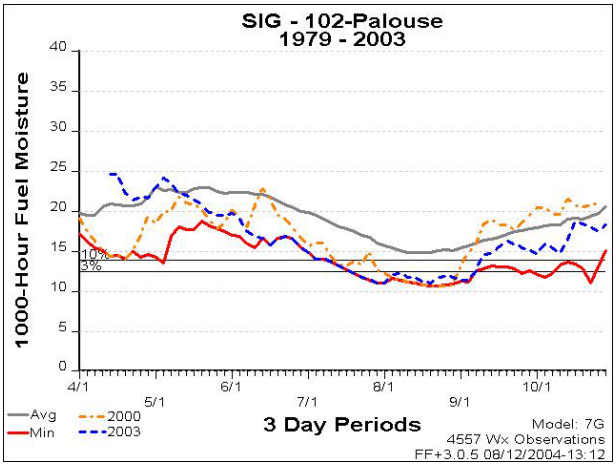
PALOUSE: 2003
ERC



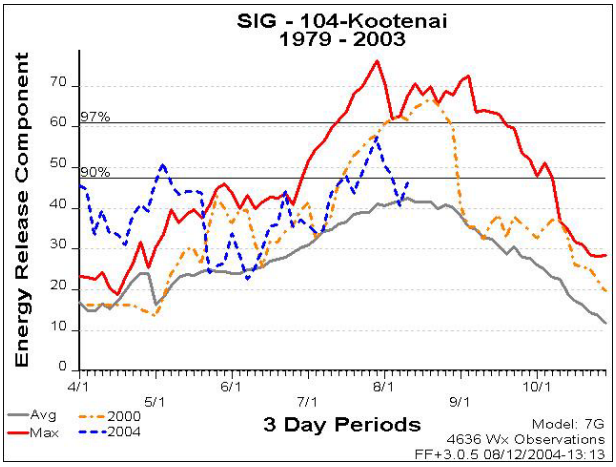
PALOUSE: 2004
1000-Hour FM



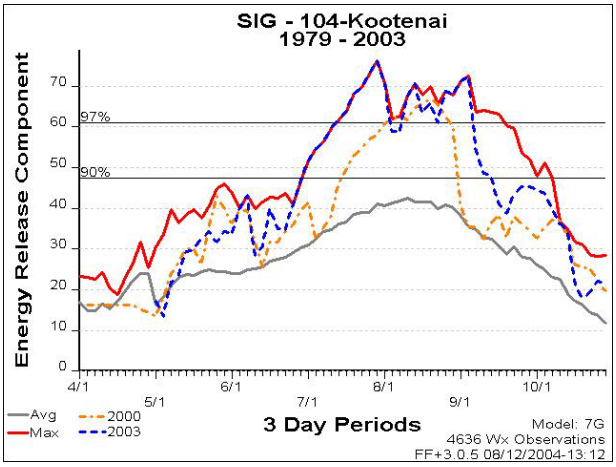
PALOUSE: 2003
1000-Hour FM



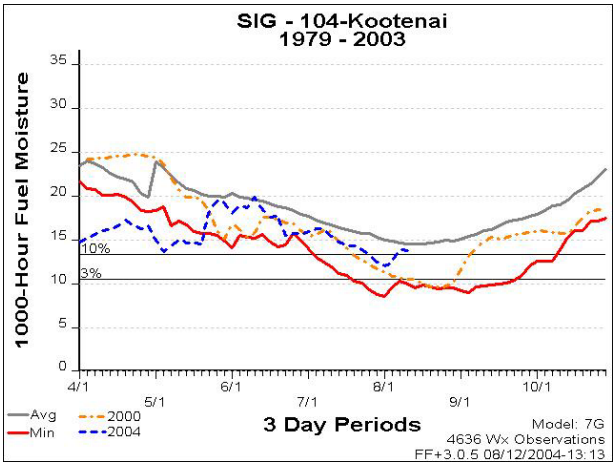
KOOTENAI: 2004
ERC



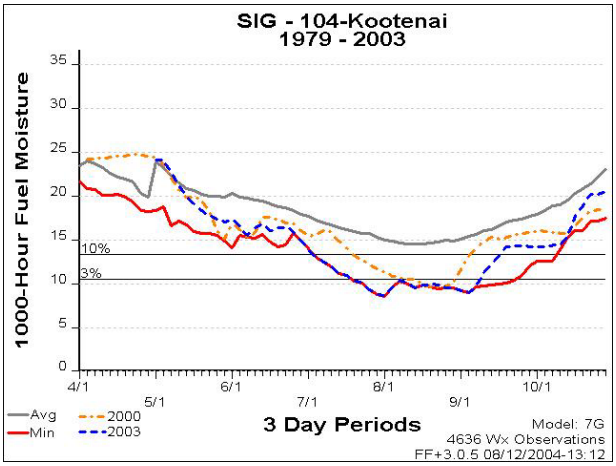
KOOTENAI: 2003
ERC



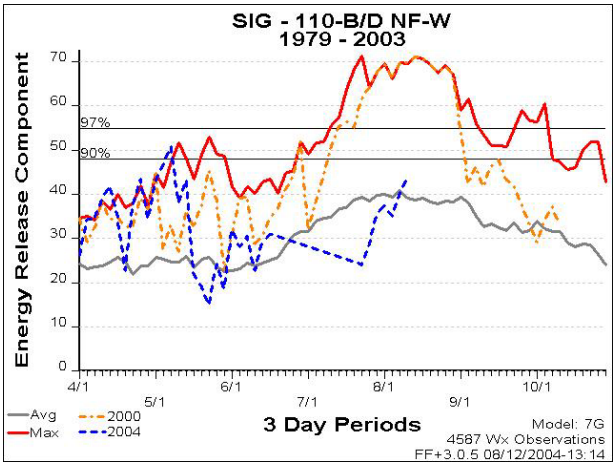
KOOTENAI: 2004
1000-Hour FM



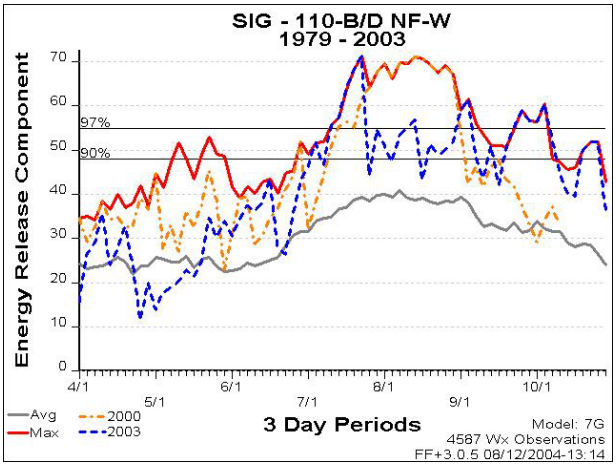
KOOTENAI: 2003
1000-Hour FM



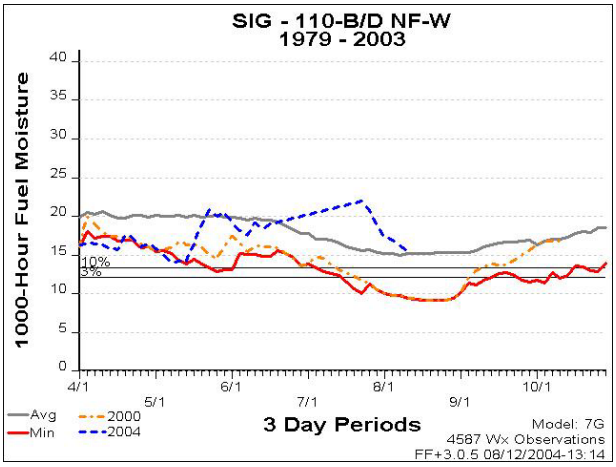
WEST BEAVERHEAD-DEERLODGE: 2004 ERC



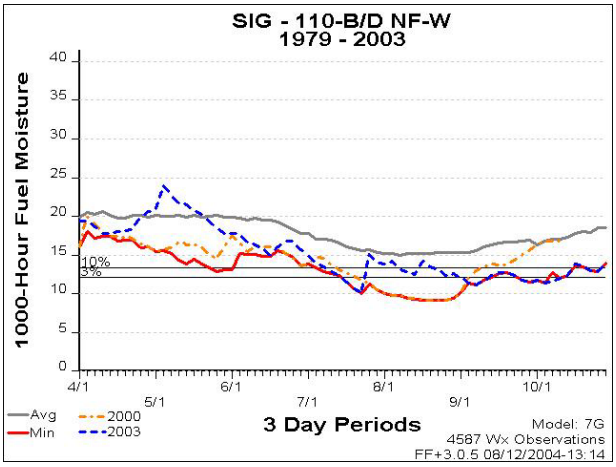
WEST BEAVERHEAD-DEERLODGE: 2003 ERC



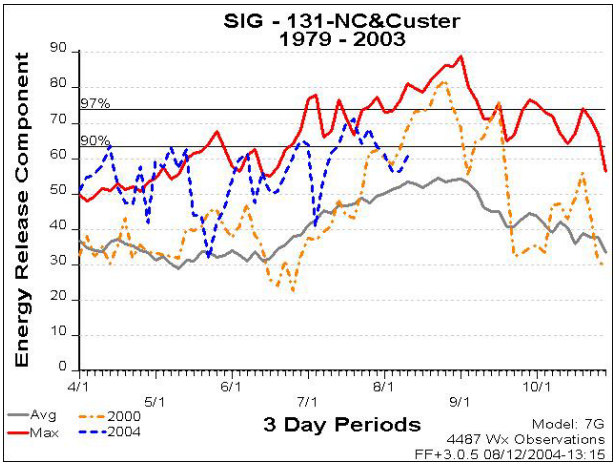
WEST BEAVERHEAD-DEERLODGE: 2004 1000-Hour FM



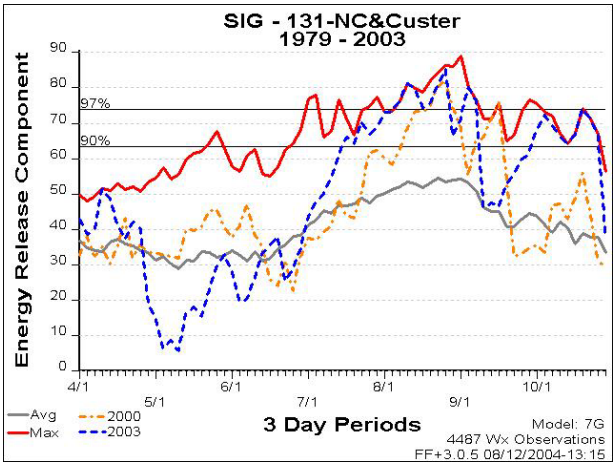
WEST BEAVERHEAD-DEERLODGE: 2003 1000-Hour FM



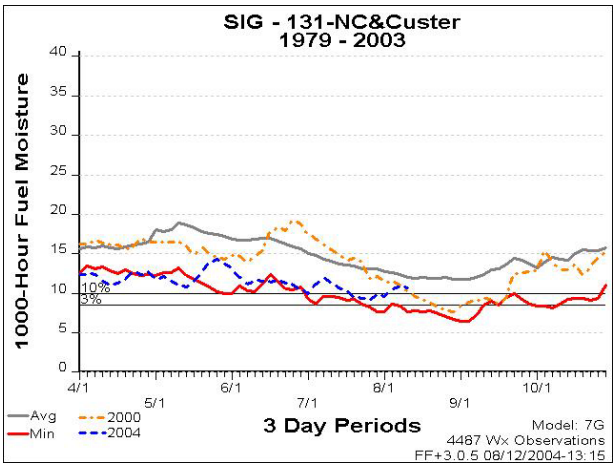
NORTHERN CHEYENNE& CUSTER: 2004 ERC



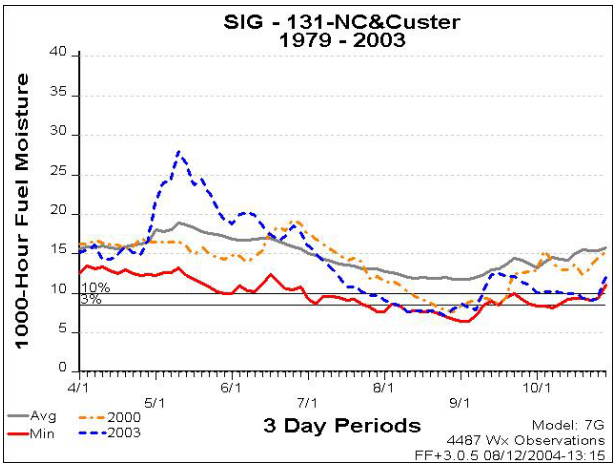
NORTHERN CHEYENNE& CUSTER: 2003 ERC



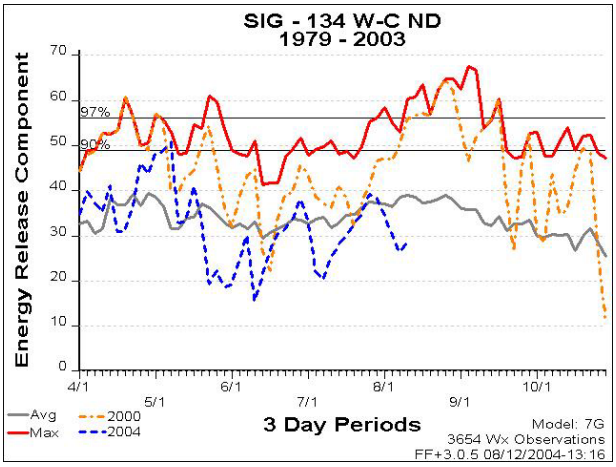
NORTHERN CHEYENNE& CUSTER: 2004 1000-Hour FM



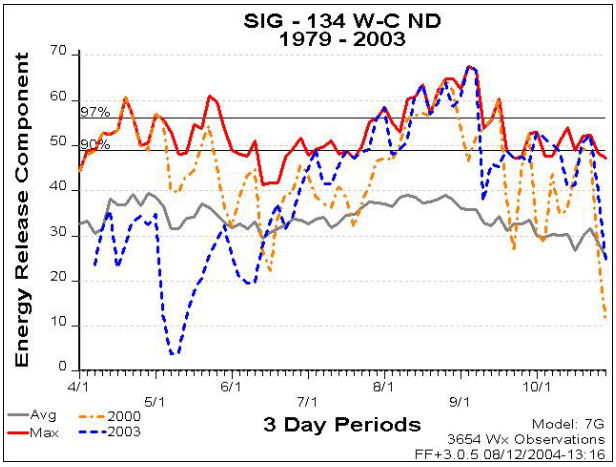
NORTHERN CHEYENNE& CUSTER: 2003 1000-Hour FM



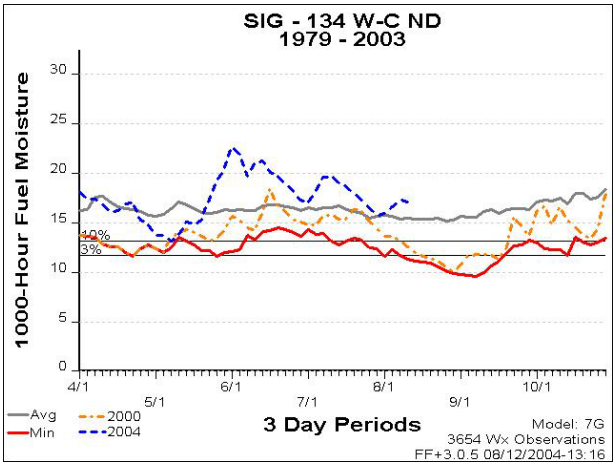
WEST–CENTRAL NORTH DAKOTA: 2004
ERC



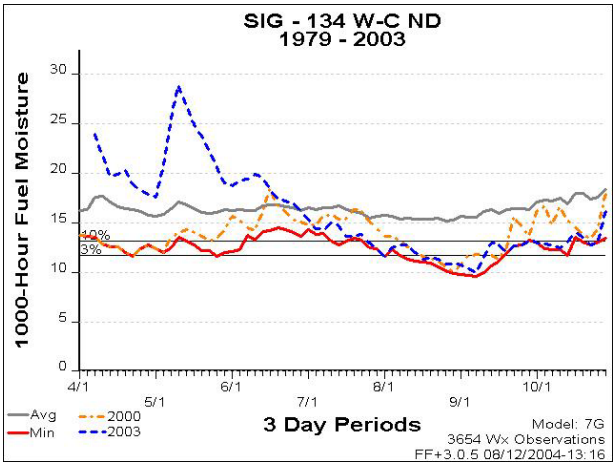
WEST–CENTRAL NORTH DAKOTA: 2003
ERC



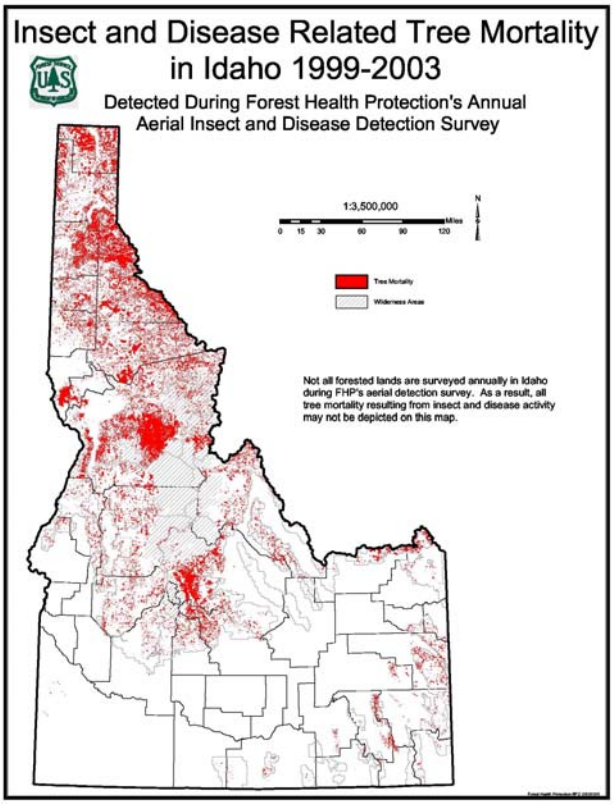
WEST–CENTRAL NORTH DAKOTA: 2004
1000-Hour FM

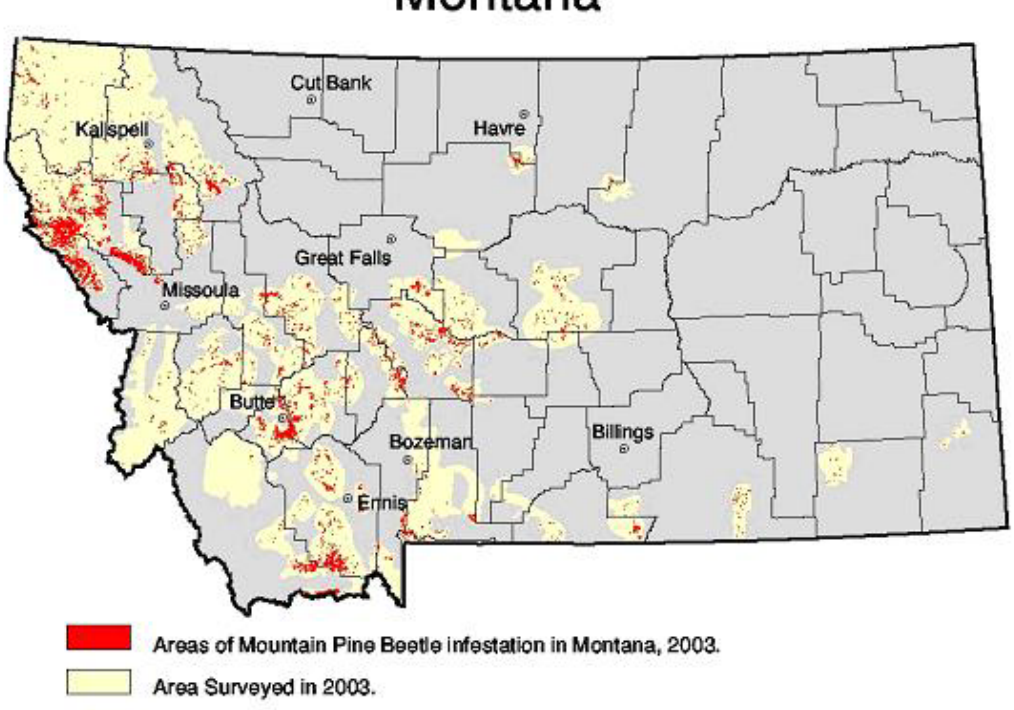


WEST–CENTRAL NORTH DAKOTA: 2003
1000-Hour FM

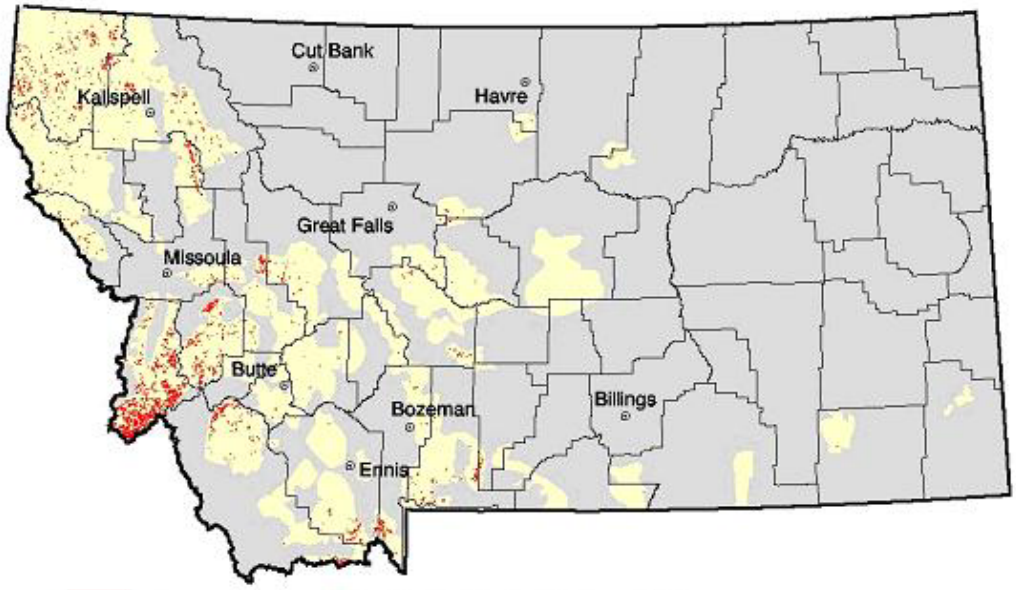


Forest Health





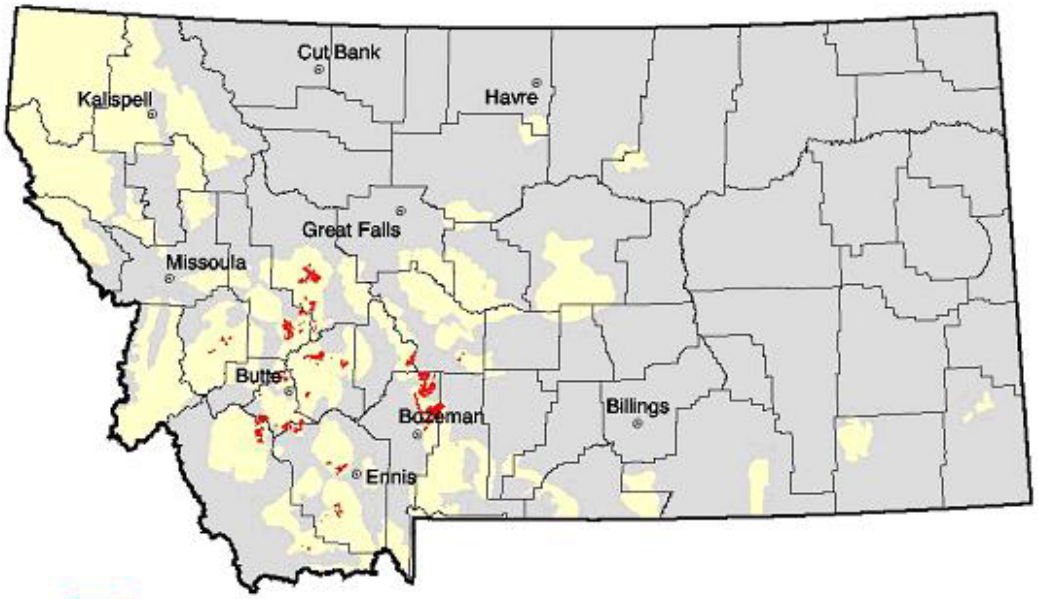
Montana



Areas of Dougas-fir Beetle infestation in Montana, 2003.

Area Surveyed in 2003.

Montana



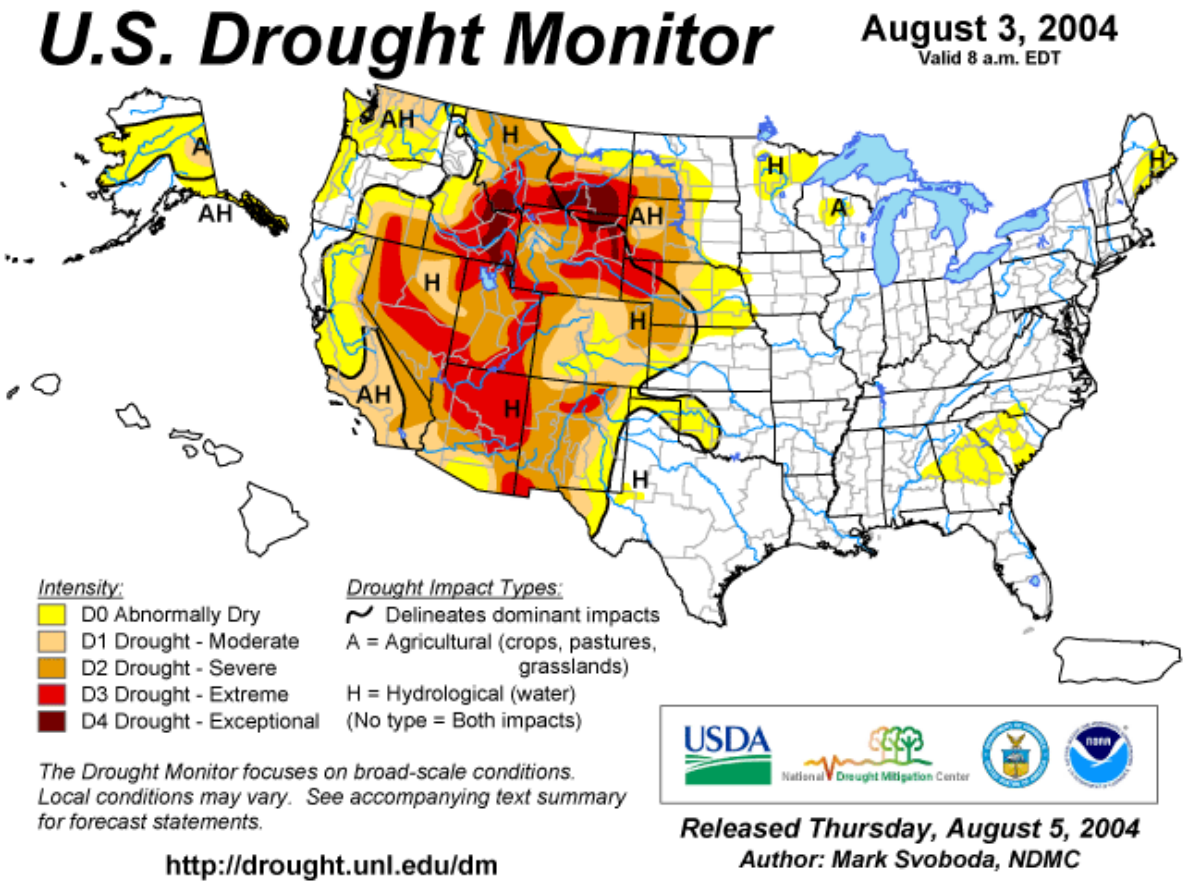
Areas of Western Spruce Budworm infestation in Montana, 2003.

Area Surveyed in 2003.

Weather:
El Nino typically occurs in cycles ranging from two to seven years with marked differences in intensity and duration and is linked to shifts in global precipitation patterns resulting in floods in arid areas and droughts in areas that are normally wet. In North America, the impacts of El Nino are most dramatic during the winter months.

Weather patterns across the northern Rocky Mountains were strongly influenced by El Nino conditions from 1998 through the winter of 2003, but these El Nino conditions diminished to neutral by the end of 2003 and have remained neutral through early summer 2004. Sea surface conditions over the past few months do indicate that a slow trend toward El Nino conditions exist in the eastern equatorial Pacific Ocean.

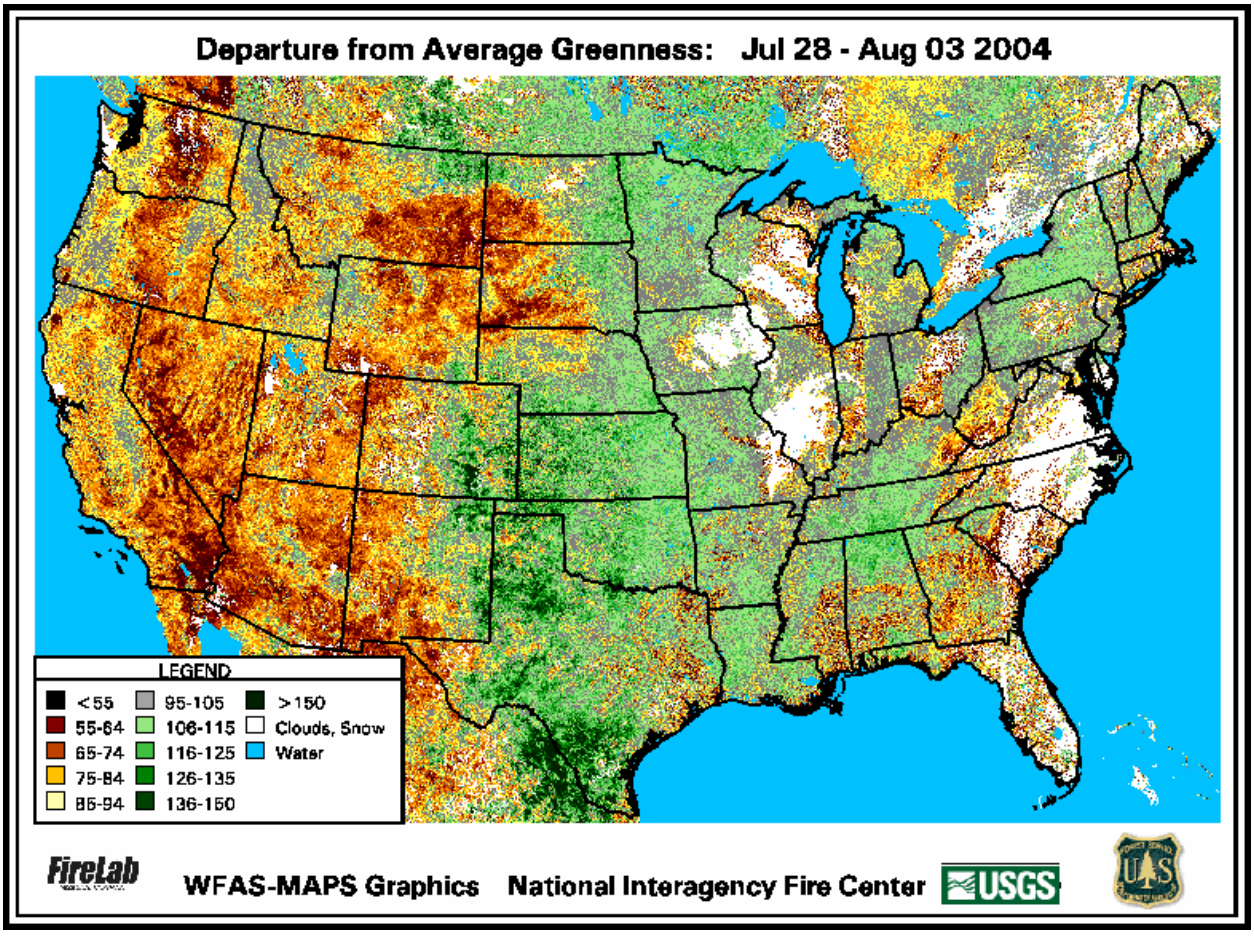
A northwest flow aloft dominated the weather over the Pacific Northwest into the Northern Rockies in the Fall and Winter of 2003 and continued into the summer of 2004. Conditions were mild and generally dry through March into April with widespread moisture episodes moving across the Northern Rockies in May and June with decreasing moisture in July. Temperatures during this period were generally normal to slightly below normal while moisture averaged normal during this period with some areas above normal and some areas below normal. Water year totals measured from October through September indicate that there was widespread below normal moisture across the Area. Long-term moisture deficits continue to show that the on-going drought is far from being over.



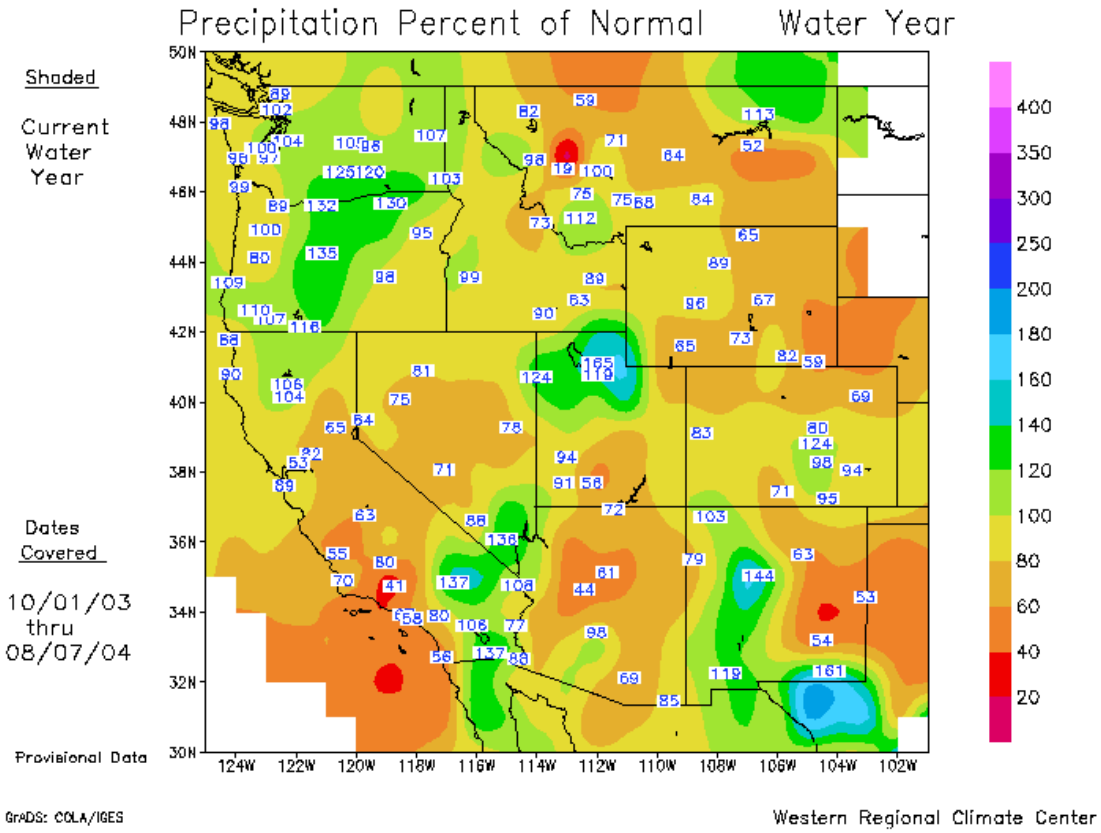
Fire Danger and Greenness Imagery:
Fire danger indicators have varied widely between the eastern and western portions of the Northern Rockies Geographic Area during the past 6 years since the drought began in 1998. As a result of deficit winter precipitation early season indices were near extreme for most areas. The dry conditions across the Geographic Area have moderated some due to moisture in May, June, and July, however, long-term moisture deficits remain.

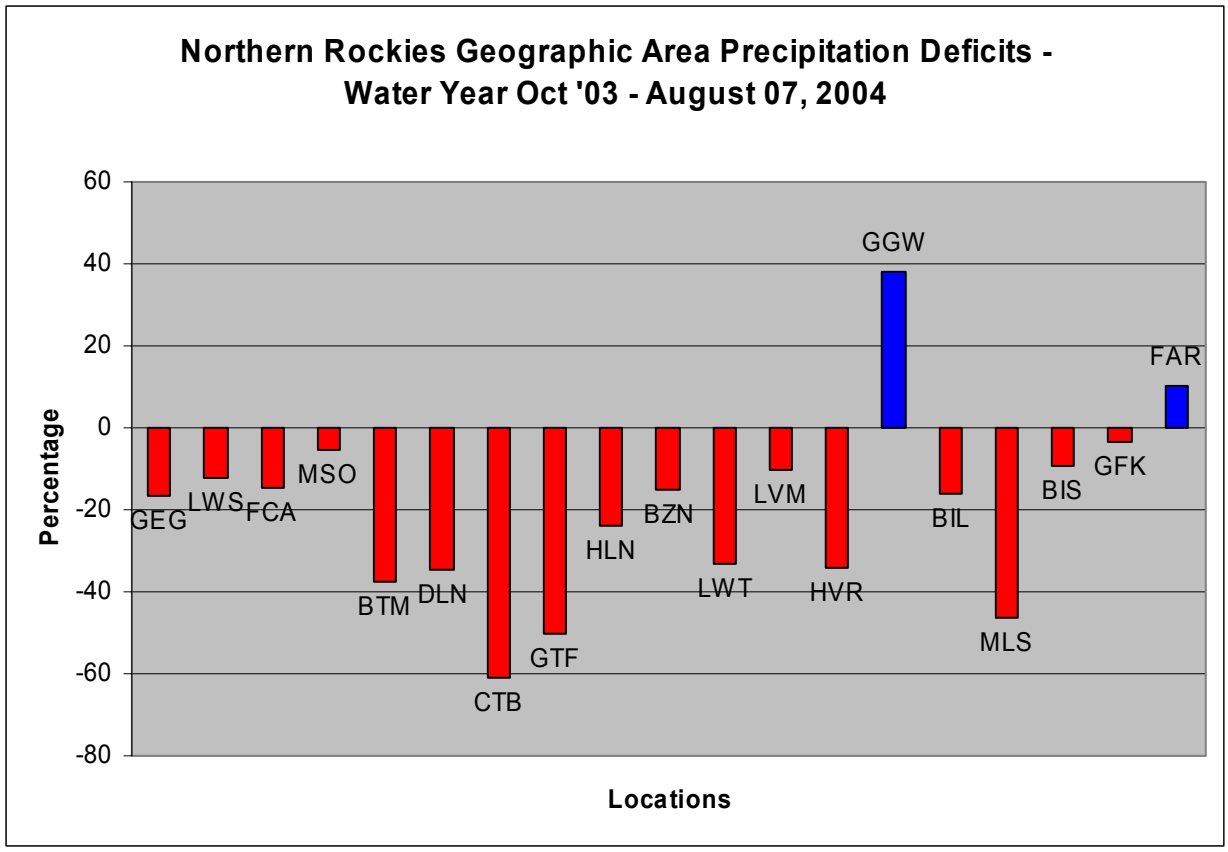
The condition of live vegetation can be assessed using the Normalized Difference Vegetation Index (NDVI), calculated from satellite observations at a one kilometer resolution. The NDVI relates to the amount of actively photosynthesizing biomass, or vegetation "greenness", and can be interpreted to assess relative fire danger (Burgan and Hartford 1993). The greenness data can be displayed as maps. Two maps that are useful for interpreting vegetation condition to fire potential relate the NDVI of each kilometer to its own historical record. Relative Greenness maps represent how green the vegetation is compared to the range of values observed since 1989 when this data became available. They are useful for showing seasonal vegetation changes and comparing years. Departure from Average maps display differences between current and average greenness for that time of year.

Greenness imagery shows central and southeast Montana and parts of southwest North Dakota with the greatest departure from average. Eastern North Dakota, northeast Montana and parts of northern Idaho show the minimal departure from average.



Comparison of Current and Historical Weather and Fire Activity Weather:
During the fall and winter of 2003-2004, ocean temperatures in the Equatorial Pacific began to return to more normal levels signaling an end to the latest El Nino episode. Recent analysis shows a slow increase in indicators that may suggest a return to El Nino conditions. As a result, a dry northwest flow aloft developed over the northwest U.S. with generally warm and dry conditions through early spring. Rain in May through early July moderated conditions in some areas but precipitation patterns of the northern Rocky Mountains during the water year (October through September) show that below normal moisture conditions continue across large portions of the Geographic Area with the greatest deficit across central and southeast Montana.

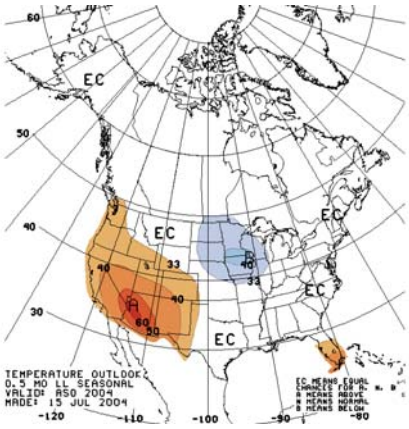



Northern Rockies Geographic Area Precipitation Deficits -
Water Year Oct '03 - August 07, 2004
60
40
20
0
-20
-40
-60
-80
Percentage
GEG
LWS
FCA
MSO
BTM
DLN
CTB
GTF
HLN
BZN
LWT
LVM
HVR
GGW
BIL
MLS
BIS
GFK
FAR
Locations

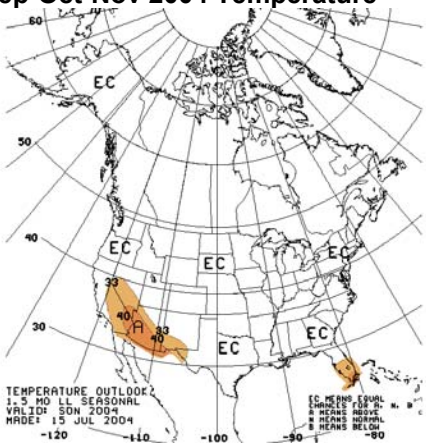
Outlook

The outlook for this summer and fall from NOAA Climate Prediction Center continues to indicate that a neutral trend for the El Nino is expected to continue the remainder of this summer and fall then either continue neutral or return to a warm ocean condition by late fall or winter. This means normal temperatures are expected across the Area through this fall.

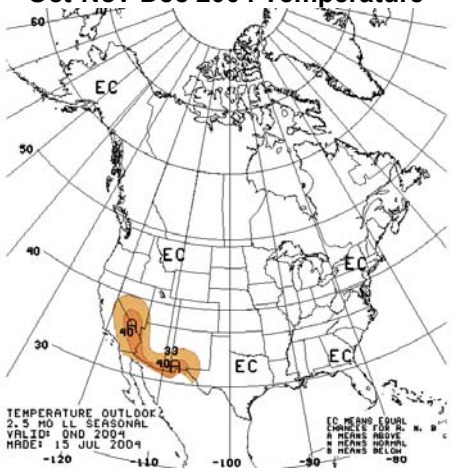
Aug-Sep-Oct 2004 Temperature



Sep-Oct-Nov 2004 Temperature

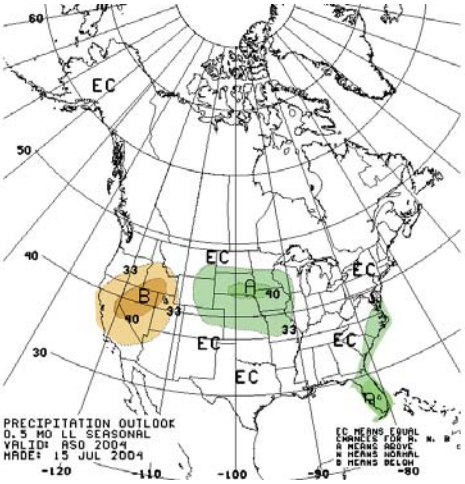


Oct-Nov-Dec 2004 Temperature

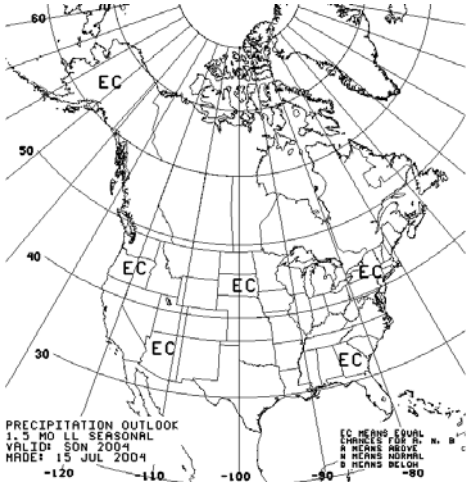


Probabilities of above normal moisture are expected across southeast Montana and southwest North Dakota for the three month period August, September and October. Normal moisture is expected elsewhere the remainder of this summer and Fall.

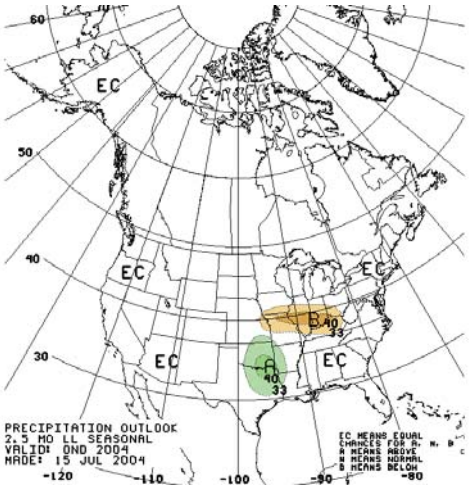
Aug-Sep-Oct 2004 Precipitation



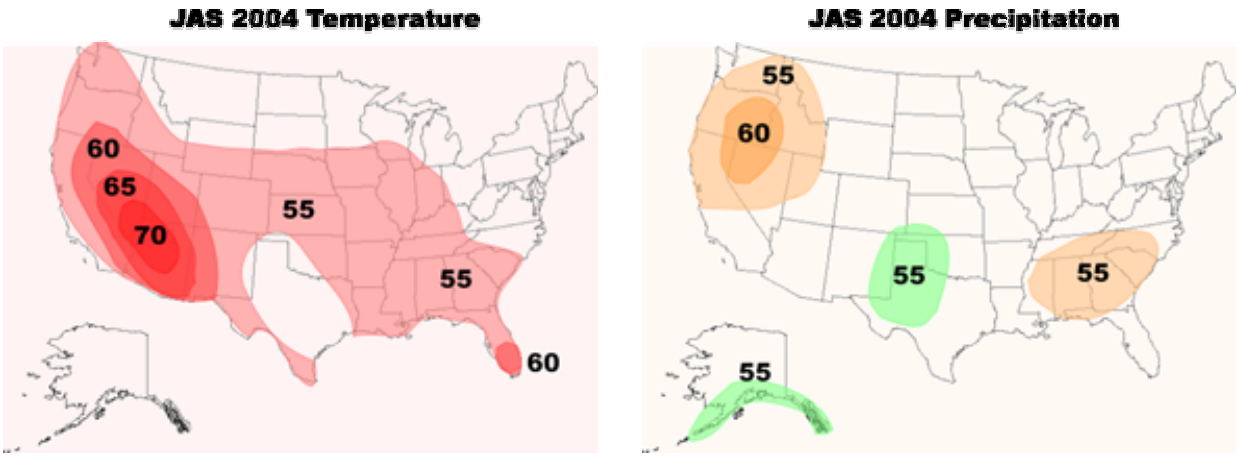
Sep-Oct-Nov 2004 Precipitation



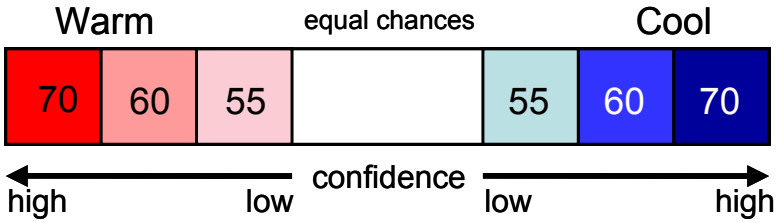
Oct-Nov-Dec 2004 Precipitation



2004 National Consensus Climate Forecast



TEMPERATURE



Colors indicate a **probability** of warmer (reds) or cooler (blues) than normal temperatures. For instance, dark red indicates a 70% chance of above normal temperatures, while white means a equal chances (50-50) of either above of below temperatures. Higher numbers indicate a higher confidence in the forecast.

Resource Outlook
Keen awareness and recognition of the potential fire situation will require proactive planning and pre-positioning of resources. This would include awareness of National activity with regards to availability of resources.

Management Implications and Concerns
The combination of continued drought, increasing fuel loads, insect outbreaks and reduced suppression capability indicate an increased need for careful planning, preparedness and the need to emphasize firefighter safety, early detection, effective initial attack and the critical recognition of an escalating fire situation.

The fuel situation across the Area indicates the importance of ongoing fuel treatment projects. However, moisture deficits in the larger fuels could lead to control problems. Therefore, projects should be done as early in the season as possible, and increased holding resources may be necessary.

Summary

The potential for the remainder of the fire season is normal to above normal. Continued long term drought, heavy, dry fuel conditions, the total area impacted by drought and insects has continued to increase, further adding to the dead fuel loading and normal weather seasonal considerations of hot and generally dry conditions in August. A significant unknown is how often rain events will occur that may affect the overall situation. These rains can mitigate fire season severity in the timber fuel types, where the majority of firefighting resources are normally used, but can lead to an increase in fire potential in the grass and brush fuels when cured. Either way, assuming the prediction for precipitation is accurate, the Northern Rockies Area is likely to experience a severe fire season somewhere in the Geographic Area, with areas west of the Continental Divide having the most potential in August and September shifting to eastern portions of the Area where grass and brush fuels dominate.