SOUTHWEST AREA

2002 Fire Season Outlook

Valid: March – July
Issue Date: March 12, 2002

I. INTRODUCTION

The following assessment and outlook is made using the most recent weather, climatological, and fuels data available. It is a general report intended to provide fire management personnel with an Areawide seasonal outlook in order to consider preparations for the 2002 fire season. Due to the variability in the data and the process for completing this report, it is quite difficult to forecast out several months, especially on an Areawide basis. Therefore, it is up to the local fire manager to know the conditions in their own area of responsibility and to base their actions on those conditions.

II. ASSESSMENT

Drought & Precipitation

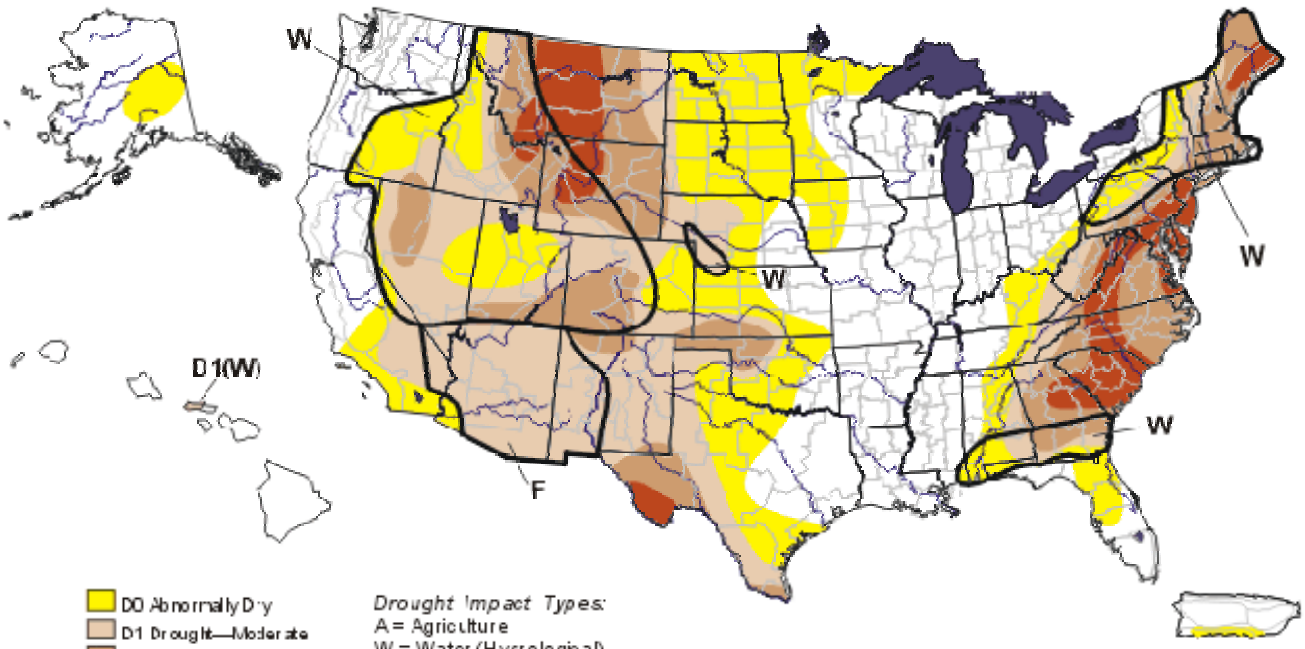
Arizona – Winter precipitation throughout Arizona has been below normal with many areas being abnormally dry throughout the state. Overall, the precipitation throughout the state is ranked as one of the driest years in the last century. Moderate drought conditions are being experienced over northern and eastern Arizona with water year precipitation deficiencies in excess of 10 inches in mountain areas.

New Mexico – Winter precipitation throughout New Mexico has been below normal with some mountainous locations being closer to normal. Specifically, the Jemez, east side of the Sangre de Cristo, central mountain chain, and the Gila mountains range have experienced significant dryness, while the west side of the Sangre de Cristo, Zuni, and Sacramento mountains are running slightly below normal.

West Texas - Winter precipitation in western Texas has been below normal and has been inadequate to alleviate long-term drought conditions.

U.S. Drought Monitor

March 12, 2002
Valid 8 a.m. EST



D0 Abnormally Dry
D1 Drought—Moderate
D2 Drought—Severe
D3 Drought—Extreme
D4 Drought—Exceptional

Drought Impact Types:
A = Agriculture
W = Water (Hycrological)
F = Fire danger (WildFires)
Delineates dominant impacts
(No type = All 3 impacts)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

http://drought.unl.edu/monitor/monitor.html

Released Thursday, March 14, 2002

Author: *Rich Tinker, NOAA/CPC*

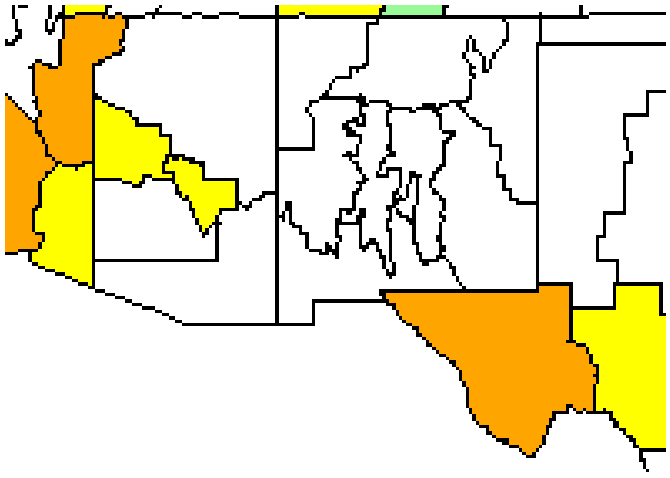
Reference: Western Region Climate Center (WRCC), www.wrcc.dri.edu
NOAA/NWS Climate Prediction Center, www.cpc.noaa.gov
National Drought Mitigation Center, drought.unl.edu/monitor/monitor.html

Standardized Precipitation Index (SPI)

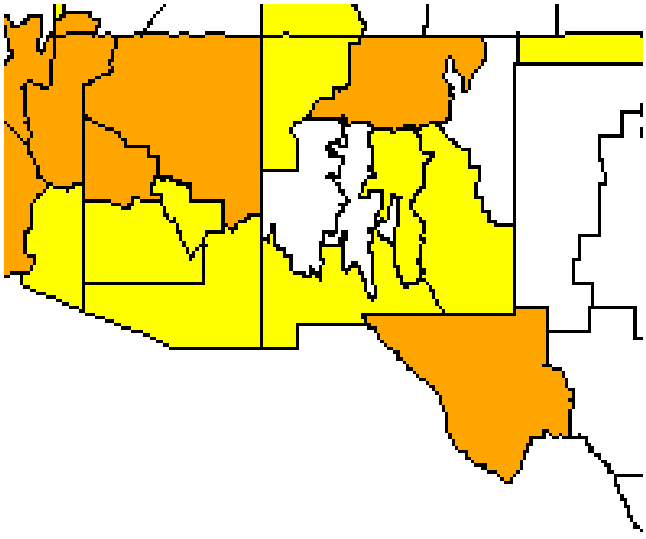
The SPI is showing a progressive drying trend, especially in Arizona and northwestern New Mexico.

- +3.00 and above (know how to swim?)
- +2.00 to +2.99 (extremely wet)
- +1.25 to +1.99 (very wet)
- +0.75 to +1.24 (moderately wet)
- -0.74 to +0.74 (near normal)
- -1.24 to -0.75 (moderately dry)
- -1.99 to -1.25 (very dry)
- -2.99 to -2.00 (extremely dry)
- -3.00 and below (where's the nearest oasis?)

36-Month SPI

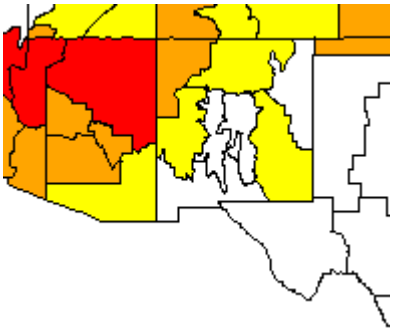


12-Month SPI



What is the SPI? - The SPI is the number of standard deviations that the observed value would deviate from the long-term mean, for a normally distributed random variable. Since precipitation is not normally distributed, a transformation is first applied so that the transformed precipitation values follow a normal distribution. The purpose is to assign a single numeric value to the precipitation, which can be compared across regions with markedly different climates.

Since October 2000

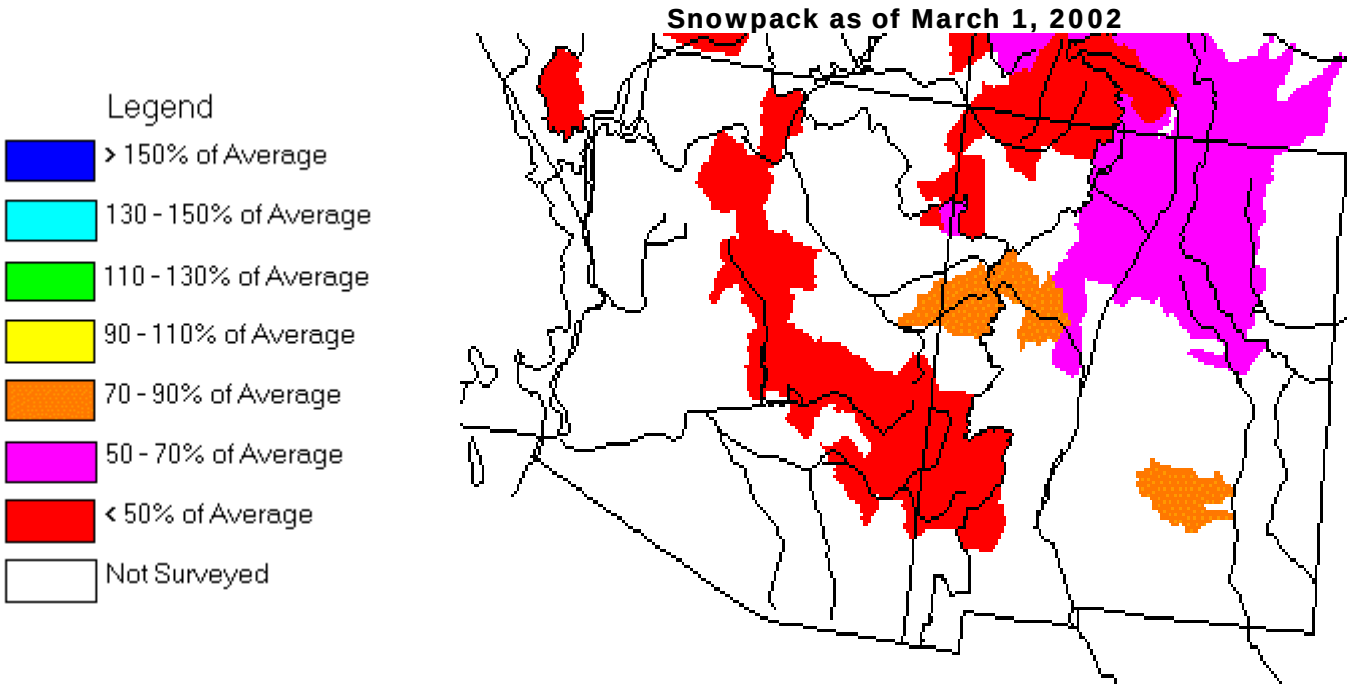


The Standardized Precipitation Index was designed to explicitly express the fact that it is possible to simultaneously experience wet conditions on one or more time scales, and dry conditions at other time scales, often a difficult concept to convey in simple terms to decision-makers. Consequently, a separate SPI value is calculated for a selection of time scales, covering the last 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 18, 24, 30, 36, 48, 60, and 72 months, and ending on the last day of the latest month.

Reference: Western Region Climate Center, www.wrcc.dri.edu

Winter Snowpack and Precipitation Equivalents

Winter snowpack, as of March1, is averaging well below normal throughout the Southwest. In Arizona, many higher elevation locations are reporting minimal to no snowpack. In New Mexico, most of the stations are reporting 50-90% range with south facing slopes having lost their snow cover through the month of February.



New Mexico	Snow Water Equivalent (% of Avg)	Total Precipitation (% of Avg)
Rio Chama Basin	53%	47%
Upper Rio Grande Basin	38%	46%
Sangre De Cristo Mountains	68%	64%
Jemez River Basin	43%	44%
San Francisco River Basin	27%	32%
Gila River Basin	25%	34%
Mimbres River Basin	4%	42%
Zuni/Bluewater River Basin	88%	64%

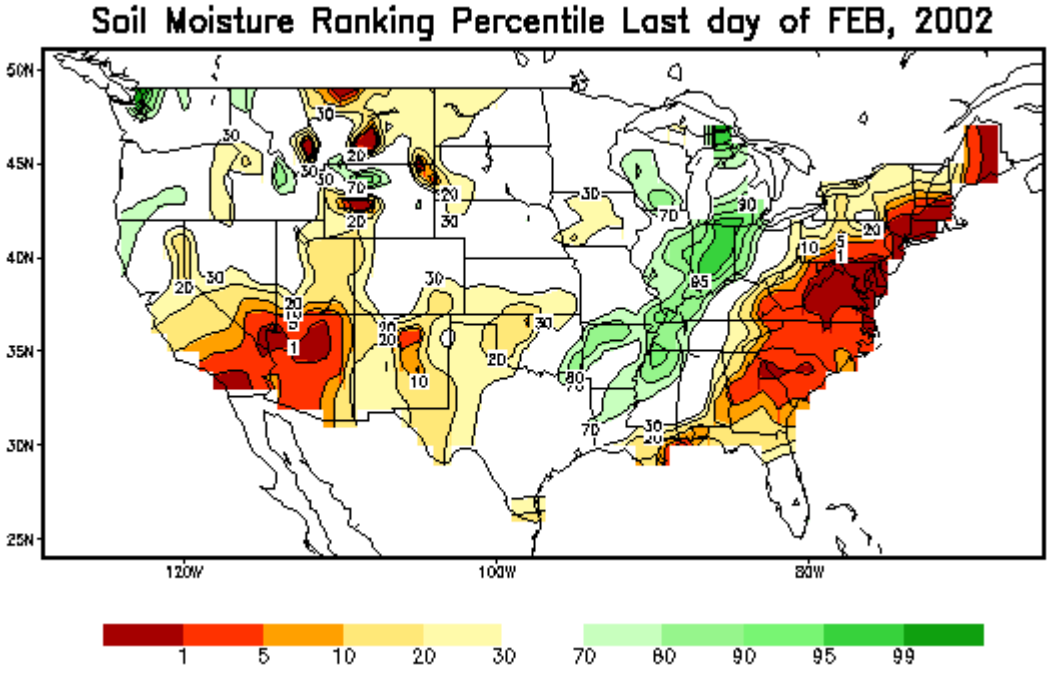
Arizona	Snow Water Equivalent (% of Avg)	Total Precipitation (% of Avg)
Verde River Basin	3%	33%
Central Mogollon Rim	8%	31%
San Francisco River Basin	52%	42%
Upper Gila River Basin	25%	34%

Reference: Natural Resources Conservation Service (NRCS), www.wcc.nrcs.usda.gov

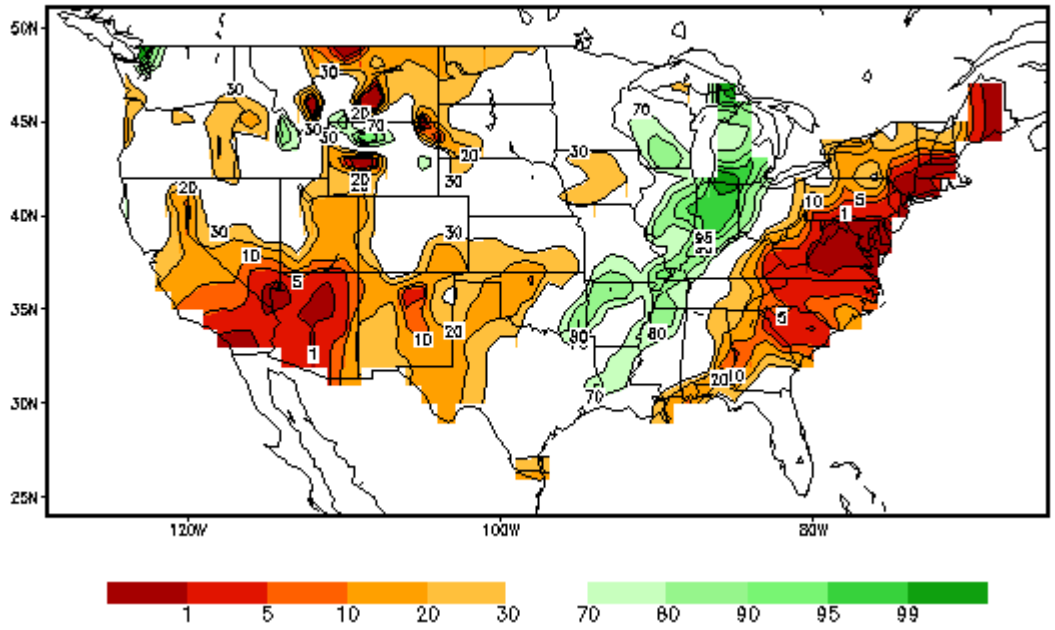
Soil Moisture

Soil moisture in the Southwest reflects the below normal precipitation across the region. In northern Arizona, soil moisture is at its driest levels since 1932. The soil moisture, on average across Arizona, ranks as the 5th driest in 70 years. In New Mexico, soil moisture conditions are not as severe as in Arizona, but are still substantially below average. Conditions from the Jemez Mountains southward through the Sandia and Manzano Mountains are the driest in the state ranking 10th and less. These conditions are persisting into March and spreading across wider areas.

Soil Moisture Ranking Percentile for February 2002



Soil Moisture Ranking Percentile for March 6, 2002



Soil moisture is estimated by a one-layer hydrological model. The model takes observed precipitation and temperature and calculates soil moisture, evaporation and runoff. The potential evaporation is estimated from observed temperature.

Reference: NOAA/NWS Climate Prediction Center, www.cpc.noaa.gov/products/soilmst/index.html

El Niño / La Niña

There is consensus that a transition into an El Niño pattern is taking place, however, this will take place sometime later in the year. It will not likely have any impact on the upcoming fire season in the Southwest Area.

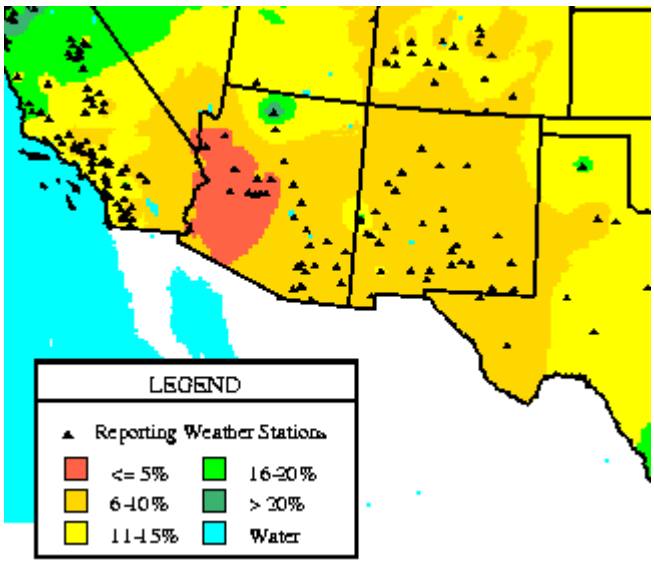
Fuels

Sufficient fine fuel cover exists over most of the Southwest Area. These fuels, for the most part, are currently cured. Because of the below average snowfall and precipitation through the winter, last years carryover dead grass is still standing and will be able to carry fire earlier than usual.

With regard to heavy fuels, 1000-hour fuel moistures are ranging from 10-15 percent compared to the average of 18-25 percent for this time of year. Areas with snowpack will likely have values closer to the average for this time of the year. In northern Arizona, foliar moisture in Ponderosa Pine is near normal (110 – 120 percent) levels.

1000-hour Fuel Moisture

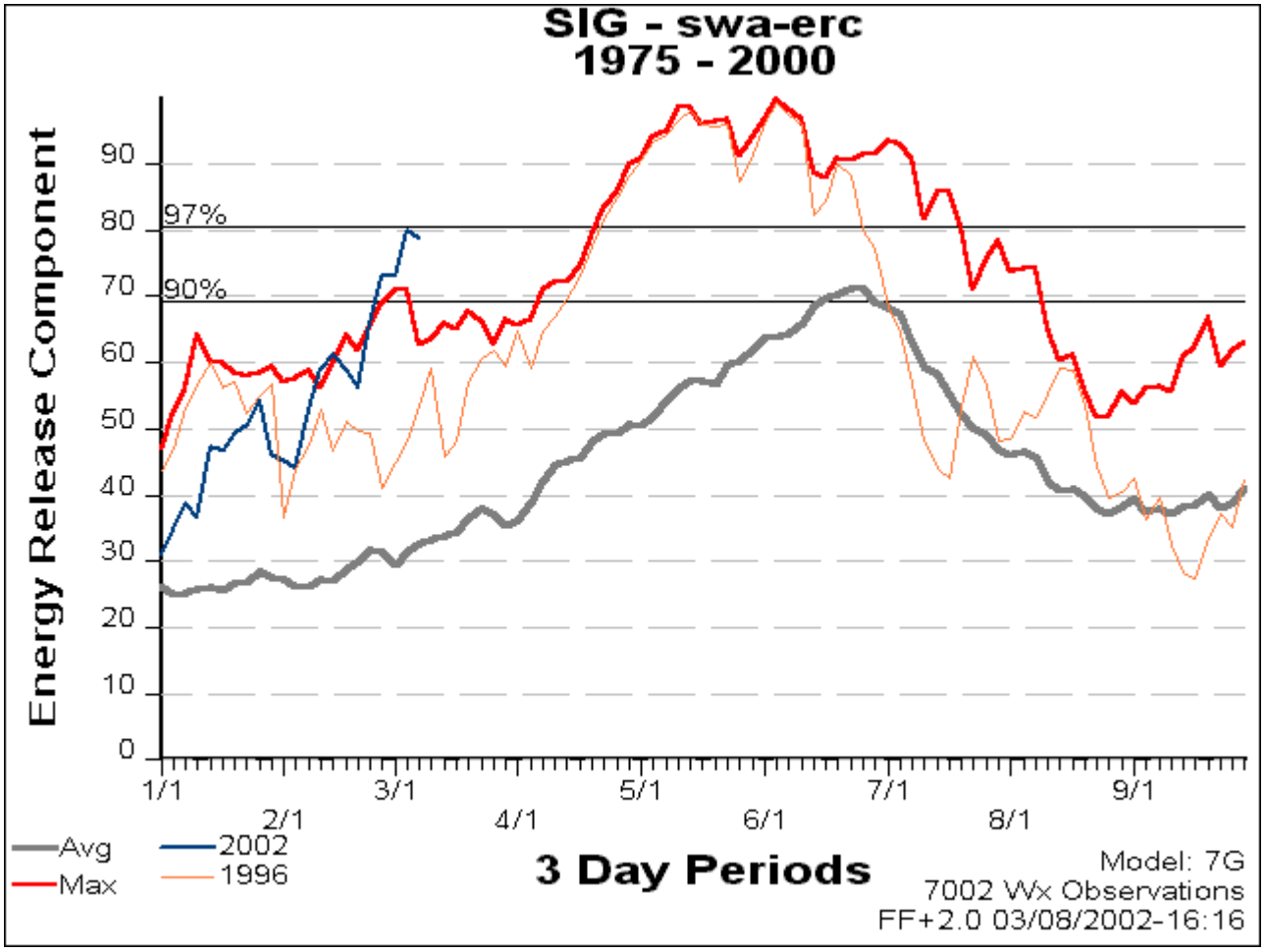
for March 6, 2002



Reference: Wildland Fire Assessment System (WFAS), www.fs.fed.us/land/wfas/map_list.htm

Fire Danger

As of March 6, 2002 high or higher fire danger conditions exist at most locations below 8,500 feet that do not have snow cover. Some locations have also been in the extreme condition from time to time. Most locations above 8,500 feet are currently experiencing low to high fire danger with south facing slopes in the high rating and snow covered areas rated as low. The area wide average ERC are running just under the 97th percentile and are currently setting records for this time of year.



III. OUTLOOK

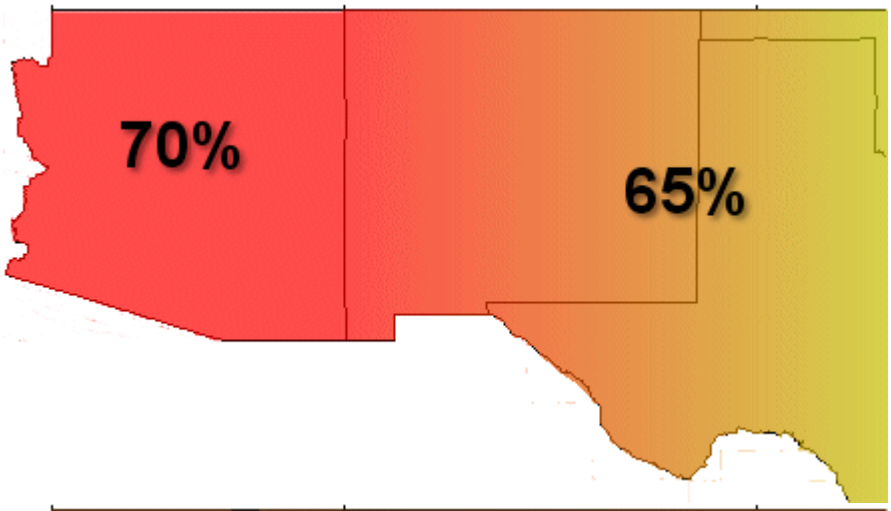
Seasonal Climate

Above average temperature on average is expected across the entire Southwest area for both seasons. The probability for above average temperature in Arizona is 70% and for New Mexico and western Texas 55% for both seasons. Below average precipitation is expected in Arizona for both seasons. Higher probabilities are noted for spring (MAM – 65%) than for summer (JJA – 55%). For New Mexico and western Texas during spring, the probability is only 55% for below average precipitation. The 50% probability for JJA means that no forecast consensus could be reached for that area.

Temperature

March-May

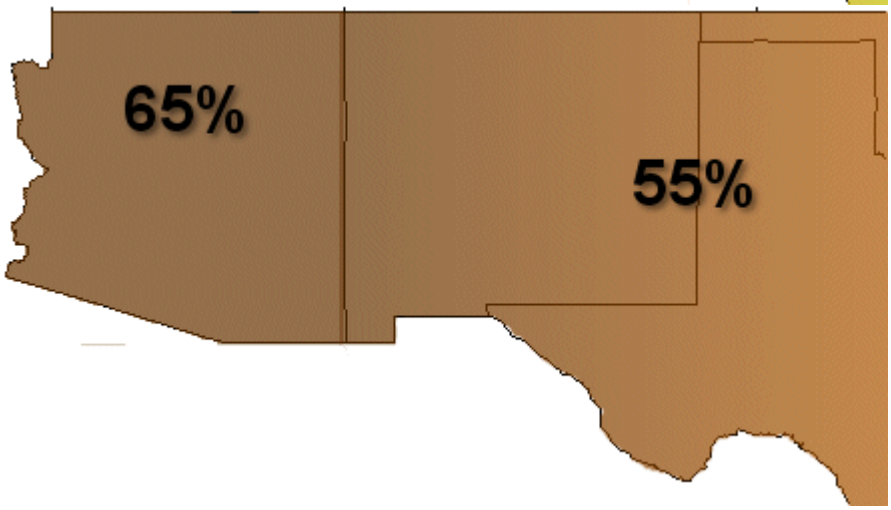
2002



Precipitation

March-May

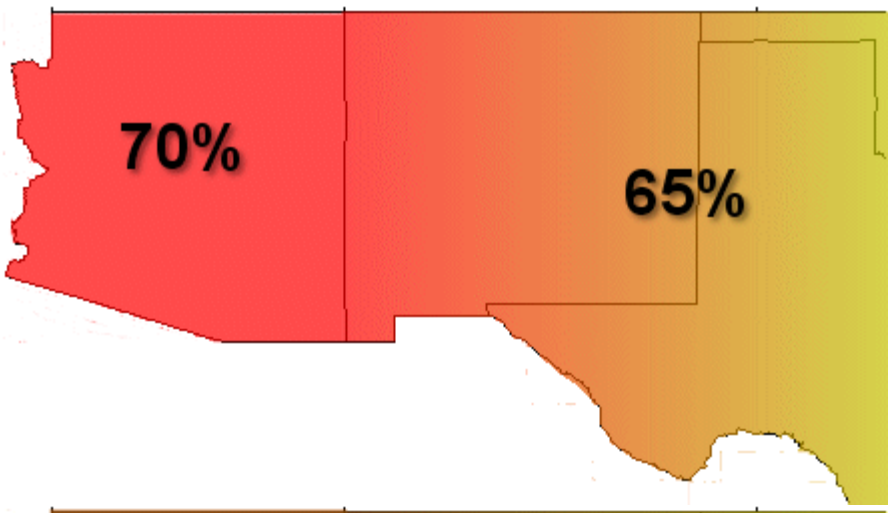
2002



Temperature

June-August

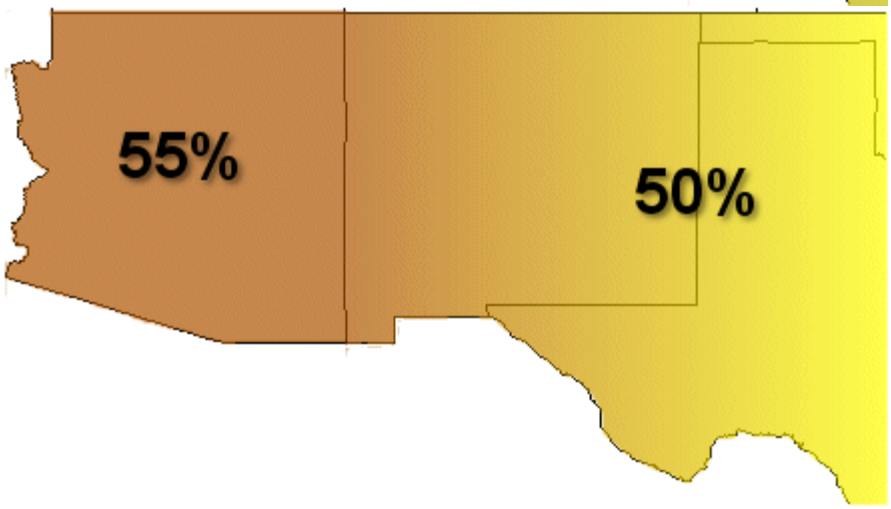
2002



Precipitation

June-August

2002



A 2-category (above and below normal) probability outlook for temperature and precipitation was produced for two seasons, including March, April and May (MAM), and June, July and August (JJA). Temperature and precipitation were examined separately, but as the forecasts were generated, correlations between the two parameters were considered. As part of the procedure for producing the outlook, forecasters started with probabilities of 50% (a 50-50 chance) of above or below normal. The forecasters then determined whether or not a particular category (e.g., above normal) is favored. For example, if the forecasters determined a 10% chance of the above normal category occurring, then the probability of the above normal category becomes 50% + 10%, or 60%. The higher the percent above 50 indicates a relative increase in forecast confidence. Given the current state of art for climate forecasting, 5% would be considered low confidence, and 20% fairly high confidence. A forecast probability of 50% means no forecast confidence for either category.

These seasonal climate outlooks were developed by national climate forecast experts* on March 5, 2002 in conjunction with the Fire in the West 2002 workshop.**

Seasonal Weather Factors

March - One or two storm systems are expected to pass through the southwest area during March. Even if these storms produce considerable precipitation, the most likely outcome the season would be delayed, but severity would not be greatly reduced. Southern portions of the southwest area will likely see red flag conditions during the month.

April - One or two storm systems may pass through the southwest area during April, but again, none of these are expected to significantly change the outcome of the season, other than delaying large fire occurrence. By end of April, the area begins to experience the climatological dry season, which is expected to be enhanced by the predicted dry conditions for the spring overall.

May - No widespread precipitation events are expected during May. Continued above normal temperatures and below average precipitation are expected. Large-scale wind events should also begin to taper off during the month, with a corresponding increase of dry lightning occurrence, especially over the Continental Divide and Mogollon Rim.

June - June is expected to be much above normal in temperature and below normal in precipitation. The potential exists for frequent dry lightning. It would not be unreasonable to see a pre-monsoonal surge during late June. Winds will probably be fairly light overall across the area.

July - The best estimate for monsoon onset this year is the climatological average of early July, and of at least average intensity for its duration.

Fuels

Greenup of annual herbaceous fuels will occur earlier than normal and will not be as strong due to the warm and dry conditions. Persistence of the warm and dry conditions will accelerate the curing process, such that annual herbaceous fuels will be able to carry fire earlier. The same condition applies to perennial fuels leading to a low live to dead ratio. Thus, these fuels will be more susceptible to carrying surface fire than would be normally expected.

Currently, 1000 hour fuel moistures are at record low values, however, it is expected that short episode events during March and April will result in some recovery. By May, it is expected that fuel moisture will reach near record low values, thus suggesting an increase of available fuels.

Given the expected state of both herbaceous and dead fuels, a higher probability of ignition will exist from any ignition source. This applies especially to all of Arizona and selected areas in New Mexico that are experiencing dry conditions. These expected conditions may begin as early as mid-April, which is earlier than normal.

Fire Danger

MOST LIKELY SCENARIO (70% Probability)

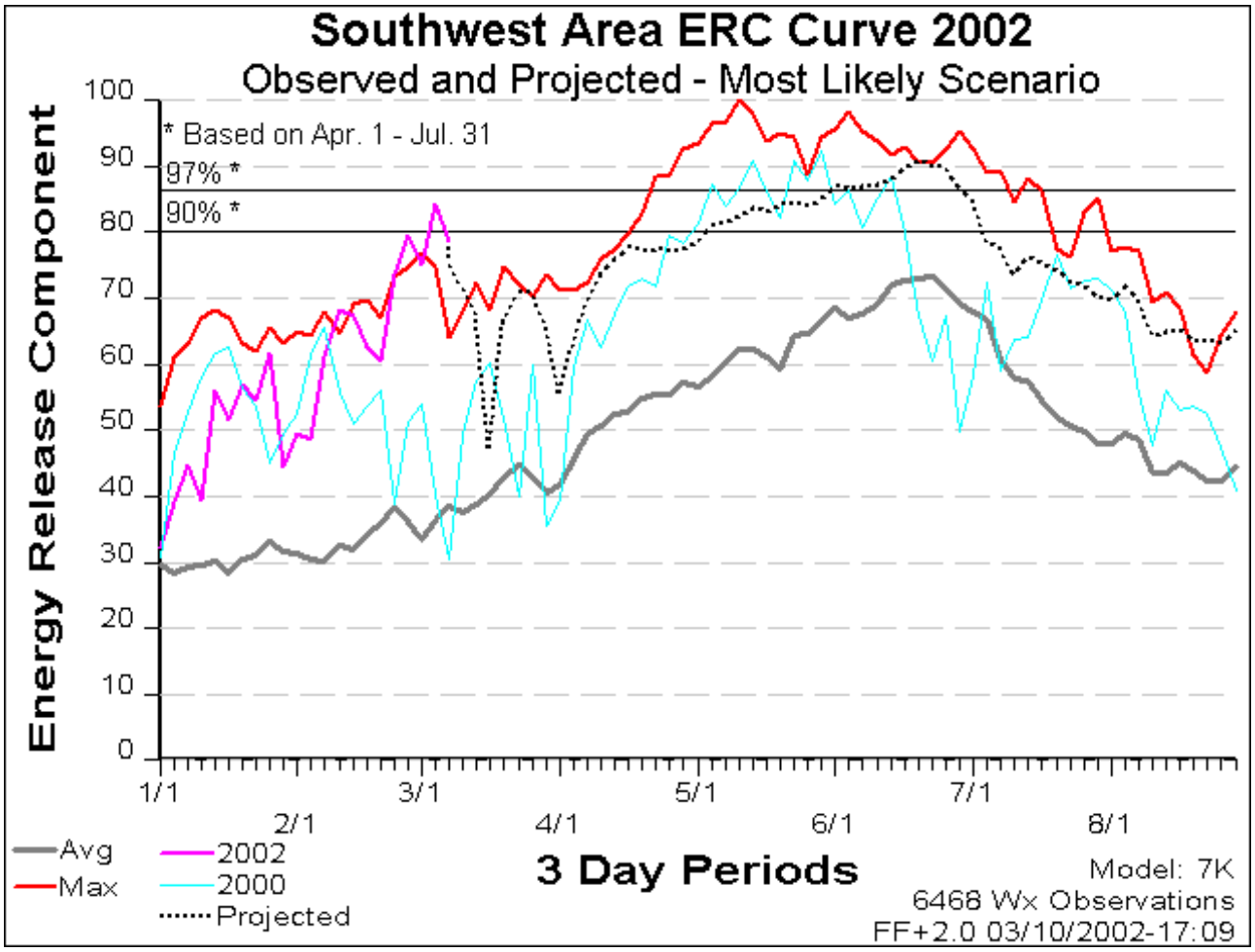
The forecast for the spring/summer fire season in the Southwest Area features a continuation of the above normal temperatures and below normal precipitation which has dominated the weather for the last 6 months. Additionally, fire danger is currently high or higher in most areas as of March 10, 2002. The current situation coupled with the weather outlook should result in fire danger to be much above normal for all elevations through the fire season. Large acreage fire potential will also be above normal leading to extended attack. Mop-up will be much more critical due to the spotting potential and increased risk of escape

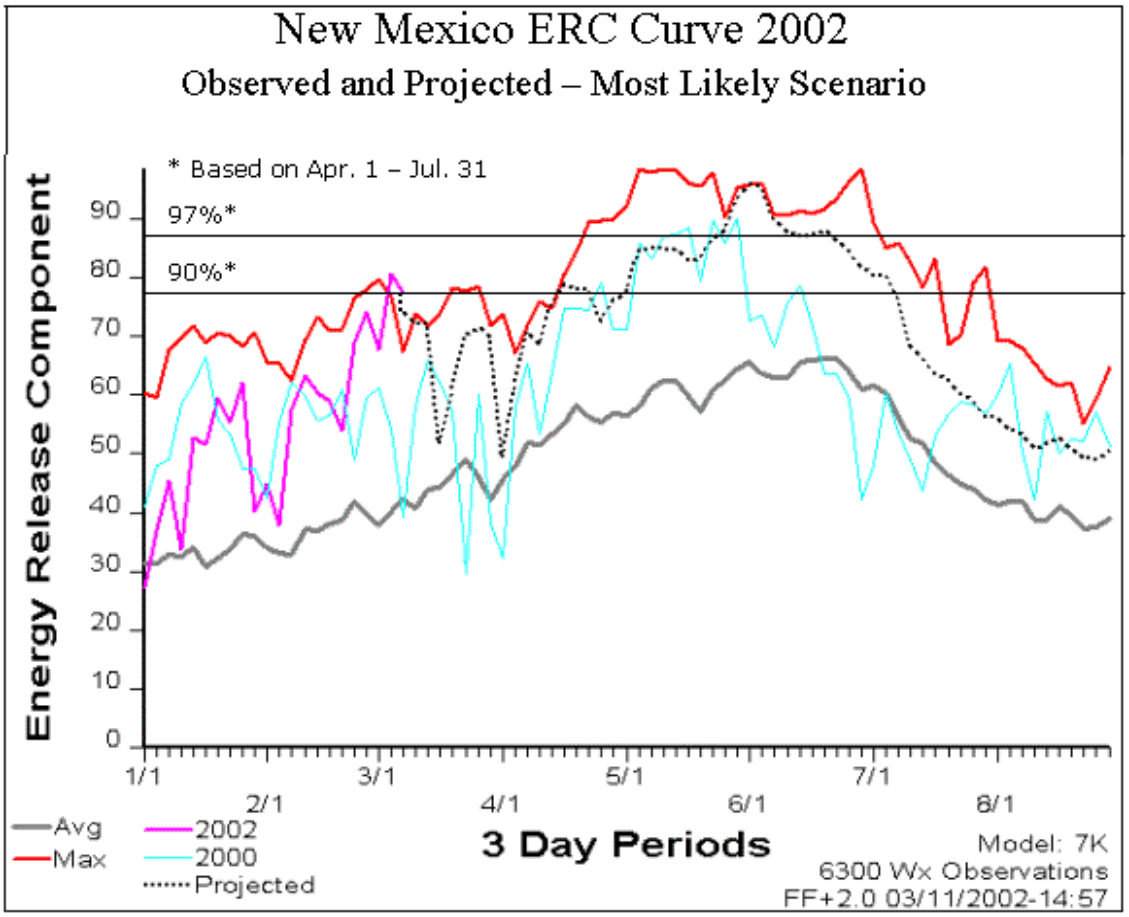
Some precipitation events in March and April will briefly lower fire danger and delay the fire season but should have little impact on the overall seasonal severity. The onset of the summer monsoon is expected to be normal and it's intensity is also expected to be near normal.

Large scale strong wind events will occur earlier this year in March and April but should also end somewhat earlier than usual in May. This should lead to below normal Red Flag events in May and June. Wind events in March and April will be required to push fires into extreme conditions though less windier conditions in May and June will result in more plume dominated fire conditions.

Given the state of the herbaceous and dead fuels, a higher probability of ignition will exist from any ignition source. Ignition sources in March and April are likely to be human caused, while starts in May and June will more likely be caused by dry lightning. Dry lightning in May and June could also lead to several episodes of multiple starts per day.

Area average ERC values will be near or exceed record levels several times throughout the season. Area average ERC values should be near or above the critical 90th percentile for 8 to 10 weeks from mid April through early July. ERC values will also rise above the critical 97th percentile for a period of 2 to 3 weeks in June.


Southwest Area ERC Curve 2002
Observed and Projected - Most Likely Scenario
* Based on Apr. 1 - Jul. 31
97% *
90% *
Energy Release Component
100
90
80
70
60
50
40
30
20
10
0
1/1
2/1
3/1
4/1
5/1
6/1
7/1
8/1
Avg
Max
2002
2000
Projected
3 Day Periods
Model: 7K
6468 Wx Observations
FF+2.0 03/10/2002-17:09


New Mexico ERC Curve 2002
Observed and Projected – Most Likely Scenario
* Based on Apr. 1 – Jul. 31
97%*
90%*
Energy Release Component
0
10
20
30
40
50
60
70
80
90
1/1
2/1
3/1
4/1
5/1
6/1
7/1
8/1
3 Day Periods
Avg
Max
2002
2000
Projected
Model: 7K
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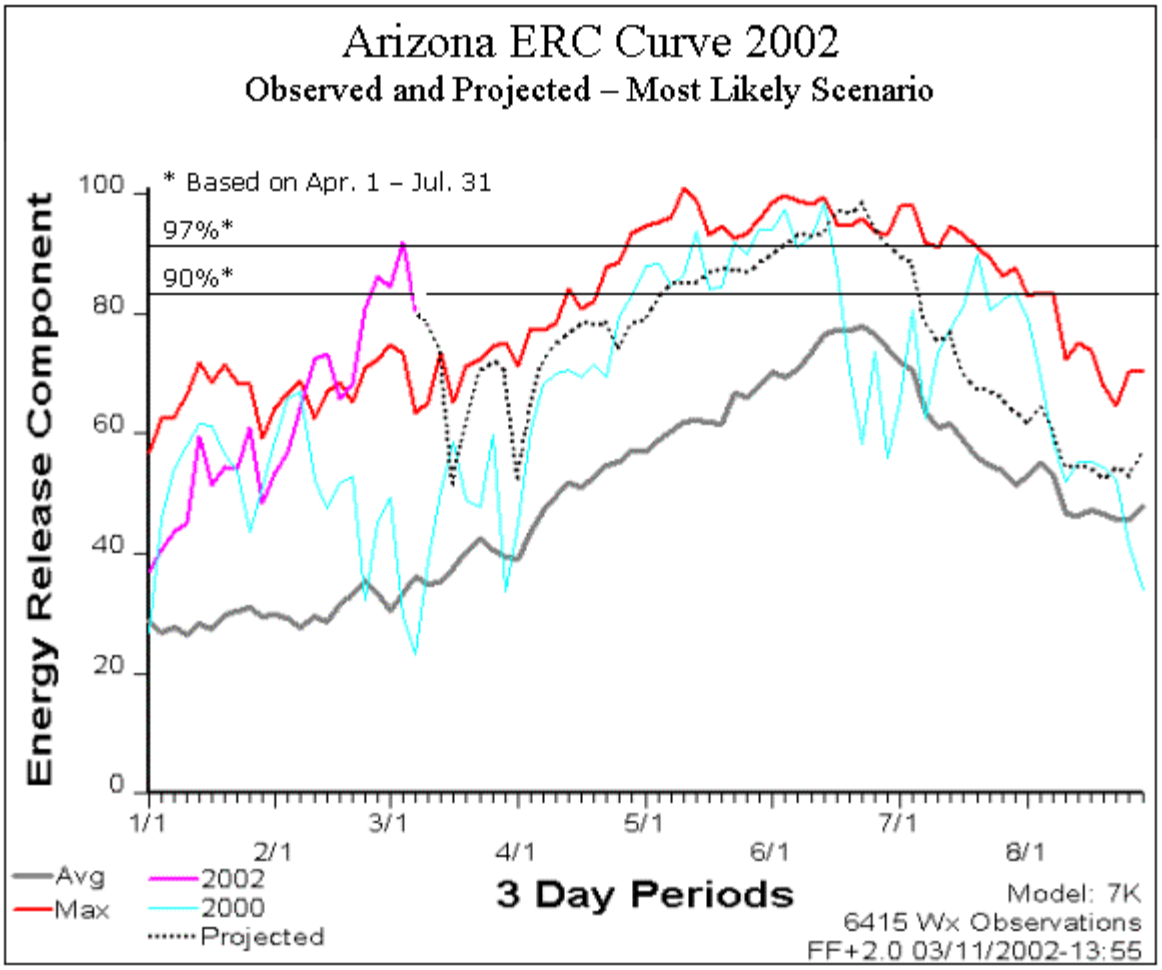
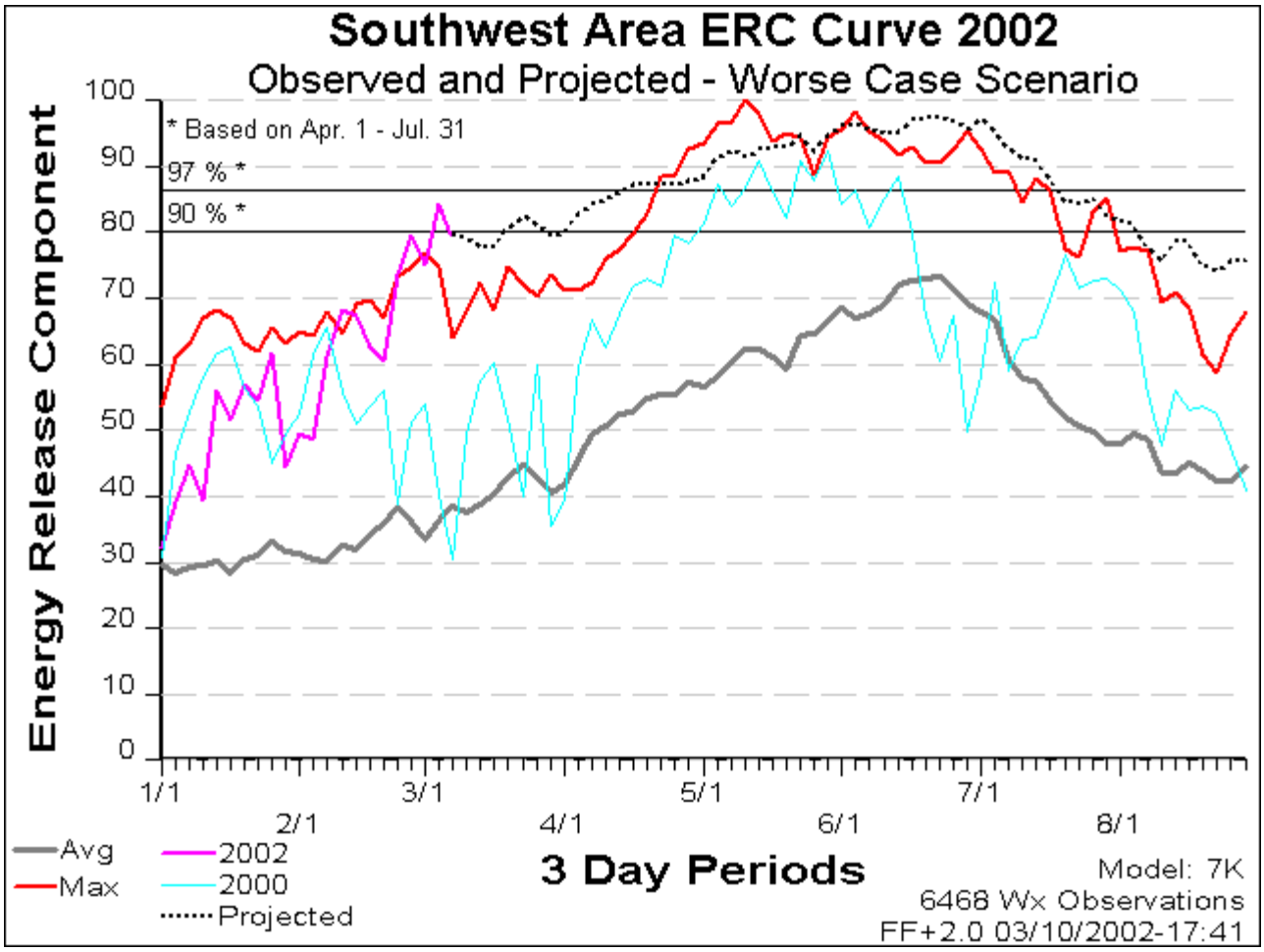


WORST CASE SCENARIO (10% Probability)

The worst case scenario entails a worsening of the drought conditions currently being experienced across the Southwest Area. This scenario assumes that no further significant precipitation occurs until the onset of the summer monsoon season. The result of this forecast coupled with current conditions will produce extreme fire danger conditions through much of the season in all areas. Large acreage potential will be very high with fires that escape initial attack and quickly transition from surface fires to crown fires. Any escaped fires will be extremely resistant to control, more likely to transition to plume dominated and exhibit the potential for long range spotting. Large commitments of resources for multiple fires in timber fuel types will further stretch initial attack capabilities.

Area wide average ERC values in this scenario exceed record values several times during the season. The critical 90th percentile is surpassed early in the season and area wide average ERC values remain above this level in excess of 16 weeks through the end of July. The area wide average ERC values rise above the critical 97th percentile in early April and remain above or near record values for 12 weeks through early July.


Southwest Area ERC Curve 2002
Observed and Projected - Worse Case Scenario
Energy Release Component
* Based on Apr. 1 - Jul. 31
97 % *
90 % *
100
90
80
70
60
50
40
30
20
10
0
1/1
2/1
3/1
4/1
5/1
6/1
7/1
8/1
Avg
Max
2002
2000
Projected
3 Day Periods
Model: 7K
6468 Wx Observations
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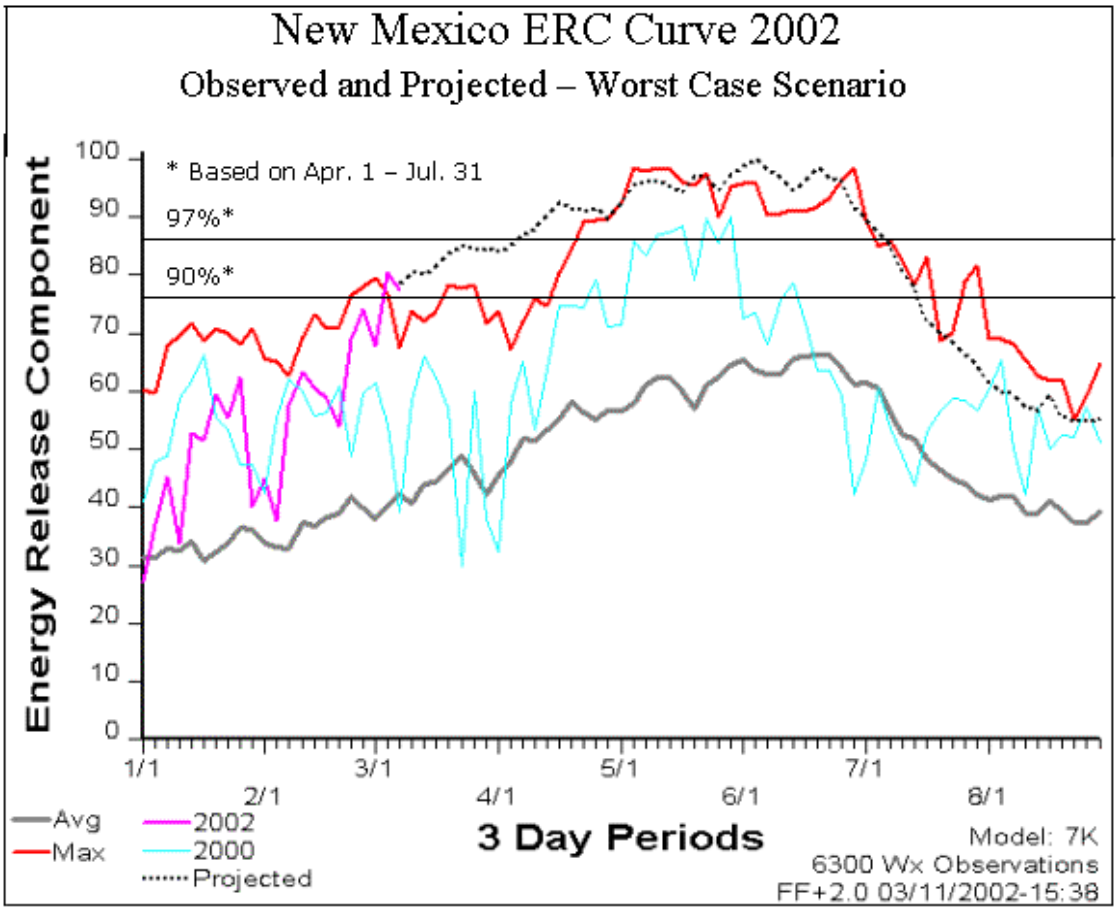
New Mexico ERC Curve 2002
Observed and Projected – Worst Case Scenario
Energy Release Component
100
90
80
70
60
50
40
30
20
10
0
* Based on Apr. 1 – Jul. 31
97%*
90%*
1/1
2/1
3/1
4/1
5/1
6/1
7/1
8/1
3 Day Periods
Avg
Max
2002
2000
Projected
Model: 7K
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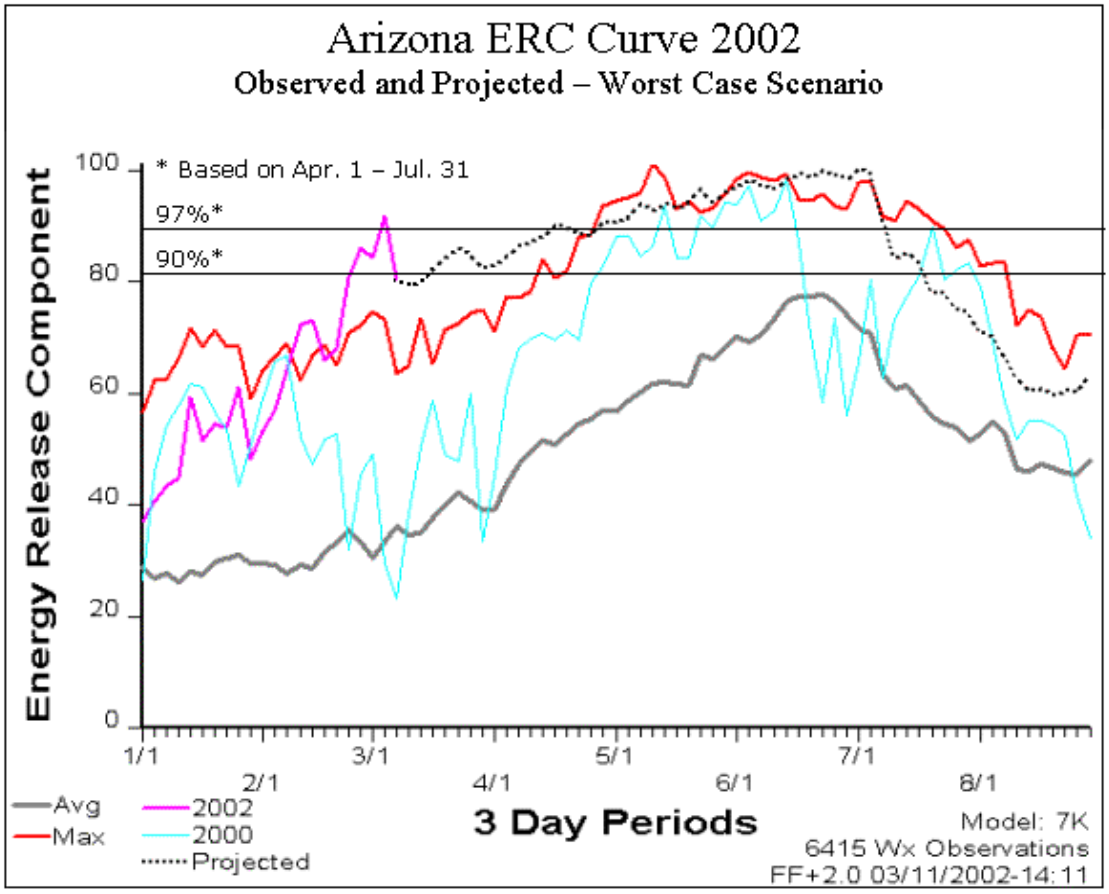
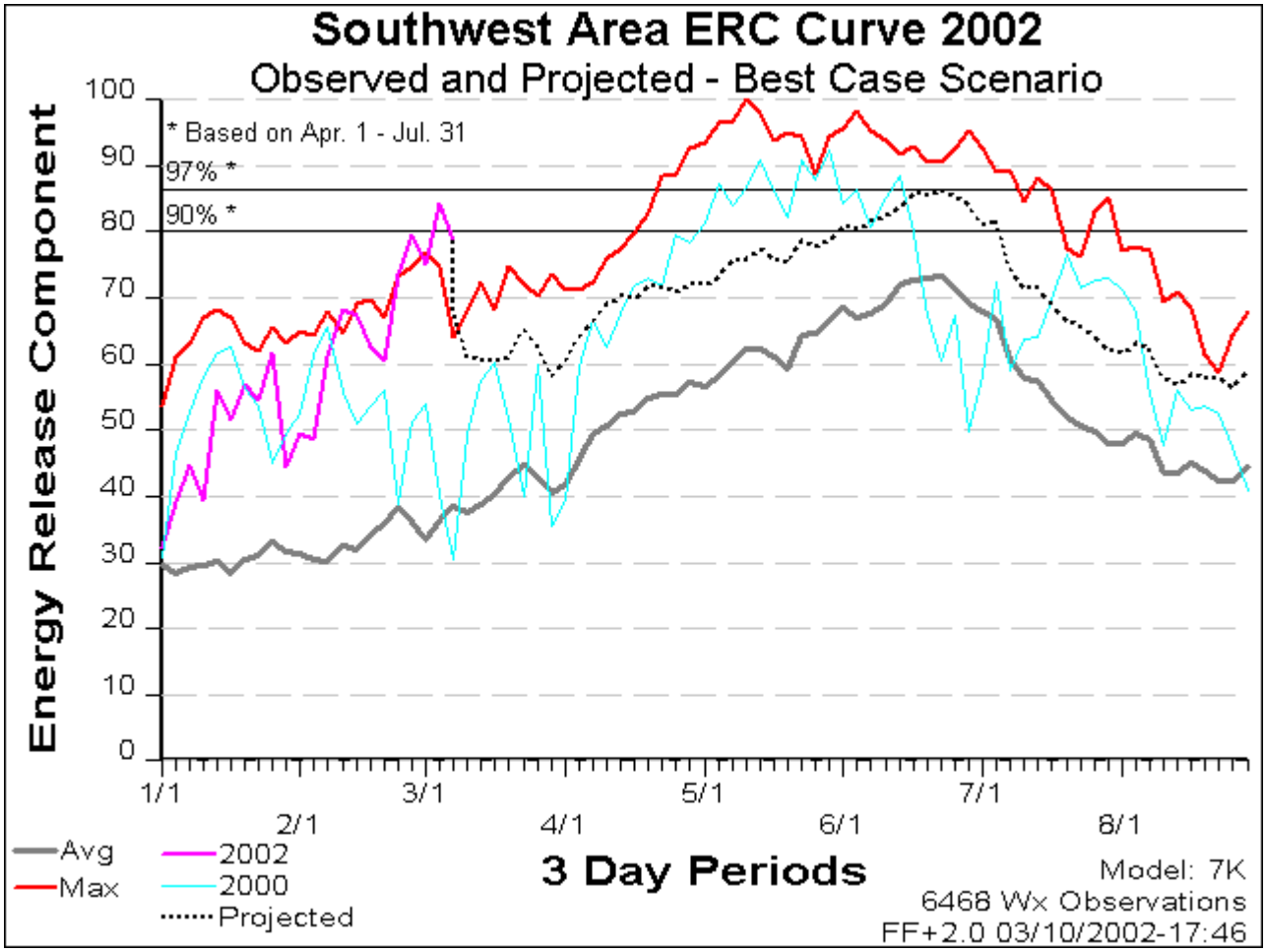
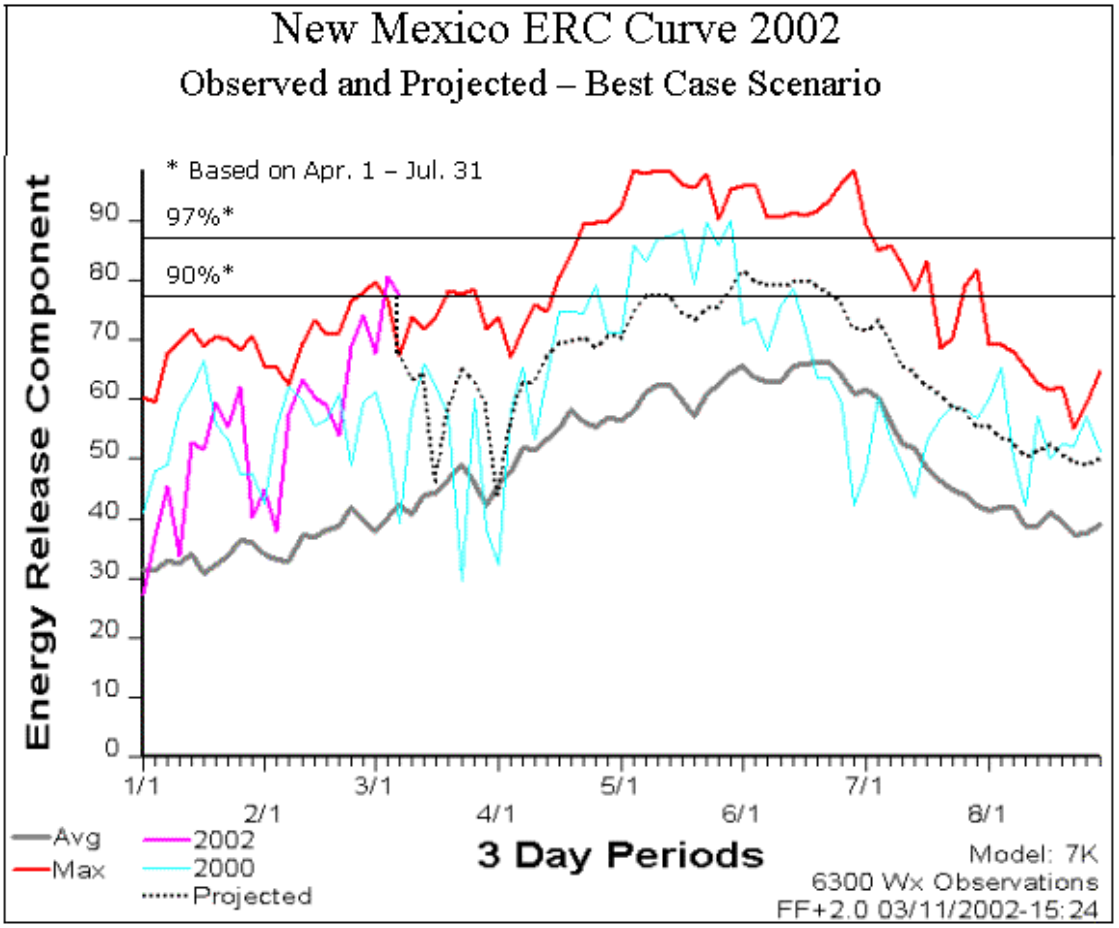

Arizona ERC Curve 2002
Observed and Projected – Worst Case Scenario
Energy Release Component
100
80
60
40
20
0
* Based on Apr. 1 – Jul. 31
97%*
90%*
1/1
2/1
3/1
4/1
5/1
6/1
7/1
8/1
Avg
Max
2002
2000
Projected
3 Day Periods
Model: 7K
6415 Wx Observations
FF+2.0 03/11/2002-14:11

BEST CASE SCENARIO (20% Probability)

The best case scenario involves several precipitation events and a return to more normal temperatures through the spring/summer season. This scenario will help to alleviate the potential for extreme conditions. Large acreage potential will also be about normal. Though in this scenario fire danger remains above normal it should be more manageable and less resource intensive.

Area wide average ERC values in this scenario do not exceed record values during the season. The critical 90th percentile is surpassed early in June and remains at that level for approximately 3 weeks. The area wide average ERC values does not rise above the critical 97th percentile.




New Mexico ERC Curve 2002
Observed and Projected – Best Case Scenario
* Based on Apr. 1 – Jul. 31
97%*
90%*
Energy Release Component
0
10
20
30
40
50
60
70
80
90
1/1
2/1
3/1
4/1
5/1
6/1
7/1
8/1
3 Day Periods
Avg
Max
2002
2000
Projected
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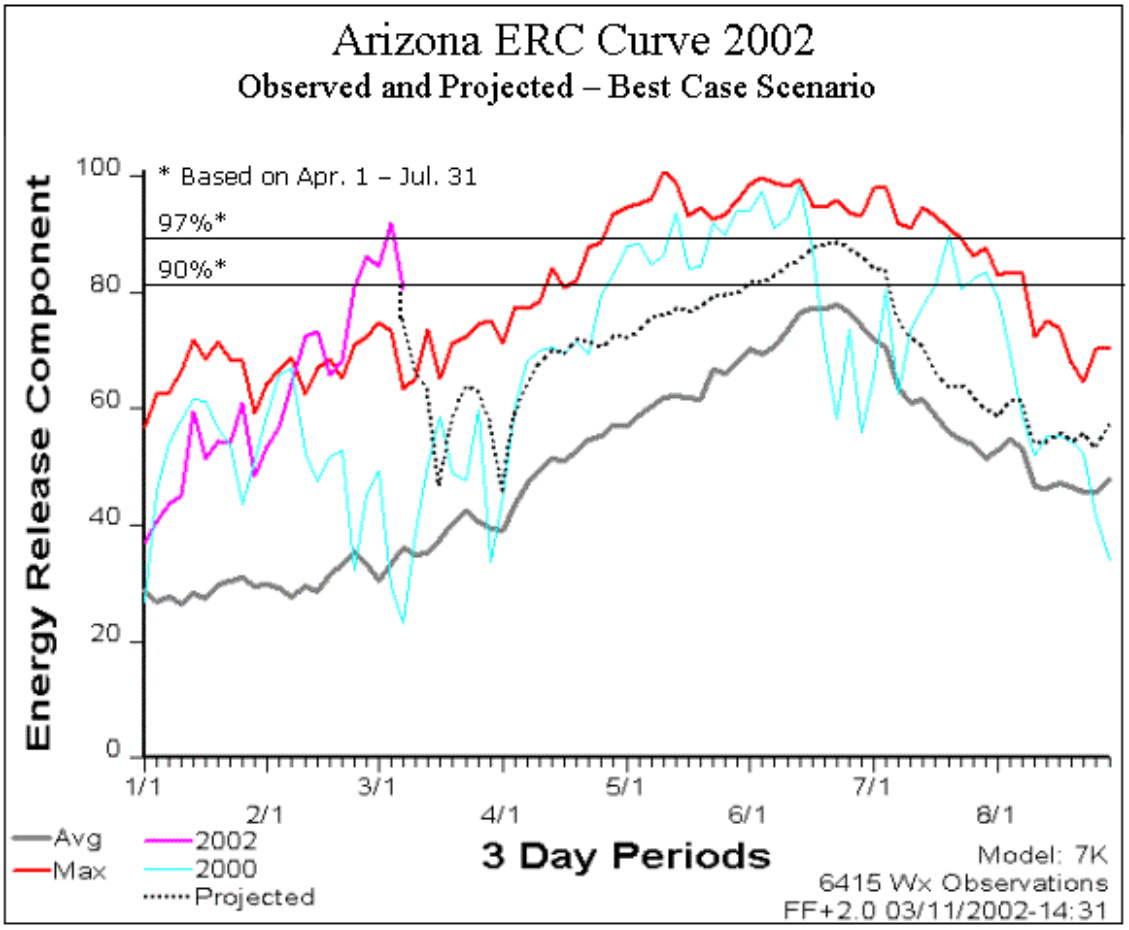

Reference: ERC Charts produced by Intelligence and Predictive Service, Southwest Coordination Center

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