

Job Aid 9. Climatological Breakpoints

Introduction

The key element of Climatological Breakpoints is that they are based only on weather. They do not consider historical fire occurrence. Climatological Breakpoints are described as percentiles relative to a whole. For example, the value of the 90th Percentile ERC is the Climatological Breakpoint at which only 10 percent of the ERC values are greater.

The percentiles used in WIMS for Climatological Breakpoints follow agency standards.

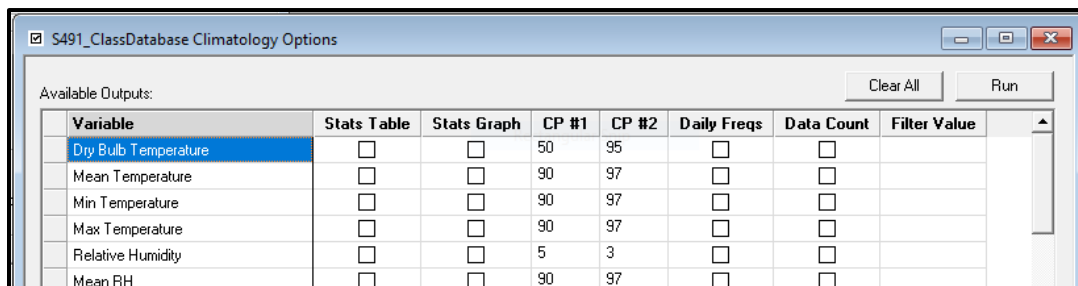
- The Forest Service, Bureau of Indian Affairs, Fish & Wildlife Service, and National Park Service use the 90th and 97th Percentiles.
- The Bureau of Land Management uses the 80th and 95th Percentiles.

Determining Climatological Breakpoints: FireFamilyPlus

In FireFamilyPlus, there are three methods to determine Climatological Breakpoints. The path for all of them is **Weather > Climatology** or the Climatology shortcut icon.



In each method, the user can keep the default critical percentiles or change them in the CP #1 and CP #2 columns in the **Climatology Options** window.

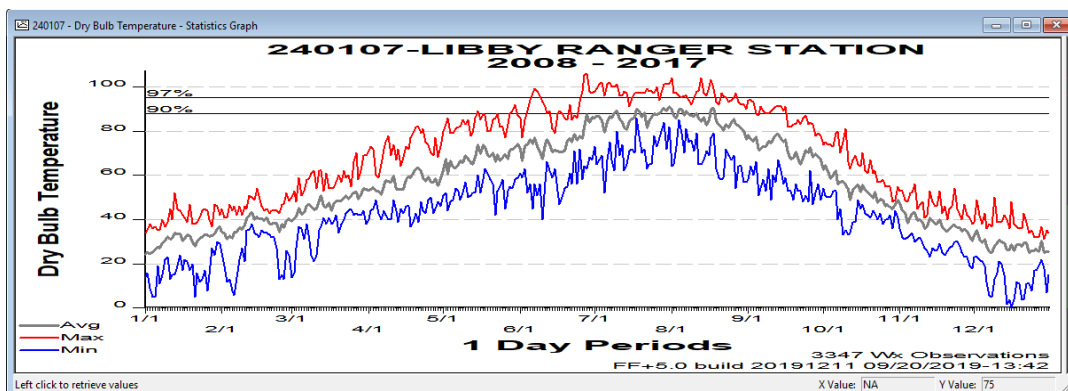


Variable	Stats Table	Stats Graph	CP #1	CP #2	Daily Freqs	Data Count	Filter Value
Dry Bulb Temperature	<input type="checkbox"/>	<input type="checkbox"/>	50	95	<input type="checkbox"/>	<input type="checkbox"/>	
Mean Temperature	<input type="checkbox"/>	<input type="checkbox"/>	90	97	<input type="checkbox"/>	<input type="checkbox"/>	
Min Temperature	<input type="checkbox"/>	<input type="checkbox"/>	90	97	<input type="checkbox"/>	<input type="checkbox"/>	
Max Temperature	<input type="checkbox"/>	<input type="checkbox"/>	90	97	<input type="checkbox"/>	<input type="checkbox"/>	
Relative Humidity	<input type="checkbox"/>	<input type="checkbox"/>	5	3	<input type="checkbox"/>	<input type="checkbox"/>	
Mean RH	<input type="checkbox"/>	<input type="checkbox"/>	90	97	<input type="checkbox"/>	<input type="checkbox"/>	

Stats Graph

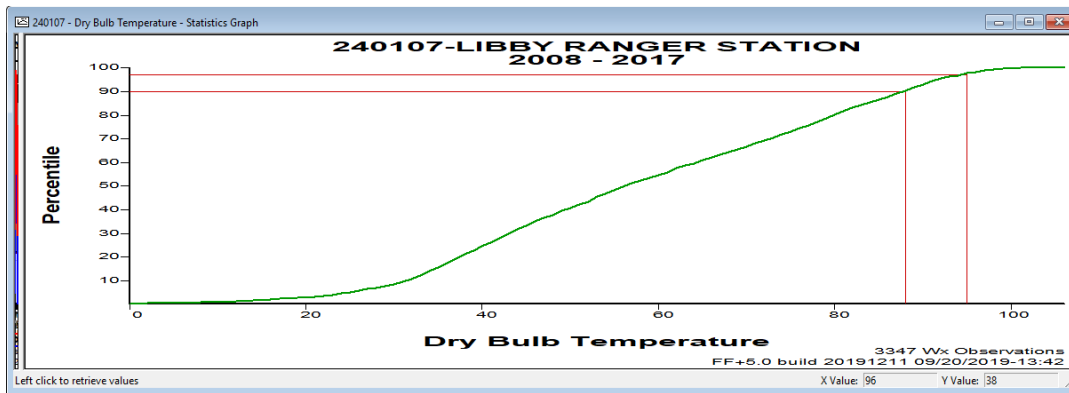
In a Stats Graph, CP #1 and CP #2 are displayed. Only the values for the two critical percentile lines can be determined. Click on either of them on the left axis. View the value in the lower right-hand corner. In this example, the 90th Percentile value is 88°F.

Tip: Look at the Y Value.



Percentile Graph

In a Percentiles Graph, CP #1 and CP #2 are displayed using red lines. Click any place along the green line to view the values (X Value) and associated percentile (Y Value) in the lower right-hand corner.



Unlike on the Stats Graph, you can find the value for any percentile value you would like on the Percentiles Graph. For example, the 68th Percentile for Dry Bulb Temperature is 74°F.

Daily Frequency Report

In the Daily Frequency Report, CP #1 and CP #2 are displayed at the top of the table. In this example, the 90th Percentile is 88°F and the 97th Percentile is 95°F.

Variable: Dry Bulb Temperature				
90% = 88.00				
97% = 95.00				
3347 Days				
Range	Frequency	Relative %	Cumulative %	
0.0 - 1.8	1	0.03	0.03	
2.0 - 3.8	1	0.03	0.06	
4.0 - 5.8	8	0.24	0.30	
6.0 - 7.8	3	0.09	0.39	
8.0 - 9.8	6	0.18	0.57	
10.0 - 11.8	5	0.15	0.72	
12.0 - 13.8	12	0.36	1.08	
14.0 - 15.8	12	0.36	1.43	
16.0 - 17.8	17	0.51	1.94	
18.0 - 19.8	15	0.45	2.39	

The table can also be used to determine other percentiles and associated values. Use the Cumulative % column and scroll down to find the percentile you wish to determine. Then, look at the left-most column for Range and find the variable value. For example, the 9th percentile is about 31°F, while the 15th Percentile is about 35°F.

You can also read the table the other way. You can scroll through the Range column to find the value that you are interested in. Then, look at the right-most column to find the associated percentile. For example, a temperature of 24°F is the 4.75th (or 5th) Percentile.

Defining Climatological Breakpoints: WIMS

Currently in WIMS, the Staffing Index Percentile Levels and Values represent the Climatological Breakpoints used by fire management agencies to guide agency decisions. You select the index in the Station Catalog in the section titled **Display/Edit Default NFDRS Parameters**. The Staffing Index Breakpoints section is highlighted in the blue box and shown in expanded form in the next image.

***** Display/Edit Default NFDRS Parameters *****

Station ID: 241513 Effective Date: 26-Nov-19 FindNFDR

Station Info | NFDRS Param | Extra Data Channels

79 & 88 NFDRS	100-hr	27	SOW Thresholds (No Precip last 24 Hrs)	Pct Pdb	SOW & Wet Flag Thresholds (Precip last 24 Hrs)	CC3* Default
88 NFDRS	1000-hr	26	PCHT_Clear	85	1HR_Drizzle (inches)	0.1
	1hr-10hr		PCHT_Scattered	75	1HR_Rain (inches)	0.15
	KBDI	160	PCHT_Broken	50	1HR_Showers (inches)	0.5
					3HR_DUR_WetFlag (hours)	2
					3HR_AMT_WetFlag (inches)	0.75
					24HR_DUR_WetFlag (hours)	10
					24HR_AMT_WetFlag (inches)	1.5

* Climate Class of the first priority Fuel Model (FC)

D e l	Active Fuel Models	P r i	ID	H S		Greenup Date	88 s b	S I p	G r s	C I l	A X D	S C M	Herb F A	Woody F A	X-1000	Staffing Idx Breakpoints					
				Herb Date	Greenup Date											Low	High	SI%	Val	SI%	Val
<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	7G	F	12-Oct-19	09-May-19		3-41-55%	P	2	L	30	35	60	26	5	90	59	97	69	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	2	7C	F	12-Oct-19	09-May-19		2-26-40%	A	2	L	32	35	60	26	5	90	18	97	20	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3	7H	F	12-Oct-19	09-May-19		3-41-55%	P	2	L	32	35	60	26	5	90	16	97	18	
<input type="checkbox"/>	<input type="checkbox"/>	4	16V					3-41-55%	P		L	108									
<input type="checkbox"/>	<input type="checkbox"/>	5	16W					3-41-55%	P		L	82									
<input type="checkbox"/>	<input type="checkbox"/>	6	16X					3-41-55%	P		L	104									
<input type="checkbox"/>	<input type="checkbox"/>	7	16Y					3-41-55%	P		L	9									
<input type="checkbox"/>	<input type="checkbox"/>	8	16Z					3-41-55%	P		L	19									
<input type="checkbox"/>	<input checked="" type="checkbox"/>																				

When Climatological Breakpoints are used, the 90th percentile represents the bottom of the “Very High” category, while the 97th percentile represents the bottom of the “Extreme” category. Decision Classes can range from 3 to 9. WIMS always computes staffing classes based on a 9-class system and converts them to the appropriate number of classes. In the NFDRS Parameters table, you define the DC (Display Classes) box in the Station Catalog. In the example below, all three models use ERC and have five decision classes. The Priority 1 model uses ERC-G (timber) from the 1978 system. They have selected the 90th and 97th percentiles for the Staffing Index (SI) and entered the associated Low and High values calculated in FireFamilyPlus.

D e l	Active Fuel Models	P r i	ID	Staffing Idx Breakpoints					
				SI	DC	Low		High	
						SI%	Val	SI%	Val
<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	7G	EC	5	90	59	97	69
<input type="checkbox"/>	<input checked="" type="checkbox"/>	2	7C	EC	5	90	18	97	20
<input type="checkbox"/>	<input checked="" type="checkbox"/>	3	7H	EC	5	90	16	97	18
<input type="checkbox"/>	<input type="checkbox"/>	5	16V						
<input type="checkbox"/>	<input type="checkbox"/>	6	16W						
<input type="checkbox"/>	<input type="checkbox"/>	7	16X						
<input type="checkbox"/>	<input type="checkbox"/>	8	16Y						
<input type="checkbox"/>	<input type="checkbox"/>	9	16Z						
<input type="checkbox"/>	<input checked="" type="checkbox"/>								

The WIMS computation is shown in the next table. In the WIMS User Guide, the top of the class is used. In S491, we refer to the value at the bottom of the class. Therefore, values in the third column have been converted to match our protocol. The ERC for SI-low (90th Percentile) is 59. The ERC for SI-high (97th Percentile) is 69.

Computed Class Level	Lower Value for Class	Calculated Value from SI Val in Image
1	SI = 0	0
2	SI-low/8	$59/8 = 7$
3	SI-low/4	$59/4 = 15$
4	$(\text{SI-low}) \times (3/8)$	$59 \times (3/8) = 22$
5	SI-low/2	$59/2 = 30$
6	$(\text{SI-low}) \times (3/4)$	$59 \times (3/4) = 44$
7	SI-low	59
8	$(\text{SI-low} + \text{SI-high})/2$	$(59 + 69)/2 = 64$
9	SI-high	69

Finally, WIMS converts these values to the correct number of decision classes. The Staffing Level for each Decision Class (3 to 9) is shown.

Computed 9-Class Level →	1	2	3	4	5	6	7	8	9
Desired Number of Staffing Levels ↓									
3	1	1	1	1	1	1	4	4	5
4	1	1	1	1	3	3	4	4	5
5	1	1	2	2	3	3	4	4	5
6	1	1	2	2	3-	3+	4	4	5
7	1	1	2	2	3-	3+	4-	4+	5
8	1	1	2-	2+	3-	3+	4-	4+	5
9	1-	1+	2-	2+	3-	3+	4-	4+	5

If you are using a SIG, WIMS needs to weight the stations to determine if the value on a given day is a “-” or “+”. It does this by weighting each staffing class.

More information about this calculation can be found in the [WIMS User’s Guide Appendix E: NFDRS Technical Reference](#).