

Massachusetts

Weather and Fire Danger- Rapid Wildfire Risk Assessment

Prepared by: Eastern Area – Decision Support Group 11/13/2024



Executive Summary

In response to expanding and elevated wildfire risk and an uptick in wildfire occurrence a wildfire risk analysis was conducted to assess the potential and expected fire environment in the State of Massachusetts for the remainder of the fall fire season. The analysis included a look at the current fire environment and extended forecast, fuels compared to normal for the time of year, National Fire Danger Rating System's Fire Danger Indices, and fire occurrence. *For a glossary of terms used in this assessment refer to the final page*

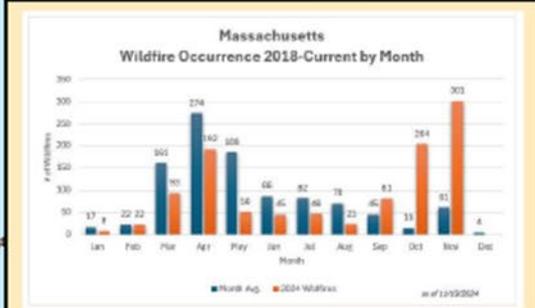
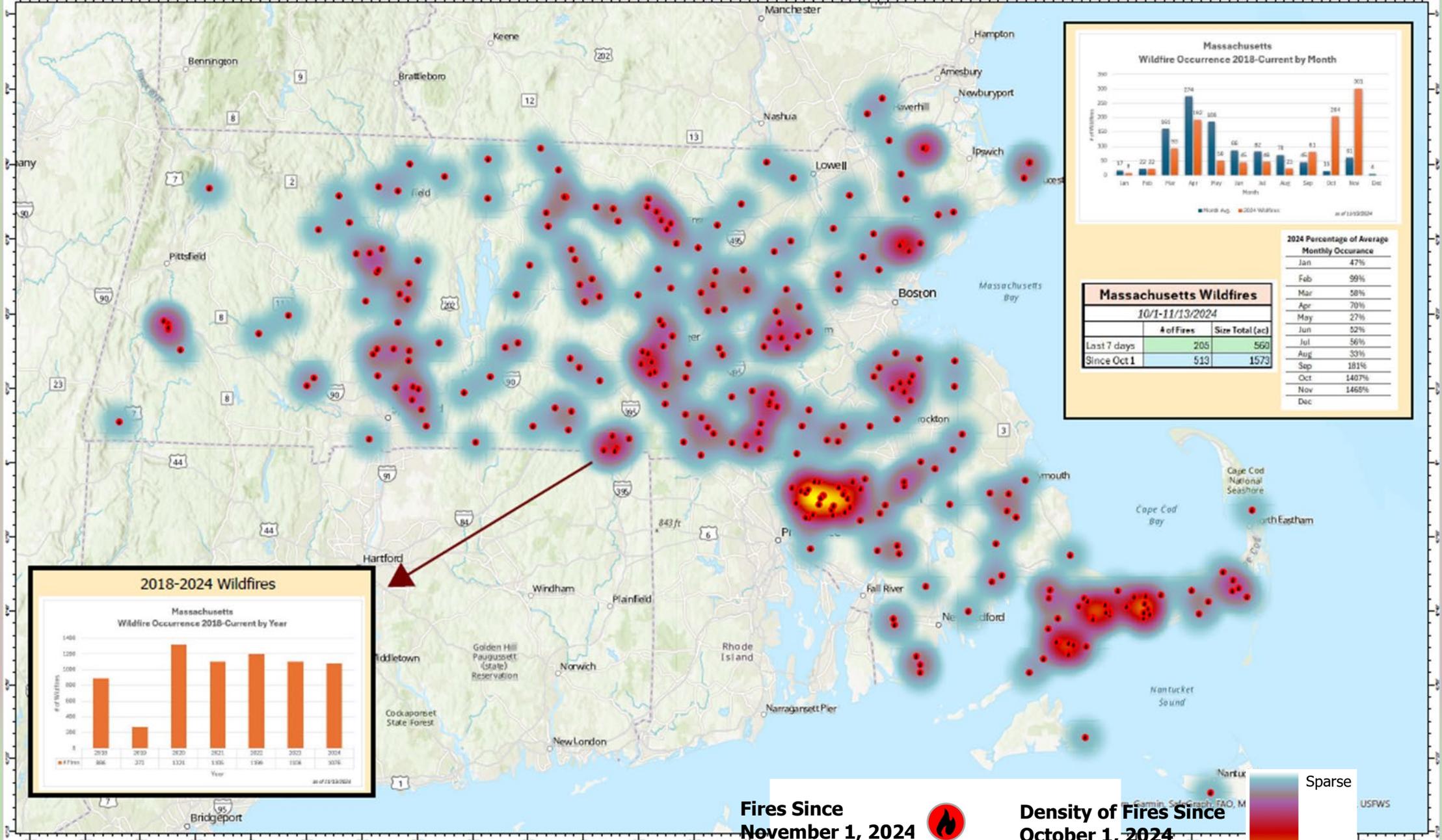
Rapid Assessment Findings and Recommendations

Based on current fuel conditions and forecasted weather conditions, the most likely scenario is an above average level of wildfire activity for the next week. This level of activity will likely cause some slight increase in firefighting resources being mobilized within a state.

- Greatest concern for elevated wildfire risk throughout the state continues to be Friday November 14, 2024. Combinations of low relative humidities (low 20s), critically dry and droughty fuels, and gusty winds (gusts in the low to mid-20s) should trigger Red Flag Warnings.
- Saturday November 15, 2024, will see increased winds again (sustained mid-teens, gusts mid to upper-20s) however, relative humidity values in the mid-30s should help moderate wildfire risk. Significant rates of spread and erratic fire behavior should still be expected on any new or extended attack incidents this day.
- Mild temperatures in the upper 40s and low 50s will persist over the New England Metro and the Mid-Atlantic States through Saturday afternoon.
- Mainly dry conditions are still being indicated in the NOAA 7-day total precipitation forecast into the mid-week over Massachusetts
<https://www.wpc.ncep.noaa.gov/qpf/p168i.gif>

- **The effects of long-term drought, coupled with below normal winter 2024/2024 precipitation, *could result in significantly elevated wildfire risk in the spring of 2025.* Wildfire managers should monitor this throughout the winter season**

- **Fire managers must consider potential extreme fire behavior, which can be expected with the current drought conditions under moderate fire weather conditions. As fire danger indices exceed the 97th percentile, extreme fire behavior and rapid-fire spread characteristics should be expected. Tactics should be altered to provide for firefighter and public safety.**
- **Do not expect any fire to be routine. Be prepared to utilize indirect tactics with extended mop-up. Utilize aerial supervision to help direct crews and keep them informed on fire behavior. Ensure that LCES is in place before engaging on any fire. Remember to STOP, THINK, and TALK before you ACT... and actively look for ways to minimize risk to firefighters in what is forecast to be a period of very high fire danger.**
- **Augmentation of initial attack resources will likely be required throughout the fall. This will result from increased fire behavior, fire spread, and longer mop-up times due to drought stressed fuels and soil.**
- **Additional resources, both ground and aviation, may be needed.**

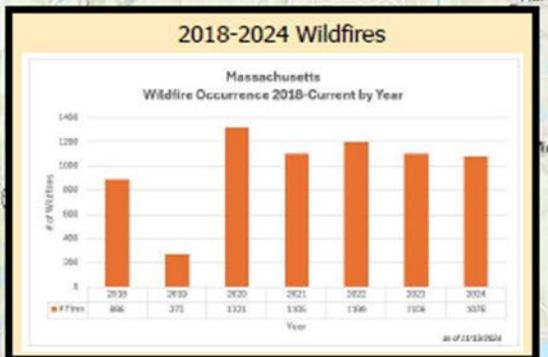


2024 Percentage of Average Monthly Occurrence

Month	Percentage
Jan	47%
Feb	99%
Mar	58%
Apr	70%
May	27%
Jun	52%
Jul	56%
Aug	33%
Sep	181%
Oct	1407%
Nov	1468%
Dec	

Massachusetts Wildfires

	# of Fires	Size Total (ac)
10/1-11/13/2024		
Last 7 days	205	560
Since Oct 1	513	1573

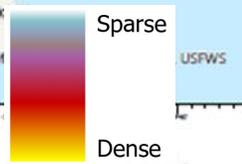
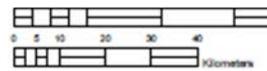


Fire Occurrence since Nov. 1st
 Massachusetts -Statewide
 11/13/2024

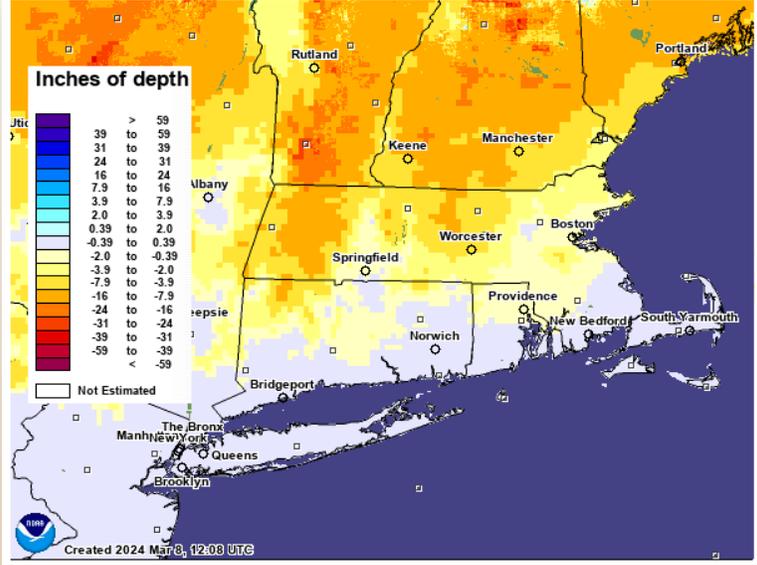
Legend
 Sparse
 Dense
 Wildfires Nov 1-13th, 2024

Fires Since November 1, 2024

Density of Fires Since October 1, 2024

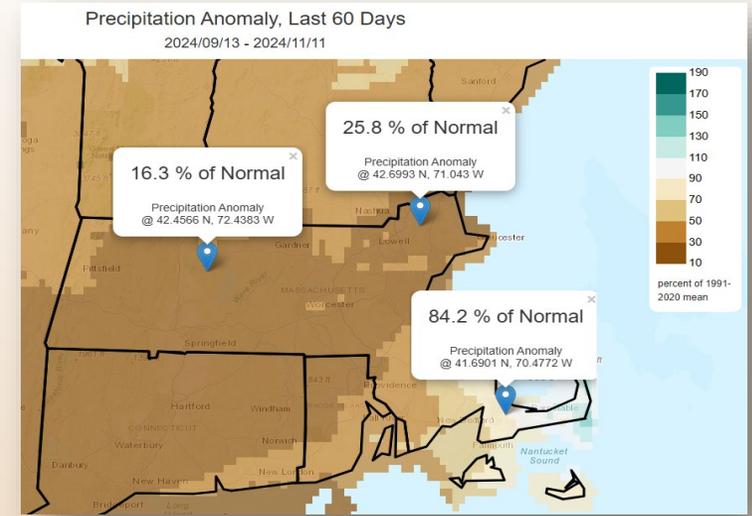


Modeled Snow Depth Departure from Normal (Daily) for 2024 March 8, 6:00 UTC



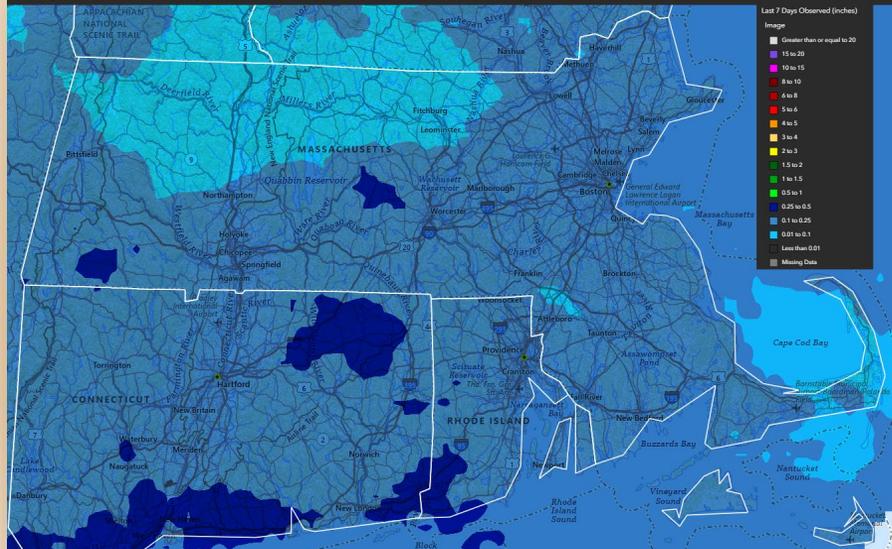
Precipitation Analysis

The winter of 2023/2024 saw far below normal snowpack throughout the state. In early-March, snow depth estimates from NOAA ranged between 2-16 inches below normal. Late spring precipitation helped moderate conditions until late August when a dryer than normal pattern developed and has ensued through early November.

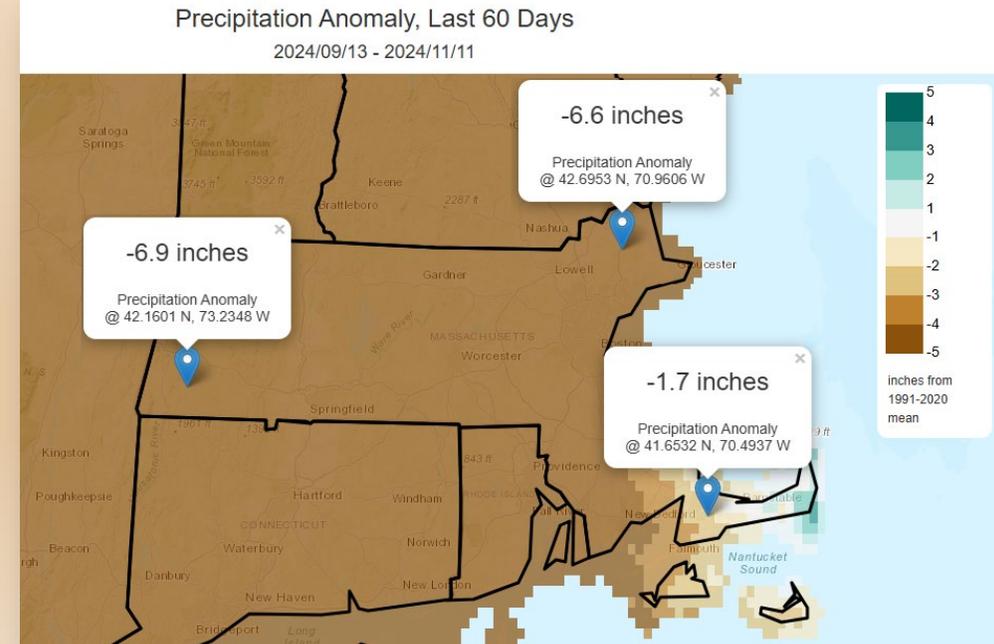


The past 60-days has seen between 16-25 % of normal precipitation over most of Massachusetts. The southeast side of the state continues to observe moderated conditions thanks to increased precipitation levels.

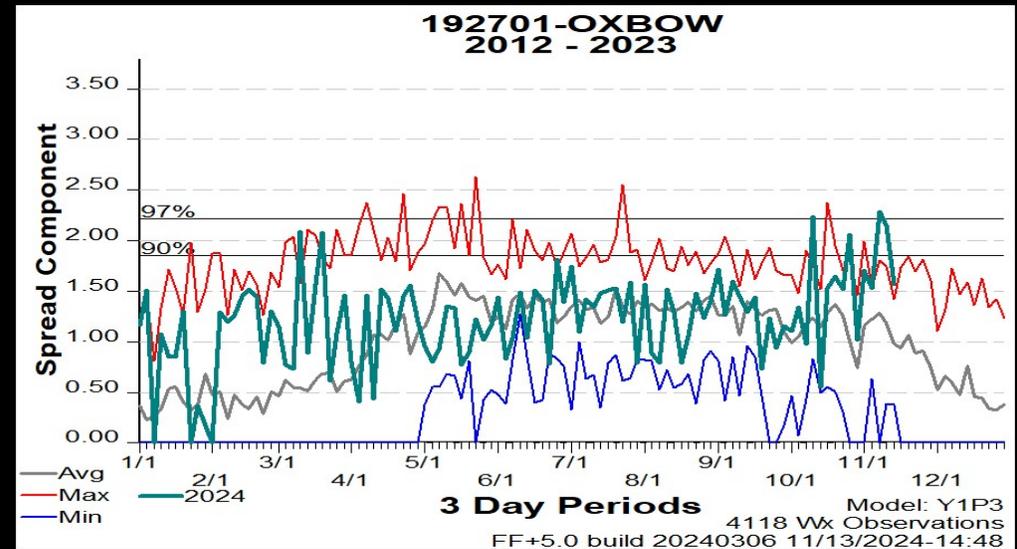
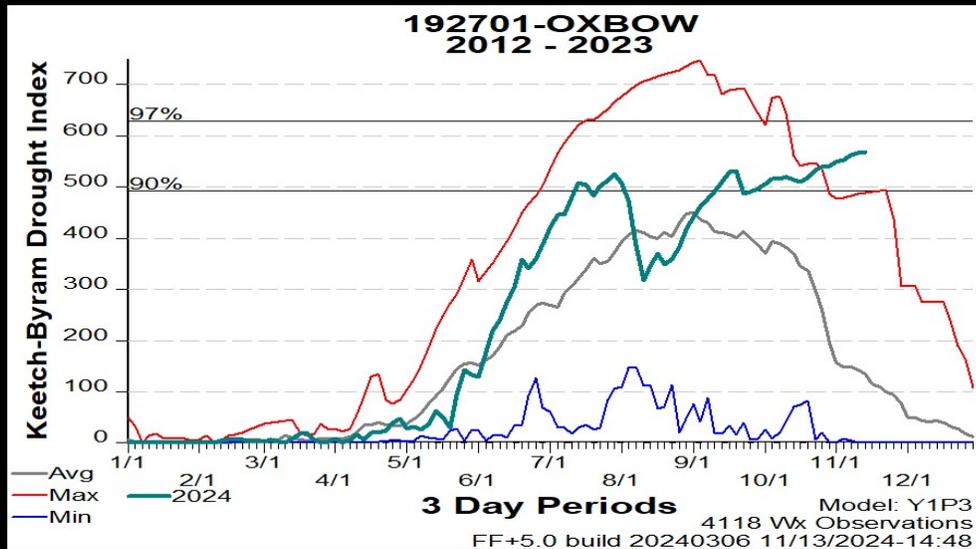
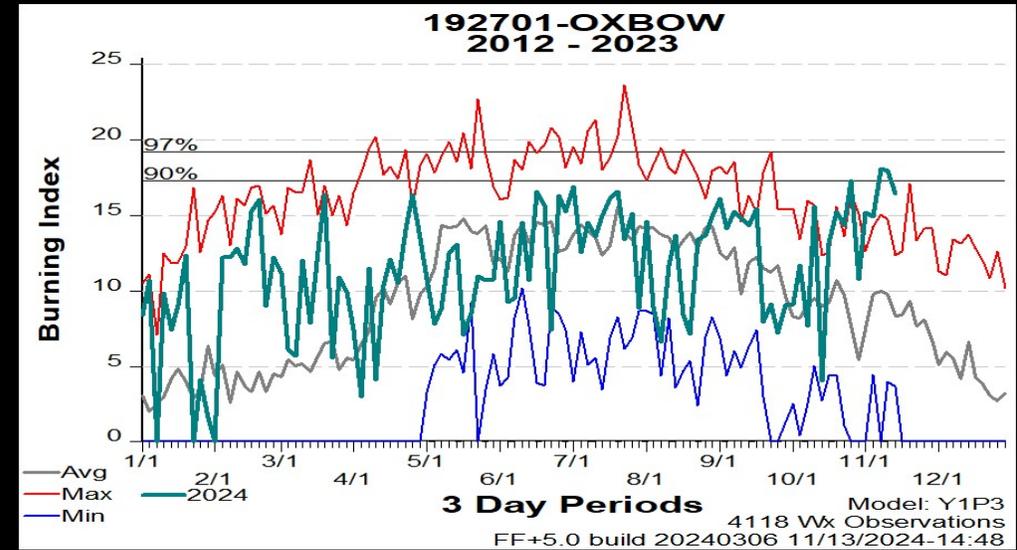
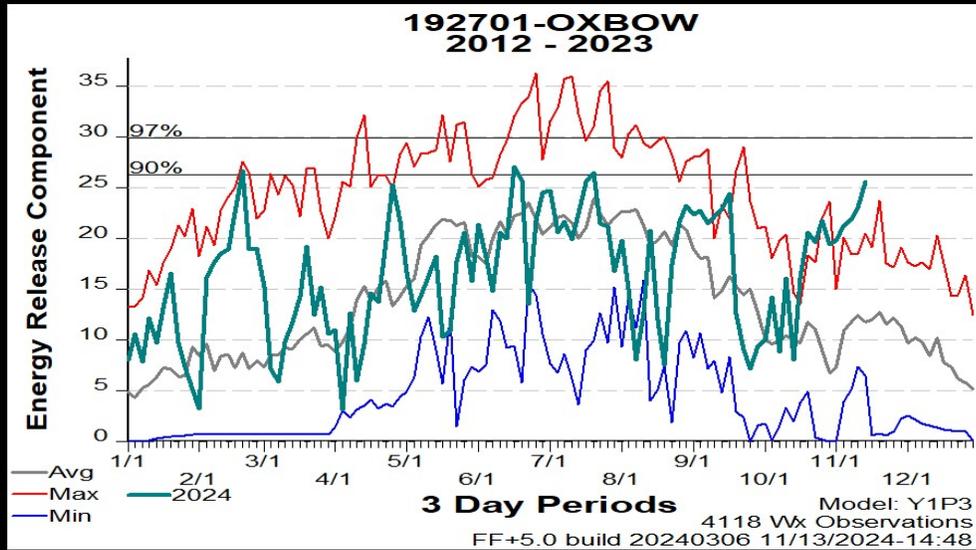
7-Day Observed Precipitation



Precipitation observed in the past week has been negligible and ineffective in moderating any wildfire risk in the long-term. Overall, the fire environment has experienced a dry and droughty 60 days and fuels conditions are at critical levels. Deficits over the past 60 days range between near normal over Cape Cod to -8.0 inches in the southwest part of the state.

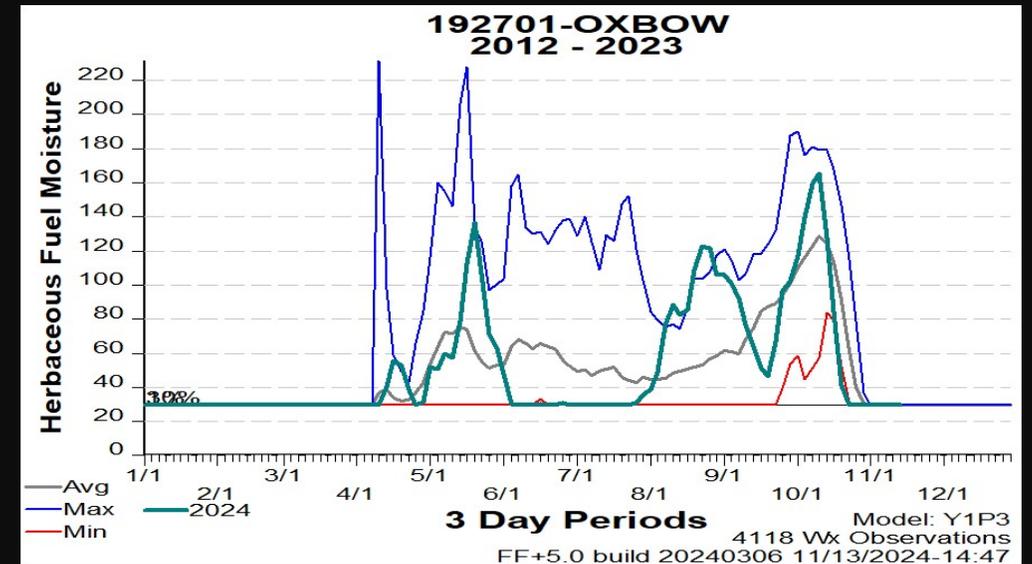
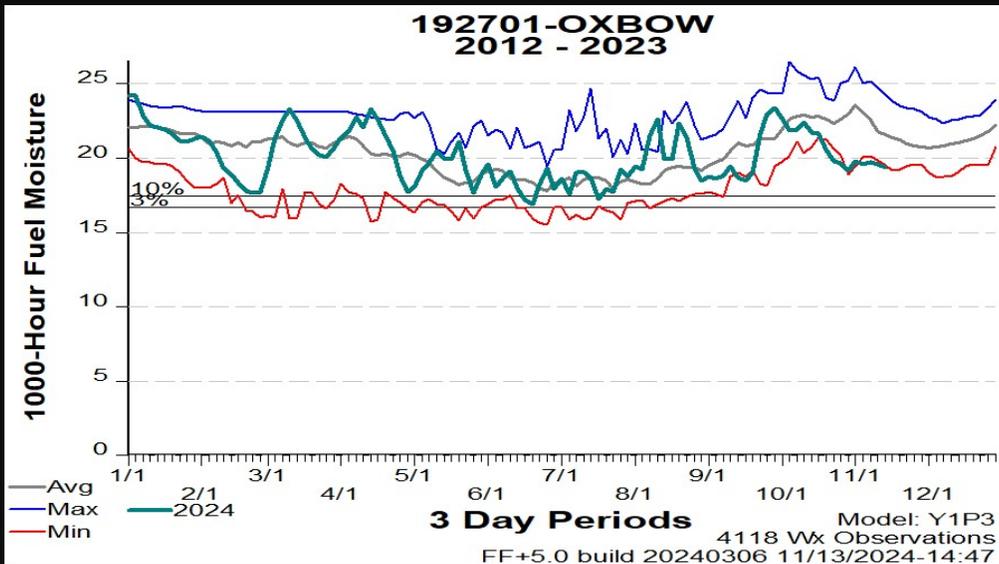
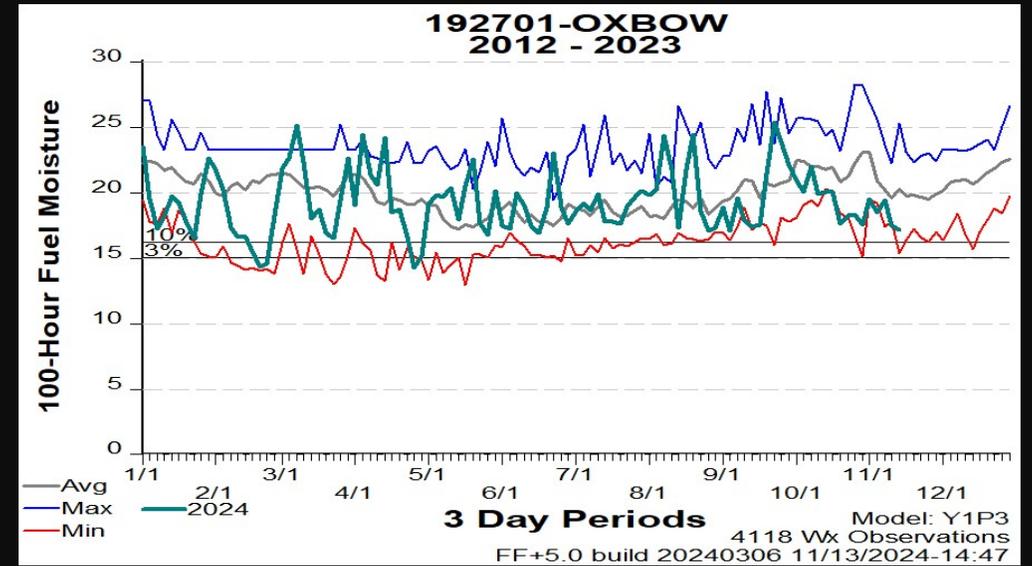
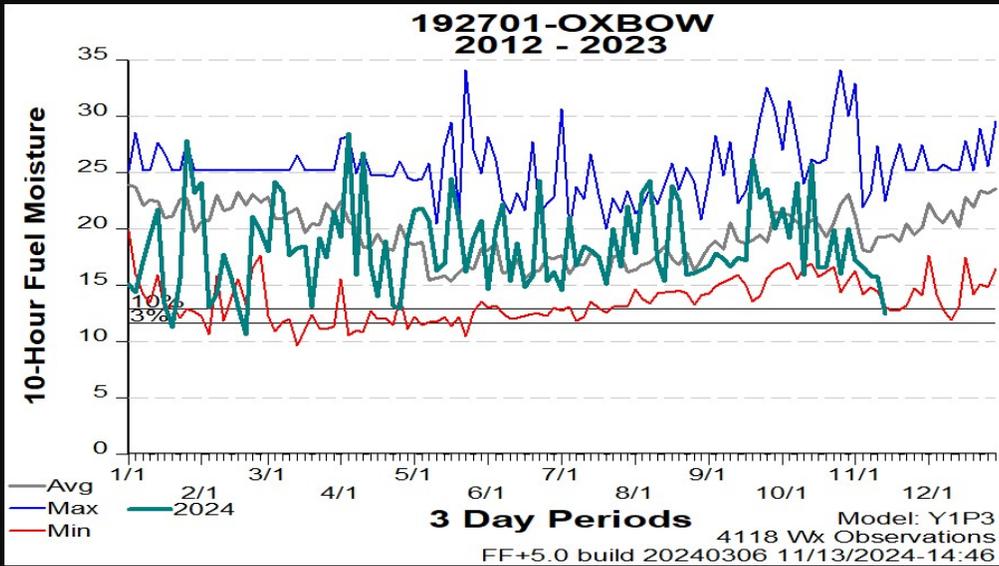


Oxbow RAWS NFDRS Indices- Climatology Graphs



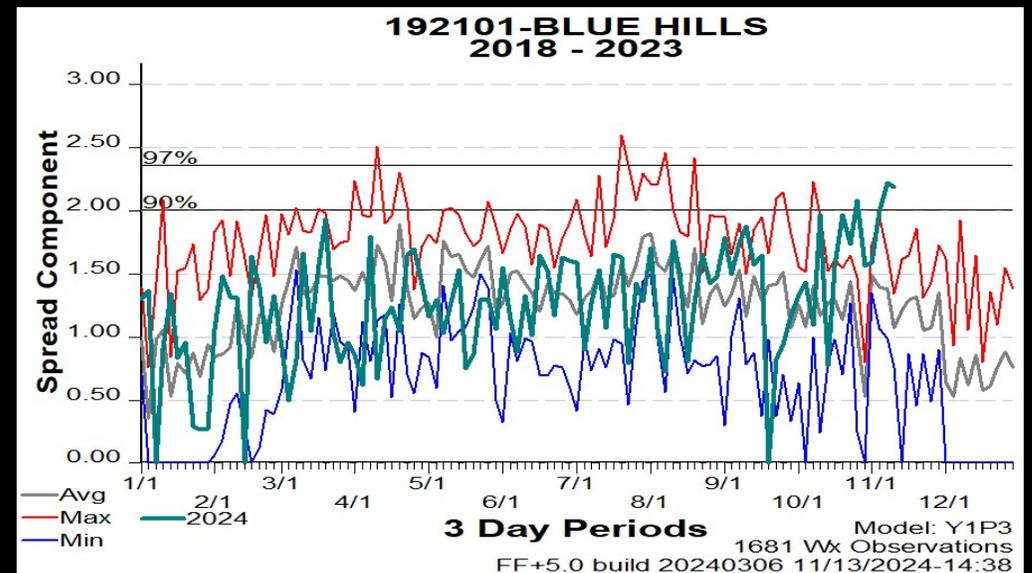
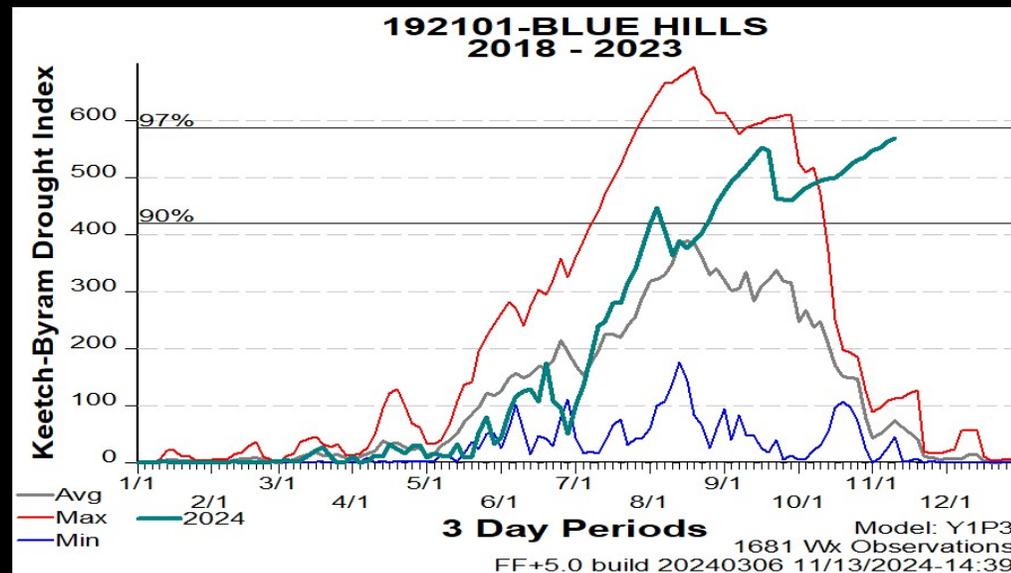
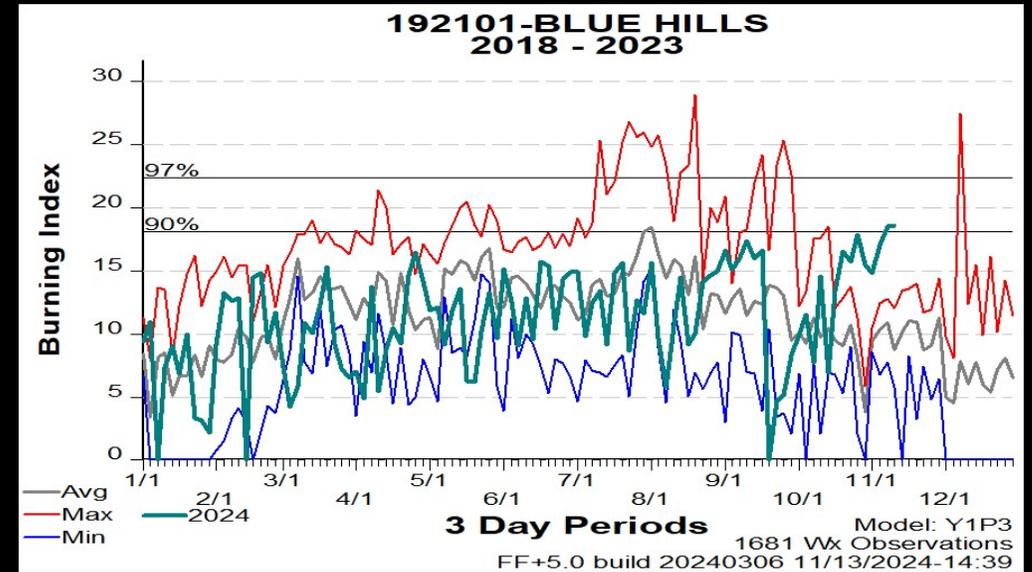
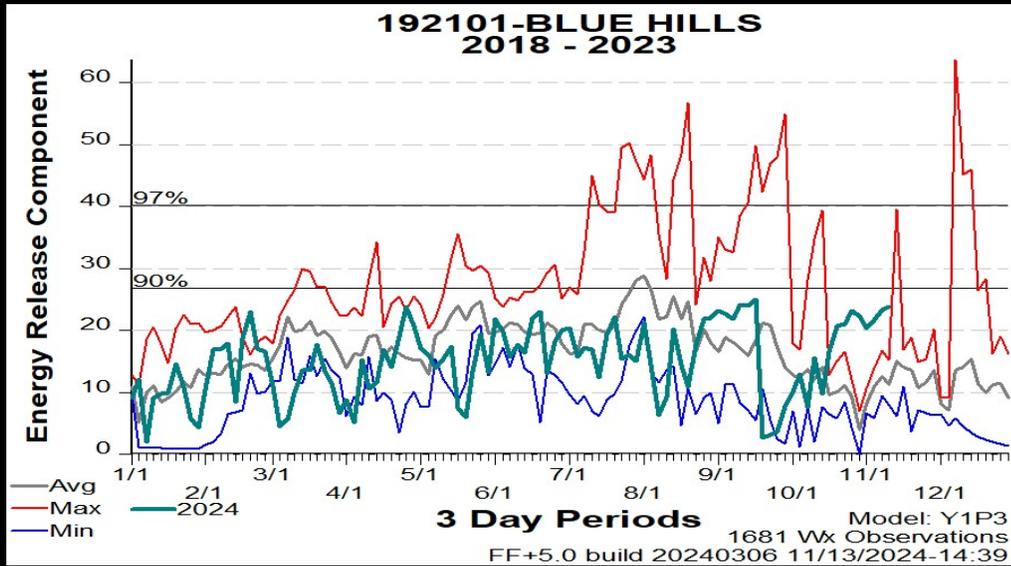
- Fire danger indices all trend above historic daily highs for this time of year. Longer term drying and drought have significantly amplified wildfire danger and risk.

Oxbow RAWS NFDRS Indices- Climatology Graphs



- Herbaceous and woody fuel moistures reduced to fully cured ~7-10 days ahead of average for this time of year.
- 10 and 100-Hour timelag dead fuels remain at or below historical lows for this time of year, continuing to trend dryer.

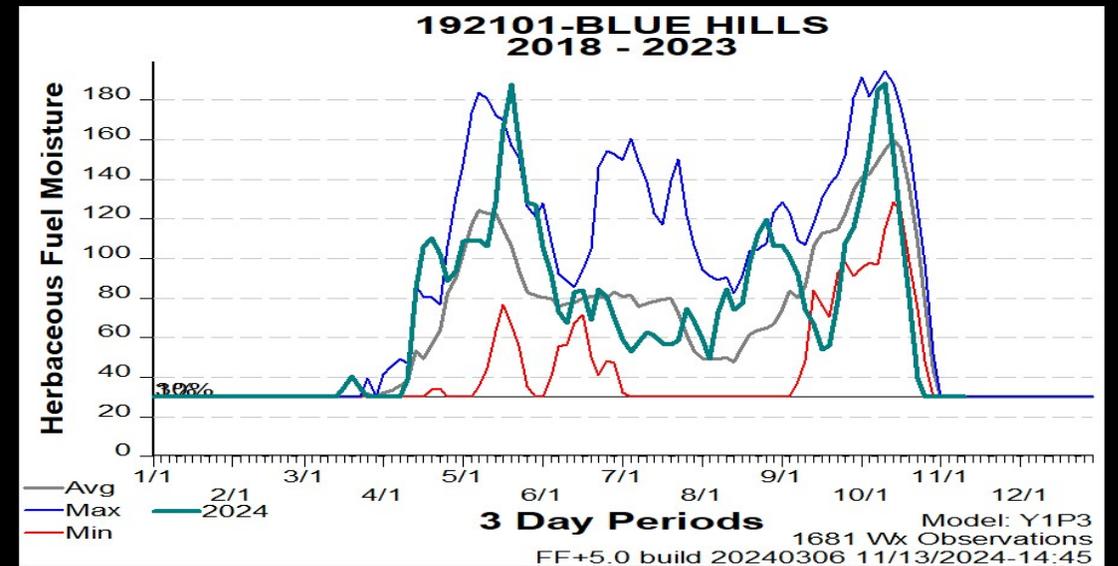
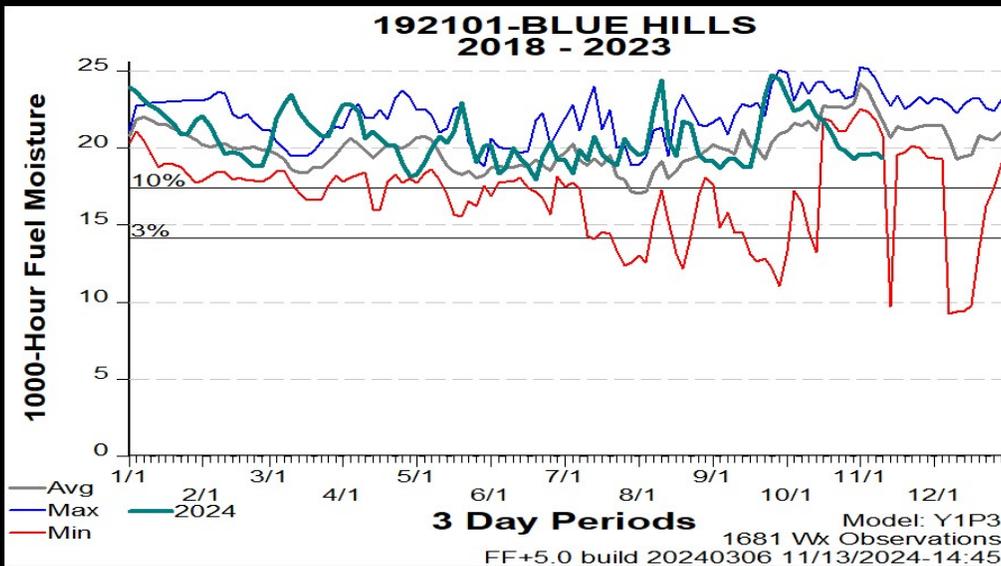
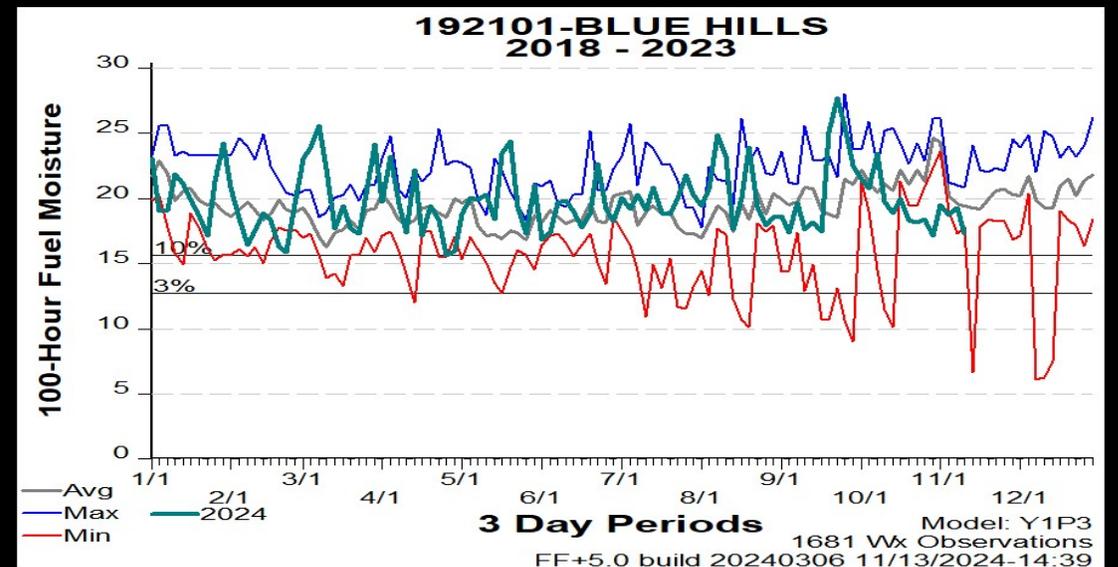
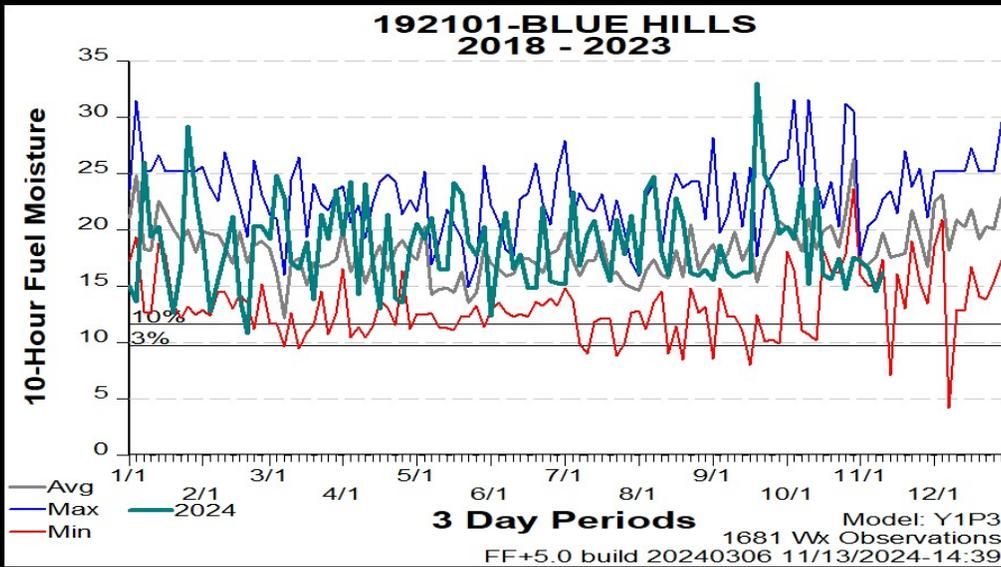
Blue Hills RAWS NFDRS Indices- Climatology Graphs



- All indices at the Blue Hills RAWS are at or above historical maximum values and percentiles for this time of year.
- The relationship of these indices to precipitation deficits yield increased availability of fuels that are typically not seen this time of year.

*Note that there is only 6 years of historical data for Blue Hills RAWS

Blue Hills RAWS NFDRS Indices- Climatology Graphs

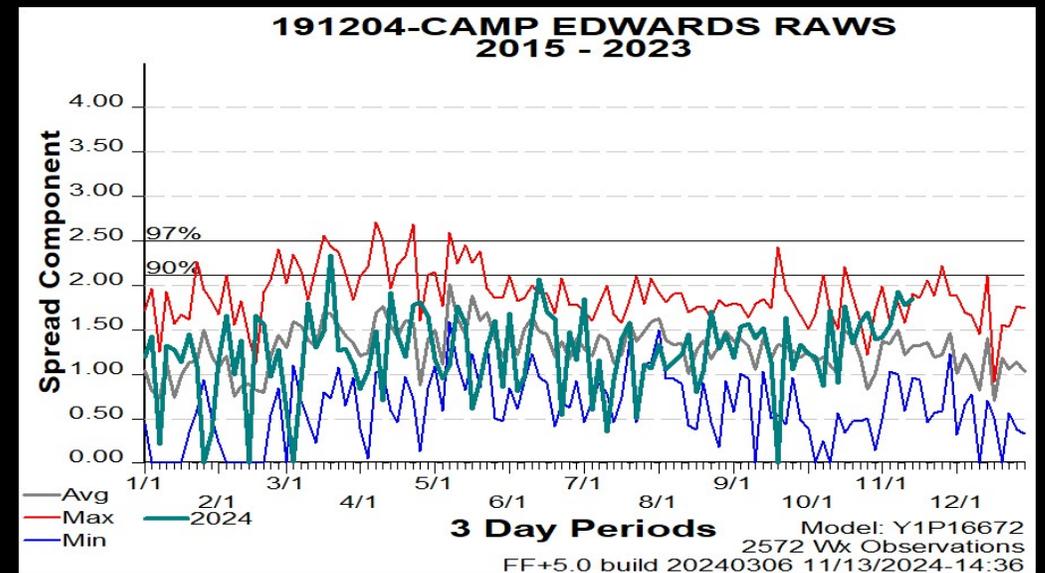
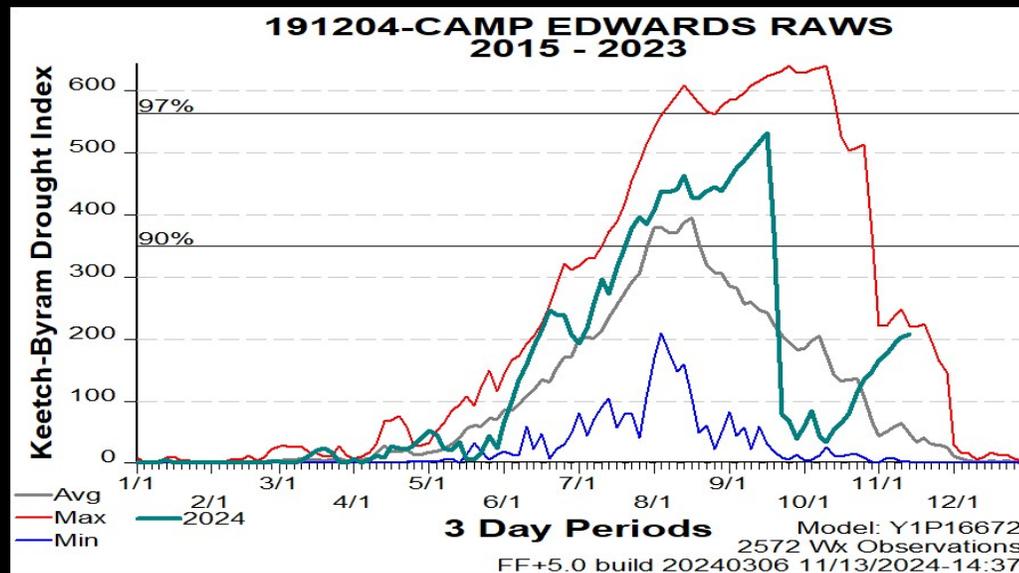
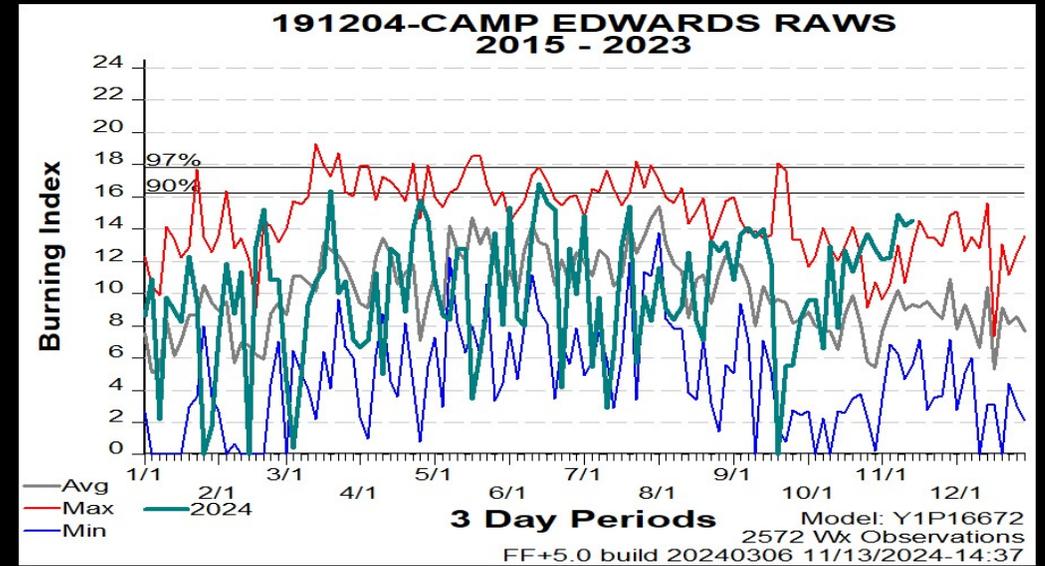
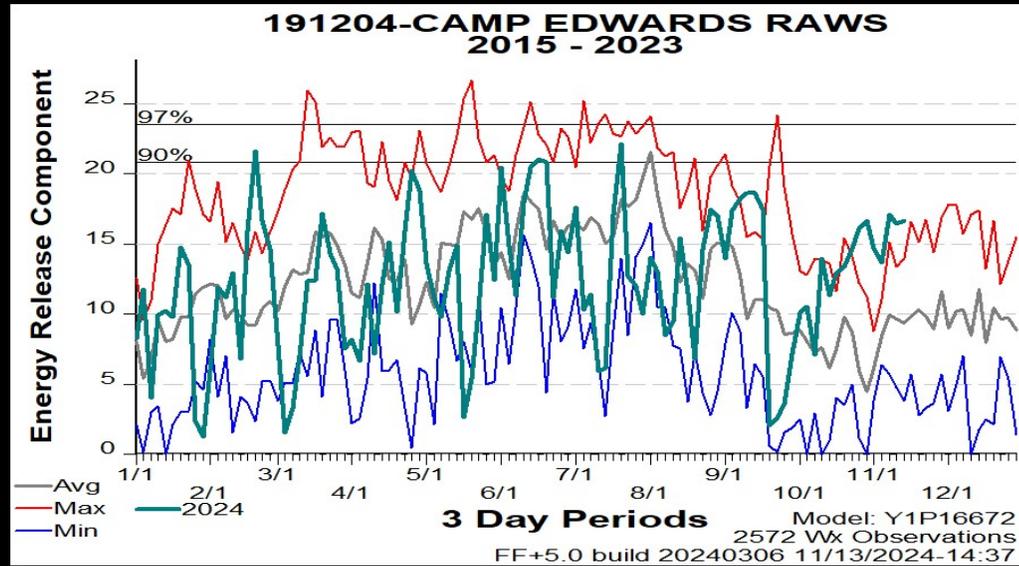


-Herbaceous and woody fuel moistures reduced to fully cured ~1 week ahead of average for this time of year.

-1,000-hour fuel moisture is below average with Blue Hills RAWS continuing to trend below historic ranges.

*Note that there is only 6 years of historical data for Blue Hills RAWS

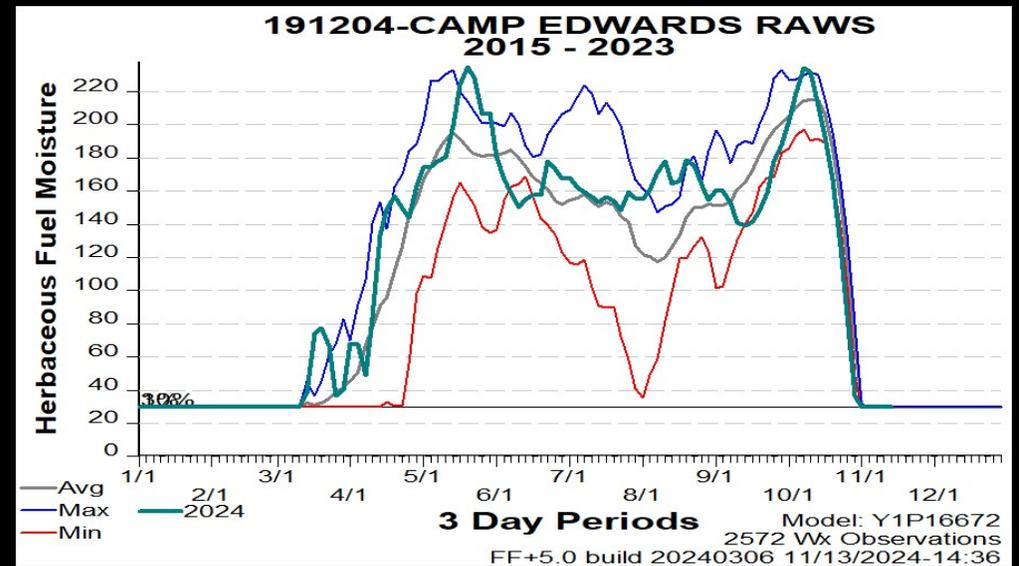
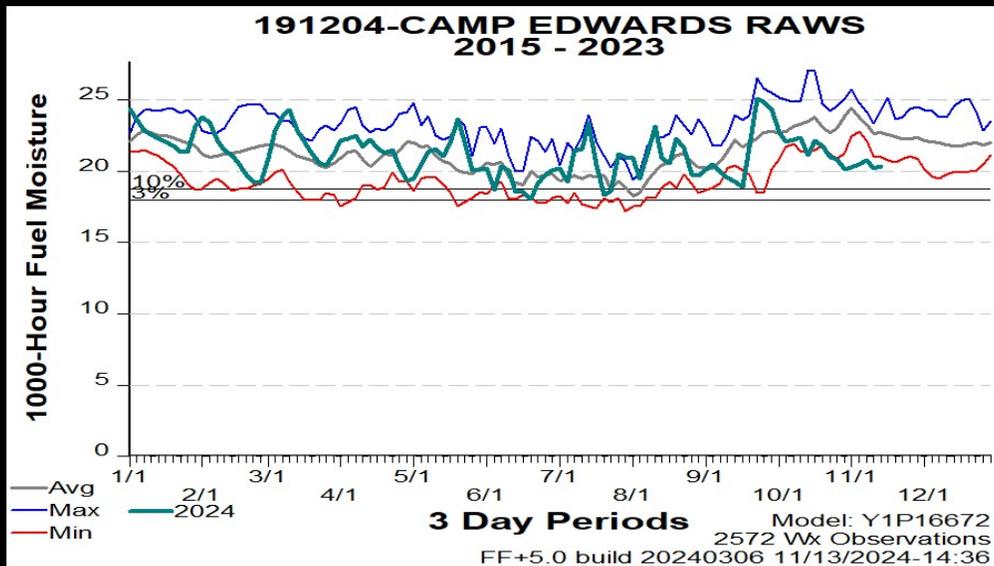
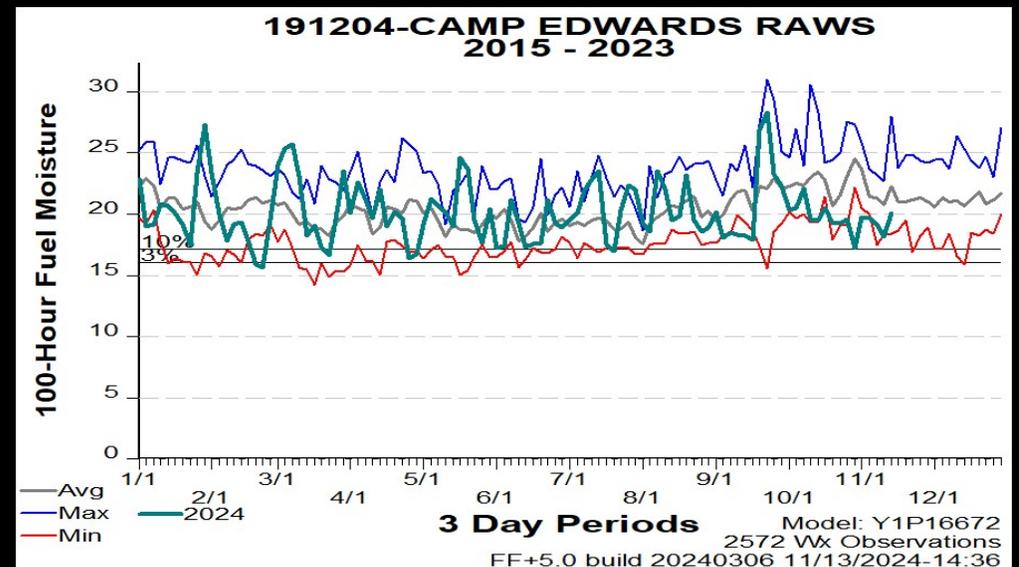
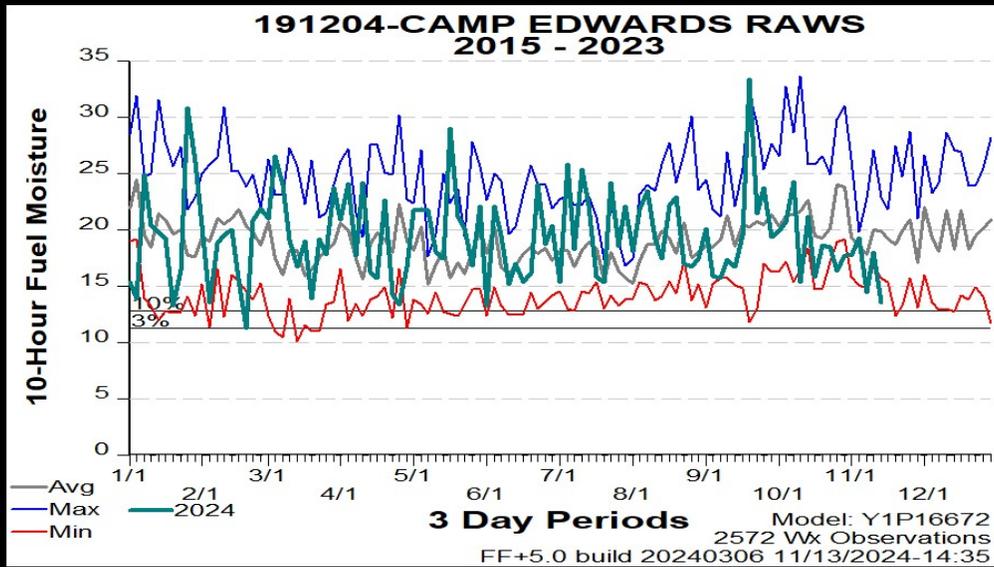
Camp Edwards RAWS NFDRS Indices- Climatology Graphs



- All indices at the Camp Edwards RAWS remain above the average and are trending towards maximum values for this time of year.

- *Note that there is only 8 years of historical data for Camp Edwards RAWS

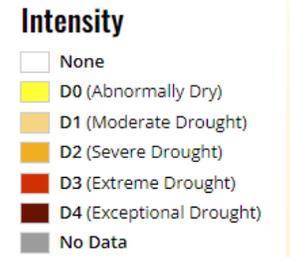
Camp Edwards RAWS NFDRS Indices- Climatology Graphs



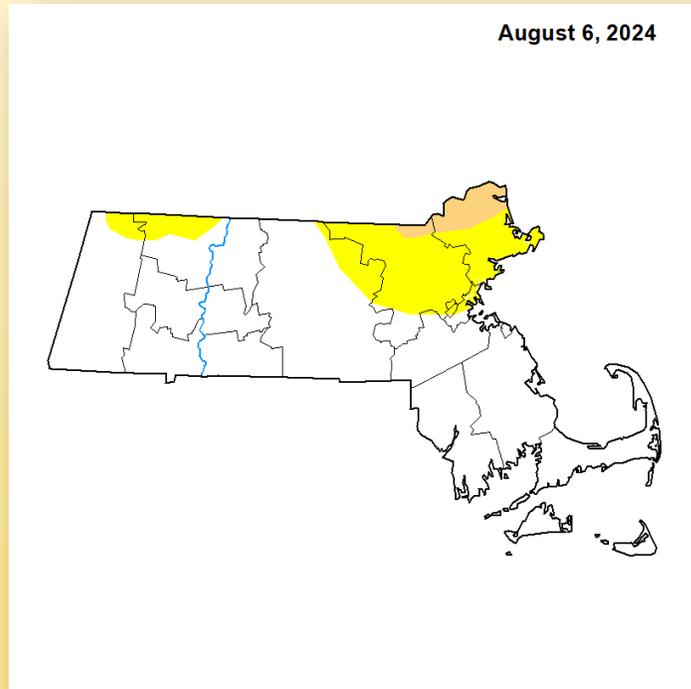
-1,000-hour fuel moisture is below average with Camp Edwards RAWS continuing to trend below historic ranges.

*Note that there is only 8 years of historical data for Camp Edwards RAWS

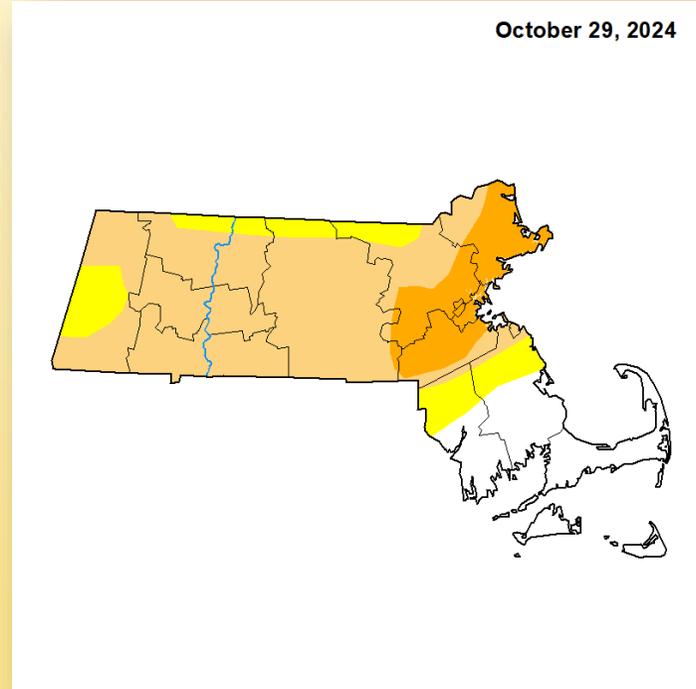
Current Drought Comparison



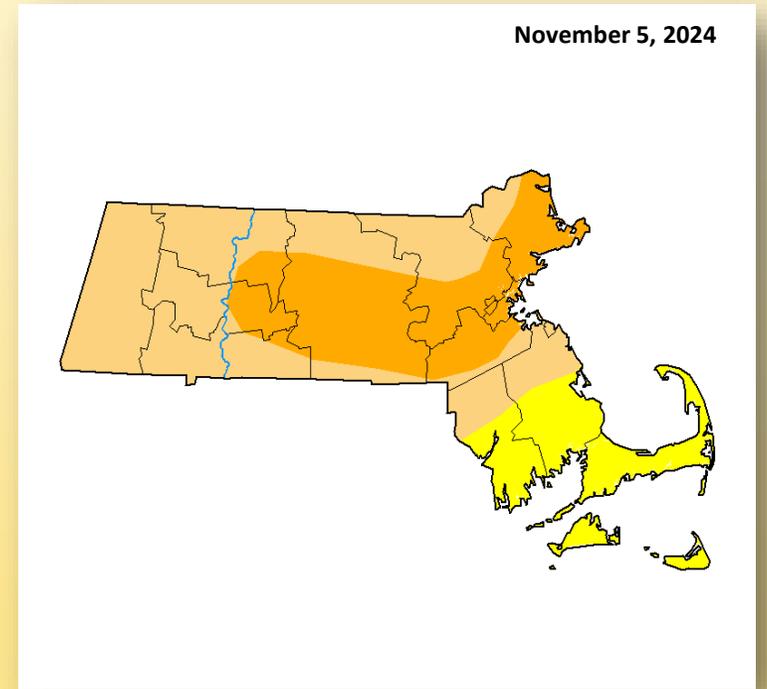
3 months ago



1 week ago



Current

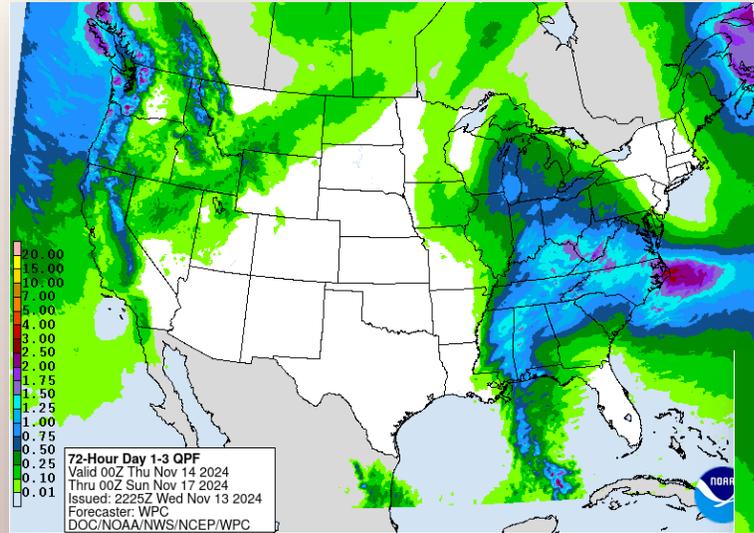


Drought conditions have worsened over the past three months. Abnormally Dry (D0), Moderate (D1), and now Severe (D2) Drought Intensity have developed throughout the majority of Massachusetts. Most if not all wildfires within the state are being influenced by Moderate to Severe Drought and critically dry dead fuels. Elevated fire danger and dry fuel conditions will likely contribute to continued fire growth on any existing or new emerging incidents until substantial weather changes are experienced (i.e. increased Relative Humidity, Precipitation, and Cooler Temperatures).

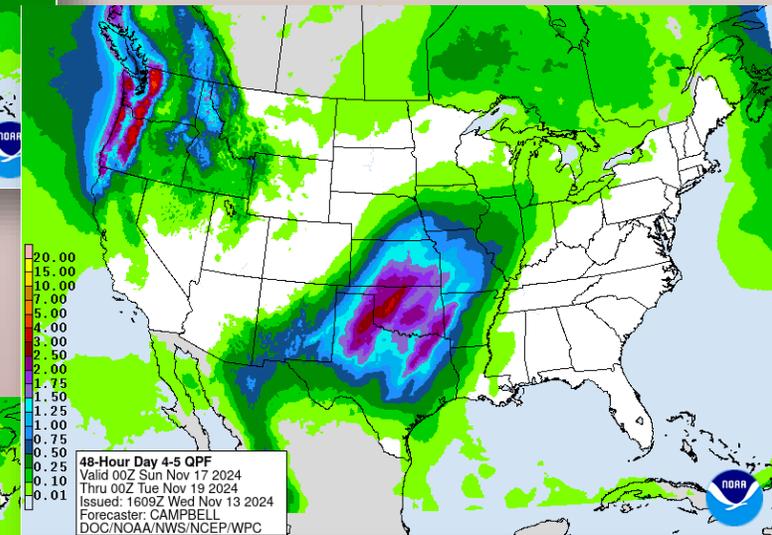
Quantitative Precipitation Forecast

NOAA's Quantitative Precipitation Forecast describes negligible precipitation over Massachusetts over the next week. Days 6-7 of the QPF do show minimal amounts (0.01-0.10 inches) of precipitation moving into the state towards the middle of next week.

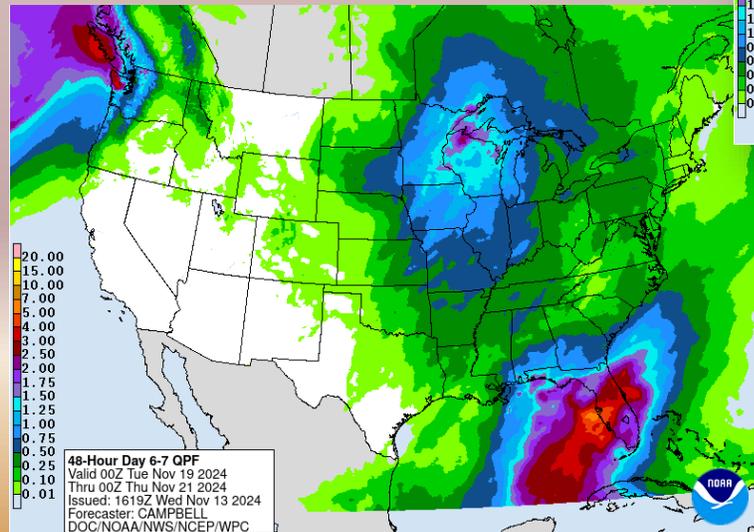
Days 1-3 QPF



Days 4-5 QPF



Days 6-7 QPF



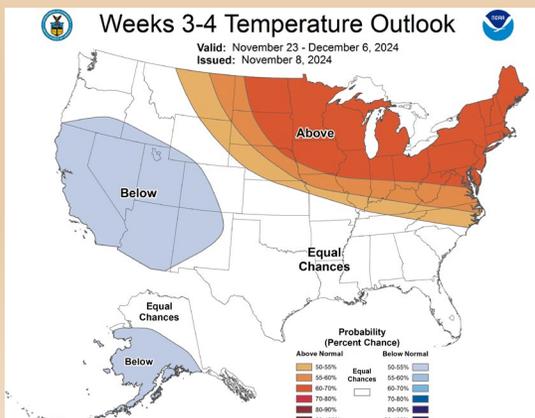
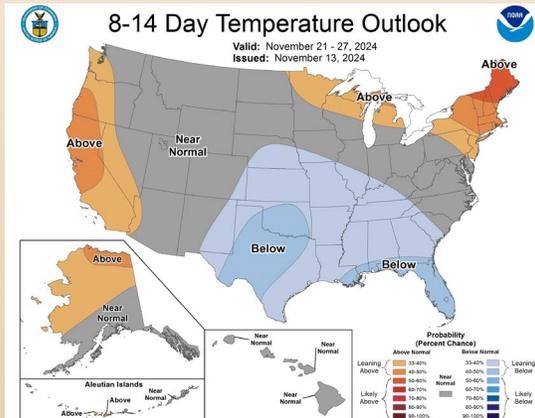
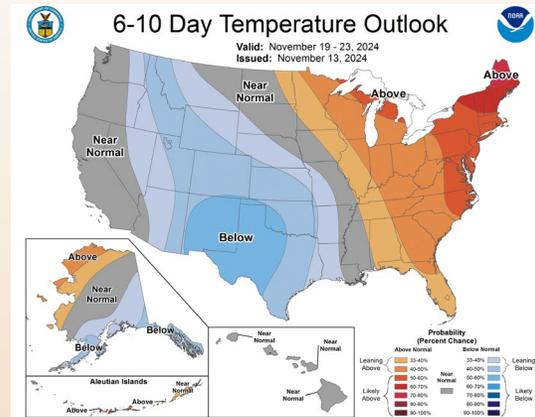
Weather Outlook

6–10-day weather outlook continue showing above normal temperatures while precipitation outlooks now lean towards above normal levels over this period

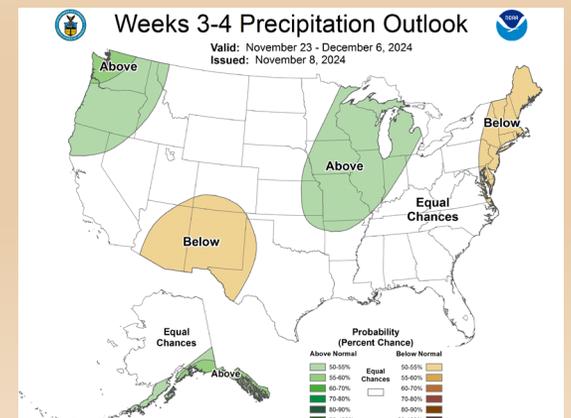
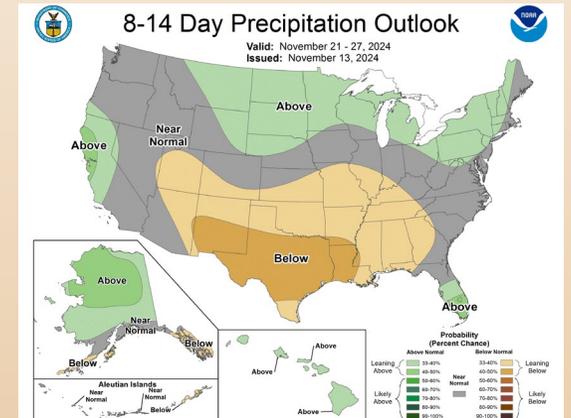
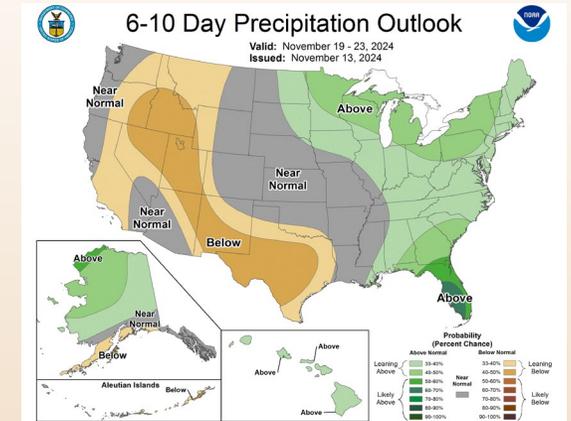
8–14-day weather outlook shows above normal temperatures while precipitation outlooks now lean towards near normal precipitation

3–4-week weather outlook shows likely above normal temperatures and lean towards below normal precipitation in the longer-term

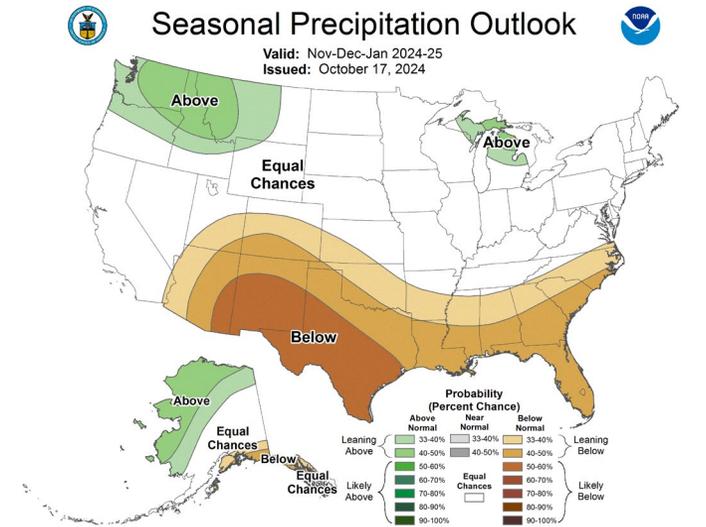
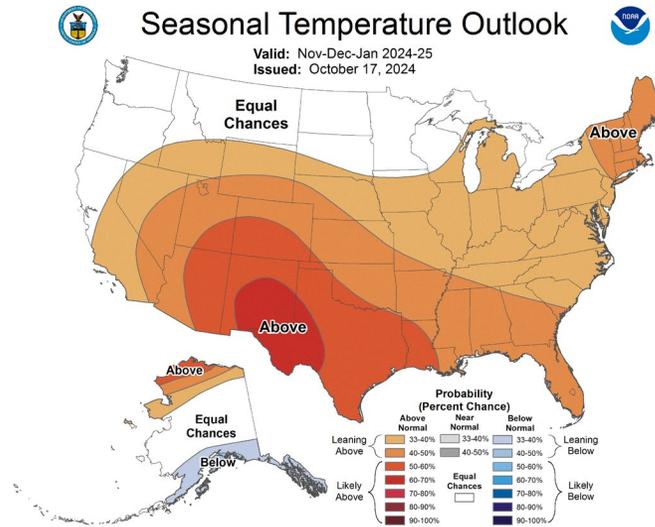
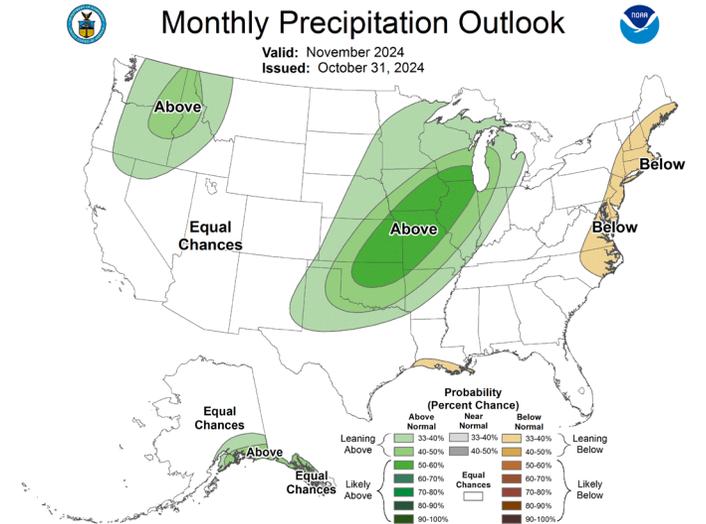
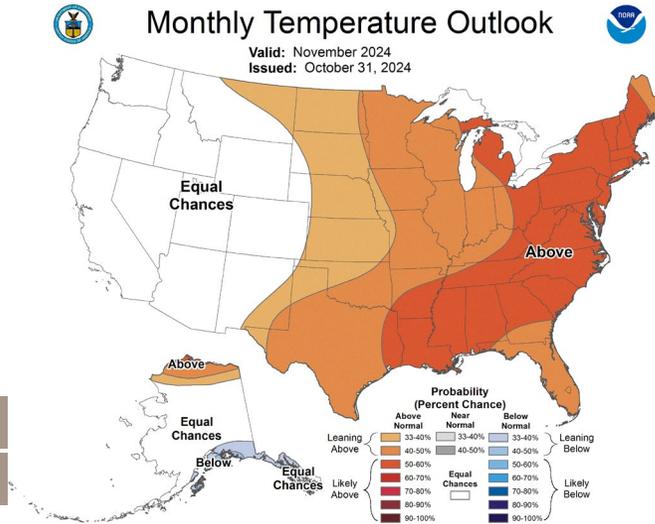
Temperature



Precipitation



Monthly/Seasonal Outlook



7-Day Forecast Fire Behavior, Fire Danger, and Fire Weather

Statewide fire behavior summary:

Thursday and into the weekend show a greater potential for fire growth with low RH values and increasing winds.

Open **grass** fuel types will likely see 3-6' flame lengths and rates of spread between 20-40 ch/hr.

Moderate load **timber understory and litter** will be receptive to fire spread showing flame lengths around 2-9' and rates of spread approaching 25-45 ch/hr.

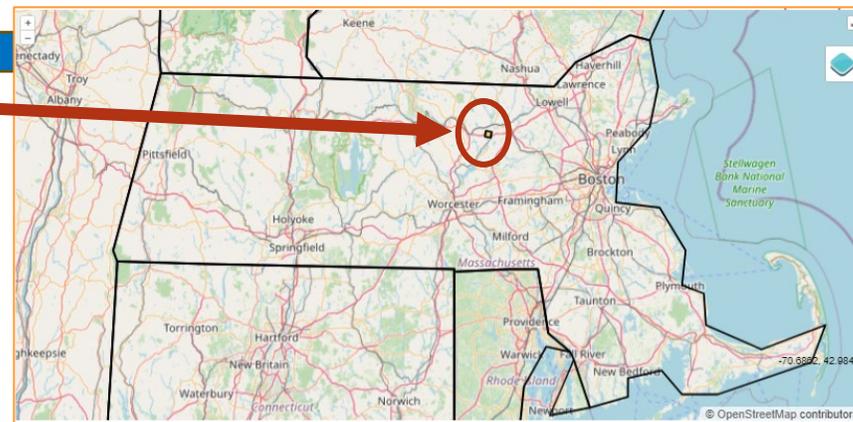
High load shrub (SH8), specifically within the **pine barrens**, can expect flame lengths (>10') and rates of spread (>30 ch/hr) depending on density and receptive fuels across the area. Current lack of moisture and drought stressed vegetation could allow for crown fire initiation where crown base heights are low (<3 meters). Increased winds with frontal passages could elevated the risk of crown fire.

Expect increased flame lengths (greater than 10') and rates of spread (>40-50 ch/hr) where fuel, wind and topography align. Lack of moisture could increase the resistance to containment as fires have the ability to burn into duff based on the availability of fuel.



Fire Behavior / Fire Danger / Fire Weather Forecasts

The intent of these forecasts is to offer a general overview of expected fire environment conditions over the next 7-days. The outputs are based on an NWS Point forecast over Devens, MA, and the fire behavior outputs are specific to that point location.



Devens, MA Weekly Summary

	Wed Nov 13	Thu Nov 14	Fri Nov 15	Sat Nov 16	Sun Nov 17	Mon Nov 18	Tue Nov 19	Wed Nov 20
Max Temp, °F	45	46	49	53	57	56	54	52
Min Temp, °F	26	21	25	37	38	40	40	35
Max RH, %	61	68	62	73	73	79	89	95
Min RH, %	26	23	30	54	43	53	54	58
Max Dewpoint, °F	14	15	26	37	35	40	40	38
Min Dewpoint, °F	10	10	10	27	30	31	36	34
Max Wind, mph	7	6	8	10	9	9	8	7
Min Wind, mph	2	2	2	6	3	2	3	3
Max Wind Gust, time/dir.	12 PM ↘	10 AM ↘	1 PM ↘	12 PM ↘	12 PM ↘	1 PM ↘	12 PM ↘	1 PM ↘
Max Wind Gust, mph	16	13	17	23	20	17	16	15
Min Wind Gust, mph	6	5	6	12	9	9	7	7
Max Cloud Cover, %	5	52	53	61	52	66	47	49
Min Cloud Cover, %	2	2	34	21	11	30	28	28
Max Prob. of Precip., %	0	2	15	11	3	12	6	25
Max Haines	4	4	4	4	4	4	4	4
Max LAL	1	1	1	1	1	1	1	1
Max Mixing Height, ft	3440	2653	2791	3006	2955	4066	3809	1853
Min Mixing Height, ft	395	369	433	479	450	454	437	403
Max Ventilation Rate, kt-ft	38	27	42	57	35	81	66	24
Min Ventilation Rate, kt-ft	2	3	3	4	3	2	3	2
Max LVORI	2	3						

	13-Nov			14-Nov			15-Nov			16-Nov			17-Nov			18-Nov			19-Nov		
FM	ROS	FL	POI																		
GR2	21.3	3.5		18.4	3.3		25.5	3.8		31.1	4		28.5	3.9		26.9	3.8		22.9	3.5	
SH3	2.6	1.9		2.3	1.8		3.1	2		3.7	2.1		3.4	2.1		3.3	2		2.9	1.9	
TU3	17.3	6	43	15	5.7	48	20.3	6.5	42	24.9	7	31	22.6	6.7	37	21.8	6.6	31	18.8	6.1	32
TL2	0.7	0.6		0.6	0.6		0.8	0.6		0.9	0.6		0.8	0.6		0.8	0.6		0.7	0.6	
TL6	2.6	1.8		2.4	1.8		3.1	1.9		3.7	2		3.4	2		3.2	1.9		2.8	1.8	

- ROS= Surface Rate of Spread (ch/hr)
- FL= Surface Flame Length (feet)
- POI- Probability of Ignition
- GR2 (102)= Grass, Low load
- SH3 (143)= Shrub, Moderate Load
- TU3 (163)= Timber Understory, Moderate Load
- TL2 (182)= Timber Litter, Low Load
- TL6 (186)= Timber Litter, Moderate Load

Fire Danger and Fire Weather Matrix

Northeastern Massachusetts

Weather Station:	Oxbow (192701)	NFDRS Fuel Model Y; 2018-2023 Historical
NFDRS Station:	Oxbow (192701)	

* Wind Gust Speed are not forecast through WIMS, values displayed are observations

Workbook created by Brad Pietruszka

NFDRS & Fire Weather Forecast

		Wed 10/30	Thu 10/31	Fri 11/1	Sat 11/2	Sun 11/3	Mon 11/4	Tue 11/5	Wed 11/6	Thu 11/7	Fri 11/8	Sat 11/9	Sun 11/10	Mon 11/11	Tue 11/12	Wed 11/13	Thu 11/14	Fri 11/15	Sat 11/16	Sun 11/17	Mon 11/18	Tue 11/19	Wed 11/20	
N F D R S	ERC Percentile	39%	67%	67%	67%	75%	75%	79%	75%	71%	75%	88%	88%	71%	85%	90%	90%	95%	95%	95%	95%	93%	90%	
	BI Percentile	22%	71%	85%	71%	78%	71%	78%	85%	95%	97%	91%	85%	97%	95%	85%	95%	99%	100%	97%	97%	95%	91%	
	KBDI Percentile	91%	90%	91%	91%	91%	91%	91%	91%	91%	91%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	
	ERC	12	19	19	19	21	21	22	21	20	21	25	25	20	24	26	26	28	28	28	28	28	27	26
	BI	0	14	16	14	15	14	15	16	18	19	17	16	19	18	16	18	21	24	19	19	18	17	
	KBDI	542	537	541	545	549	550	550	553	557	561	563	564	565	567	569	569	569	569	569	569	569	569	569
	1 hr	26	13	12	14	12	15	11	11	11	10	9	10	12	11	10	12	11	11	13	13	15	16	
	10 hr	28	20	18	18	16	15	18	17	19	16	12	12	21	14	12	11	11	13	14	15	17	18	
	100 hr	17	20	20	19	19	18	18	20	20	20	18	17	17	18	17	16	16	15	14	15	15	15	
	1000 hr	19	19	20	20	20	20	19	20	20	20	20	20	20	19	19	19	19	19	18	18	18	17	
Live Herbaceous	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30		
Live Woody	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60		
w e a t h e r	Max Temp	78	79	76	59	60	57	72	77	71	67	57	51	66	51	49	44	52	55	57	57	57	54	
	Min RH	40%	41%	17%	34%	16%	44%	50%	50%	38%	26%	25%	46%	46%	43%	27%	23%	20%	21%	38%	40%	53%	52%	
	Min Temp	43	49	48	38	30	30	42	58	44	38	30	27	47	34	27	21	19	37	36	39	39	36	
	Max RH	95%	98%	74%	70%	93%	89%	99%	92%	93%	95%	79%	97%	99%	69%	60%	68%	66%	70%	79%	82%	89%	96%	
	Max Wind	5	7	8	4	7	7	6	8	5	8	6	7	6	9	5	4	7	10	6	6	5	5	
	Max Gust	12	18	30	14	14	19	18	19	23	25	26	16	19	25	16								

Fire Behavior / Fire Danger / Fire Weather Forecasts

The intent of these forecasts is to offer a general overview of expected fire environment conditions over the next 7-days. The outputs are based on an NWS Point forecast over Monument Beach, MA, and the fire behavior outputs are specific to that point location.



Monument Beach, MA Weekly Summary

	Wed Nov 13	Thu Nov 14	Fri Nov 15	Sat Nov 16	Sun Nov 17	Mon Nov 18	Tue Nov 19	Wed Nov 20
Max Temp, °F	43	45	49	53	56	56	55	52
Min Temp, °F	34	32	34	40	41	43	43	41
Max RH, %	73	83	70	79	79	82	92	93
Min RH, %	50	58	42	61	55	62	61	66
Max Dewpoint, °F	26	32	33	41	40	43	42	42
Min Dewpoint, °F	23	26	23	32	34	36	40	38
Max Wind, mph	17	15	13	13	12	13	10	10
Min Wind, mph	12	9	9	10	7	6	6	7
Max Wind Gust, time/dir.	1 PM ↘	10 AM ↘	1 PM ↘	9 AM ↘	12 AM ↘	12 PM →	9 AM ↘	12 PM ↘
Max Wind Gust, mph	29	24	24	23	22	20	18	17
Min Wind Gust, mph	22	20	20	21	16	16	14	14
Max Cloud Cover, %	29	47	61	58	45	64	42	58
Min Cloud Cover, %	6	8	30	33	13	28	23	30
Max Prob. of Precip., %	0	4	21	19	5	22	12	31
Max Haines	4	4	4	3	4	4	4	4
Max LAL	1	1	1	1	1	1	1	1
Max Mixing Height, ft	3464	3123	2278	3058	2665	3932	3495	1910
Min Mixing Height, ft	314	340	447	480	363	350	374	236
Max Ventilation Rate, kt-ft	76	59	32	46	32	67	56	21
Min Ventilation Rate, kt-ft	4	5	5	5	3	2	3	1
Max LVORI	4	6						

	13-Nov			14-Nov			15-Nov			16-Nov			17-Nov			18-Nov			19-Nov		
FM	ROS	FL	POI																		
GR2	65.2	5.7		50.6	5		44.7	4.8		41.3	4.5		37	4.3		41.3	4.5		28.7	3.8	
SH3	6.9	2.9		5.7	2.6		5	2.5		4.8	2.4		4.4	2.3		4.8	2.4		3.6	2.1	
SH8	42.7	14	30	36.1	13	26	30.9	12	30	30.4	12	27	27.7	11	27	30.4	12	27	22.3	10	27
TU3	49.4	9.6		40.6	8.7		34.8	8.1		33.7	8		30.4	7.6		33.7	8		24	6.8	
TL2	1.6	0.8		1.4	0.8		1.2	0.7		1.2	0.7		1	0.7		1.2	0.7		0.8	0.6	
TL6	7.5	2.8		6	2.5		5.2	2.4		4.9	2.3		4.4	2.2		4.9	2.3		3.5	2	

- ROS= Surface Rate of Spread (ch/hr)
- FL= Surface Flame Length (feet)
- POI= Probability of Ignition
- GR2 (102)= Grass, Low load
- SH3 (143)= Shrub, Moderate Load
- SH8 (148)= Shrub, High Load
- TU3 (163)= Timber Understory, Moderate Load
- TL2 (182)= Timber Litter, Low Load
- TL6 (186)= Timber Litter, Moderate Load

Fire Danger and Fire Weather Matrix

Southeastern Massachusetts

Weather Station:

Camp Edwards (191204)

NFDRS Station:

Camp Edwards (191204)

NFDRS Fuel Model Y; 2018-2023 Historical

* Wind Gust Speed are not forecast through WIMS, values displayed are observations

Workbook created by Brad Pietruszka

NFDRS & Fire Weather Forecast

		Wed 10/30	Thu 10/31	Fri 11/1	Sat 11/2	Sun 11/3	Mon 11/4	Tue 11/5	Wed 11/6	Thu 11/7	Fri 11/8	Sat 11/9	Sun 11/10	Mon 11/11	Tue 11/12	Wed 11/13	Thu 11/14	Fri 11/15	Sat 11/16	Sun 11/17	Mon 11/18	Tue 11/19	Wed 11/20	
N F D R S	ERC Percentile	61%	61%	49%	72%	76%	72%	54%	49%	66%	76%	89%	92%	54%	76%	76%	76%	80%	86%	86%	80%	80%	76%	
	BI Percentile	48%	48%	48%	66%	66%	66%	66%	58%	83%	89%	83%	94%	48%	89%	83%	94%	97%	98%	89%	83%	83%	83%	
	KBDI Percentile	71%	72%	73%	73%	74%	74%	74%	74%	74%	75%	75%	76%	77%	77%	78%	78%	78%	78%	78%	78%	78%	78%	78%
	ERC	14	14	12	16	17	16	13	12	15	17	21	22	13	17	17	17	17	18	20	20	18	18	17
	BI	11	11	11	13	13	13	13	12	15	16	15	17	11	16	15	15	17	18	19	16	15	15	15
	KBDI	143	148	155	162	168	170	171	175	180	187	194	197	199	203	207	207	208	208	208	208	208	208	208
	1 hr	18	17	19	14	13	14	16	18	11	13	9	12	18	11	13	13	15	13	13	14	16	16	17
	10 hr	23	22	21	16	17	17	21	20	18	14	12	11	26	17	14	14	15	14	15	16	20	19	20
	100 hr	16	19	20	20	19	19	19	21	21	19	17	16	18	20	20	20	19	18	17	16	16	17	18
	1000 hr	20	20	20	20	20	20	20	21	21	21	21	20	20	20	20	20	20	20	20	20	19	19	19
Live Herbaceous	49	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	
Live Woody	72	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	
w e a t h e r	Max Temp	78	79	76	59	60	57	72	77	71	67	57	51	66	51	53	46	50	55	56	57	57	55	
	Min RH	40%	41%	17%	34%	16%	44%	50%	50%	38%	26%	25%	46%	46%	43%	42%	46%	31%	31%	49%	51%	61%	61%	
	Min Temp	43	49	48	38	30	30	42	58	44	38	30	27	47	34	36	32	29	40	41	43	42	41	
	Max RH	95%	98%	74%	70%	93%	89%	99%	92%	93%	95%	79%	97%	99%	69%	65%	85%	83%	76%	79%	93%	89%	93%	
	Max Wind	5	7	8	4	7	7	6	8	5	8	6	7	6	9	13	11	11	11	8	8	8	9	
	Max Gust	12	18	30	14	14	19	18	19	23	25	26	16	19	25	16								

Fire Danger and Fire Weather Matrix

Eastern Massachusetts

Weather Station:	Blue Hills (192101)	NFDRS Fuel Model Y; 2018 2023 Historical
NFDRS Station:	Blue Hills (192101)	

Workbook created by Brad Pietruszka, please send any bug reports to bradley.pietruszka@usda.gov

*Solar Radiation and Wind Gust Speed are not forecast through WIMS, values displayed are observations
 *Burn Period Index (BPI) = (Temperature ÷ Relative Humidity) x Windspeed
 *ERC2 x Wind reflects the compounding influence of dry fuels combined with wind.
 10% drier fuels will exhibit a 23% increase in fire behavior with the same windspeed.

NFDRS & Fire Weather Forecast

		Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed
		10/30	10/31	11/1	11/2	11/3	11/4	11/5	11/6	11/7	11/8	11/9	11/10	11/11	11/12	11/13	11/14	11/15	11/16	11/17	11/18	11/19	11/20
N F D R S	ERC Percentile	70%	78%	66%	70%	86%	78%	84%	84%	78%	86%	91%	92%	84%	86%	90%	88%	92%	94%	94%	94%	94%	92%
	BI Percentile	64%	81%	81%	64%	81%	81%	94%	94%	88%	96%	96%	97%	88%	94%	91%	96%	97%	98%	97%	96%	96%	94%
	KBDI Percentile	95%	95%	95%	95%	95%	95%	95%	95%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%
	ERC	19	21	18	19	23	21	22	22	21	23	26	27	22	23	25	24	27	28	28	28	28	27
	BI	13	15	15	13	15	15	18	18	16	20	19	21	16	18	17	19	22	23	21	19	19	18
	KBDI	535	537	540	544	548	549	549	552	557	562	564	565	566	568	570	570	570	570	570	570	570	570
	1 hr	17	11	12	14	11	15	11	10	10	9	8	9	12	10	10	12	10	11	12	13	14	15
	10 hr	22	20	21	17	14	16	18	16	18	15	12	11	20	17	13	12	11	12	13	14	16	17
	100 hr	16	19	20	20	19	18	18	20	20	20	18	17	17	18	19	18	17	16	15	15	15	15
	1000 hr	19	19	20	20	20	20	19	19	20	20	20	19	19	19	19	19	19	19	18	18	18	17
Live Herbaceous	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	
Live Woody	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	
w e a t h e r	Max Temp	72	77	80	56	52	51	75	82	71	65	54	61	69	55	50	45	52	55	59	59	59	56
	Min RH	58%	40%	32%	52%	33%	57%	48%	42%	34%	27%	21%	28%	42%	38%	34%	31%	20%	20%	37%	37%	49%	51%
	Min Temp	48	51	50	37	28	25	48	61	43	37	31	25	49	35	29	27	25	38	39	40	40	38
	Max RH	100%	100%	89%	87%	100%	100%	100%	85%	94%	90%	62%	87%	100%	99%	60%	71%	57%	70%	70%	82%	85%	92%
	Max Wind	5	4	6	4	3	4	8	9	6	8	4	7	7	6	8	7	8	10	7	6	6	6
	Max Gust	15	12	18	12	11	11	19	26	19	23	18	17	19	19	15							

Glossary of Wildland Fire and Weather Terms

National Fire Danger Rating System (NFDRS)

- **NFDRS** is a system that allows fire managers to estimate today's or tomorrow's fire danger for a given area. Managers use *NFDRS* to input data and to receive information used to determine fire danger in their area. *NFDRS* is based on historical weather observations at *Remote Automated Weather Stations (RAWS)*.
- **Energy Release Component (ERC)** is a calculated output of the *NFDRS*. The *ERC* is a number related to the available energy (BTU) per unit area (square foot) within the flaming front at the head of a fire. *ERC* has memory and as live fuels cure and live fuels dry, the *ERC* will increase.
- **Burning Index (BI)** is a number related to the contribution of fire behavior to the effort of containing a fire. The *BI* (difficulty of control) is derived from a combination of *Spread Component* (how fast it will spread) and *Energy Release Component* (how much energy will be produced).
- **Keetch-Byram Drought Index (KBDI)** assesses the risk of fire by representing the net effect of evapotranspiration and precipitation in producing cumulative moisture deficiency in deep duff and upper soil layers.
 - The *KBDI* attempts to measure the amount of precipitation necessary to return the soil to full field capacity. The index ranges from zero, the point of no moisture deficiency, to 800, the maximum drought that is possible, and represents a moisture regime from 0 to 8 inches of water through the soil layer.
- **Ignition Component (IC)** relates to the probability of a firebrand producing a fire that will require suppression action. It is mainly a function of the 1-hour time lag (fine fuels) fuel moisture content and the temperature of the receptive fine fuels. *IC* has no units. A percentage of probability from 1-100.
- **Spread Component (SC)** is a rating of the forward rate of spread of a head fire. It integrates the effect of wind, slope, and fuel bed and fuel particle properties. The daily variations are caused by the changes in the wind and moisture contents of the live fuels and the dead fuel time lag classes of 1, 10, and 100 hr.
- **Percentile**, in the context of *NFDRS*, is a value on a scale of one hundred that indicates the percent of distribution that fire danger indices rank, as based on historic occurrence. i.e., the 97th percentile for an *NFDRS* index means that only 3% of the historic records held a value higher, while 97% were lower.

Fire Behavior Attributes

- **Rates of Spread (ROS)** is the surface rate of spread in chains per hour. One chain is equal to 66 feet.
- **Flame Length (FL)** is the length of the flame on the surface from base to tip (not vertically).
- **Probability of Ignition (PIO)** is the probability of a fire brand igniting at the surface.

Fire Behavior Fuel Models

- **GR2 (102)** is low load, dry climate grass
- **SH3 (143)** is moderate load, humid climate shrub
- **TL2 (182)** is low load broadleaf litter
- **TL6 (186)** is moderate load broadleaf litter

Live and Dead Fuel Moistures used in both NFDRS and Fire Behavior Calculation

- **1-Hour Fuel (1 HR)** is a dead fuel, sized less than ¼ inch, with a time lag of 1 hour; meaning these fuels typically take 1 hour to cure.
- **10-Hour Fuel (10 HR)** is a dead fuel, sized between ¼ and 1 inch, with a time lag of 10 hours; meaning these fuels typically take 10 hours to cure.
- **100-Hour Fuel (100 HR)** is a dead fuel, sized between 1 and 3 inch, with a time lag of 100 hours; meaning these fuels typically take 100 hours to cure.
- **1000-Hour Fuel (1000 HR)** is a dead fuel, sized over 3 inches, with a time lag of 1000 hours; meaning these fuels typically take 1000 hours to cure.
- **Live Herbaceous and Woody Fuel Moisture** values are important for fire spread models as they offer a dynamic fuel moisture value that should typically parallel those live herbaceous and woody fuel moistures being experienced within vegetation in which wildfires are spreading. The lower the value the dryer.