

Smoke Permit Weather Forecasts

Ventilation adjective forecasts for anywhere in Colorado are available on the web.

Ventilation is a measure of the atmosphere's capacity to disperse a pollutant like smoke at a particular time.

This forecast may be used to establish compliance with [Colorado prescribed fire permit](#) weather forecast requirements. Print a copy of the relevant forecast(s) for your files.

Private landowners may not obtain National Weather Service (NWS) [spot forecasts](#). If you burn for an agency that gives you the option to forego a spot, and with respect only to smoke, consider the smoke risk of the burning you are about to do. If it is significant we recommend that you get a spot forecast. More than the fuel affects smoke risk, but in general for hand piles, machine piles far from homes, grass, and similarly lower smoke risk projects the website described below is sufficient smoke forecast information.

Forecasts from sources other than the National Weather Service may **not** be used to establish compliance with Colorado prescribed fire smoke permits.

Go to http://www.crh.noaa.gov/bou/?n=neco_firedss. It works regardless of which NWS office typically issues forecasts for your area. You will see a screen like this:

The screenshot shows the National Weather Service Weather Forecast Office website for Denver/Boulder, CO. The page features a navigation menu with links for Home, Site Map, News, Organization, and a search bar. Below the navigation, there are tabs for Emergency Info, Fire Status, Observations, Fcsts/Outlooks, and Fuels. The main content area includes a map of Colorado with a forecast table and various weather data links. The forecast table is titled "Hourly FireWx Table" and includes fields for Lat and Lon. The map shows the state of Colorado with major cities and rivers labeled. The forecast table is currently empty. The weather data links include Regional Radar, NASA Lightning, Regional Satellite, Severe Outlook, Surface Analysis, Rainfall Outlook, MesoWest Observations, and CO WX Impact.

www.crh.noaa.gov/bou/?n=neco_firedss

Dispatch & Fuels | Email | FatWire | Maps | NewsForFires | Other States | Research | Smoke Refs | Utilities | Weather

National Weather Service Weather Forecast Office
Denver/Boulder, CO

Home | Site Map | News | Organization | Search for: | NWS | All NOAA

Emergency Info | Fire Status | Observations | Fcsts/Outlooks | Fuels

Click to change Forecast Type: Hourly FireWx Table | Lat: | Lon: | Go

Click in map for forecast. Left click (+) to toggle layers. | Enter Lat/Lon for point Fcst

Regional Radar | NASA Lightning

Regional Satellite | Severe Outlook

Surface Analysis | Rainfall Outlook

MesoWest Observations | CO WX Impact

Instructions: Left mouse click to obtain tabular forecast for clicked area. To zoom, use mouse wheel or upper left hand controls. The default Forecast Type is the FireWx Tabular Table. To change the Forecast Type, use the forecast type pull down in the upper left corner. Use the Lat/Lon entry box in the upper right to enter a specific point and then click Go.

In the white boxes toward the top center of the screen enter the burn site's latitude and longitude. Then click 'go.'

If you want a general idea of the forecast, click on the map. But for enough precision to use with a smoke permit, enter lat-long or zoom in repeatedly. The forecast grid is 3 km resolution.

Your burn's lat/long may be on the smoke permit. If not, an option is to locate the burn site on Google Earth. Look at the bottom of the screen for the cursor's lat/long.

You'll see a table like this:

National Weather Service Weather Forecast Office

Denver/Boulder, CO

Home
Site Map
News
Organization
Search for:
NWS
All NOAA
Go

TABULAR WEATHER FORECAST

ISSUED BY: NATIONAL WEATHER SERVICE DENVER/BOULDER, CO

FORECAST RELEASE TIME: 5:28 AM MST ON DEC 23, 2009

FORECAST PERIOD: 10AM MST DEC 23, 2009 TO 6PM MST DEC 30, 2009

CURRENT TIME: 1048 AM MST WED DEC 23 2009

POINT INFORMATION: Zone Num: COZ213 Latitude: 40.062N Longitude: -106.407W Elevation: 7387FT

LOCATIONS WITHIN 5 MILES: 2 Miles WNW Kremmling CO

FIRE ZONE FWF PRODUCT: [Click Here](#) to view the Fire Weather Narrative (FWF) for Zone COZ213

SUNRISE/SUNSET INFO: Sunrise: 7:25 AM MST Sunset: 4:44 PM MST

GRAPHIC FORMAT: [Click Here](#) to view Forecast Data in a Graphical Format

FORECAST	SC	PP	CWR	TF	TD	MX RH	MX SFC	SFC	G	H	L	10K	10K	MIXG	TRAN	TRAN	VENTL	AJTV	QPF	SNOW	PRIMARY	
VALID AT	%	%	%	F	F	MN %	MN WIND	WIND	S	I	A	WIND	WIND	HGT	WIND	WIND	RATE	RATG	6HRS	6HRS	WX TYPE	
(MST)						TF	RH	DIR	MPH	T	L	DIR	MPH	AGL	DIR	MPH	KT-FT		DUR	DUR		
12/23-10A	97	60			23	18	84	N	6			1		1677	N	8	11012	P			SNOW	
12/23-11A	97	60			24	18	80	N	6	6	2	1	N	16	2248	N	8	14827	P	0.02	0.4	SNOW
12/23-12P	97	60			24	18	78	N	6			1		2480	N	7	14312	P			SNOW	
12/23-1P	97	60			25	18	76	N	6			1		2711	N	6	13796	P			SNOW	
12/23-2P	97	60			25	18	75	N	6	6	2	1	N	17	2943	N	6	13281	P			SNOW
12/23-3P	97	60			24	17	75	N	6			1		2541	N	8	16147	P			SNOW	
12/23-4P	97	60			23	17	76	N	6			1		2140	NW	12	19013	P			SNOW	
12/23-5P	100	60			22	16	78	N	6	6	2	1	N	17	1739	NW	15	21880	P	0.01	0.1	SNOW
12/23-6P	100	70			20	16	25 82 75	N	6			1		1292	NW	13	15761	P			SNOW	
12/23-7P	100	70			18	15	85	N	7			1		845	NW	12	9643	P			SNOW	
12/23-8P	100	70			16	14	88	N	7	7	2	1	NW	18	398	NW	10	3525	P			SNOW
12/23-9P	100	70			15	12	91	NW	7			1		393	NW	10	3708	P			SNOW	
12/23-10P	100	70			13	11	93	NW	8			1		389	NW	12	3892	P			SNOW	
12/23-11P	89	70			12	10	93	NW	8	8	2	1	W	22	384	NW	13	4076	P	0.04	0.6	SNOW
FORECAST	SC	PP	CWR	TF	TD	MX RH	MX SFC	SFC	G	H	L	10K	10K	MIXG	TRAN	TRAN	VENTL	AJTV	QPF	SNOW	PRIMARY	
VALID AT	%	%	%	F	F	MN %	MN WIND	WIND	S	I	A	WIND	WIND	HGT	WIND	WIND	RATE	RATG	6HRS	6HRS	WX TYPE	
(MST)						TF	RH	DIR	MPH	T	L	DIR	MPH	AGL	DIR	MPH	KT-FT		DUR	DUR		
12/24-12A	89	70			11	9	94	NW	8			1		363	NW	12	3582	P			SNOW	
12/24-1A	89	70			10	8	93	NW	8			1		342	NW	10	3088	P			SNOW	

12/24-2A	89	70	9	7	92	NW	7	7	2	1	W	23	321	NW	9	2593	P					SNOW
12/24-3A	89	70	8	6	90	NW	6					1	743	NW	12	9476	P					SNOW
12/24-4A	89	70	8	5	88	NW	6					1	1165	NW	14	16358	P					SNOW
12/24-5A	82	36	7	4	86	NW	5	5	2	1	NW	36	1586	NW	17	23240	P	0.03	0.5			
12/24-6A	82	36	6	3	5	87	94	NW	5			1	1753	NW	15	22490	P					
12/24-7A	82	36	6	3	86	NW	3					1	2392	NW	15	31023	P					
12/24-8A	82	36	7	3	82	NW	3	3	2	1	NW	39	3030	NW	15	39556	P					
12/24-9A	82	36	10	3	75	NW	3					1	3679	NW	17	55765	F					
12/24-10A	82	36	12	5	71	NW	3					1	4327	NW	18	71975	G					
12/24-11A	74	36	15	5	66	NW	3	3	2	1	NW	49	4975	NW	21	88184	G	0.02	0.4			
12/24-12P	74	36	16	5	61	NW	3					1	5234	NW	25	115400	V					
12/24-1P	74	36	17	5	58	W	5					1	5493	NW	30	142616	V					
12/24-2P	74	36	18	5	56	W	5	5	2	1	NW	47	5752	NW	35	169831	E					
12/24-3P	74	36	17	5	57	W	6					1	5487	NW	35	164692	E					
12/24-4P	74	36	16	5	60	W	6					1	5222	NW	36	159552	E					
12/24-5P	70	10	13	5	69	W	8	8	2	1	NW	52	4956	NW	36	154412	E	0.01	0.2			
12/24-6P	70	10	11	3	18	71	56	W	8			1	4872	NW	35	145358	V					
12/24-7P	70	10	10	2	70	W	7					1	4787	NW	32	136304	V					
12/24-8P	70	10	9	0	67	W	6	6	2	1	NW	62	4702	NW	31	127251	V					
12/24-9P	70	10	8	-2	63	W	6					1	4552	NW	30	119156	V					
12/24-10P	70	10	7	-5	58	NW	5					1	4403	NW	29	111061	V					
12/24-11P	70	10	6	-6	55	NW	5	5	2	1	NW	73	4253	NW	28	102965	V	0.00				

Which columns in the table you should use depends on the permit conditions.

1) If the permit's weather options include one or more **ventilation adjectives**, look at the columns with colored letters labeled 'ajtv ratg.'

The best ventilation adjective for the day establishes permit compliance. For example, if at any time during the day of ignition the adjective will be 'good' but not reach 'very good,' use permit conditions for 'good.'

Translation:

P (red) = poor

F (orange) = fair

G (yellow) = good

V (blue) = very good

E (also blue) = excellent.

(All the column headers are translated way down at the bottom of the web page.)

Using the table above as an example, on 12/23 the day's best forecasted adjective was 'poor.' Unless other weather criteria of snowing or storm are met and are approved for the project, the permit probably does not allow any burning that day. Basically, the overnight inversion is not expected to break, and smoke would disperse minimally. By contrast, for the 24th the best forecasted adjective is 'excellent.' It is unusual weather in that favorable ventilation is expected to last well into the evening, and reflects stiff upper-level winds that may follow passage of a cold front like the one that brought the snowstorm on the 23rd.

2) If the permit requires '**storm**', use the 3rd column from the left, labeled PP % (probability of precipitation).

To meet the very specific definition of 'storm' that applies to prescribed fire permits, the probability of snow must be at least 60% for at least 6 of the 18 hours following ignition. Check that the 'PP%' column is 60 or greater for at least 6 hours. Also establish that the

form of the precipitation is forecasted to be snow, not rain, which is shown in the last column on the right.

In this example, on the 23rd the probability of snow is forecasted to be 60 or 70% all day. The storm criterion of at least 6 hours of 60% or higher probability of snow is met. On the 24th the forecast showed five hours of 60% or higher probability. The permit criterion for 'storm' requires at least six hours. The storm criterion is not met despite the possibility of snowfall that day.

3) The tabular forecast includes both **transport wind** directions and speeds. They may be relevant for constrained wind directions on a smoke permit.

The direction shown is the source of the wind - where it is coming from, not the direction in which it is headed.

In the example the transport wind direction on both days was N and NW. A permit whose allowed wind directions include both of these directions could be used. On the 24th a permit that did not allow W but did include NW could also be used.

4) Finally, this forecast also has **sunset** time in the header. In most cases sunset time affects how late in the day your smoke permit says you may light.

The sunset time is in daylight savings time year round. If you are burning in winter, from the first Sunday in November until the second Sunday in March, translate the forecast's listed sunset time to time on your watch by subtracting one hour.

In the example the sunset time on the 23rd is 4:44 p.m. We round to the nearest quarter hour. A permit that required ignition to end no later than two hours before sunset would let a person light piles or broadcast fuels until 2:45 p.m. but no later.

Thank you to National Weather Service fire weather forecasters for making this format of forecast available. Questions or concerns about how this website's information applies to Colorado prescribed fire permits? Call Coleen Campbell at 303 692-3224, Sarah Gallup at 303 916-1260, or Pat McLaughlin at 303 692-3244.