

AQI Forecasting, Burn Bans, and Verification



STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

Jacob Wolf
Senior Air Quality Meteorologist

Outline

- Building a forecast
- Daily forecast submissions to AIRNOW
- Daily forecast submissions to DEQ
- Public-facing daily forecasts
- Additional regional outreach
- Air Pollution Forecast and Caution
- Verification

Building a Forecast

Model Output Statistics (MOS) for GFS, NAM, and Extended GFS from NOAA

Note: This product is raw model output and has not been adjusted for antecedent conditions or analyzed by a forecaster. Use at own discretion.

» [How to Decode the MOS Guidance](#)

Southwest Idaho	Southeast Idaho	North Idaho
Boise	Twin Falls	Coeur d'Alene
Ontario	Idaho Falls	Spokane
Mountain Home	Burley	Pullman
McCall	Pocatello	Lewiston
Caldwell	Rexburg	

Boise Regional Office

- » [Boise National Weather Service Area Forecast Discussion](#)
- » [Idaho National Weather Service Graphical Forecasts](#)
- » [Soundings](#)
- » [WRF-GFS 12km-850mb Temps](#)
- » [WRF-GFS 12km-500mb Temps](#)
- » [City of Boise Visibility Webcam](#)
- » [Boise National Weather Service Visibility Webcams](#)
- » [Idaho Transportation Department Visibility Webcams](#)
- » [Weather and Hazards Data Viewer](#)

Coeur d'Alene Regional Office

- » [Spokane National Weather Service Forecast Discussion](#)
- » [Idaho National Weather Service Graphical Forecasts](#)
- » [Weather and Hazards Data Viewer](#)
- » [WRF-GFS 12km-500mb Temps](#)

Quick Links

- » [National Weather Service Radar](#)
- » [Infrared Satellite](#)
- » [Water Vapor Satellite](#)
- » [Surface Analysis](#)
- » [AirNow-Tech Log-In](#)
- » [DEQ AQI Log-in](#)
- » [AIRPACT](#)
- » [National Weather Service](#)
- » [UW WRF-ARW](#)
- » [University of Wyoming Sounding](#)
Select PDF:Skew-T in plot type drop-down.
- » [DEQ Daily Air Quality Reports and Forecasts](#)
- » [DEQ Real-Time Air Quality Monitoring](#)
- » [On the Fly Sounding Generator](#)
- » [MesoWest Surface Weather Maps](#)
- » [Canadian GEM GDPS](#)
- » [RUC Soundings](#)
- » [SJSU Model Graphics](#)

Smoke Mgmt Forecasting Tools

Staff Contact

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NWS Tools					
Idaho Graphical Forecast Spot Weather Requests FirePoker					
Area Forecast Discussion					
BOI	PIH	MSQ	OTX	PDT	SLC
Fire Weather Forecast					
BOI	PIH	MSQ	OTX	PDT	SLC
FireDay Graphical Forecast					
BOI	PIH	MSQ	OTX	PDT	SLC
Local Climate					
BOI	PIH	MSQ	OTX	PDT	SLC
NOAA HPC/SPC					
Model Diagnostic Discussion		SPC Mesoanalysis		HPC Surface Analysis	
AirFire Tools					
HYSPLIT Trajectories		Monitoring		BlueSky Playground	
				Bluesky Daily Runs	
NWP Models					
UW-WRF		UW-WRF Extended		UW-WRF Air Quality	
UW-WRF Extended Air Quality		College of DuPage Models		Windy	
Tropical Tidbits		SimuAWIPS			
Observations					
Weather and Hazards Viewer College of DuPage-Satellite MesoWest Montana-Idaho Airshed Group Proposed Burn Map					

AIRNOW Forecast Entry

Create or Choose an Existing Form

BRO

For categorical forecasts, enter:

g for Good	m for Moderate
usg for Unhealthy for Sensitive Groups	u for Unhealthy
vu for Very Unhealthy	h for Hazardous

[Hide All Guidance](#)
[Show All Discussions](#)
[Show Saved Forecasts](#)

Boise

Submitted: 5/24/2021 9:50 AM (ET)

Apply to Group:

Pollutant	Yest. Obs Mon, 05/24	Today Tue, 05/25	Tomorrow Wed, 05/26	Day 2 Thu, 05/27	Day 3 Fri, 05/28	Day 4 Sat, 05/29	Day 5 Sun, 05/30	Delete Forecast
Ozone Forecast (AQI)	39	39	Good	Good	Good	Good	<input type="text"/>	<input type="checkbox"/>
Hide Guidance								
NOAA 06Z		38	44					
Action Day	<input type="checkbox"/>							
Burn Ban	<input type="checkbox"/>							
PM _{2.5} Forecast (AQI)	11	<input type="text"/>	<input type="checkbox"/>					
Action Day	<input type="checkbox"/>							
Burn Ban	<input type="checkbox"/>							
PM ₁₀ Forecast (AQI)	10	<input type="text"/>	<input type="checkbox"/>					
Action Day	<input type="checkbox"/>							
Burn Ban	<input type="checkbox"/>							

[Show Discussion](#)

DEQ Air Quality Forecast Entry

DEQ User
Administrator

Boise Regional Office - Air Quality Forecast and Information Outdoor Entry

AQI Admin

ADMINISTRATION

Home

Sites

Users

OUTDOOR BURNING

Edit Actions

Outdoor Burn Map Notes

Coeur d'Alene Region

Lewiston Region

Boise Region

Idaho Falls Region

Twin Falls Region

Pocatello Region

AQI FORECAST

Boundary County

Coeur d'Alene

Franklin County

Treasure Valley AQI Forecast

Last Updated 05/24/2021 7:53 AM by DEQ\mtoole

[Public Site](#)

AQI Color / Category	
■ Good	■ Moderate
■ Unhealthy for Sensitive Groups	■ Unhealthy
■ Very Unhealthy	■ Hazardous

Pollutant

	Today Tue, 5/25	Tomorrow Wed, 5/26	Day 3 Thu, 5/27	Day 4 Fri, 5/28	Day 5 Sat, 5/29	Day 6 Sun, 5/30	Day 7 Mon, 5/31
Ozone Forecast (AQI)	<input type="text" value="39"/> ■	<input type="text"/> ■					
PM 2.5 Forecast (AQI)	<input type="text"/> ■	<input type="text"/> ■	<input type="text"/> ■	<input type="text"/> ■	<input type="text"/> ■	<input type="text"/> ■	<input type="text"/> ■
Forecast Discussion <small>Click Message Icon To Edit Discussion</small>	●	●	●				
Action Forecast: Outdoor Burning	■	■	■	■	■	■	<input type="text"/>
Action Forecast: Residential Wood Burning	■	■	■	■	■	■	<input type="text"/>
Special Message <small>Click Message Icon To Edit Message</small>	●	●	●	●	●	●	●

Submit Cancel

Air Quality Forecasts-Public

Treasure Valley 3-day Forecast (Default Site)

Boise Region - Coeur d'Alene Region - Idaho Falls Region - Lewiston Region - Pocatello Region - Twin Falls Region

Forecast Forecast (Mobile View) Current Air Quality 10-day AQI Trends Outdoor Open Burning Map

Last Updated: 5/26/2021

Subscribe Daily AQI Forecast E-Mail Notifications through EPA's "Enviroflash" Service

Current National Weather Service Forecast For Treasure Valley

Forecast Discussion

Sunny with light winds and a high near 72. Air quality is expected to be within the "Good" category. Local ordinance may prohibit outdoor open burning in your area. Please contact your local city/county office for additional information.



Air Quality Forecasts

DEQ provides air quality forecasts throughout the state. Forecasts utilize current monitoring data, weather prediction models and meteorological observations to project anticipated pollutant concentrations. For example, a wintertime stagnation event would result in forecasters anticipating elevated pollutant concentrations and thereby issuing worsening air quality forecasts. We are required to provide forecast information for areas with populations over 350,000 people, and we also provide forecasts for many smaller communities.

Our regional offices issue daily forecasts on our Air Quality Forecasts page and on EPA's AirNow pages. An Air Quality Index (AQI) category is assigned for each forecasted day. The pollutant with the highest AQI projected for that day is the one used for the forecast. Particulate matter and ozone are typically the highest pollutants driving the forecasts.

A variety of other helpful information is found on our Air Quality Forecasts page:

- Smoke management advisories and tips
- Crop Residue Burning map
- Health information and precautionary actions associated with each AQI category
- AQI trends for 10-day periods
- Links to other helpful tools



Wednesday May 26

Thursday May 27

Friday May 28

Health	Health	Health
Good AQI=41 Ozone	Good AQI=43 Ozone	Good Ozone
Action	Action	Action
Residential Wood Heating	Residential Wood Heating	Residential Wood Heating
No Restrictions	No Restrictions	No Restrictions
Click HERE for Local Wood Heating Ordinances	Click HERE for Local Wood Heating Ordinances	Click HERE for Local Wood Heating Ordinances
Outdoor Burning	Outdoor Burning	Outdoor Burning
No Restrictions	No Restrictions	No Restrictions
Click HERE for Local Outdoor Open Burning Ordinances	Click HERE for Local Outdoor Open Burning Ordinances	Click HERE for Local Outdoor Open Burning Ordinances

Outdoor Burning Map Entry

AQI Admin 

ADMINISTRATION

- Home
- Sites
- Users

OUTDOOR BURNING

- Edit Actions
- Outdoor Burn Map Notes
- Coeur d'Alene Region
- Lewiston Region
- Boise Region
- Idaho Falls Region
- Twin Falls Region
- Pocatello Region

AQI FORECAST

- Boundary County
- Coeur d'Alene
- Franklin County
- Grangeville
- Idaho City
- Idaho Falls

Boise Regional Office Outdoor Burning Map Data Entry Page

Click the buttons below to select desired category:

Unrestricted Conditional Restricted Not Available

[Public Outdoor Burn Map](#)

Last updated by DEQ\mtoole on 6/1/2021 1:04:44 PM

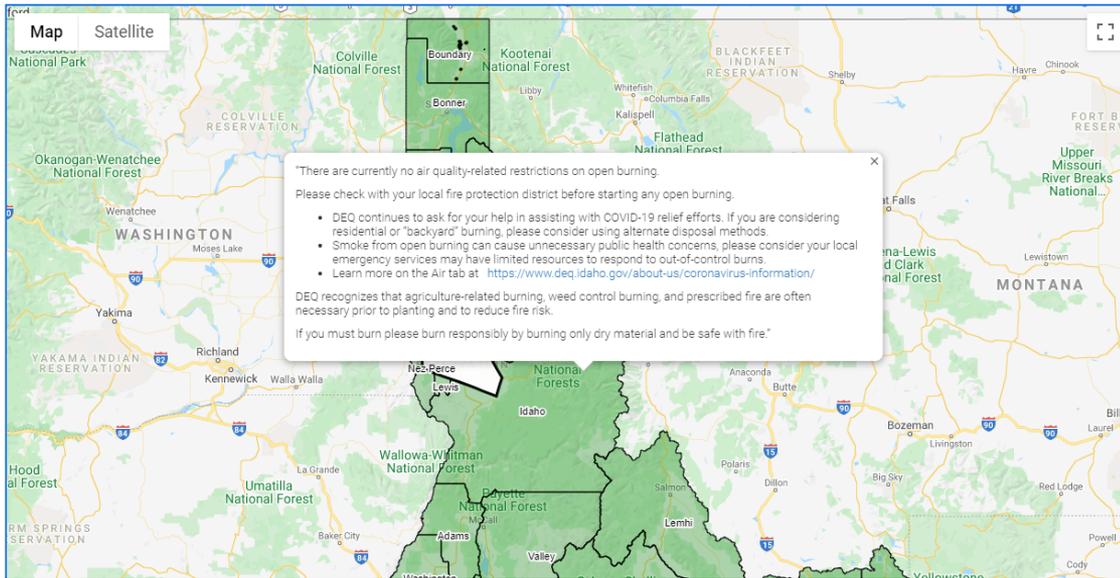
County	Set All	Today Thu, 6/03	Tomorrow Fri, 6/04	Day 3 Sat, 6/05	Day 4 Sun, 6/06	Day 5 Mon, 6/07	Day 6 Tue, 6/08
Adams	<input type="checkbox"/>	<input checked="" type="checkbox"/> U	<input type="checkbox"/>				
Valley	<input type="checkbox"/>	<input checked="" type="checkbox"/> U	<input type="checkbox"/>				
Ada	<input type="checkbox"/>	<input checked="" type="checkbox"/> U	<input type="checkbox"/>				
Boise	<input type="checkbox"/>	<input checked="" type="checkbox"/> U	<input type="checkbox"/>				
Payette	<input type="checkbox"/>	<input checked="" type="checkbox"/> U	<input type="checkbox"/>				
Gem	<input type="checkbox"/>	<input checked="" type="checkbox"/> U	<input type="checkbox"/>				
Canyon	<input type="checkbox"/>	<input checked="" type="checkbox"/> U	<input type="checkbox"/>				
Owyhee	<input type="checkbox"/>	<input checked="" type="checkbox"/> U	<input type="checkbox"/>				
Elmore	<input type="checkbox"/>	<input checked="" type="checkbox"/> U	<input type="checkbox"/>				
Washington	<input type="checkbox"/>	<input checked="" type="checkbox"/> U	<input type="checkbox"/>				

Outdoor Open Burn Map

Date Last Updated: 06/02/2021 8:09 AM

Boise Region ▾ Coeur d'Alene Region ▾ Idaho Falls Region ▾ Lewiston Region ▾ Pocatello Region ▾ Twin Falls Region ▾ Current Air Quality

Click on county of interest to view special messages.



- This map may contain burn information from multiple agencies. DEQ restrictions are in accordance with IDAPA 58.01.01.550-562, 600-624 or local outdoor open burning ordinances.
- It is your responsibility to ensure no additional burn restrictions are currently in place prior to burning.
- Contact your local fire district or sheriff's office prior to ignition. Visit the Idaho Department of Lands web site for fire safety burn restriction information.
- Advanced registration with DEQ is required before conducting crop residue burning. Visit [DEQ's Crop Residue Burning](#) to see requirements and apply for a permit.
- For daily updates on Air Quality Forecasts, Residential Wood Burning Conditions, Real-time Air Quality Conditions and Trends, please visit our [Daily AQ Forecast and Burn Conditions](#) page.

Legend	
	Counties with No Outdoor Burning Restrictions
	Counties with Conditional Burning Restrictions
	Counties where Outdoor Burning is Prohibited
	Not Available at This Time
	Indian Lands

Daily AQI Forecast Email

The Air Quality Index (AQI) forecast for the Treasure Valley for **Wednesday, June 2, 2021** is 52. Air quality is expected to be in the **YELLOW/MODERATE** category.

Activity	Unincorporated Ada County	Ada County Cities	Unincorporated Canyon County	Canyon County Cities
Outdoor Burning	YES	YES	YES	YES
Woodstove/Fireplace	YES	YES	YES	YES

For additional information concerning local open burning ordinances, please refer to the attached contact list.

IDL Closed Fire Season: Individuals living outside city limits anywhere in Idaho who plan to burn for any reason – including crop residue burning and excluding recreational campfires – during “closed fire season,” from **May 10 to October 20** every year, must obtain a fire safety burn permit.

For more information concerning general air quality and the air quality index and forecasts, please visit the Idaho Department of Environmental Quality’s website at <https://www2.deq.idaho.gov/air/AQIPublic/Forecast>

Location	AQI Air Quality Forecast	AQI Health Message	Yesterday's AQI (10/27/20)	Open Outdoor Burning and Woodstove Status Advisory Forecast
Pinehurst	Tomorrow Moderate (75)	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.	76	Day 1 - Yellow Voluntary restrictions on open burning until further notice.
	Day 2 Moderate (70)			Day 2 - Yellow Voluntary restrictions on open burning until further notice.
	Day 3 Moderate (65)			Day 3 - Yellow Voluntary restrictions on open burning until further notice.
Kootenai County	PM2.5	None	55	Day 1 - Yellow Voluntary restrictions on open burning until further notice.
	Tomorrow Good (45)			Day 2 - Yellow Voluntary restrictions on open burning until further notice.
	Day 2 Good (45)			Day 3 - Yellow Voluntary restrictions on open burning until further notice.
Greater Sandpoint Area	Day 3 Good (45)	PM2.5	79	Day 1 - RED NO OPEN OUTDOOR BURNING ALLOWED BY STATE AIR QUALITY RULE. Ensure proper wood burning stove operation and limit use if possible.
	Tomorrow Unhealthy for Sensitive Groups (110)			Day 2 - Yellow Voluntary restrictions on open burning until further notice.
	Day 2 Moderate (80)			Day 3 - Yellow Voluntary restrictions on open burning until further notice.
Greater Sandpoint Area	Day 3 Moderate (70)	PM2.5		Day 3 - Yellow Voluntary restrictions on open burning until further notice.
	PM2.5			Day 3 - Yellow Voluntary restrictions on open burning until further notice.



Burn Bans

- Triggered by forecasts or observations
- Duration plays an important role
- Local ordinances may trigger burn bans at lower thresholds.
- Emailed to public distribution lists, media, NWS, Program office.
- Posted on DEQ social media, wildfire blog

In the process of updating this product to be more streamlined and less text-focused.

Air Pollution Forecast and Caution - Issued

Date/Time Issued: **Wednesday, October 28, 2020 at 12:00 p.m.**

Next Update: **Thursday, October 29, 2020 at 12:00 p.m.**

The Idaho Department of Environmental Quality (DEQ) has issued an Air Pollution Forecast and Caution to notify residents of **Bonner County** of degraded air quality. Due to a stagnant atmosphere and elevated pollutant levels health impacts may occur. **BURNING RESTRICTIONS ARE IN EFFECT.** Air quality is currently in the **UNHEALTHY FOR SENSITIVE GROUPS*** category and is forecast to **be in the Unhealthy for Sensitive Groups.** The pollutant of concern is Fine Particulate Matter (PM_{2.5}).

Health Impacts and Recommended Actions

When air quality is unhealthy for sensitive groups, sensitive persons* may experience health effects and should limit prolonged or heavy exertion and limit time spent outdoors. The general public is unlikely to be affected.

Woodstove Burning Restrictions

Voluntary burn ban for residential wood burning activities.

Outdoor Burning Restrictions

All outdoor open burning is prohibited by the Department of Environmental Quality in accordance with the Rules for the Control of Air Pollution in Idaho (IDAPA 58.01.01.550).

Contact

For more information, contact DEQ's Regional Office in Coeur d'Alene at (208) 769-1422.

For real-time air monitoring information, visit DEQ's website at airquality.deq.idaho.gov.

For more information concerning local ordinances contact your local city or county.

Air Quality Index (AQI):

Range	Category	Meaning
	Good	Air quality is considered satisfactory, and air pollution poses little or no risk
51 to 100	Moderate	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
101 to 150	Unhealthy for Sensitive Groups*	Members of sensitive groups may experience health effects. The general public is not likely to be affected.
151 to 200	Unhealthy	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.
201 to 300	Very Unhealthy	Health warnings of emergency conditions. The entire population is more likely to be affected.
301 to 500	Hazardous	Health alert: everyone may experience more serious health effects.

For more information on the AQI, visit http://www.epa.gov/airnow/aqi_brochure_02_14.pdf.

For more information about wildfire smoke, visit Idaho's Smoke Blog at idsmoke.blogspot.com.

* Sensitive groups include those with heart and lung disease, older adults, and children.

Verification

$$\text{Accuracy (A): } A = \frac{a+d}{N} \times 100$$

$$\text{Bias (B): } B = \frac{b+d}{c+d}$$

$$\text{False Alarm Rate (FAR): } FAR = \frac{b}{b+d} \times 100$$

$$\text{Critical Success Index (CSI): } CSI = \frac{d}{b+c+d} \times 100$$

$$\text{Probability of Detection (POD): } POD = \frac{d}{c+d} \times 100$$

		Forecasted Exceedance	
		No	Yes
Observed Exceedance	No	a	b
	Yes	c	d

<https://www.airnow.gov/sites/default/files/2020-06/aq-forecasting-guidance-1016.pdf>

Verification

AQI Break	Total Observations	Correct Forecast	Percent Correct
GOOD	3341	3130	93.68%
MODERATE	574	330	57.49%
USG	55	23	41.82%
UNHEALTHY	56	31	55.36%
V.UNHEALTHY	18	12	66.67%
HAZARDOUS	5	0	0.00%
Total	4049	3526	87.08%

Table 1: Statewide AQI forecast accuracy.



City	Forecasts	Percent Correct	Bias	FAR	CSI	POD	Skill	A	B	C	D
Statewide	234	89.5	0.96	27	55	69	-2.3	181	12	14	28

Table 2: Statewide AQI forecast statistics at the Good/Moderate threshold.

Verification

City	Forecasts	Accuracy	Bias	FAR	CSI	POD	A	B	C	D
Boise	243	87	1.24	49	40	64	190	20	12	21
Idaho City	229	83	1.5	50	43	75	159	30	10	30
McCall	231	84	1.02	42	41	59	168	19	18	26

Table 8: AQI forecast statistics at the Good/Moderate threshold for Boise Regional Office sites.

City	Forecasts	Accuracy	Bias	FAR	CSI	POD	A	B	C	D
Boise	243	100		0			243	0	0	0
Idaho City	229	99	0	0	0	0	227	0	2	0
McCall	231	100		0			231	0	0	0

Table 9: AQI forecast statistics at the Moderate/Unhealthy for Sensitive Groups (NAAQS) threshold for Boise Regional Office sites.

City	Forecasts	Accuracy	Bias	FAR	CSI	POD	A	B	C	D
Boise	243	98	1.33	75	17	33	237	3	2	1

Table 10: AQI forecast statistics at a threshold of 74 for Boise.

City	Forecasts	Accuracy	Bias	FAR	CSI	POD	A	B	C	D
Boise	243	95	0.41	14	33	35	225	1	11	6

Table 11: AQI forecast statistics at a threshold of 60 for Boise.

Questions?

Contact:

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