

# **2012 Annual Enhanced Smoke Management Plan Open Burns & Air Quality Report**

Prepared by  
Department of Environmental Conservation  
Division of Air Quality  
for the Air Quality & Smoke Management Committee  
of the Alaska Wildland Fire Coordinating Group

FINAL December 5, 2013

Approved by AWFCG in January, 2014

## 2012 Annual Report - Enhanced Smoke Management Plan Report for Open Burns & Air Quality

This report fulfills the Alaska Enhanced Management Plan yearly report requirements. It provides information about the Department of Environmental Conservation (DEC) Open Burn Applications for prescribed or land clearing burns received and approved by DEC for 2012. Also included is air quality data representing the number and locations of monitored fine particulate matter (PM<sub>2.5</sub>) exceedances due to wildland fire smoke occurring during the 2012 summer wildfire season. This report, in conjunction with the wildland fire emissions inventory for 2012 (draft June 2013), presents an air quality view of the 2012 wildland fire season. Summaries of 2006 through 2012 data are included as comparisons.

### Resource Management Burns

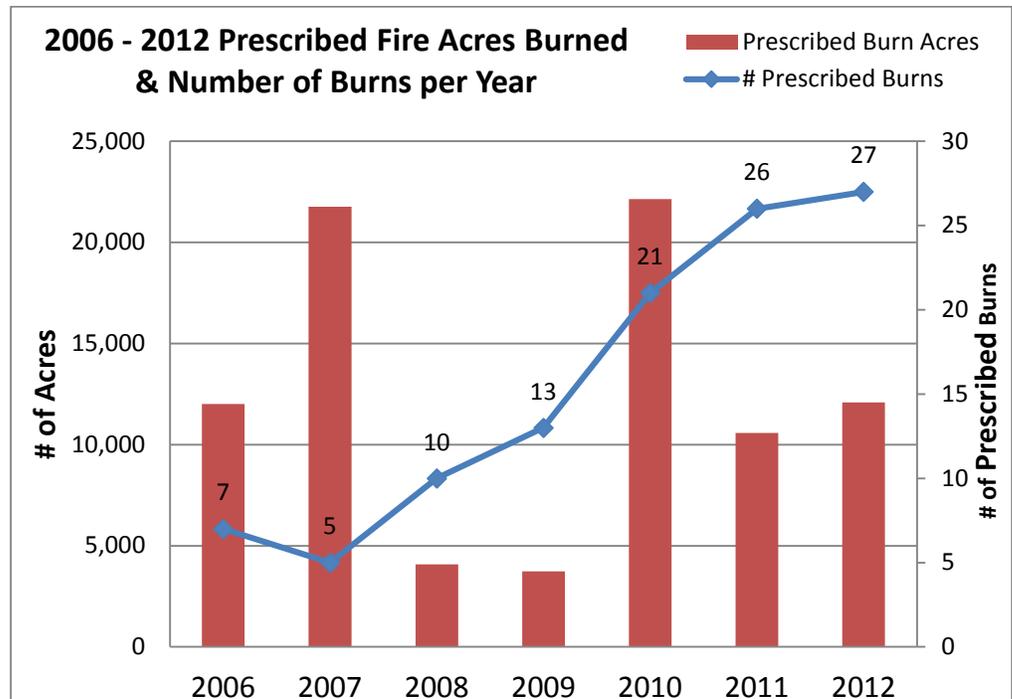
During 2012, DEC Air Quality received 27 open burn applications and 27 were approved. DEC open burn permit approvals include prescribed fires of 40 acres and over, either cleared and burned, or burned, during 2012. Three of the DEC permit approvals contained multiple burn areas which were counted as 10 separate burns in the Alaska Interagency Coordination Center (AICC) data. Twenty prescribed burns of less than 40 acres are not included in the DEC application numbers, but were included in the AICC situation reports. The 27 DEC permit approvals were classified as follows:

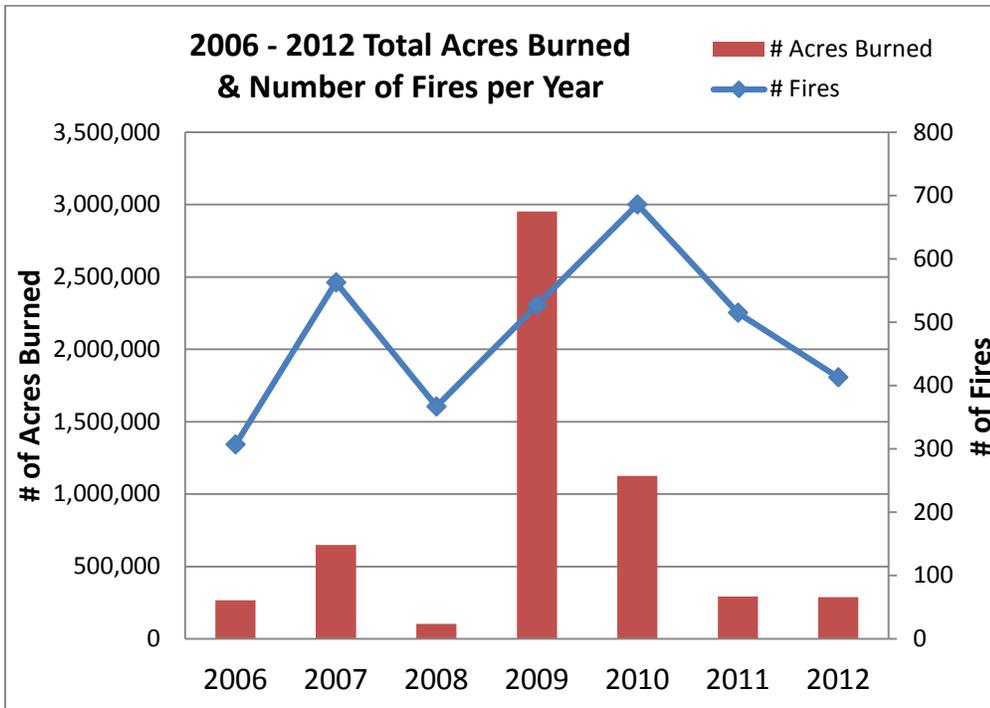
- 9 fire training, fuel / black smoke (2 not conducted)
- 4 fire training, structure
- 14 resource management (7 applicants did not report activity)

DEC approved 63,502 acres for resource management burns, however only 11,999.7 acres (18.9%) were actually burned during 2012. The majority of open burns, permitted by DEC or not, occurred in May; the rest were conducted April through November; none in June or July. No complaints were received by applicants or DEC. There were no reported adverse effects on Class 1 Areas or Sensitive Areas. During 2012, DEC had no enforcement actions in response to permitted burn activity.

The figure on the right shows the 2006 through 2012 resource management acres burned and the total number of those burns occurring per year.

There does not appear to be a correlation between the number of prescribed burns and the acreage burned.





The graph on the left shows the comparison between the total number of wildland fire acres burned per year and the number of wildland fires for 2006 through 2012.

A larger number of fires in 2010 and 2011 as compared to acreage burned is indicative of many small fires in 2010 and 2011.

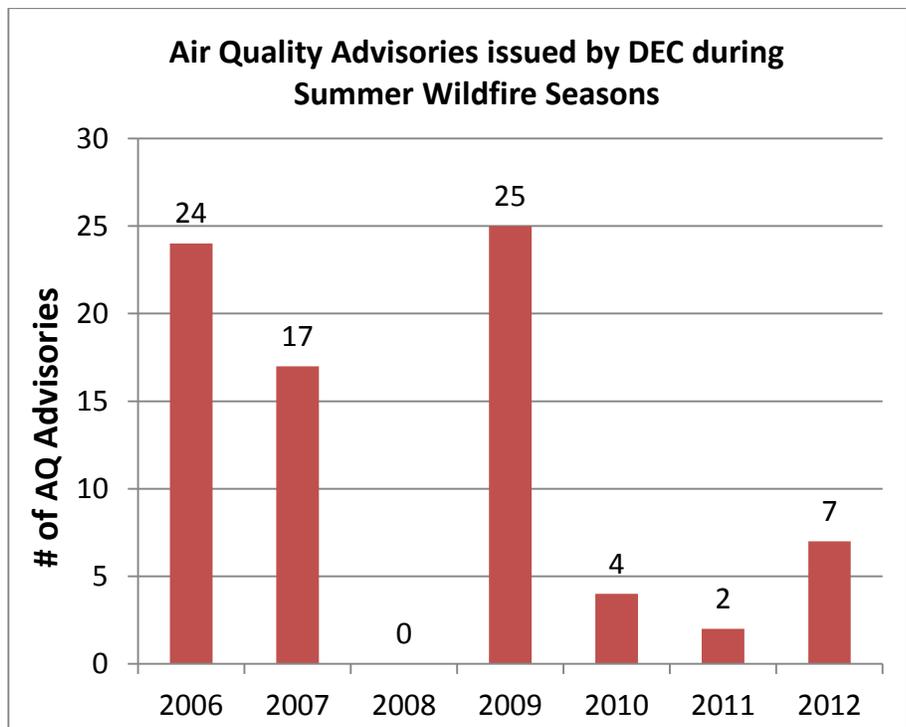
**DEC Air Quality Advisories**

The Department of Environmental Conservation issues air quality (AQ) health advisories during times of widespread wildland fire smoke, windblown dust, volcanic ash, and high levels of wintertime particulate matter. The graph to the right portrays DEC AQ advisories issued for wildfire smoke during the 2006 through 2012 summer wildland fire seasons.

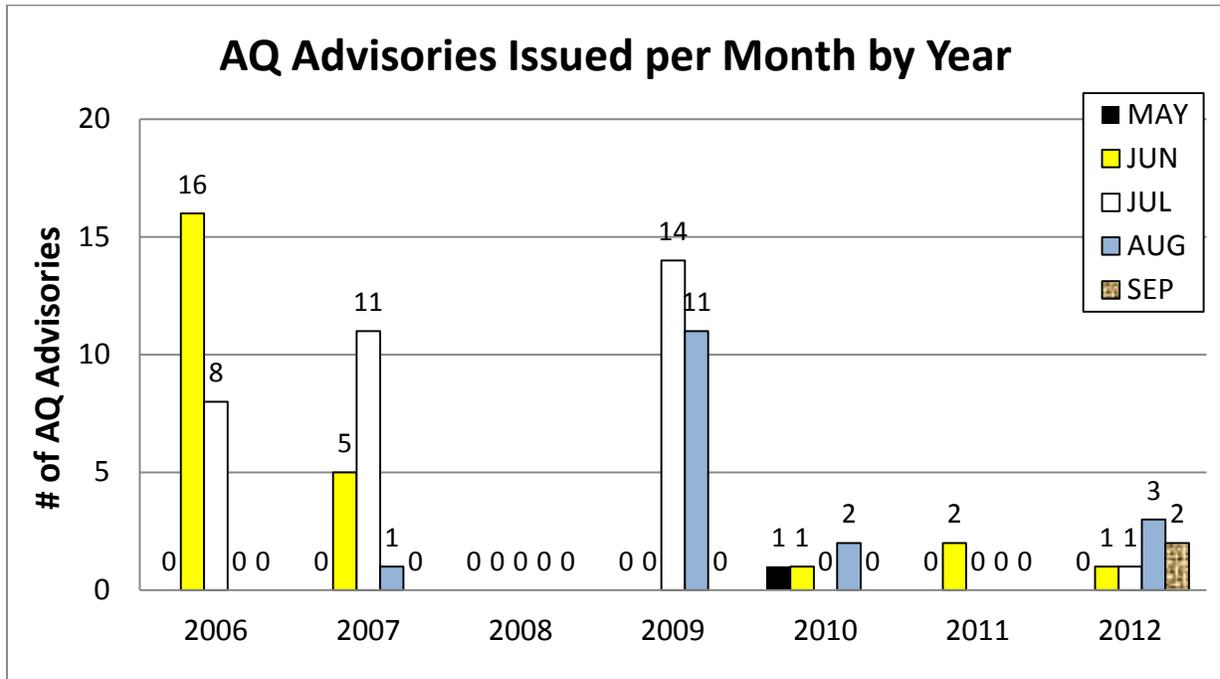
The advisories are issued for portions of Alaska that may be affected by wildfire smoke.

For some years it appeared the less acreage burned led to fewer AQ advisories being

issued. However, 2006 and 2007, with lower burned acreages, indicate fire location, intensity, and wind direction also affect the need for AQ advisories.



Multiple air quality advisories may be issued on the same day for different areas of the state, and sometimes advisories are issued for multiple days, not just for 24 hours. Although there were about the same number of advisories issued during 2006 and 2009, there were many more multiple day advisories issued in 2009 than in 2006. Also, 2009 had four days when there were two advisories issued for different parts of the state, and three days when three separate advisories were issued compared to just one day of double issuance in 2006. In 2012, two advisories were issued for 24 hours; the other five were issued for 2, 3, or 4 days.



The above graph shows the number of air quality advisories issued by DEC per summer month. It can be seen that June 2006 was much smokier than June 2007 through 2012. Wildfire smoke advisories are most common from June through August, however early and late fire seasons do occur and can impact public health. In 2010, a wildfire smoke AQ advisory was issued in May for the first time. In 2012, there were two AQ advisories issued in September for the first time for late season fires.

The table below shows the estimated PM<sub>2.5</sub> emissions for the 2006 through 2012 wildfire seasons and includes the emissions from wildland fire, wildland fire use (2006-08), and controlled burn / prescribed fires. Roughly, the more yearly acreage burned, the greater the PM<sub>2.5</sub> emissions for that year.

**PM<sub>2.5</sub> Fire Emissions**

Year	PM <sub>2.5</sub> Emissions
2006	96,391 tons
2007	269,928 tons
2008	63,330 tons
2009	1,597,321 tons
2010	549,721 tons
2011	181,165 tons
2012	89,753 tons

## Air Quality Standards

An “exceedance” of the PM<sub>2.5</sub> ambient air quality standard occurs when the 24-hour average concentration, measured in micrograms per cubic meter (µg/m<sup>3</sup>), exceeds the standard value of 35 µg /m<sup>3</sup> PM<sub>2.5</sub>. In Alaska, fine particulate matter is measured in the major population areas. Until 2009, most monitors ran on a 3-day schedule, i.e., the 1<sup>st</sup>, 4<sup>th</sup>, 7<sup>th</sup>, etc., day of the month. In 2009, most of the monitoring sites began using continuous PM<sub>2.5</sub> monitors. The data in the chart below is from the 3-day data for 2006-2008, and the daily PM<sub>2.5</sub> data for 2009 through 2012. The data from 2009-2012 may show more exceedances of the PM<sub>2.5</sub> standard since every day was measured. During the 2006–2008 seasons, using the data reported, only every 3<sup>rd</sup> day was measured and it is possible some daily exceedances were missed. It is also possible exceedances occurred where monitoring data is not available.

The following chart shows the number of exceedances of the PM<sub>2.5</sub> standard as monitored in different areas of the state during the 2006 through 2012 wildfire seasons. Since most of the wildfires occur in the Interior, most of the exceedances also occur there.

### PM<sub>2.5</sub> exceedances during the summer wildland fire season

May through September, FRM<sup>1</sup> PM<sub>2.5</sub>, every 3-day data

Year	PM <sub>2.5</sub> Monitor Location	# Exceedances	Air Quality Index (AQI) Categories <sup>2</sup>			
			# Unhealthy for Sensitive Groups	# Unhealthy	# Very Unhealthy	# Hazardous
2006	Fairbanks	0	0	0	0	0
2006	Anchorage	0	0	0	0	0
2006	Butte	1	1	0	0	0
2006	Juneau	0	0	0	0	0
	Totals	1	1	0	0	0
2007	All	0	0	0	0	0
2008	All	0	0	0	0	0
2009 <sup>3</sup>	Fairbanks	17	5	9	2	1
2009	Anchorage	0	0	0	0	0
2009	Wasilla	0	0	0	0	0
2009	Palmer	1	1	0	0	0
2009	Butte	1	1	0	0	0
2009	Juneau <sup>4</sup>	0	0	0	0	0
	Totals	19	7	9	2	1
2010	Fairbanks	2	2	0	0	0
2010	Other Areas	0	0	0	0	0
	Totals	2	2	0	0	0
2011	All	0	0	0	0	0
2012	All	0	0	0	0	0

<sup>1</sup> *Federal reference method (FRM)* means a method of sampling and analyzing the ambient air for an air pollutant that is specified as a reference method in an appendix to 40 CFR Part 50

<sup>2</sup> See the next page for descriptions of the AQI and AQI Category descriptions

<sup>3</sup> Note: daily PM<sub>2.5</sub> data is shown for 2009, 2010, 2011 and 2012

<sup>4</sup> Juneau sampler not in operation during July 2009 and the first half of August 2009

The previous chart also shows the number of days an Air Quality Index Category was reported. The information below explains the Air Quality Index and describes its reporting categories.

**The Air Quality Index (AQI) is an index for reporting daily air quality.**

The AQI tells how clean or polluted the air is, and what associated health effects might be a concern. The AQI focuses on health effects likely to be experienced within a few hours or days after breathing polluted air. The U.S. Environmental Protection Agency (EPA) calculates the AQI for five major air pollutants regulated by the Clean Air Act: EPA has established national ambient air quality standards for ground-level ozone, particle pollution (also known as particulate matter), carbon monoxide, sulfur dioxide, and nitrogen dioxide to protect public health. Ground-level ozone and airborne particles are the two pollutants that pose the greatest threat to human health in this country.<sup>5</sup>

In Alaska, the primary pollutant of concern with wildfires is Particulate Matter (PM). Fine particulate matter is less than 2.5 micrometers in diameter. It is a product of combustion, primarily caused by burning fuels. Examples of PM<sub>2.5</sub> sources include power plants, vehicles, wood burning stoves, and wildland fires. These particles can be inhaled deep in the lungs, causing future cardiovascular and respiratory health risks. The following table is from the EPA website, which relates the AQI Categories and Cautionary Statements to actual levels of PM<sub>2.5</sub>.<sup>6</sup> For further information see EPA’s Air Quality Guide for Particle Pollution at: [http://www.epa.gov/airnow/air-quality-guide\\_pm\\_2013.pdf](http://www.epa.gov/airnow/air-quality-guide_pm_2013.pdf).

Air Quality Index (AQI) information:

Air Quality Index Categories	Air Quality Index Cautionary Statements	24 Hour Particulate Levels µg /m <sup>3</sup> PM <sub>2.5</sub>
Good	None	0.0 to 12.0
Moderate	Unusually sensitive people should consider reducing prolonged or heavy exertion.	12.1 to 35.4
Unhealthy for Sensitive Groups	People with respiratory or heart disease, the elderly and children should limit prolonged exertion.	35.5 to 55.4
Unhealthy	People with respiratory or heart disease, the elderly and children should avoid prolonged exertion; everyone else should limit prolonged exertion.	55.5 to 150.4
Very Unhealthy	People with respiratory or heart disease, the elderly and children should avoid any outdoor activity; everyone else should avoid prolonged exertion.	150.5 to 250.4
Hazardous	Everyone should avoid any outdoor exertion; people with respiratory or heart disease, the elderly and children should remain indoors.	greater than 250.4

<sup>5</sup> EPA website: <http://www.airnow.gov/index.cfm?action=aqibasics.aqi>

<sup>6</sup> <http://www.epa.gov/airquality/particlepollution/2012/decfsstandards.pdf>