Piecing it Together: Minnesota's Air Quality Forecast/Alert Collaboration and Outreach

Program Changes

AQL History in MN

Collaboration

Results

Outreach

CANADIAN SMOKE INVASION

YESTERDAY

TODAY

EPA National AQ Conf - Jan 2018

MINNESOTA POLLUTION CONTROL AGENCY
Air Quality Forecasts in Minnesota

Kicked off by National Air Quality Forecast Capability (NAQFC) in mid-2000s
*an unfunded EPA mandate
Forecasting contract with vendor: 2008

Two locations:
Minneapolis/St. Paul (Twin Cities)
Rochester

*No other outstate locations due to cost, etc.
No forecasts for outstate Minnesota

*Over 90% land area and 40% of population not forecasted
Air quality events/impacts can be statewide

Air dispersion modeling meteorologists hired with weather/air quality forecast experience

Statewide meteorological and air monitoring locations can allow more forecast locations

Need for cost savings/budget improvements
Air Pollution Health Advisories and Alerts

Text-only products with limited specific details in area covered or start/end times (issued by MPCA)

Focus too Twin Cities-centric even during wildfire smoke events

Reactive vs proactive in most cases

Confusion by public and internally of advisory vs alert

Feb. 19, 2010

The Minnesota Pollution Control Agency (MPCA) has issued an air pollution health advisory for the Twin Cities and Rochester for Friday, Feb. 19, and an air pollution health alert for the same areas on Saturday, Feb. 20.

The MPCA issues an air pollution health alert when the Air Quality Index (AQI) exceeds or is expected to exceed 101, the level considered unhealthy for sensitive groups. An air pollution health advisory is issued when the AQI is expected to exceed 90.

An overnight temperature inversion, which traps pollutants near the surface, coupled with light to calm winds, which limit pollutant dispersion, is causing fine particle concentrations to build to levels considered unhealthy for sensitive groups in Rochester and the Twin Cities. As calm conditions persist into Saturday, fine particle levels are expected to continue to increase.

Increased wind speeds from the north on Sunday are expected to improve pollutant dispersion, leading to high moderate AQI levels on Sunday and low moderate AQI levels on Monday, Feb. 22. Air quality is expected to improve to good AQI conditions by Tuesday, Feb. 23.

Those with respiratory or cardiovascular problems, young children, the elderly and individuals who participate in activities that require heavy exertion are the most sensitive to elevated levels of air pollution. Since fine particles can be drawn deeply into the lungs, it is a good idea to reduce or postpone activities that lead to deep or accelerated breathing. Exposure to high levels of fine particles may cause chest pain, shortness of breath, coughing and fatigue, even after air quality has improved. If you experience these symptoms, contact your physician. Even individuals that are otherwise healthy may experience health effects when air pollution increases.
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Evaluation of Air Quality Advisories and Alerts

*Air Quality Advisories eliminated

*Air Quality Alerts (AQAs) to be primary alerting method for unhealthy air quality episodes/events
Alert Issuance Improvements

Air Quality Alert issued for southwest, western and central Minnesota from 9 am Friday to 6 am Saturday. More info at: pca.state.mn.us/aqi/current...

Maps, Apps, Tweets & more!
Expanded forecast sites across the state

Utilizing air quality monitors statewide for instant data & verification

*Split the Twin Cities metro into 3 forecast 'zones'
Duties transferred to MPCA meteorologists

Air quality alerts: January 2016

Air quality daily forecasts: June 1 2017
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MINNESOTA POLLUTION CONTROL AGENCY
State of Minnesota agencies

MINNESOTA POLLUTION CONTROL AGENCY

DEPARTMENT OF HEALTH

DEPARTMENT OF TRANSPORTATION
Tribal Nations in Minnesota
Other Agencies
# Air Quality Guide for Ozone

<table>
<thead>
<tr>
<th>Air Quality Index (0-500)</th>
<th>Who Needs to Be Concerned?</th>
<th>What Should I Do?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good (0-50)</td>
<td></td>
<td>It's a good day to be active outside.</td>
</tr>
<tr>
<td>Moderate (51-100)</td>
<td>Some people may be unusually sensitive to ozone.</td>
<td>Sensitive groups: Avoid exercising, as prolonged or heavy outdoor exertion can cause or worsen symptoms such as coughing or shortness of breath. Schedule outdoor activities in the morning when ozone is lower. Consider moving activities indoors or outdoors. People with asthma should follow their asthma action plans and keep quick-relief medicine handy. Everyone else: Reduce prolonged or heavy outdoor exertion. Take more breaks, do less intense activities. Schedule outdoor activities in the morning when ozone is lower.</td>
</tr>
<tr>
<td>Unhealthy for Sensitive Groups (101-150)</td>
<td>Sensitive groups: Avoid exercising, as prolonged or heavy outdoor exertion can cause or worsen symptoms such as coughing or shortness of breath. Schedule outdoor activities in the morning when ozone is lower. Consider moving activities indoors.</td>
<td>People with asthma should follow their asthma action plans and keep quick-relief medicine handy. Everyone else: Reduce prolonged or heavy outdoor exertion. Take more breaks, do less intense activities. Schedule outdoor activities in the morning when ozone is lower.</td>
</tr>
<tr>
<td>Unhealthy (151-200)</td>
<td>Everyone</td>
<td>Sensitive groups: Avoid exercising, as prolonged or heavy outdoor exertion can cause or worsen symptoms such as coughing or shortness of breath. Schedule outdoor activities in the morning when ozone is lower. Consider moving activities indoors. People with asthma should follow their asthma action plans and keep quick-relief medicine handy. Everyone else: Reduce prolonged or heavy outdoor exertion. Take more breaks, do less intense activities. Schedule outdoor activities in the morning when ozone is lower.</td>
</tr>
<tr>
<td>Very Unhealthy (201-300)</td>
<td>Everyone</td>
<td>Sensitive groups: Avoid exercising, as prolonged or heavy outdoor exertion can cause or worsen symptoms such as coughing or shortness of breath. Schedule outdoor activities in the morning when ozone is lower. Consider moving activities indoors. People with asthma should follow their asthma action plans and keep quick-relief medicine handy. Everyone else: Reduce prolonged or heavy outdoor exertion. Take more breaks, do less intense activities. Schedule outdoor activities in the morning when ozone is lower.</td>
</tr>
<tr>
<td>Hazardous (301-500)</td>
<td>Everyone</td>
<td>Everyone: Avoid all physical activity outdoors.</td>
</tr>
</tbody>
</table>

### Simplify and Focus the Message

- **Good (0-50)**: It's a good day to be active outside.
- **Moderate (51-100)**: Sensitive groups should avoid exercising, and everyone else should reduce prolonged or heavy outdoor exertion.
- **Unhealthy for Sensitive Groups (101-150)**: Follow asthma action plans and schedule activities in the morning.
- **Unhealthy (151-200)**: Reduce exertion and schedule activities in the morning.
- **Very Unhealthy (201-300)**: Avoid exercising and schedule activities in the morning.
- **Hazardous (301-500)**: Avoid all physical activity outdoors.
Mn Department of Health

MPCA and Mn Dept of Health review of literature in Minnesota and elsewhere of health impacts of air quality (i.e. AQI values 51-100 especially 90-100 AQI which was the subjective Advisory range)

- Little to no health information used for advisory thresholds
- Be more consistent with other state/local air quality agencies
- Address concerns of communication desensitization
- Effort of advisory unnecessarily equal to alert

Removal of Advisory -> Focus on Alert

Improved Content and Format of Alert
Little to no health information used for advisory thresholds

Be more consistent with other state/local air quality agencies

Address concerns of communication desensitization

Effort of advisory unnecessarily equal to alert
Removal of Advisory ->
Focus on Alert
Improved Content and Format of Alert
Template content now used by all groups in the Agency for air quality communication

For release: [Month Date, Year]

Media contact: [Contact Name], [Phone Number]

[Title to include type of product, generic area description, and optionally the pollutant of concern — ex.

Air quality alert issued due to [wildfire smoke] for Friday, Month/Day through Saturday, Month Day OR begins Friday, Month/Day.

The Minnesota Pollution Control Agency (MPCA) has issued an air quality alert for [region], effective [start date/time — ex. Friday, July 22 beginning at 11 a.m.] through [end date/time — ex. Saturday, July 23 ending at 8 p.m.].

The affected area includes [area names as applicable].

Example Event Description: Air quality is expected to worsen Friday, Month/Day. Sunny skies, hot temperatures, and light winds will combine to form an increase in ground level ozone. Air Quality Index (AQI) values are expected to climb into unhealthy range by Friday afternoon.

People whose health is affected by unhealthy air quality include:

- People with asthma or other breathing conditions like chronic obstructive pulmonary disease (COPD), chronic bronchitis, or emphysema
- Children and teenagers
- People of all ages who are doing extended or heavy physical activity or working outdoors
- People who are more sensitive to ozone even though they have none of these symptoms

Health effects: Unhealthy ozone levels can aggravate lung diseases like asthma, emphysema, and COPD. When the air quality is unhealthy, people with these conditions may experience symptoms like chest pain, shortness of breath, wheezing, coughing, or difficulty breathing deeply, shortness of breath, and chest pain.

Health effects: Air pollution can aggravate heart and cardiovascular disease as well as lung diseases. Symptoms like chest pain, shortness of breath, wheezing, coughing, or fatigue. If you are experiencing any of these symptoms, use your inhalers as directed and contact your health care provider.

Take Precautions:

- Take it easy and listen to your body.
- Limit, change, or postpone your physical activity.
- If possible, stay away from sources of air pollution like busy roads and woods.
Updated text on traffic signage and improved coordination for alert issuances
Updated text on traffic signage and improved coordination for alert issuances
National Weather Service

Partnership with all six offices serving Minnesota

1. MRCA GIS-created map -- underlying data layer with NWS zones
2. Script with meteorologist entries, creates NWS formatted Air Quality Alert
3. FTP to NWS offices - nearly instantaneous to IWAPS 2 system
4. NWS disseminates out - text and auto-graphic created
Partnership with all six offices serving Minnesota
1. MPCA GIS-created map -- underlying data layer with NWS Zones
2. Script with meteorologist entries, creates NWS formatted Air Quality Alert
3. FTP to NWS offices - nearly instantaneous to AWIPS-2 system
>ftp to NWS

>file transfer successful!
4. NWS disseminates out-text and auto-graphic created
Coordination and Collaboration in Action
Tribal Nations

Inclusion/mention in Air Quality Alerts

Meetings and conference calls
Work to gain permission and support by Tribes
Inclusion/mention in Air Quality Alerts

Meetings and conference calls

Work to gain permission and support by Tribes
Work to gain permission and support by Tribes

*Few to no offices east of the Rockies include Tribal Nation mention in Air Quality Alerts*
Forecast Location Expansion
Mn Pollution Control

Air Monitoring
Air Analysis
Communications/PIO
Continuous Improvement (CI)
Tribal Nations

Coordinate existing monitor locations on Tribal Lands and publishing forecasts

- Meetings and conference calls
- Work to increase awareness and importance/use of forecast by Tribes
Mn Department of Health

Increase partnership with medical, academia and amateur sports networks
Mn Incident Command System

Awareness and use of AQI forecasts for both wildfire responses and permit issuances for prescribed fires
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1. AOI History in MN
2. Program Changes
3. CANADIAN SMOKE INVASION
4. Collaboration
5. Results
6. Outreach
7. Contact Us
8. EPA National AQ Conf - Jan 2018

MINNESOTA POLLUTION CONTROL AGENCY
Results, Results, Results!
Additions, Improvements and More!

- Alert Issuances: Maps
- Alert Issuances: Various
- Forecast Pages
- Mobile App
Air Quality Alert Message
Minnesota Pollution Control Agency
Relayed by National Weather Service Twin Cities/Chanhassen MN
318 PM CDT and Sep 13 2017

MND043-044-045-050-051-052-053-059-060-061-062-063-064-069-079-
150590-Andalu-Chester-Chicago-Rochester-St. Paul-Minneapolis
Air Quality Alert: Widespread unhealthy for sensitive groups due to high ozone concentrations.

The Minnesota Pollution Control Agency has issued an Air Quality Alert for much of eastern Minnesota due to high ozone concentrations. Ozone levels are expected to increase throughout the day, reaching unhealthy levels after 10 PM tonight. The worst conditions are expected during the early evening across the Twin Cities and eastern Minnesota. Ozone will continue to increase through the overnight hours.

Air Quality Alert in effect from 12 AM Thursday through 12 AM Friday.
Forecast Pages

Forecasts

Northeast region

Duluth
- Today: Good
- Tomorrow: Good
- Particles: Particles
- Wind: Good

Ely
- Today: Good
- Tomorrow: Good
- Particles: Particles
- Wind: Good

Read du Lac
- Today: Good
- Tomorrow: Good
- Particles: Particles
- Wind: Good

Grand Portage
- Today: Good
- Tomorrow: Good
- Particles: Particles
- Wind: Good

Virginia
- Today: Good
- Tomorrow: Good
- Particles: Particles
- Wind: Good

Central region

Brainerd
- Today: Good
- Tomorrow: Moderate
- Particles: Particles
- Wind: Good

Mille Lacs
- Today: Good
- Tomorrow: Moderate
- Particles: Particles
- Wind: Good

St. Cloud
- Today: Moderate
- Tomorrow: Moderate
- Particles: Particles
- Wind: Good

Weather forecasts and alerts are available at mncleanairreport.org. Additional information is available at mncleanairreport.org. The data used in these forecasts is from the Minnesota Pollution Control Agency and the National Oceanic and Atmospheric Administration. The information is subject to change daily as new data becomes available.
Mobile App
Alert Issuances: Various
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Outreach

Explaining .... and more explaining -- internally!

Reaching out to partners and the many 'publics'

Internally

Externally
Internally

Educating the Agency
Externally

Proactive to inform and educate and simply to gain interest

Media partners

Getting Out!

MDH affiliations and more ... 2018
Media partners

Providing media meteorologists with AQI details and process to post alerts

Interviews and/or info on AQ -- usually spawned by an Air Quality Alert
Providing media meteorologists with AQI details and process to post alerts
Interviews and/or info on AQ -- usually spawned by an Air Quality Alert
Even the odd events can get 'pub' -- Ex. late Fall agricultural odors in Twin Cities
Getting Out!

Different places/venues to showcase AQI - opportunity to share and listen to people about science, weather and air quality.

Going to the Fair!

Community Events

Schools, STEM, and more
Going to the Fair!
Going to the Fair!

Largest fair in the country -
*Daily Attendance and Size
Community Events

- St. Paul Energy Fair
- MN Science Museum
- Nat'l Adapt. Forum
- Nat'l Tribal Forum
St. Paul Energy Fair

MN Science Museum

Nat'l Adapt. Forum

Nat'l Tribal Forum
St. Paul Energy Fair

MN Science Museum

Nat'l Adapt. Forum

Nat'l Tribal Forum
Schools, STEM, and more

- Classroom visits to talk weather and air quality
- School career and STEM fairs
- Science fairs
- Local weather and environmental groups
Classroom visits to talk weather and air quality

School career and STEM fairs

Science fairs

Local weather and environmental groups
MDH affiliations and more ... 2018

Medical workshops and conferences

Academia and athletic organization events and fairs
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