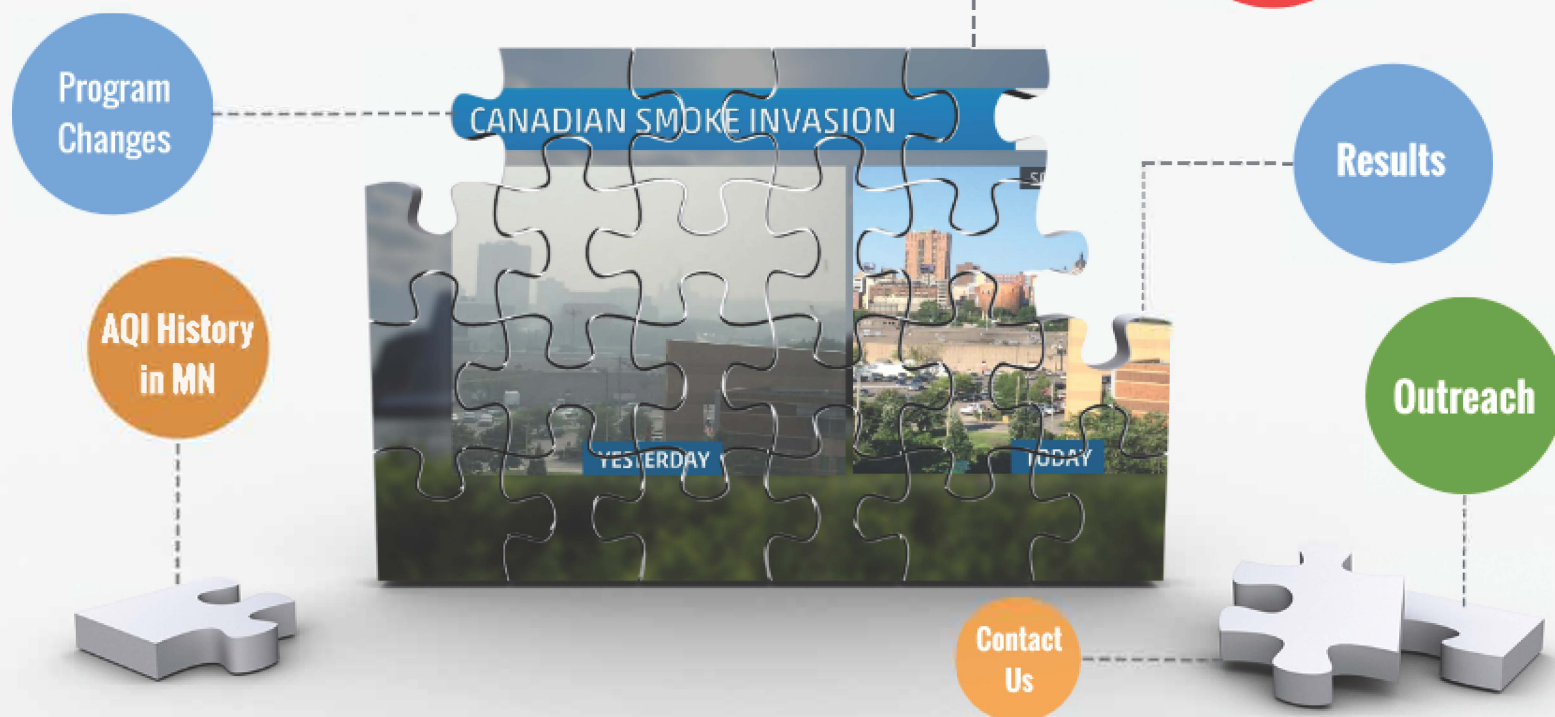


Piecing it Together: Minnesota's Air Quality Forecast/Alert Collaboration and Outreach



EPA National AQ Conf - Jan 2018

m1 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:

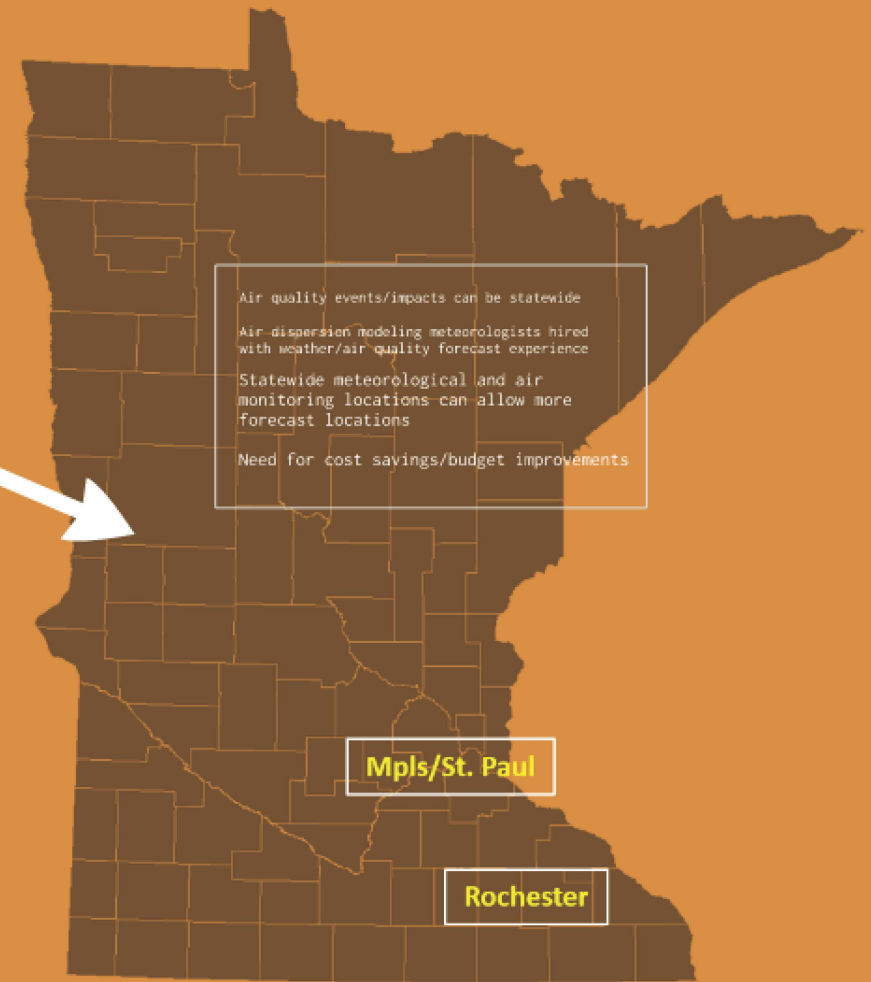
Minneapolis/St. Paul (Twin Cities)

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.

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



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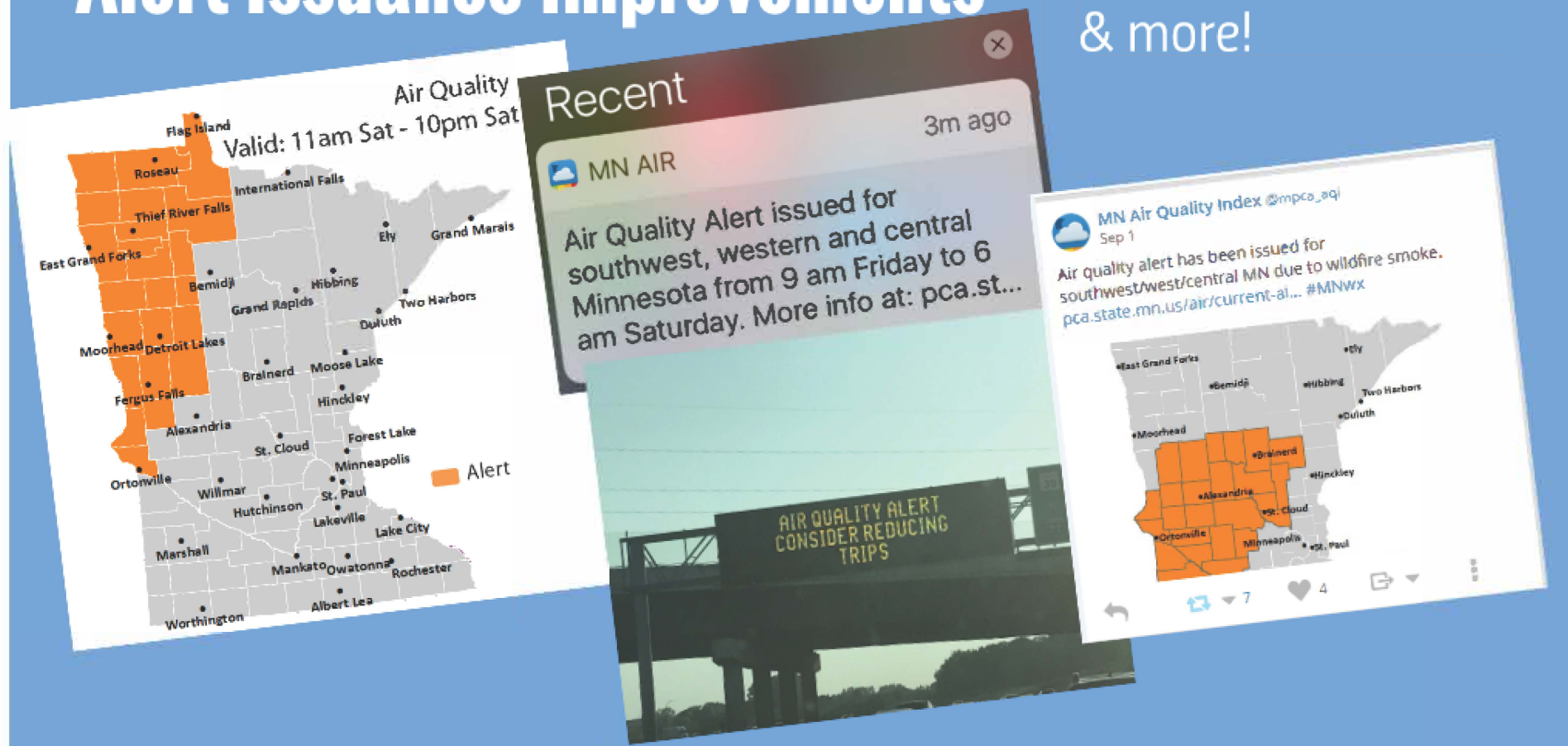
Evaluation of Air Quality Advisories and Alerts

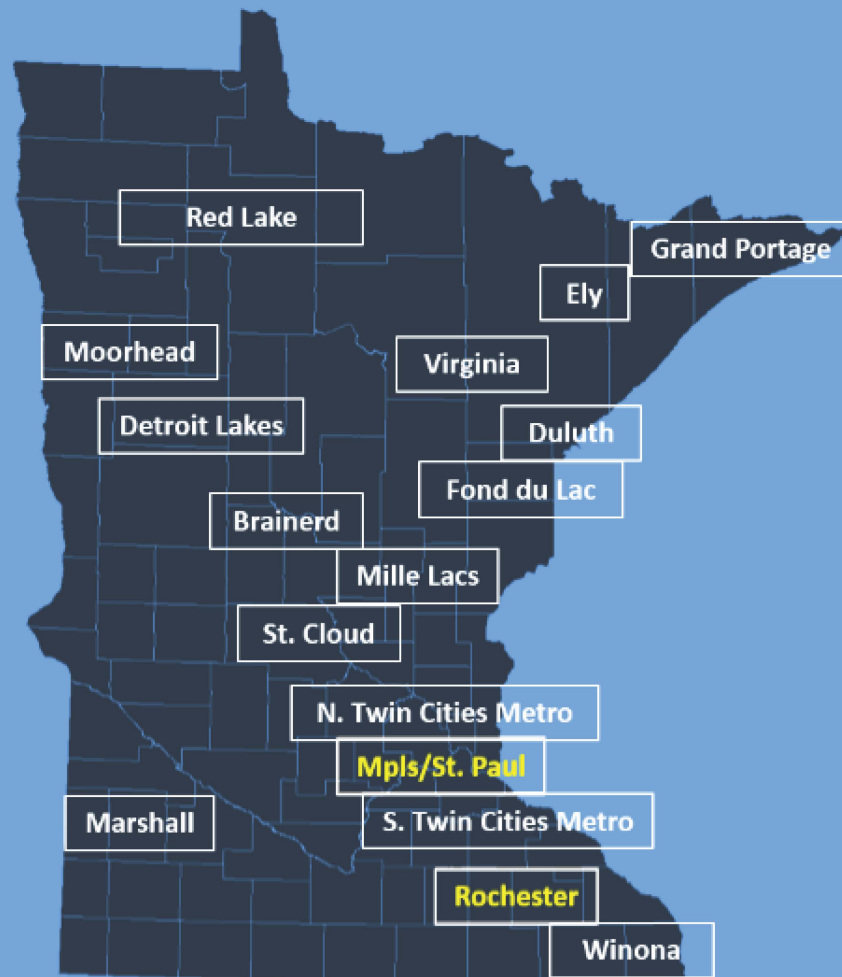
- *Air Quality Advisories** eliminated

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

Alert Issuance Improvements

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

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



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Collaboration

State of Minnesota agencies



**MINNESOTA POLLUTION
CONTROL AGENCY**
**DEPARTMENT
OF HEALTH**
**DEPARTMENT OF
TRANSPORTATION**

National Weather Service



Tribal Nations in Minnesota



Other Agencies



**Air Quality
Advisory/
Alert Changes**

**Forecast Location
Expansion**

State of Minnesota agencies



 MINNESOTA POLLUTION
CONTROL AGENCY

 DEPARTMENT
OF HEALTH

 DEPARTMENT OF
TRANSPORTATION

National Weather Service

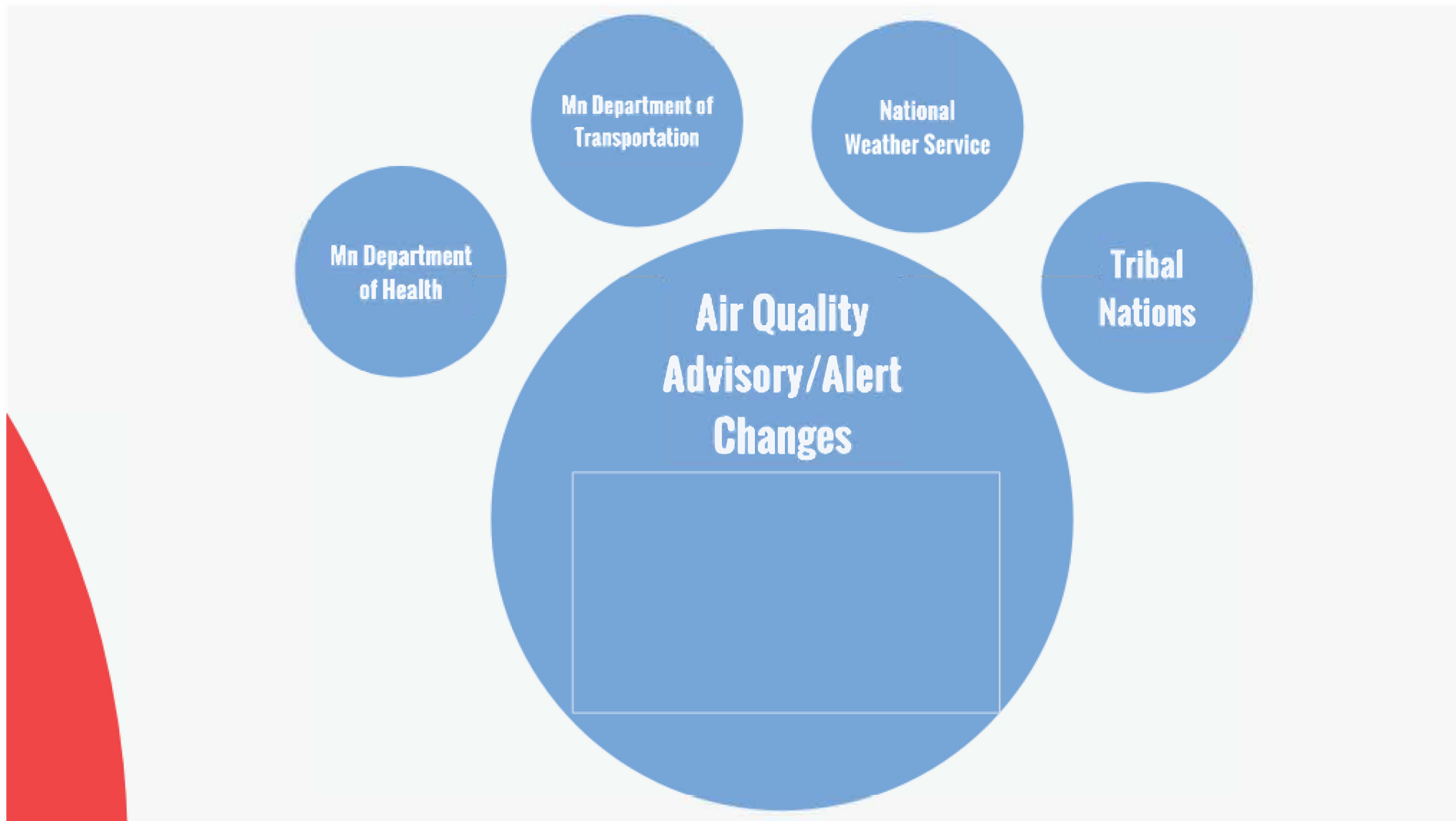


Tribal Nations in Minnesota



Other Agencies





Air Quality Guide for Ozone

Ground-level ozone is one of our nation's most common air pollutants. Use the chart below to help reduce your exposure and protect your health. For your local air quality, visit www.airnow.gov.

View or print guide in PDF (p. 48) [PDF](#) Updated August 2015.

Air Quality Index (0-500)	Who Needs to be Concerned?	What Should I Do?
Good (0-50)		It's a great day to be active outside.
Moderate (51-100)	Some people who may be unusually sensitive to ozone.	Unusually sensitive people: Consider reducing prolonged or heavy outdoor exertion. Watch for symptoms such as coughing or shortness of breath. These are signs to take it a little easier. Everyone else: It's a good day to be active outside.
Unhealthy for Sensitive Groups (101-150)	Sensitive groups include people with lung disease such as asthma, older adults, children and teenagers, and people who are active outdoors.	Sensitive groups: Reduce prolonged or heavy outdoor exertion. Take more breaks, do less intense activities. Watch for symptoms such as coughing or shortness of breath. Schedule outdoor activities in the morning when ozone is lower. People with asthma: should follow their asthma action plans and keep quick relief medicine handy.
Unhealthy (151-200)	Everyone	Sensitive groups: Avoid prolonged or heavy outdoor exertion. Schedule outdoor activities in the morning when ozone is lower. Consider moving activities indoors. People with asthma: 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.
Very Unhealthy (201-300)	Everyone	Sensitive groups: Avoid all physical activity outdoors. Move activities indoors or reschedule to a time when air quality is better. People with asthma: keep quick-relief medicine handy. Everyone else: Avoid prolonged or heavy outdoor exertion. Schedule outdoor activities in the morning when ozone is lower. Consider moving activities indoors.
Hazardous (301-500)	Everyone	Everyone: Avoid all physical activity outdoors.

Simplify and Focus the Message

AQI		
AQI	Air quality	Actions
0-50	Good	Stay active
51-100	Moderate	Watch the AQI
101-150	Unhealthy for sensitive groups	Take it easy
151-200	Unhealthy for all	Limit physical activity

**Removal of
Advisory ->
Focus on Alert**

**Improved
Content and
Format of Alert**

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

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



For release: [Month Date, Year]
Media contact: [Meteorologist](#), 651-503-6582

[Title to include type of product, generic area description, and optionally pollutant of concern – ex.
Air quality alert issued due to ozone 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 8 p.m.] The affected area includes [county, tribal areas and/or city 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 cause an increase in ground level ozone. Air Quality Index (AQI) values are expected to climb into the unhealthy range by midday through the afternoon. Air quality will improve into the weekend, with showers and thunderstorms expected on Saturday, Month/Day.

People whose health is affected by unhealthy air quality include people who are more likely to experience an unhealthy level of ozone when it reaches an unhealthy level.

- People who have 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 like playing sports or working outdoors
- Some healthy people who are more sensitive to ozone even though they have none of the above factors. There may be a genetic base for this increased sensitivity

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 difficulty breathing deeply, shortness of breath, throat soreness, 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: Everyone should take precautions when the air quality is unhealthy.

- Take it easy and listen to your body.
- Limit, change, or postpone your physical activity.
- If possible, stay away from local sources of air pollution like busy roads and wood burning.

For release: [Month Date, Year]
Media contact: [Meteorologist](#), 651-503-6582

[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 8 a.m.] through [end date/time ex. Saturday, July 23 8 p.m.] The affected area includes [county, tribal areas and/or city names as applicable].

Example Event Description: [wildfire smoke] is expected to cause a rapid rise in fine particles with values dropping to 1-3 miles due to smoke across the Twin Cities metropolitan area as well as several locations in southern Minnesota. The smoke plume that traveled southward from southwest Ontario, Canada and northern Minnesota is expected to persist in this area through Saturday afternoon, Month/Day. During this time, fine particle pollution is expected to remain at, or above, a level that is considered unhealthy for sensitive groups. By Saturday afternoon, winds will begin to decrease the transport of smoke into the affected region.

People whose health is affected by unhealthy air quality: There are people who are more likely to be affected when fine particle pollution reaches an unhealthy level.

- People who have asthma or other breathing conditions like chronic obstructive pulmonary disease (COPD)
- People who have heart disease or high blood pressure
- Children and older adults
- People of all ages who are doing extended or heavy, physical activity like playing sports or working outdoors

Health effects: Air pollution can aggravate heart and cardiovascular disease as well as lung diseases like asthma and COPD. When the air quality is unhealthy, people with these conditions may experience 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.

Template content now used by all groups in the Agency for air quality communication

Mn Department of Transportation

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. MPCA GIS-created map --
underlying data layer with
NWS Zones



2. Script with meteorologist
entries, creates NWS
formatted Air Quality Alert

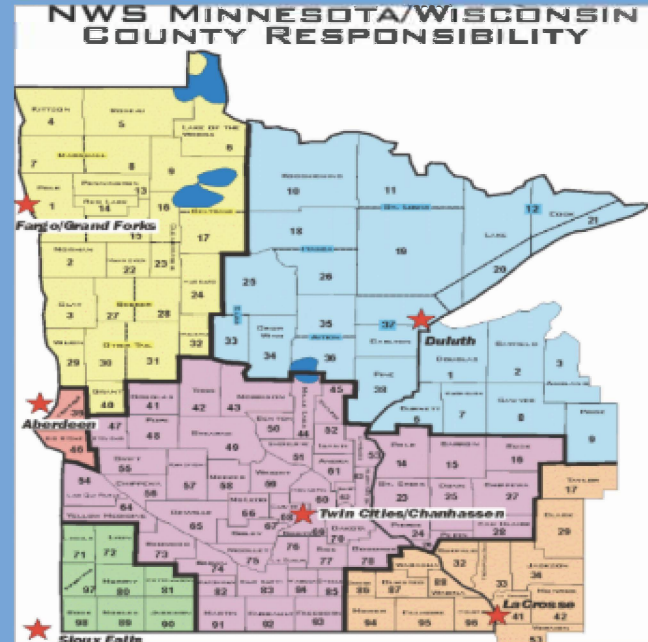


3. FTP to NWS offices - nearly
instantaneous to AWIPS-2 system

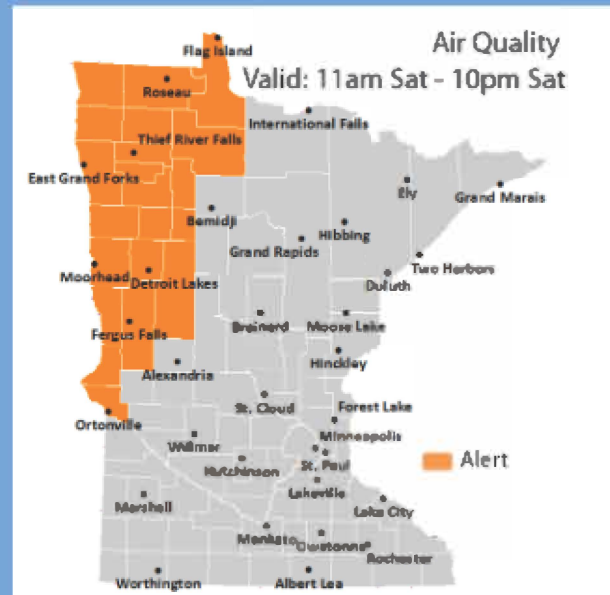


4. NWS disseminates out -
text and auto-graphic created

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

The Alert for Fargo/Grand Forks ND STARTS at what local time and day? (ex. 10 pm tonight) 7pm this evening

Air Quality Alerts
Relayed by the National Weather Service Fargo/Grand Forks ND
1200 AM CDT Sat Apr 06 2007

MIDOT-003-005-006-009-007-008-009-013-014-015-016-017-018-019-020-021-022-023-024-025-026-027-028-029-030-031-032-033-034-035-036-037-038-039-040-041-042-043-044-045-046-047-048-049-050-051-052-053-054-055-056-057-058-059-060-061-062-063-064-065-066-067-068-069-070-071-072-073-074-075-076-077-078-079-080-081-082-083-084-085-086-087-088-089-090-091-092-093-094-095-096-097-098-099-100-101-102-103-104-105-106-107-108-109-110-111-112-113-114-115-116-117-118-119-120-121-122-123-124-125-126-127-128-129-130-131-132-133-134-135-136-137-138-139-140-141-142-143-144-145-146-147-148-149-150-151-152-153-154-155-156-157-158-159-160-161-162-163-164-165-166-167-168-169-170-171-172-173-174-175-176-177-178-179-180-181-182-183-184-185-186-187-188-189-190-191-192-193-194-195-196-197-198-199-200-201-202-203-204-205-206-207-208-209-210-211-212-213-214-215-216-217-218-219-220-221-222-223-224-225-226-227-228-229-230-231-232-233-234-235-236-237-238-239-240-241-242-243-244-245-246-247-248-249-250-251-252-253-254-255-256-257-258-259-260-261-262-263-264-265-266-267-268-269-270-271-272-273-274-275-276-277-278-279-280-281-282-283-284-285-286-287-288-289-290-291-292-293-294-295-296-297-298-299-300-301-302-303-304-305-306-307-308-309-310-311-312-313-314-315-316-317-318-319-320-321-322-323-324-325-326-327-328-329-330-331-332-333-334-335-336-337-338-339-340-341-342-343-344-345-346-347-348-349-350-351-352-353-354-355-356-357-358-359-360-361-362-363-364-365-366-367-368-369-370-371-372-373-374-375-376-377-378-379-380-381-382-383-384-385-386-387-388-389-390-391-392-393-394-395-396-397-398-399-400-401-402-403-404-405-406-407-408-409-410-411-412-413-414-415-416-417-418-419-420-421-422-423-424-425-426-427-428-429-430-431-432-433-434-435-436-437-438-439-440-441-442-443-444-445-446-447-448-449-450-451-452-453-454-455-456-457-458-459-460-461-462-463-464-465-466-467-468-469-470-471-472-473-474-475-476-477-478-479-480-481-482-483-484-485-486-487-488-489-490-491-492-493-494-495-496-497-498-499-500-501-502-503-504-505-506-507-508-509-510-511-512-513-514-515-516-517-518-519-520-521-522-523-524-525-526-527-528-529-530-531-532-533-534-535-536-537-538-539-540-541-542-543-544-545-546-547-548-549-550-551-552-553-554-555-556-557-558-559-560-561-562-563-564-565-566-567-568-569-570-571-572-573-574-575-576-577-578-579-580-581-582-583-584-585-586-587-588-589-590-591-592-593-594-595-596-597-598-599-600-601-602-603-604-605-606-607-608-609-610-611-612-613-614-615-616-617-618-619-620-621-622-623-624-625-626-627-628-629-630-631-632-633-634-635-636-637-638-639-640-641-642-643-644-645-646-647-648-649-650-651-652-653-654-655-656-657-658-659-660-661-662-663-664-665-666-667-668-669-670-671-672-673-674-675-676-677-678-679-680-681-682-683-684-685-686-687-688-689-690-691-692-693-694-695-696-697-698-699-700-701-702-703-704-705-706-707-708-709-710-711-712-713-714-715-716-717-718-719-720-721-722-723-724-725-726-727-728-729-730-731-732-733-734-735-736-737-738-739-740-741-742-743-744-745-746-747-748-749-750-751-752-753-754-755-756-757-758-759-760-761-762-763-764-765-766-767-768-769-770-771-772-773-774-775-776-777-778-779-780-781-782-783-784-785-786-787-788-789-790-791-792-793-794-795-796-797-798-799-800-801-802-803-804-805-806-807-808-809-810-811-812-813-814-815-816-817-818-819-820-821-822-823-824-825-826-827-828-829-830-831-832-833-834-835-836-837-838-839-840-841-842-843-844-845-846-847-848-849-850-851-852-853-854-855-856-857-858-859-860-861-862-863-864-865-866-867-868-869-870-871-872-873-874-875-876-877-878-879-880-881-882-883-884-885-886-887-888-889-890-891-892-893-894-895-896-897-898-899-900-901-902-903-904-905-906-907-908-909-910-911-912-913-914-915-916-917-918-919-920-921-922-923-924-925-926-927-928-929-930-931-932-933-934-935-936-937-938-939-940-941-942-943-944-945-946-947-948-949-950-951-952-953-954-955-956-957-958-959-960-961-962-963-964-965-966-967-968-969-970-971-972-973-974-975-976-977-978-979-980-981-982-983-984-985-986-987-988-989-990-991-992-993-994-995-996-997-998-999-1000

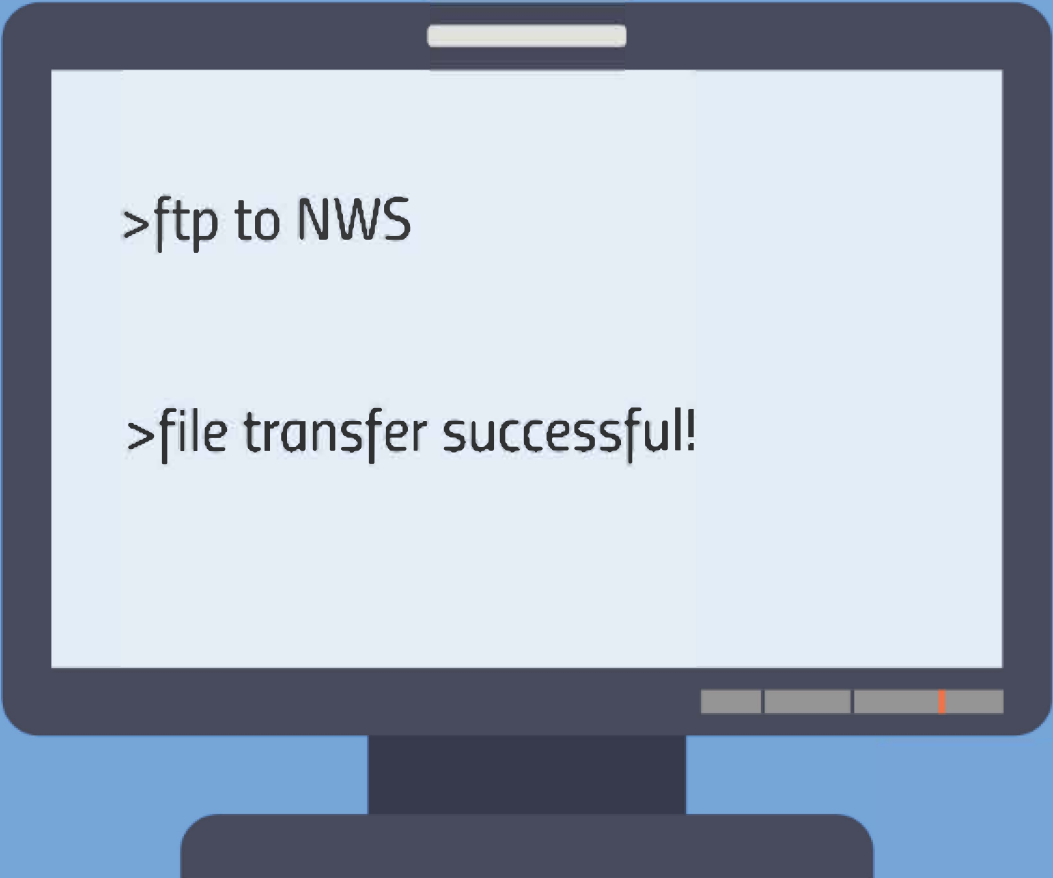
...Including the states of...Colorado...Deloit...East Grand Forks...Fergus Falls...Hawthorn...Hudson...Jesse...Jesse Falls

...Including the tribal nations of...and Lake

1200 AM CDT Sat Apr 0

3. FTP to NWS offices - nearly instantaneous to AWIPS-2 system

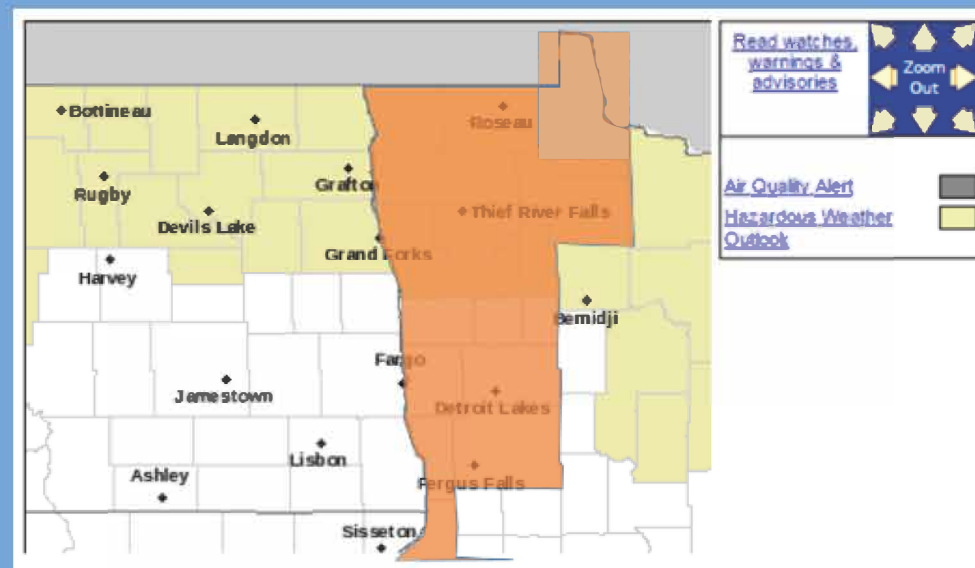




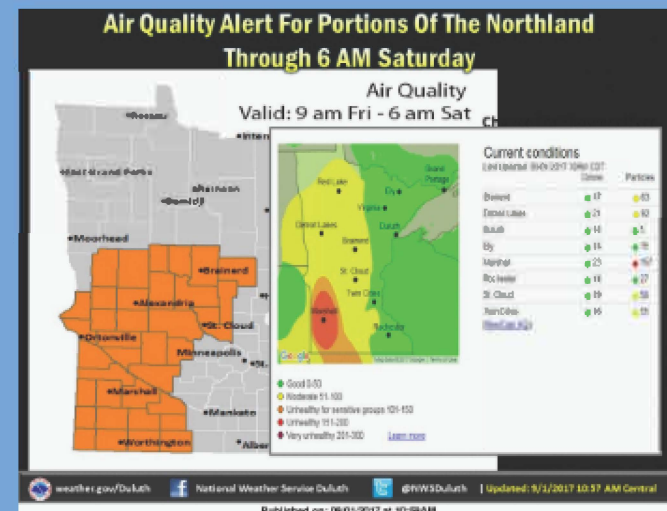
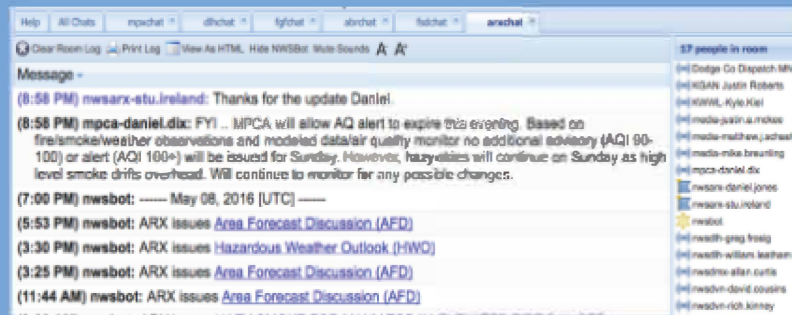
>ftp to NWS

>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



A map of Minnesota with tribal nation names labeled. A legend indicates that orange shading represents an 'Alert' status. The text 'Air Quality Valid: 3pm Tue - 10pm Wed' is present in the upper right corner of the map area.

Inclusion/mention in Air Quality Alerts

- Meetings and conference calls
- Work to gain permission and support by Tribes



A map of Minnesota with counties shaded in orange to indicate an Air Quality Alert. The text 'Valid: 3pm Tue - 10pm Wed' is displayed in the upper right. A legend in the bottom right corner shows an orange square next to the word 'Alert'. Various county names are labeled across the state, including Hennepin, Ramsey, and others.

Inclusion/mention in Air Quality Alerts

- Meetings and conference calls
- Work to gain permission and support by Tribes



Valid: 3pm Tue - 10pm Wed

Air Quality Alert

Inclusion/mention in Air Quality Alerts

- Meetings and conference calls
- Work to gain permission and support by Tribes



Valid: 3pm Tue - 10pm Wed

Air Quality

Alert



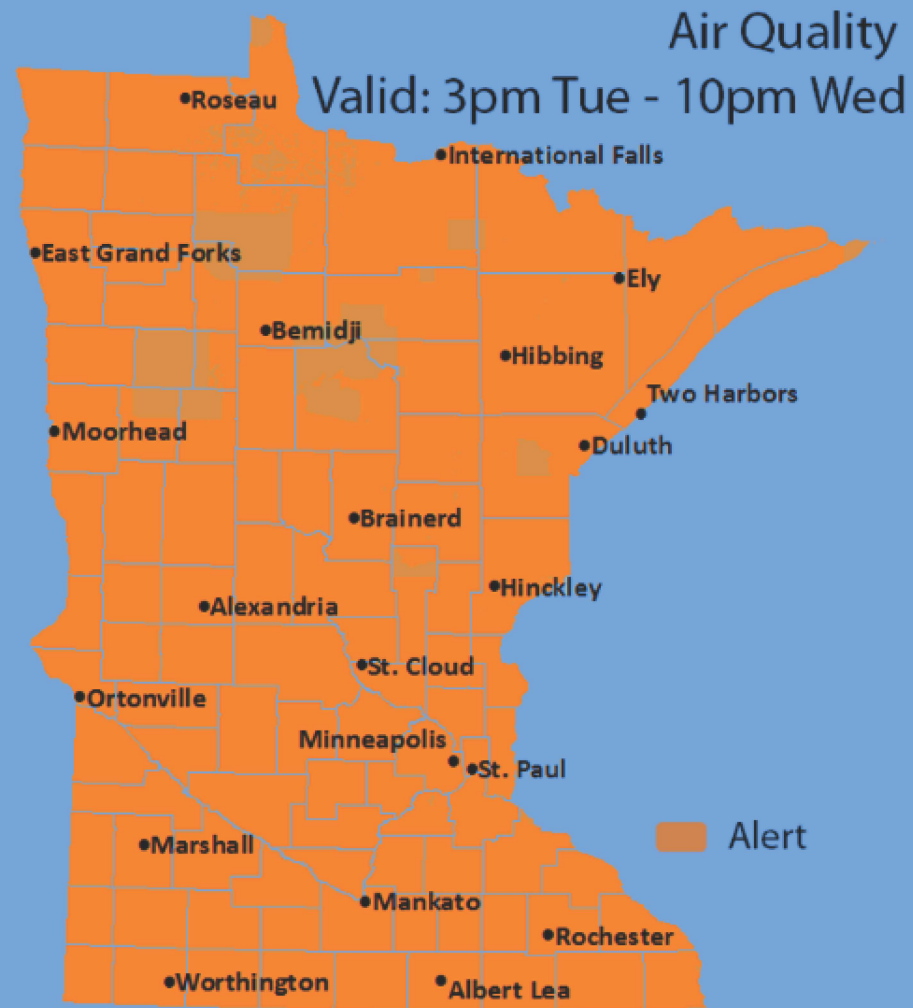
Inclusion/mention in Air Quality Alerts

Meetings and conference calls

Work to gain permission and support by Tribes



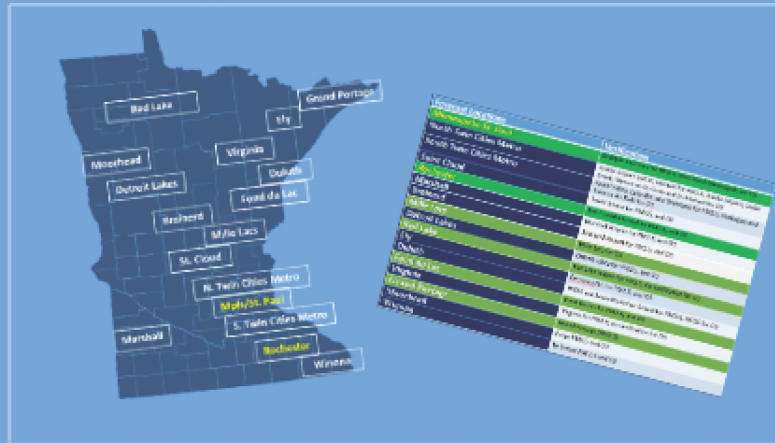
e calls
and



support by Tribes

*Few to no offices east of the Rockies include Tribal Nation mention in Air Quality Alerts

Forecast Location Expansion

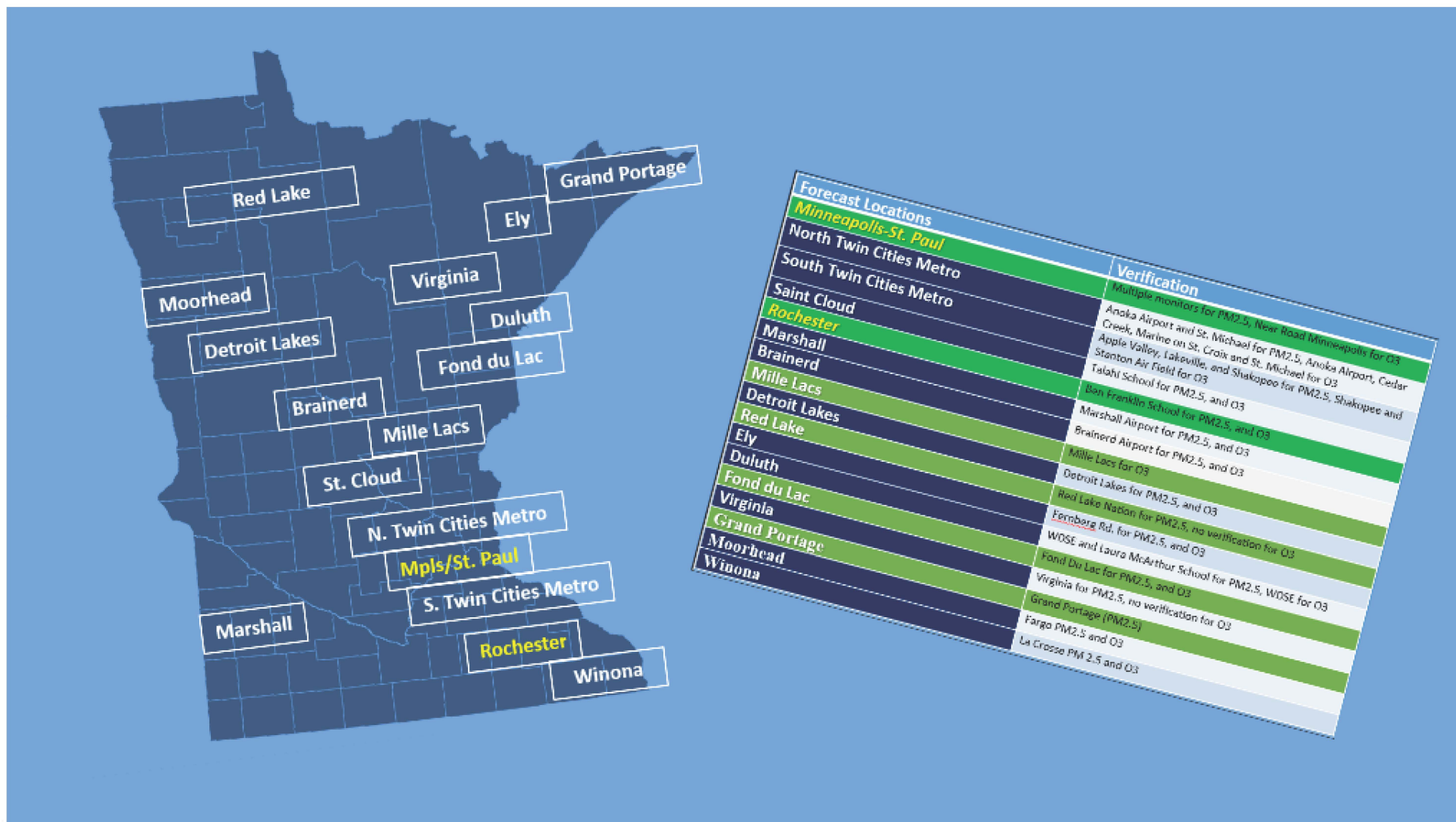


Mn Pollution
Control

Tribal
Nations

Mn Department
of Health

Mn Incident
Command
System



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

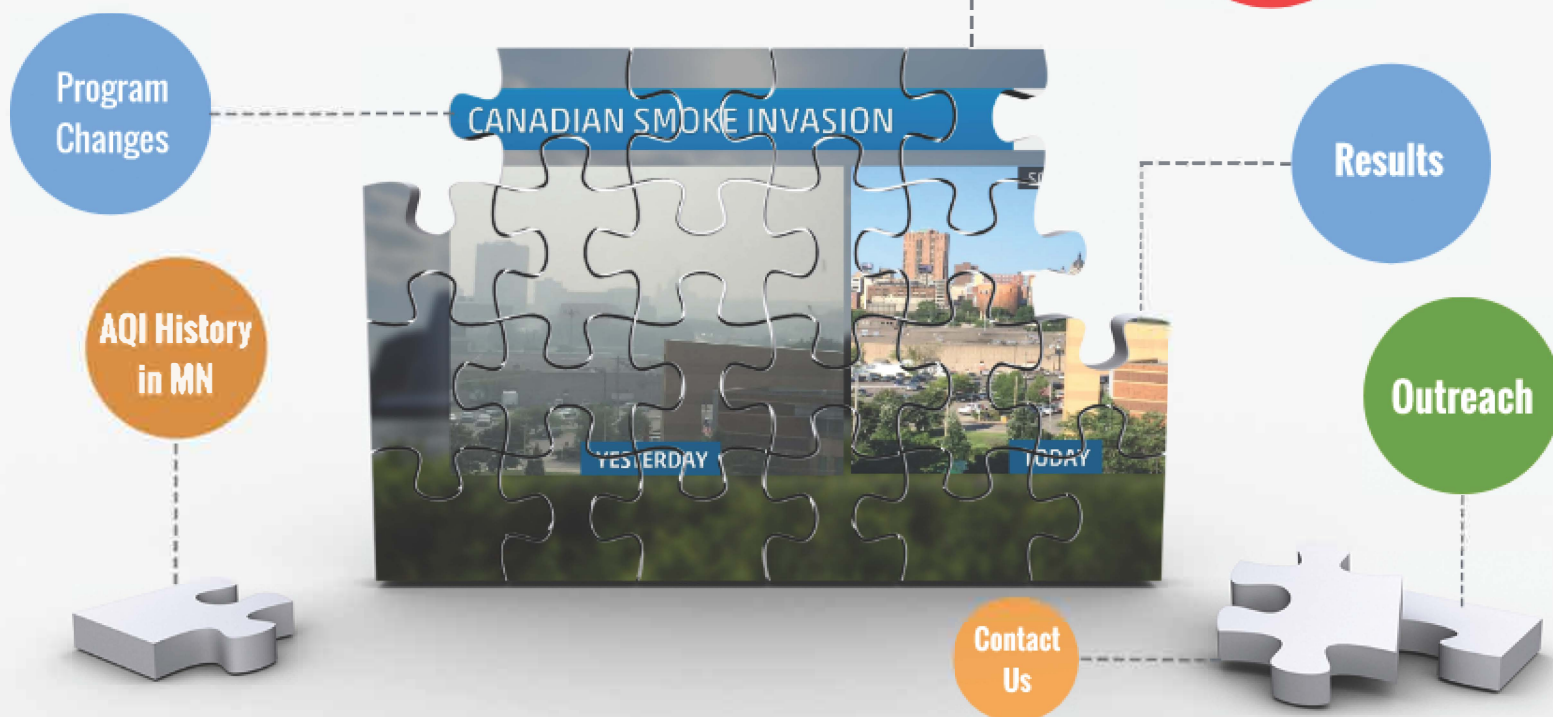
Increase portnership with medical,
academia and amatuer sports networks



Mn Incident Command System

Awareness and use of AQI forecasts for both wildfire responses and permit issuances for prescribed fires

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



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Results, Results, Results!

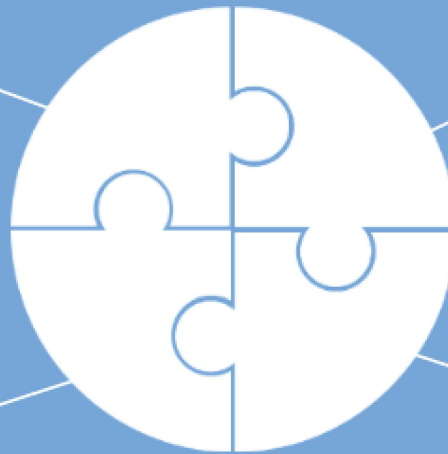
Additions, Improvements and More!

Alert Issuances: Maps

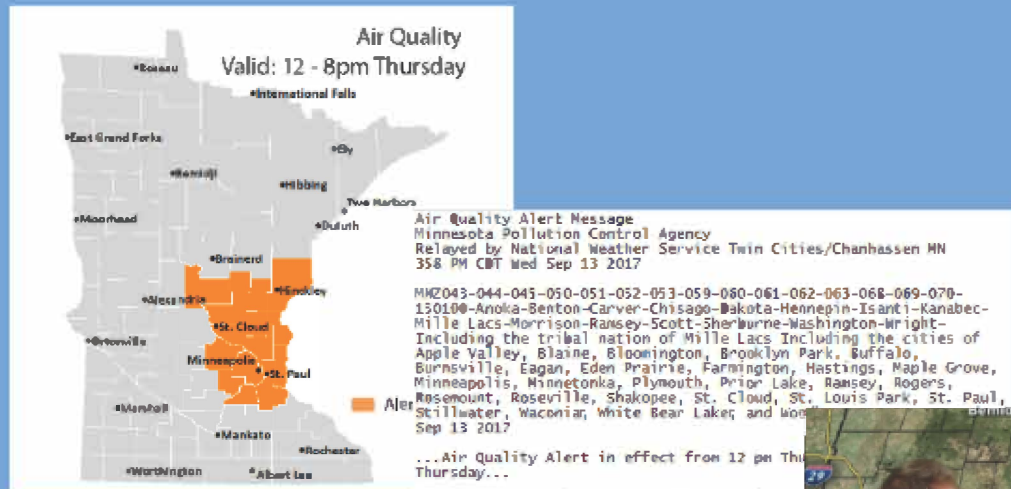
Forecast Pages

Alert Issuances: Various

Mobile App



Alert Issuances: Maps



The Minnesota Pollution Control Agency has issued an Air Quality Alert for ozone pollution for much of eastern Minnesota. Temperatures near 90 degrees, wildfire smoke will combine to create orange (unhealthy for sensitive groups) levels. The worst conditions are expected during the early evening across the Twin Cities metro area and parts of Minnesota. Ozone values will decrease back to yellow levels as the sun sets Thursday evening. Wildfire smoke will continue to keep fine particulate matter in the yellow category after ozone decreases.

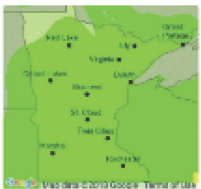


Forecast Pages

mn MINNESOTA POLLUTION CONTROL AGENCY

Home | About | Mission | Regulations | Living, Learning & Working | Data | Request Assistance

Current air quality



Current conditions
Last updated 3/11/2018 8PM CST

Region	PM _{2.5}	PM ₁₀	Ozone	Particulates
Brainerd	0.14	0.13	0.13	0.13
Central Lakes	0.14	0.13	0.13	0.13
Duluth	0.14	0.13	0.13	0.13
Ely	0.14	0.13	0.13	0.13
Fond du Lac	0.14	0.13	0.13	0.13
Grand Portage	0.14	0.13	0.13	0.13
St. Cloud	0.14	0.13	0.13	0.13
Virginia	0.14	0.13	0.13	0.13

In this section:
[Current condition details](#)
[Historical data](#)
[Annual AQ summary reports](#)
[AQ data](#)
[Particulates and forecasts via email](#)
[Sign up for email](#)
[Download PM Air mobile app](#)
[Android](#)
[Apple](#)
[Twitter forecasts and alerts](#)
[Get forecasts and alerts](#)
[Air quality recorded from 2014](#)
[Twitter forecasts and alerts](#)
[Air quality information](#)
[PM_{2.5} AQI](#)
[Particulates](#)
[Daily values: pollution.mn.gov](#)
[Forecasts: pm25.mn.gov](#)

Forecast

Metro Northwest Northeast Central South

Metro region

Brainerd
Today: Good, Sat: Good, Sun: Moderate
Particulates: 101, Ozone: Good, Particulates: Moderate

Brainerd

Today: 101, Sat: Good, Sun: Moderate
Particulates: 101, Ozone: Good, Particulates: Moderate

Mille Lacs

Today: 101, Sat: Good, Sun: Moderate
Particulates: 101, Ozone: Good, Particulates: Moderate

St. Cloud

Today: 105, Sat: Moderate, Sun: Moderate
Particulates: 105, Particulates: Moderate, Particulates: Moderate

Forecasts

Metro Northwest Northeast Central South

Northeast region

Duluth

Today	Tue	Wed
Good	Good	Good
Particulates	Particulates	Particulates

Ely

Today	Tue	Wed
Good	Good	Good
Particulates	Particulates	Particulates

Fond du Lac

Today	Tue	Wed
Good	Good	Good
Particulates	Particulates	Particulates

Grand Portage

Today	Tue	Wed
Good	Good	Good
Particulates	Particulates	Particulates

Virginia

Today	Tue	Wed
Good	Good	Good
Particulates	Particulates	Particulates

Forecasts

Metro Northwest Northeast Central South

Central region

Brainerd

Today	Sat	Sun
101	Good	Moderate
Particulates	Ozone	Particulates

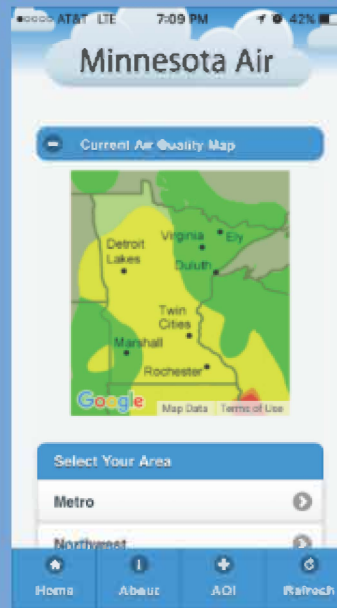
Mille Lacs

Today	Sat	Sun
101	Good	Moderate
Particulates	Ozone	Particulates

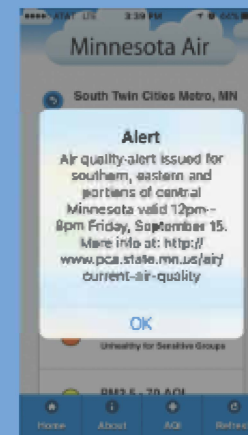
St. Cloud

Today	Sat	Sun
105	Moderate	Moderate
Particulates	Particulates	Particulates

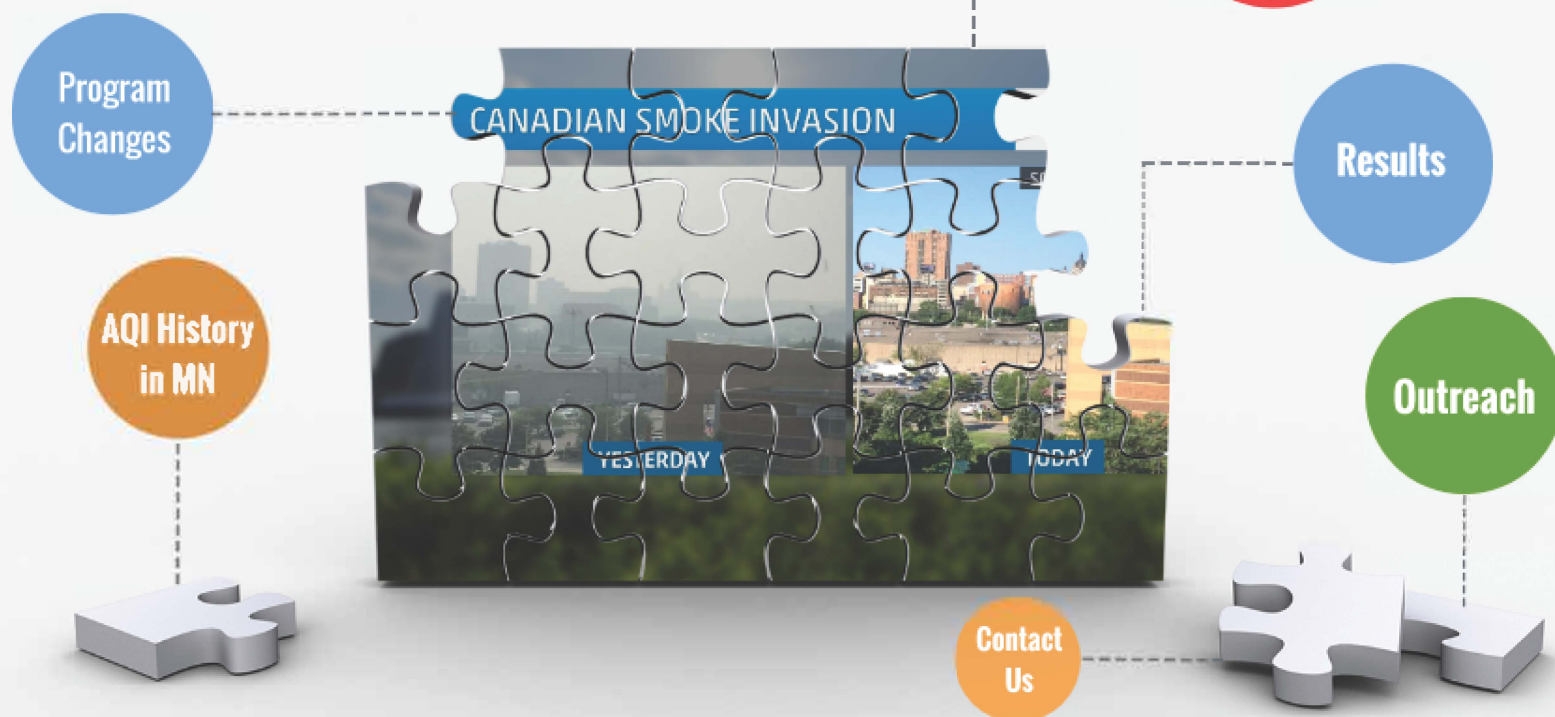
Mobile App



Alert Issuances: Various



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



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mn MINNESOTA POLLUTION
CONTROL AGENCY

Outreach

Explaining and more explaining -- internally!

Reaching out to partners and the many 'publics'

Internally

Externally

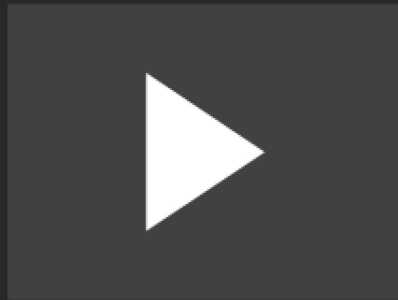


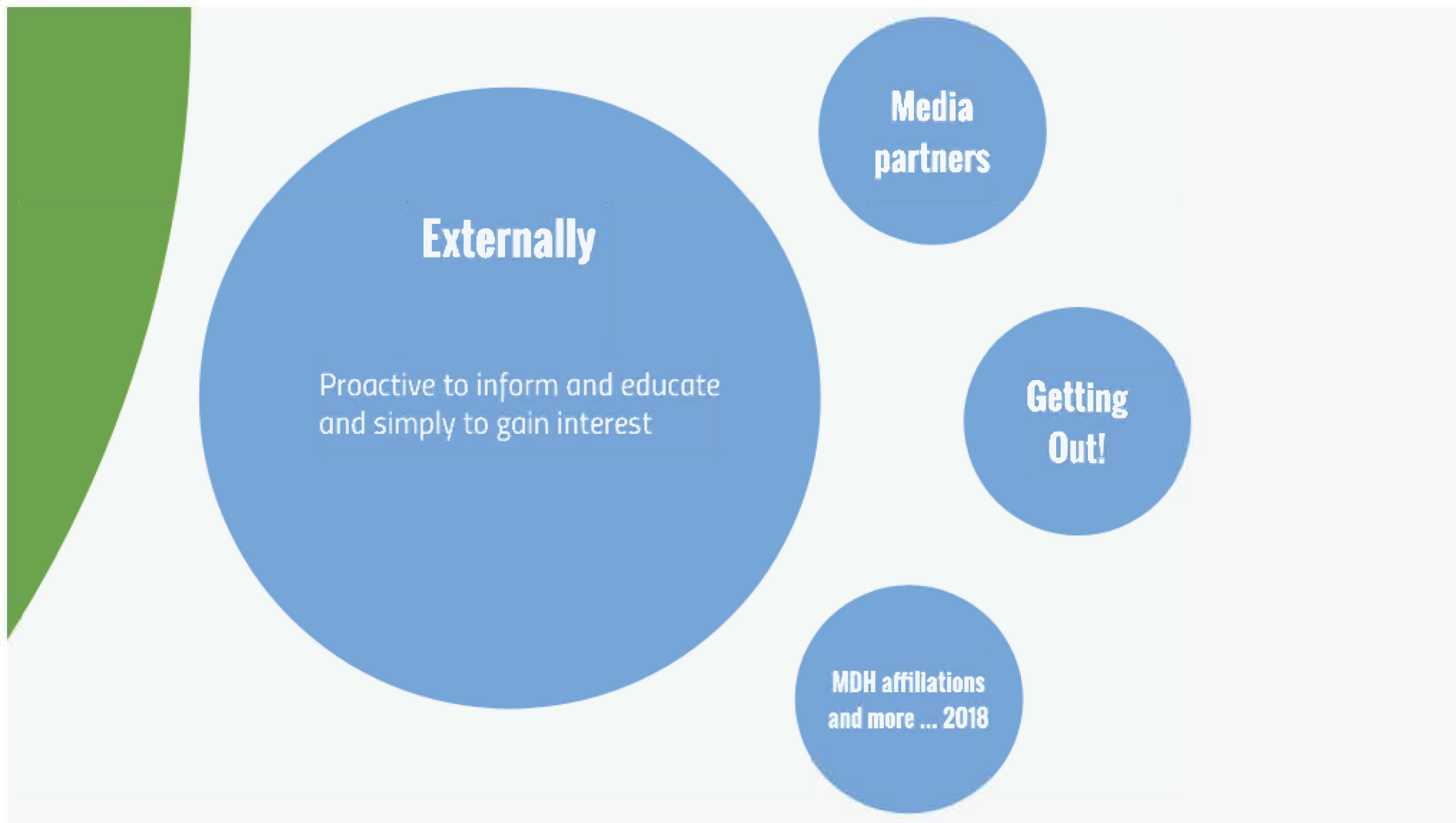
Internally

Educating the Agency



Getting Creative ... Garner Interest and Inform!





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

**Minnesota Pollution Control
Agency/National Weather Service Air
Quality Alert Program - Media**

A joint venture between the Minnesota Pollution Control Agency and the U.S. National Weather Service office covering the state of Minnesota in the issuance of Air Quality Alerts (AQAs) and alerts for both fine particulate and ozone events.



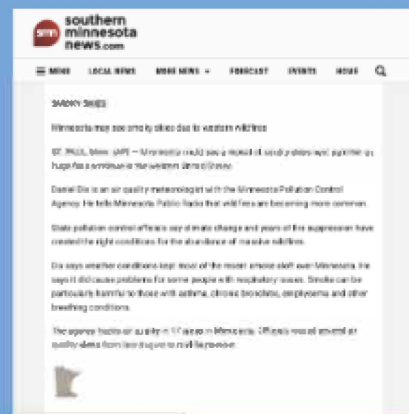
The map shows the state of Minnesota with various regions highlighted in orange, indicating an Air Quality Alert. The alert is valid from 3pm Tuesday to 10pm Wednesday. The map includes labels for major cities and regions, and a legend indicating the alert status.

Minnesota Pollution Control Agency

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CONTROL AGENCY**

September 2017

Interviews and/or info on AQ -- usually spawned by an Air Quality Alert





Minnesota Pollution Control Agency
MINNESOTA POLLUTION CONTROL AGENCY

December 2007



Minnesota Pollution Control Agency
MINNESOTA POLLUTION CONTROL AGENCY

December 2007

Even the odd events can get 'pub' -- Ex.
late Fall agricultural odors in Twin Cities

Getting Out!

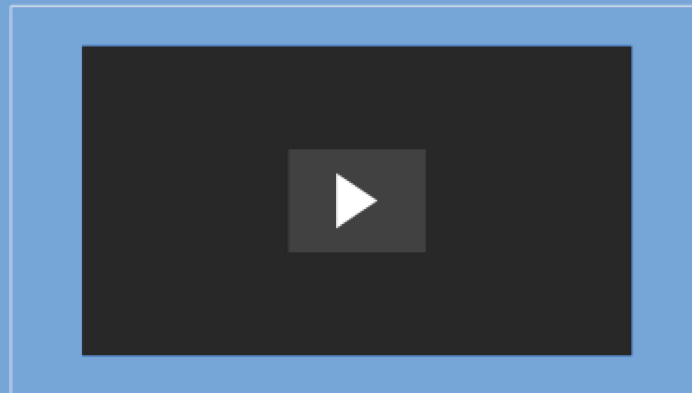
Different places/venues to showcase AQI
- opportunity to share and listen to people
about science, weather and air quality

**Going to
the Fair!**

**Community
Events**

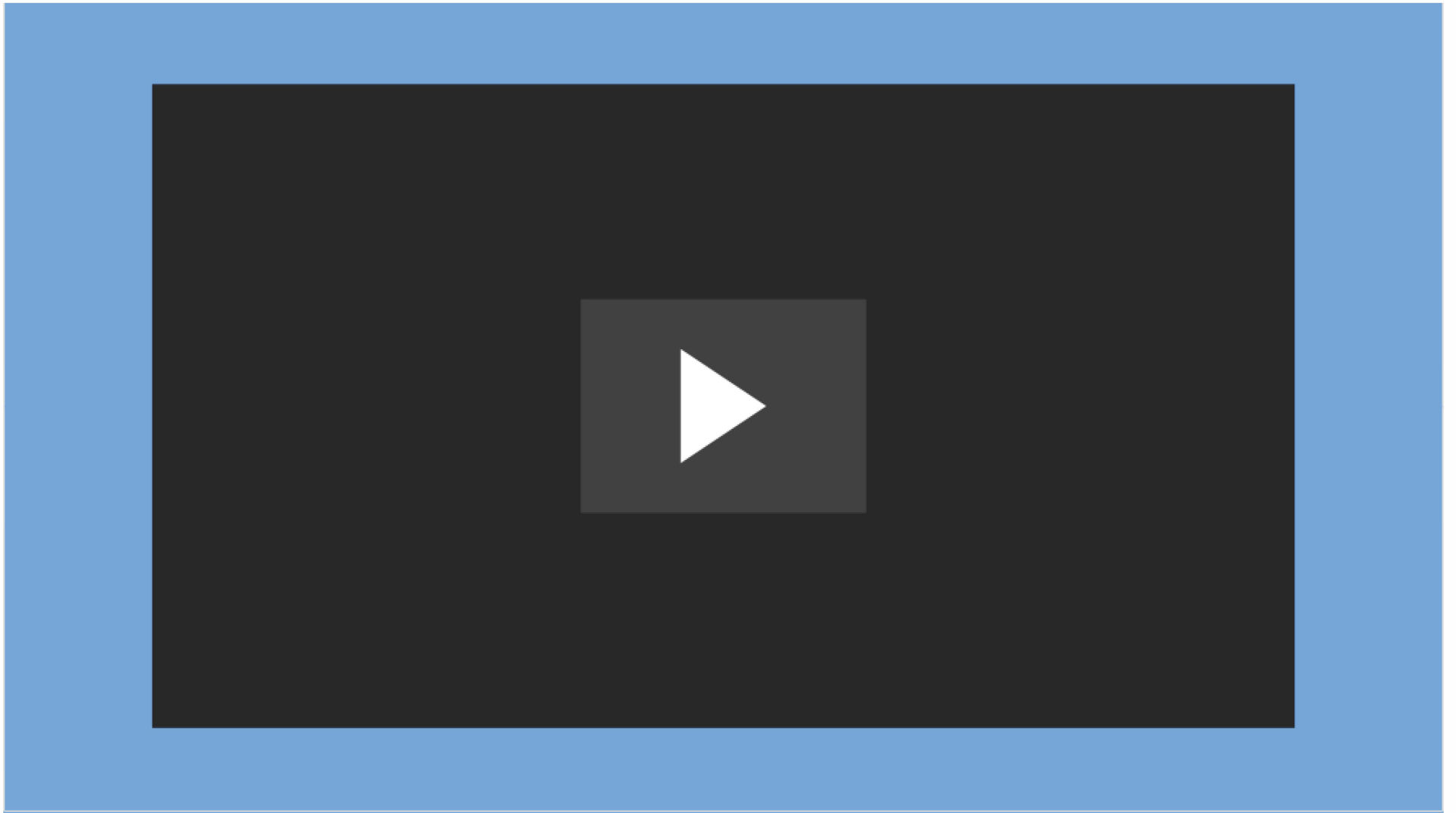
**Schools, STEM,
and more**

Going to the Fair!



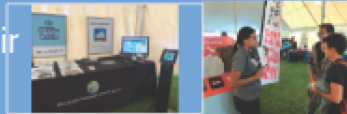
Going to the Fair!

Largest fair in the country -
*Daily Attendance and Size

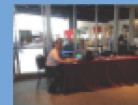


Community Events

St. Paul Energy Fair



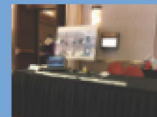
MN Science Museum



Nat'l Adapt. Forum



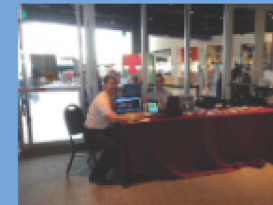
Nat'l Tribal Forum



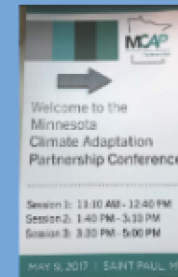
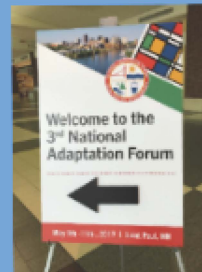
St. Paul Energy Fair



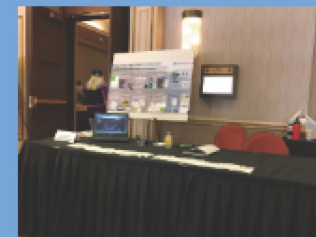
MN Science Museum



Nat'l Adapt. Forum



Nat'l Tribal Forum



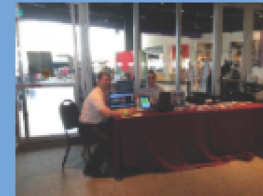
r



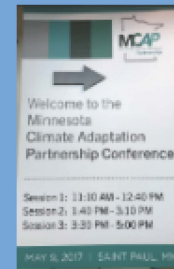
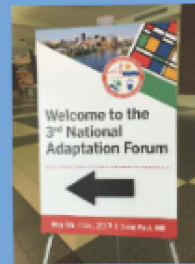
St. Paul Energy Fair



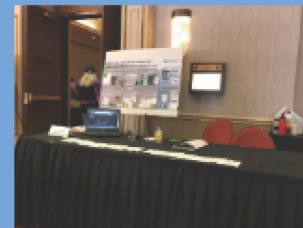
MN Science Museum



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



A large blue circle is centered on the page, containing the title and two lines of text. In the top-left corner of the slide, there is a blue triangle pointing towards the center.

MDH affiliations and more ... 2018

Medical workshops and conferences

Academia and athletic organization events and fairs

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Talk with us follow us!



<http://www.pca.state.mn.us/aqi>



daniel.dix@state.mn.us
mpca.aqi@state.mn.us

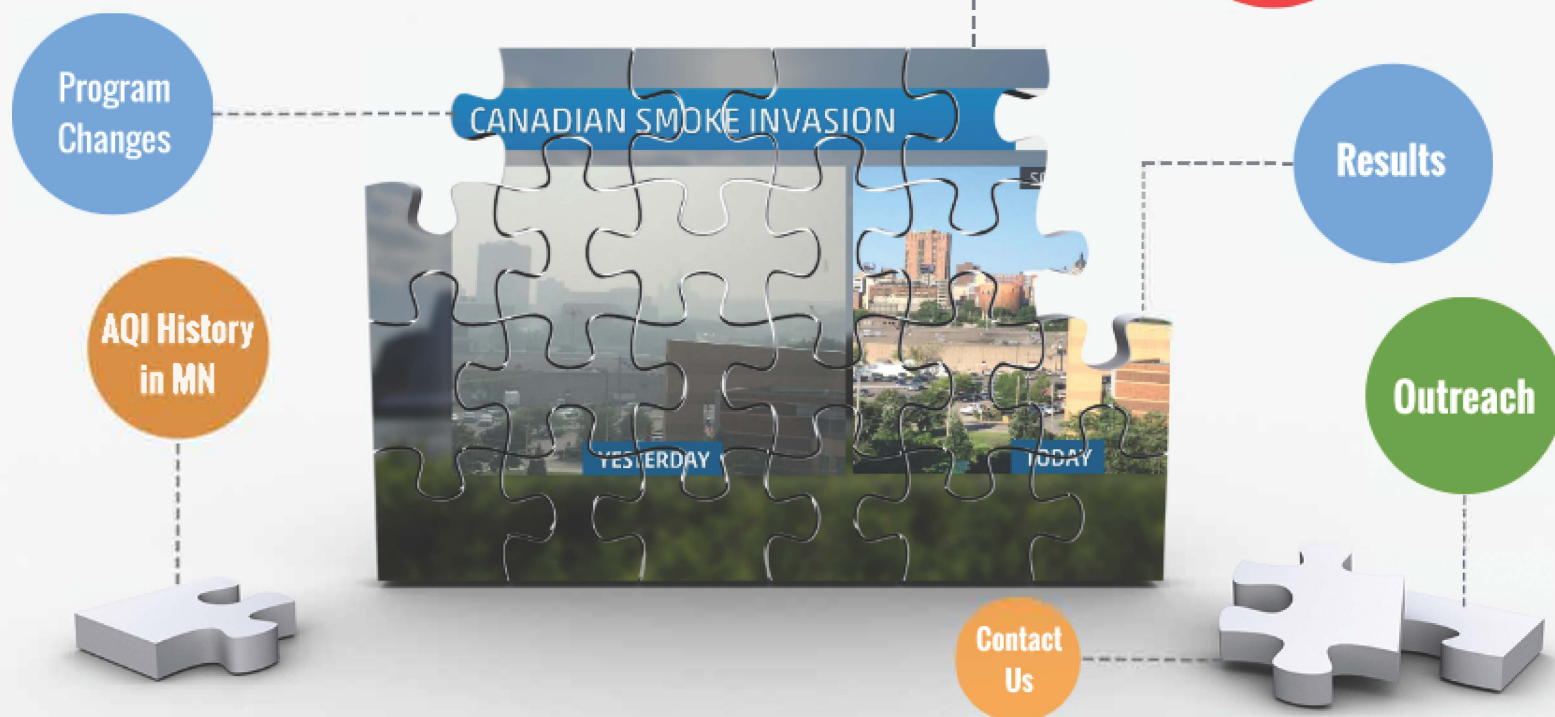


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[@mnpca](https://twitter.com/mnpca)



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



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