Weaver Fertilizer Plant Fire
Winston-Salem, NC

Analysis of Publicly Disseminated Air Quality Information During Facility Fire Incident

Compiled by Blue Ridge Environmental Defense League



Still picture from Winston-Salem Fire Dept. Feb. 1, 2022 drone video.

Source: City of Winston-Salem

August 3, 2022
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Executive Summary

At approximately 6:45 p.m. on January 31, 2022 a large fire was reported at the Weaver Fertilizer Plant located at 4440 North Cherry Street in Winston-Salem, North Carolina. Nearly 600 tons of highly explosive ammonium nitrate was stored on site. The fire led to the evacuation of roughly 6,500 residents.

In April 2013 an explosion and fire at the West Fertilizer Company in West, Texas killed 15 people. The West facility stored 270 tons of ammonia nitrate on site.

The Weaver fire led to two significant threats to the community: a high risk of a life threatening explosion and a high risk of life threatening health impacts from hazardous air quality.

The Winston-Salem Fire Department and assisting area first responders maintained the fire the best they could during this potential deadly incident. The department's press conferences were essential for public safety during the event. However, fire departments do not have advisory capacity in the area of ambient air quality. Local, state and federal agencies who are responsible for ambient air quality monitoring, data and reporting should have been present during each press conference. During each press conference air quality agencies should have issued updates on the air quality along with associated health impacts. Because these agencies took a back seat and usually did not publicly participate in the press conferences, the air quality aspect of this incident was often downplayed.

We have reviewed the press conferences and listed relevant comments on a timeline along with the current air quality conditions at that time. By tracking the air quality along with the public information, we demonstrate how the air quality issue was downplayed even when air quality conditions were unhealthy or even hazardous.

This report demonstrates how and why the government agencies who serve as the experts on air quality must take an active role during industrial incidents such as the Weaver fire to ensure adequate and timely consideration of public health effects of air pollution.

Our analysis leads us to make the following recommendations for local, state and federal officials:

- Maintain a list of high risk facilities in the event that they suffer a catastrophic fire or significant release of chemicals, immediate evacuation will go into effect. This could have reduced evacuation times.
- Maintain the same message regarding air quality unless data or situation changes.
- Agencies must be transparent in reporting the air quality data and health impacts.
- Agencies must not under report or misrepresent the air quality data and associated adverse health impacts
- Local, state and federal air quality experts should be included in all press briefings, press releases, and public statements during facility incidents.
- State and Federal air quality experts must periodically release information and transparent statements during critical incidents, which must be included in the press briefings.

- Current, real time air quality data must be made available to the public and not just select officials. This would be in addition to the summary information EPA may provide on their incident webpage.
- Health impacts from such incidents must be relayed to the public promptly and unambiguously.
- Agencies can use the EJScreen tool to access at-risk communities during facility incidents.
- EPA needs to incorporate facility incidents, such as the Weaver Fertilizer Fire, into its Fire and Smoke Map and/or AirNow Map so the public has a better idea of air quality during incidents.
- Depending on meteorological conditions and severity of an incident, impacts to air quality expand well beyond the impact/evacuation zone. More emphasis needs to be given to these health impacts. Air Modeling displaying the cone of unhealthy and hazardous air quality conditions and estimation of how far that extends beyond the incident should be completed and presented to the public.

Introduction

The January 31 fire at the Weaver Fertilizer Plant led to two significant threats to the community: a high risk of a life threatening explosion and a high risk of life threatening health impacts from hazardous air quality.

This paper reviews the impacts to air quality from the Weaver fire, specifically PM 2.5.



Still from Winston-Salem Fire Dept. Jan. 31, 2022 active fire video.
Source: City of Winston-Salem

The area around the Weaver Fertilizer plant meets the definition of being an environmental justice community. The surrounding area includes marginalized and low-wealth community members with vulnerabilities due to pollution and its related health impacts.

Information about PM 2.5 and potential health impacts to this environmental justice community are outlined in this report.

The purpose of this report is to demonstrate how and why the government agencies who serve as the experts on air quality must take an active role during industrial incidents such as the Weaver fire to ensure public health and safety regarding air pollutants.

We reviewed press conferences and interviews available online. Most of these were directly from the city online sites or local media reports. After we catalogued official statements and comments on a timeline, we calculated the coordinating PM 2.5 one-hour averages using EPA and North Carolina air quality data. This allowed us to compare official statements with the air quality data which was available to the fire command center in real time.

More about the PM 2.5 data can be found on page 11 in the section Understanding the PM 2.5 Data.

Environmental Justice Community at Risk

The community surrounding the Weaver Fertilizer Plant is an environmental justice community according to the EPA EJScreen mapping tool. The area within a 1-mile radius includes a people of color population at 92nd of the state percentile. In addition, the area is at the 95th percentile for low income. Other socioeconomic indicators include ranking at the 77th percentile in the state for linguistically Isolated population, 69th percentile in the state for less than a high school education, and 78th percentile in North Carolina for unemployment.

The EJ community surrounding the Weaver Fertilizer Plant is a community with many risk factors. These risk factors add to the importance of fully comprehending the air quality health impacts associated with the Weaver fire. The EPA EJScreen mapping tool highlights several of these risk factors.

The area within a 1-mile radius of the Weaver facility is in the 95th percentile for PM 2.5 in North Carolina. Air toxics cancer risk index is at 93rd percentile, and air toxics respiratory hazard index at 94th percentile.

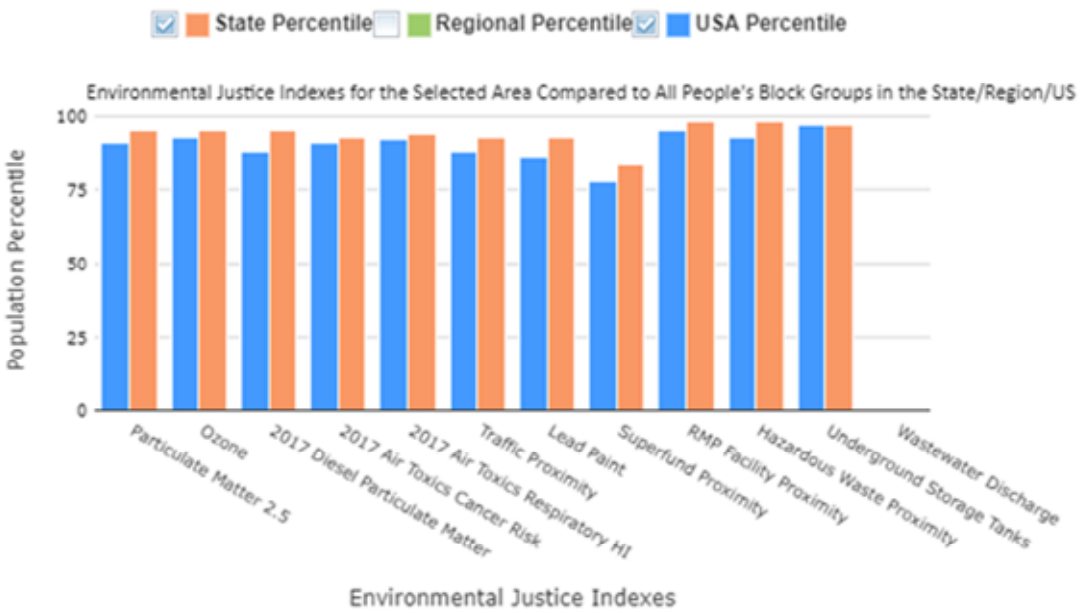


Chart source: EPA EJScreen

Most of the area within a 1-mile radius is in the high 90-95th percentile for prevalence of asthma with the remaining portion in the 80-90th percentile. The prevalence of heart disease isn't much better with around 50% of the area falling in the 80-90th percentile. This contributes to a low life expectancy for this 1-mile area. Around 75% fall within the 90-95th percentile for low life expectancy.

Please see the Appendix for the EPA EJScreen 1-mile and 3-mile radius maps.

About Particulate Matter

Particulate matter, or PM, is the term for particles found in the air, including dust, dirt, soot, smoke, and liquid droplets. Particles less than 2.5 micrometers in diameter (PM 2.5) are referred to as "fine" particles and are believed to pose the greatest health risks among particulates. Because of their small size (approximately 1/30th the average width of a human hair), fine particles can lodge deeply into the lungs.

The Clean Air Act requires U.S. EPA to set National Ambient Air Quality Standards (NAAQS) for six common air pollutants (also known as "criteria air pollutants"). PM 2.5 is considered a “criteria air pollutant” by EPA. In coordination with EPA, state environmental agencies maintain an air monitoring network for these criteria air pollutants.

Sources of fine particles include all types of combustion activities (motor vehicles, power plants, wood burning, fires, etc.) and certain industrial processes. The primary chemical constituents of outdoor particles are sulfate, nitrate, and organic and black carbon.

Roughly one out of every three people in the United States is at a heightened risk of experiencing PM 2.5 related health effects. People with heart or lung diseases, children, and older adults are the most likely to be affected by particle pollution exposure. People of all ages who are active outdoors are at increased risk because, during physical activity, PM 2.5 penetrates deeper into the parts of the lungs that are more vulnerable to injury.

PM 2.5 causes about 200,000 early deaths each year. One study has found that lung cancer rose by 18% for every increase of 5 micrograms per cubic meter (ug/m^3). Another study found that reducing particulates has added 5 months to urban life expectancy.

PM 2.5 Health Impacts

Increased hospital admissions

aggravated asthma Increases in respiratory symptoms (coughing, difficult/painful breathing)

chronic bronchitis

decreased lung function

premature death

increases dementia risk

risks for heart attacks, heart disease, strokes, irregular heartbeat

increases premature births

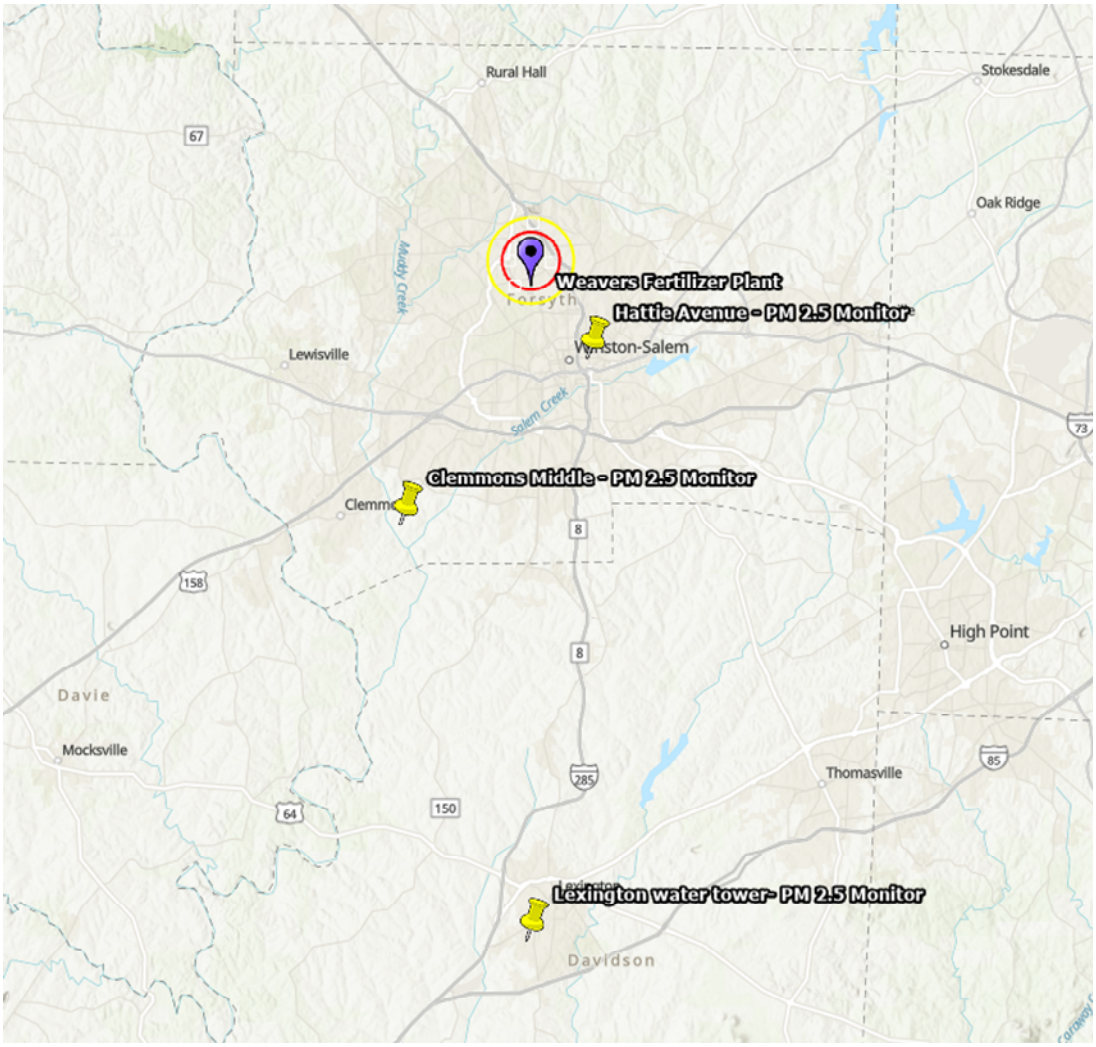
PM 2.5 Air Monitors

The three "permanent" PM 2.5 air monitoring stations operated by NC DEQ (North Carolina Department of Environmental Quality) closest to the Weaver Fire are the Hattie Avenue and Clemmons Middle monitors in Forsyth County, and the Lexington Water Tower monitor in Davidson County. These are part of the NC DEQ statewide air monitoring network and feed data to EPA's AirNow. We acquired the 1-hour PM 2.5 data from these monitors and calculated the EPA AirNow NowCast concentrations for each hour. As stated by EPA, "NowCast is designed to be responsive to rapidly changing air quality conditions, such as during a wildfire. The NowCast calculation uses longer averages during periods of stable air quality and shorter averages when air quality is changing rapidly. The NowCast allows AirNow's current conditions to align more closely with what people are actually seeing or experiencing. This gives people information they can use to protect their health when air quality is poor. "[1]

NC DEQ PM 2.5 Monitors	Distance from fire
Hattie Avenue	3.77 miles
Clemmons Middle	9.49 miles
Lexington Water Tower	23.13 miles

The following map displays these three air monitors. They are notated by the yellow push pin icons on the map. The Weaver facility is notated by the purple point.

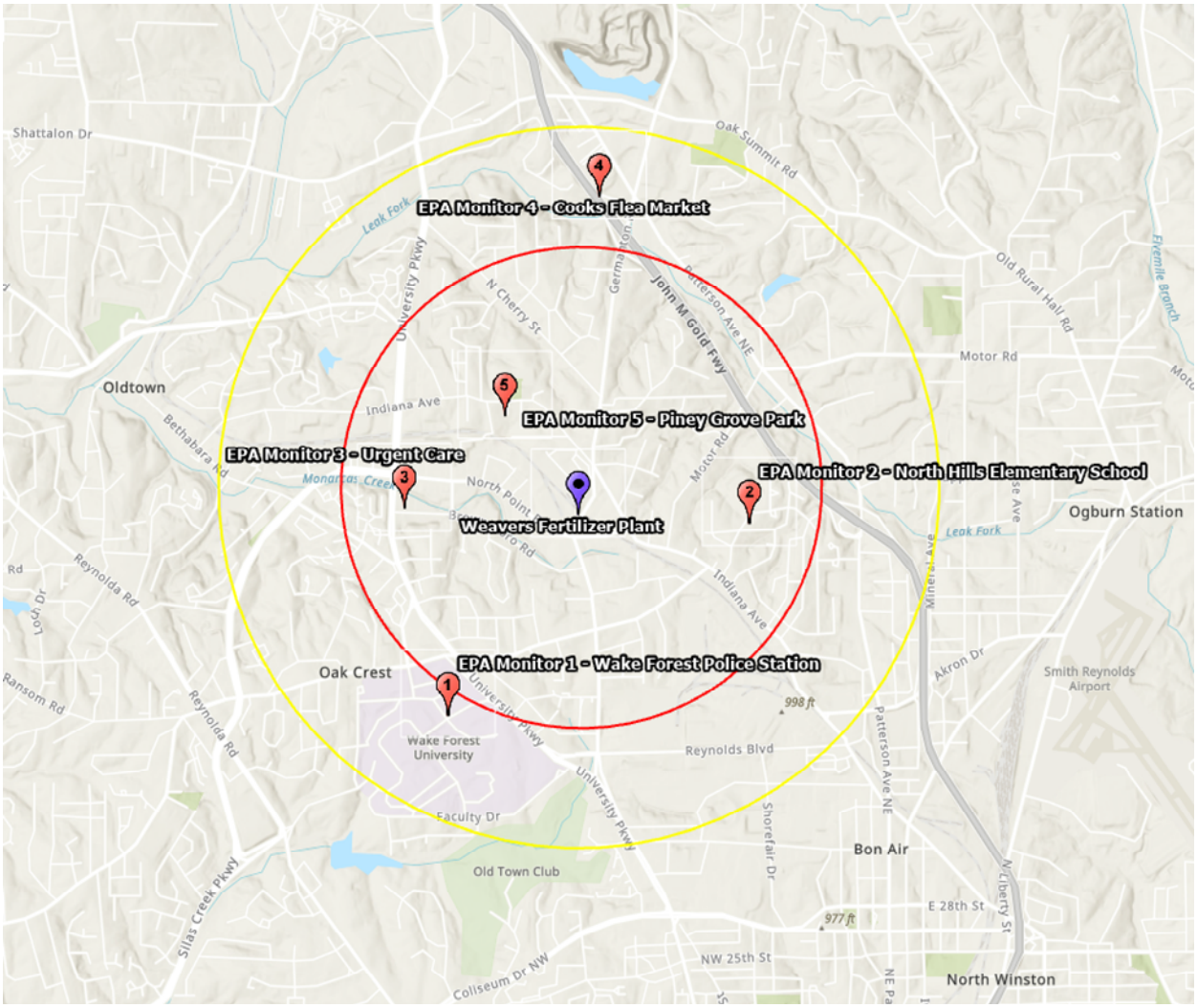
[1] https://usepa.servicenowservices.com/airnow?id=kb_article_view&sysparm_article=KB0011856&sys_kb_id=bb8b65ef1b06bc10028420eae54bcb98&spa=1

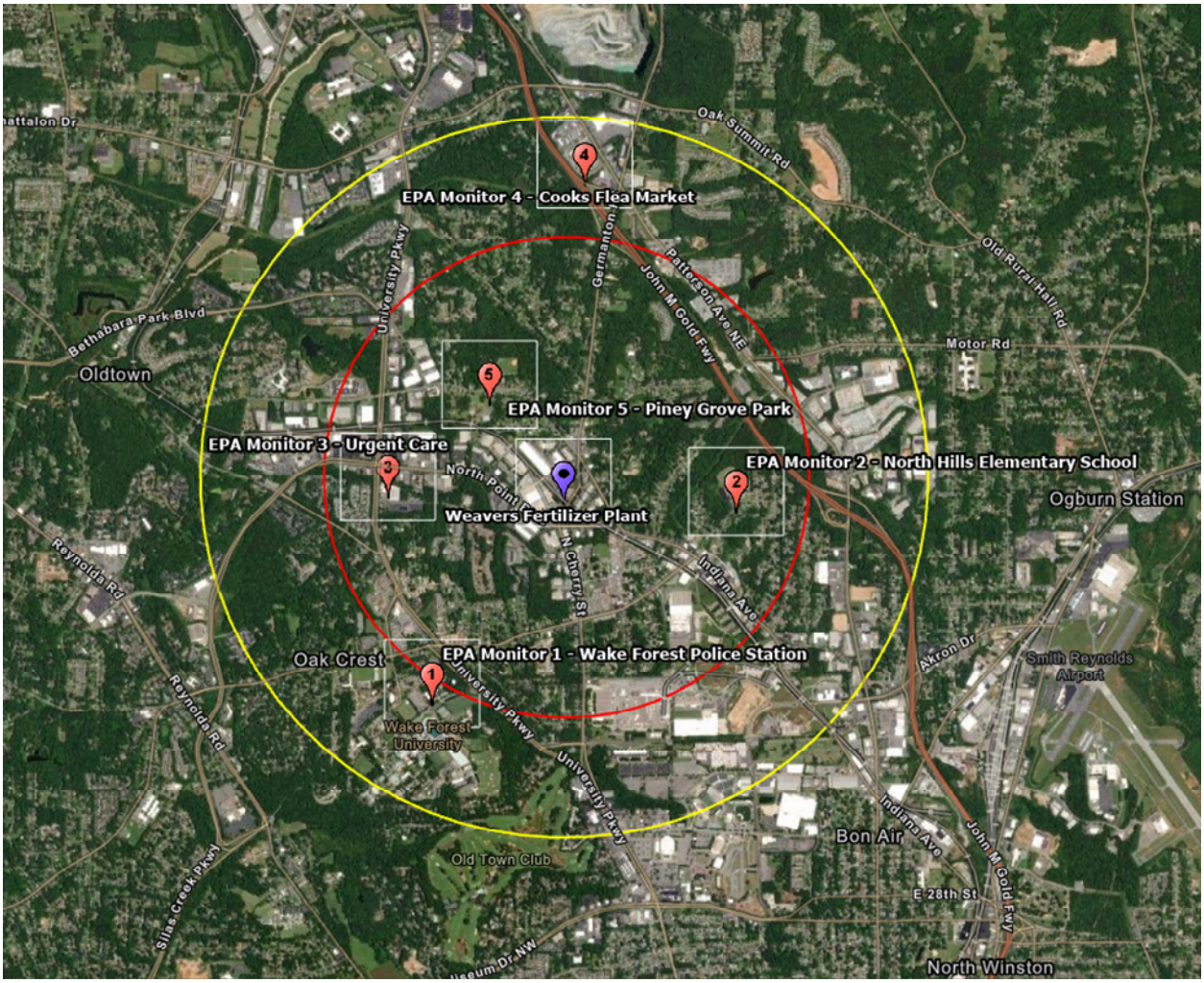


In addition to the NC DEQ "permanent" monitors, EPA set up temporary, remote air monitors within 0.5 to 1.4 miles of the fire beginning on Feb. 2, 2022.

EPA Monitors	Name	Distance from fire
1	WFU Police Station	1.00 miles
2	North Hills Elem.	0.71 miles
3	Urgent Care (Not PM 2.5)	0.72 miles
4	Cook's Flea Mkt	1.35 miles
5	Piney Grove Park	0.47 miles

These temporary, remote EPA air monitors are notated by the red points. The red circle is a 1-mile radius. The yellow circle is a 1.5-mile radius. During the fire, the data from these monitors were released by EPA in 12-hour increments in summary documents – although it is unclear when those summary documents were publicly available.


EPA Monitor 4 - Cooks Flea Market
EPA Monitor 5 - Piney Grove Park
EPA Monitor 3 - Urgent Care
EPA Monitor 2 - North Hills Elementary School
Weavers Fertilizer Plant
EPA Monitor 1 - Wake Forest Police Station
Shattalon Dr
Oak Summit Rd
Leak Fork
University Pkwy
N Cherry St
John M Gold Fwy
Patterson Ave NE
Old Rural Hall Rd
Motor Rd
Oldtown
Indiana Ave
Bethabara Rd
Monarcas Creek
North Point Blvd
Ogburn Station
Reynolda Rd
Oak Crest
Akron Dr
Smith Reynolds Airport
Ransom Rd
998 ft
Wake Forest University
Reynolds Blvd
Faculty Dr
Shorefair Dr
Bon Air
Old Town Club
E 28th St
977 ft
Silas Creek Pkwy
Coliseum Dr NW
NW 25th St
North Winston



Understanding the PM 2.5 Data

EPA utilizes community action threshold levels based on the NAAQS (National Ambient Air Quality Standards) which are used during high levels of PM 2.5 in critical incidents such as the Weaver fire. Data from the air monitors - mainly the temporary air monitors set up in proximity to an incident - would dictate the level of concern and the action to take.

Unrelated to critical incidents, EPA uses the existing state air monitoring networks to report the current and daily air quality in terms of a color-colored Air Quality Index (AQI) based on the NAAQS.

PM 2.5 NAAQS has a 24-hour average and an annual health standard. During an incident, EPA uses community action thresholds based on 1-hour averages. In addition and on a daily basis, EPA uses the AirNow NowCast in order to provide a better indication of the current air quality.

EPA Community Action Threshold Levels

$PM_{2.5}$ (Particulate Matter ≤ 2.5 microns) Community Action Threshold Levels				
1-Hour Average ($\mu g/m^3$)	24-Hour Average ($\mu g/m^3$)	Level of Health Concern	Meaning	Action
0.0 - 40.0	0.0-12.0	**Good**	Air Quality is considered satisfactory, and air pollution poses little or no risk.	Implement communication plan.
40.1 - 80.0	12.1 - 35.4	**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 senstive to air pollution.	Issue public announcement about health effects. Stay out of areas with visible smoke.
80.1 - 175.0	35.5 - 55.4	**Unhealthy for Sensitive Groups**	Members of sensitive groups may experience health effects. The general public is not likely to be affected.	Recommend evacuation or shelter-in-place for sensitive populations.
175.1 - 300.0	55.5 - 150.4	**Unhealthy**	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.	Consider closing schools and cancelling outdoor events. Recommend shelter-in-place for affected neighborhoods.
300.1 - 500.0	150.5 - 250.4	**Very Unhealthy**	Health warnings of emergency conditions. The entire population is more likely to be affected.	Consider closing schools and cancel all outdoor events. Recommend shelter-in-place and/or evacuation for affected neighborhoods.
> 500.0	> 250.5	**Hazardous**	Health alert: everyone may experience more serious health effects.	Recommend closing schools & cancel outdoor events. Recommend closing workplaces and evacuating affected neighborhoods.

This table is only designed for respirable particulates ≤ 2.5 microns in diameter averaged over a time period of either 1 hour or 24 hours

When comparing airborne particulate data to this table, ensure that the correct size franction, average, and units are used (1,000 µg/m3 is equivalent to 1 mg/m^3)

EPA NAAQS and AQI Values

$PM_{2.5}$ 24-hr Avg. Concentration (ug/m^3)	AQI Values	Level of Health Concern	Cautionary Statements
0.0 - 12.0	**0 - 50**	**Good**	**Little or no health risk.**
12.1 - 35.4	**51 - 100**	**Moderate**	**People unusually sensitive may be mildly affected.**
35.5 - 55.4	**101 - 150**	**Unhealthy for Sensitive Groups**	**People with respiratory or heart disease, the elderly, and children should limit prolonged exertion.**
55.5 - 150.4	**151 - 200**	**Unhealthy**	**People with respiratory or heart disease, the elderly and children should avoid prolonged exertion, everyone else should limit prolonged exertion.**
150.5 - 250.4	**201 - 300**	**Very Unhealthy**	**People with respiratory or heart disease, the elderly and children should avoid any outdoor activity, everyone else should avoid prolonged exertion.**
250.5 +	**301 - 500**	**Hazardous**	**Everyone should avoid any outdoor exertion; people with respiratory or heart disease, the elderly and children should remain indoors.**

For the NC DEQ state air network “permanent” PM 2.5 monitors, we calculated the EPA AirNow NowCast concentrations. These concentrations would have been what the general public would have seen on the EPA AirNow current air quality page.

For the EPA remote, mobile, temporary PM 2.5 monitors, which were set up around the perimeter of the fire incident, we calculated the one-hour average concentrations from the EPA raw data. Then, we used the EPA Community Action Threshold Levels for one-hour average concentrations and applied the AQI color code based on Level of Health Concern.

Wind Rose

We compiled daily wind roses based on the nearest airport. Wind data from the Smith Reynolds Airport was used. A wind rose is a way to plot wind direction and wind speed for a sampling period. The wind rose shows the direction that the wind is coming from. We then superimposed each day’s wind rose on top of the location of the Weaver fire. These wind rose diagrams are located in the Appendix section under Meteorological Data.

Pollutants other than PM 2.5

Fourteen hours after the start of the fire Winston-Salem city officials stated at a city press conference that the state was monitoring for nitrous oxide over 1-mile away from the fire. Those concentrations were stated as 65 ppm (parts per million) which were under the health threshold of 100 ppm. Those monitors were initially located 2 miles away, and they were moving the monitors 1000 feet closer to the fire every hour. City officials said they were not measuring anything harmful to life and health, but at the time they were not measuring within the 1-mile radius of the fire. Officials did say the more compromised your respiratory system the more at risk you are when outside. They said that people should avoid outside activity, exercise. They said that the number one chemical of concern was nitrous oxide and that it was more of an irritant than life threatening – not harmful to life and health. But this was prior to the EPA temporary monitors being set up.

According to the EPA summary air quality data[2], after the EPA temporary monitors were set up, EPA also monitored several pollutants using AreaRAE instruments at four stations along the fertilizer plant perimeter – mostly along or close to the facility's property. They monitored Nitrogen Dioxide (NO_2), Ammonia (NH_3), PM 2.5, VOCs (Volatile Organic Compounds), Carbon Monoxide, and Hydrogen Sulfide (H_2S). Several of these pollutants showed very high concentrations above the EPA Action Levels. It's reasonable to assume that some of these higher concentrations occurred off site as well.

During the evening of February 2 and early morning of February 3, NO_2 exceedances were reached at the fertilizer plant perimeter with concentrations ranging up to 0.700 ppm and as high as 5.20 ppm. EPA Action level for NO_2 is 0.500 ppm.

From the evening of February 3 to the morning of February 4, VOC exceedances were reached at the fertilizer plant perimeter with concentrations ranging up to 6227 ppb (parts per billion). EPA VOC Action level is 1000 ppb. Also during this time period, there were NH_3 exceedances ranging up to 100 ppm (EPA Action level is 30 ppm). There were also NO_2 exceedances ranging up to 0.8 ppm (EPA Action level is 0.5 ppm.)

There were very high levels of VOCs reported from the morning of February 4 to that evening. VOC exceedances ranged up to 59179 ppb at one perimeter monitor, and up to 85798 ppb at a second monitor. A third perimeter monitor had VOC exceedances up to 86892 ppb. EPA VOC Action level is 1000 ppb. Also during this time period, there were exceedances of NH3 up to 45 ppm and 151 ppm (Action level of 30 ppm), exceedances of NO_2 up to 21.5 ppm (Action Level of 0.5 ppm) and Hydrogen sulfide exceedances up to 13.3 ppm (Action Level is 0.51 ppm).

[2] https://response.epa.gov/site/site_profile.aspx?site_id=15489

While we concentrated on PM 2.5 throughout this report, some of these extremely high concentrations are noteworthy as one may expect there were high concentrations well beyond the property line. More details on the perimeter monitor summary readings may be found at the EPA response page.[3]

Analysis of Air Quality and Publicly Disseminated Information

Prioritize air quality – be transparent

During the Weaver Fertilizer Plant fire air quality should have been more of a priority. Both the possibility of an explosion and the worsening air quality were significant threats to human health and life. The air quality impacts were often glossed over during official press and public briefings.

There was a mixed bag of messages when it came to air quality. Official public communications regarding the air quality impacts of the fire were inconsistent and unsubstantiated. Early on officials mentioned the smoke and poor air quality and advised against strenuous outdoor activity.[4] Then, less than 5 hours later, they said they were concerned over air quality but said the pollutants were mostly just "irritants".[5]

Later the same day, officials reported that changing winds would blow towards the communities of Lewisville and Clemmons advising people to stay inside if they have breathing issues. This message was repeated in another briefing. However, once again, officials regarded the pollutants as irritants and "not particularly toxic". Ammonia and sulfur compounds were mentioned as the pollutants with no references to particulate matter.[6]

Concerns over air quality and messaging were heightened once EPA set up temporary air monitors and began receiving data. We note that it was 29 hours into the fire event before the EPA monitors were set up and operational.

In the early morning hours of February 2, 2022 from 12 AM – 6 AM, an EPA monitor set up at the Wake Forest University Police Station picked up a PM 2.5 concentration of 9200 ug/m^3, a concentration that the EPA considers Hazardous.[7] To put it in perspective, the Hazardous category for the EPA community action thresholds begins at just 500 ug/m^3. BREDL requested the data from this time period but we did not receive it with the data given to us in response to

[3] Ibid.
[4] Press Conference at 4:30 AM on February 1, 2022
[5] Press Briefing at 9 AM on February 1, 2022
[6] Press Briefings at 12:30 PM and 3:30 PM on February 1, 2022
[7] https://response.epa.gov/site/site_profile.aspx?site_id=15489

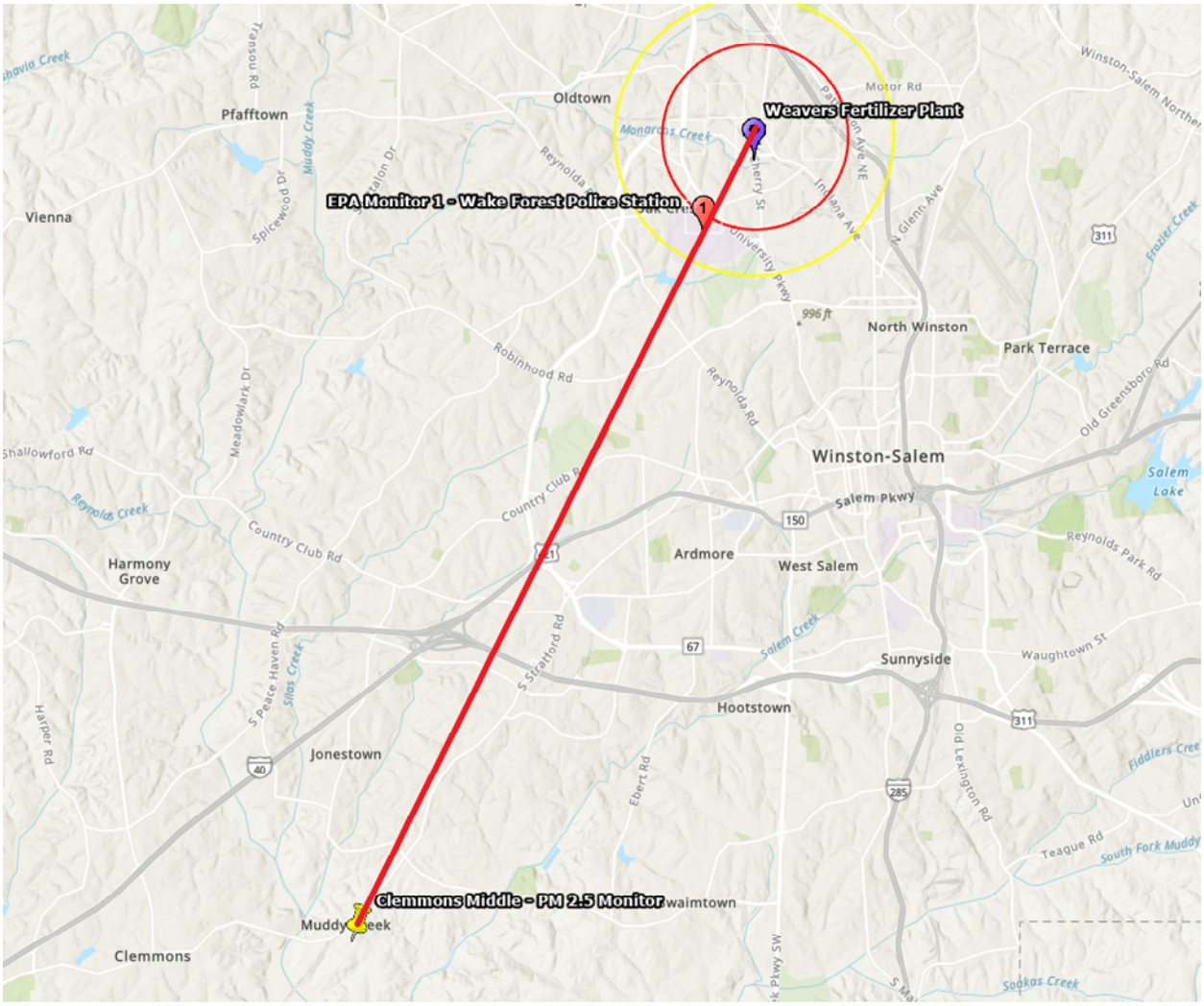
our FOIA request. Therefore, we can't determine when that 9200 ug/m3 concentration occurred during that time frame. However, based on the data we received beginning at 6 AM on February 2, we feel confident that PM 2.5 concentrations at the Wake Forest University temporary monitor location were well above healthy concentrations or at the very least trending upward when officials said "all levels have been in the acceptable range" at a 5 AM briefing.[8] We also point out that these were the first PM 2.5 readings from the fire and they were indicating hazardous air quality – over 29 hours from the start of the fire.

At this briefing, officials were still only recommending that those with compromised respiratory conditions stay inside. They added that an overnight temperature inversion caused low-lying smoke, which should lift as temperature rises. We point out that the cautionary statements and actions associated with hazardous air quality conditions include: (1) everyone should avoid any outdoor exertion, (2) everyone may experience more serious health effects and, (3) it is recommended that schools and nearby workplaces be closed and outdoor events cancelled. Hazardous and Very Unhealthy PM 2.5 concentrations were reported at the Wake Forest University monitor from at least 5 AM (probably well before) to just past 10 AM on February 2.[9] Officials failed to properly alert the public regarding these extremely high levels of PM 2.5. In fact, they miscommunicated the bad air quality by reporting that levels have been in the acceptable range. Even if the hazardous conditions were not met prior to their 5 AM briefing, those officials should have issued a health alert once they noticed those hazardous conditions, which lasted for at least 5 to 10 hours.

This misrepresentation of the air quality data was also evident in an afternoon alert put out by Wake Forest University. The 1 PM alert to its students, faculty and staff stated that, "As of Wednesday morning [February 2, 2022], the EPA reports that air-quality readings on and near campus indicate that the air poses no threat to individual health and is safe to breathe." If EPA had, in fact, said that to university officials, then the agency was negligent in its obligation to present the air quality data and associated adverse health impacts.

During the same time that the Wake Forest University air monitor was indicating hazardous PM 2.5 air quality, the NC DEQ permanent PM 2.5 air monitor located approximately 9.5 miles away in Clemmons was indicating Unhealthy and Very Unhealthy air quality – conditions which warrant that everyone should limit or avoid prolonged exertion. A direct path from the Wake Forest University Police Station monitor to the Clemmons Middle School monitor goes right through the Wake Forest University campus. It's implausible to think that the air was safe to breathe during that morning based on the readings from both monitors.

[8] Press Briefing at 5 AM on February 2, 2022.
[9] See Timetable and Appendix Sections for details.



At a 2 PM February 2 briefing, even after a morning of extremely hazardous PM 2.5 readings, officials were still referencing the pollutants merely as irritants – even when referring to them as “some just general indescribable particulate matter”. No further explanation about the particulate matter was given.

For more details on what was being said to the public and what the PM 2.5 air quality was at that time, please check out the Timeline section of this report.

Recommendations:

- Maintain a list of high risk facilities that, if they suffer a catastrophic fire or significant release of chemicals, immediate evacuation goes into effect. This could have reduced evacuation times.
- Maintain the same message regarding air quality unless data or situation changes.
- Agencies must be transparent in reporting the air quality data and health impacts.

- Agencies must not underreport or misrepresent the air quality data and associated adverse health impacts.

Agency air quality experts must be utilized

It was not until around 4:30 PM on February 2 that for the first time – some 45 hours into the event – a local official raised concerns over the air pollution from the Weaver fire. Local public radio station WFDD reported that Minor Barnette, the director of the Forsyth County Office of Environmental Assistance and Protection, said the fire has released particles that pose particularly serious health risks. As quoted by WFDD, Barnette stated, "If you can see it, if you can smell it, you need to take evasive action. And if someone could smell it outside, but not inside then they should stay inside. If they start smelling it strongly inside their home or wherever they are, they need to relocate to a different place until it subsides." This is the type of message one would expect to have heard starting on the morning of February 2, based on the air quality data.

Agency air quality experts were not evident at press conference/briefings. We usually only heard from local fire department experts. The fire department's expertise is in the knowledge of how to control fires. However, they are not experts on ambient air quality and associated health impacts. Agency air quality experts must be heard and available during these industrial events.

Recommendation:

- Local, state and federal air quality experts should be included in all press briefings, press releases, and public statements during facility incidents.

Agency information dissemination

Local, state and federal air quality agencies did a good job - within their agency world - of acknowledging and responding to this fire incident's severe impact on air quality. However, that level of knowledge and concern was not evident in public dissemination of the information.

During a March 9, 2022 briefing before the North Carolina Environmental Management Commission[10], it was pointed out that NC DEQ contacted EPA, which got the EPA Response Team on the ground in Winston-Salem.

[10] https://www.youtube.com/watch?v=K0gflGhUSpQ&list=PLsBpAjvXXIH0UFujbn0ITIVdxhfS-BzBg&index=7

The EPA Response Team placed several monitors, including a roving, mobile air monitor, around the perimeter of the fire to collect air quality data. That data was fed in real-time to the local officials responding to the fire incident.

Minor Barnette, Director of Forsyth County Office of Environmental Assistance and Protection, told the Commission that during the week, FCEAP, NC DEQ and EPA met every morning at 8:15 AM to get current updates on the fire and air quality data. In the evening, FCEAP met with health agencies to brief them.

That's why it's both puzzling and troubling that during press conferences, officials speaking to the media and public seemingly downplayed the severity of the air quality.

FCEAP did issue four press releases[11] related to air quality during the event. Those were released on February 1, 4, 5 and 6. The February 1 press release did state, "FCEAP recommends avoiding outdoor activity in and near the smoke plume, especially children, and adults with compromised respitratory conditions including asthma and COPD." FCEAP went on to mention for current air quality information people should visit the EPA AirNow.gov website. This February 1 press release was prior to the EPA temporary monitors being in place. A second press release was not issued until February 4. This February 4 press release echoed the same thing as the February 1 press release with a brief update on conditions. There was no mention of the significant air quality impacts that were present from February 2 through February 4. The EPA temporary monitors indicated unhealthy to hazardous PM 2.5 concentrations during this time. Subsequent press releases on February 5 and 6 also provided brief updates on the conditions. The February 5 press release still included the FCEAP recommendation on avoiding outdoor activity listed above. That was no longer included in the February 6 press release. None of the four press releases included any data from the EPA temporary monitors nor did they include a link to view that EPA data from those temporary monitors. The only link to data in the press releases was a link to the EPA Air Now site, which uses the NC DEQ state air monitoring network.

We mention this because a FCEAP official had this to say a month later. Minor Barnette's commentary, released on March 9, 2022 as part of his briefing to the North Carolina Environmental Management Commission, is revealing of the immense danger created by the fire. Said Mr. Barnette, "I had a panic attack. I had never seen numbers like that."

It is evident to us that there was concern amongst the air quality agencies, but we don't see any indication that this health risk was fully and properly conveyed to the general public. That is very troublesome.

We searched other agency websites and some social media feeds to see if there were any additional press releases, besides the four from the Forsyth County Office of Environmental Assistance and Protection, regarding this fire incident. We could only locate one reference to the Weaver Fire incident. This was on twitter, a retweet by NC DEQ at 9:36 AM on Feb. 1. They retweeted an announcement from

[11] https://forsyth.cc/archivednews.aspx?sectionid=26

the city of Winston-Salem regarding an upcoming press conference. We could not locate any press releases or social media posts related to the air quality from the fire from NC DEQ or US EPA. EPA did set up an incident page[12] which included summary air quality data. We are unsure when this page was first posted. This site does mention that "EPA resources will coordinate with the Local Incident Commander and provide data to support decision making and protect human health and the environment."

Lastly, we point out that during the March 9 meeting, the Environmental Management Commission members stressed a need for a long-term monitoring of the environmental and human health impacts from the Weaver fire. However, there was no indication of which governmental agencies would be able to do this. A NC DEQ official did tell the EMC that he would inquire with local and state health agencies. We hope that as part of this follow up, there will be an examination of local hospitals and clinics to see if lung and heart related visits increased during the fire incident.

Recommendations:

- State and federal air quality experts must periodically release information and statements during critical incidents. They must be transparent. Air quality data must be included in the press briefings.
- Current, real time air quality data must be made available to the public and not just select officials. This would be in addition to the summary information EPA may provide on their incident webpage.
- More emphasis is needed to express health impacts from such incidents.

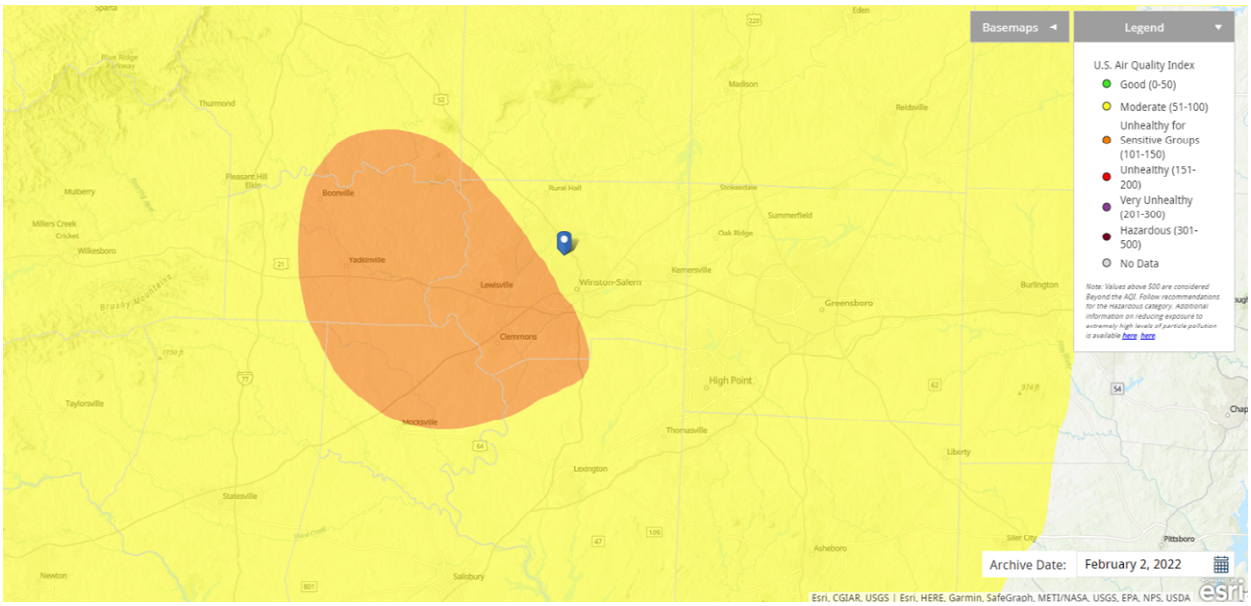
Include EPA industrial incident temporary air monitors in EPA Fire and Smoke Map

One issue with the EPA remote, temporary incident air monitors is that data they generate is not integrated into the EPA's Air Now Air Quality network. After years of being trained to check the Air Now forecasts and current air quality, anyone living in the area would have received bad information. One would hope with the media coverage of the fire that the hazardous air quality conditions around the fire were highlighted - using the EPA temporary monitors - and that impacted residents used that information and not the Air Now network – state network monitors – information.

[12] https://response.epa.gov/site/site_profile.aspx?site_id=15489

EPA needs to implement a process to add data from air monitors during industrial incidents to its Fire and Smoke map.[13]

This is the map plot from February 2, 2022 as reported on the EPA Air Now website. As you can see, there is no indication of the significantly unhealthy air quality immediately around the Weaver plant fire, which is marked with the blue marker.



The map plot above is based on the 24-hour air data from the NC DEQ statewide air monitoring network. Here is the data from the 3 monitors closest to Winston-Salem.

NC DEQ PM 2.5 Air Monitors

Date	Time Period	Concentration	Unit	Site Name	Latitude	Longitude
2/2/2022	24-Hour	17.3	ug/m^3	Lexington water twr	35.8145	-80.2627
2/2/2022	24-Hour	16.8	ug/m^3	Hattie Avenue	36.11094	-80.224501
2/2/2022	24-Hour	50.3	ug/m^3	Clemmons Middle	36.026612	-80.341962

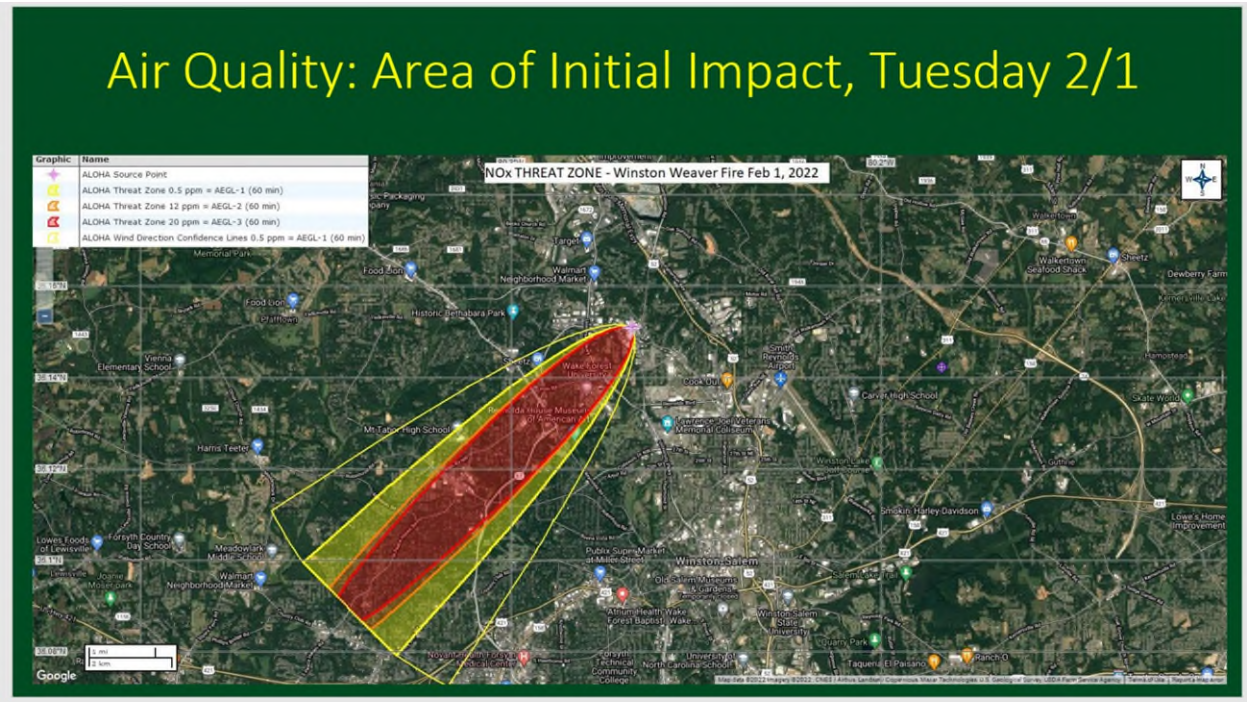
Recommendation:

- EPA needs to incorporate facility incidents, such as the Weaver Fertilizer Fire, into its Fire and Smoke Map and/or AirNow Map so the public has a better idea of air quality during incidents.

[13] https://fire.airnow.gov/

Utilize air modeling to highlight impacted areas

During the March 9, 2022 briefing before the North Carolina Environmental Management Commission, Minor Barnette, Director of Forsyth County Office of Environmental Assistance and Protection, shared a power point which included air modeling for NOx – see screenshot below.



When possible, it would be advisable to use air modeling such as this to highlight and warn impacted areas during an industrial incident.

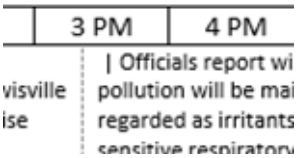
Recommendation:

- Depending on meteorological conditions and severity of an incident, impacts to air quality expand well beyond the impact/evacuation zone. More emphasis needs to be given to these health impacts. Air modeling displaying the cone of unhealthy and hazardous air quality conditions and estimation of how far that extends beyond the incident should be completed and presented to the public.

Timeline

We plotted what officials were saying during press briefings or posted on social media accounts along with what the known air quality data was – specifically for PM 2.5 – from the start of the fire through Sunday, January 6, 2022. This week-long timeline is broken into 12-hour increments per page.

The timeline includes the hours in AM/PM format at the top of the page. The next part of the timeline is the Fire Update section. The Vertical Line Pipe | indicates the time of the press briefing or event. For example, in the graphic to the right, this briefing happened at 3:30 PM.



The next section lists the EPA AirNow NowCast calculation for each hour for the three NC DEQ statewide air network monitors closest to the Weaver Fertilizer Plant fire.

Below the DEQ monitor data is the hourly average data from the EPA temporary air monitors set up around the perimeter of the fire.

At the bottom is the color strip key indicating the level of health concerns for each color.

January 31, 2022 Timeline

	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM
Fire Update							|Fire reported at Weaver Fertilizer Plant			|Evacuation announced for 1-mile radius (fumes and explosion concerns) |W-S Fire Dept abandons fire-fighting operations |Wake Forest Univ. asks students within 1-mile radius to evacuate; on-campus housing not evacuated – advised to stay indoors. | Officials tell people to plan to be away from homes for 48 hours.		

NC DEQ state air network Air Monitors (EPA AirNow NowCast calculation ug/m^3)

Lexington Water Tower		**7.9**	**8.9**	**11.4**	**12.7**	**11.8**	**10.4**
Hattie Avenue		**9.0**	**9.7**	**9.7**	**9.2**	**9.1**	**9.3**
Clemmons Middle		**11.2**	**11.8**	**12.4**	**12.0**	**11.1**	**10.7**

EPA remote, temporary Air Monitors

EPA remote, temporary monitors not in operation yet.

KEY	Good	Moderate	Unhealthy for Sensitive	Unhealthy	Very Unhealthy	Hazardous

February 1, 2022 Timeline

	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM
Fire Update	|Wake Forest University cancels classes for Feb. 1		| First Responders drive through neighborhoods encouraging people to evacuate.		| Officials say there will be smoke in the air and poor air quality. They advise against strenuous outdoor activity.					|Officials are concerned over air quality but said pollutants are mostly "irritants" not harmful to health. Report nitrous oxide levels at 65 ppm, below the 100 ppm health threshold.		

NC DEQ state air network Air Monitors (EPA AirNow NowCast calculation ug/m^3)

Lexington Water Tower	**10.2**	**11.1**	**11.5**	**11.2**	**10.1**	**10.0**	**9.2**	**8.7**	**8.4**	**9.4**	**11.4**	**11.2**
Hattie Avenue	**9.1**	**9.0**	**8.9**	**8.7**	**8.6**	**8.7**	**8.7**	**8.8**	**8.9**	**9.0**	**9.2**	**9.4**
Clemmons Middle	**10.6**	**10.3**	**10.1**	**10.0**	**10.0**	**10.1**	**10.2**	**10.3**	**10.3**	**10.7**	**11.3**	**12.2**

EPA remote, temporary Air Monitors

EPA remote, temporary monitors not in operation yet.

KEY	**Good**	**Moderate**	**Unhealthy for Sensitive**	**Unhealthy**	**Very Unhealthy**	**Hazardous**

February 1, 2022 Timeline

	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM
Fire Update	| Official report that winds changing to blow towards the Lewisville and Clemmons areas. Official advise people to stay inside if you have breathing issues.			| Officials report winds will be changing directions. Official says pollution will be mainly sulfur compounds and ammonia which are regarded as irritants and are not particularly toxic. Advises people with sensitive respiratory systems to avoid being outside and to remain indoors.						| Wake Forest University cancels classes again on Feb. 2. WFU alert says "it remains safe for students to be on Reynolda campus. Local officials have been and continue to monitor readings from air monitoring equipment on and around campus and have found no health concerns for the Reynolda Campus."		

NC DEQ state air network Air Monitors (EPA AirNow NowCast calculation ug/m^3)

Lexington Water Tower	10.7	11.2	10.2	9.3	7.5	6.7	7.8	8.9	11.4	13.2	13.1	18.5
Hattie Avenue	9.5	9.5	9.5	9.4	9.4	9.6	9.7	9.8	10.7	12.4	14.4	18.4
Clemmons Middle	12.7	12.8	12.9	12.8	12.4	12.3	12.2	11.9	12.3	12.6	13.5	21.9

EPA remote, temporary Air Monitors

EPA remote, temporary monitors not in operation yet.

KEY	Good	Moderate	Unhealthy for Sensitive	Unhealthy	Very Unhealthy	Hazardous

February 2, 2022 Timeline

	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM
Fire Update						| Officials will maintain the 1-mile radius. Still recommending those with compromised respiratory conditions to stay inside. Temperature inversion overnight causing low-lying smoke which should lift as temperature rises. Regarding air monitoring, official says "all levels have been in the acceptable range".						

NC DEQ state air network Air Monitors (EPA AirNow NowCast calculation ug/m^3)

Lexington Water Tower	22.7	20.3	21.6	21.8	19.4	20.2	20.1	26.0	28.5	26.7	23.0	15.9
Hattie Avenue	17.9	16.1	15.0	13.9	13.2	13.2	13.3	13.6	13.9	14.0	13.8	13.1
Clemmons Middle	27.9	26.6	24.1	23.9	24.6	26.6	62.8	84.6	118.3	156.4	171.2	119.9

EPA remote, temporary Air Monitors (Concentration averaged over time period ug/m3)

WFU Police Station	29 - 9200[a]				865.0	1061.9	829.7	396.7	502.9	-
North Hills Elem.	30 - 48[a]				31.8	31.6	30.5	26.5	24.7	28.7
Cook's Flea Mkt	31 - 54[a]				36.6	35.8	30.5	26.8	24.9	23.3

KEY	Good	Moderate	Unhealthy for Sensitive	Unhealthy	Very Unhealthy	Hazardous

[a] Hourly data for 12 AM – 5 AM was not provided by EPA FOIA request, thus EPA Summary data range for 12 AM – 6 AM displayed here.

i Incomplete hourly data for 10 AM WFU PS monitor, See Appendix 2 for details.

- Indicates no data during this time period

February 2, 2022 Timeline

	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM
Fire Update		| WFU alert. Classes will resume on Feb. 3. The alert also stated, "As of Wednesday morning, the EPA reports that air-quality readings on and near campus indicate that the air poses no threat to individual health and is safe to breathe."				| For the first time, an official raises concerns over the air pollution resulting from the Weaver fire. WFDD reported, Minor Barnette, the director of the Forsyth County Office of Environmental Assistance and Protection, says the fire has released particles that pose particularly serious health risks. "If you can see it, if you can smell it, you need to take evasive action," says Barnette. "And if someone could smell it outside, but not inside then they should stay inside. If they start smelling it strongly inside their home or wherever they are, they need to relocate to a different place until it subsides."						
		| Official states that last night a good blanket of smoke in north and west Winston-Salem due to atmospheric conditions, calm wind. Rain in the forecast. Rain can cause the smoke to lay closer to the ground. Air Quality concerns still referenced as just irritants. "What they're measuring is outside the one-mile radius and they are still primarily measuring nitrogen dioxide and some compounds of sulfur and some just general indescribable particulate matter," official says.				| WFU alert. After hearing from students and families regarding the situation, WFU has decided to cancel classes for the remainder of the week. The alert stated, "EPA air-quality readings on and near campus continue to indicate that the air currently poses no threat to individual health and is safe to breathe. Intermittent smoke could cause irritation for those with respiratory concerns, and public health officials continue to advise people to avoid being outside for prolonged periods when smoke is present."						

NC DEQ state air network Air Monitors (EPA AirNow NowCast calculation ug/m^3)

Lexington Water Tower	**13.9**	**10.4**	**9.2**	**10.6**	**10.8**	**8.9**	**7.4**	**9.7**	**12.3**	**15.6**	**17.8**	**19.9**
Hattie Avenue	**13.1**	**13.0**	**13.0**	**13.2**	**13.5**	**13.3**	**12.5**	**13.6**	**14.4**	**15.0**	**38.1**	**32.6**
Clemmons Middle	**81.0**	**50.2**	**33.0**	**26.2**	**22.9**	**21.1**	**20.8**	**21.4**	**20.2**	**19.9**	**19.1**	**19.5**

EPA remote, temporary Air Monitors (Concentration averaged over time period ug/m3)

WFU Police Station	**-**	**-**	**35.3**	**36.0**	**89.3**	**74.0**	**53.5**	**48.6**	**47.0**	**46.6**	**68.0**	**68.1**
North Hills Elem.	**26.1**	**29.8**	**64.6**	**49.2**	**41.6**	**38.0**	**32.4**	**31.2**	**40.3**	**41.3**	**39.2**	**37.3**
Cook's Flea Mkt	**21.7**	**29.5**	**45.9**	**56.2**	**47.7**	**42.6**	**43.3**	**41.6**	**44.8**	**45.1**	**42.5**	**35.3**

KEY	Good	Moderate	Unhealthy for Sensitive	Unhealthy	Very Unhealthy	Hazardous

- Indicates no data during this time period ; i Incomplete hourly data for 2 PM, 3 PM, & 4 PM WFU PS monitor, See Appendix 2 for details.

February 3, 2022 Timeline

	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM
Fire Update						| Press Conference: Residents should still stay out of the area at this time, still a risk of an explosion. Rain has come in. Rain is pushing smoke to the ground creating more of a health hazard. People should stay out of the smoke cloud. The fire has gotten smaller but there still is an active fire. Can only access site area from 300 feet away – unable to determine if structure or chemicals or both are burning. When asked if they will extend the perimeter for air quality issues, a Fire Department official responded no.						

NC DEQ state air network Air Monitors (EPA AirNow NowCast calculation ug/m^3)

Lexington Water Tower	23.9	21.9	23.4	20.2	20.6	19.3	20.6	17.3	17.1	13.0	12.0	14.0
Hattie Avenue	31.8	24.6	20.7	17.5	15.6	14.3	13.3	11.8	10.3	9.7	9.1	8.8
Clemmons Middle	19.7	20.3	20.4	21.0	21.3	20.9	20.6	20.4	22.0	18.2	15.2	13.7

EPA remote, temporary Air Monitors (Concentration averaged over time period ug/m3)

WFU Police Station	183.8	118.5	281.5	262.1	281.1	193.9	185.8	288.9	129.6	30.3	20.2	18.3
North Hills Elem.	35.1	36.6	32.0	29.0	28.7	27.0	24.4	24.2	24.0	20.6	21.1	19.6
Cook's Flea Mkt	35.4	37.5	36.4	32.8	33.4	28.4	25.7	26.9	24.6	20.6	20.5	16.6

KEY	Good	Moderate	Unhealthy for Sensitive	Unhealthy	Very Unhealthy	Hazardous

February 3, 2022 Timeline

	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM
Fire Update			| Press Conference: Fire Chief Mayo said that over the next few days, the smoke/emissions will ebb and flow as firefighting operations continue. Said EPA is doing live air monitoring, but no update on that. Said air emissions are lumped in the category as an "irritant". Further says rain and atmospheric conditions are causing the smoke to lay close to the ground creating "visibility" issues. Explosion threat was significantly reduced overnight with cooling operations. No estimate on when evacuation order will be lifted.					| Winston-Salem Fire Dept. announces that the 1 mile evacuation order will be reduced to 660 ft effective 8:00 pm tonight, Thursday, February 03, 2022. | Winston-Salem Fired Dept. announces that the Relocation Facility/Shelter at the Education Building serving residents during the evacuation will close at 8:00 am Friday, February 04.				

NC DEQ state air network Air Monitors (EPA AirNow NowCast calculation ug/m^3)

Lexington Water Tower	13.0	15.0	16.5	17.7	18.3	18.6	16.3	16.1	16.5	15.5	15.0	11.8
Hattie Avenue	8.5	9.0	9.9	25.2	32.3	21.7	15.3	12.1	10.9	10.5	10.7	11.7
Clemmons Middle	13.2	13.1	13.1	13.5	12.1	11.0	10.9	10.1	10.1	10.1	10.9	12.9

EPA remote, temporary Air Monitors (Concentration averaged over time period ug/m3)

WFU Police Station	125.5	109.1	29.1	24.3	119.6	73.9	33.5	34.2	92.3	97.5	47.8	27.2
North Hills Elem.	20.5	21.6	27.0	28.9	20.8	18.5	19.1	21.6	23.7	26.7	27.5	258.0
Cook's Flea Mkt	19.0	21.4	-	-	-	-	-	-	-	-	-	-

KEY	Good	Moderate	Unhealthy for Sensitive	Unhealthy	Very Unhealthy	Hazardous

- Indicates no data during this time period

i Incomplete hourly data for 5 PM WFU PS monitor and for 1 PM Cooks Flea Mkt monitor, See Appendix 2 for details.

February 4, 2022 Timeline

	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM
Fire Update													Winston-Salem Fire Dept. announces that no media briefing is scheduled today on the fire at the Winston Weaver Co. fertilizer plant. Progress updates will be posted on twitter and on their website.

NC DEQ state air network Air Monitors (EPA AirNow NowCast calculation ug/m^3)

Lexington Water Tower	8.9	7.4	8.7	8.8	8.9	8.4	7.2	6.1	5.0	3.0	1.5	0.7
Hattie Avenue	12.3	14.2	13.4	12.8	10.9	7.8	5.9	4.6	3.3	2.7	2.7	2.9
Clemmons Middle	13.9	13.7	13.3	13.1	11.9	8.7	6.5	4.8	3.3	2.8	2.8	3.1

EPA remote, temporary Air Monitors (Concentration averaged over time period ug/m3)

WFU Police Station	27.0	23.9	21.5	16.3	7.9	5.1	3.7	2.5	2.6	3.4	3.8	4.3
North Hills Elem.	482.9	309.7	32.1	22.7	11.8	8.8	6.0	4.7	4.5	-	-	-
Cherry St. Staging	-	-	-	-	-	-	-	-	-	-	237.9	262.8

KEY	Good	Moderate	Unhealthy for Sensitive	Unhealthy	Very Unhealthy	Hazardous

- Indicates no data during this time period

i Incomplete hourly data for 8 AM North Hills monitor and 10 AM Cherry St monitor, See Appendix 2 for details.

February 4, 2022 Timeline

	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM
Fire Update		| Winston-Salem posts smoky video of mitigation efforts at Weaver Fertilizer fire scene.										
				| On social media, a brief update from a spokesperson who mentioned the reduction of the evacuation zone to 660 ft, then said that Air Quality conditions continued to be monitored. "People with respiratory conditions should limit outside activity within that area."								

NC DEQ state air network Air Monitors (EPA AirNow NowCast calculation ug/m^3)

Lexington Water Tower	**0.8**	**0.4**	**0.7**	**1.8**	**1.9**	**2.9**	**2.9**	**1.9**	**1.9**	**1.4**	**0.7**	**1.8**
Hattie Avenue	**3.1**	**3.2**	**3.3**	**3.3**	**3.1**	**2.5**	**2.3**	**2.2**	**2.2**	**2.4**	**3.1**	**2.1**
Clemmons Middle	**3.3**	**3.3**	**3.3**	**3.3**	**3.1**	**2.7**	**2.2**	**2.0**	**1.8**	**1.5**	**1.4**	**1.2**

EPA remote, temporary Air Monitors (Concentration averaged over time period ug/m3)

WFU Police Station	**4.5**	**5.0**	**4.8**	**3.5**	**2.5**	**2.2**	**2.5**	**2.8**	**3.1**	**4.4**	**5.0**	**5.6**
North Hills Elem.	-	-	**5.0**	**3.9**	**3.2**	**3.0**	**3.0**	**2.6**	**2.6**	**3.0**	**3.0**	**3.0**
Cherry St. Staging	**333.5**	**296.1**	**279.1**	**208.5**	**66.1**	**1.0**	**1.0**	**1.0**	**1.0**	**0.9**	-	-
Piney Grove Park	-	-	-	-	-	-	**2.7**	**2.8**	**2.3**	**2.9**	**2.9**	**3.0**

KEY	Good	Moderate	Unhealthy for Sensitive	Unhealthy	Very Unhealthy	Hazardous

- Indicates no data during this time period

i Incomplete hourly data for 2 PM for North Hills monitor and 9 PM for Cherry St. monitor, See Appendix 2 for details.

February 5, 2022 Timeline

	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM
Fire Update													Winston-Salem Fire Dept. posts photo on social media of crew working on site. No smoke can be seen in the photograph.

NC DEQ state air network Air Monitors (EPA AirNow NowCast calculation ug/m^3)

Lexington Water Tower	**1.4**	**-0.2**	**0.8**	**0.4**	**-0.7**	**-1.3**	**-2.1**	**-0.5**	**0.7**	**1.3**	**2.1**	**2.5**
Hattie Avenue	**1.6**	**1.2**	**1.3**	**1.7**	**1.4**	**1.2**	**2.2**	**3.0**	**3.3**	**3.5**	**3.5**	**3.5**
Clemmons Middle	**4.3**	**2.7**	**2.0**	**1.7**	**1.6**	**1.7**	**2.3**	**2.7**	**3.1**	**3.8**	**4.0**	**3.8**

EPA remote, temporary Air Monitors (Concentration averaged over time period ug/m3)

WFU Police Station	**6.4**	**7.5**	**8.0**	**8.2**	**8.0**	**9.4**	**11.4**	**12.4**	**13.2**	**13.1**	**13.2**	**12.8**
North Hills Elem.	**3.3**	**3.4**	**3.8**	**3.2**	**3.0**	**3.6**	**5.0**	**5.7**	**5.8**	**5.9**	**6.5**	**6.4**
Cherry St. Staging	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2.3**	**5.0**	**5.9**	**7.6**
Piney Grove Park	**2.9**	**3.2**	**3.9**	**3.5**	**3.3**	**4.9**	**6.9**	**7.6**	**8.1**	**7.5**	**6.7**	**6.5**

KEY	**Good**	**Moderate**	**Unhealthy for Sensitive**	**Unhealthy**	**Very Unhealthy**	**Hazardous**

- Indicates no data during this time period

i Incomplete hourly data for 8 AM & 9 AM for Cherry St. monitor, See Appendix 2 for details.

February 5, 2022 Timeline

	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM
Fire Update	| Winston-Salem Fire Dept. posts that a 10 ft berm is completed. Ground monitors are in place. Data being collected for air quality test. A second posts mentions that the EPA air monitoring summary tables are publicly assessable and website listed.											

NC DEQ state air network Air Monitors (EPA AirNow NowCast calculation ug/m^3)

Lexington Water Tower	**2.7**	**2.8**	**4.4**	**4.2**	**3.6**	**2.8**	**2.9**	**2.9**	**2.4**	**3.7**	**6.8**	**7.4**
Hattie Avenue	**3.6**	**3.4**	**3.4**	**3.6**	**3.8**	**3.7**	**3.8**	**3.9**	**4.6**	**5.2**	**5.7**	**6.7**
Clemmons Middle	**3.9**	**3.8**	**3.8**	**3.9**	**4.1**	**4.1**	**4.2**	**4.3**	**4.6**	**5.7**	**6.7**	**7.6**

EPA remote, temporary Air Monitors (Concentration averaged over time period ug/m3)

WFU Police Station	**10.9**	**9.7**	**9.7**	**9.8**	**10.2**	**13.4**	**16.7**	**18.3**	**18.1**	**20.8**	**20.2**	**22.4**
North Hills Elem.	**6.0**	**6.7**	**7.1**	**7.3**	**6.8**	**6.9**	**7.3**	**7.3**	**8.1**	**10.2**	**8.9**	**11.0**
Cherry St. Staging	**5.7**	**20.2**	**5.8**	**11.7**	**39.0**	**7.4**	**9.4**	**8.6**	**12.2**	**12.2**	**13.0**	**14.5**
Piney Grove Park	**6.3**	**6.8**	**7.1**	**7.3**	**7.7**	**7.9**	**9.0**	**10.4**	**11.5**	**12.6**	**15.8**	**14.0**

KEY	Good	Moderate	Unhealthy for Sensitive	Unhealthy	Very Unhealthy	Hazardous

February 6, 2022 Timeline

	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM
Fire Update						| Winston-Salem Fire Dept. posts "Weaver Fire Hotline: 866-412-7768. A medical hotline is available for residents who live in the area affected by the fire at the Weaver Fertilizer Co. Hours are 8 a.m. - 8 p.m. est. 7 days a week." | W-S F.D. posts "Onsite overhaul cleaning in process. Staff is being cautious due to hotspots."						

NC DEQ state air network Air Monitors (EPA AirNow NowCast calculation ug/m^3)

Lexington Water Tower	6.2	7.1	8.0	9.0	12.0	11.0	10.5	8.2	7.1	6.0	5.0	5.5
Hattie Avenue	6.7	6.6	6.6	6.8	7.8	7.8	7.7	8.0	7.8	7.7	7.4	7.1
Clemmons Middle	7.7	7.9	8.1	8.3	8.3	8.1	8.0	8.0	8.0	8.0	8.0	7.8

EPA remote, temporary Air Monitors (Concentration averaged over time period ug/m3)

WFU Police Station	21.3	22.6	9.0	52.2	49.2	42.8	-	-	-	-	-	-
North Hills Elem.	10.1	10.1	9.9	10.4	10.8	10.1	-	-	-	-	-	-
Cherry St. Staging	5.2	1.0	1.0	1.0	1.0	1.0	-	-	-	-	-	-
Piney Grove Park	15.4	17.4	17.7	20.7	19.6	19.7	-	-	-	-	-	-

KEY	Good	Moderate	Unhealthy for Sensitive	Unhealthy	Very Unhealthy	Hazardous

- Indicates no data during this time period

i Incomplete hourly data for 5 AM for Cherry St. monitor, See Appendix 2 for details.

February 6, 2022 Timeline

	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM
Fire Update					| Winston-Salem Fire Dept. posts that the 660 ft. evacuation zone will be reduced to 275 ft. at 8 PM tonight Sunday, Feb. 6.							

NC DEQ state air network Air Monitors (EPA AirNow NowCast calculation ug/m^3)

Lexington Water Tower	6.7	6.3	6.1	6.0	6.0	6.0	7.0	5.5	5.2	5.6	8.8	10.4
Hattie Avenue	6.7	6.2	5.8	5.7	5.7	5.8	5.7	5.8	8.1	8.2	8.8	8.6
Clemmons Middle	7.8	7.5	7.3	7.3	7.3	7.2	7.2	7.0	7.5	8.1	10.4	11.5

EPA remote, temporary Air Monitors (Concentration averaged over time period ug/m3)

WFU Police Station	-	-	-	-	-	-	-	-	-	-	-	-
North Hills Elem.	-	-	-	-	-	-	-	-	-	-	-	-
Cherry St. Staging	-	-	-	-	-	-	-	-	-	-	-	-
Piney Grove Park	-	-	-	-	-	-	-	-	-	-	-	-

KEY	Good	Moderate	Unhealthy for Sensitive	Unhealthy	Very Unhealthy	Hazardous

- Indicates no data during this time period

Conclusions

It's clear that the existing, sparsely located PM 2.5 air monitoring network is not very helpful during critical air quality incidents such as the Weaver Fertilizer Plant fire. Most likely the existing network is not a good indication of PM 2.5 impacts on neighborhoods near stationary PM 2.5 sources if the PM 2.5 monitor is not located in those neighborhoods.

Depending on the air monitor proximity and wind direction during an incident, the EPA Air Now network data could be very misleading and dangerous to the general public.

During a wildfire, EPA recommends using the AirNow Fire and Smoke Map. With that map, EPA is able to add data from low-cost air sensors to the map as part of a pilot project between the EPA and the U.S. Forest Service. There should be an equivalent for critical industrial air quality incidents like the Weaver Fire. There should also be a way to incorporate air quality data from industrial incidents into the EPA AirNow mapping.

We are appreciative of the EPA, state and local first responders in their efforts to alert the community about the health impacts from the Weaver fire. We are thankful for EPA's work in placing temporary air monitors around the fire so that the neighborhood would have a clearer indication of the hazardous air quality conditions. We are most grateful that the ammonium nitrate did not explode. We hope that nearby residents don't suffer any long-term health impacts from the fire.

However, officials need to be careful and not send mixed messages regarding air quality. For example, before the EPA temporary monitors were in place collecting data, Winston-Salem Fire Chief Mayo said the pollution will be mainly sulfur compounds and ammonia, which are regarded as irritants and are not particularly toxic. Health impacts from particulate matter 2.5, which have been well documented, were neglected. The data from the EPA temporary monitors should have been up front and presented to the public. Modeling to estimate how far out the hazardous and unhealthy air quality conditions extended beyond the 1-mile perimeter should have been completed.

We do applaud local officials who provided updates in Spanish throughout the incident so that the impacted Latino community would stay informed.

An air quality expert from NC DEQ or US EPA should have participated in the incident press conferences.

Recommendations

- Maintain a list of high risk facilities in the event that they suffer a catastrophic fire or significant release of chemicals, immediate evacuation will go into effect. This could have reduced evacuation times.
- Maintain the same message regarding air quality unless data or situation changes.
- Agencies must be transparent in reporting the air quality data and health impacts.
- Agencies must not under report or misrepresent the air quality data and associated adverse health impacts
- Local, state and federal air quality experts should be included in all press briefings, press releases, and public statements during facility incidents.
- State and Federal air quality experts must periodically release information and transparent statements during critical incidents, which must be included in the press briefings.
- Current, real time air quality data must be made available to the public and not just select officials. This would be in addition to the summary information EPA may provide on their incident webpage.
- Health impacts from such incidents must be relayed to the public promptly and unambiguously.
- Agencies can use the EJScreen tool to access at-risk communities during facility incidents.
- EPA needs to incorporate facility incidents, such as the Weaver Fertilizer Fire, into its Fire and Smoke Map and/or AirNow Map so the public has a better idea of air quality during incidents.
- Depending on meteorological conditions and severity of an incident, impacts to air quality expand well beyond the impact/evacuation zone. More emphasis needs to be given to these health impacts. Air Modeling displaying the cone of unhealthy and hazardous air quality conditions and estimation of how far that extends beyond the incident should be completed and presented to the public.

Sources

Press Conferences via social media sources (Twitter, Facebook, YouTube) and local media outlets.

Photos from city of Winston-Salem Fire Department: https://twitter.com/cityofwsfire

NC DEQ air monitors data: https://www.epa.gov/outdoor-air-quality-data/download-daily-data

EPA temporary air monitors data - EPA response page for Weaver Fertilizer Fire: https://response.epa.gov/site/site_profile.aspx?site_id=15489

EPA Air Now Data Maps: https://gispub.epa.gov/airnow/

Winston-Salem precipitation data: https://www.wunderground.com/history/monthly/us/nc/winston-salem

Smith Reynolds Airport wind data: ftp://ftp.ncdc.noaa.gov/pub/data/asos-onemin

EPA EJScreen: https://www.epa.gov/ejscreen

Appendix

A-1 - Meteorological conditions by Day

A-2 - EPA Temporary Monitors Hourly Air Quality Data

A-3 - EPA EJScreen 1-mile and 3-mile radius maps

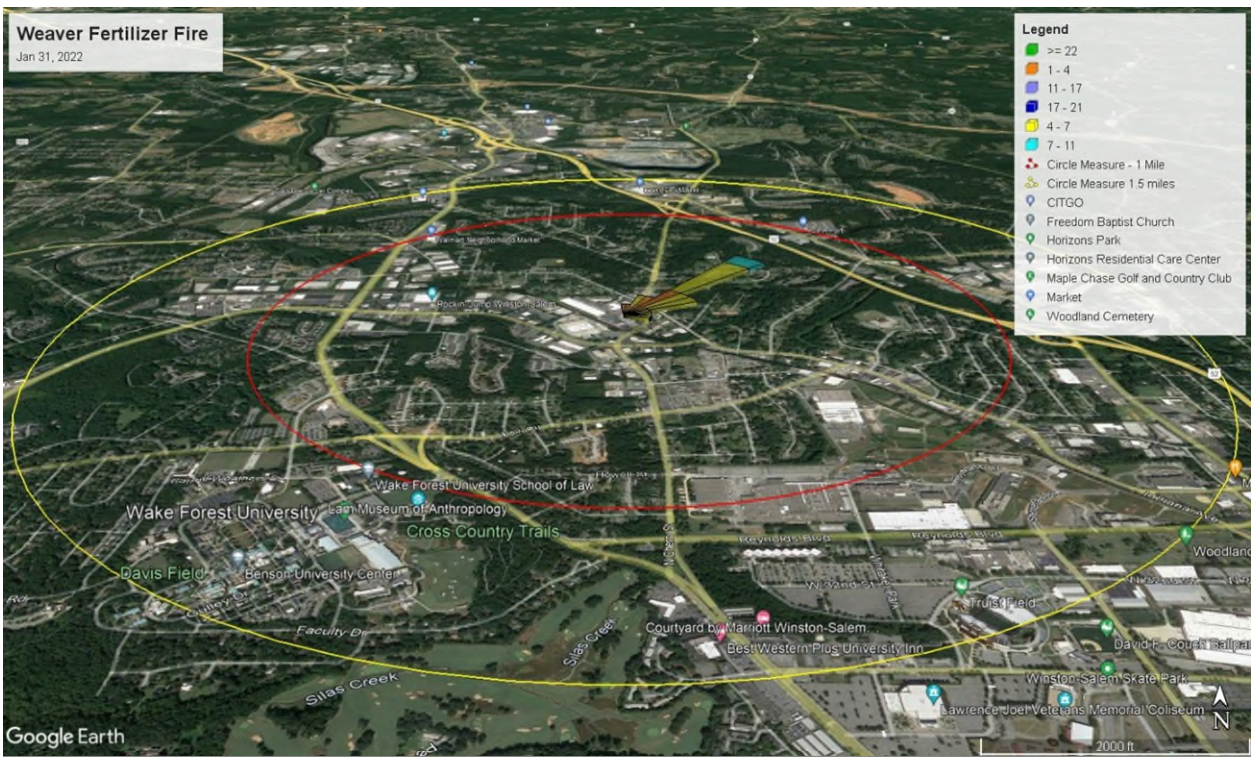
Appendix 1

Meteorological conditions for each day during the Weaver fire event.

Monday, January 31, 2022

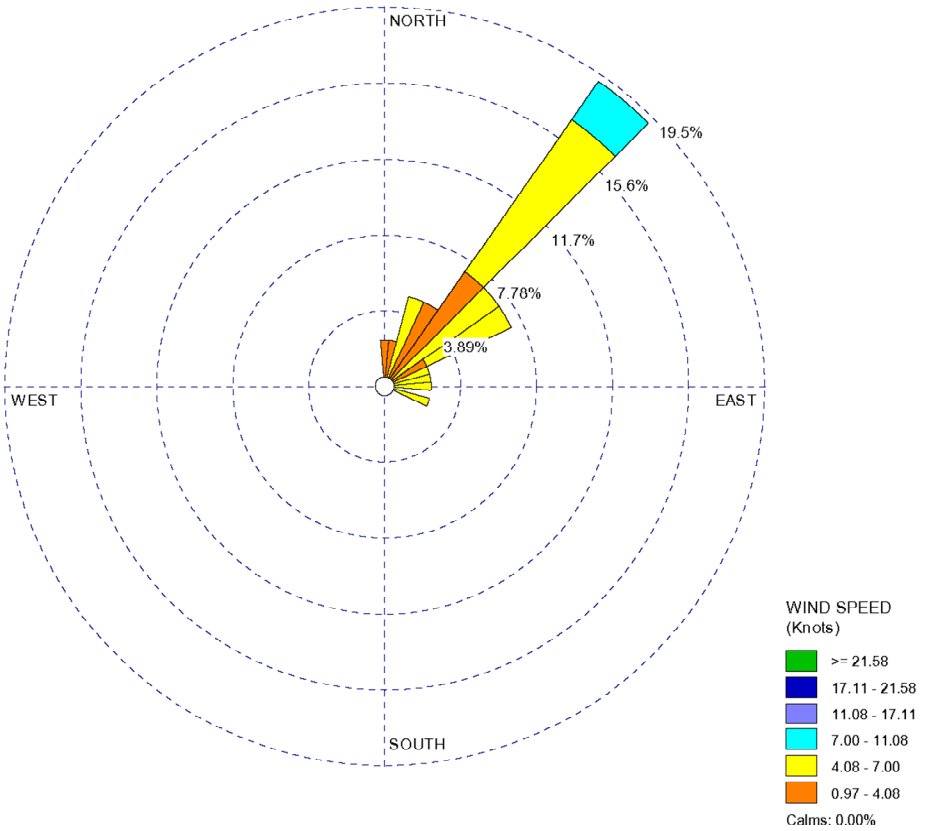
A plot of the Jan. 31 wind rose using the data from the Smith Reynolds Airport indicated a northeasterly wind. That would have blown the smoke pollution in the direction of Wake Forest University. The wind rose of the airport data was plotted overtop the location of the Weaver Fertilizer Plant.

No precipitation was reported on Jan. 31.



WIND ROSE PLOT:
Station #93807 - Smith Reynolds Airport, NC

DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 1/31/2022 - 00:00** **End Date: 1/31/2022 - 23:00**	COMPANY NAME: **Blue Ridge Environmental Defense League, inc.**	
		MODELER: **meb**	BREDL
	CALM WINDS: **0.00%**	TOTAL COUNT: **24 hrs.**	
	AVG. WIND SPEED: **4.59 Knots**	DATE: **3/15/2022**	PROJECT NO.: **Weaver Fertilizer Fire**

WRPLOT View - Lakes Environmental Software

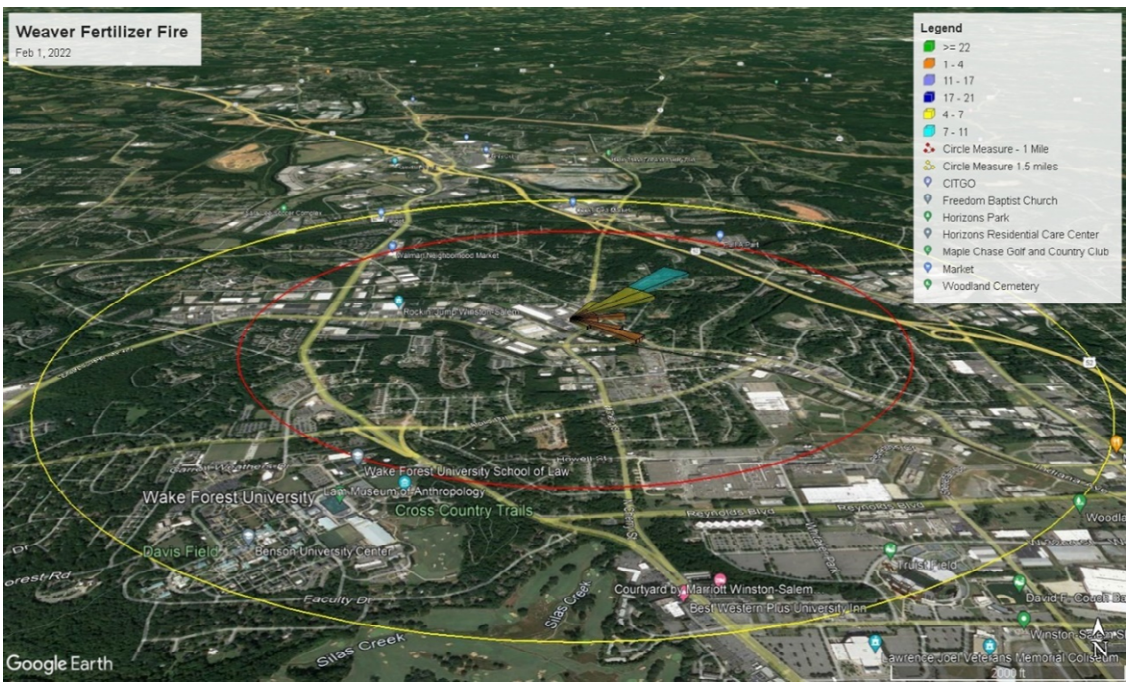
Tuesday, February 1, 2022

The winds continued to be mostly out of the northeast on February 1 with a few instances of southeasterly flow.

No precipitation was reported on Feb. 1.



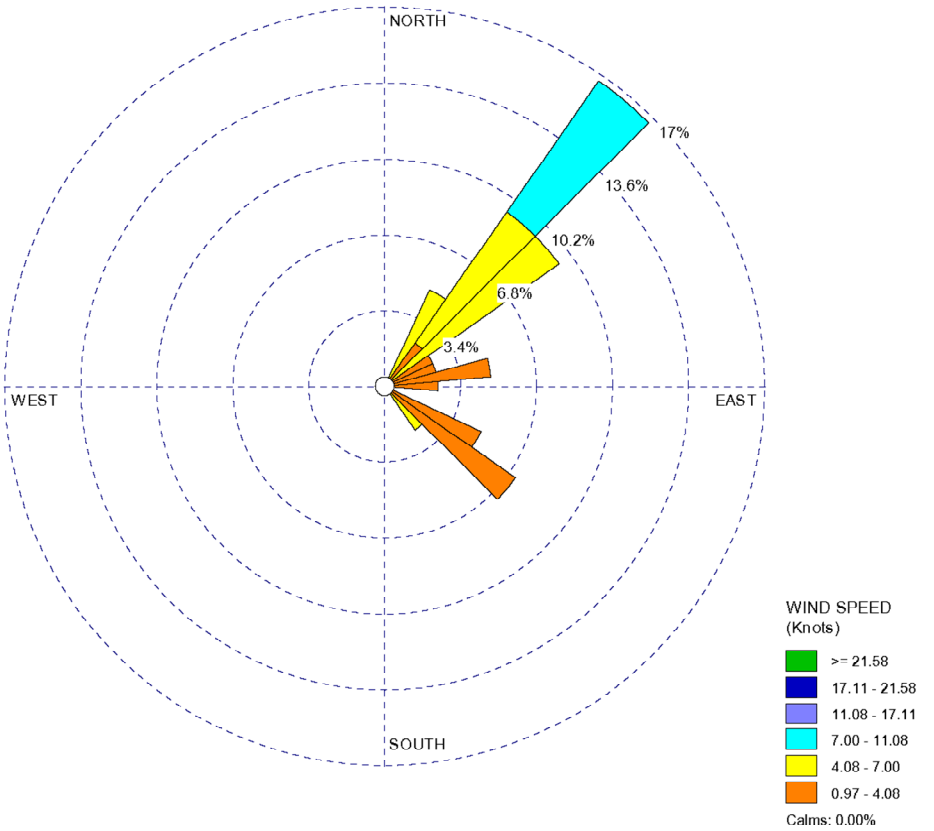
Still from Winston-Salem Fire Dept. Feb. 1, 2022 drone video.
Source: City of Winston-Salem



The winds continued to blow the smoke pollution in the direction of the Clemmons monitor, located 9.5 miles from the fire. The EPA temporary monitors were not in place yet.

WIND ROSE PLOT:
Station #93807 - Smith Reynolds Airport, NC

DISPLAY:
Wind Speed
Direction (blowing from)



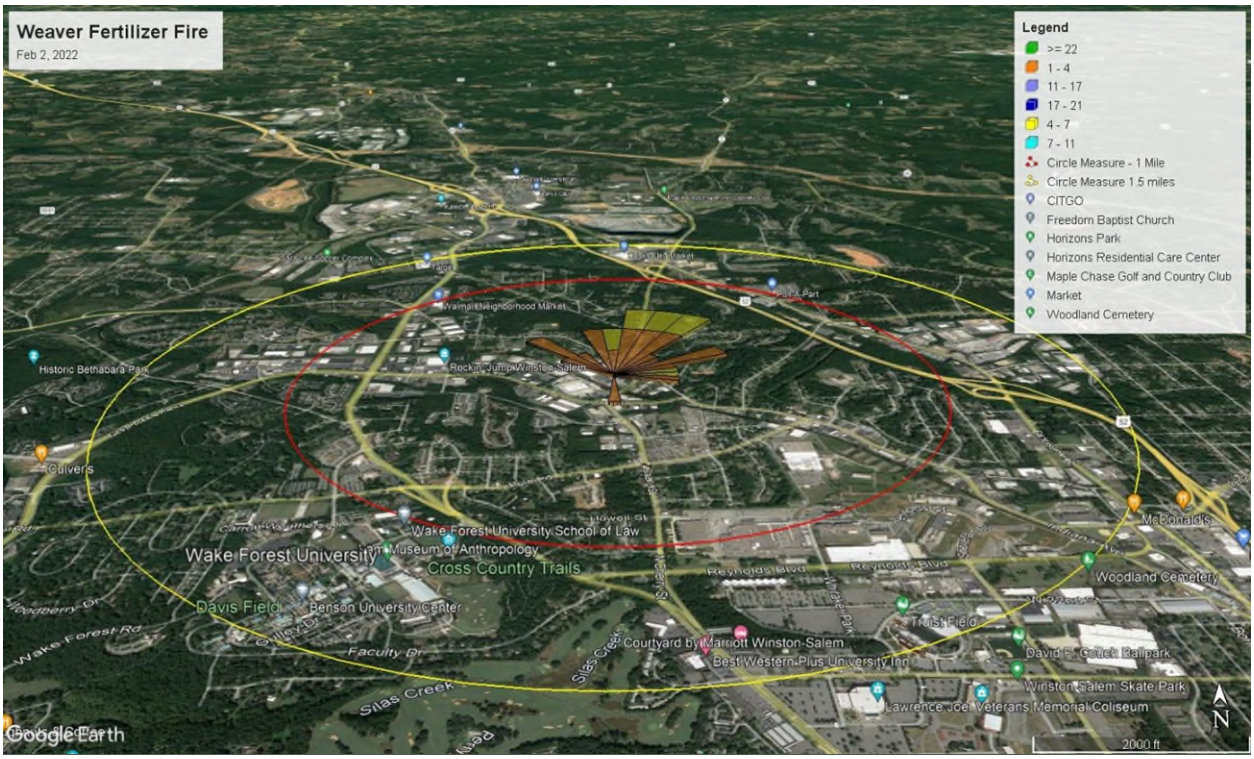
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		MODELER: **meb**	BREDL
	CALM WINDS: **0.00%**	TOTAL COUNT: **24 hrs.**	
	AVG. WIND SPEED: **4.51 Knots**	DATE: **3/15/2022**	PROJECT NO.: **Weaver Fertilizer Fire**

WRPLOT View - Lakes Environmental Software

Wednesday, February 2, 2022

The winds continued to be mostly out of the northeast on February 2 with slower speeds.

No precipitation was reported on Feb. 2.



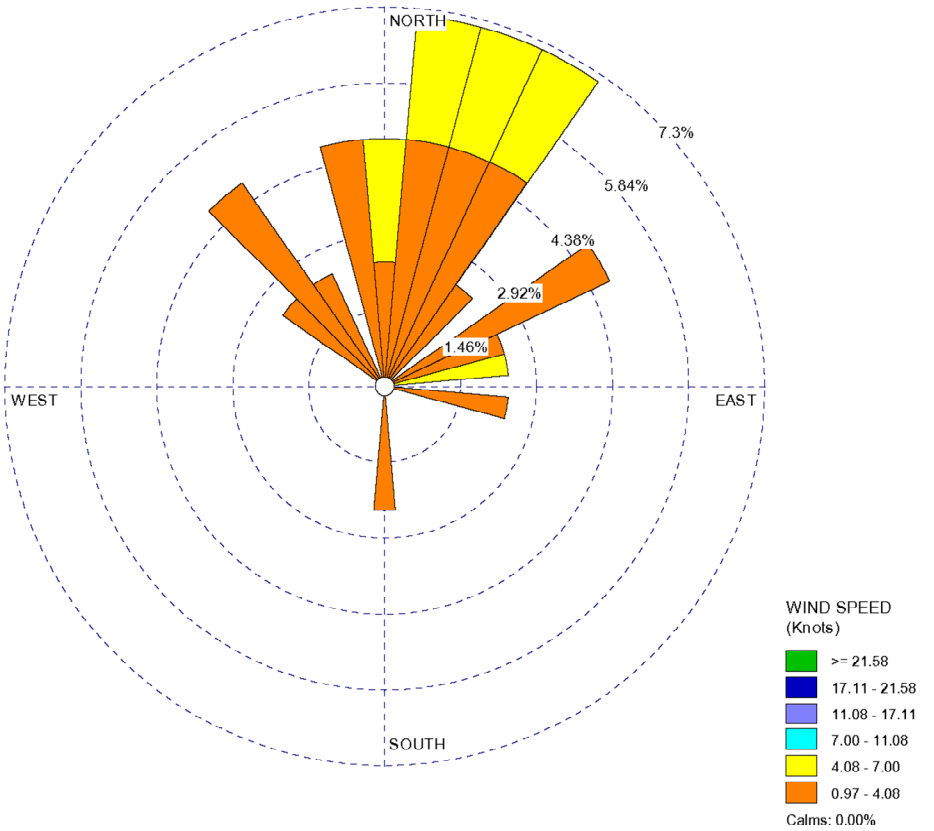
By now (Feb. 2), EPA's temporary monitors were up and collecting data. Those were showing exceedances of PM 2.5 especially at the Wake Forest Police Station location. **The Wake Forest Police Station location showed hazardous concentrations as high as 9,200 ug/m^3 – over 180 times the EPA action level.** The EPA community action for concentrations greater than 500 ug/m^3 for a 1-hour period is this: "**Everyone may experience more serious health effects. Recommend closing schools and cancel outdoor events. Recommend closing workplaces and evacuating affected neighborhoods."**

In addition, **the NC DEQ air monitor at Clemmons Middle School, about 9.5 miles from the fire, showed an exceedance of the PM 2.5 24-hour health standard.** For the 24-hour average, 35.5 ug/m^3 is an exceedance of the health standard. The Clemmons monitor had a concentration of 50.3 ug/m^3 for the 24-hour average. However, this was the only day and only monitor in which a "nearby" NC DEQ air monitor indicated an unhealthy condition with PM 2.5.

For context, the highest PM 2.5 24-hour average concentration for these three NC DEQ PM 2.5 monitors in 2021 was 44.9 ug/m^3 on Nov. 30 at the Clemmons location. In 2020 it was 33.2 ug/m^3 at the Lexington location on June 28. In 2019 it was 31.2 ug/m^3 at the Lexington location on Dec. 22.

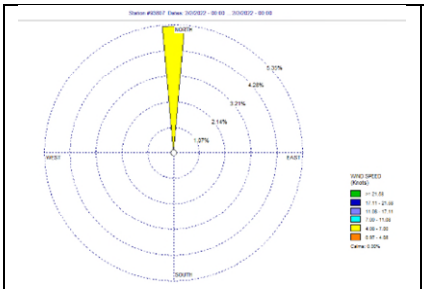
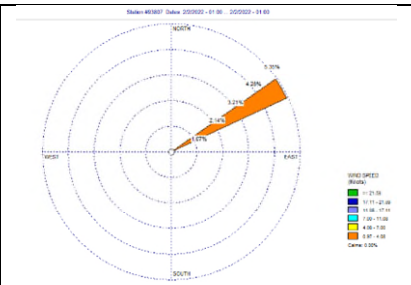
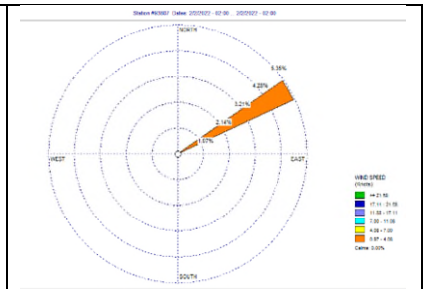
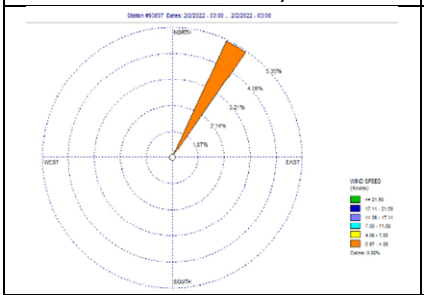
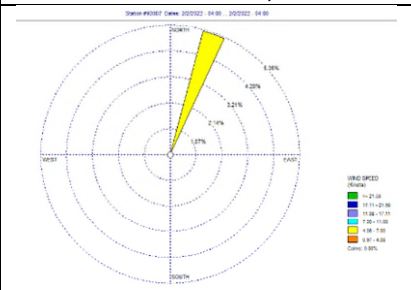
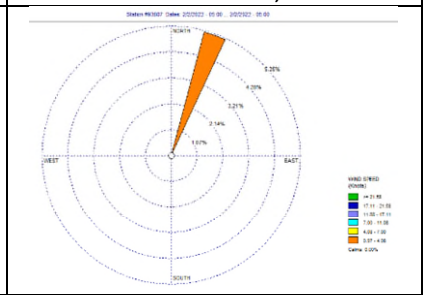
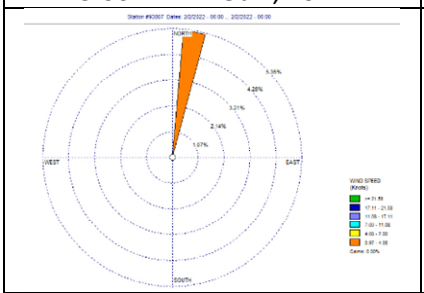
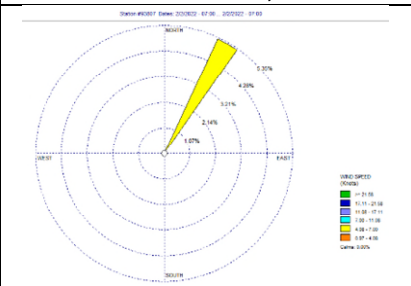
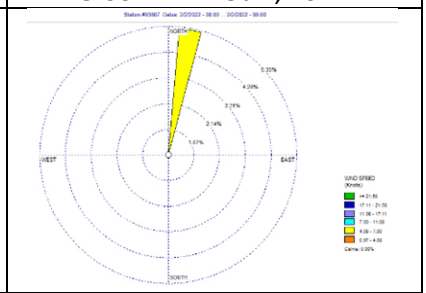
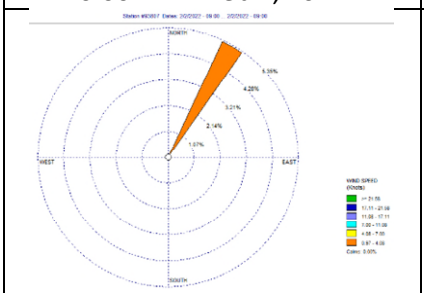
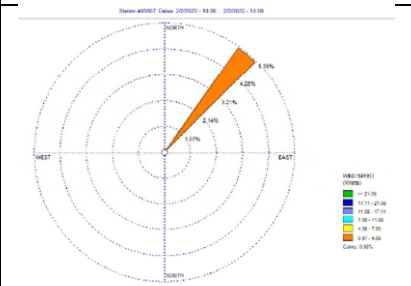
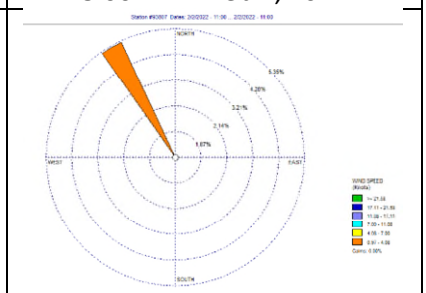
WIND ROSE PLOT:
Station #93807 - Smith Reynolds Airport, NC

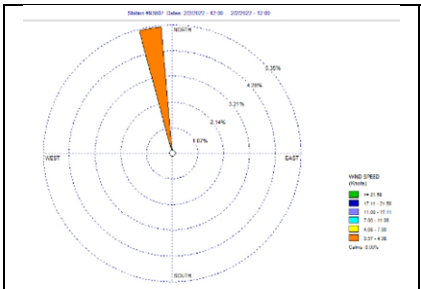
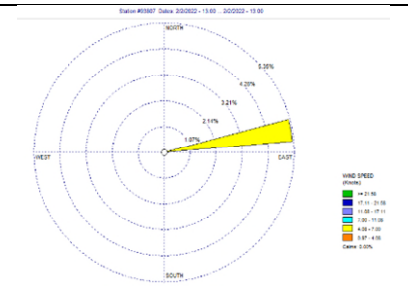
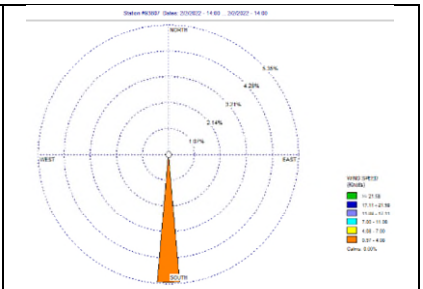
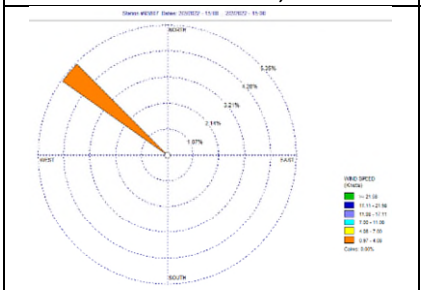
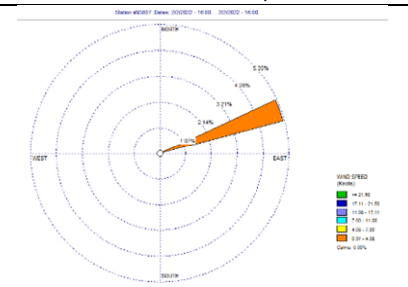
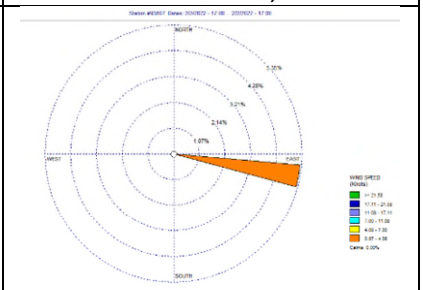
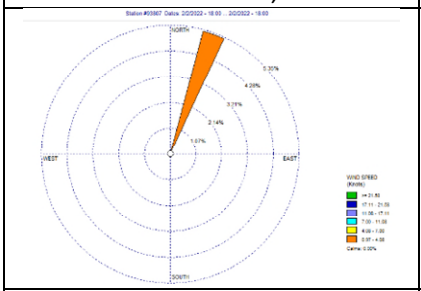
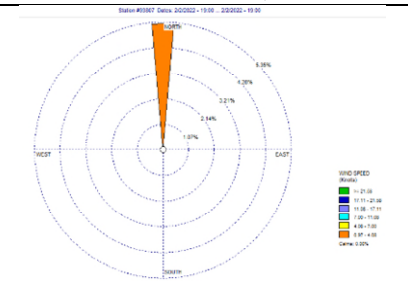
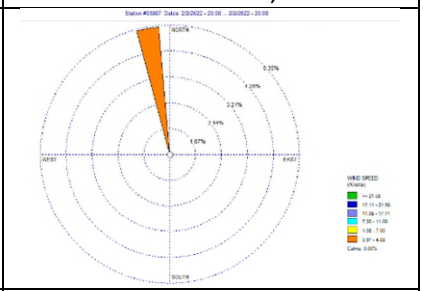
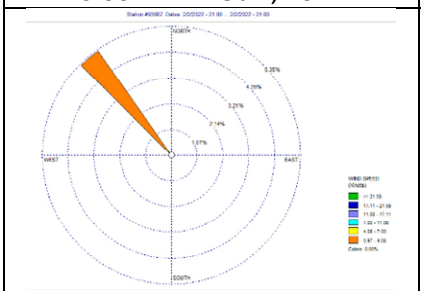
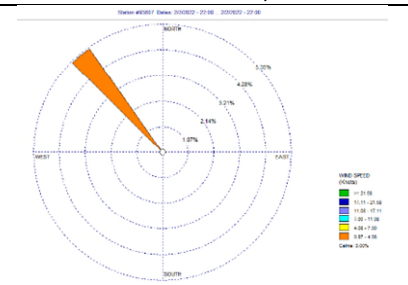
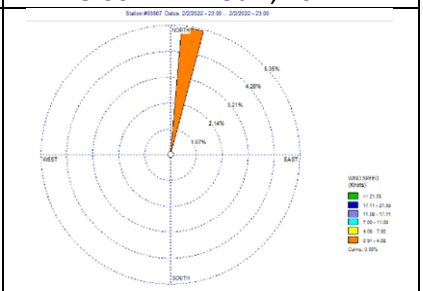
DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 2/2/2022 - 00:00** **End Date: 2/2/2022 - 23:00**	COMPANY NAME: **Blue Ridge Environmental Defense League, inc.**	
		MODELER: **meb**	
	CALM WINDS: **0.00%**	TOTAL COUNT: **24 hrs.**	
	AVG. WIND SPEED: **2.99 Knots**	DATE: **3/15/2022**	PROJECT NO.: **Weaver Fertilizer Fire**

WRPLOT View - Lakes Environmental Software

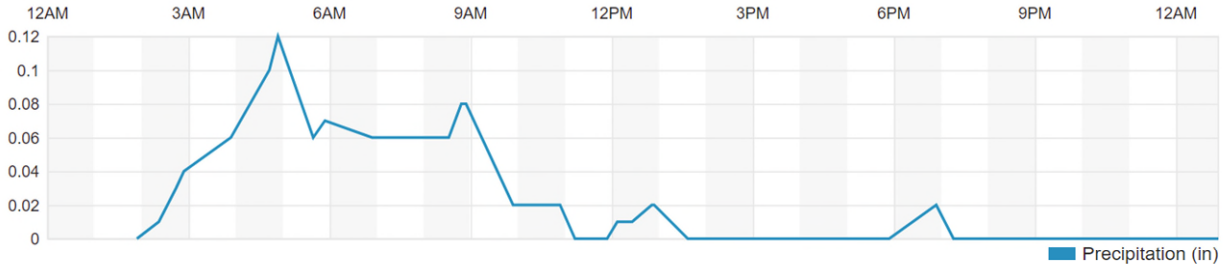
		
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3:00 AM – Feb 2, 2022	4:00 AM – Feb 2, 2022	5:00 AM – Feb 2, 2022
		
6:00 AM – Feb 2, 2022	7:00 AM – Feb 2, 2022	8:00 AM – Feb 2, 2022
		
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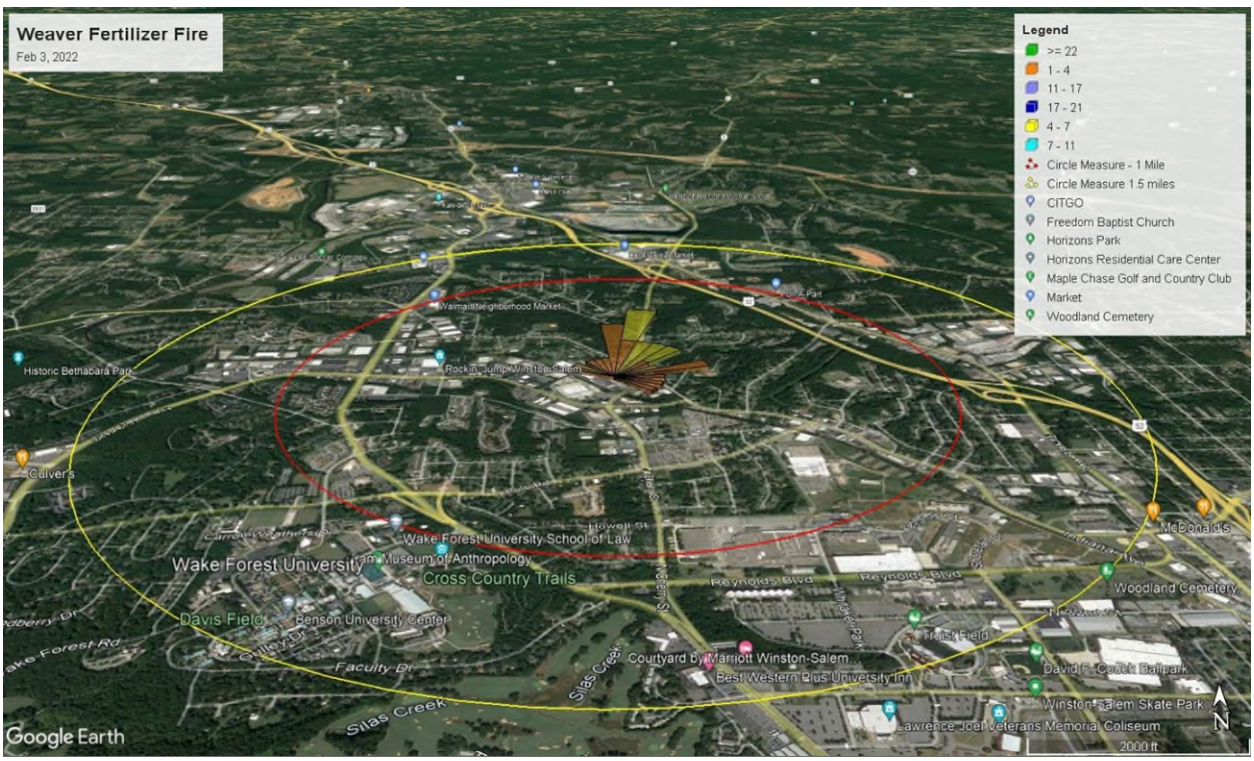
		
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6:00 PM – Feb 2, 2022	7:00 PM – Feb 2, 2022	8:00 PM – Feb 2, 2022
		
9:00 PM – Feb 2, 2022	10:00 PM – Feb 2, 2022	11:00 PM – Feb 2, 2022

Thursday, February 3, 2022

Winds coming mostly from the north on Feb. 3. The North Hills Elementary School temporary monitor showing high PM 2.5 levels from 6 PM – 6 AM, Feb. 4.

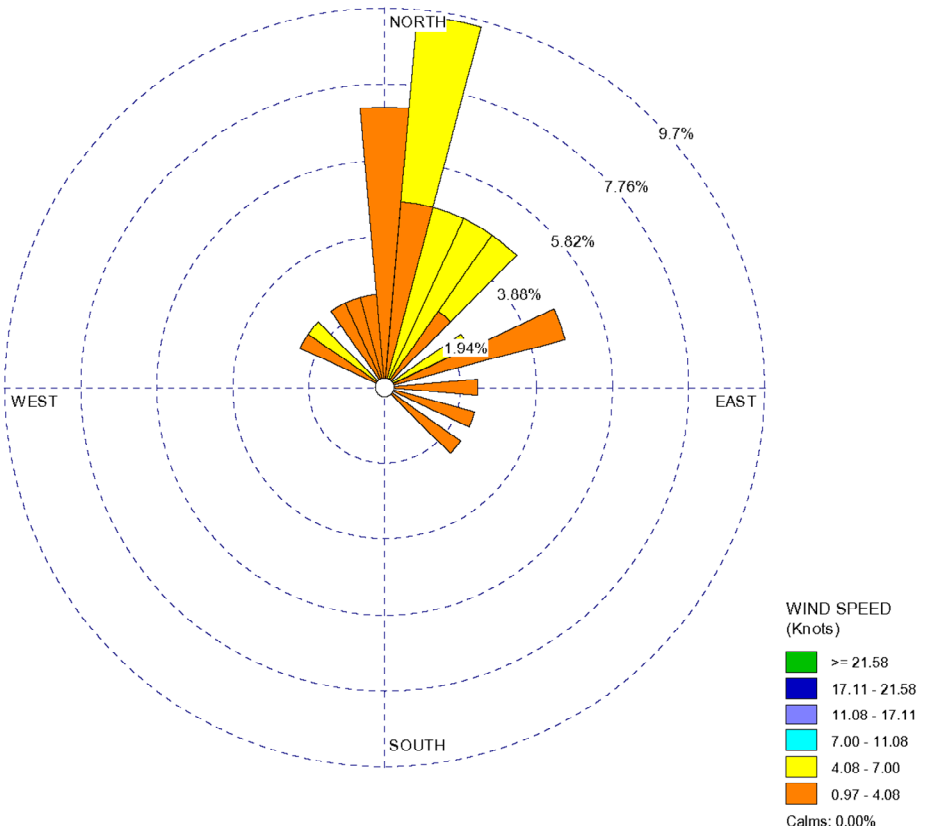
Precipitation was reported for some hours on Feb. 3. Below is the precipitation via Weather Underground.





WIND ROSE PLOT:
Station #93807 - Smith Reynolds Airport, NC

DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 2/3/2022 - 00:00 **End Date: 2/3/2022 - 23:00**	**Blue Ridge Environmental Defense League, inc.**	
		MODELER: **meb**	BREDL
	CALM WINDS: **0.00%**	TOTAL COUNT: **24 hrs.**	
	AVG. WIND SPEED: **3.38 Knots**	DATE: **3/15/2022**	PROJECT NO.: **Weaver Fertilizer Fire**

WRPLOT View - Lakes Environmental Software

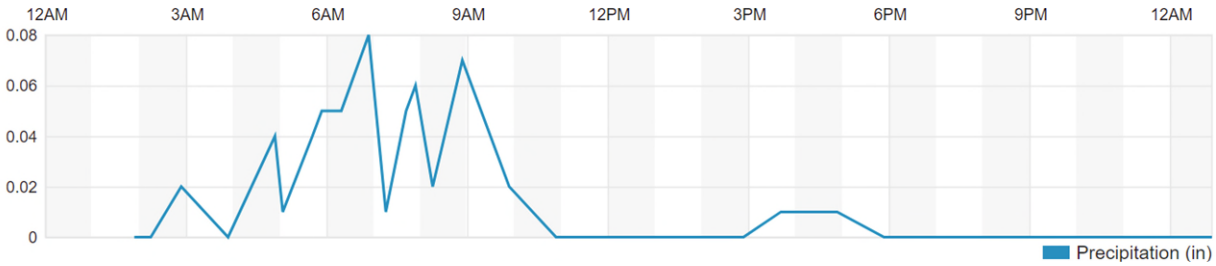
Friday, February 4, 2022

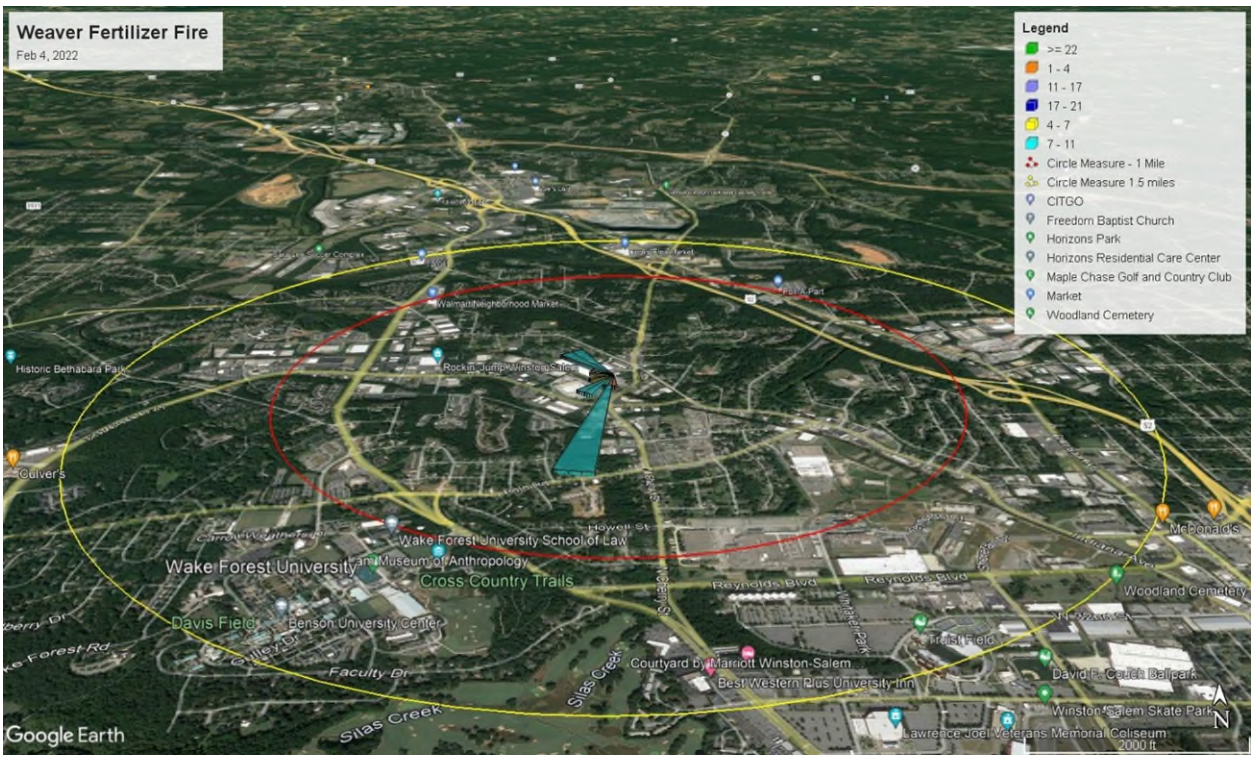
Winds shifted to come out of the west on Feb. 4. The North Hills Elementary School temporary monitor showing high PM 2.5 levels from 6 PM – 6 AM, Feb. 4.

Precipitation was reported for some hours on Feb. 4. Below is the precipitation via Weather Underground.



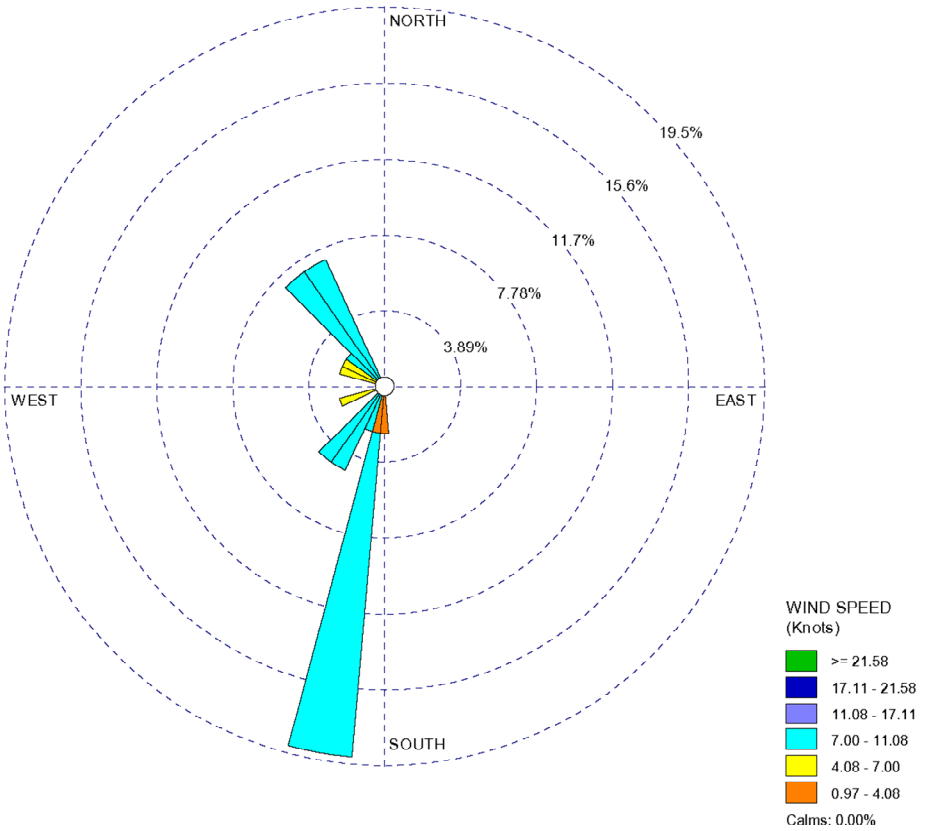
Still from Winston-Salem Fire Dept. Feb. 4, 2022 mitigation efforts video.
Source: City of Winston-Salem





WIND ROSE PLOT:
Station #93807 - Smith Reynolds Airport, NC

DISPLAY:
Wind Speed
Direction (blowing from)



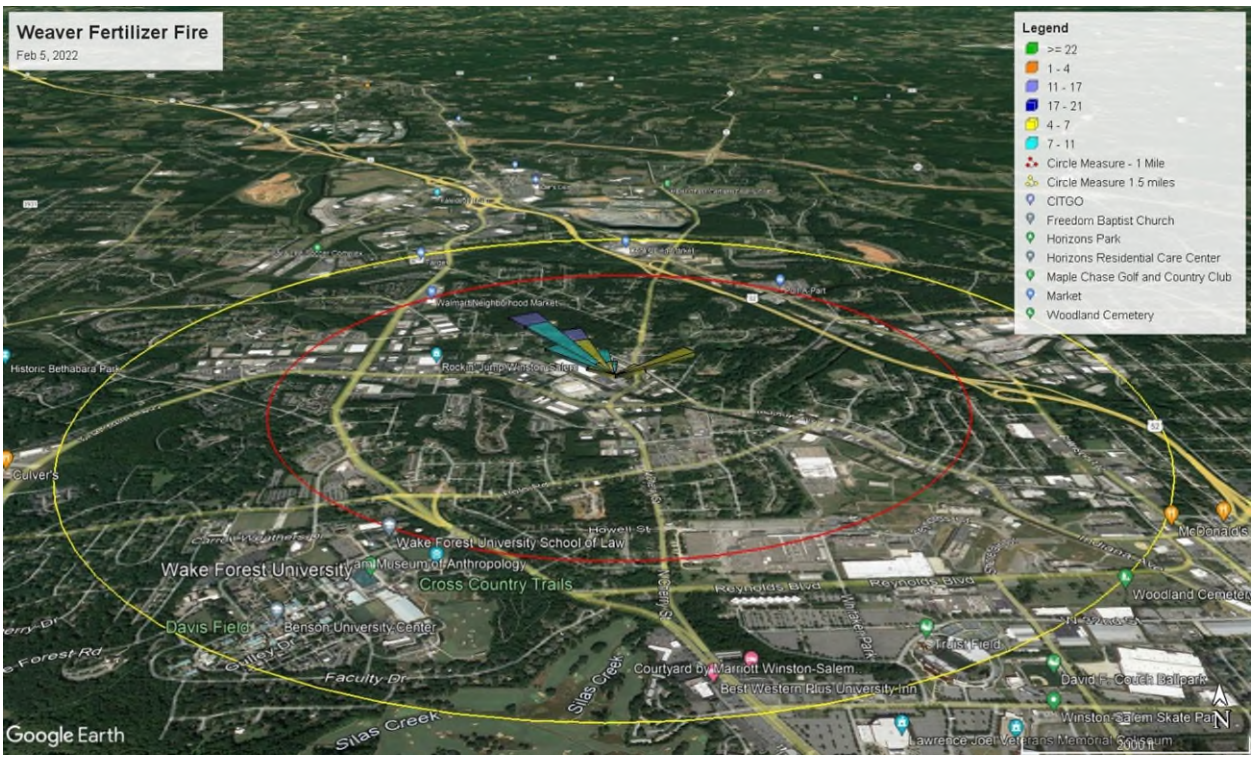
COMMENTS:	DATA PERIOD: **Start Date: 2/4/2022 - 00:00** **End Date: 2/4/2022 - 23:00**	COMPANY NAME: **Blue Ridge Environmental Defense League, inc.**	
		MODELER: **meb**	BREDL
	CALM WINDS: **0.00%**	TOTAL COUNT: **24 hrs.**	
	AVG. WIND SPEED: **8.01 Knots**	DATE: **3/15/2022**	PROJECT NO.: **Weaver Fertilizer Fire**

WRPLOT View - Lakes Environmental Software

Saturday, February 5, 2022

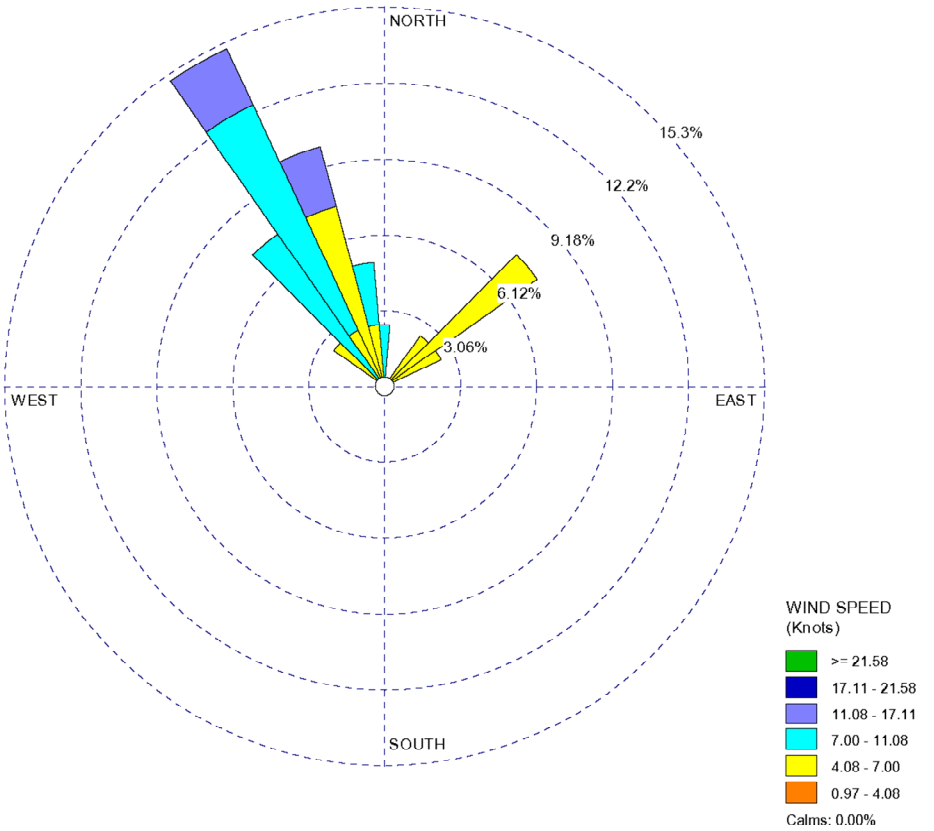
Now, winds mostly coming from the northwest on Feb.5

No precipitation was reported on Feb. 5.



WIND ROSE PLOT:
Station #93807 - Smith Reynolds Airport, NC

DISPLAY:
Wind Speed
Direction (blowing from)



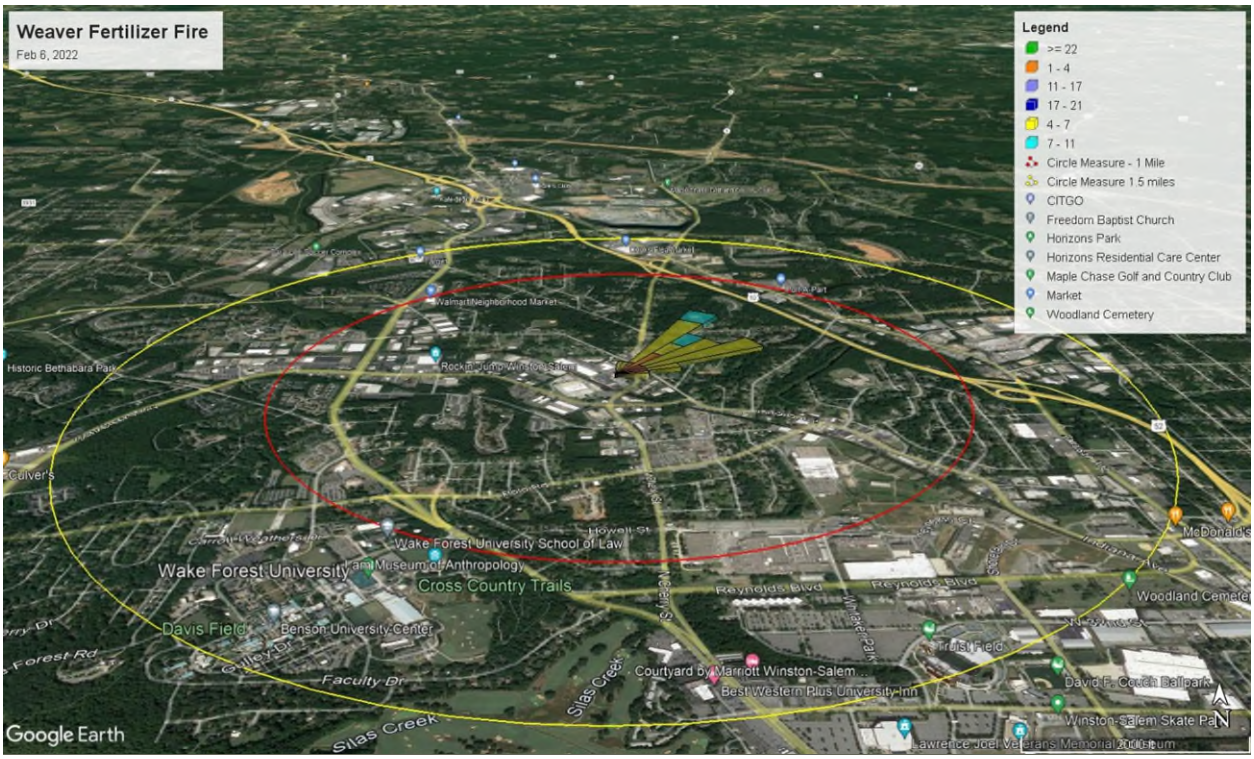
COMMENTS:	DATA PERIOD: **Start Date: 2/5/2022 - 01:00** **End Date: 2/5/2022 - 22:00**	COMPANY NAME: **Blue Ridge Environmental Defense League, inc.**	
		MODELER: **meb**	BREDL
	CALM WINDS: **0.00%**	TOTAL COUNT: **22 hrs.**	
	AVG. WIND SPEED: **7.39 Knots**	DATE: **3/15/2022**	PROJECT NO.: **Weaver Fertilizer Fire**

WRPLOT View - Lakes Environmental Software

Sunday, February 6, 2022

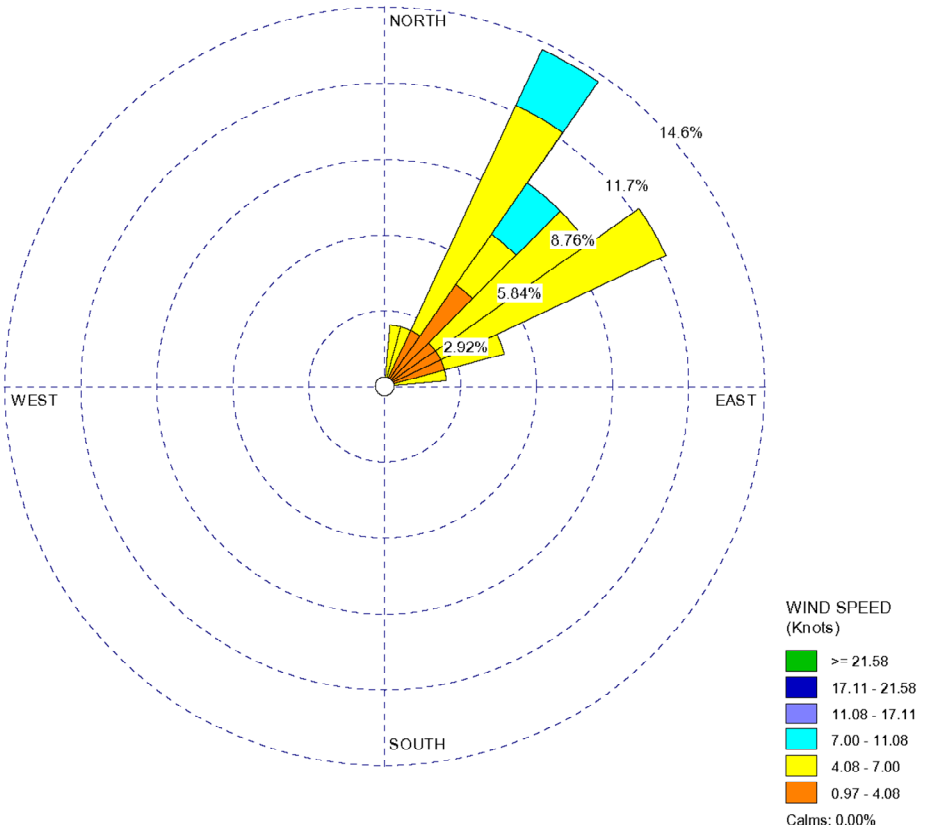
Winds have shifted back from the northeast on Feb.6

No precipitation was reported on Feb. 6.



WIND ROSE PLOT:
Station #93807 - Smith Reynolds Airport, NC

DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 2/6/2022 - 00:00** **End Date: 2/6/2022 - 23:00**	COMPANY NAME: **Blue Ridge Environmental Defense League, inc.**	
		MODELER: **meb**	BREDL
	CALM WINDS: **0.00%**	TOTAL COUNT: **24 hrs.**	
	AVG. WIND SPEED: **4.61 Knots**	DATE: **3/15/2022**	PROJECT NO.: **Weaver Fertilizer Fire**

WRPLOT View - Lakes Environmental Software

Appendix 2

Hourly concentrations calculated from EPA FOIA Data for EPA temporary, remote monitors set up around the perimeter of the Weaver Fertilizer fire.

Monitor: Wake Forest Police Station
Pollutant: PM 2.5
Unit: ug/m^3
Date: 2/2/2022

Date	Hour	Begin	End	1-Hr Ave. Concentration	No. of Readings	Low Concentration	High Concentration
2/2/2022	6 AM	6 AM	6:59 AM	865.0	1481	47	3160
2/2/2022	7 AM	7 AM	7:59 AM	1061.9	1480	29	3280
2/2/2022	8 AM	8 AM	8:59 AM	829.7	1481	29	3340
2/2/2022	9 AM	9 AM	9:59 AM	396.7	1475	35	1320
2/2/2022	10 AM	10 AM	10:22 AM	502.9	554	376	689
2/2/2022	2 PM	2:55 PM	2:59 PM	35.3	107	33	42
2/2/2022	3 PM	3 PM	3:02 PM	36.0	64	33	42
2/2/2022	4 PM	4:04 PM	4:59 PM	89.3	1328	26	189
2/2/2022	5 PM	5 PM	5:59 PM	74.0	1437	26	170
2/2/2022	6 PM	6 PM	6:59 PM	53.5	1454	26	67
2/2/2022	7 PM	7 PM	7:59 PM	48.6	1447	26	68
2/2/2022	8 PM	8 PM	8:59 PM	47.0	1440	26	66
2/2/2022	9 PM	9 PM	9:59 PM	46.6	1447	26	60
2/2/2022	10 PM	10 PM	10:59 PM	68.0	1441	26	290
2/2/2022	11 PM	11 PM	11:59 PM	68.1	1441	26	238

i = incomplete, Readings not collected for full hour for these hours: 10 AM, 2 PM, 3 PM.

- No data collected for these hours: 11 AM, 12 PM, 1 PM.

Monitor: Wake Forest Police Station
Pollutant: PM 2.5
Unit: ug/m^3
Date: 2/3/2022

Date	Hour	Begin	End	1-Hr Ave. Concentration	No. of Readings	Low Concentration	High Concentration
2/3/2022	12 AM	12 AM	12:59 AM	183.8	1448	26	852
2/3/2022	1 AM	1 AM	1:59 AM	118.5	1449	26	630
2/3/2022	2 AM	2 AM	2:59 AM	281.5	1452	26	816
2/3/2022	3 AM	3 AM	3:59 AM	262.1	1445	26	702
2/3/2022	4 AM	4 AM	4:59 AM	281.4	1451	26	579
2/3/2022	5 AM	5 AM	5:59 AM	193.9	1428	25	596
2/3/2022	6 AM	6 AM	6:59 AM	185.8	1450	22	503
2/3/2022	7 AM	7 AM	7:59 AM	288.9	1454	22	515
2/3/2022	8 AM	8 AM	8:59 AM	129.6	1450	19	436
2/3/2022	9 AM	9 AM	9:59 AM	30.3	1452	18	135
2/3/2022	10 AM	10 AM	10:59 AM	20.2	1467	17	54
2/3/2022	11 AM	11 AM	11:59 AM	18.3	1457	16	34
2/3/2022	12 PM	12 PM	12:59 PM	125.5	1453	15	359
2/3/2022	1 PM	1 PM	1:59 PM	109.1	1465	15	480
2/3/2022	2 PM	2 PM	2:59 PM	29.1	1470	15	58
2/3/2022	3 PM	3 PM	3:59 PM	24.3	1457	15	509
2/3/2022	4 PM	4 PM	4:59 PM	119.6	1464	15	283
2/3/2022	5 PM	5 PM	5:46 PM	73.9	1139	15	231
2/3/2022	6 PM	6 PM	6:59 PM	33.5	62	17	165
2/3/2022	7 PM	7 PM	7:59 PM	34.2	63	19	87
2/3/2022	8 PM	8 PM	8:59 PM	92.3	62	27	195
2/3/2022	9 PM	9 PM	9:59 PM	97.5	62	15	173
2/3/2022	10 PM	10 PM	10:59 PM	47.8	61	27	114
2/3/2022	11 PM	11 PM	11: 59 PM	27.2	64	24	36

i = incomplete, Readings not collected for full hour for these hours: 5 PM

- No data collected for these hours:

Monitor: Wake Forest Police Station
Pollutant: PM 2.5
Unit: ug/m^3
Date: 2/4/2022

Date	Hour	Begin	End	1-Hr Ave. Concentration	No. of Readings	Low Concentration	High Concentration
2/4/2022	12 AM	12 AM	12:59 AM	27.0	63	15	33
2/4/2022	1 AM	1 AM	1:59 AM	23.9	62	21	28
2/4/2022	2 AM	2 AM	2:59 AM	21.5	63	15	26
2/4/2022	3 AM	3 AM	3:59 AM	16.3	62	12	26
2/4/2022	4 AM	4 AM	4:59 AM	7.9	62	6	11
2/4/2022	5 AM	5 AM	5:59 AM	5.1	60	4	7
2/4/2022	6 AM	6 AM	6:59 AM	3.7	60	3	10
2/4/2022	7 AM	7 AM	7:59 AM	2.5	62	2	4
2/4/2022	8 AM	8 AM	8:59 AM	2.6	61	2	4
2/4/2022	9 AM	9 AM	9:59 AM	3.4	63	3	5
2/4/2022	10 AM	10 AM	10:59 AM	3.8	62	3	5
2/4/2022	11 AM	11 AM	11:59 AM	4.3	61	4	6
2/4/2022	12 PM	12 PM	12:59 PM	4.5	60	4	6
2/4/2022	1 PM	1 PM	1:59 PM	5.0	63	4	8
2/4/2022	2 PM	2 PM	2:59 PM	4.8	63	4	6
2/4/2022	3 PM	3 PM	3:59 PM	3.5	63	2	7
2/4/2022	4 PM	4 PM	4:59 PM	2.5	61	2	4
2/4/2022	5 PM	5 PM	5:59 PM	2.2	60	1	4
2/4/2022	6 PM	6 PM	6:59 PM	2.5	64	2	14
2/4/2022	7 PM	7 PM	7:59 PM	2.8	61	2	5
2/4/2022	8 PM	8 PM	8:59 PM	3.1	63	1	5
2/4/2022	9 PM	9 PM	9:59 PM	4.4	62	4	9
2/4/2022	10 PM	10 PM	10:59 PM	5.0	62	4	6
2/4/2022	11 PM	11 PM	11: 59 PM	5.6	63	5	6

i = incomplete, Readings not collected for full hour for these hours:

- No data collected for these hours:

Monitor: Wake Forest Police Station
Pollutant: PM 2.5
Unit: ug/m^3
Date: 2/5/2022

Date	Hour	Begin	End	1-Hr Ave. Concentration	No. of Readings	Low Concentration	High Concentration
2/5/2022	12 AM	12 AM	12:59 AM	6.4	61	6	9
2/5/2022	1 AM	1 AM	1:59 AM	7.5	62	7	20
2/5/2022	2 AM	2 AM	2:59 AM	8.0	63	7	9
2/5/2022	3 AM	3 AM	3:59 AM	8.2	60	8	9
2/5/2022	4 AM	4 AM	4:59 AM	8.0	61	8	9
2/5/2022	5 AM	5 AM	5:59 AM	9.4	61	1	11
2/5/2022	6 AM	6 AM	6:59 AM	11.4	60	11	12
2/5/2022	7 AM	7 AM	7:59 AM	12.4	61	11	14
2/5/2022	8 AM	8 AM	8:59 AM	13.2	62	13	14
2/5/2022	9 AM	9 AM	9:59 AM	13.1	60	12	14
2/5/2022	10 AM	10 AM	10:59 AM	13.2	62	1	18
2/5/2022	11 AM	11 AM	11:59 AM	12.8	60	12	28
2/5/2022	12 PM	12 PM	12:59 PM	10.9	60	1	13
2/5/2022	1 PM	1 PM	1:59 PM	9.7	65	9	12
2/5/2022	2 PM	2 PM	2:59 PM	9.7	61	9	13
2/5/2022	3 PM	3 PM	3:59 PM	9.8	62	9	13
2/5/2022	4 PM	4 PM	4:59 PM	10.2	62	9	12
2/5/2022	5 PM	5 PM	5:59 PM	13.4	60	11	19
2/5/2022	6 PM	6 PM	6:59 PM	16.7	62	1	26
2/5/2022	7 PM	7 PM	7:59 PM	18.3	60	1	23
2/5/2022	8 PM	8 PM	8:59 PM	18.1	63	1	25
2/5/2022	9 PM	9 PM	9:59 PM	20.8	62	18	23
2/5/2022	10 PM	10 PM	10:59 PM	20.2	61	1	24
2/5/2022	11 PM	11 PM	11: 59 PM	22.4	64	20	26

i = incomplete, Readings not collected for full hour for these hours:

- No data collected for these hours:

Monitor: Wake Forest Police Station
Pollutant: PM 2.5
Unit: ug/m^3
Date: 2/6/2022

Date	Hour	Begin	End	1-Hr Ave. Concentration	No. of Readings	Low Concentration	High Concentration
2/6/2022	12 AM	12 AM	12:59 AM	21.3	61	1	25
2/6/2022	1 AM	1 AM	1:59 AM	22.6	63	1	29
2/6/2022	2 AM	2 AM	2:59 AM	9.0	62	21	28
2/6/2022	3 AM	3 AM	3:59 AM	52.2	63	27	86
2/6/2022	4 AM	4 AM	4:59 AM	49.2	63	27	113
2/6/2022	5 AM	5 AM	5:59 AM	42.8	62	1	101

i = incomplete, Readings not collected for full hour for these hours:

- No data collected for these hours: No more Readings were taken after 5:59 AM.

Monitor: North Hills Elementary
Pollutant: PM 2.5
Unit: ug/m^3
Date: 2/2/2022

Date	Hour	Begin	End	1-Hr Ave. Concentration	No. of Readings	Low Concentration	High Concentration
2/2/2022	6 AM	6 AM	6:59 AM	31.8	61	30	34
2/2/2022	7 AM	7 AM	7:59 AM	31.6	63	30	33
2/2/2022	8 AM	8 AM	8:59 AM	30.5	61	27	34
2/2/2022	9 AM	9 AM	9:59 AM	26.5	61	25	31
2/2/2022	10 AM	10 AM	10:59 AM	24.7	61	24	29
2/2/2022	11 AM	11 AM	11:59 AM	28.7	63	24	54
2/2/2022	12 PM	12 PM	12:59 PM	26.1	61	24	30
2/2/2022	1 PM	1 PM	1:59 PM	29.8	60	28	33
2/2/2022	2 PM	2 PM	2:59 PM	64.6	61	29	164
2/2/2022	3 PM	3 PM	3:59 PM	49.2	62	39	65
2/2/2022	4 PM	4 PM	4:59 PM	41.6	61	37	50
2/2/2022	5 PM	5 PM	5:59 PM	38.0	61	32	44
2/2/2022	6 PM	6 PM	6:59 PM	32.4	65	30	35
2/2/2022	7 PM	7 PM	7:59 PM	31.2	64	29	34
2/2/2022	8 PM	8 PM	8:59 PM	40.3	61	35	46
2/2/2022	9 PM	9 PM	9:59 PM	41.3	60	23	46
2/2/2022	10 PM	10 PM	10:59 PM	39.2	63	35	45
2/2/2022	11 PM	11 PM	11: 59 PM	37.3	62	35	43

i = incomplete, Readings not collected for full hour for these hours:

- No data collected for these hours:

Monitor: North Hills Elementary
Pollutant: PM 2.5
Unit: ug/m^3
Date: 2/3/2022

Date	Hour	Begin	End	1-Hr Ave. Concentration	No. of Readings	Low Concentration	High Concentration
2/3/2022	12 AM	12 AM	12:59 AM	35.1	63	33	38
2/3/2022	1 AM	1 AM	1:59 AM	36.6	62	34	41
2/3/2022	2 AM	2 AM	2:59 AM	32.0	62	30	36
2/3/2022	3 AM	3 AM	3:59 AM	29.0	64	23	31
2/3/2022	4 AM	4 AM	4:59 AM	28.7	63	27	32
2/3/2022	5 AM	5 AM	5:59 AM	27.0	62	24	29
2/3/2022	6 AM	6 AM	6:59 AM	24.4	62	22	27
2/3/2022	7 AM	7 AM	7:59 AM	24.2	61	22	28
2/3/2022	8 AM	8 AM	8:59 AM	24.0	63	20	28
2/3/2022	9 AM	9 AM	9:59 AM	20.6	64	20	22
2/3/2022	10 AM	10 AM	10:59 AM	21.1	61	19	22
2/3/2022	11 AM	11 AM	11:59 AM	19.6	63	18	21
2/3/2022	12 PM	12 PM	12:59 PM	20.5	64	18	25
2/3/2022	1 PM	1 PM	1:59 PM	21.6	65	18	24
2/3/2022	2 PM	2 PM	2:59 PM	27.0	61	22	32
2/3/2022	3 PM	3 PM	3:59 PM	28.9	61	22	38
2/3/2022	4 PM	4 PM	4:59 PM	20.8	61	18	25
2/3/2022	5 PM	5 PM	5:59 PM	18.5	61	17	20
2/3/2022	6 PM	6 PM	6:59 PM	19.1	62	17	22
2/3/2022	7 PM	7 PM	7:59 PM	21.6	61	20	28
2/3/2022	8 PM	8 PM	8:59 PM	23.7	61	22	27
2/3/2022	9 PM	9 PM	9:59 PM	26.7	61	23	30
2/3/2022	10 PM	10 PM	10:59 PM	27.5	62	25	33
2/3/2022	11 PM	11 PM	11: 59 PM	258.0	62	28	1040

i = incomplete, Readings not collected for full hour for these hours:

- No data collected for these hours:

Monitor: North Hills Elementary
Pollutant: PM 2.5
Unit: ug/m^3
Date: 2/4/2022

Date	Hour	Begin	End	1-Hr Ave. Concentration	No. of Readings	Low Concentration	High Concentration
2/4/2022	12 AM	12 AM	12:59 AM	482.9	61	81	984
2/4/2022	1 AM	1 AM	1:59 AM	309.7	61	45	602
2/4/2022	2 AM	2 AM	2:59 AM	32.1	61	25	68
2/4/2022	3 AM	3 AM	3:59 AM	22.7	61	17	28
2/4/2022	4 AM	4 AM	4:59 AM	11.8	62	9	17
2/4/2022	5 AM	5 AM	5:59 AM	8.8	60	7	10
2/4/2022	6 AM	6 AM	6:59 AM	6.0	63	5	7
2/4/2022	7 AM	7 AM	7:59 AM	4.7	65	4	6
2/4/2022	8 AM	8 AM	8:33 AM	4.5	35	4	5
2/4/2022	2 PM	2:21 PM	2:59 PM	5.0	42	4	7
2/4/2022	3 PM	3 PM	3:59 PM	3.9	61	3	5
2/4/2022	4 PM	4 PM	4:59 PM	3.2	61	2	5
2/4/2022	5 PM	5 PM	5:59 PM	3.0	63	2	4
2/4/2022	6 PM	6 PM	6:59 PM	3.0	66	2	4
2/4/2022	7 PM	7 PM	7:59 PM	2.6	62	2	3
2/4/2022	8 PM	8 PM	8:59 PM	2.6	62	2	3
2/4/2022	9 PM	9 PM	9:59 PM	3.0	64	2	4
2/4/2022	10 PM	10 PM	10:59 PM	3.0	62	3	4
2/4/2022	11 PM	11 PM	11: 59 PM	3.0	63	3	5

i = incomplete, Readings not collected for full hour for these hours: 8 AM, 2 PM

- No data collected for these hours: 9 AM, 10 AM, 11 AM, 12 PM, 1 PM

Monitor: North Hills Elementary
Pollutant: PM 2.5
Unit: ug/m^3
Date: 2/5/2022

Date	Hour	Begin	End	1-Hr Ave. Concentration	No. of Readings	Low Concentration	High Concentration
2/5/2022	12 AM	12 AM	12:59 AM	3.3	61	3	4
2/5/2022	1 AM	1 AM	1:59 AM	3.4	63	3	4
2/5/2022	2 AM	2 AM	2:59 AM	3.8	61	3	4
2/5/2022	3 AM	3 AM	3:59 AM	3.2	64	3	4
2/5/2022	4 AM	4 AM	4:59 AM	3.0	62	3	3
2/5/2022	5 AM	5 AM	5:59 AM	3.6	62	3	5
2/5/2022	6 AM	6 AM	6:59 AM	5.0	62	0	6
2/5/2022	7 AM	7 AM	7:59 AM	5.7	61	5	6
2/5/2022	8 AM	8 AM	8:59 AM	5.8	61	5	6
2/5/2022	9 AM	9 AM	9:59 AM	5.9	60	5	6
2/5/2022	10 AM	10 AM	10:59 AM	6.5	62	6	7
2/5/2022	11 AM	11 AM	11:59 AM	6.4	61	6	7
2/5/2022	12 PM	12 PM	12:59 PM	6.0	61	6	7
2/5/2022	1 PM	1 PM	1:59 PM	6.7	62	6	7
2/5/2022	2 PM	2 PM	2:59 PM	7.1	60	7	8
2/5/2022	3 PM	3 PM	3:59 PM	7.3	62	7	8
2/5/2022	4 PM	4 PM	4:59 PM	6.8	62	6	8
2/5/2022	5 PM	5 PM	5:59 PM	6.9	61	6	8
2/5/2022	6 PM	6 PM	6:59 PM	7.3	63	7	9
2/5/2022	7 PM	7 PM	7:59 PM	7.3	60	7	8
2/5/2022	8 PM	8 PM	8:59 PM	8.1	63	7	9
2/5/2022	9 PM	9 PM	9:59 PM	10.2	62	9	12
2/5/2022	10 PM	10 PM	10:59 PM	8.9	60	8	10
2/5/2022	11 PM	11 PM	11: 59 PM	11.0	62	9	13

i = incomplete, Readings not collected for full hour for these hours:

- No data collected for these hours:

Monitor: North Hills Elementary
Pollutant: PM 2.5
Unit: ug/m^3
Date: 2/6/2022

Date	Hour	Begin	End	1-Hr Ave. Concentration	No. of Readings	Low Concentration	High Concentration
2/6/2022	12 AM	12 AM	12:59 AM	10.1	62	10	11
2/6/2022	1 AM	1 AM	1:59 AM	10.1	63	9	11
2/6/2022	2 AM	2 AM	2:59 AM	9.9	66	9	11
2/6/2022	3 AM	3 AM	3:59 AM	10.4	64	10	11
2/6/2022	4 AM	4 AM	4:59 AM	10.8	62	10	12
2/6/2022	5 AM	5 AM	5:59 AM	10.1	63	9	11

i = incomplete, Readings not collected for full hour for these hours:

- No data collected for these hours:

Monitor: Cooks Flea Market
Pollutant: PM 2.5
Unit: ug/m^3
Date: 2/2/2022

Date	Hour	Begin	End	1-Hr Ave. Concentration	No. of Readings	Low Concentration	High Concentration
2/2/2022	6 AM	6 AM	6:59 AM	36.6	61	32	41
2/2/2022	7 AM	7 AM	7:59 AM	35.8	62	33	39
2/2/2022	8 AM	8 AM	8:59 AM	30.5	63	25	39
2/2/2022	9 AM	9 AM	9:59 AM	26.8	62	25	32
2/2/2022	10 AM	10 AM	10:59 AM	24.9	64	22	29
2/2/2022	11 AM	11 AM	11:59 AM	23.3	63	21	34
2/2/2022	12 PM	12 PM	12:59 PM	21.7	62	19	25
2/2/2022	1 PM	1 PM	1:59 PM	29.5	63	23	85
2/2/2022	2 PM	2 PM	2:59 PM	45.9	64	29	93
2/2/2022	3 PM	3 PM	3:59 PM	56.2	60	42	83
2/2/2022	4 PM	4 PM	4:59 PM	47.7	65	45	53
2/2/2022	5 PM	5 PM	5:59 PM	42.6	62	36	50
2/2/2022	6 PM	6 PM	6:59 PM	43.3	60	36	62
2/2/2022	7 PM	7 PM	7:59 PM	41.6	63	33	50
2/2/2022	8 PM	8 PM	8:59 PM	44.8	64	36	53
2/2/2022	9 PM	9 PM	9:59 PM	45.1	64	36	54
2/2/2022	10 PM	10 PM	10:59 PM	42.5	63	37	49
2/2/2022	11 PM	11 PM	11: 59 PM	35.3	63	32	44

i = incomplete, Readings not collected for full hour for these hours:

- No data collected for these hours:

Monitor: Cooks Flea Market
Pollutant: PM 2.5
Unit: ug/m^3
Date: 2/3/2022

Date	Hour	Begin	End	1-Hr Ave. Concentration	No. of Readings	Low Concentration	High Concentration
2/3/2022	12 AM	12 AM	12:59 AM	35.4	62	32	39
2/3/2022	1 AM	1 AM	1:59 AM	37.5	62	35	40
2/3/2022	2 AM	2 AM	2:59 AM	36.4	60	33	39
2/3/2022	3 AM	3 AM	3:59 AM	32.8	65	29	38
2/3/2022	4 AM	4 AM	4:59 AM	33.4	64	28	39
2/3/2022	5 AM	5 AM	5:59 AM	28.4	59	26	30
2/3/2022	6 AM	6 AM	6:59 AM	25.7	61	24	27
2/3/2022	7 AM	7 AM	7:59 AM	26.9	64	24	31
2/3/2022	8 AM	8 AM	8:59 AM	24.6	67	20	30
2/3/2022	9 AM	9 AM	9:59 AM	20.6	63	19	22
2/3/2022	10 AM	10 AM	10:59 AM	20.5	62	17	26
2/3/2022	11 AM	11 AM	11:59 AM	16.6	64	14	20
2/3/2022	12 PM	12 PM	12:59 PM	19.0	62	16	46
2/3/2022	1 PM	1 PM	1:09 PM	21.4	10	20	24

i = incomplete, Readings not collected for full hour for these hours: 1 PM

- No data collected for these hours: Monitor relocated after 1:09 PM.

Monitor: Cherry Street Staging
Pollutant: PM 2.5
Unit: ug/m^3
Date: 2/4/2022

Date	Hour	Begin	End	1-Hr Ave. Concentration	No. of Readings	Low Concentration	High Concentration
2/4/2022	10 AM	10:12 AM	10:59 AM	237.9	46	4	983
2/4/2022	11 AM	11 AM	11:59 AM	262.8	57	3	916
2/4/2022	12 PM	12 PM	12:59 PM	333.5	62	16	1940
2/4/2022	1 PM	1 PM	1:59 PM	296.1	60	7	4370
2/4/2022	2 PM	2 PM	2:59 PM	279.1	56	8	1320
2/4/2022	3 PM	3 PM	3:59 PM	208.5	57	1	894
2/4/2022	4 PM	4 PM	4:59 PM	66.1	60	0	1340
2/4/2022	5 PM	5 PM	5:59 PM	1.0	53	1	1
2/4/2022	6 PM	6 PM	6:59 PM	1.0	48	1	1
2/4/2022	7 PM	7 PM	7:59 PM	1.0	64	1	1
2/4/2022	8 PM	8 PM	8:59 PM	1.0	61	1	1
2/4/2022	9 PM	9 PM	9:52 PM	0.9	32	0	1

i = incomplete, Readings not collected for full hour for these hours: 10 AM, 9 PM

- No data collected for these hours: No readings after 9:52 PM on 2/4/2022.

Monitor: Cherry Street Staging
Pollutant: PM 2.5
Unit: ug/m^3
Date: 2/5/2022

Date	Hour	Begin	End	1-Hr Ave. Concentration	No. of Readings	Low Concentration	High Concentration
2/5/2022	8 AM	8:29 AM	8:59 AM	2.3	32	0	7
2/5/2022	9 AM	9:10 AM	9:59 AM	5.0	45	4	8
2/5/2022	10 AM	10 AM	10:59 AM	5.9	47	4	18
2/5/2022	11 AM	11 AM	11:59 AM	7.6	55	4	49
2/5/2022	12 PM	12 PM	12:59 PM	5.7	60	4	32
2/5/2022	1 PM	1 PM	1:59 PM	20.2	48	5	247
2/5/2022	2 PM	2 PM	2:59 PM	5.8	57	5	11
2/5/2022	3 PM	3 PM	3:59 PM	11.7	56	5	75
2/5/2022	4 PM	4 PM	4:59 PM	39.0	59	6	456
2/5/2022	5 PM	5 PM	5:59 PM	7.4	46	5	34
2/5/2022	6 PM	6 PM	6:59 PM	9.4	53	7	19
2/5/2022	7 PM	7 PM	7:59 PM	8.6	41	8	10
2/5/2022	8 PM	8 PM	8:59 PM	12.2	23	9	15
2/5/2022	9 PM	9 PM	9:59 PM	12.2	42	10	15
2/5/2022	10 PM	10 PM	10:59 PM	13.0	49	12	14
2/5/2022	11 PM	11 PM	11: 59 PM	14.5	19	13	21

i = incomplete, Readings not collected for full hour for these hours: 8 AM, 9 AM

- No data collected for these hours: Readings started back up at 8:29 AM on 2/5/2022.

Monitor: Cherry Street Staging
Pollutant: PM 2.5
Unit: ug/m^3
Date: 2/6/2022

Date	Hour	Begin	End	1-Hr Ave. Concentration	No. of Readings	Low Concentration	High Concentration
2/6/2022	12 AM	12 AM	12:59 AM	5.2	63	1	16
2/6/2022	1 AM	1 AM	1:59 AM	1.0	46	1	1
2/6/2022	2 AM	2 AM	2:59 AM	1.0	48	1	1
2/6/2022	3 AM	3 AM	3:59 AM	1.0	39	1	1
2/6/2022	4 AM	4 AM	4:59 AM	1.0	50	1	1
2/6/2022	5 AM	5 AM	5:31 AM	1.0	27	1	1

i = incomplete, Readings not collected for full hour for these hours: 5 AM

- No data collected for these hours:

Monitor: Piney Grove Park
Pollutant: PM 2.5
Unit: ug/m^3
Date: 2/4/2022

Date	Hour	Begin	End	1-Hr Ave. Concentration	No. of Readings	Low Concentration	High Concentration
2/4/2022	6 PM	6 PM	6:59 PM	2.7	63	2	7
2/4/2022	7 PM	7 PM	7:59 PM	2.8	62	2	5
2/4/2022	8 PM	8 PM	8:59 PM	2.3	62	2	3
2/4/2022	9 PM	9 PM	9:59 PM	2.9	62	2	4
2/4/2022	10 PM	10 PM	10:59 PM	2.9	63	2	7
2/4/2022	11 PM	11 PM	11: 59 PM	3.0	62	2	4

i = incomplete, Readings not collected for full hour for these hours:

- No data collected for these hours:

Monitor: Piney Grove Park
Pollutant: PM 2.5
Unit: ug/m^3
Date: 2/5/2022

Date	Hour	Begin	End	1-Hr Ave. Concentration	No. of Readings	Low Concentration	High Concentration
2/5/2022	12 AM	12 AM	12:59 AM	2.9	61	2	4
2/5/2022	1 AM	1 AM	1:59 AM	3.2	64	3	4
2/5/2022	2 AM	2 AM	2:59 AM	3.9	64	3	5
2/5/2022	3 AM	3 AM	3:59 AM	3.5	64	3	5
2/5/2022	4 AM	4 AM	4:59 AM	3.3	64	3	4
2/5/2022	5 AM	5 AM	5:59 AM	4.9	59	4	7
2/5/2022	6 AM	6 AM	6:59 AM	6.9	61	6	8
2/5/2022	7 AM	7 AM	7:59 AM	7.6	63	7	12
2/5/2022	8 AM	8 AM	8:59 AM	8.1	64	7	9
2/5/2022	9 AM	9 AM	9:59 AM	7.5	62	6	8
2/5/2022	10 AM	10 AM	10:59 AM	6.7	63	6	7
2/5/2022	11 AM	11 AM	11:59 AM	6.5	63	6	11
2/5/2022	12 PM	12 PM	12:59 PM	6.3	64	6	7
2/5/2022	1 PM	1 PM	1:59 PM	6.8	61	6	8
2/5/2022	2 PM	2 PM	2:59 PM	7.1	63	7	8
2/5/2022	3 PM	3 PM	3:59 PM	7.3	63	7	8
2/5/2022	4 PM	4 PM	4:59 PM	7.7	63	7	10
2/5/2022	5 PM	5 PM	5:59 PM	7.9	61	7	10
2/5/2022	6 PM	6 PM	6:59 PM	9.0	62	8	10
2/5/2022	7 PM	7 PM	7:59 PM	10.4	63	9	13
2/5/2022	8 PM	8 PM	8:59 PM	11.5	62	10	15
2/5/2022	9 PM	9 PM	9:59 PM	12.6	61	11	14
2/5/2022	10 PM	10 PM	10:59 PM	15.8	61	14	18
2/5/2022	11 PM	11 PM	11: 59 PM	14.0	64	13	15

i = incomplete, Readings not collected for full hour for these hours:

- No data collected for these hours:

Monitor: Piney Grove Park
Pollutant: PM 2.5
Unit: ug/m^3
Date: 2/6/2022

Date	Hour	Begin	End	1-Hr Ave. Concentration	No. of Readings	Low Concentration	High Concentration
2/6/2022	12 AM	12 AM	12:59 AM	15.4	61	14	18
2/6/2022	1 AM	1 AM	1:59 AM	17.4	62	16	19
2/6/2022	2 AM	2 AM	2:59 AM	17.7	61	16	20
2/6/2022	3 AM	3 AM	3:59 AM	20.7	68	18	23
2/6/2022	4 AM	4 AM	4:59 AM	19.6	63	19	21
2/6/2022	5 AM	5 AM	5:59 AM	19.7	61	19	21

i = incomplete, Readings not collected for full hour for these hours:

- No data collected for these hours:

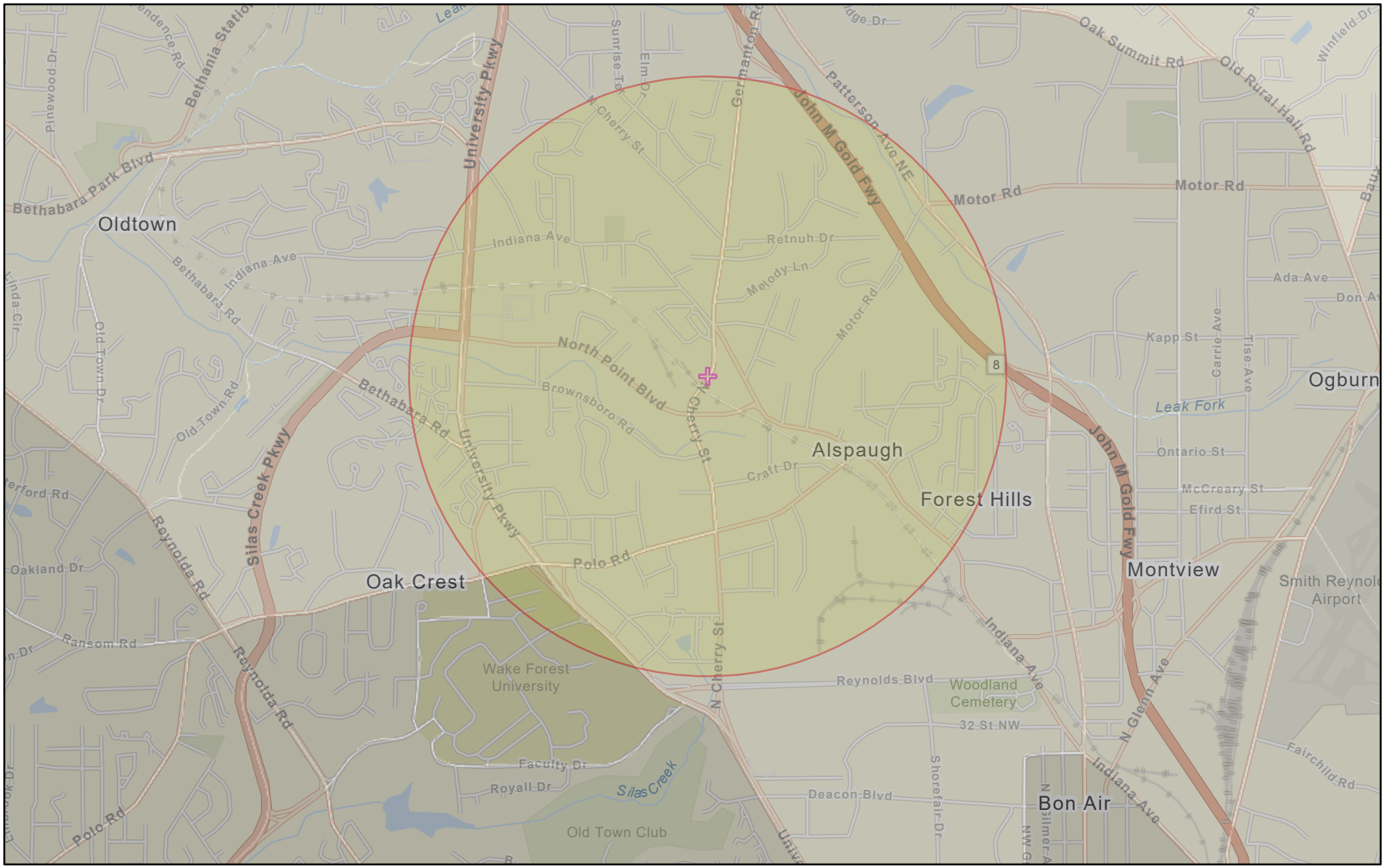
Appendix 3

EPA EJScreen 1-mile and 3-mile radius maps displaying the percentiles for PM 2.5 State, Asthma, Heart Disease and Low-Life Expectancy.

EPA explains the percentiles in EJ Screen as follows: "In EJScreen, if your results indicate that an area is 48% minority and is at the 69th national percentile, this means that 48% of the area's population is minority, and that is an equal or higher % minority than where 69% of the US population lives."

EPA EJScreen 1-mile and 3-mile radius maps displaying the schools within the area.

Weaver Fire - PM 2.5 - State Percentiles - 1-mile radius



5/12/2022

EJSCREEN_StatePct

- Data not available
- Less than 50 percentile
- 50 -60 percentile
- 60 -70 percentile
- 70 -80 percentile
- 80 - 90 percentile
- 90 - 95 percentile
- 95 - 100 percentile
- Weaver Fertilizer Plant

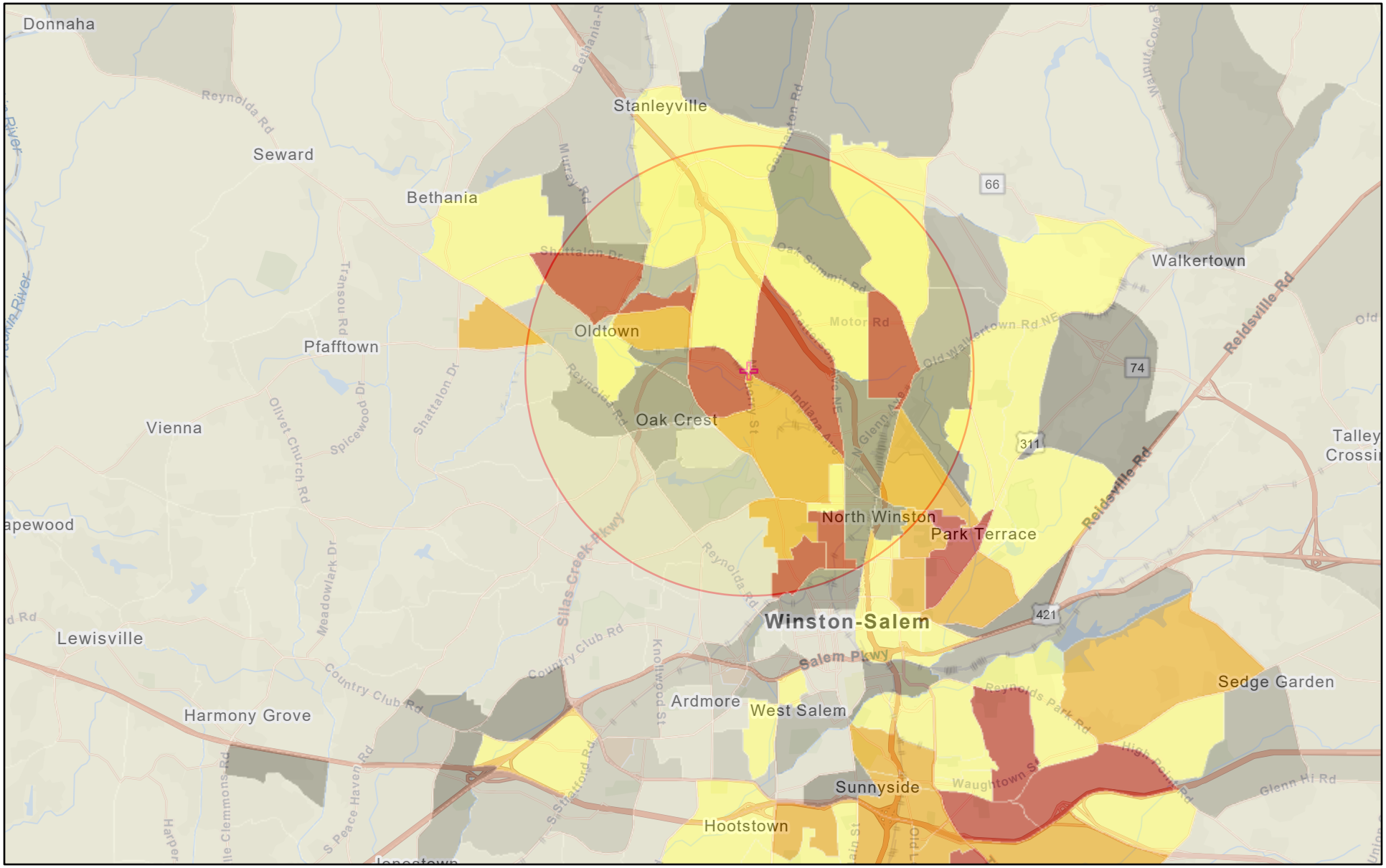
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0 0.25 0.5 1 mi

0 0.4 0.8 1.6 km

State of North Carolina DOT, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau,

Weaver Fire - PM 2.5 - State Percentiles - 3-mile radius



5/12/2022

EJSCREEN_StatePct

- Data not available
- Less than 50 percentile
- 50 -60 percentile
- 60 -70 percentile
- 70 -80 percentile
- 80 - 90 percentile
- 90 - 95 percentile
- 95 - 100 percentile
- Weaver Fertilizer Plant

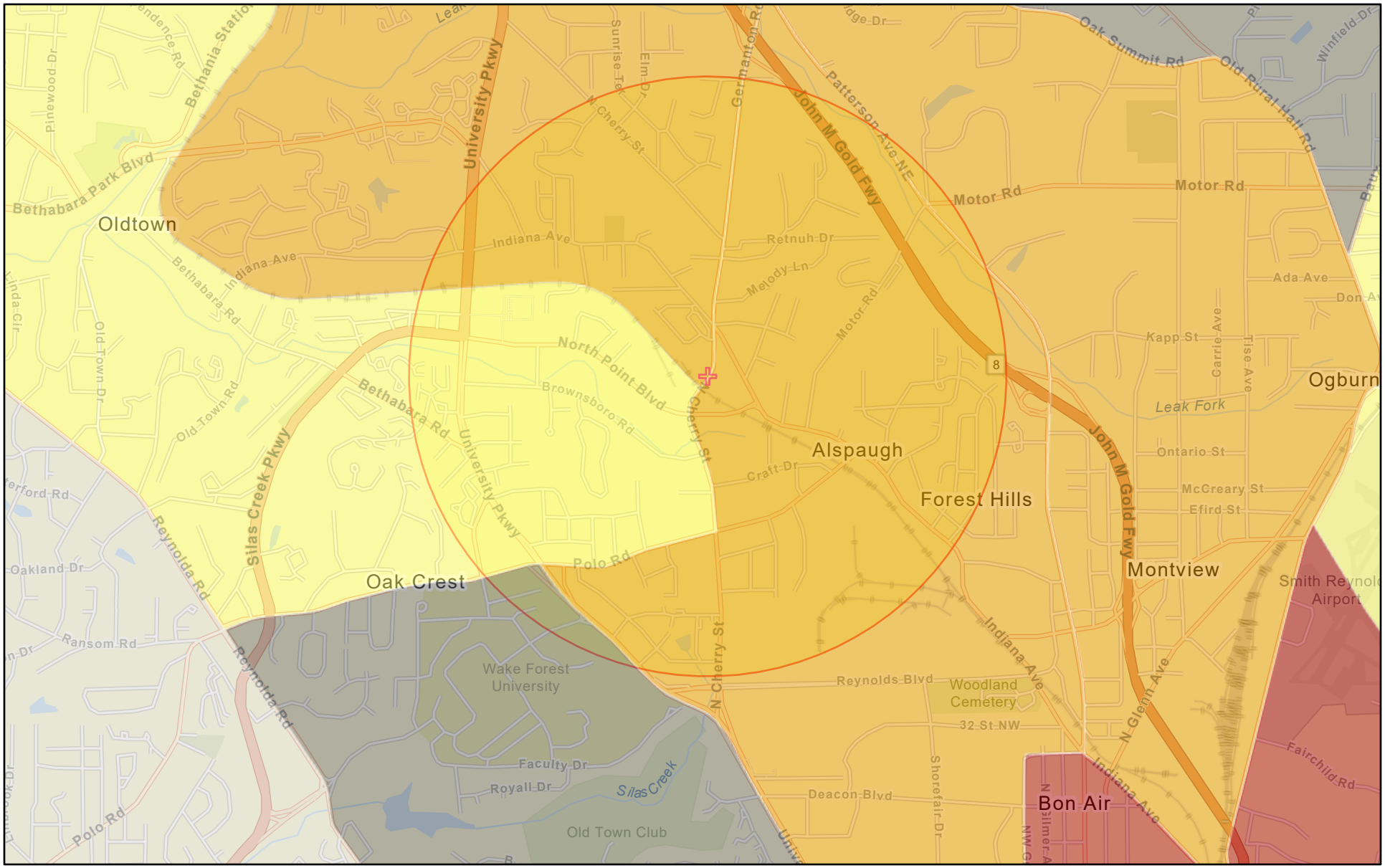
1:144,448

0 1 2 4 mi

0 1.5 3 6 km

State of North Carolina DOT, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA

Weaver Fire - Asthma - 1-mile radius



5/12/2022

Current Asthma

- Less than 50%ile
- 70-80%ile
- 80-90%ile
- 90-95%ile
- 95-100%ile
- Weaver Fertilizer Plant

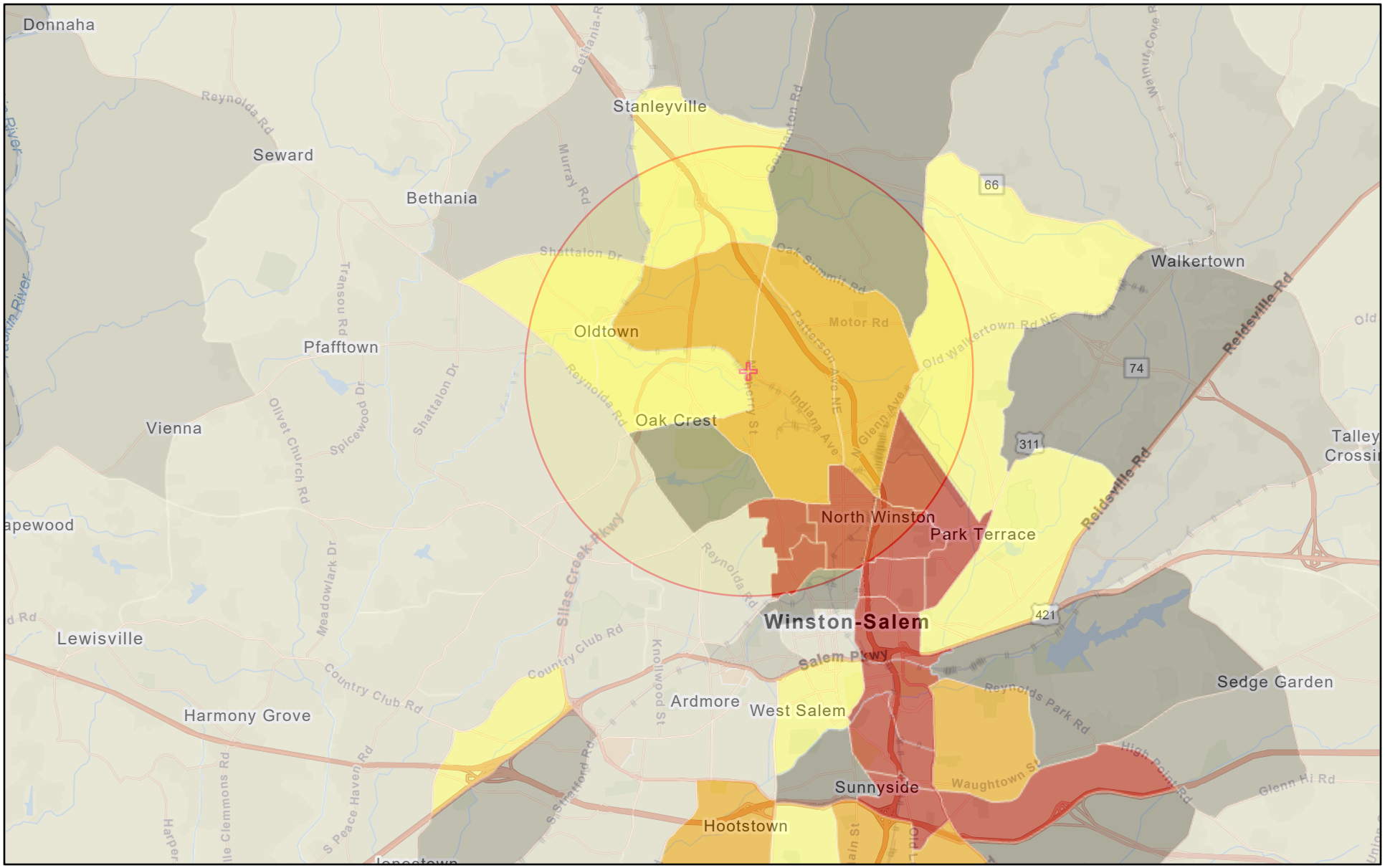
1:36,112

0 0.25 0.5 1 mi

0 0.4 0.8 1.6 km

State of North Carolina DOT, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau,

Weaver Fire - Asthma - 3-mile radius



5/12/2022

Current Asthma

- Less than 50%ile
- 50-60%ile
- 60-70%ile
- 70-80%ile
- 80-90%ile
- 90-95%ile
- 95-100%ile
- Weaver Fertilizer Plant

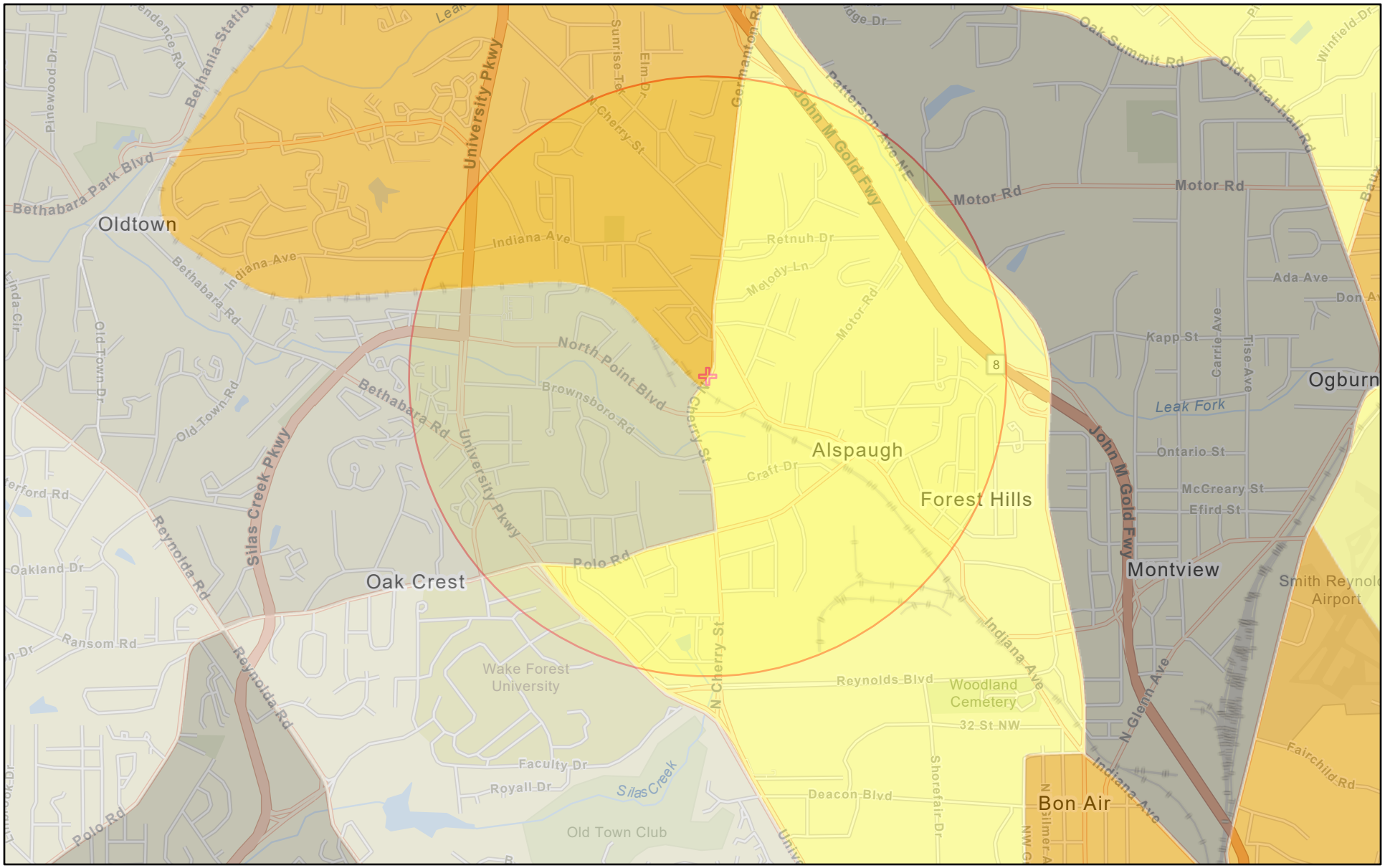
1:144,448

0 1 2 4 mi

0 1.5 3 6 km

State of North Carolina DOT, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA

Weaver Fire - Heart Disease - 1-mile radius



5/12/2022

Coronary Heart Disease

- Less than 50%ile
- 50-60%ile
- 60-70%ile
- 70-80%ile
- 80-90%ile
- 90-95%ile
- Weaver Fertilizer Plant

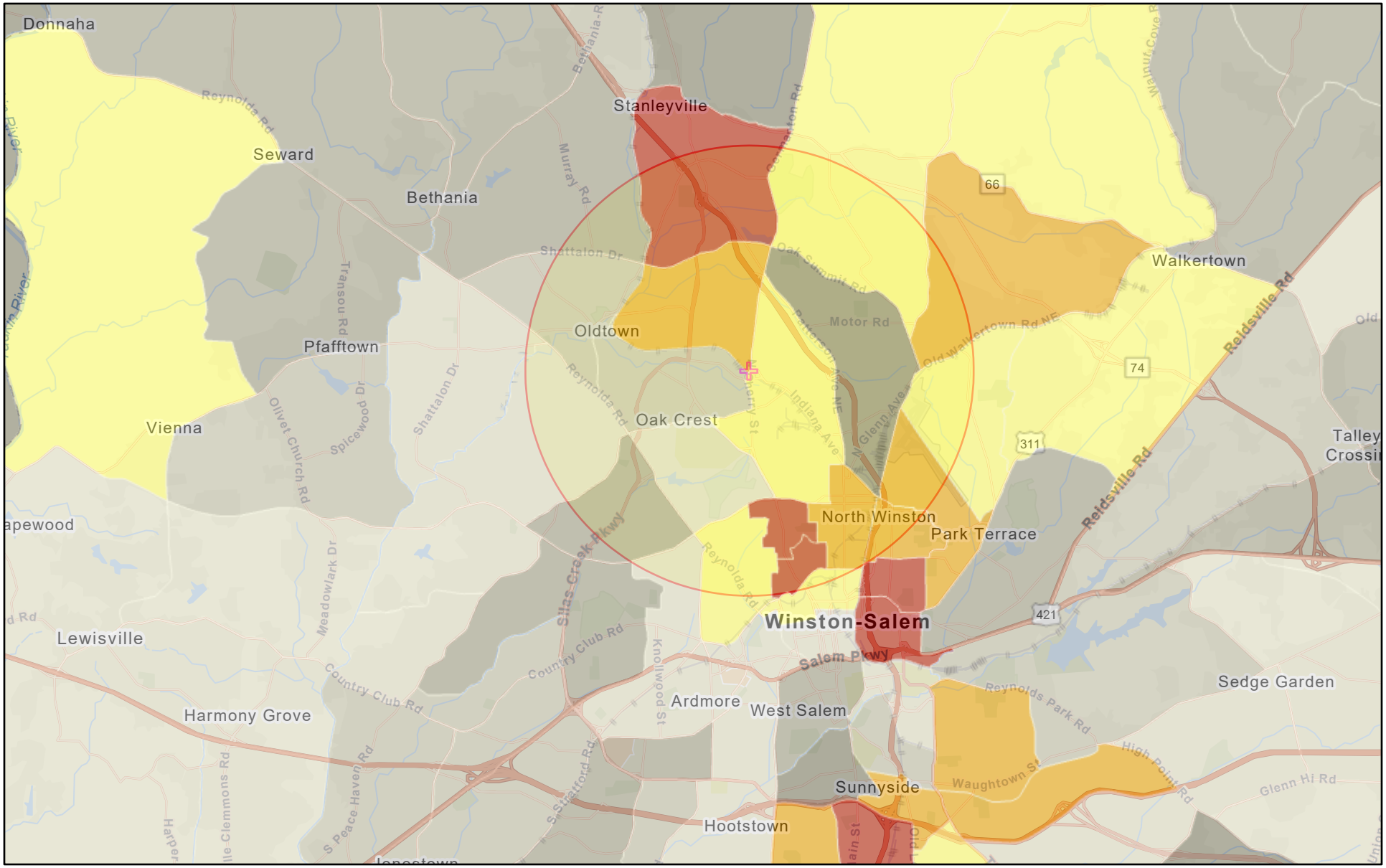
1:36,112

0 0.25 0.5 1 mi

0 0.4 0.8 1.6 km

State of North Carolina DOT, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau,

Weaver Fire - Heart Disease - 3-mile radius



5/12/2022

Coronary Heart Disease

- Less than 50%ile
- 50-60%ile
- 60-70%ile
- 70-80%ile
- 80-90%ile
- 90-95%ile
- 95-100%ile
- Weaver Fertilizer Plant

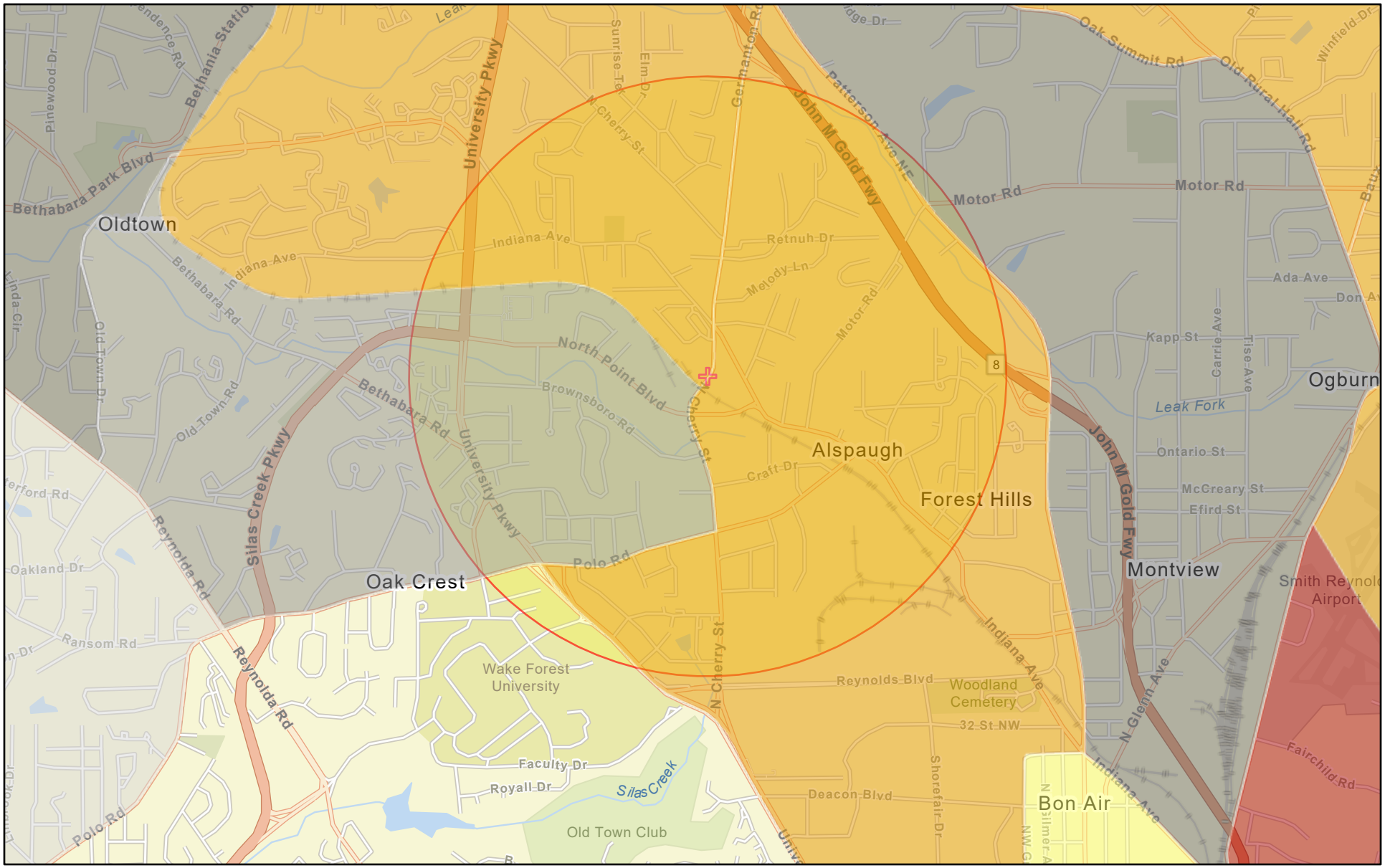
1:144,448

0 1 2 4 mi

0 1.5 3 6 km

State of North Carolina DOT, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA

Weaver Fire - Low Life Expectancy - 1-mile radius



5/12/2022

Low Life Expectancy

- Less than 50%ile
- 60-70%ile
- 70-80%ile
- 80-90%ile
- 90-95%ile
- 95-100%ile
- Weaver Fertilizer Plant

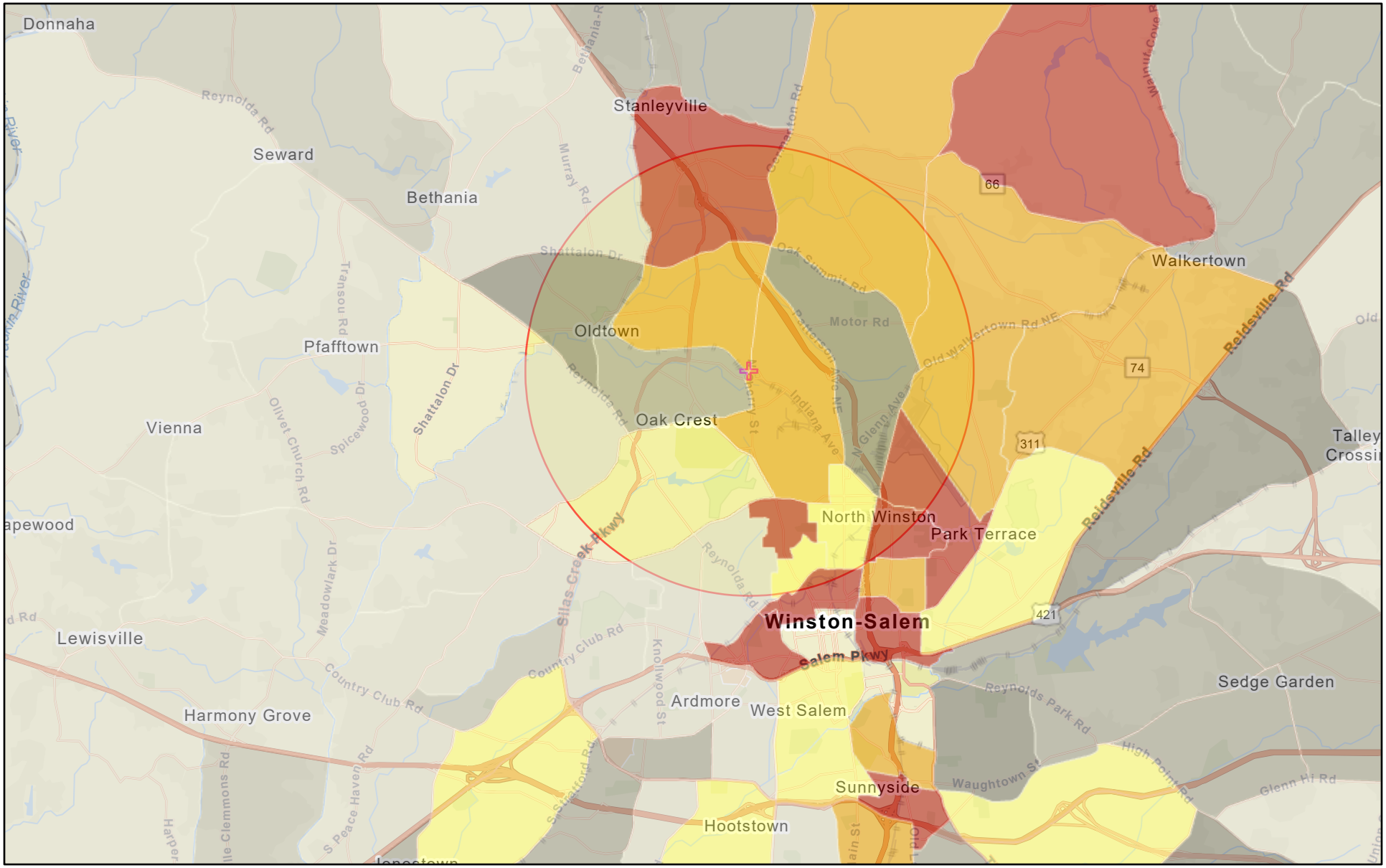
1:36,112

0 0.25 0.5 1 mi

0 0.4 0.8 1.6 km

State of North Carolina DOT, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau,

Weaver Fire - Low Life Expectancy- 3-mile radius



5/12/2022

Low Life Expectancy

- Less than 50%ile
- 50-60%ile
- 60-70%ile
- 70-80%ile
- 80-90%ile
- 90-95%ile
- 95-100%ile
- Weaver Fertilizer Plant

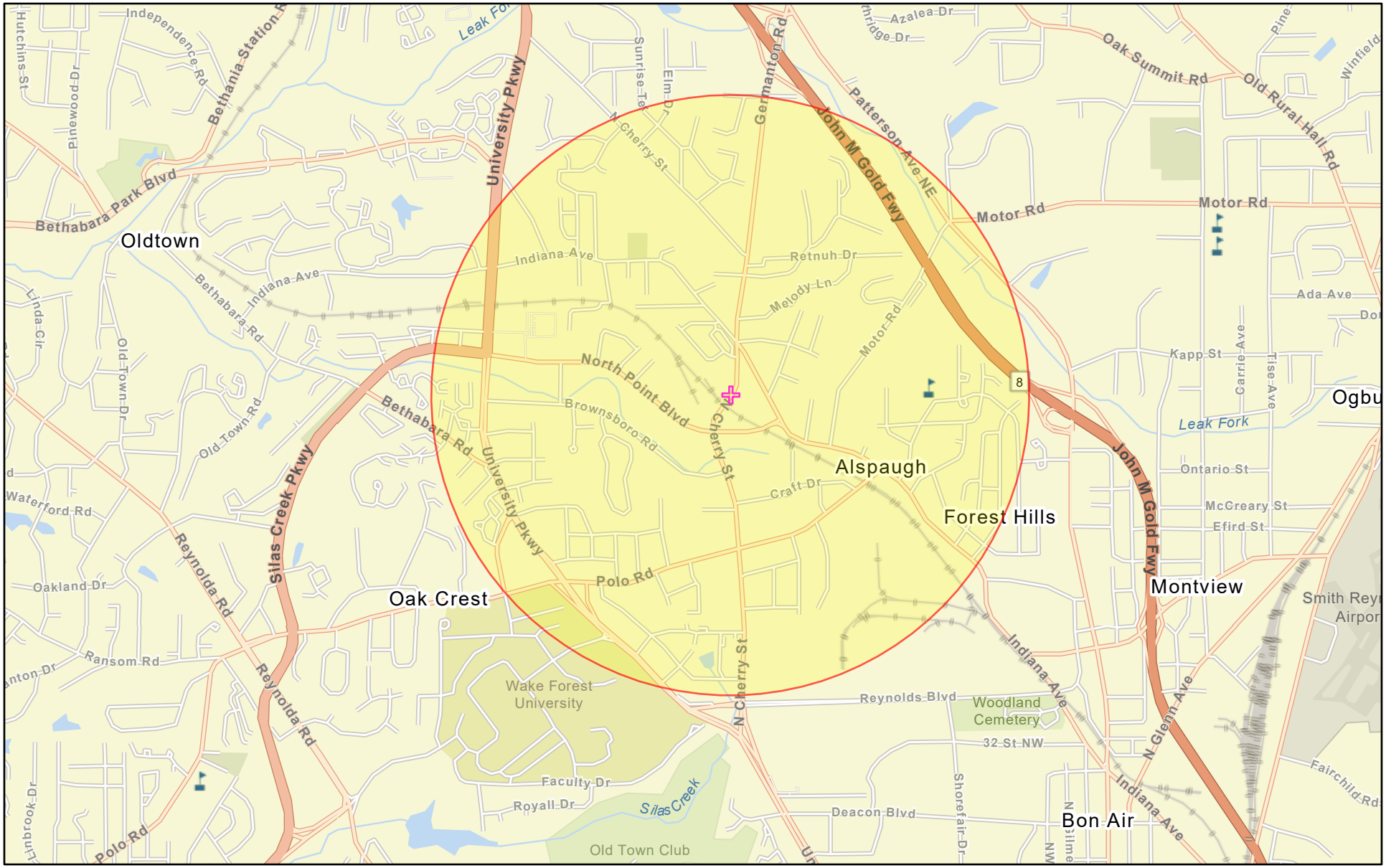
1:144,448

0 1 2 4 mi

0 1.5 3 6 km

State of North Carolina DOT, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA

Weaver Fire - Schools - 1mile radius



5/12/2022

- Schools
- Weaver Fertilizer Plant

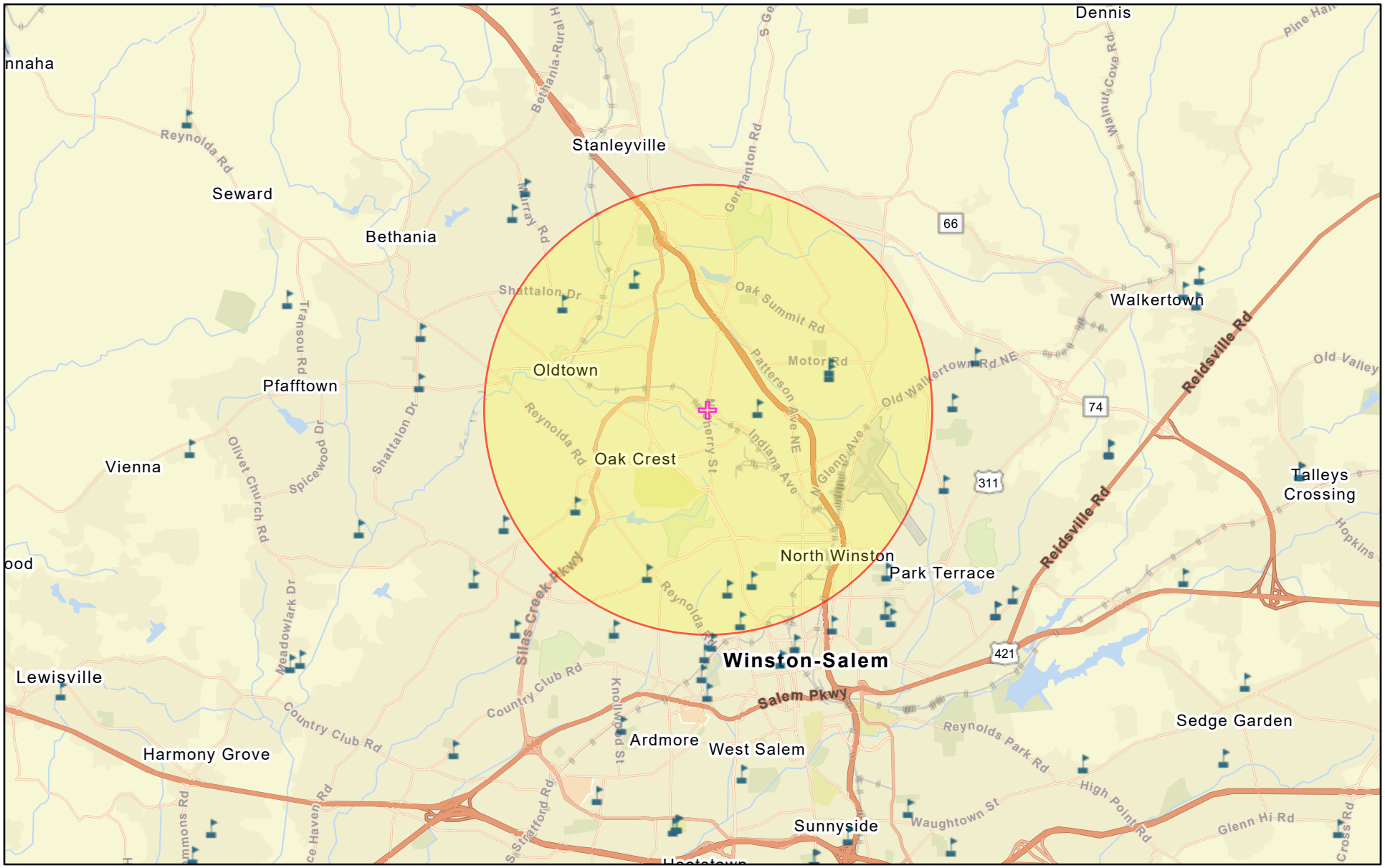
1:36,112

0 0.25 0.5 1 mi

0 0.4 0.8 1.6 km

State of North Carolina DOT, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau,

Weaver Fire - Schools 3-mile radius



5/12/2022

Schools

Weaver Fertilizer Plant

1:144,448

0 1 2 4 mi

0 1.5 3 6 km

State of North Carolina DOT, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA