

Air Quality Sensors

- Citizen science and low cost sensor technology rapidly progressing
- Goals of Wisconsin sensors
 - Gain familiarity when working with external stakeholders
 - Determine Quality Assurance practices to disseminate
 - Determine the suitability of using these sensors to communicate results with the public



Waukesha Study



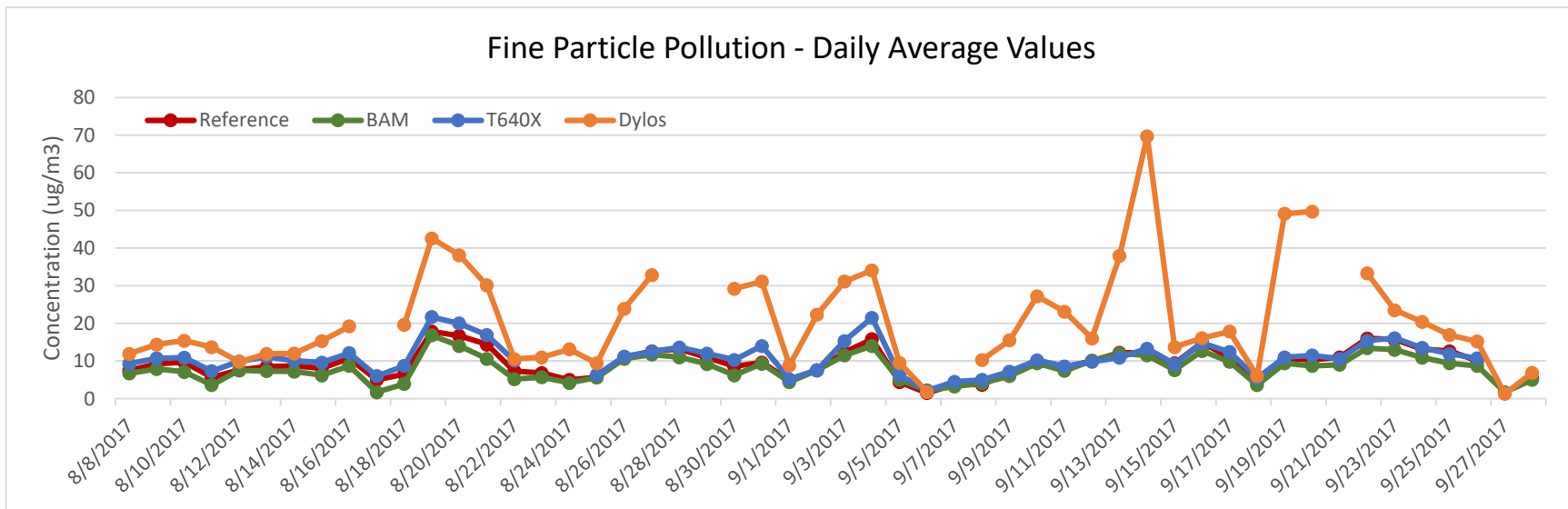
Instruments

- Dylos DC1100 (Dylos)
- Thermo 2025i (FRM)
- Met One 1020 (BAM)
- TAPI T640X (T640X)

Dates

- Aug. 8 – Sept. 29, 2017

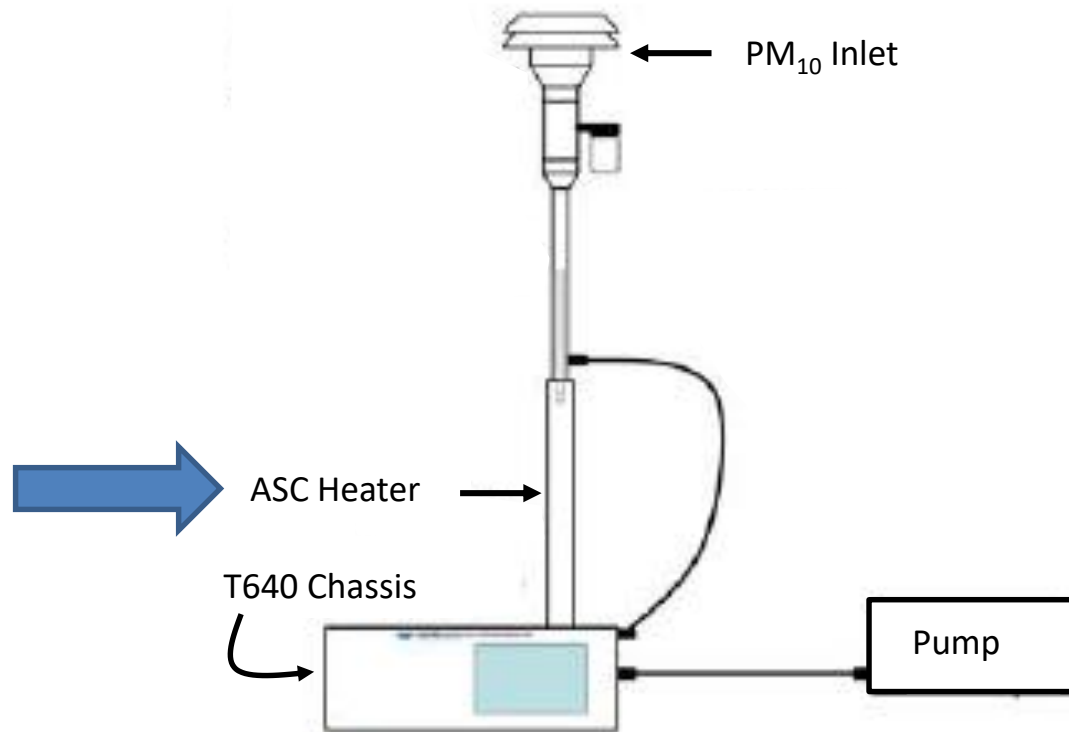
Dylos Study



Comparison	N	Test conc. ($\mu\text{g}/\text{m}^3$)	Ref conc. ($\mu\text{g}/\text{m}^3$)	N*	Avg bias* (%)
BAM-FRM	51	8.2	9.5	49	-13.2
T640X-FRM	48	10.9	9.7	47	14.1
Dylos-FRM	46	21.5	9.6	45	122.7

Managing Humidity

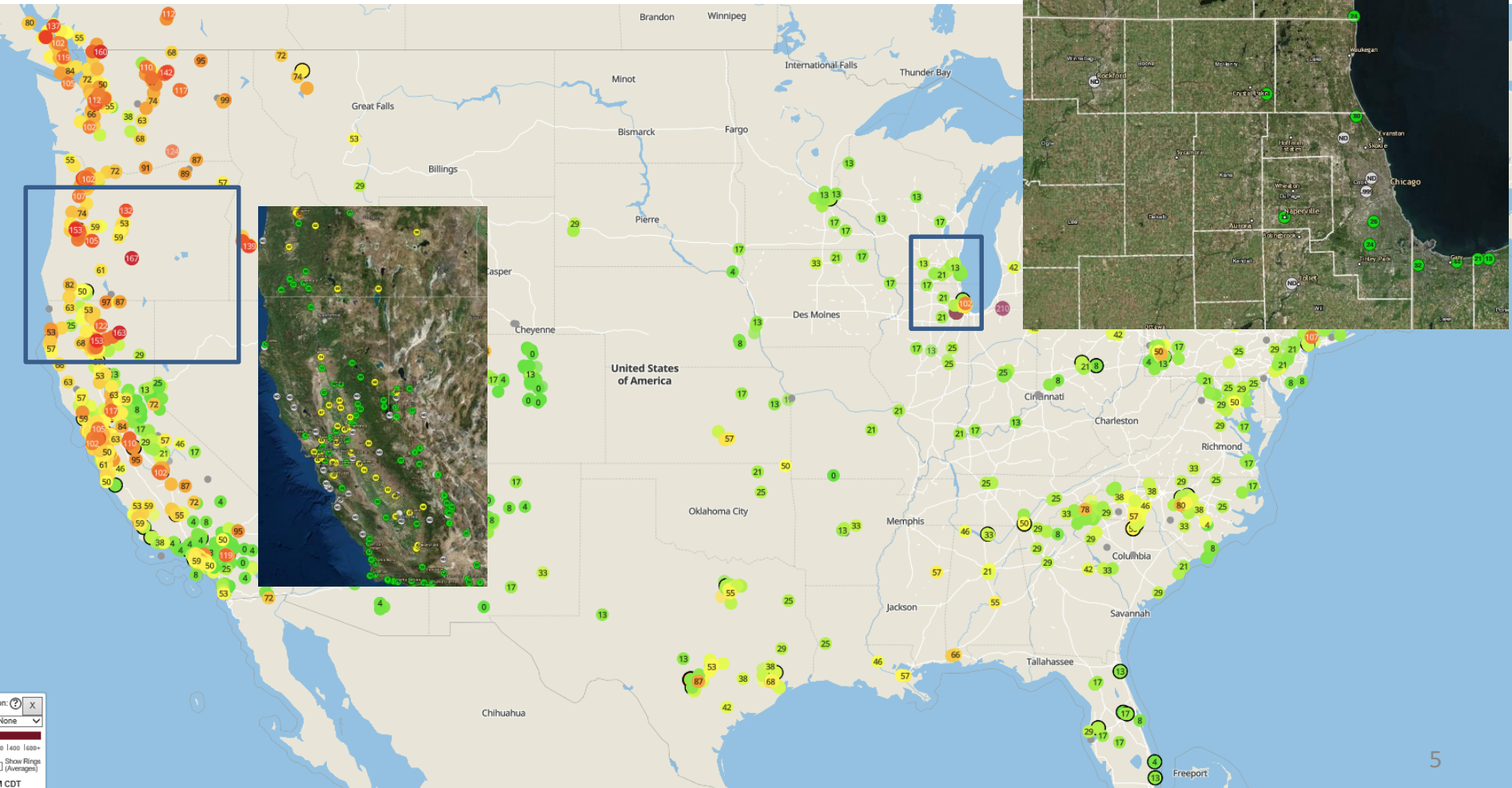
T640X



Dylos



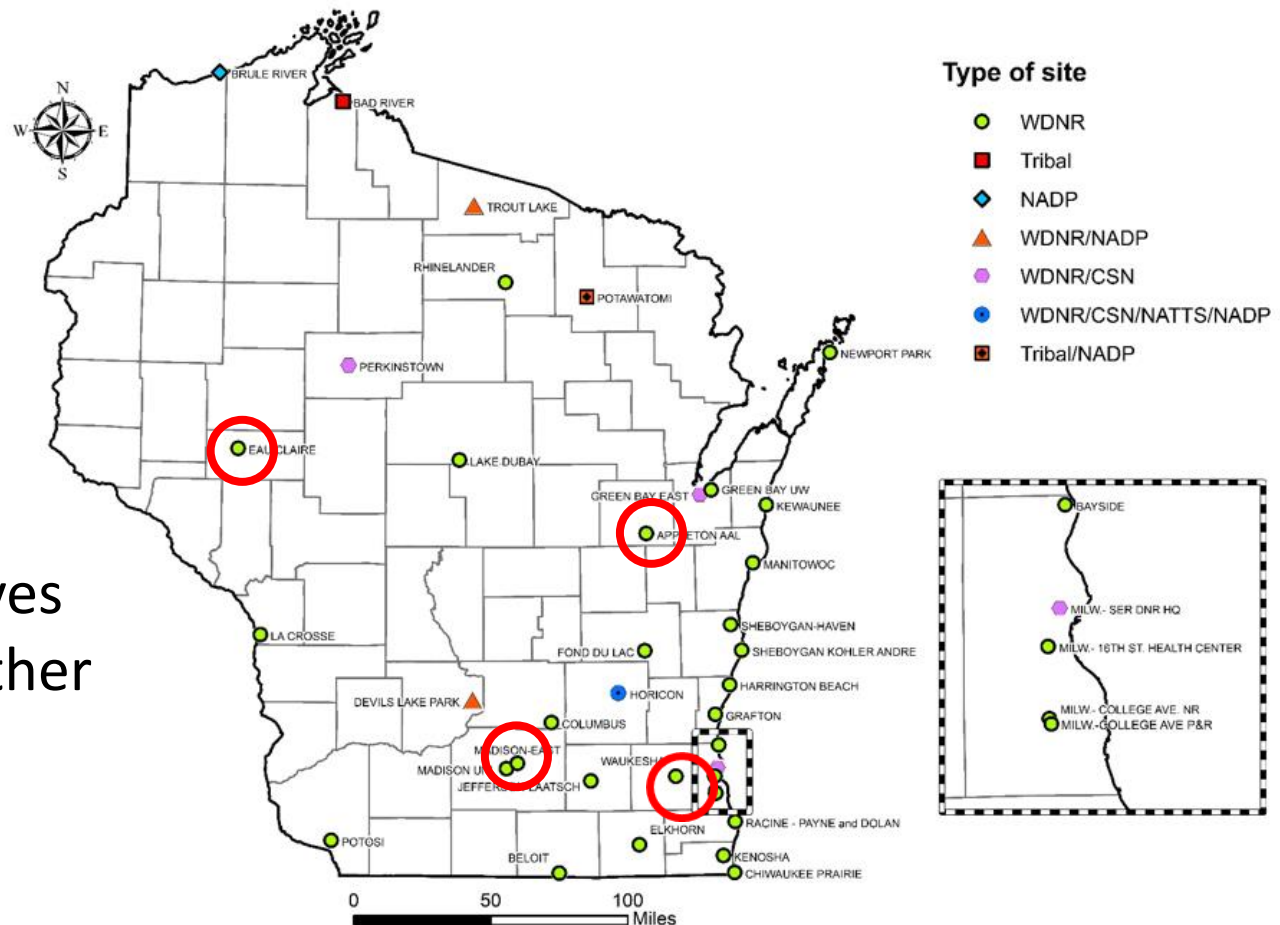
Purple Air vs. AQI



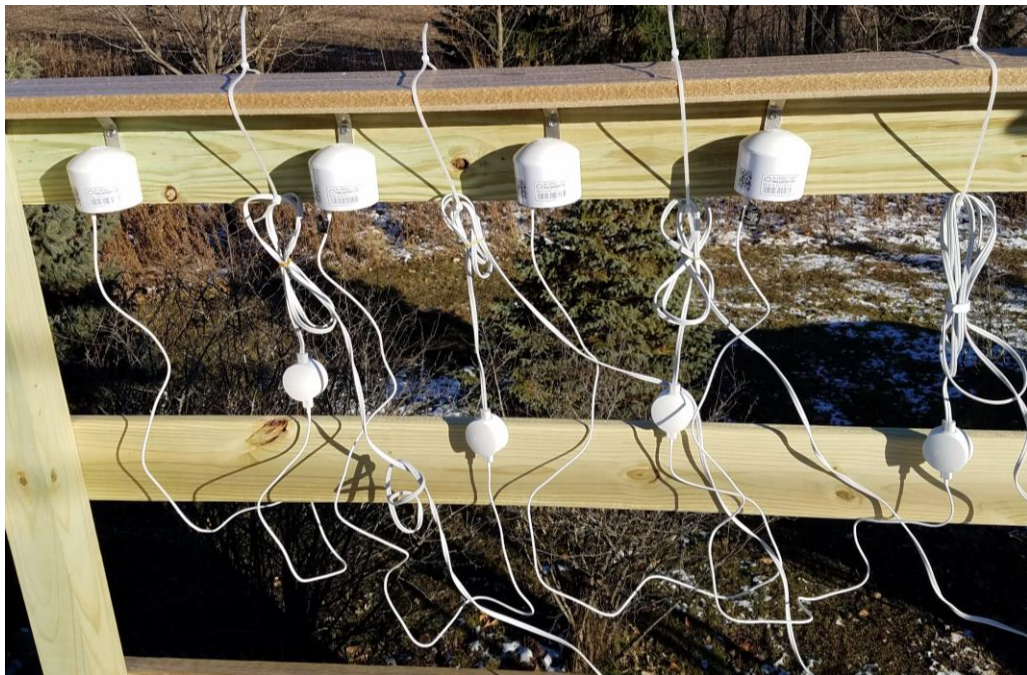
2019 Wisconsin DNR PurpleAir Project

Set up 5 sensors in locations currently running a T640:

- * Eau Claire
- * Appleton
- * Madison East
- * Waukesha
- * The 5th sensor moves to collocate at the other sites throughout the year.



Collocation Comparison Study



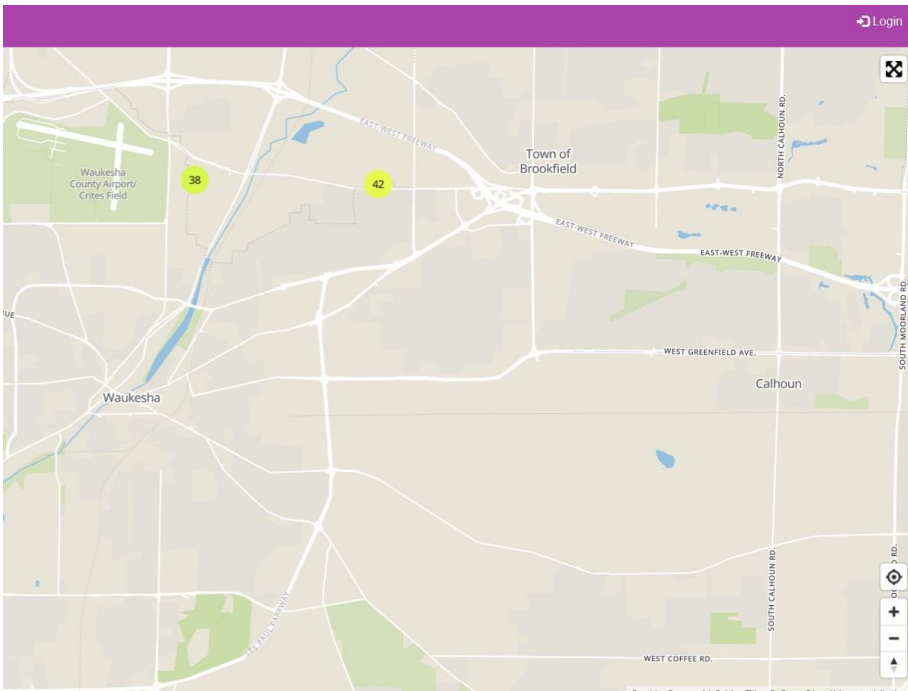
Where: Appleton

What: 5 Sensors

How Long: 1 Week

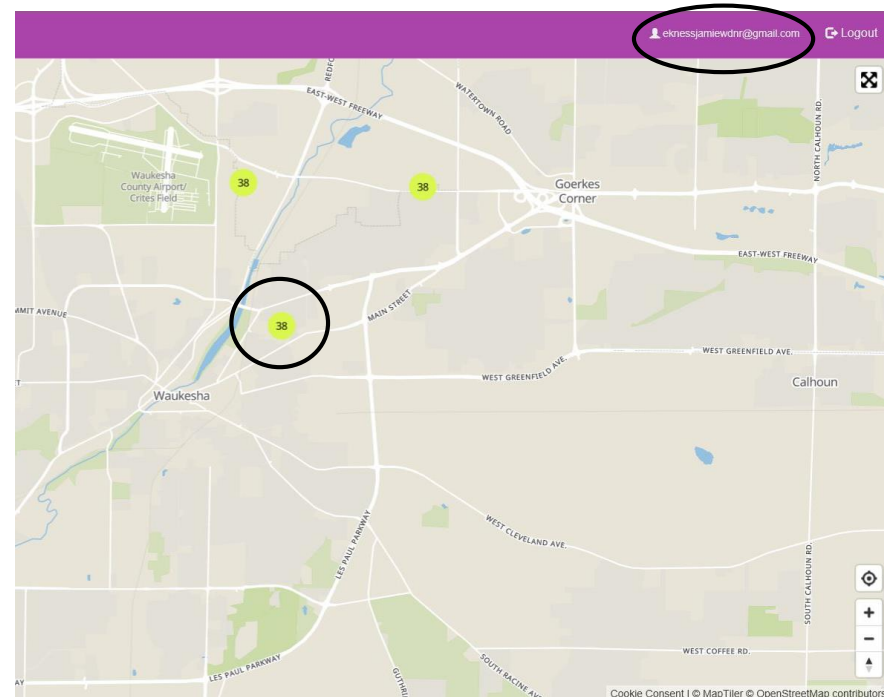
QAPP development

Public Sensors Map



*Only sensors set up as visible are displayed on the PurpleAir map

Private Sensors Map



*Only the owner of the sensor can log in and see their sensor visible on the map

Sensor Wishlist

- Regressions/correction factors can only go so far, need informed users and/or QA/QC support
- Sensor manufacturers develop performance metrics and flag or exclude data when they are outside of that.
- Sensor manufacturers take a national approach at applying comprehensive national correction factor overlay on real time data.
- Sensor manufacturers properly account for averaging time in calculating AQI.