

ADEC's Community-Based Air Sensor Network

Quarterly Call
September 10, 2024
10:00 AM AKST

Lydia Johnson, lydia.johnson@alaska.gov

Simeon Ng, simeon.ng@alaska.gov

Kelly Ireland, kelly.ireland@alaska.gov

Isaac Van Flein, isaac.vanflein@alaska.gov

Grace Carico, grace.carico@alaska.gov

Housekeeping Items

- Mute – Please mute yourself for presentations.
- Please use chat during presentation as you have questions/comments.
 - 20-30 minutes of planned discussion time at end
- Mark your calendar for next call! **December 10th 10-11am**



Agenda

Welcome!

Sensor network overview and progress

Data findings

Next steps

Questions and discussion



What is Particulate Matter (PM)?

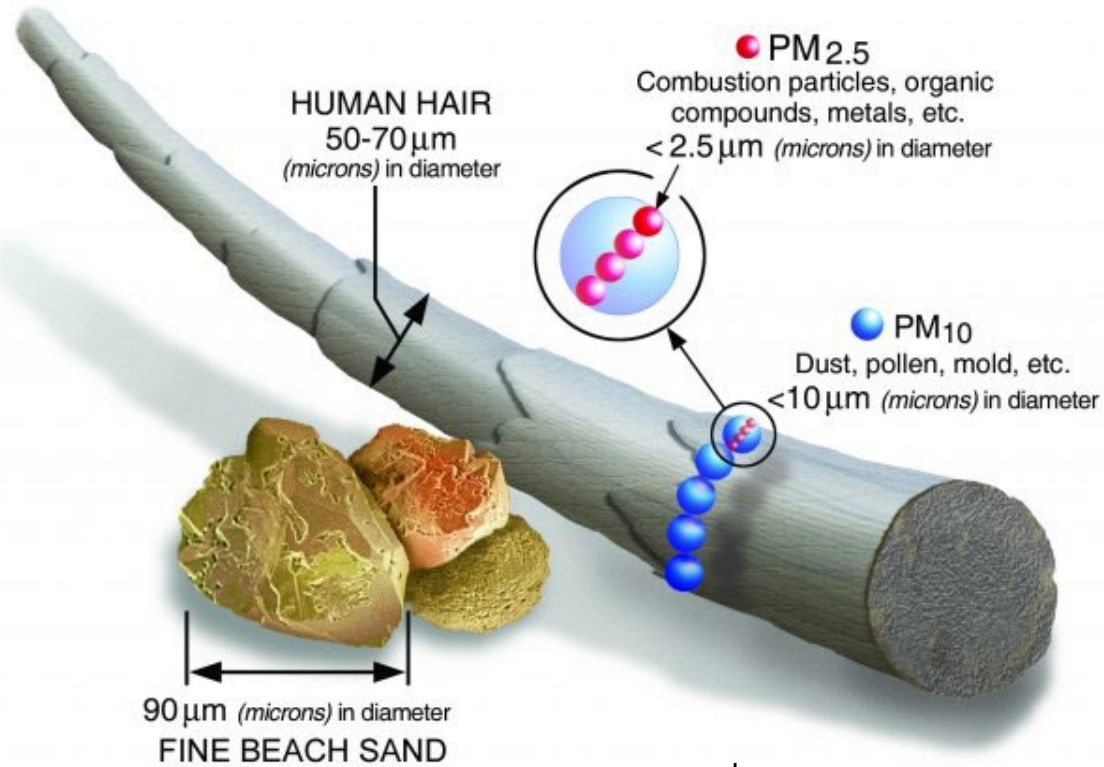


Image source: www.epa.gov

- ▶ Mixture of solid particles and liquid droplets in the air
- ▶ May be composed of chemicals, particles, etc.
- ▶ Small enough to be inhaled
 - ▶ PM2.5 reaches furthest into lungs
- ▶ Different sources



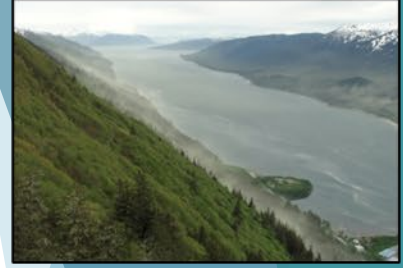


Combustion

- ▶ Natural sources
 - ▶ Wildland fires
- ▶ Man made sources:
 - ▶ Smoke from wood stoves
 - ▶ Power plant exhaust
 - ▶ Vehicle exhaust
 - ▶ Solid waste burning
 - ▶ Trash
 - ▶ Hazardous Air Pollutants

Particulates

- ▶ Natural sources
 - ▶ Wind blown dust
 - ▶ Pollen
 - ▶ Volcanic eruptions
 - ▶ Glacial silt
- ▶ Man made sources:
 - ▶ Road dust
 - ▶ Brake dust
 - ▶ Dust from runways



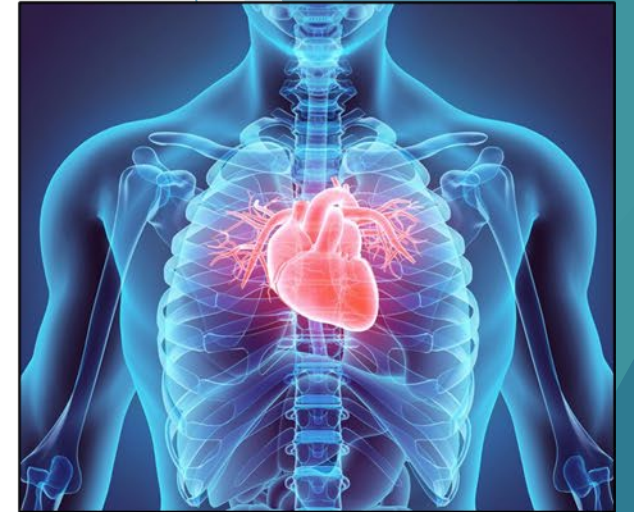
Environmental Impacts

- ▶ Reduce visibility – dust, smoke
- ▶ Damage plants – NO₂, SO₂, O₃
- ▶ Harm wildlife
- ▶ Acid rain – NO₂, SO₂
- ▶ Impact fish drying
- ▶ Cover berries



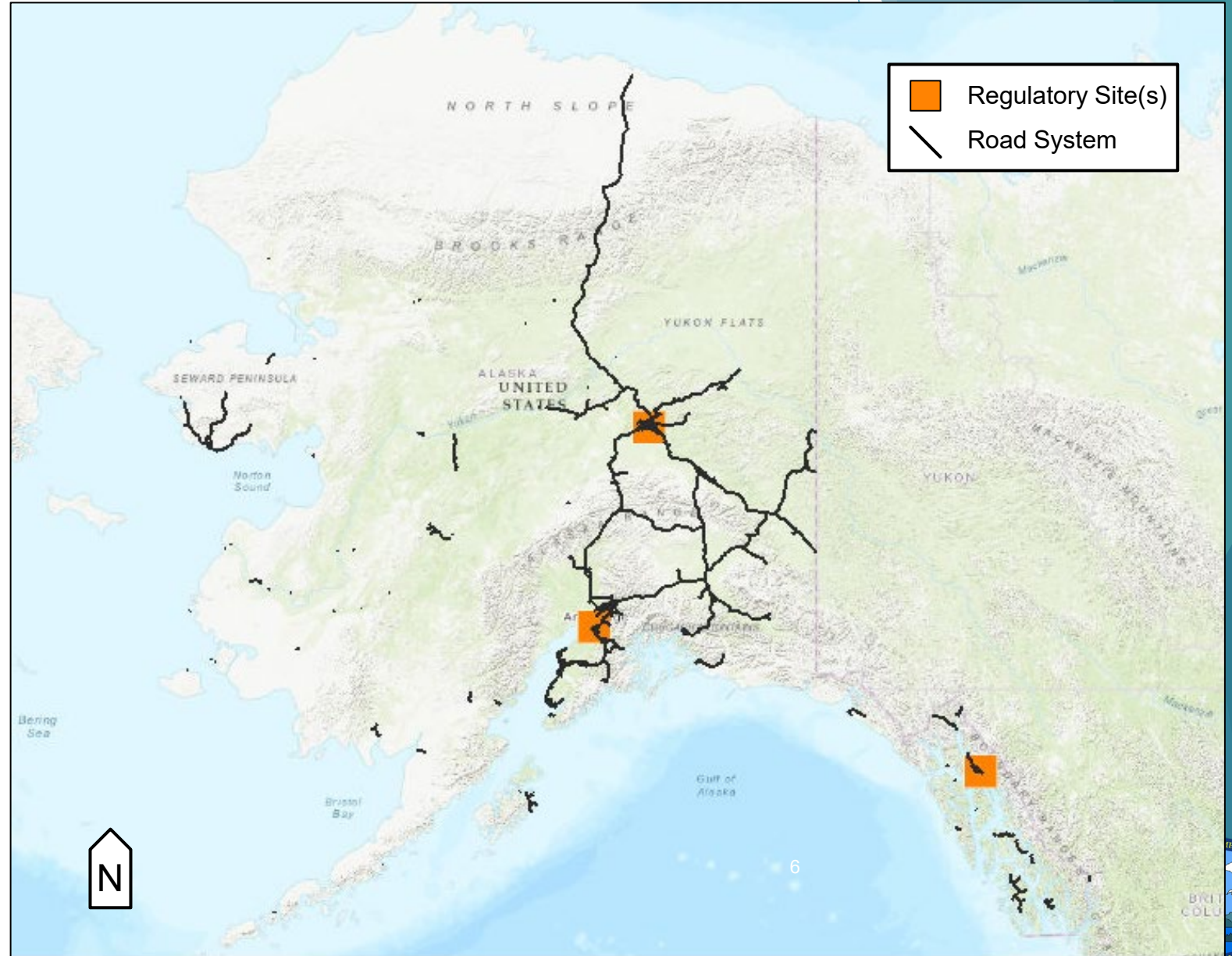
Health Impacts

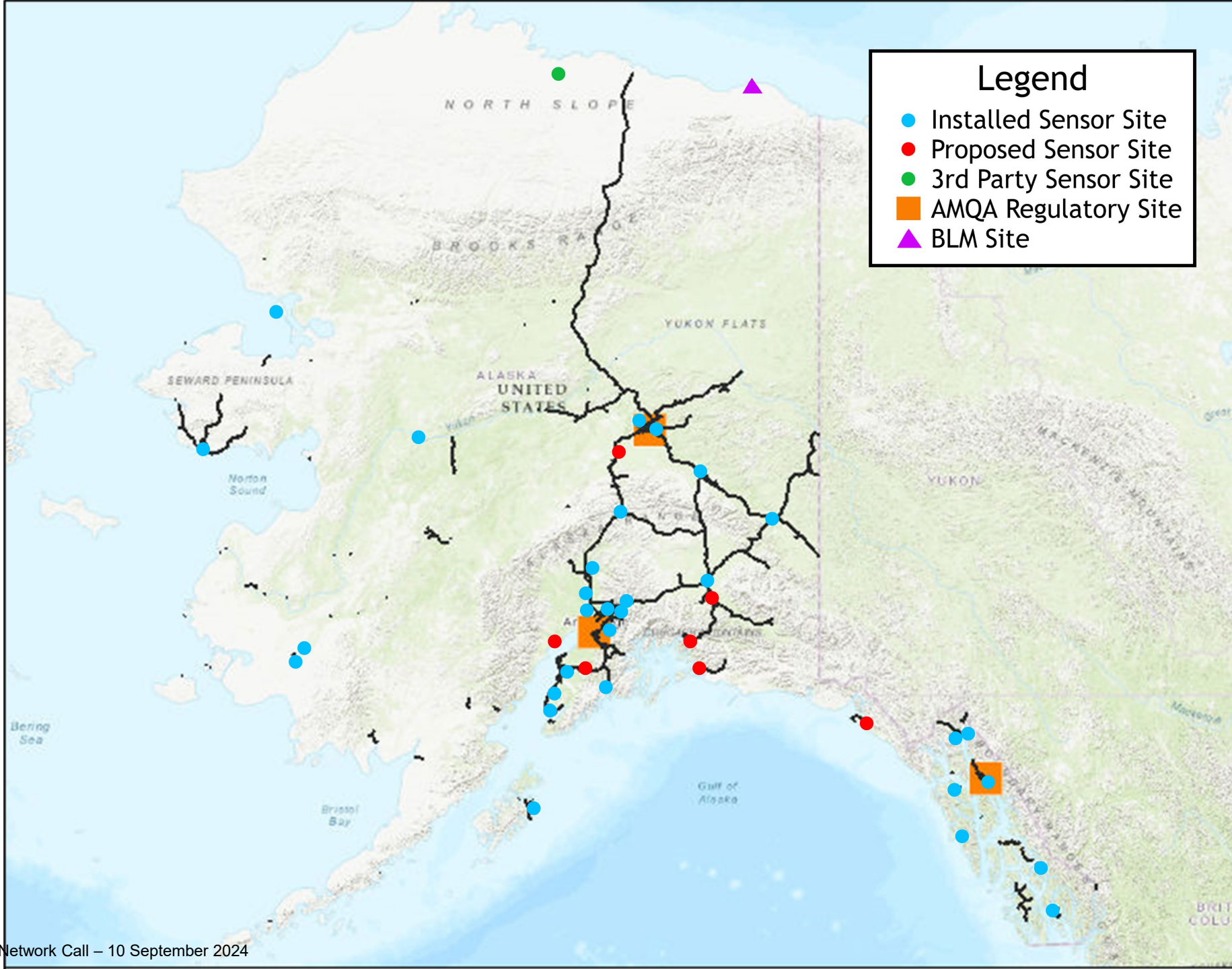
- ▶ Respiratory
 - ▶ Adverse effects
 - ▶ Hindered lung development
 - ▶ Limited breathing capacity for lifetime
 - ▶ Indicators of increased risk
 - ▶ Allergies
 - ▶ Asthma
- ▶ Cardiovascular
 - ▶ Adverse effects
 - ▶ Constriction of blood vessels
 - ▶ Increase in blood pressure
 - ▶ Heart attacks
 - ▶ Indicators of increased risk
 - ▶ Increased heart rate or variability in heart rate
 - ▶ Changes in blood chemistry



DEC's Regulatory Network

- ▶ Regulatory stations in 3 Metropolitan Statistical Areas (MSAs)
 - ▶ Anchorage / Mat-Su (4 sites)
 - ▶ Fairbanks (3 sites)
 - ▶ Juneau (1 site)
- ▶ Monitor criteria pollutants:
 - ▶ Particulate matter (PM_{2.5} and PM₁₀)
 - ▶ Gases:
 - ▶ Carbon monoxide (CO)
 - ▶ Nitric oxide (NO)
 - ▶ Ozone (O₃)
 - ▶ Sulfur dioxide (SO₂)





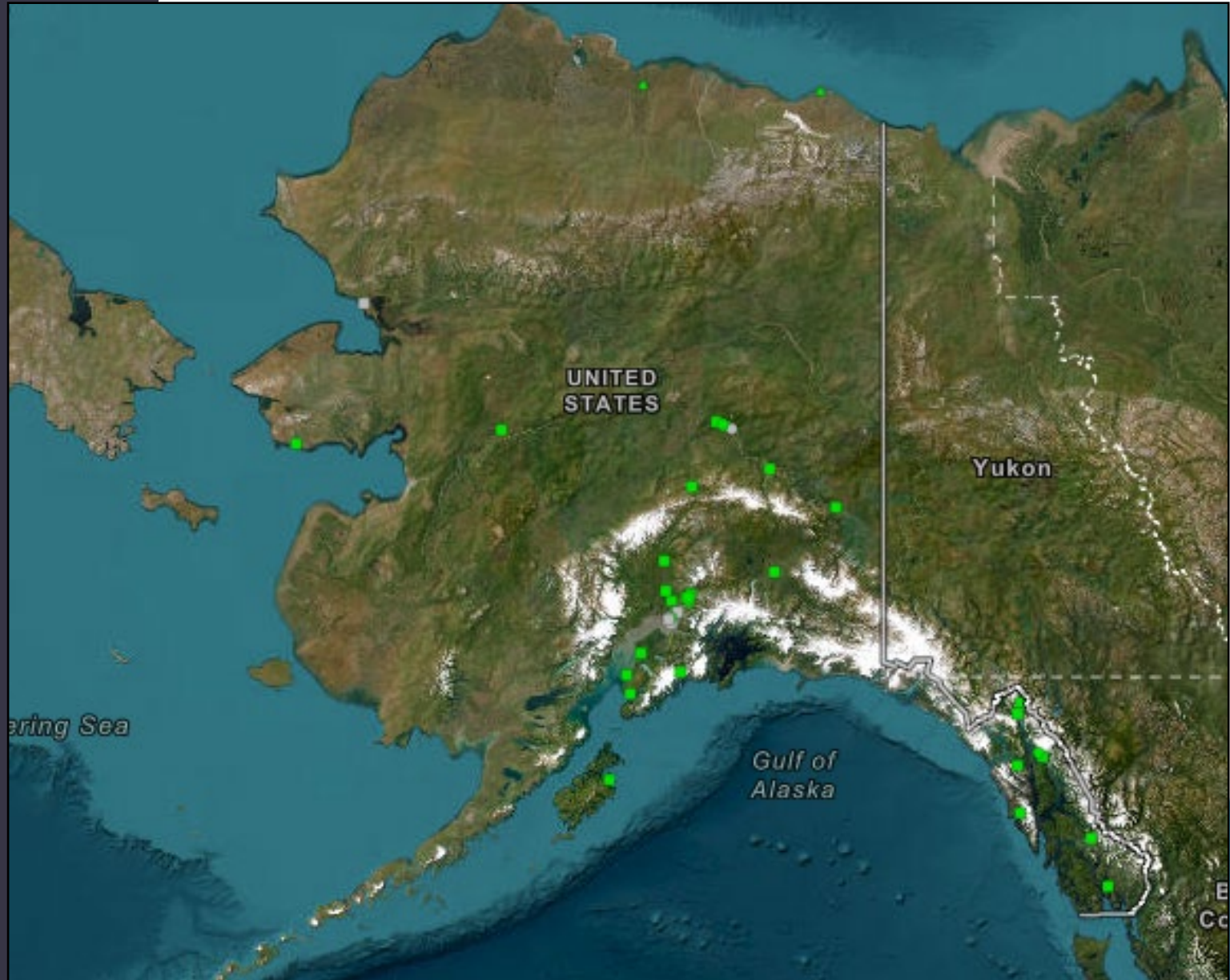
Legend

- Installed Sensor Site
- Proposed Sensor Site
- 3rd Party Sensor Site
- AMQA Regulatory Site
- ▲ BLM Site



We are growing!

- ▶ Map as of September 2024
- ▶ We have a new website!
- ▶ Continued expansion as we...
 - ▶ Deploy more sensors
 - ▶ Collaborate with communities doing their own studies and display their data
 - ▶ Partnered with the AQEarth project to display Anchorage sensor data



Napaskiak



Alaska State Museum



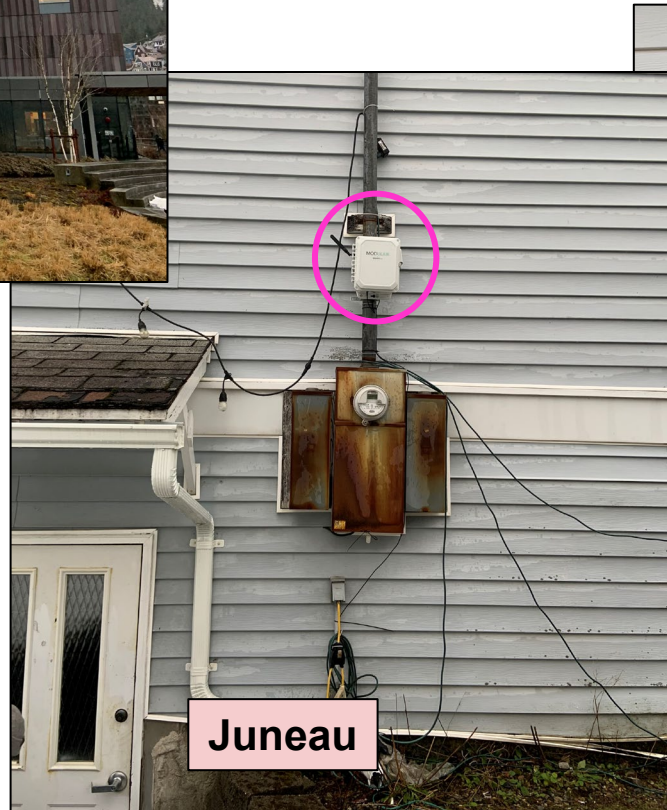
Goldstream



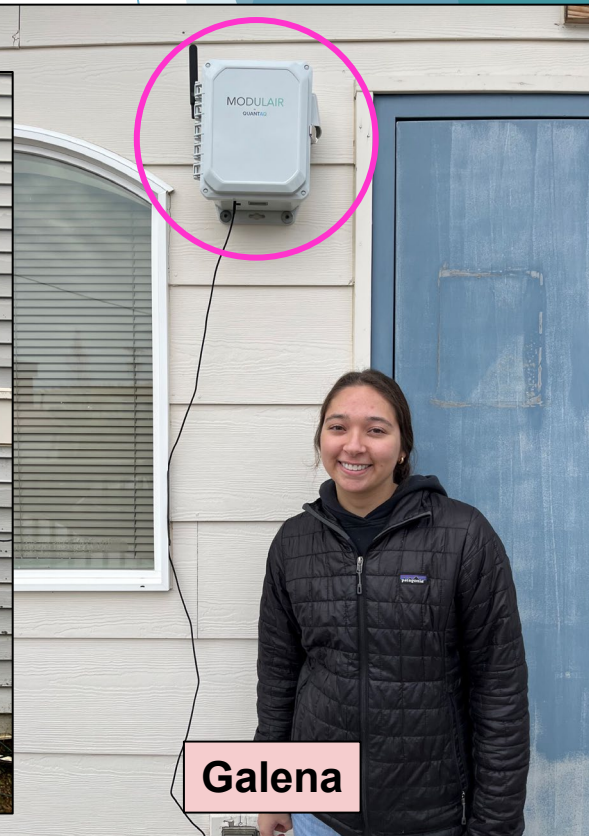
Wrangell



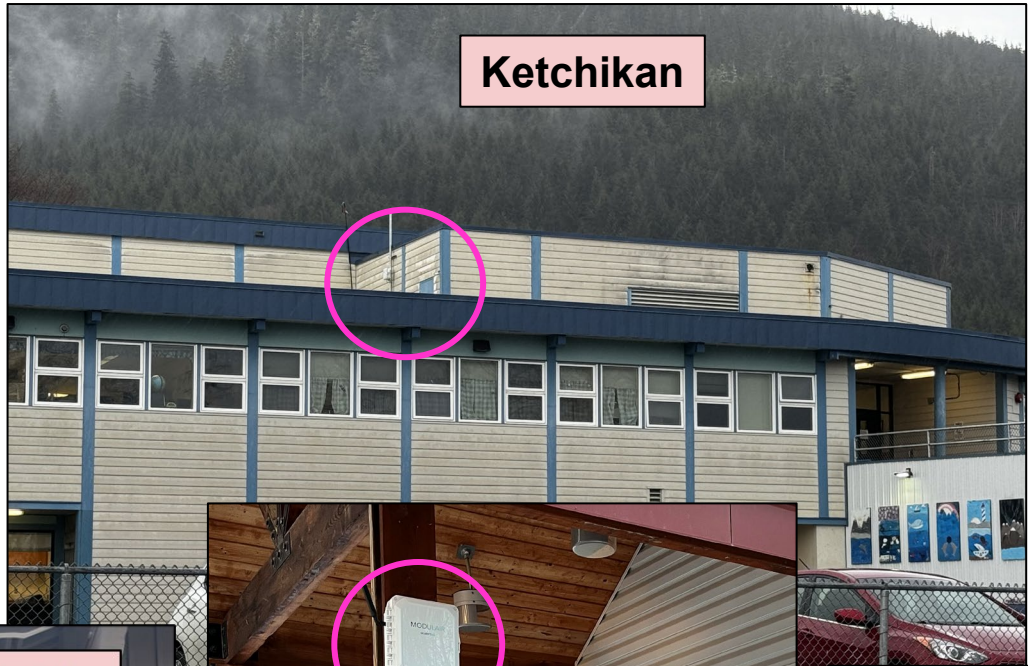
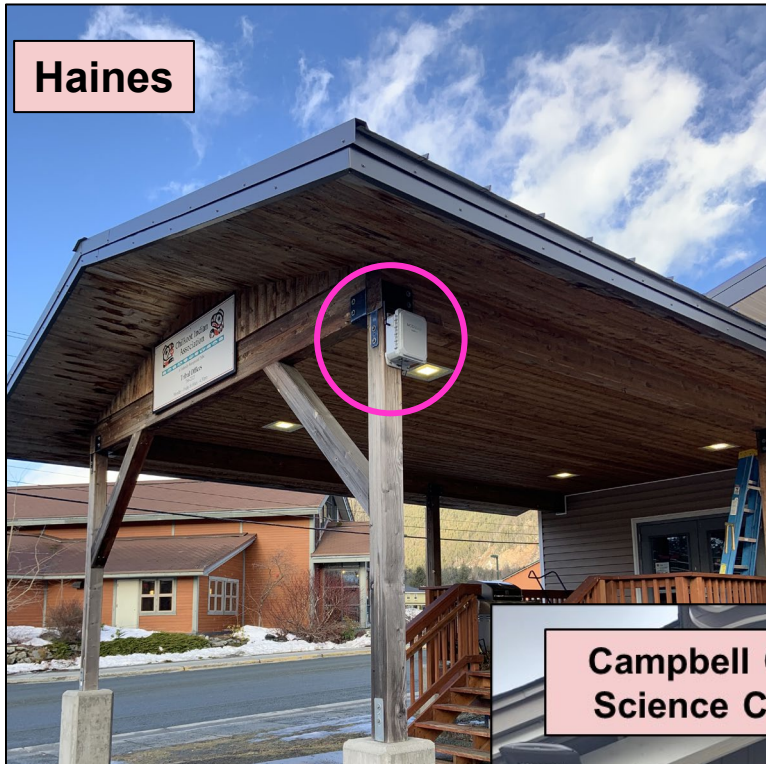
Tok

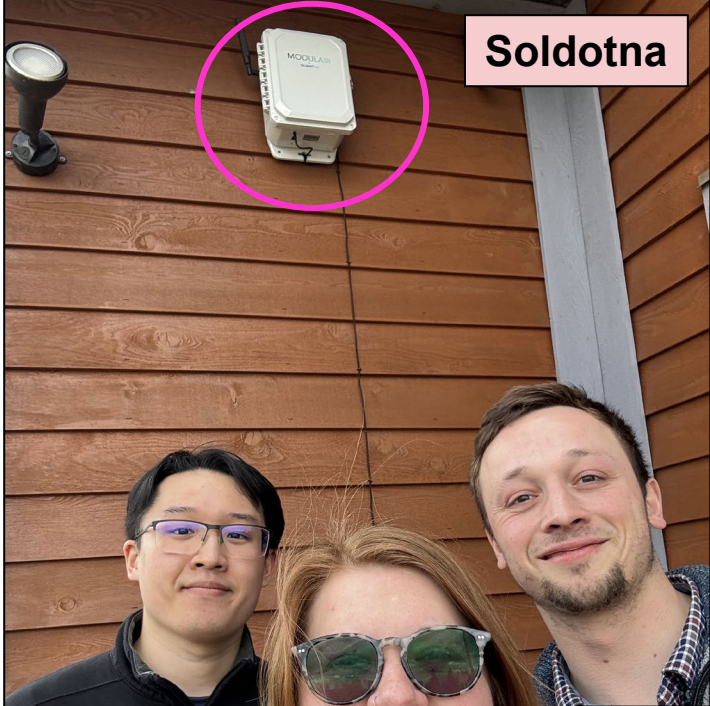


Juneau

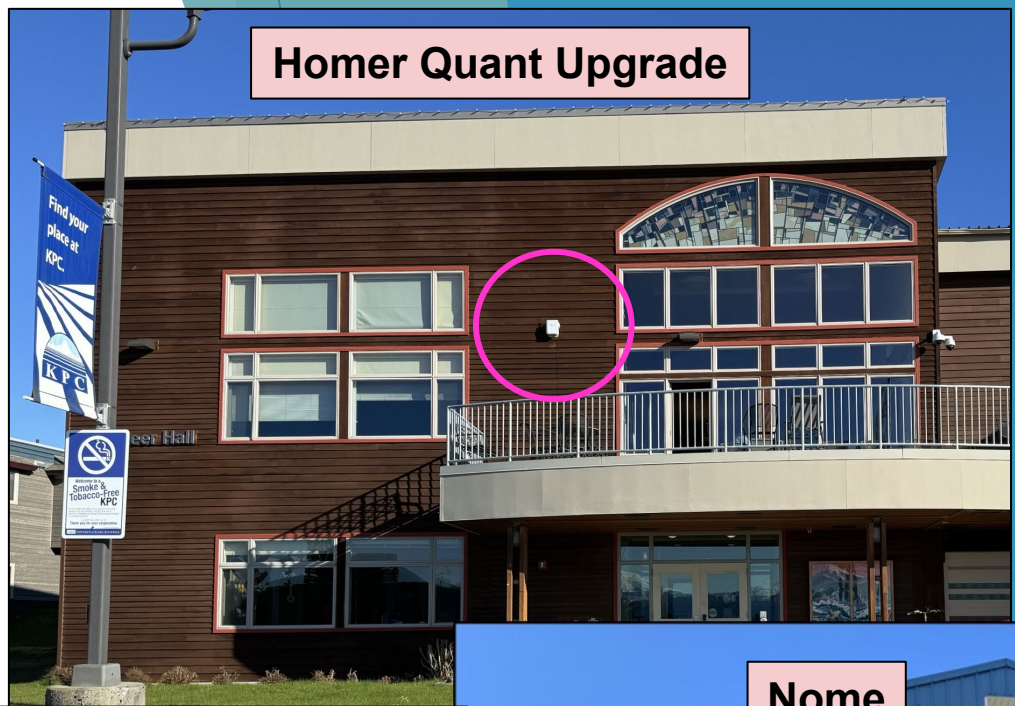


Galena





Soldotna



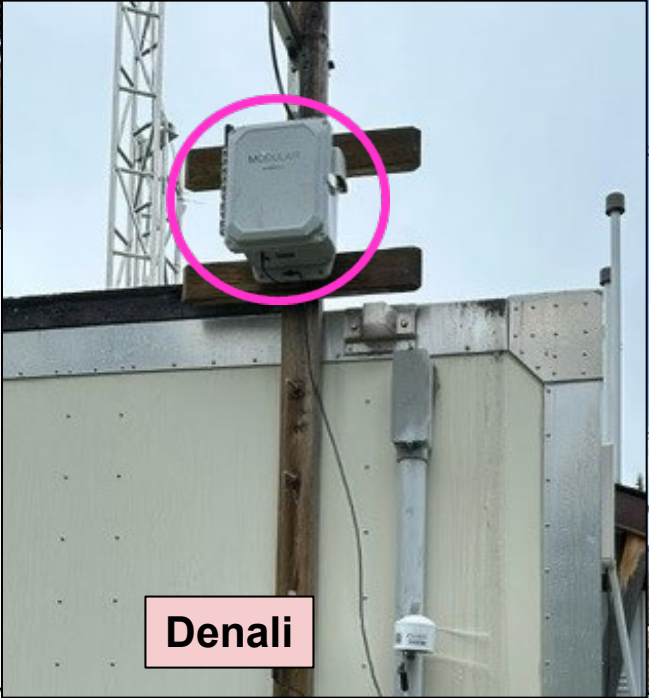
Homer Quant Upgrade



Ninilchik



Badger



Denali



Nome



Seward Quant Upgrade

South Central Region Campaign

August 2024

Deployed **new** sensors in:

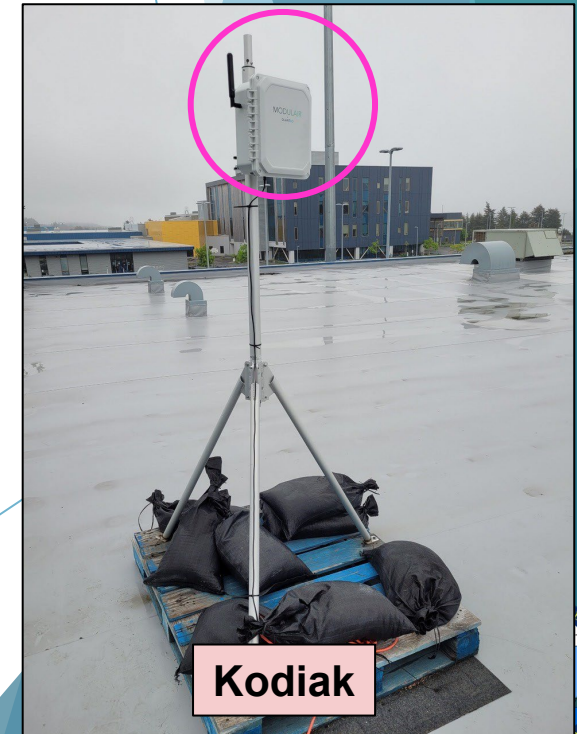
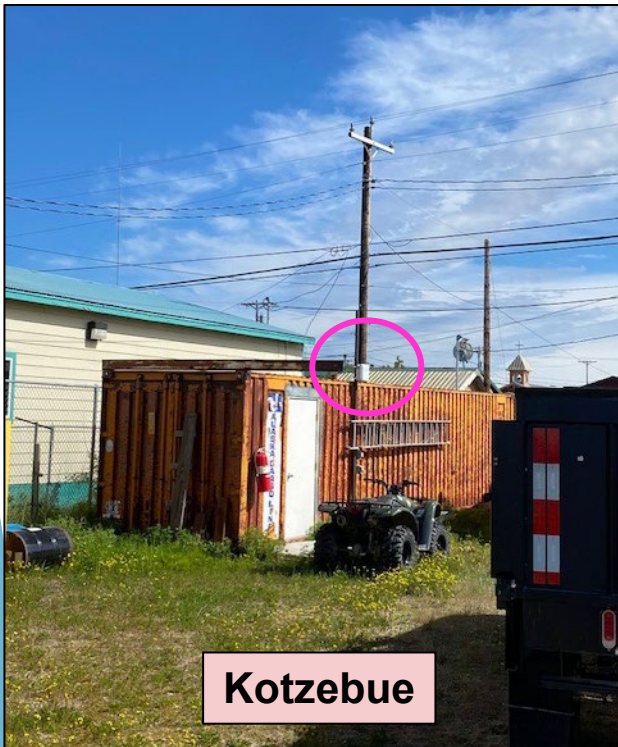
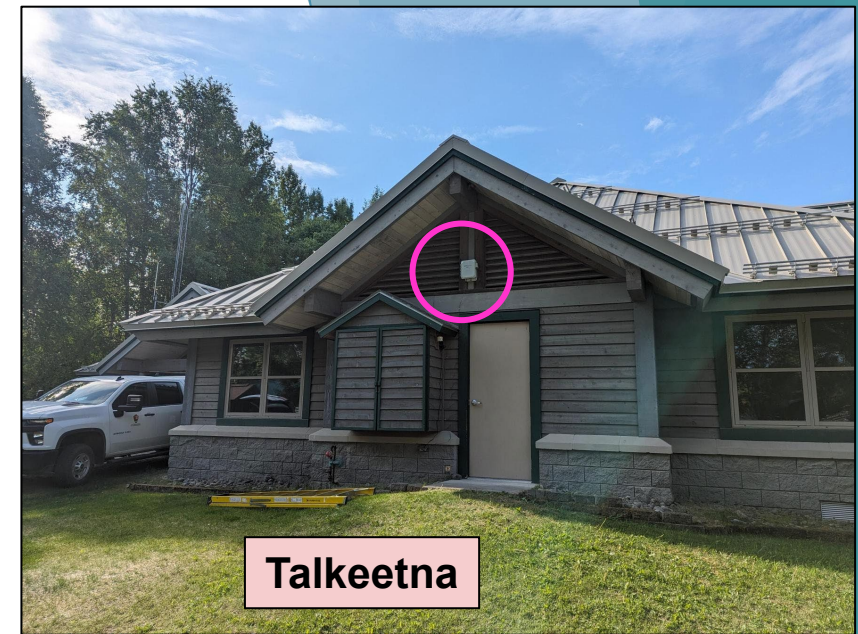
- Chickaloon
- Willow
- Wasilla
- Palmer
- Big Lake



Other Sensors Last Quarter

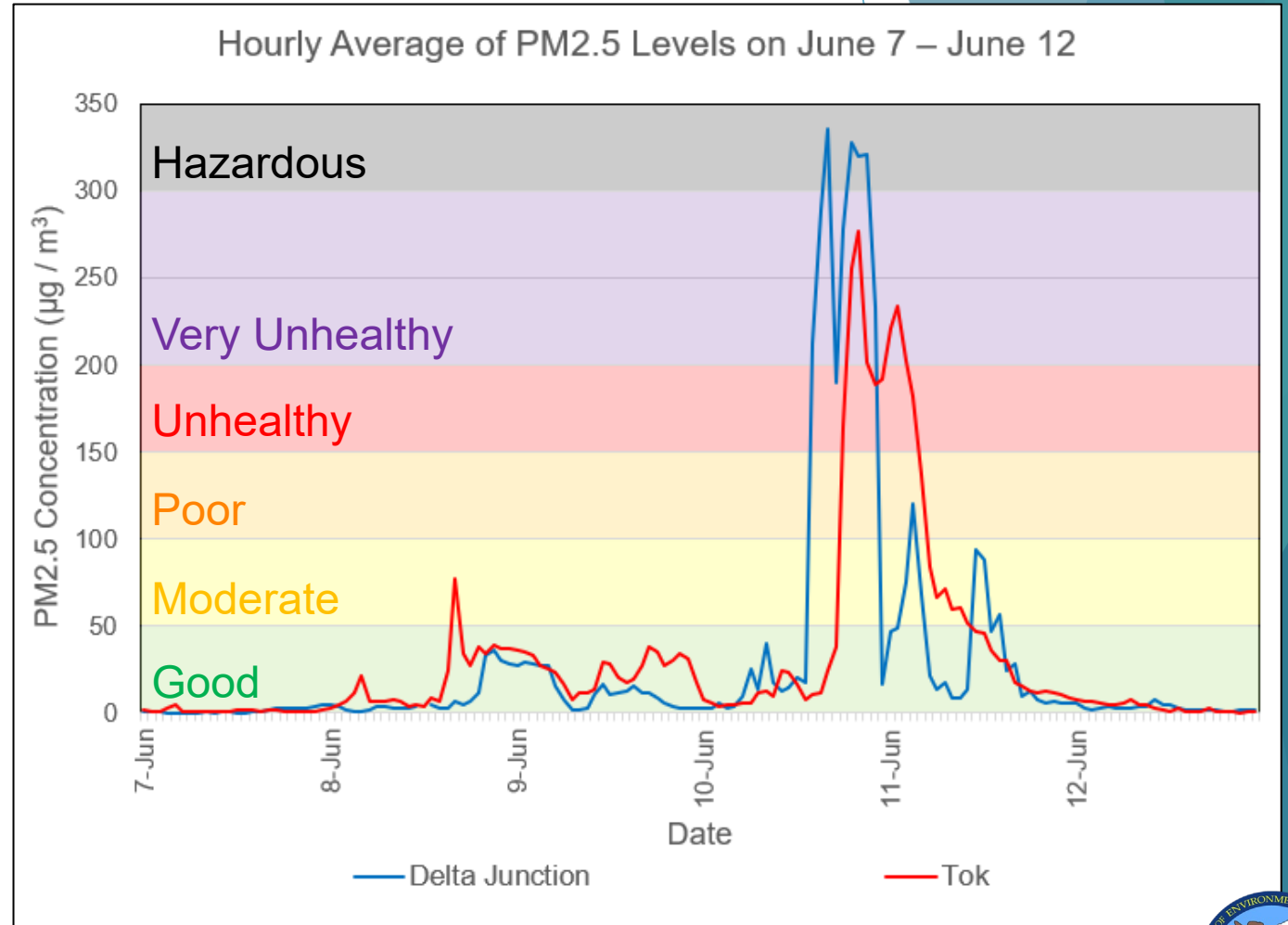
Deployed **new** sensors in:

- Bethel – AQMesh swap-out
- Glennallen
- Kotzebue – AQMesh swap-out
- Kodiak – AQMesh swap-out
- Talkeetna
- Nenana



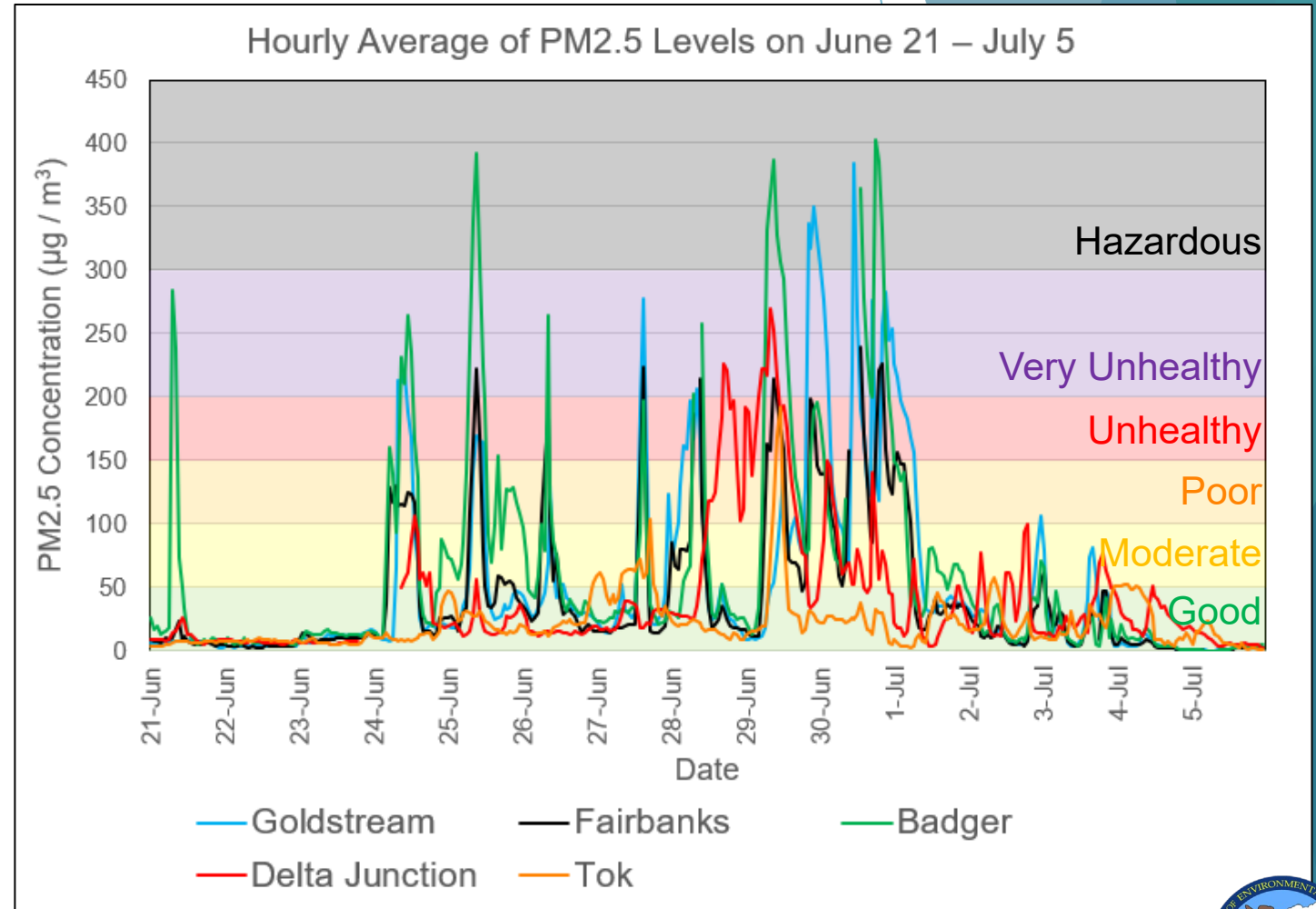
Early June Smoke Incident

- ▶ Affected eastern interior communities
 - ▶ Delta Junction
 - ▶ Tok
- ▶ Reached 'Very Unhealthy' levels of PM2.5 on June 10-11
 - ▶ Delta Junction reached 'Hazardous' levels of PM2.5
- ▶ Smoke originated from Canadian wildfires south of Dawson, near juncture of Yukon, White, and Stewart rivers

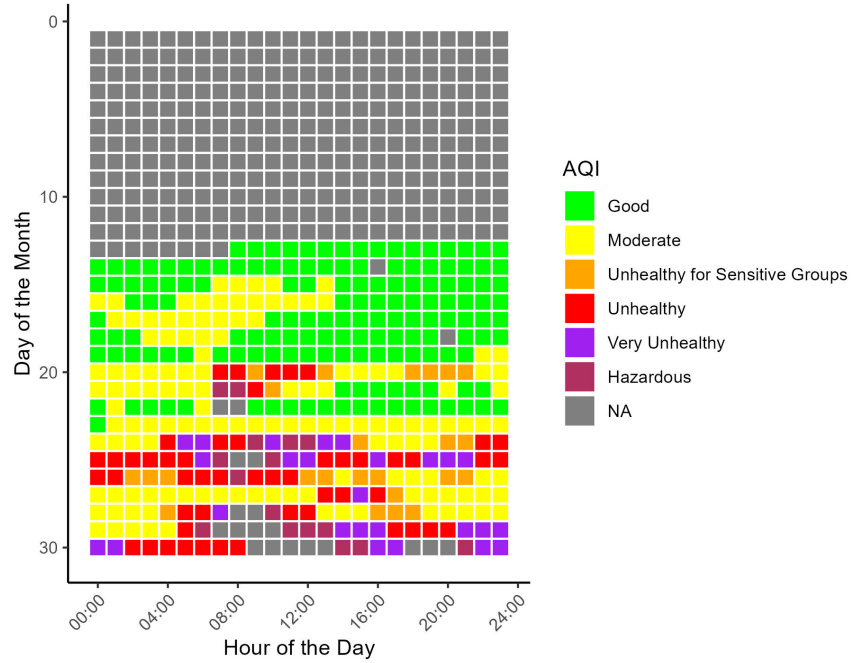


Late June Smoke Incident

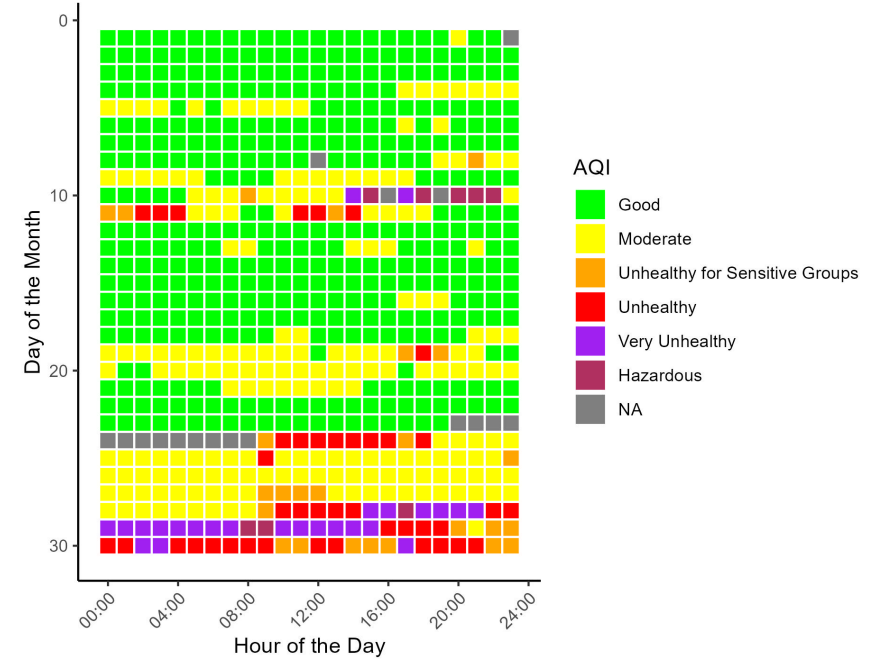
- ▶ Affected interior communities
 - ▶ Goldstream
 - ▶ Fairbanks
 - ▶ Badger
 - ▶ Delta Junction
 - ▶ Tok
- ▶ PM2.5 reached 'Unhealthy' AQI threshold in all communities
 - ▶ Central interior communities reached 'Hazardous' levels of PM2.5
- ▶ Smoke originated from multiple fires



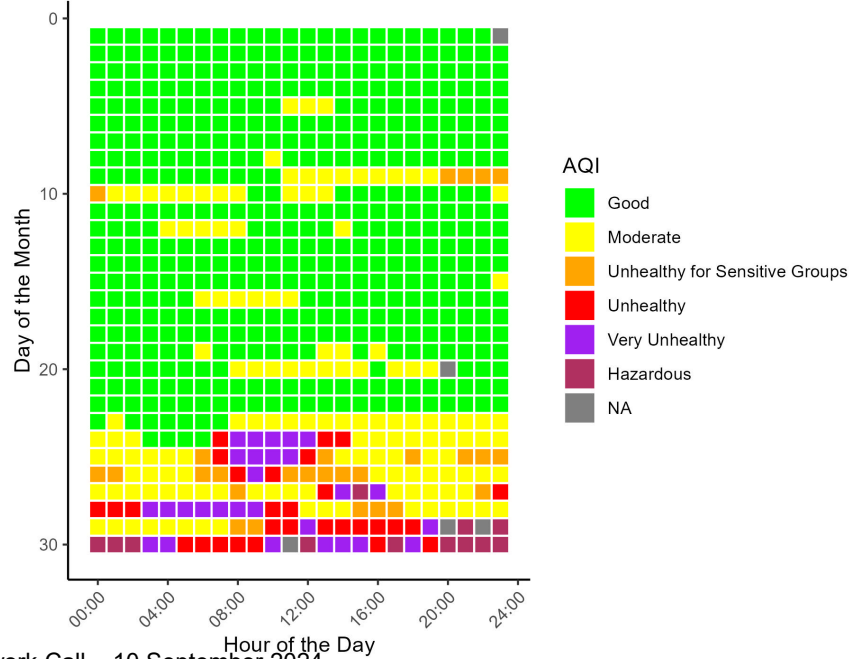
Badger PM2.5 AQI in June



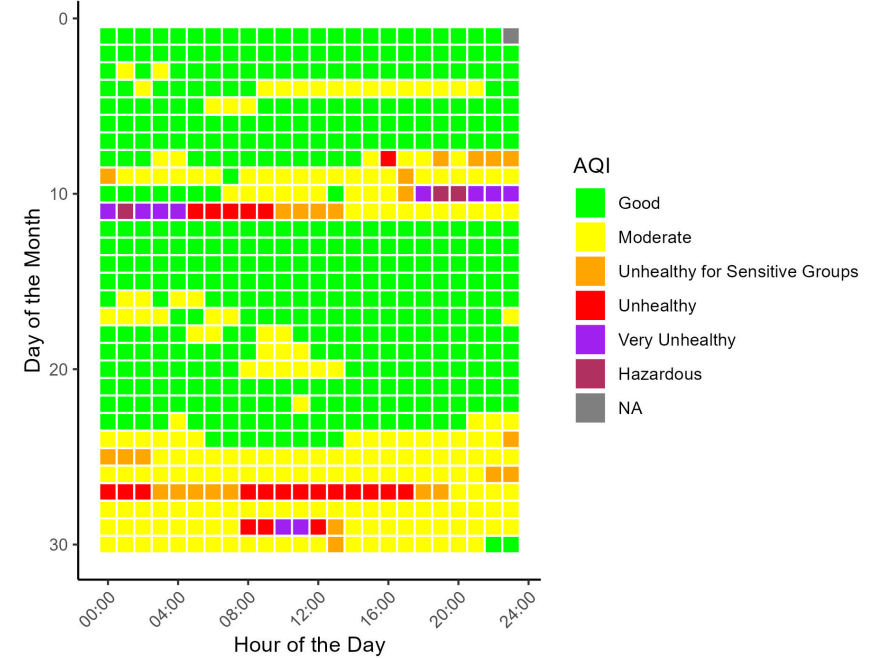
Delta Junction PM2.5 AQI in June



Goldstream Sports PM2.5 AQI in June

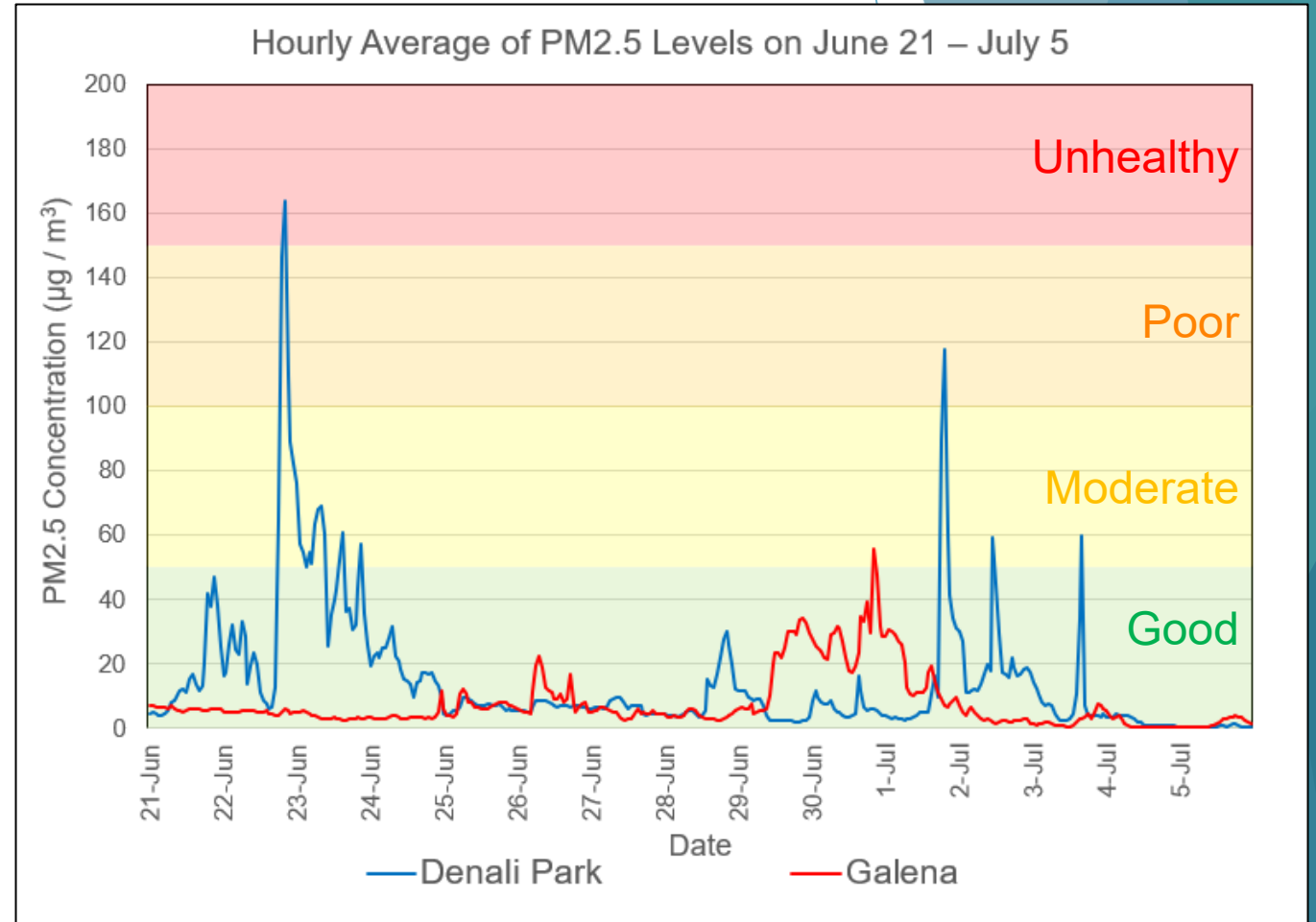


Tok PM2.5 AQI in June

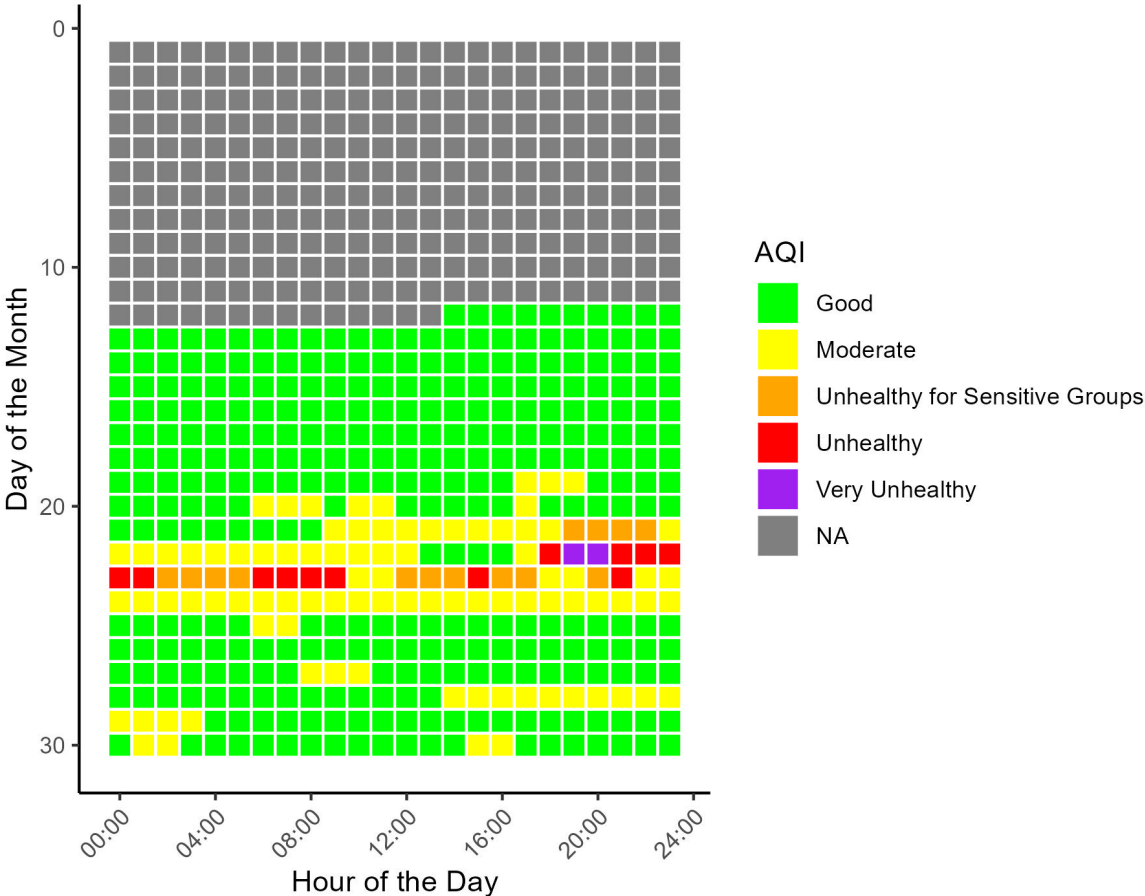


Late June Smoke Incident

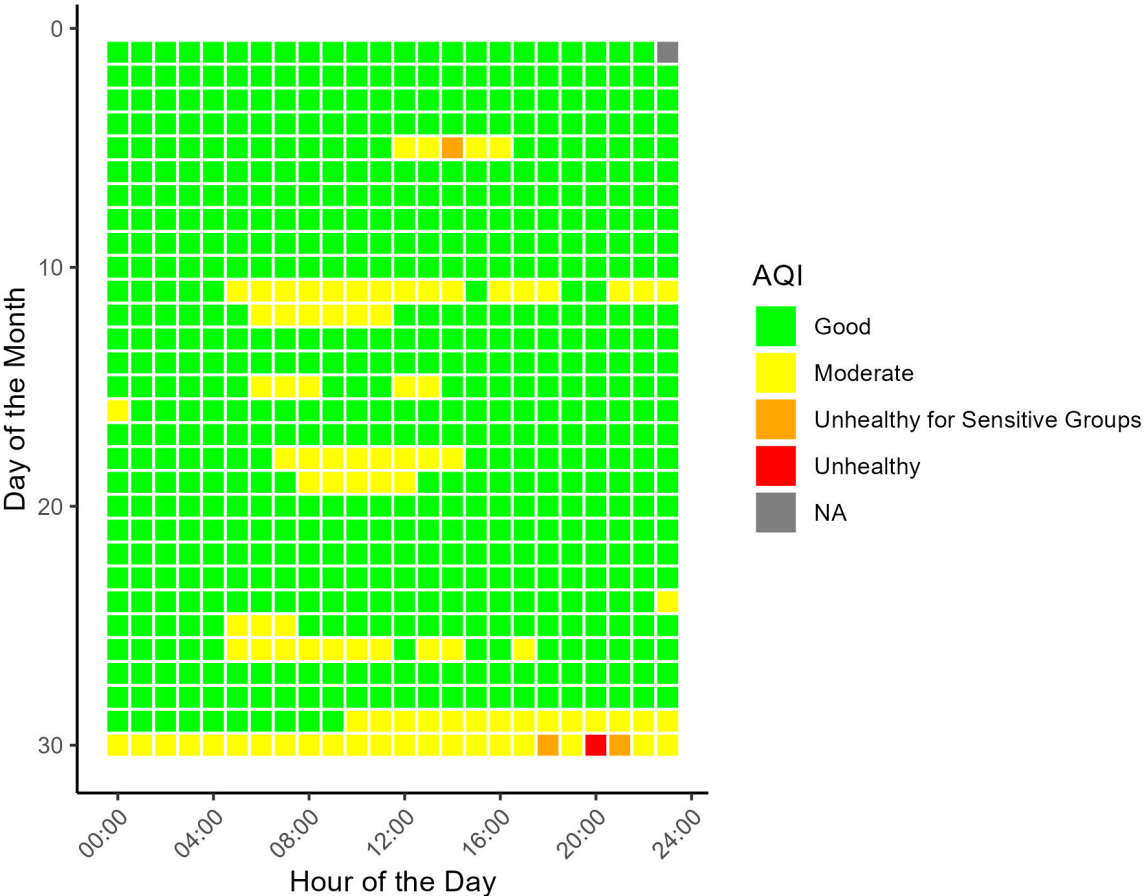
- ▶ Affected interior communities
 - ▶ Galena – Brief exposure
 - ▶ Primarily smoke from the smaller Main, Yuki, and Cecil Dome fires between the Yukon river and northern extent of Kaiyuh mountains
 - ▶ Denali Park – Several spikes
 - ▶ Primarily smoke from Sanctuary, Grizzly, and Foraker fires immediately north of the Alaska range



Denali National Park PM2.5 AQI in June



Galena PM2.5 AQI in June

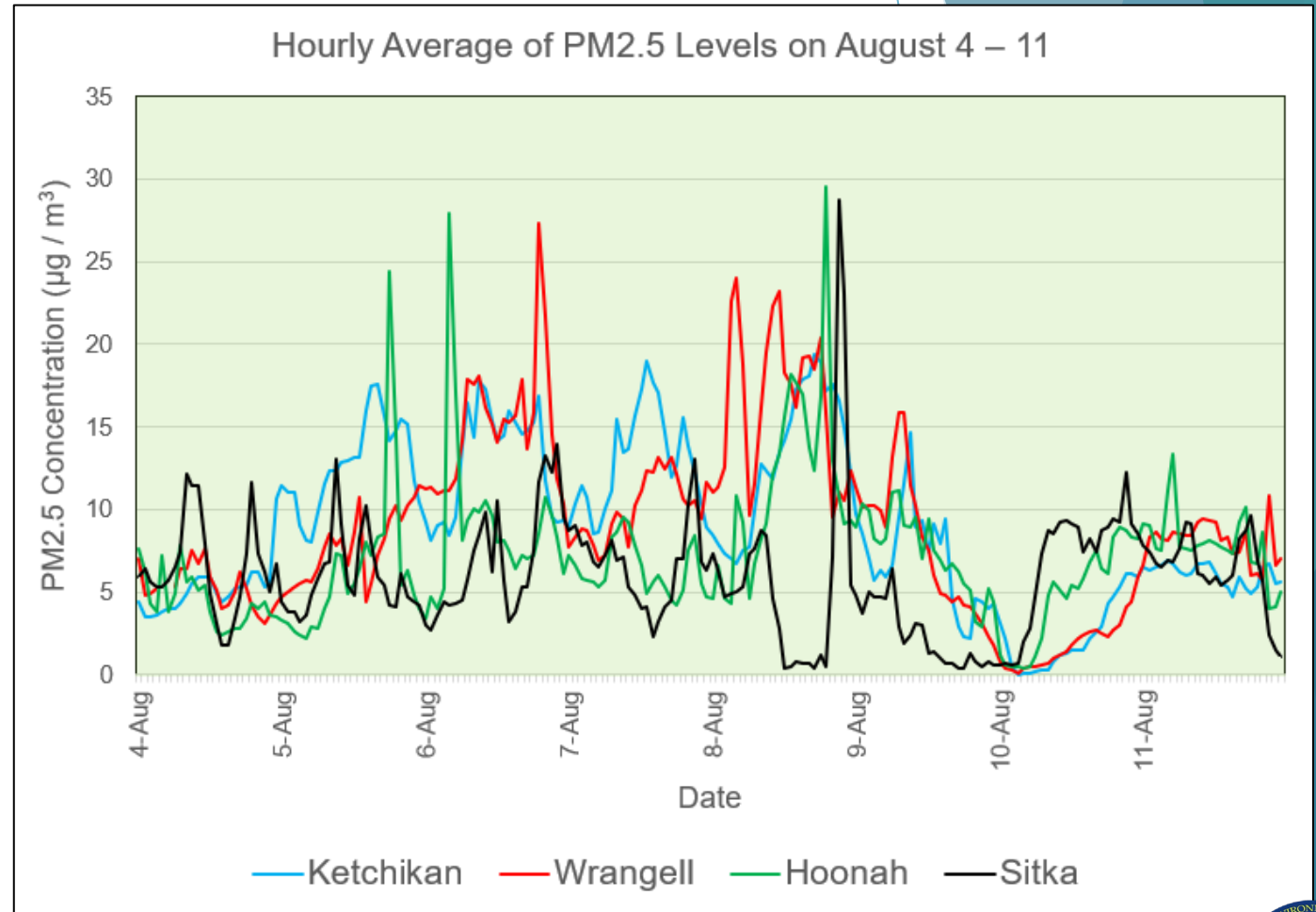


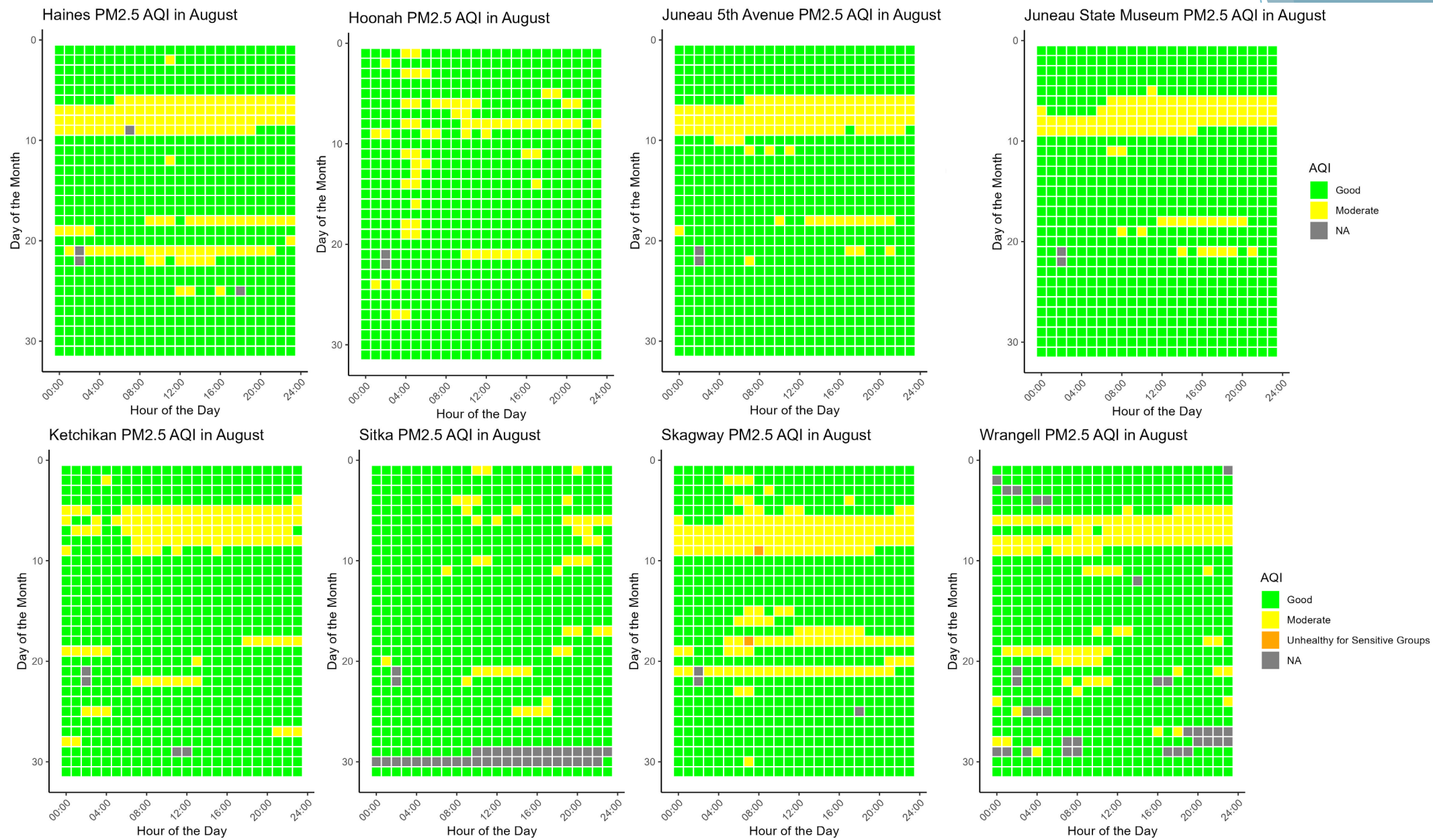
Early August Smoke Incident

- ▶ Affected interior communities

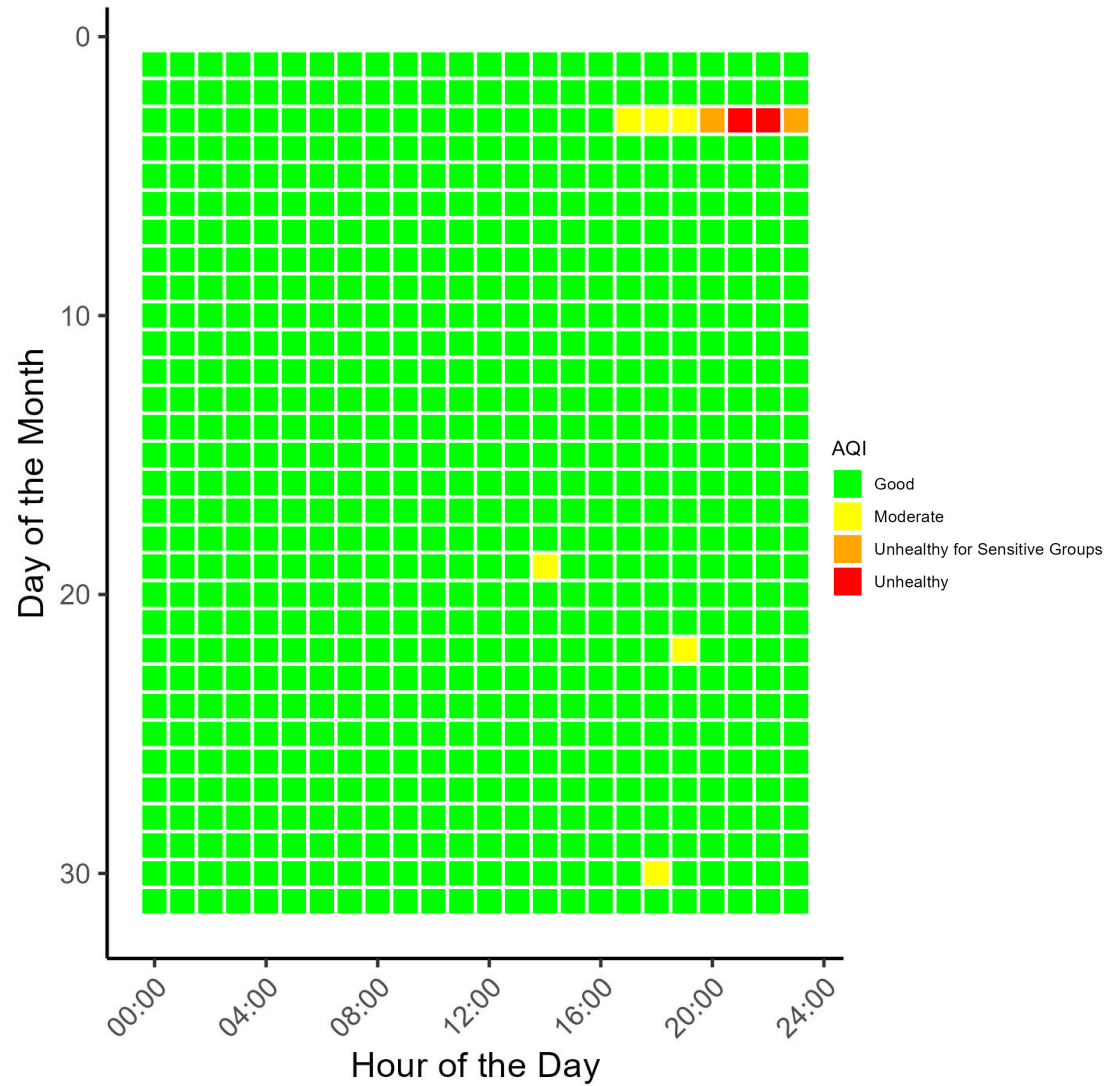
- ▶ Juneau
- ▶ Haines
- ▶ Skagway
- ▶ Ketchikan
- ▶ Sitka
- ▶ Hoonah
- ▶ Wrangell

- ▶ Peaks of PM2.5 concentration did not exceed 'Good' AQI threshold
- ▶ Suspected to have originated from Canadian fires to the north, which was mixed and blown south in early August

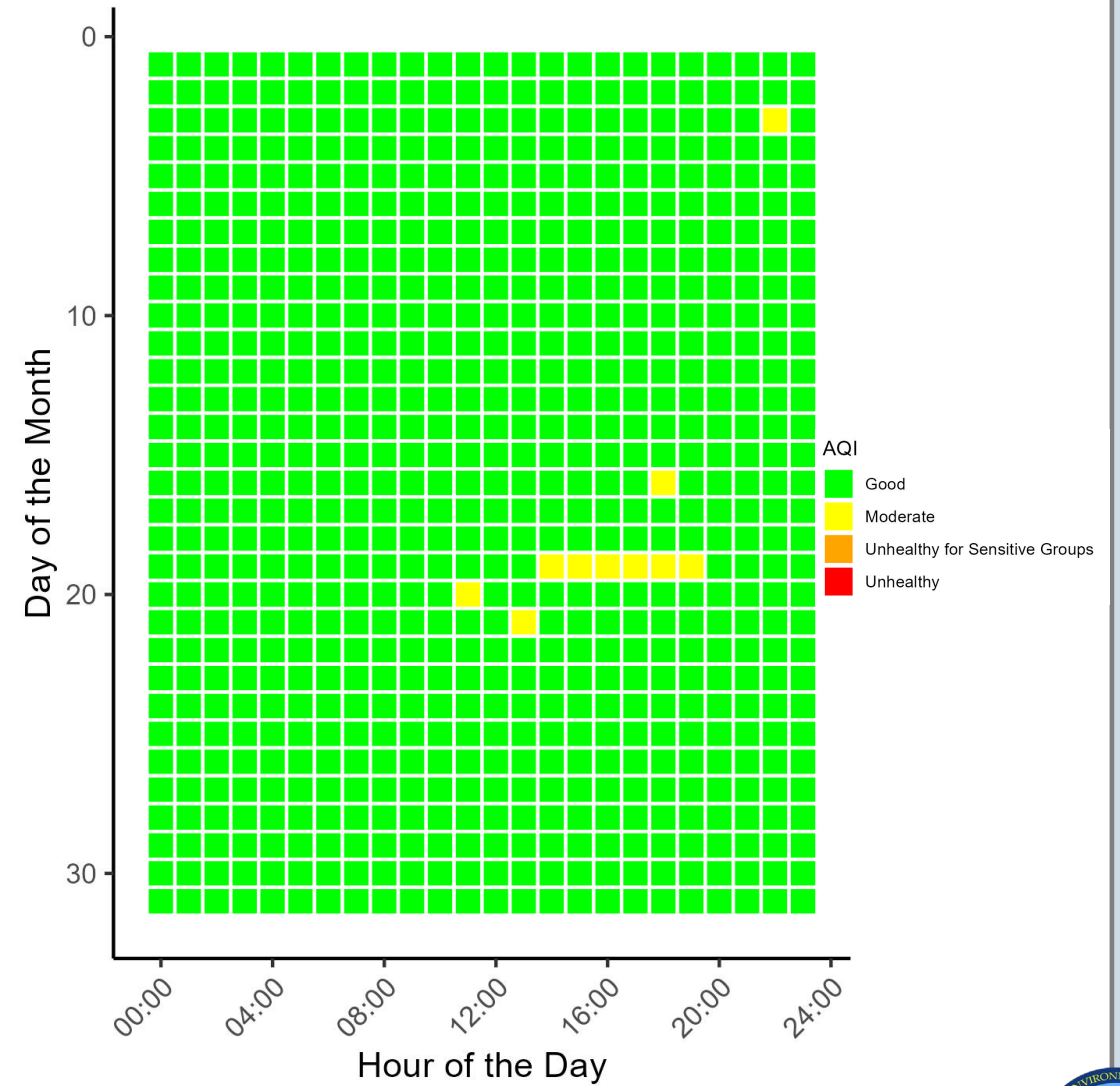




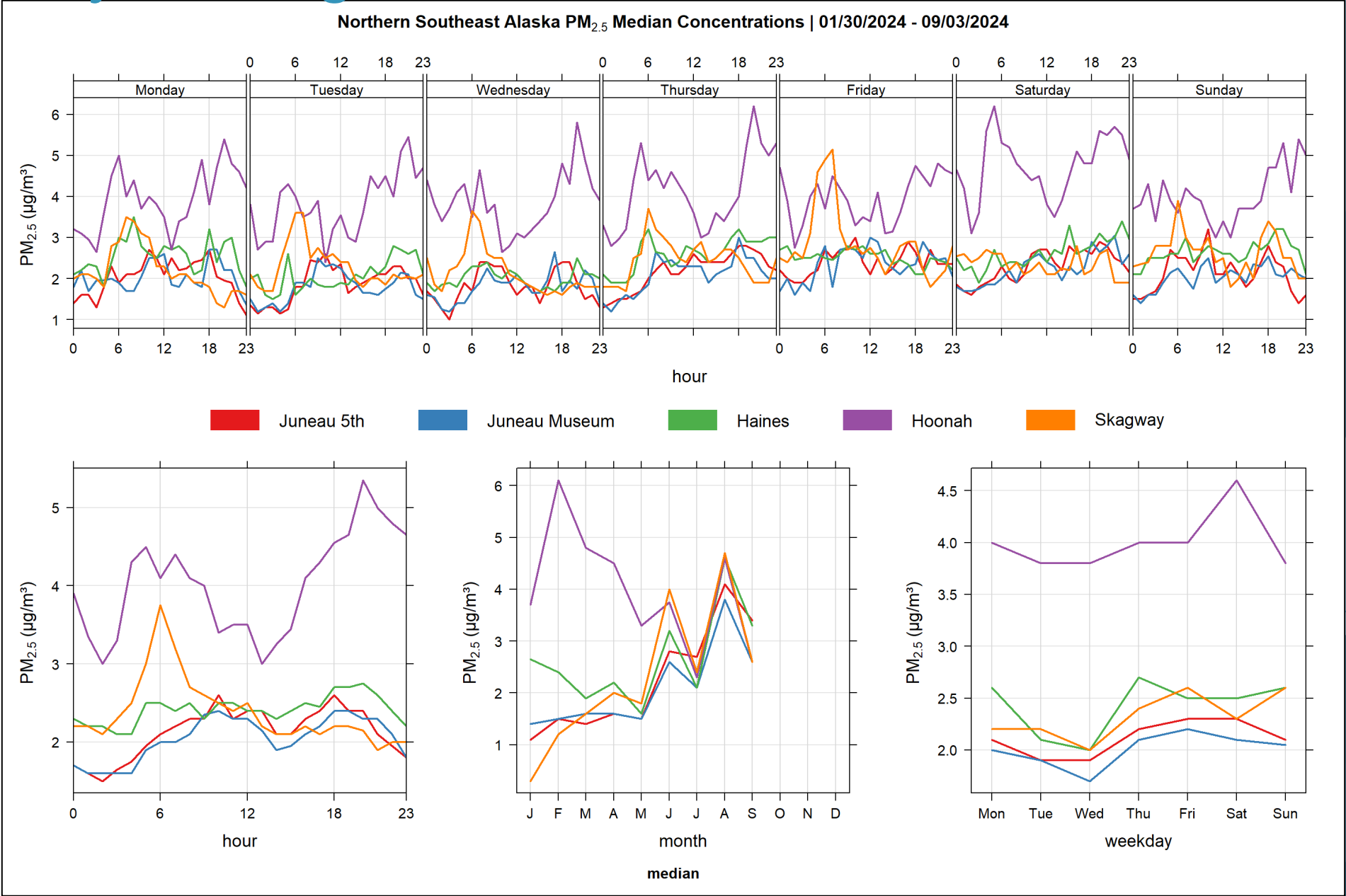
Juneau State Museum PM2.5 AQI in July

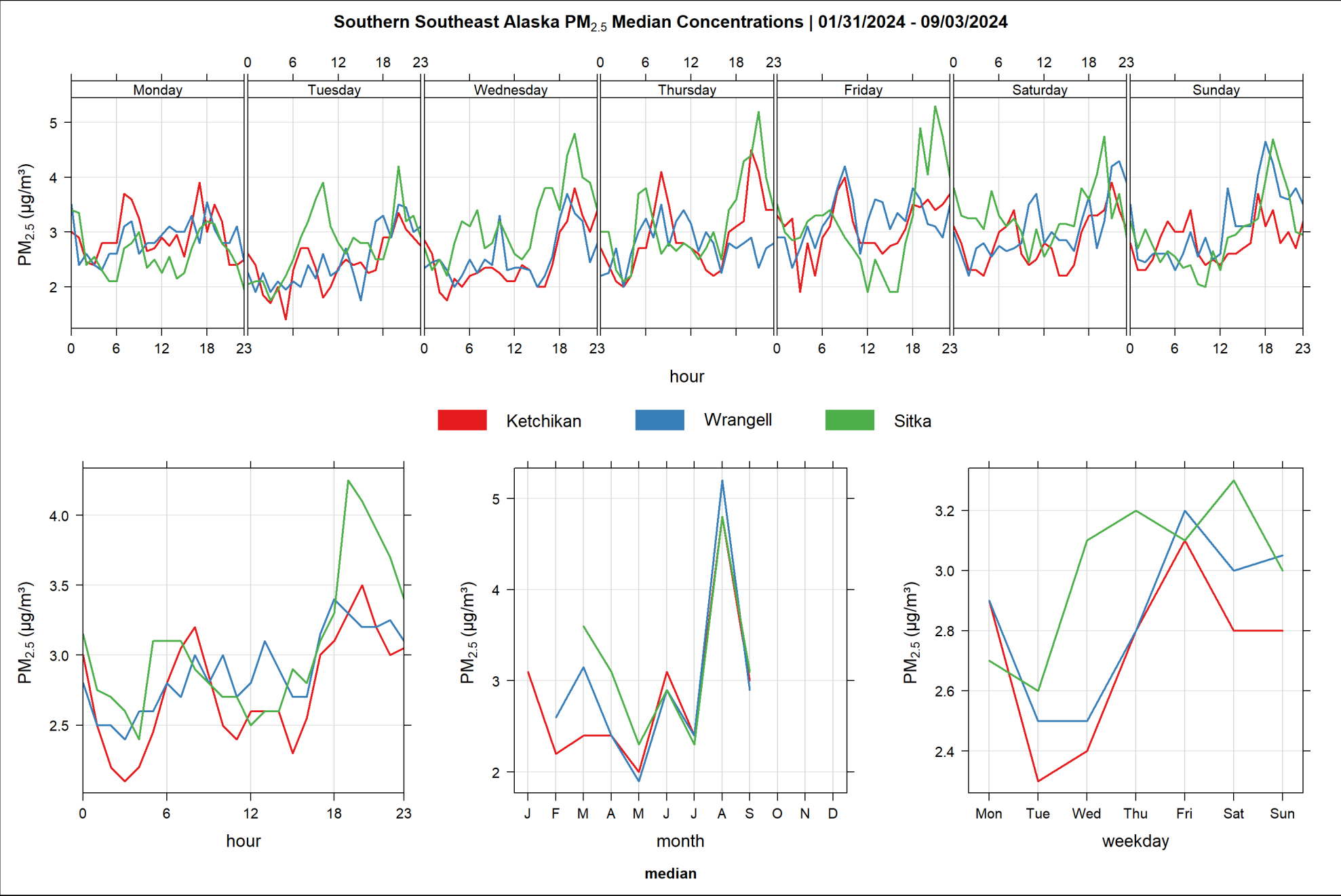


Juneau 5th Avenue PM2.5 AQI in July

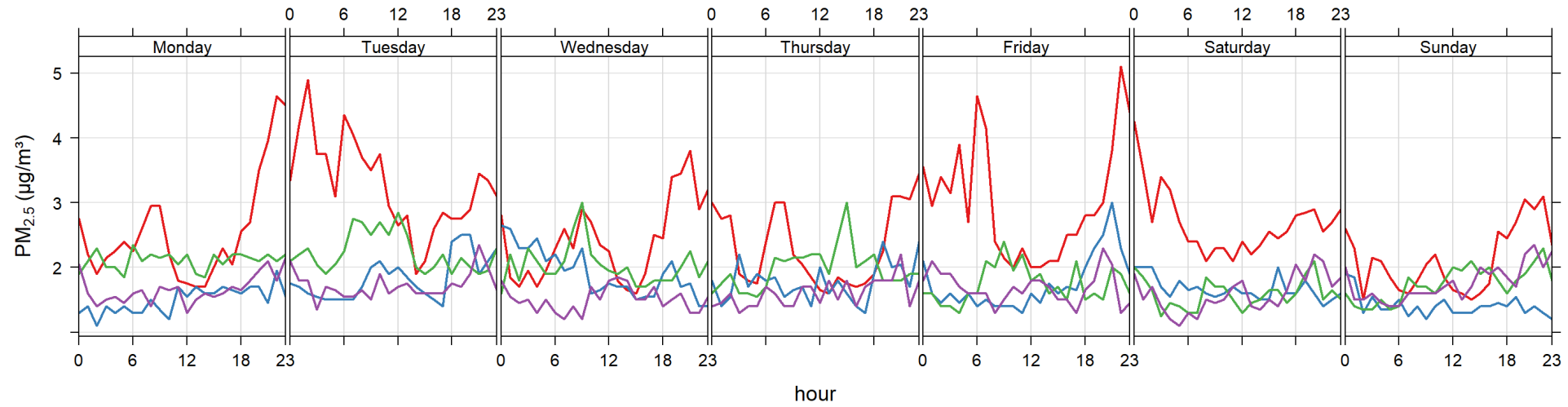


Sensors by Ecoregion

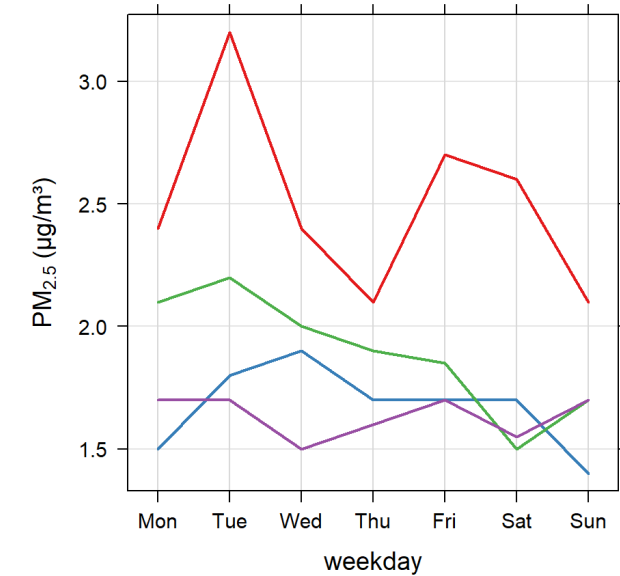
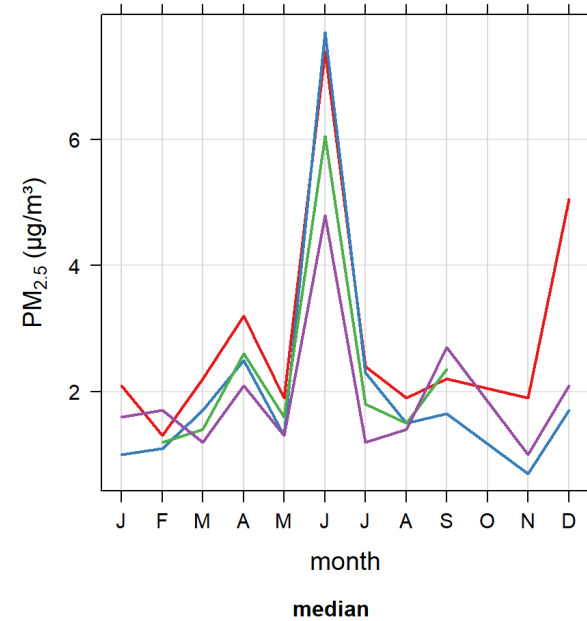
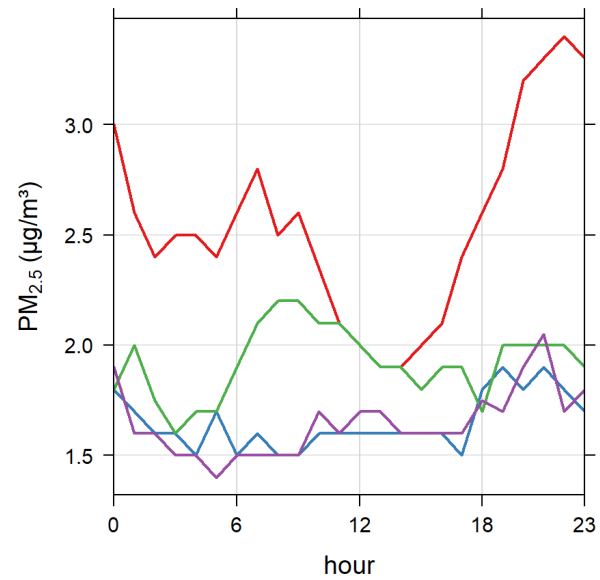




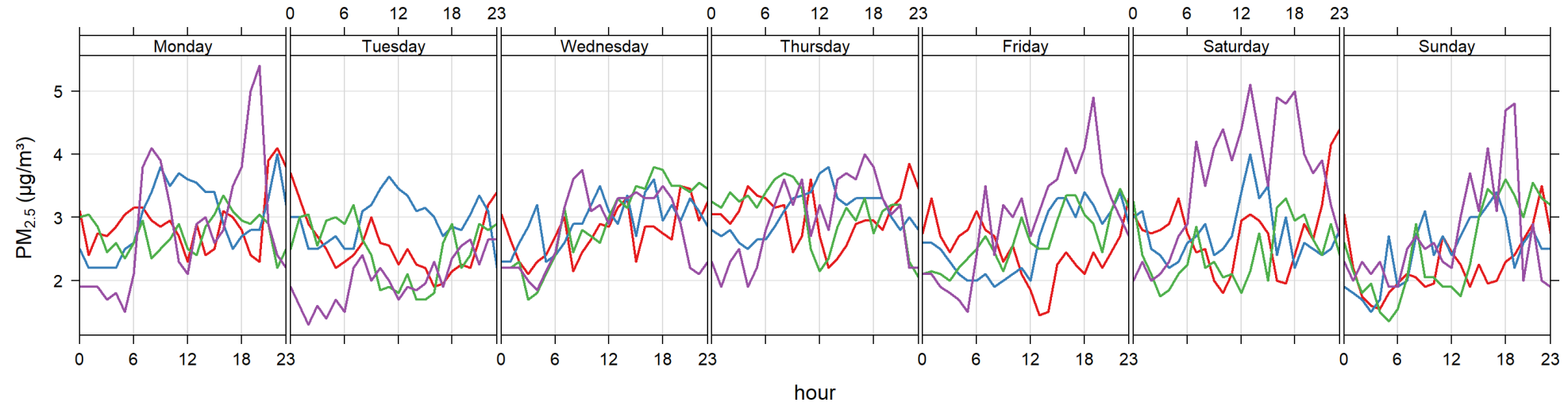
Interior Alaska PM_{2.5} Median Concentrations | 10/27/2023 - 09/03/2024



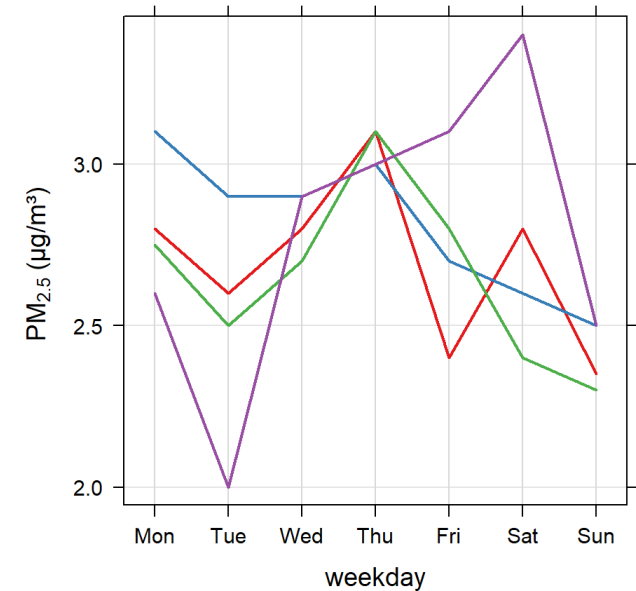
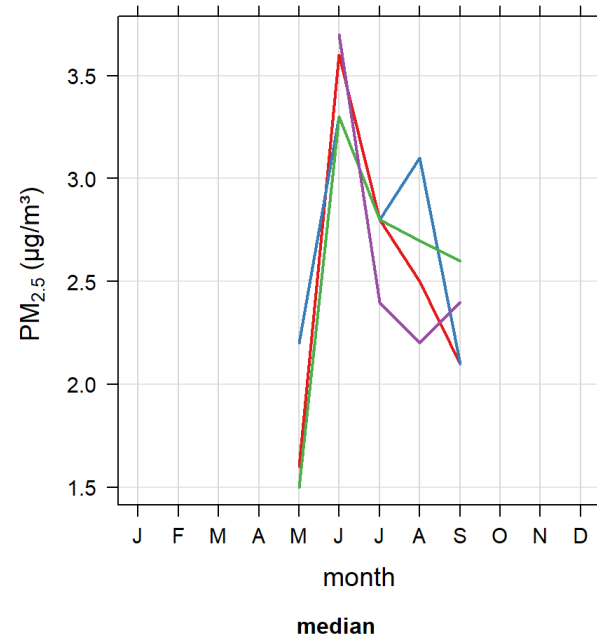
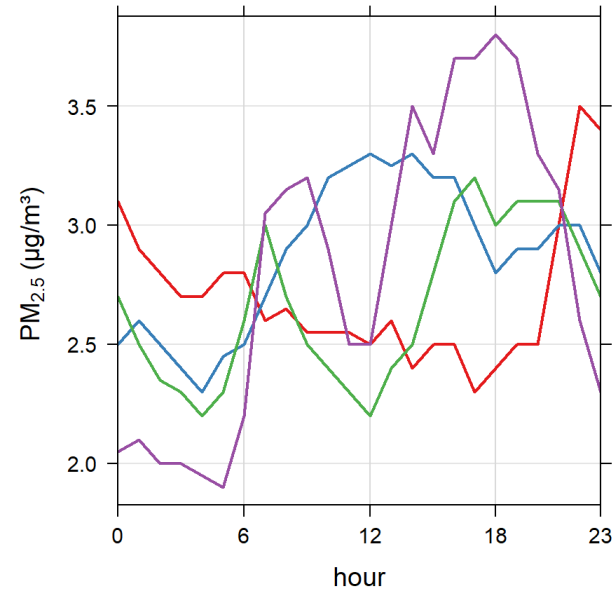
■ Tok
 ■ Delta
 ■ Goldstream
 ■ Galena



Southcentral Alaska PM_{2.5} Median Concentrations | 05/13/2024 - 09/03/2024



■ Soldotna
 ■ Ninilchik
 ■ Homer
 ■ Seward



Interested about a specific sensor within a range of dates?

- ▶ Community Sensor Network Diurnal Comparisons





Rowing in the same direction

- ▶ **Looking for Community Champions**
 - ▶ Finding a location and deployment
 - ▶ Receive training on sensor
 - ▶ Join the network! On the map, network calls, semiannual data reports
 - ▶ Data available at request
- ▶ **We want to host your air quality data on our website!**
- ▶ **Researching new sensor technology**
- ▶ **DEC sensor network collaboration**
 - ▶ Contact us for direct collaboration
 - ▶ Future calls and knowledge share
 - ▶ Semiannual data report- what do you want to see?



Local Air Quality Observations

Link for: [Local Air Quality Observations jot form](#)

Local Air Quality Observations

This form serves as a repository for Alaska Department of Environmental Conservation's Air Monitoring and Quality Assurance (DEC AMQA) team to collect observations on local conditions or events in a community that may impact air quality or air quality sensor data validity.

What community sensor do you have a local observation for? *

What time does this local condition/event start?



Date

Hour Minutes

What time does this local condition/event start?



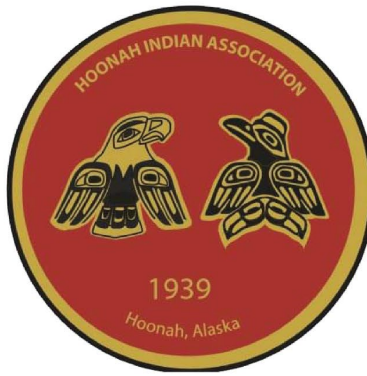
Date

Hour Minutes

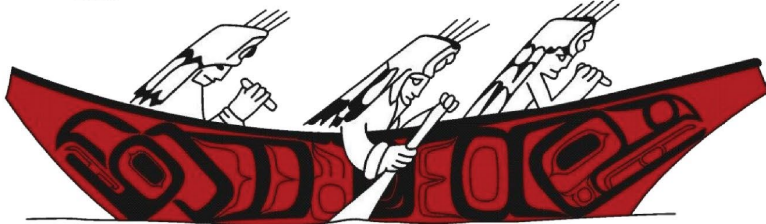
What local condition or event occurred?

Please provide any additional details about what you observed if you have any. For example: does this observation seem out of the norm for your local community?





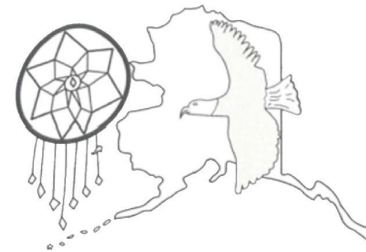
**NORTON SOUND
HEALTH CORPORATION**



Chilkoot Indian Association



Kenai Peninsula College
UNIVERSITY of ALASKA ANCHORAGE



Louden Tribe



- Tok Community Library
- Ninilchik Library
- Soldotna Senior Center
- Big Lake Public Library
- Palmer Public Library
- Cathedral of the Nativity of the Blessed Virgin Mary

Thank you for your support!



Questions

- ▶ Next quarterly call date: December 10th @ 10-11am. Link in chat will take you to registration and will be emailed to our contact list.
- ▶ Visit our [Air Quality Index Map](#) (or Google 'Alaska air quality' and look for DEC AQI link)
- ▶ Contact info is in chat and in QR code

Resources

- ▶ Not sure what sensor to buy?
 - ▶ EPA Air Sensor Toolbox: epa.gov/air-sensor-toolbox
 - ▶ South Coast AQMD's AQ-SPEC program and evaluations: aqmd.gov/aq-spec
 - ▶ Contact us!
- ▶ ANTHC's PurpleAir program – contact Ida Clark

Contact us

