Lower Eastern Shore Ambient Air Monitoring Project

Air and Radiation Administration, Ambient Air Monitoring Program

Project Map

Air Monitoring Project
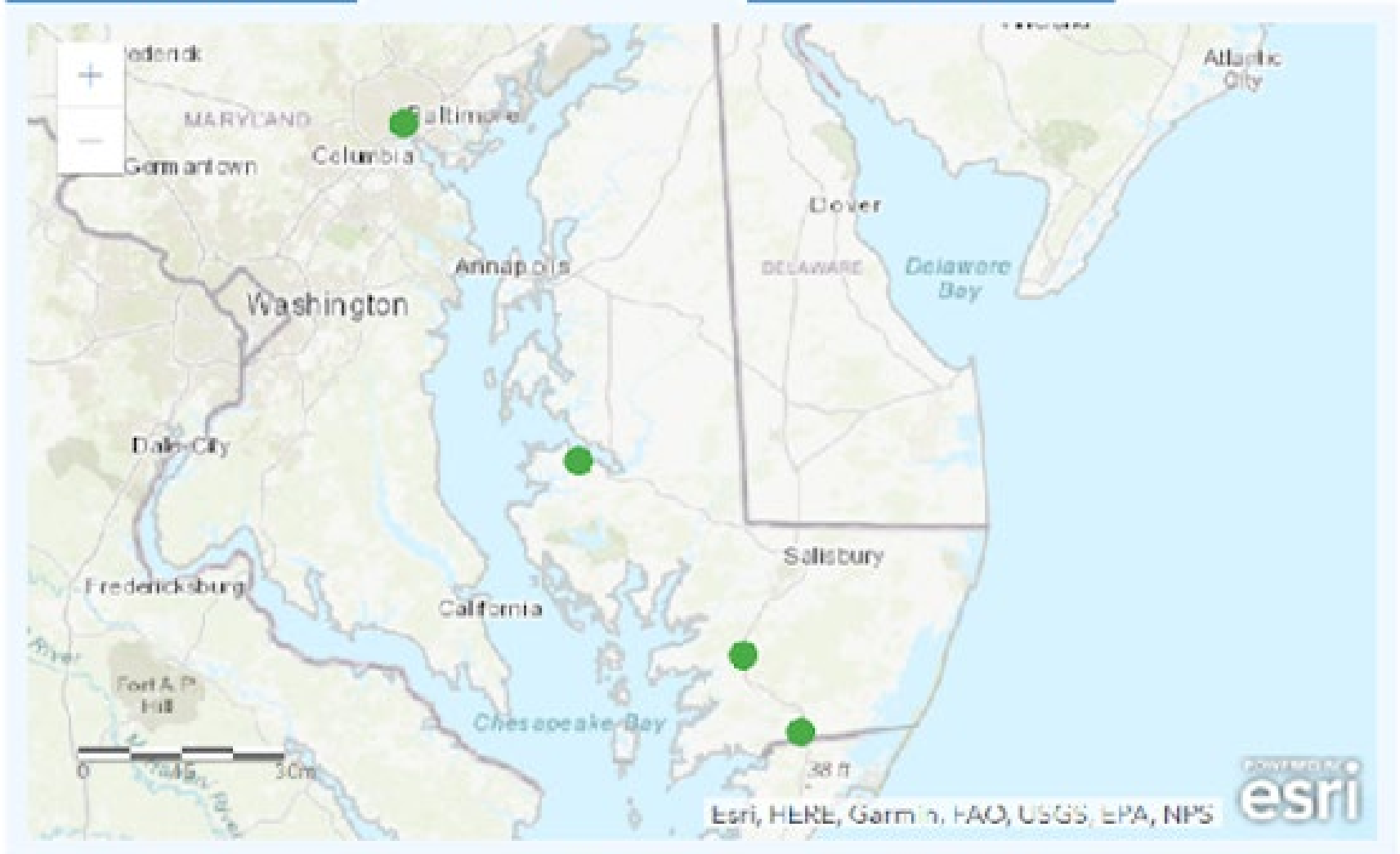
- **Objectives**

  - Collect ambient air quality data near poultry houses for one year

  - Compare to controls
    - 2 experimental sites
    - 2 control sites

  - Publicly available in near real time
    - https://mde.maryland.gov/programs/Air/AirQualityMonitoring/Pages/Lower-Eastern-Shore-Monitoring-Project.aspx

  - EPA siting criteria used for site selection

NH3 Analyzer rack with data logger and calibration system

Project Website

Downloadable Hourly Data and Summaries

	Monthly Summary	Hourly Data	Project Summary (to date)
			✓
September - 2020	✓	✓	
August - 2020	✓	✓	
July - 2020	✓	✓	
June 2020	✓	✓	
May - 2020	✓	✓	
April - 2020	✓	✓	

Lower Eastern Shore Air Monitoring Project - September 2020 Summary

September 2020 Data Summary for NH₃   MDE 1-hour screening level = 350 ppb

Parameter	Site	Average hourly value (ppb)	Median hourly value (ppb)	Maximum hourly value (ppb)	Minimum hourly value (ppb)
NH₃	Oldtown (Urban, no poultry operations)	7.7	7.6	14.7	1.8
	Horn Point (Rural, no poultry operations)	2.5	2.5	5.9	0.9
	Princess Anne (Low poultry operation density)	2.8	2.6	11.6	0.8
	Pocomoke City (High poultry operation density)	8.5	6.4	119.8	0.2

September 2020 Data Summary for PM₂.₅   NAAQS PM₂.₅ 24-hour standard = 35 µg/m³

Parameter	Site	Average 24-hr value (µg/m³)	Median 24-hr value (µg/m³)	Maximum 24-hr value (µg/m³)	Minimum 24-hr value (µg/m³)
PM₂.₅	Oldtown (Urban, no poultry operations)	4.5	4.2	9.6	1.7
	Horn Point (Rural, no poultry operations)	2.6	2.7	5.9	-0.6
	Princess Anne (Low poultry operation density)	5.9	5.5	11.1	3.7
	Pocomoke City (High poultry operation density)	5.6	5.3	10.9	3.6

Group: LES data summary Monthly: 09/2020 Type: AVG 1 Hr.

Date & Time	OLD TOWN NH3 ppb	HORN POINT NH3 ppb	Princess Anne NH3 ppb
9/1/2020 12:00 AM	7.6	2.1	3.3
9/1/2020 1:00 AM	7.6	2	3.1
9/1/2020 2:00 AM	Calibration	Calibration	Calibration
9/1/2020 3:00 AM	Calibration	Calibration	Calibration
9/1/2020 4:00 AM	3Span	5Span	3Span
9/1/2020 5:00 AM	3Span	5Span	3Span
9/1/2020 6:00 AM	Calibration	Calibration	Calibration
9/1/2020 7:00 AM	Purge	Purge	Purge
9/1/2020 8:00 AM	Purge	Purge	Purge
9/1/2020 9:00 AM	9.6	4.3	6.3
9/1/2020 10:00 AM	11	3.8	6
9/1/2020 11:00 AM	9.4	3.3	6.5
9/1/2020 12:00 PM	9.7	3.1	5.6
9/1/2020 1:00 PM	10.8	2.9	4.8
9/1/2020 2:00 PM	11.2	2.9	4
9/1/2020 3:00 PM	11.6	2.8	3.9
9/1/2020 4:00 PM	10.9	3.1	3.5
9/1/2020 5:00 PM	11	2.9	3.2
9/1/2020 6:00 PM	11	3.2	2.9
9/1/2020 7:00 PM	13.1	3.2	2.7
9/1/2020 8:00 PM	12.4	3.1	2.6
9/1/2020 9:00 PM	11.1	2.9	2.5
9/1/2020 10:00 PM	10.7	2.8	2.2
9/1/2020 11:00 PM	10	3.4	2
9/2/2020 12:00 AM	9.6	3.4	1.8

- Monthly and hourly data files are available on the project website along with a summary to date PDF data file

4

Project Sites

- **Four Ammonia Sites:**

  ➢ Two sites configured on the lower shore:

  　➢ One located in a high density poultry houses location

  　➢ Second site located lower density poultry houses

  ➢ Other two Ammonia Sites

  　➢ Horn Point station Dorchester County

  　➢ Oldtown station in Baltimore City

Pocomoke City Site

Ambient Air Monitoring Project

- **Monitoring Methods:**

  - Ammonia (NH$_3$)]

    - EPA approved method

    - No Federal ambient air health standard for Ammonia
      - Data compared to:
        - 1-hour MDE Air Toxics Screening of 350 ppb

  - Fine Particulate Matter (PM 2.5) and Coarse Particulate Matter (PM 10)
    - Federally approved sampling methods
    - Data compared to:
      - 24-hour NAAQS (National Ambient Air Quality Standards)

  - Meteorological parameters
    - Wind speed/direction
    - Temperature
    - Rain…

Princess Anne Site

6

Project Map
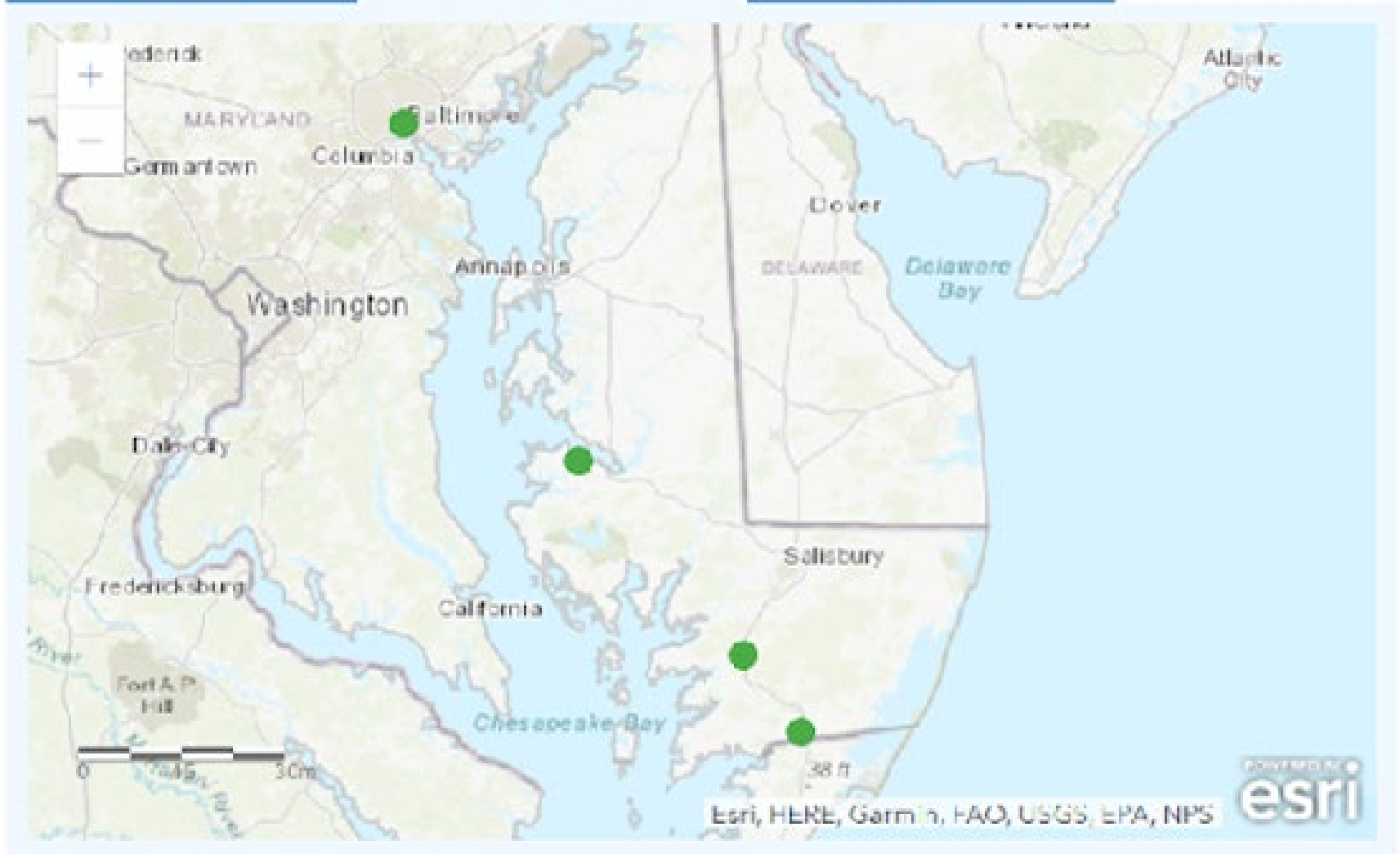
Sites: High Density vs Low Density

Pocomoke City
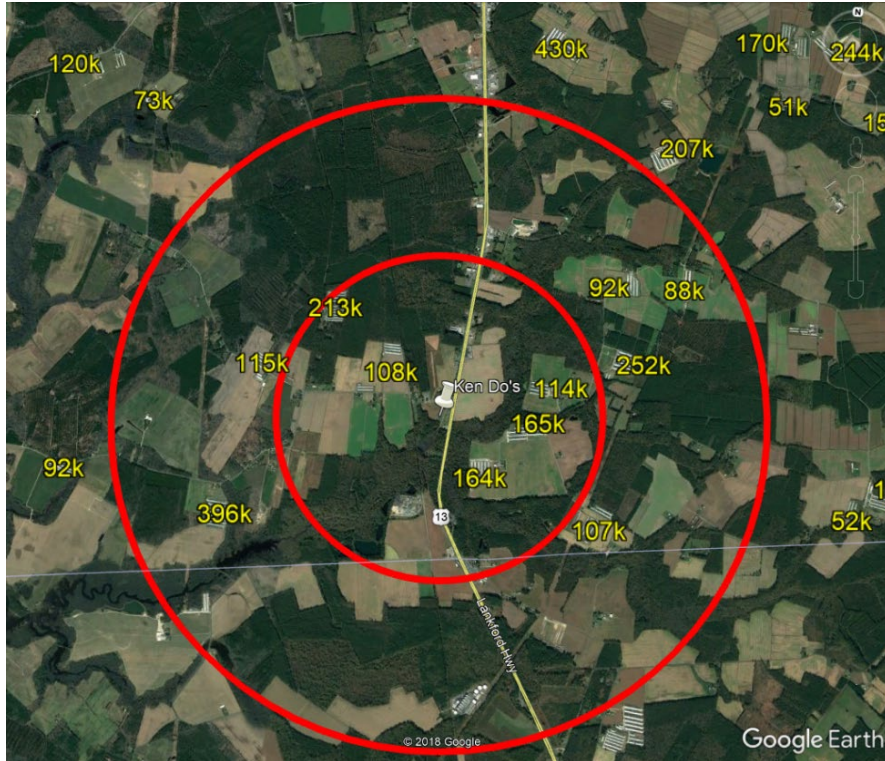
Princess Anne

Higher

- 29 broiler houses within a 1-mile radius

- 70 houses within a 2-mile radius

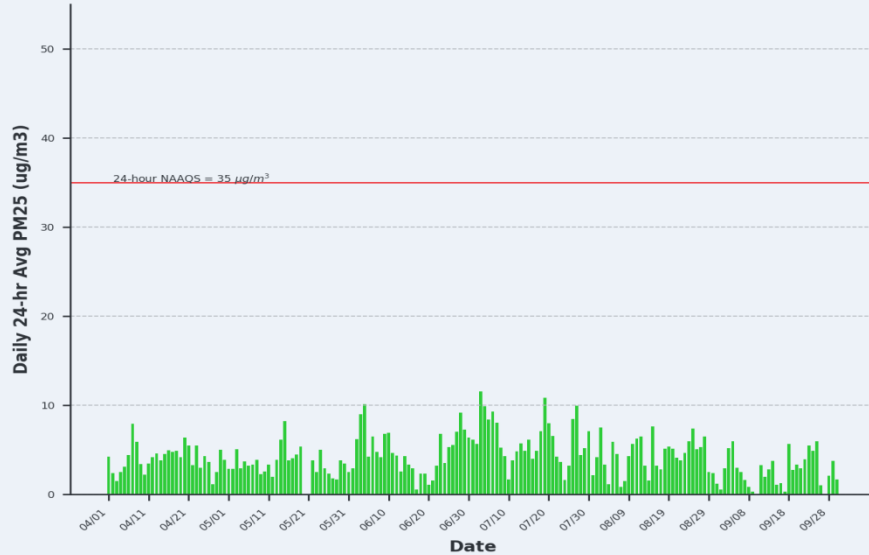- More poultry houses outside of 2-mile radius
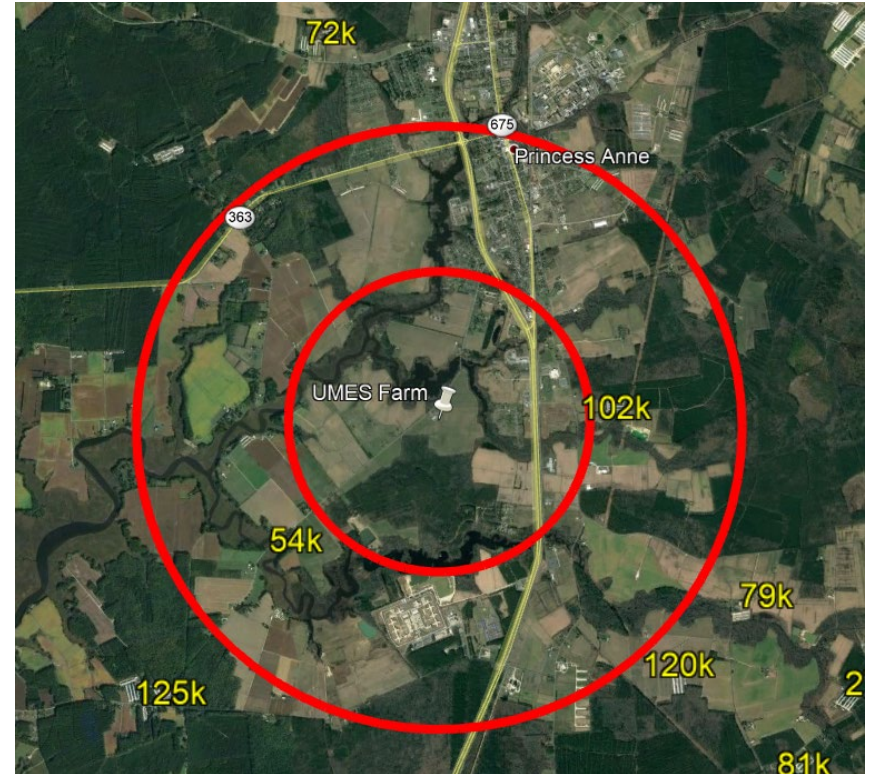
Lower

- No broiler houses within a 1-mile radius

- 7 houses within a 2-mile radius.

- More poultry houses outside 2-mile radius

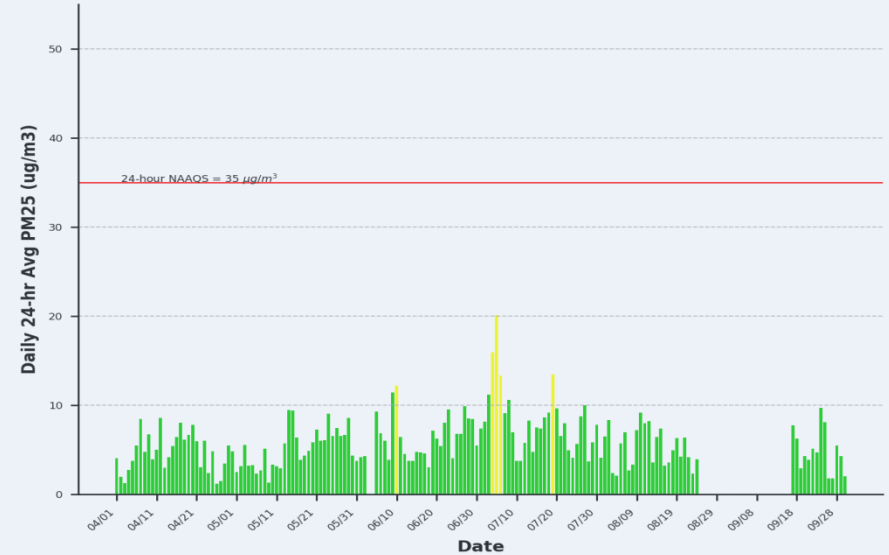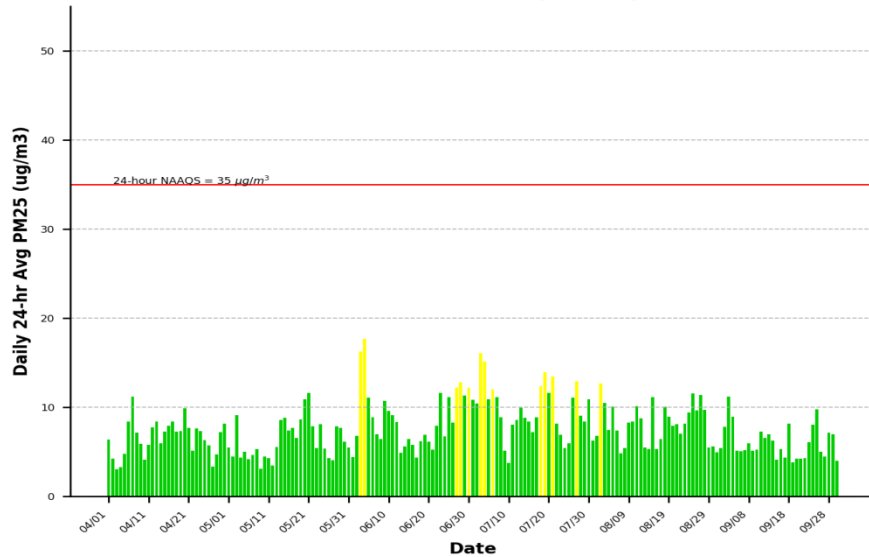# Time Series Charts PM$_{2.5}$
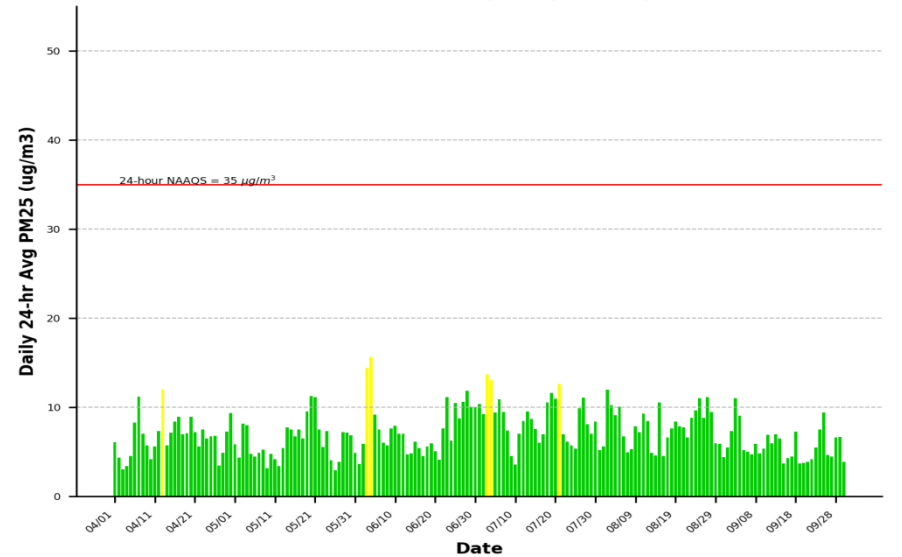
PM2.5 Summary To Date

2020 (April-September) Data Summary for PM2.5   **NAAQS PM2.5 24-hr standard = 35 µg/m³**

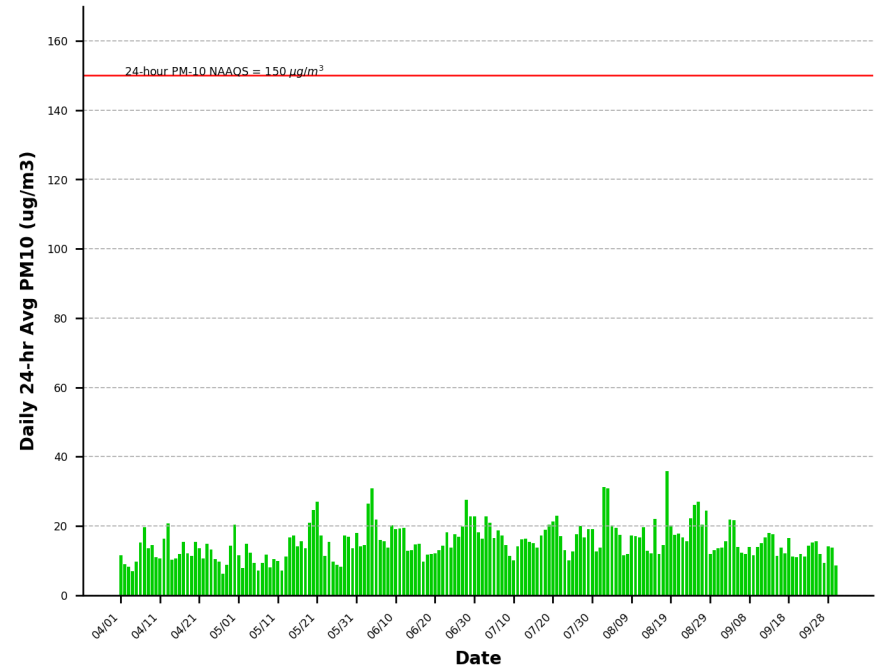| Pollutant	Site	Average 24-hr Value (µg/m³)	Median 24-hr value (µg/m³)	Maximum 24-hr value (µg/m³)	Minimum 24-hr value (µg/m³)
PM2.5	Oldtown (Urban, no poultry operations)	5.8	5.5	20	1.1
	Horn Point (Rural, no poultry operations)	4.1	4.0	11.5	0
	Princess Anne (Low poultry operation density)	7.4	7.1	17.6	2.9
	Pocomoke City (High poultry operation density)	6.9	6.8	15.6	2.8

Time Series Charts PM$_{10}$

PM10 Pocomoke City - April-Sept 2020
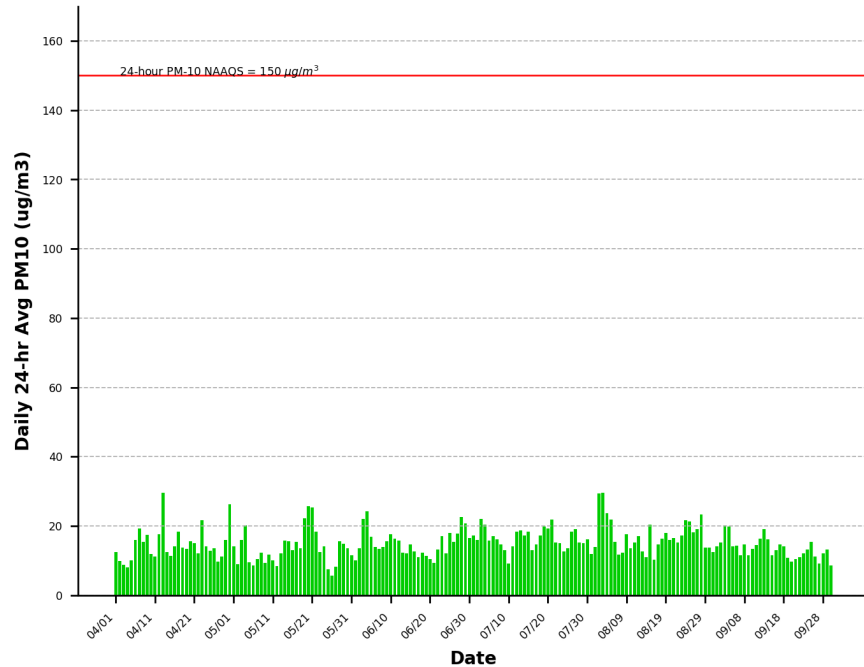
PM10 Princess Anne - April-Sept 2020

Oldtown and Horn Point stations measure PM$_{10}$ with manual filter method.

Project Summary To Date
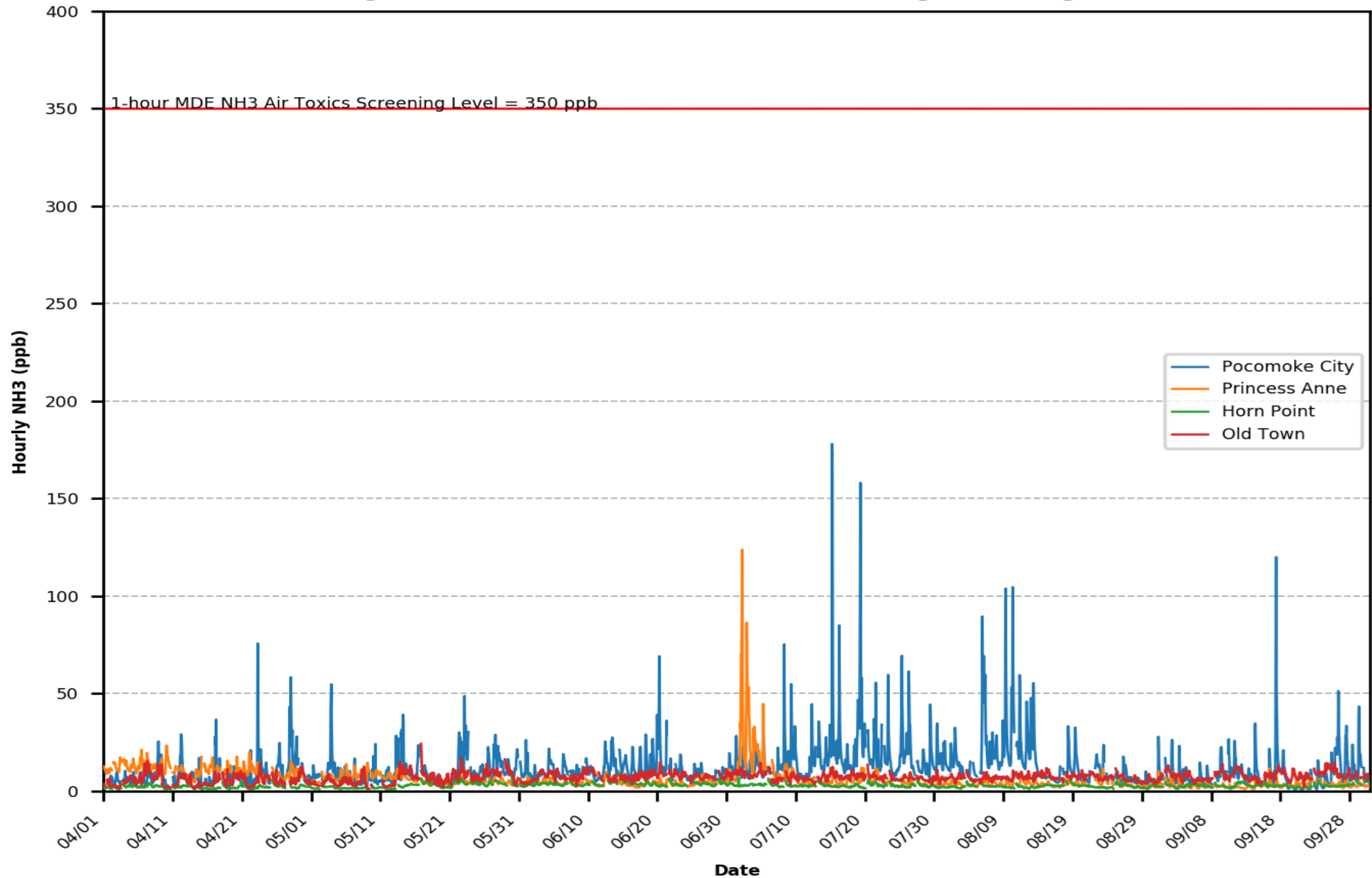
2020 (April-September) Data Summary for PM10   **NAAQS PM10 24-hr standard = 150 µg/m³**

Pollutant	Site	Average 24-hr Value (µg/m³)	Median 24-hr value (µg/m³)	Maximum 24-hr value (µg/m³)	Minimum 24-hr value (µg/m³)
PM10	Oldtown* (Urban, no poultry operations)	12.7	12.4	23.1	3
	Horn Point* (Rural, no poultry operations)	9.7	9.6	19.9	2.2
	Princess Anne (Low poultry operation density)	15.3	14.5	35.8	6.2
	Pocomoke City (High poultry operation density)	14.8	14.4	29.5	5.6

Oldtown and Horn Point stations measure PM_{10} with an FRM manual filter method. Values shown are through September 1, 2020

Hourly NH3 Concentrations - April-Sept 2020

NH3 Summary To Date

2020 (April-September) Data Summary for NH3   **MDE 1-hr screening level = 350 ppb**

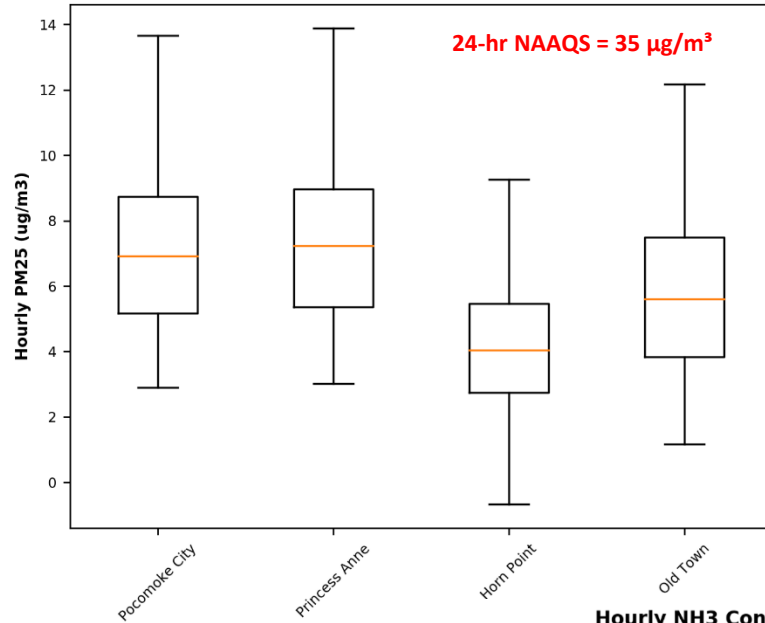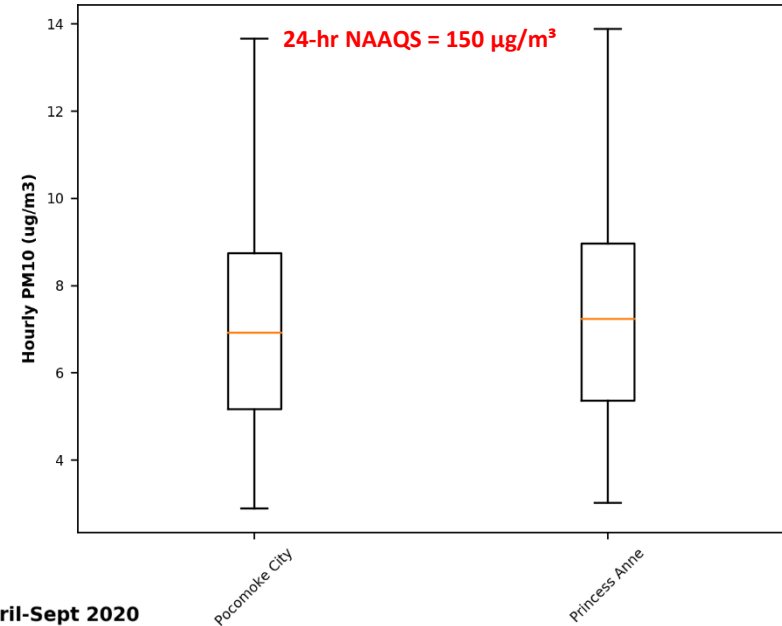| Pollutant	Site	Average Hourly Value (ppb)	Median hourly value (ppb)	Maximum hourly value (ppb)	Minimum hourly value (ppb)
NH3	Oldtown (Urban, no poultry operations)	6.7	6.7	24.2	0.7
	Horn Point (Rural, no poultry operations)	2.5	2.5	9.4	0.5
	Princess Anne (Low poultry operation density)	5.8	4.4	123.6	0.8
	Pocomoke City (High poultry operation density)	11.4	8.5	177.8	0.2

Thank You

Instrumentation

- Continuous Ammonia

- PM fine (PM 2.5)

- Coarse PM (PM10)

- Meteorology

Ammonia Analyzer

PM 10 & 2.5 Monitor

Met Station

For any techies: a T201 NH_3 Analyzer, a T640X PM Mass Monitor and a Vaisala WXT 536 Meteorological Station