



Bureau of Air Quality



# **Ambient Air Quality in PA During COVID-19 Pandemic**

**Air Quality Technical Advisory Committee  
Meeting**

**August 13, 2020**

**Via Webinar**

Tom Wolf, Governor

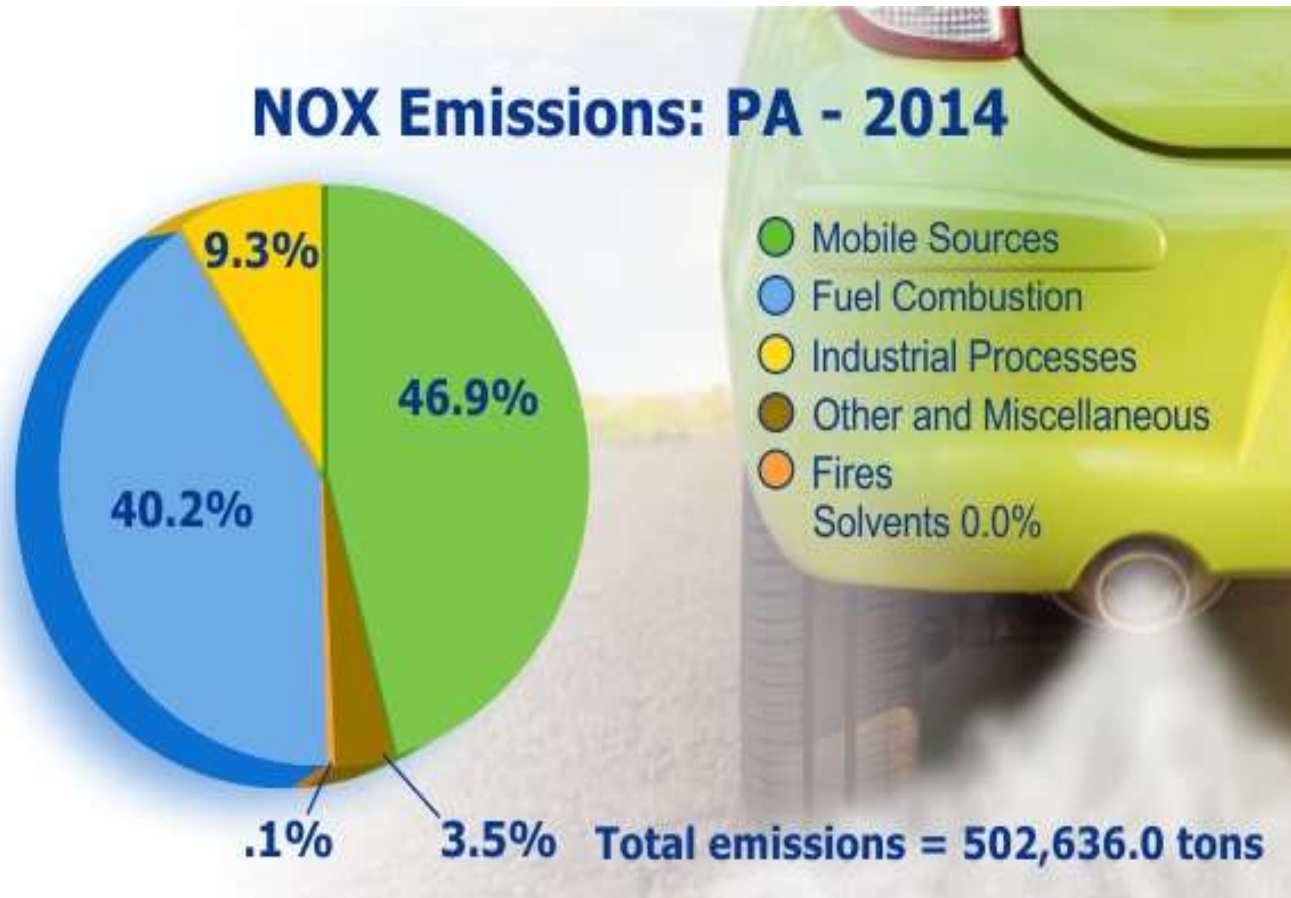
Patrick McDonnell, Secretary

# Agenda

- Focus on Three Pollutants:
  - $\text{NO}_2$  ( $\text{NO}_x$ ), Ozone, and Black Carbon
- Emission Trends – 2019 vs. 2020
  - Vehicles: Traffic Counts
- Satellite Data – 2019 vs. 2020
  - TROPOMI  $\text{NO}_2$  Satellite Data
- Air Monitoring Trends – 2019 vs. 2020

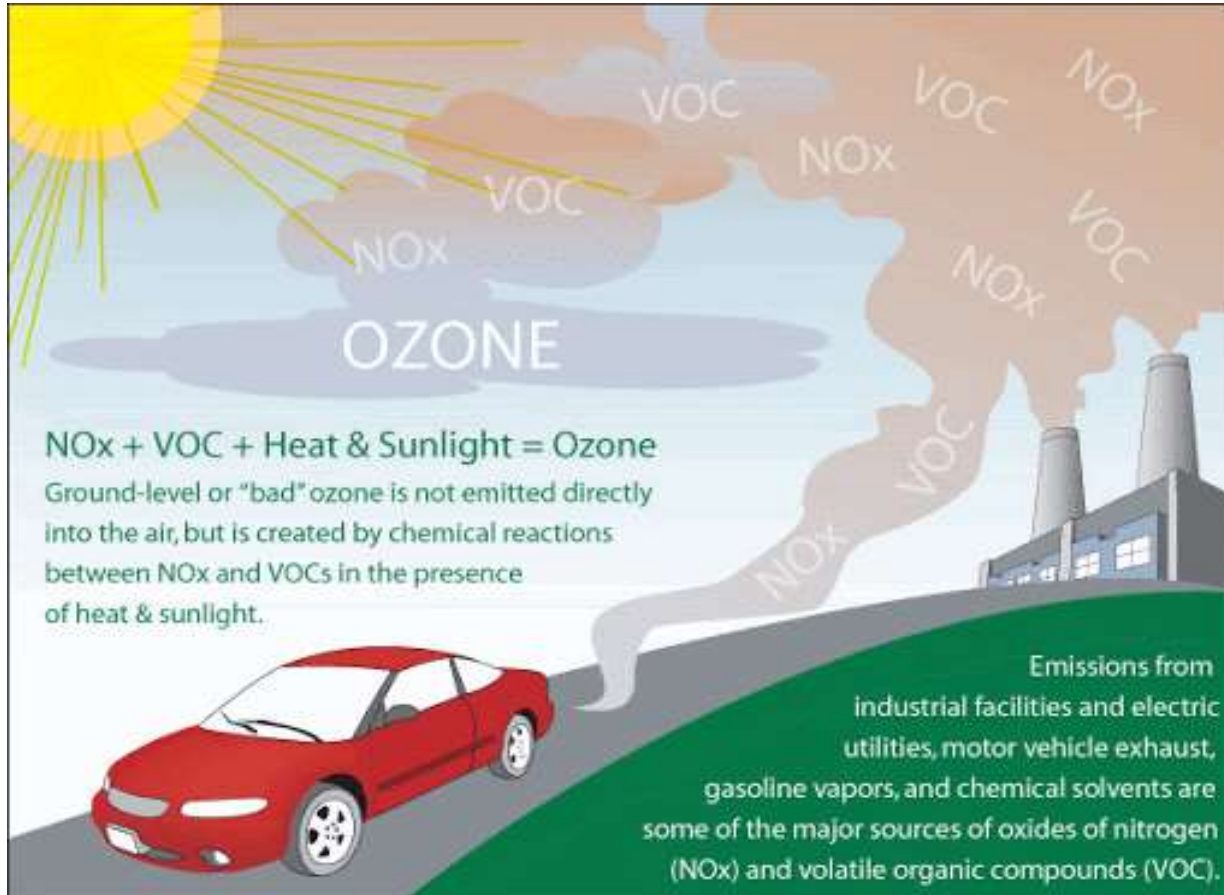
# The Three Air Pollutants: NO<sub>2</sub>, Ozone, and Black Carbon

# The Air Pollutants – NO2



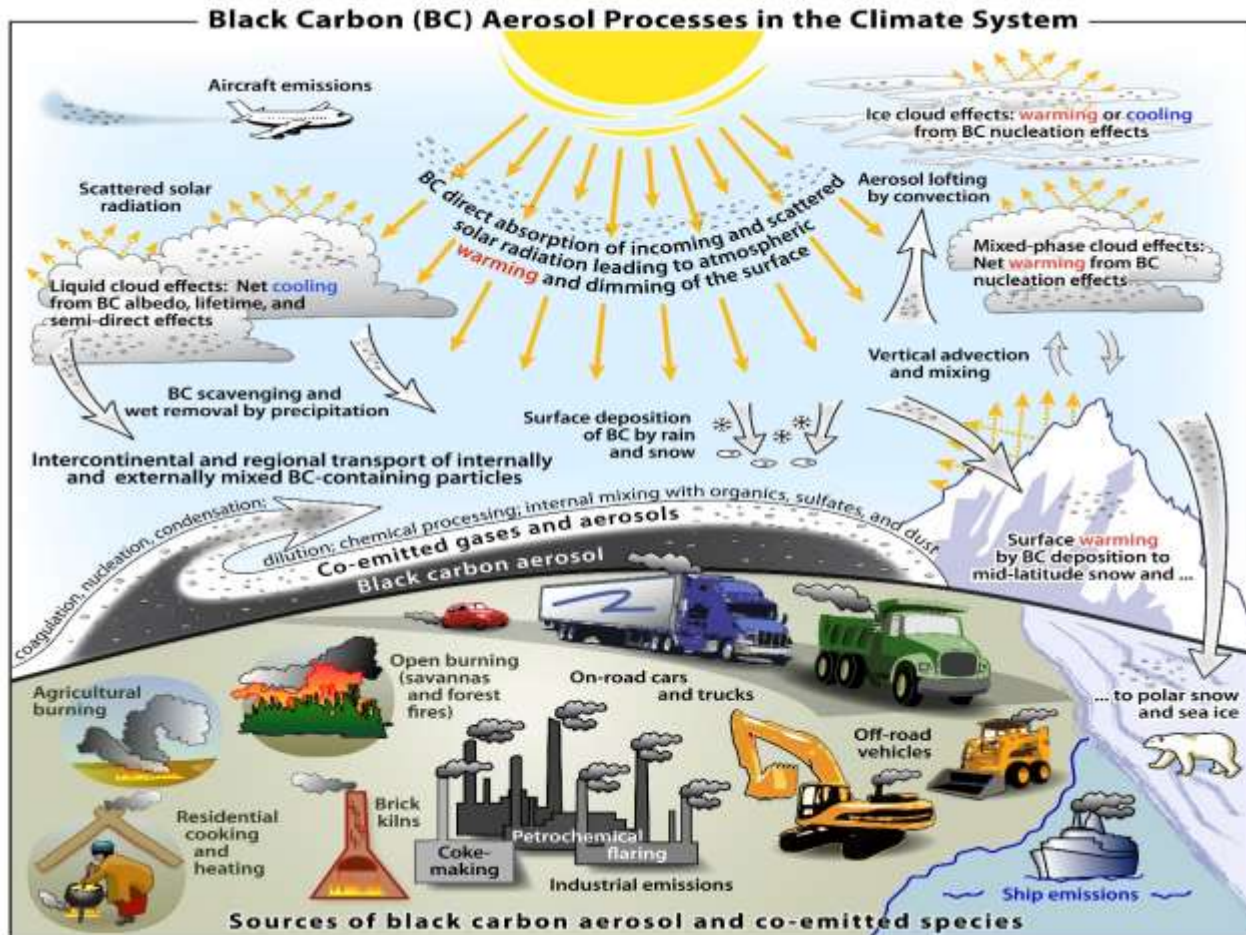
Source: PADEP's Driving PA Forward Campaign

# The Air Pollutants – Ozone



Source: The Ozone Hole website

# The Air Pollutants – Black Carbon



Source: Phys.org website

# 2019-20 PADEP Analysis Timeline

## Stay At Home Period (First 42 Days)

COVID Day:

1

21

42

2019: Monday, March 18, 2019      Sunday, April 7, 2019      Sunday, April 28, 2019

2020: Monday, March 16, 2020      Sunday, April 5, 2020      Sunday, April 26, 2020



2019: Friday, May 10, 2019      Saturday, May 25, 2019      Sunday, June 9, 2019

2020: Friday, May 8, 2020      Saturday, May 23, 2020      Sunday, June 7, 2020

COVID Day:

54

69

84

## Loosening Period (31 Days)

# Vehicles: Traffic Counts 2019 vs. 2020



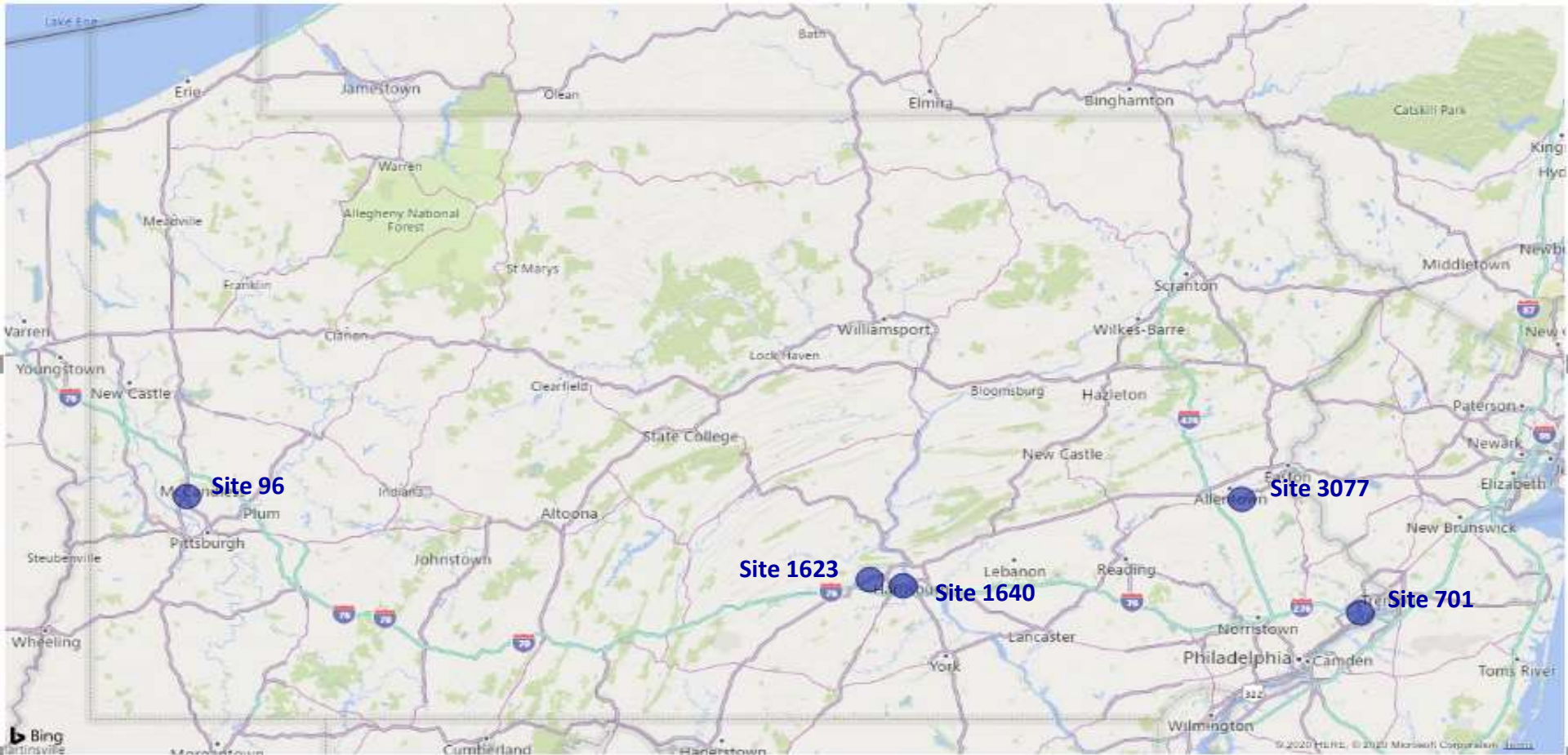
## Stay At Home Period

Monday, March 16, 2020

to

Sunday, April 26, 2020

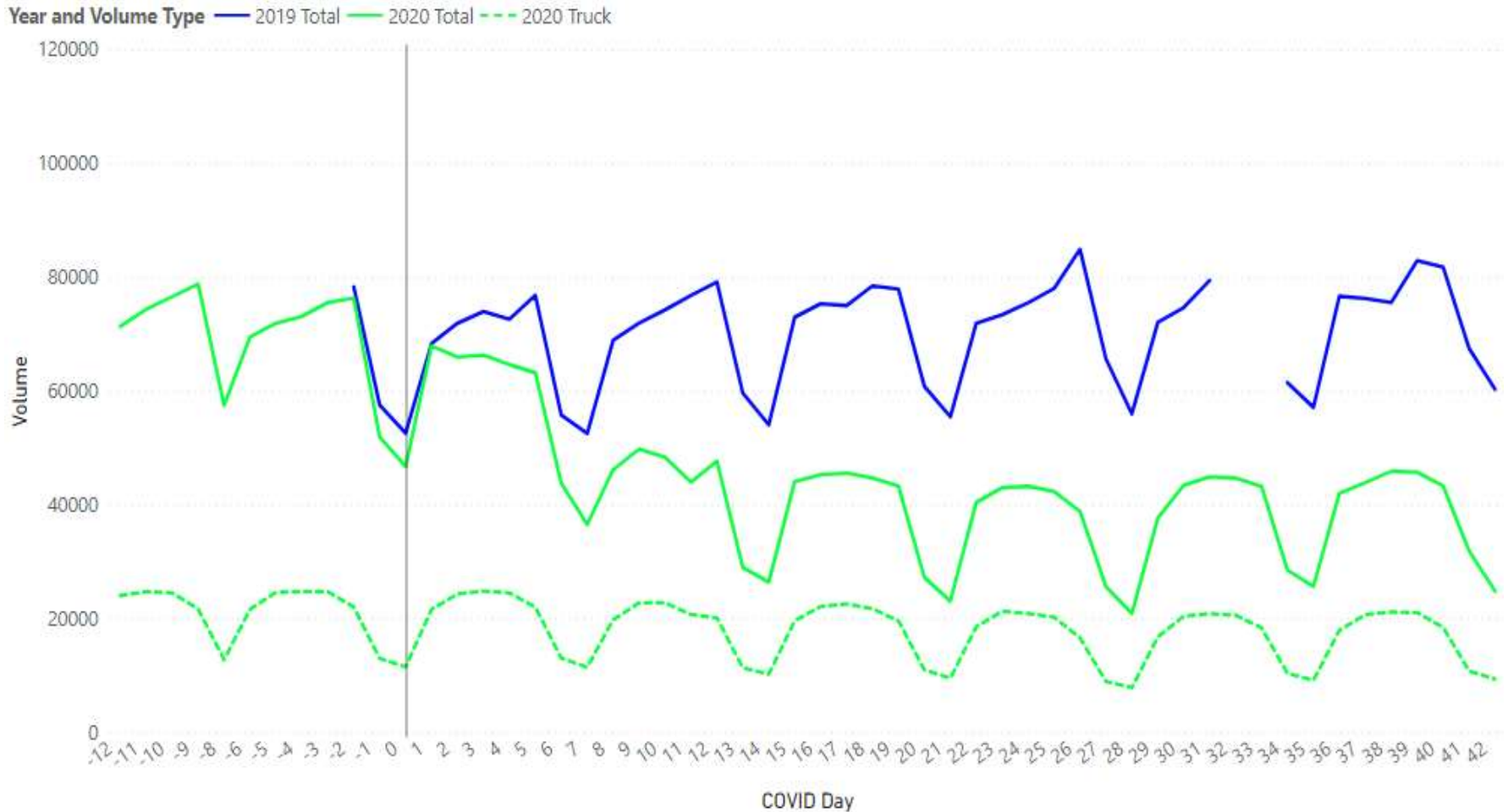
# PennDOT Traffic Monitor Locations



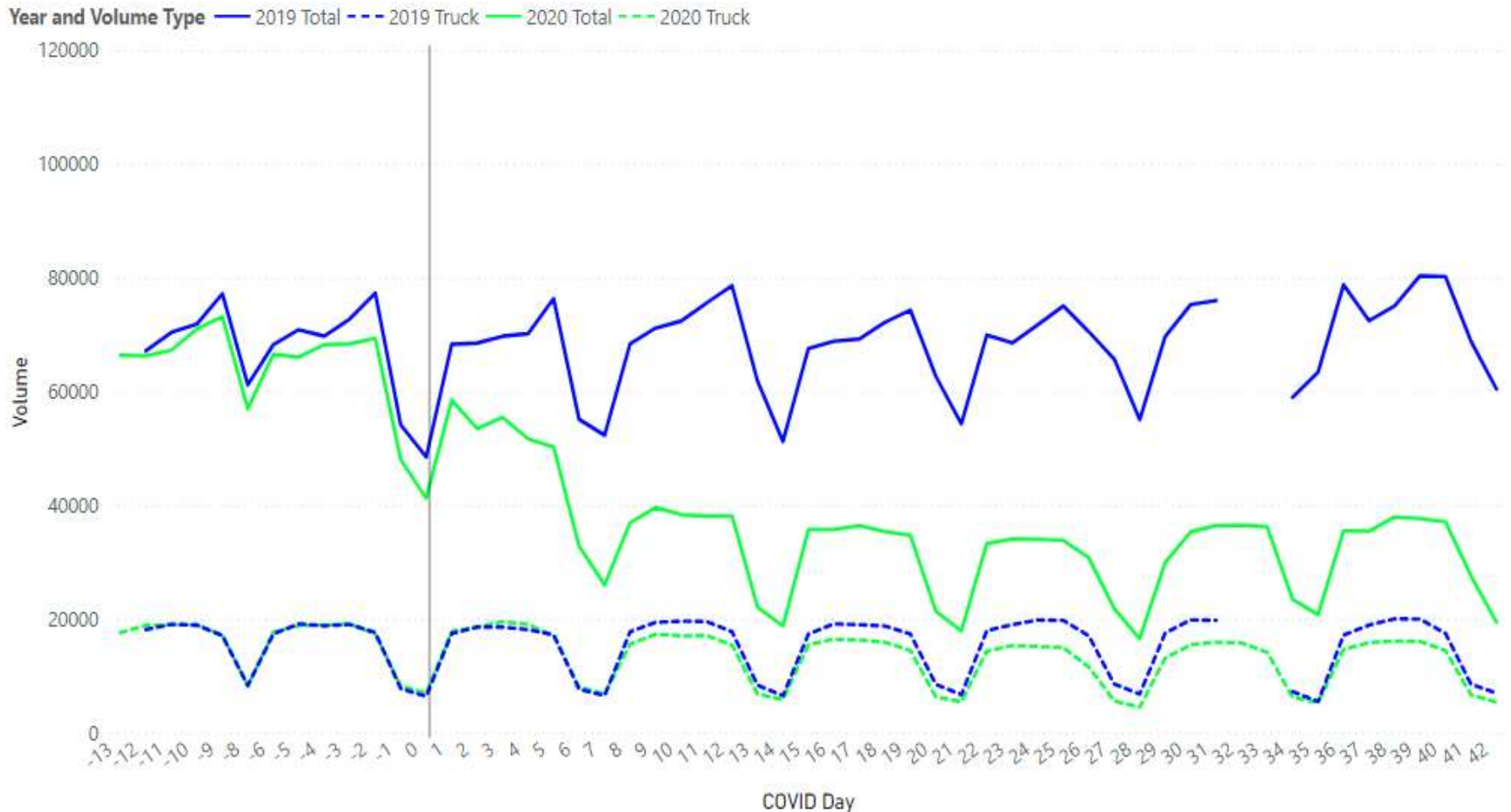
# Daily Traffic Counts – Site 96 (I-279, Pittsburgh)



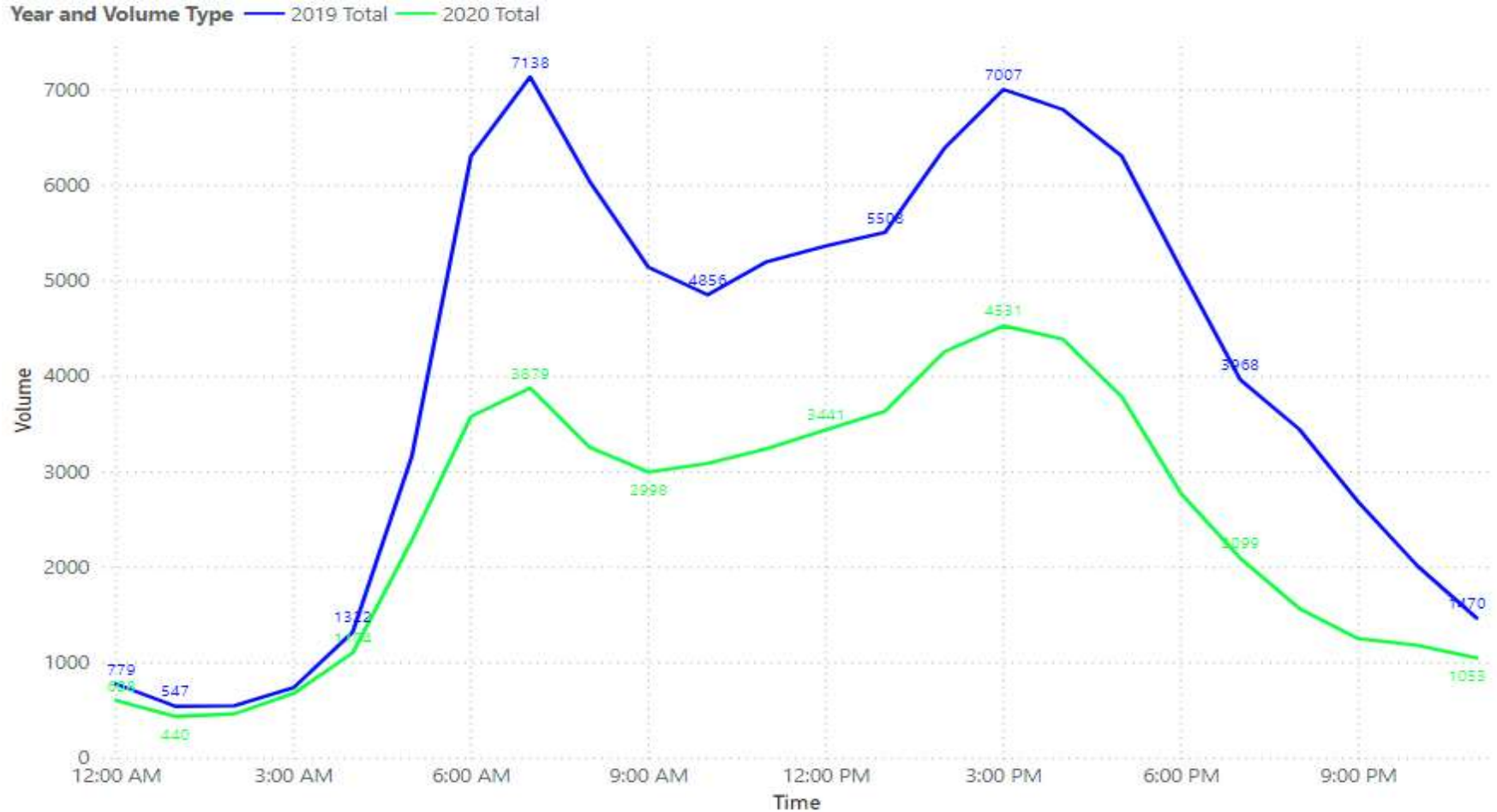
# Daily Traffic Counts – Site 1623 (I-81, Carlisle)



# Daily Traffic Counts – Site 3077 (I-78, Allentown)

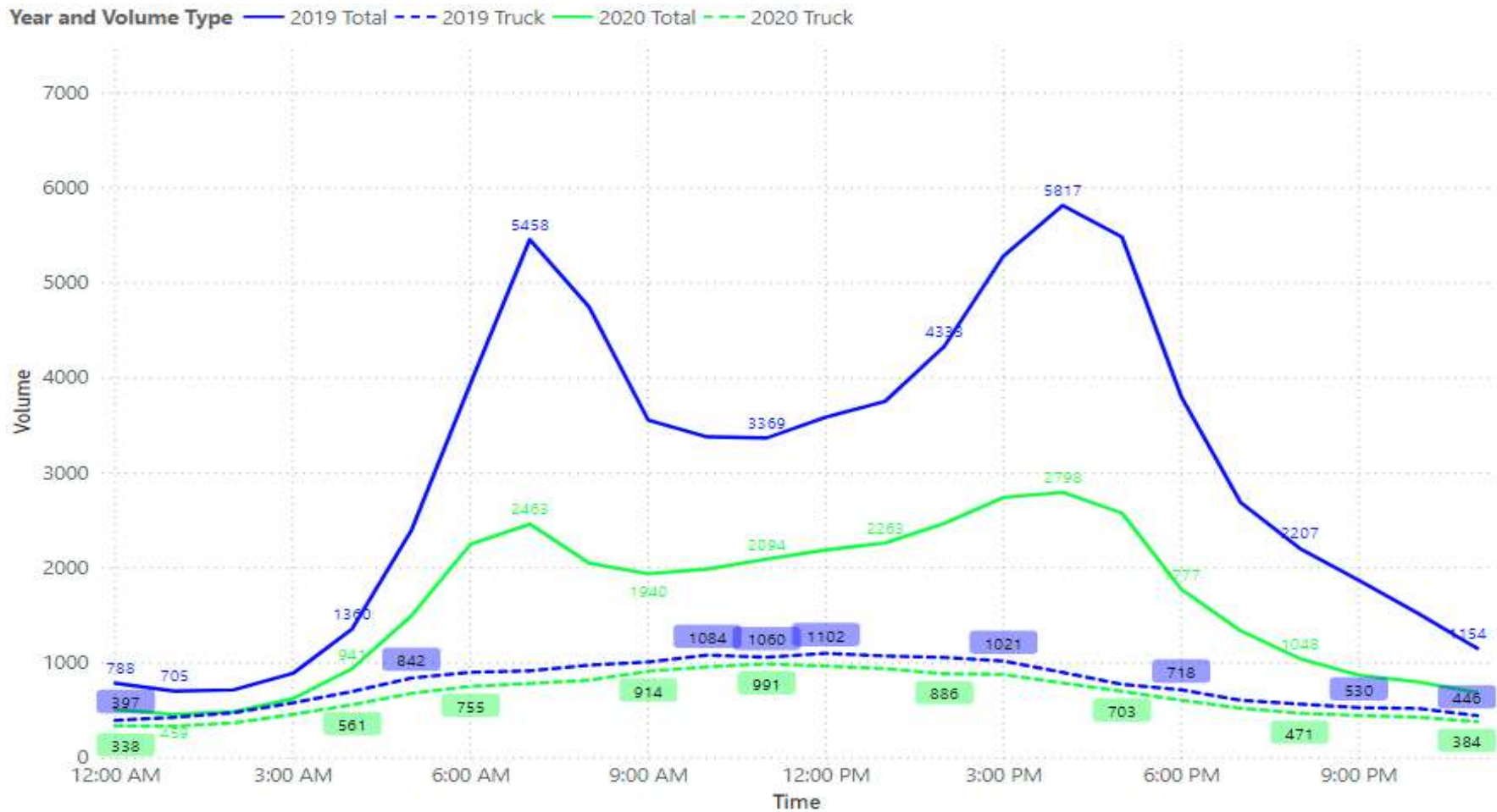


# Hour Traffic Counts – Site 1640 (Rt. 581, Hbg)



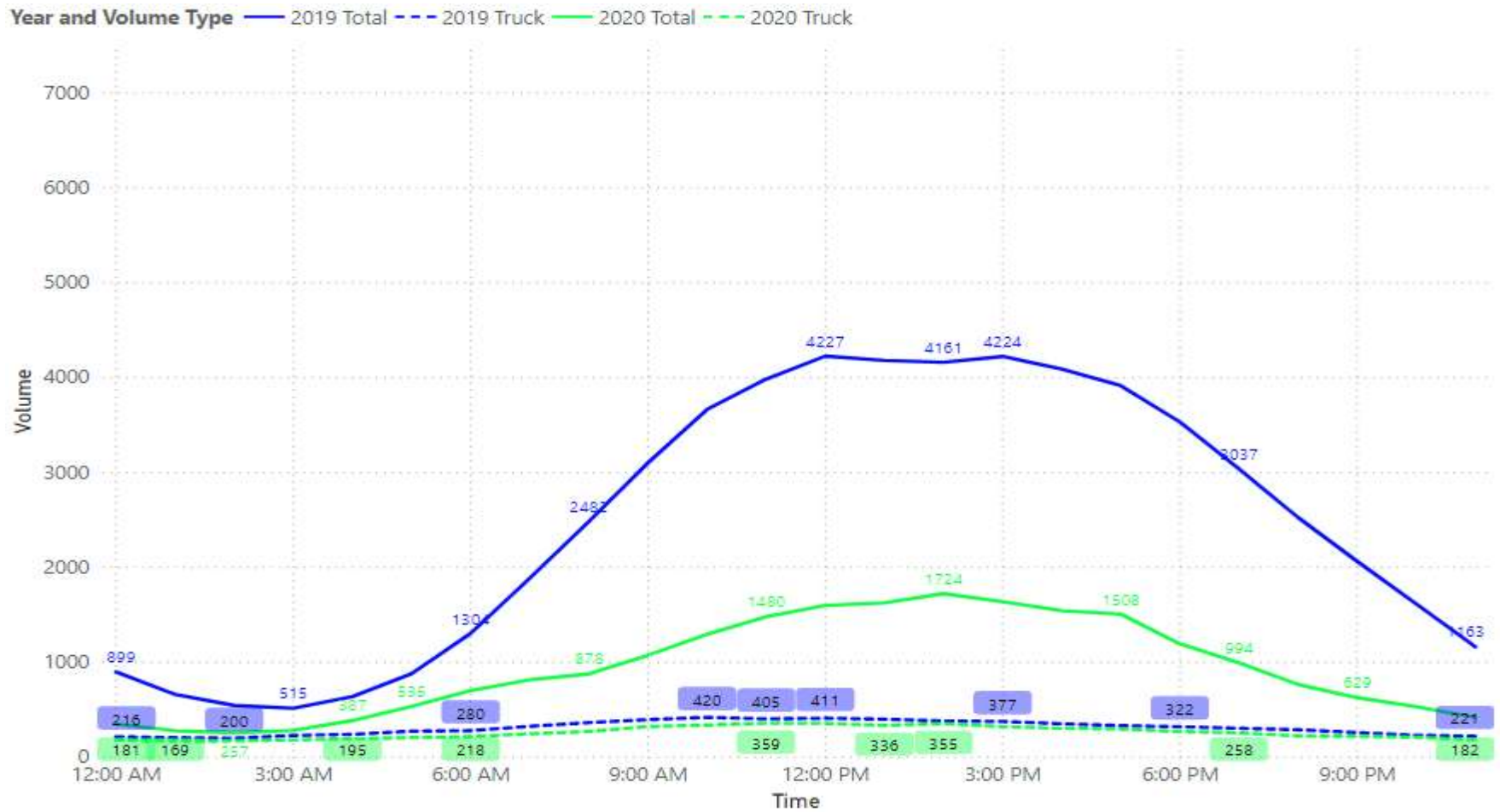
Weekday Traffic Counts

# Hour Traffic Counts – Site 3077 (I-78, Allentown)



Weekday Traffic Counts

# Hour Traffic Counts – Site 3077 (I-78, Allentown)

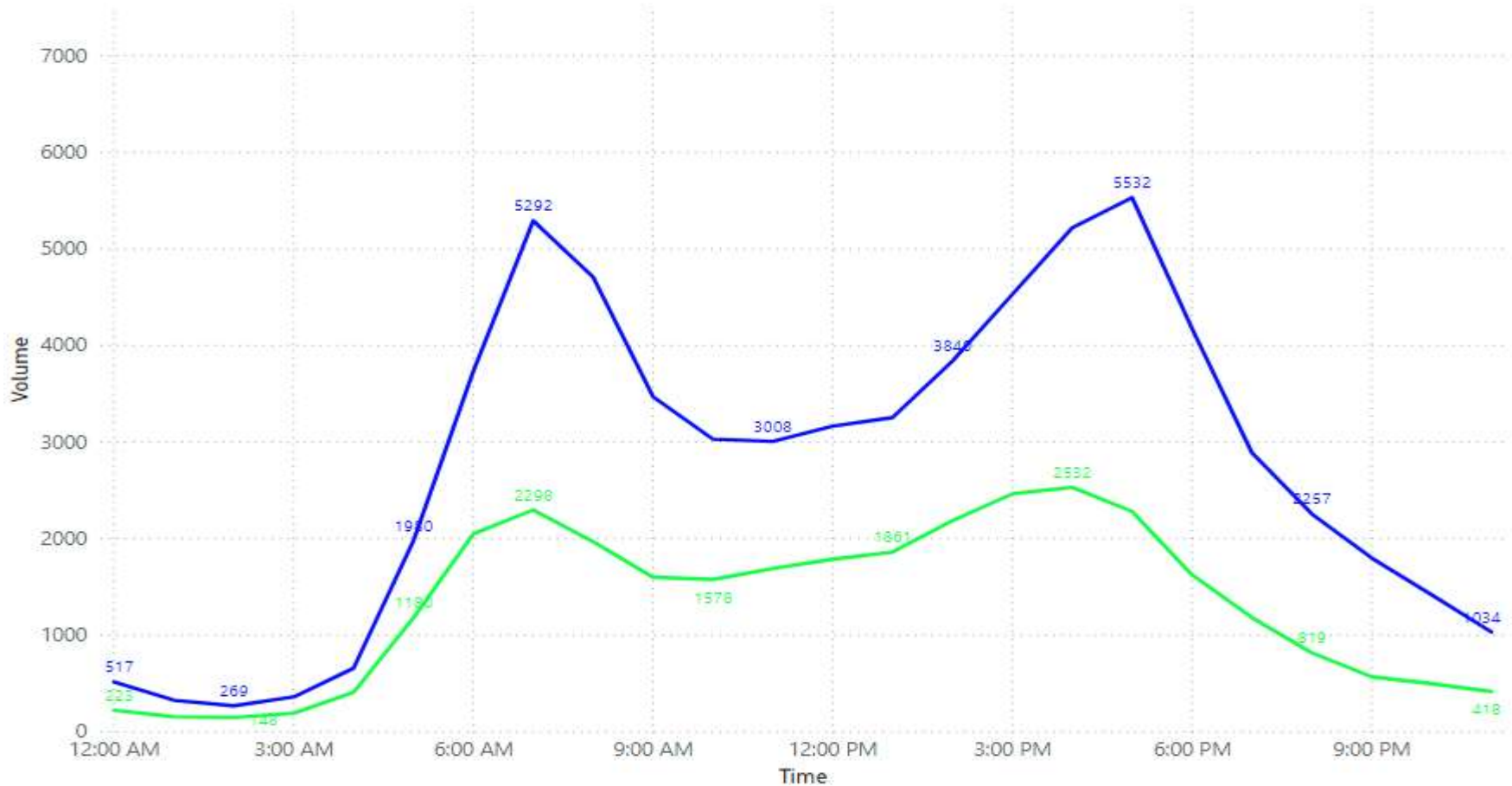


## Weekend Traffic Counts



# Hour Traffic Counts – Site 701 (I-276, Philly)

Year and Volume Type — 2019 Total — 2020 Total



Weekday Traffic Counts



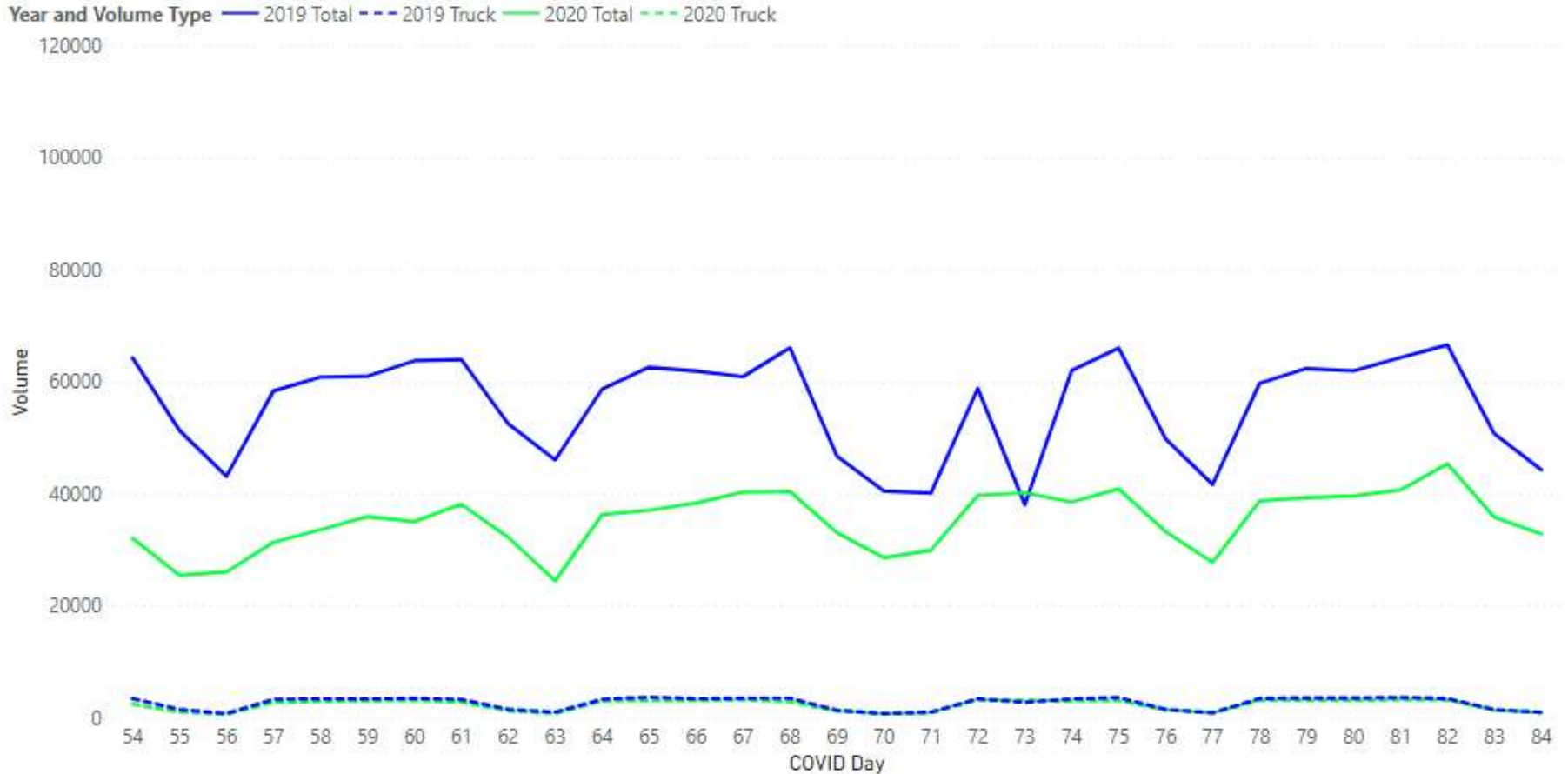
## Loosening Period

Friday, May 8, 2020

to

Sunday, June 7, 2020

# Daily Traffic Counts – Site 96 (I-279, Pittsburgh)



**Yellow** Phase – Since May 15 (24 Days)

# Daily Traffic Counts – Site 1623 (I-81, Carlisle)



**Yellow** Phase – Since May 22 (17 Days)

# Daily Traffic Counts – Site 3077 (I-78, Allentown)

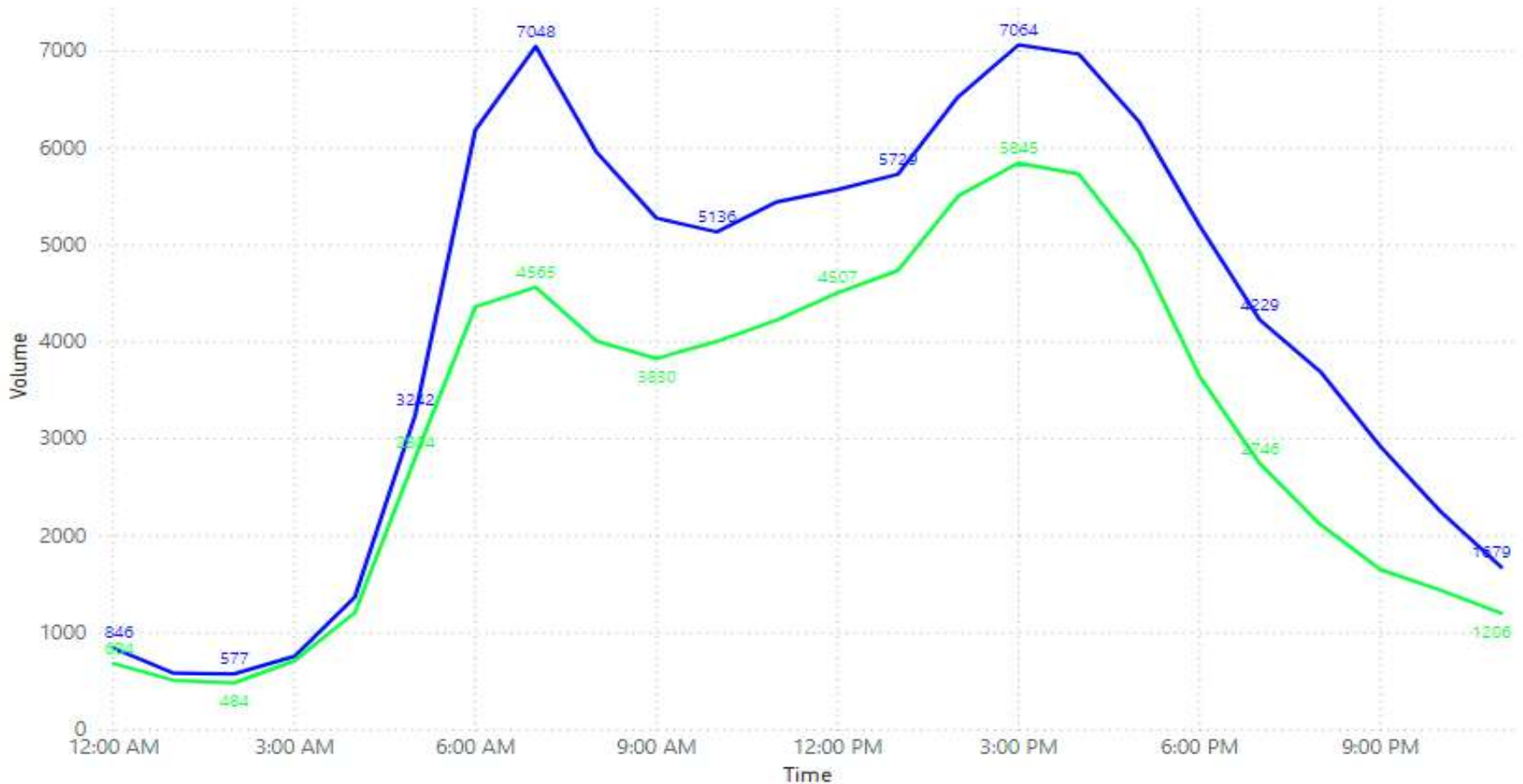


**Yellow** Phase – Since June 5 (3 Days)



# Hour Traffic Counts – Site 1640 (Rt. 581, Hbg)

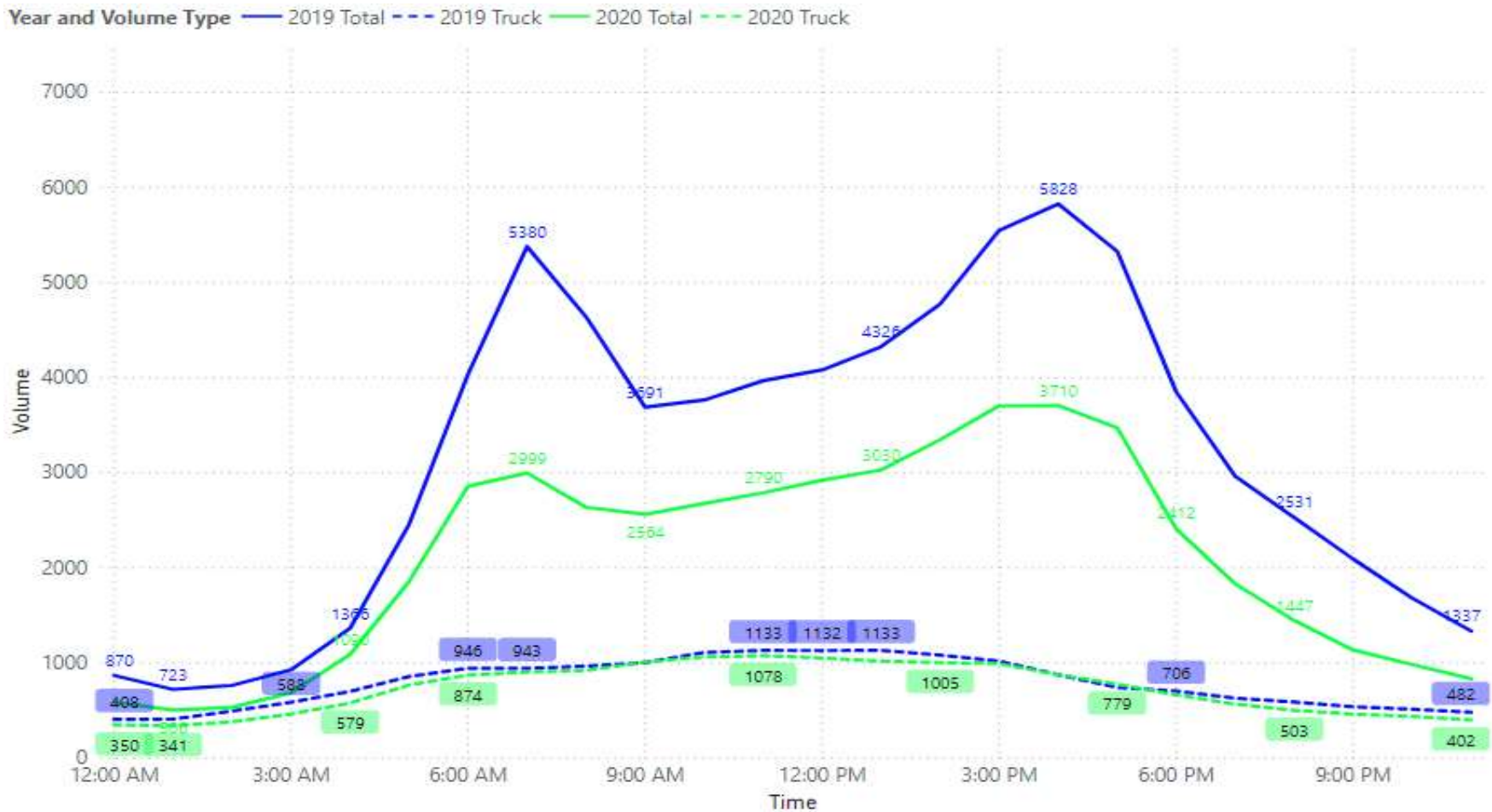
Year and Volume Type — 2019 Total — 2020 Total



Weekday Traffic Counts

**Yellow** Phase – Since May 22 (17 Days)

# Hour Traffic Counts – Site 3077 (I-78, Allentown)

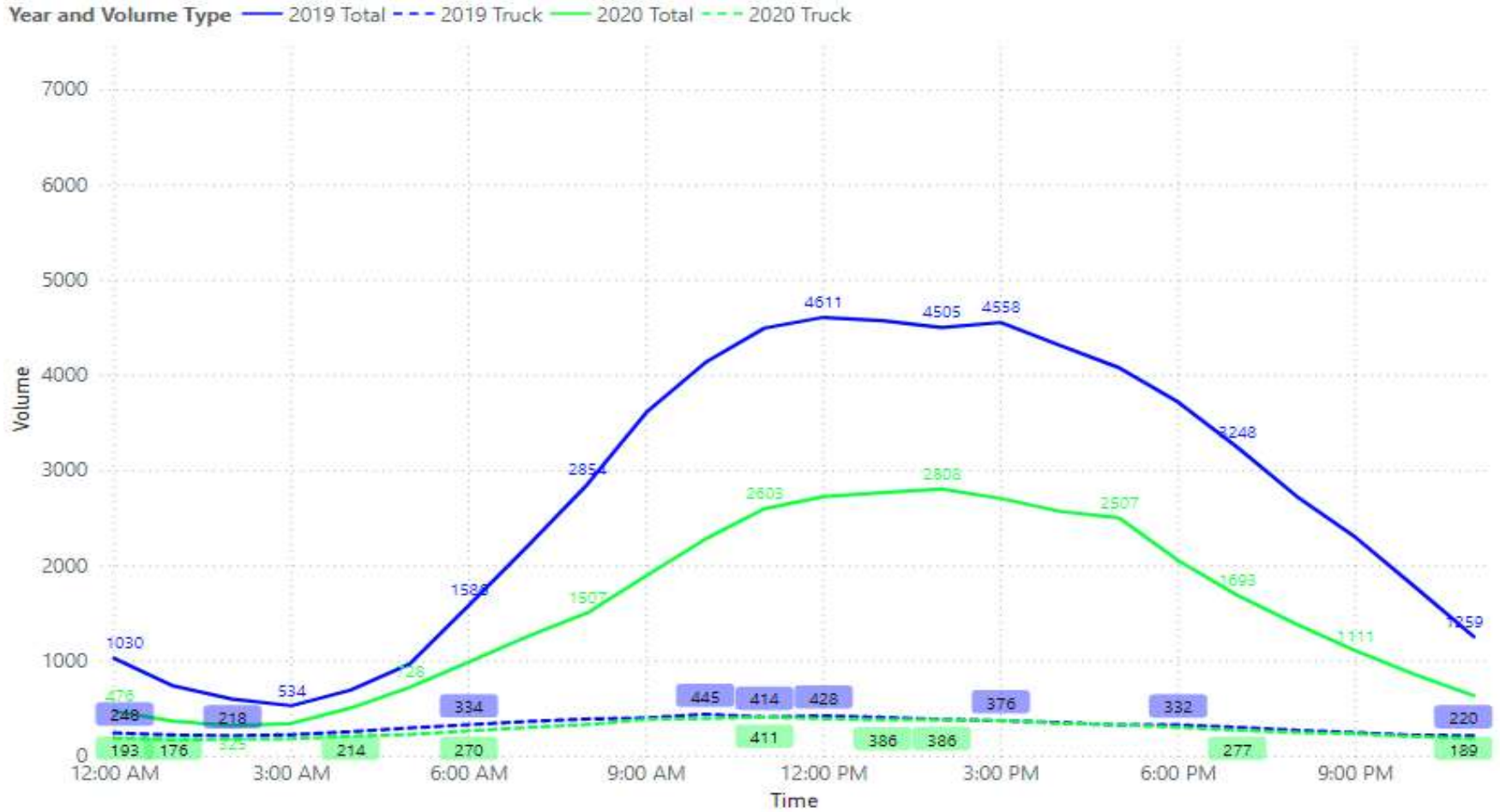


Weekday Traffic Counts

**Yellow** Phase – Since June 5 (3 Days)



# Hour Traffic Counts – Site 3077 (I-78, Allentown)



## Weekend Traffic Counts

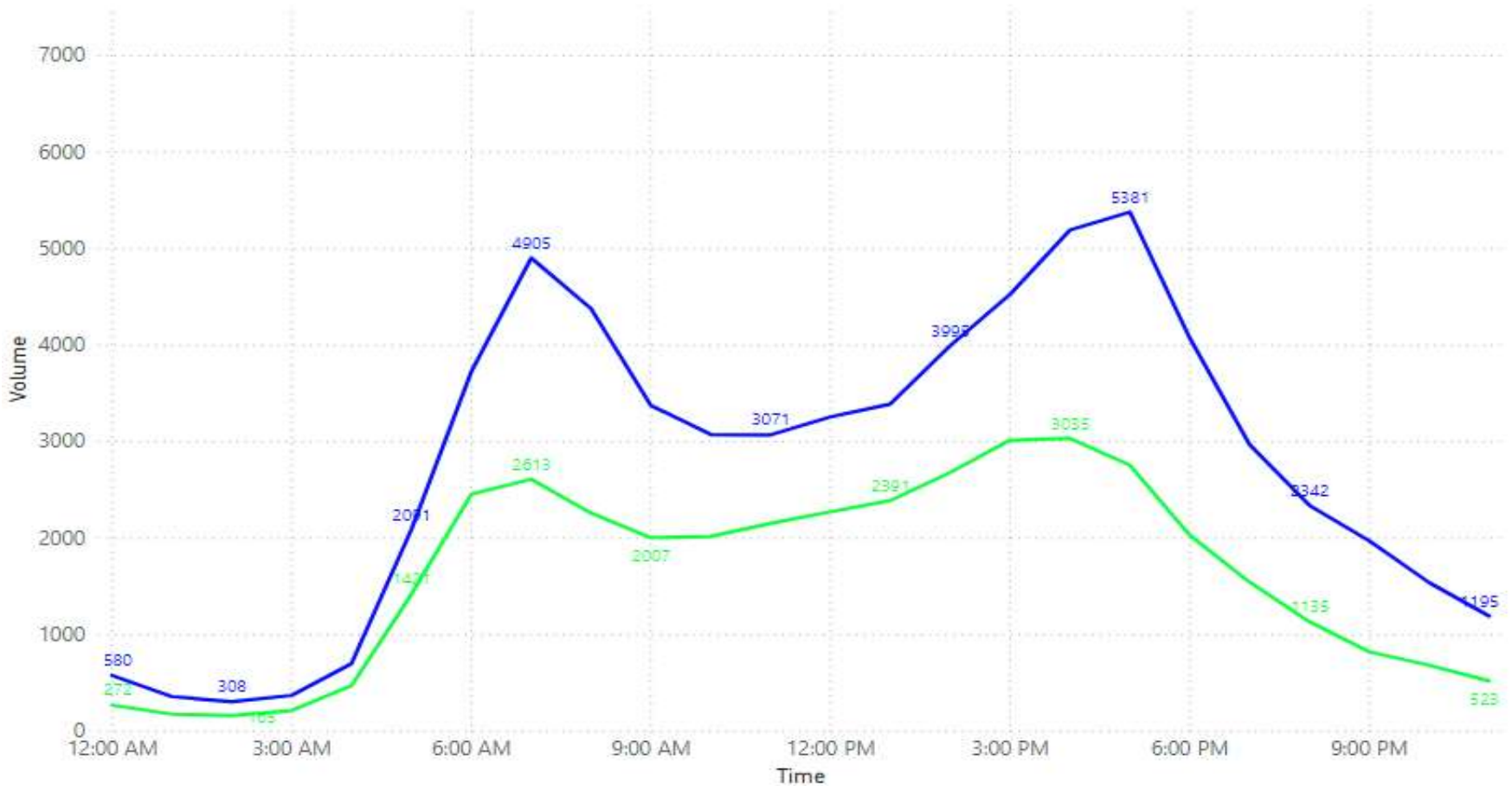
**Yellow** Phase – Since June 5 (3 Days)





# Hour Traffic Counts – Site 701 (I-276, Philly)

Year and Volume Type — 2019 Total — 2020 Total



Weekday Traffic Counts

**Yellow** Phase – Since June 5 (3 Days)



# TROPOMI NO<sub>2</sub> Satellite Data: 2019 vs. 2020

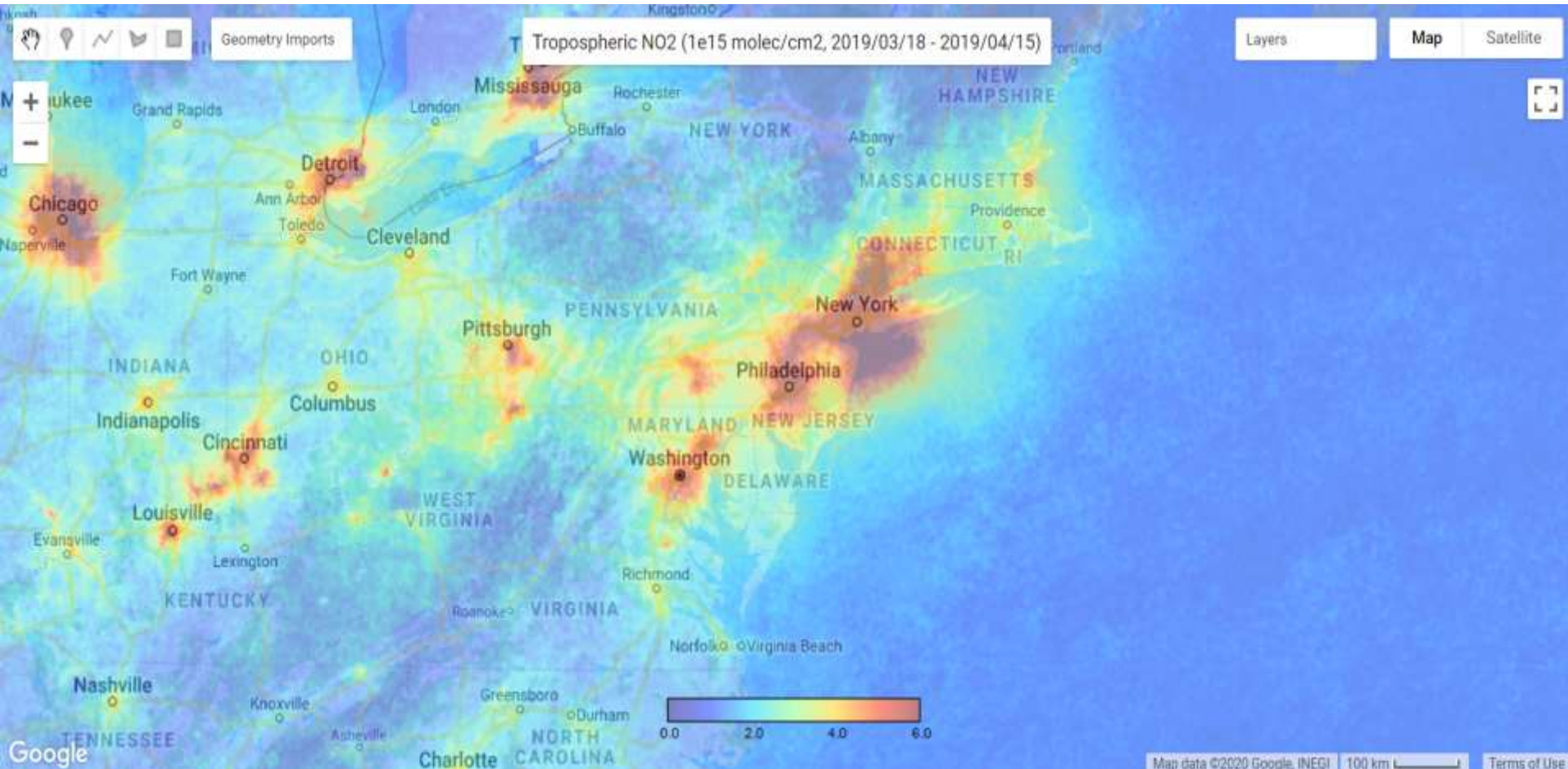
## Stay At Home Period

Monday, March 16, 2020

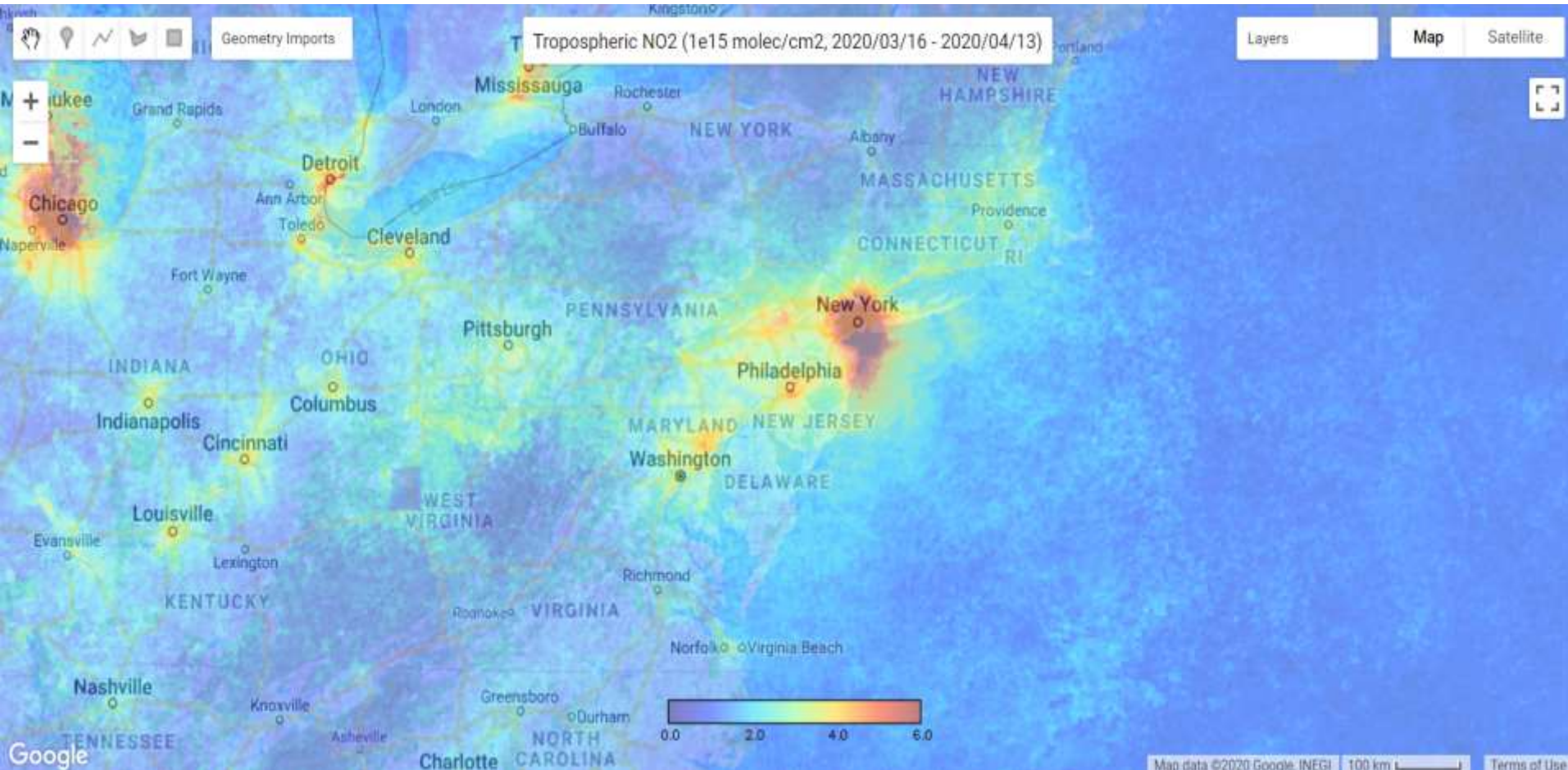
to

Sunday, April 26, 2020

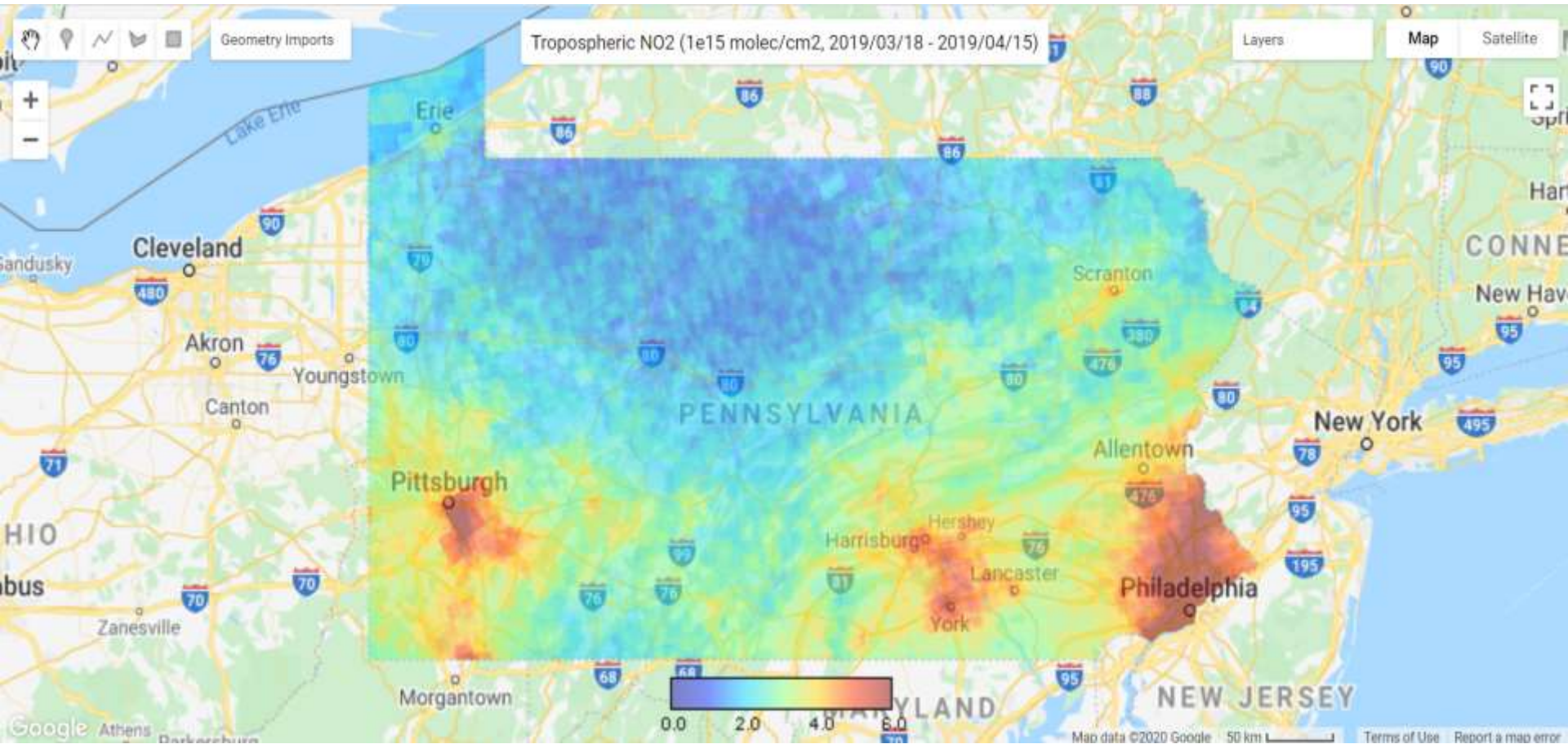
# Regional NO<sub>2</sub> – Mid March-Mid April 2019



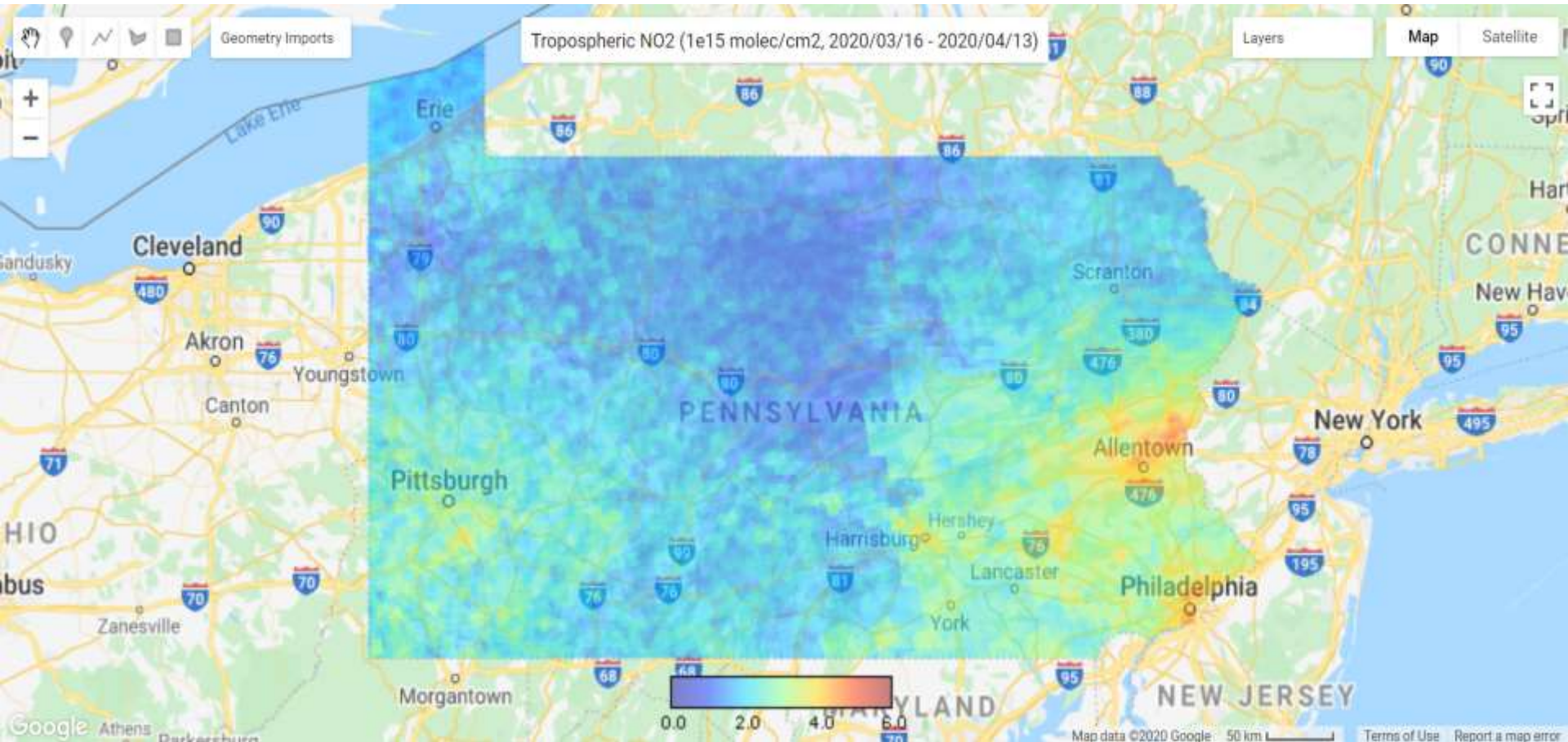
# Regional NO<sub>2</sub> – Mid March-Mid April 2020



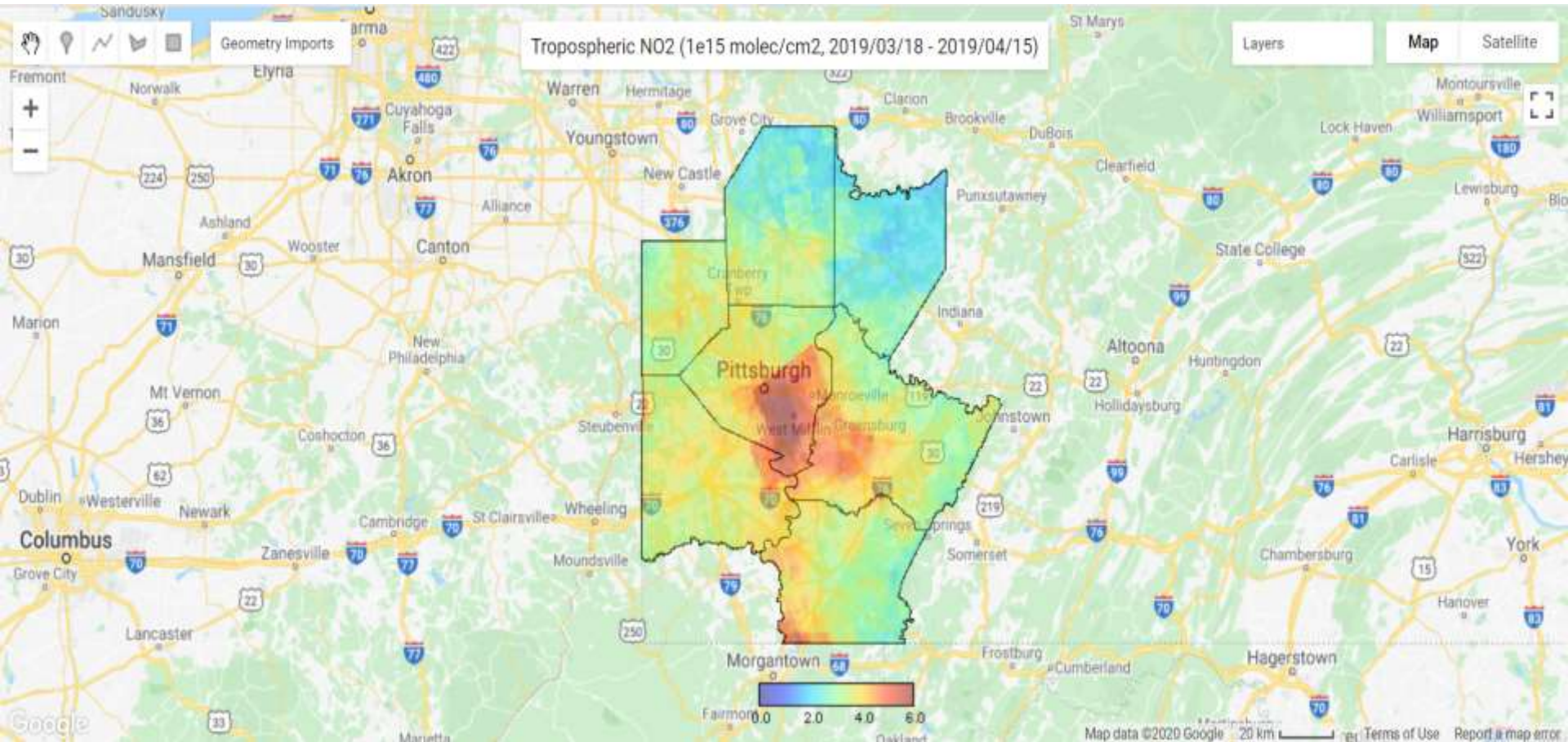
# PA NO<sub>2</sub> – Mid March-Mid April 2019



# PA NO<sub>2</sub> – Mid March-Mid April 2020

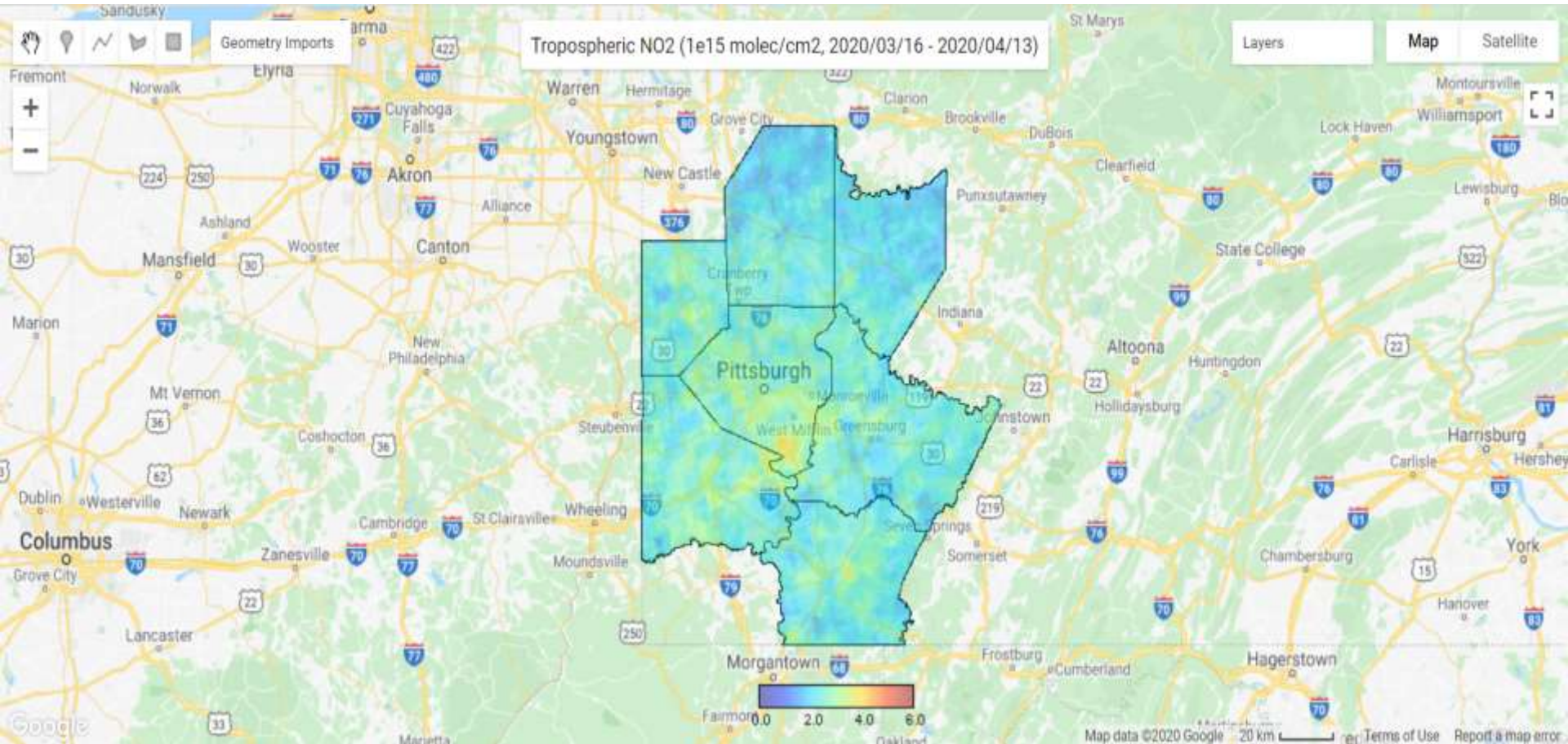


# Pitt NO<sub>2</sub> – Mid March-Mid April 2019

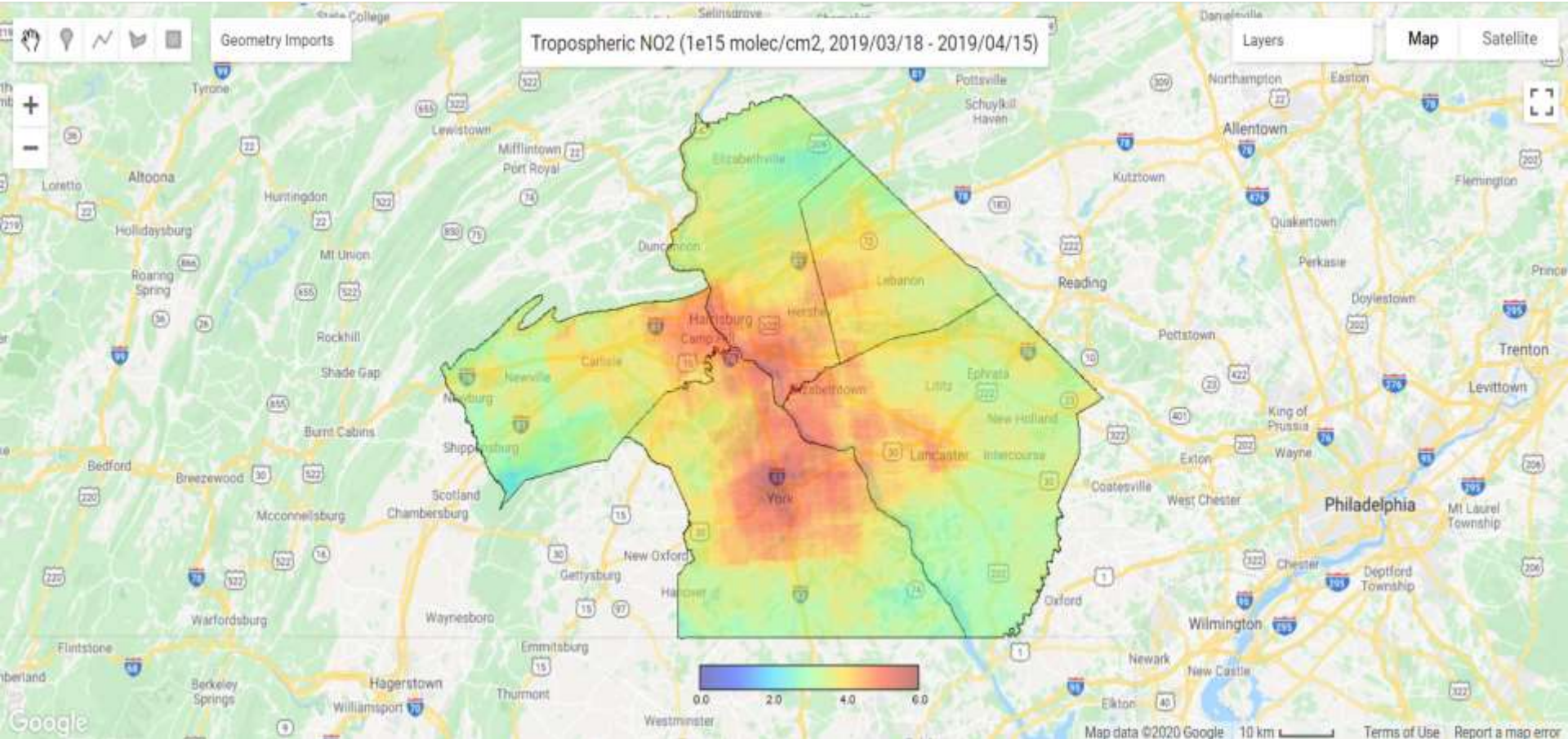




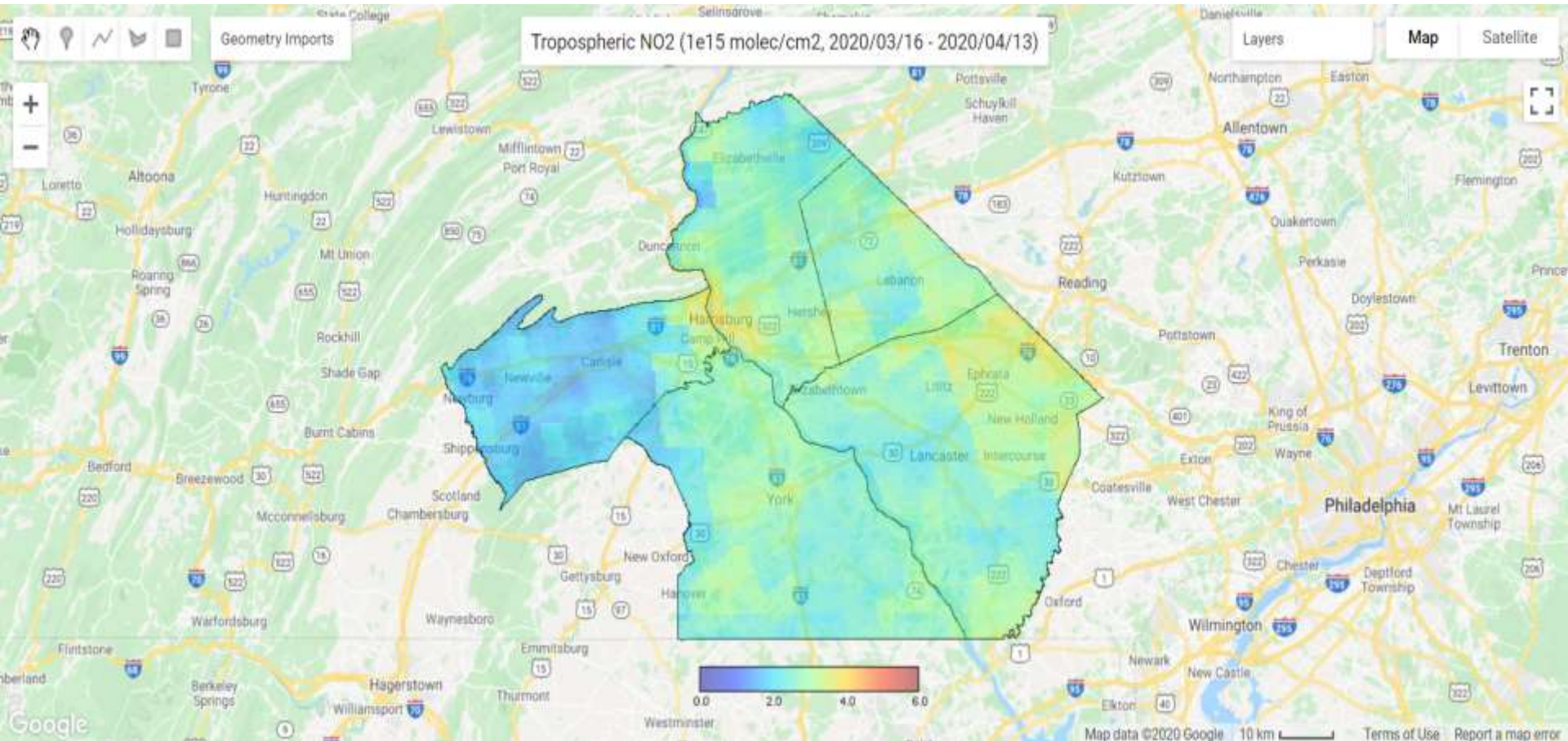
# Pitt NO<sub>2</sub> – Mid March-Mid April 2020



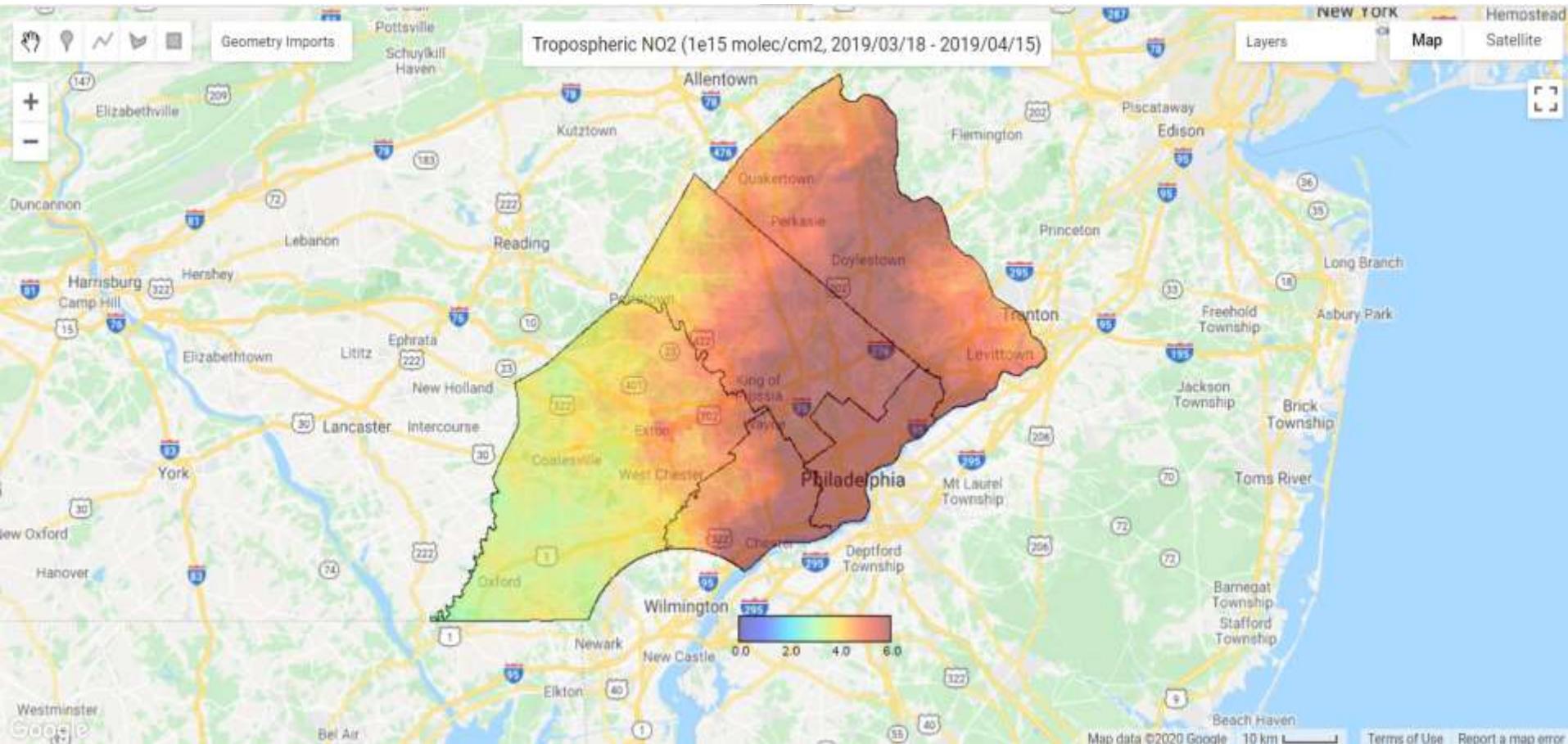
# Susq Valley NO<sub>2</sub> – Mid March-Mid April 2019



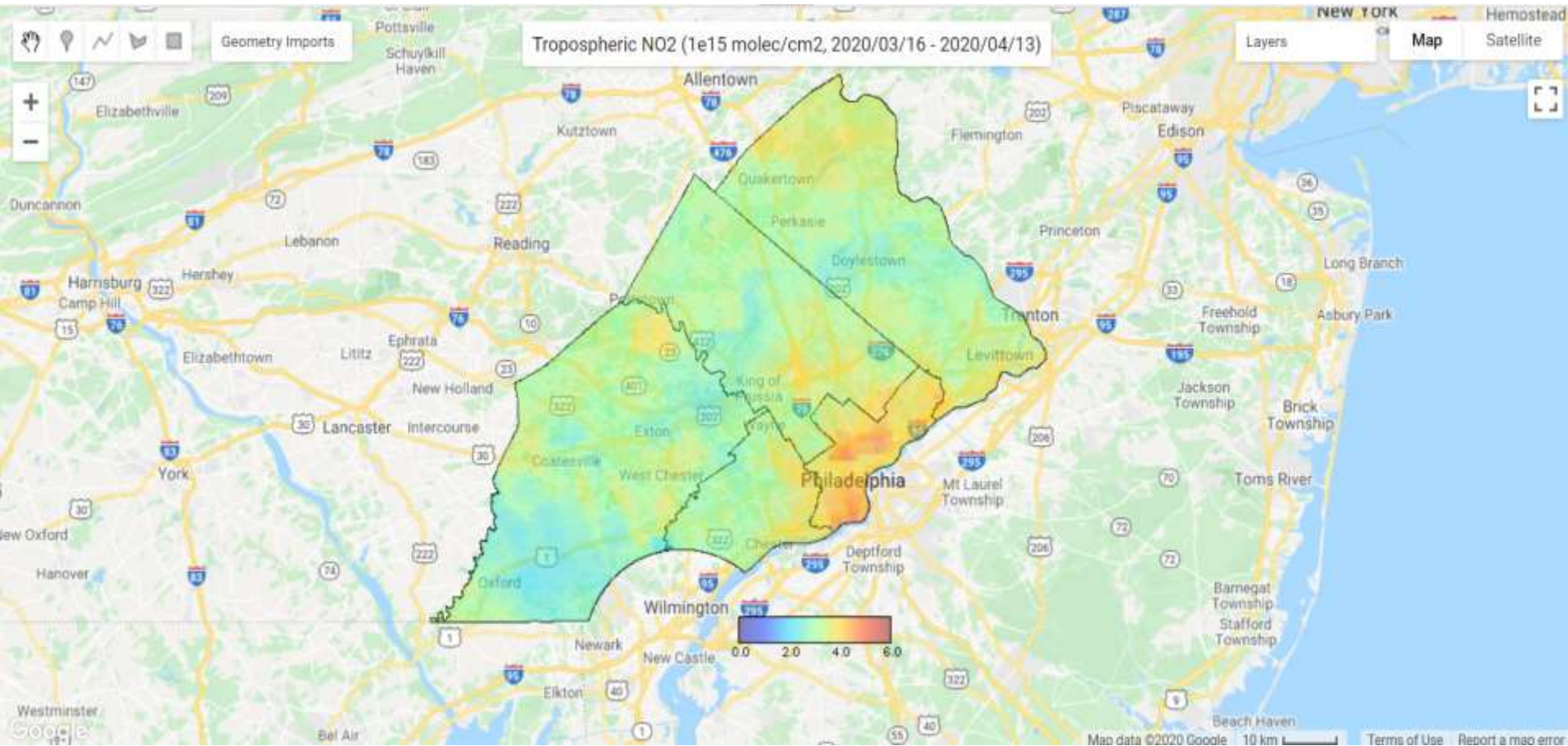
# Susq Valley NO<sub>2</sub> – Mid March-Mid April 2020



# Philly NO<sub>2</sub> – Mid March-Mid April 2019



# Philly NO<sub>2</sub> – Mid March-Mid April 2020



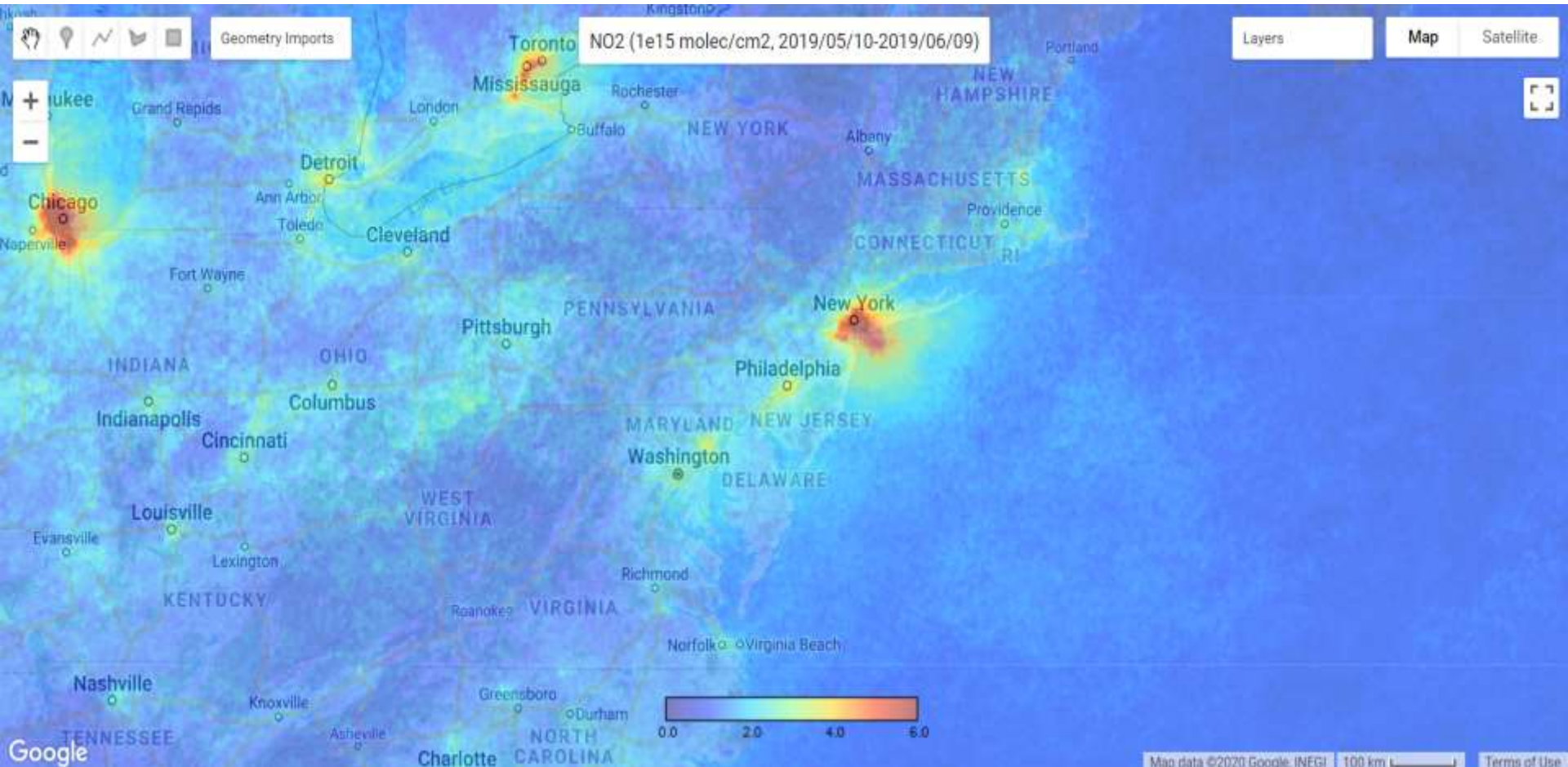
## Loosening Period

Friday, May 8, 2020

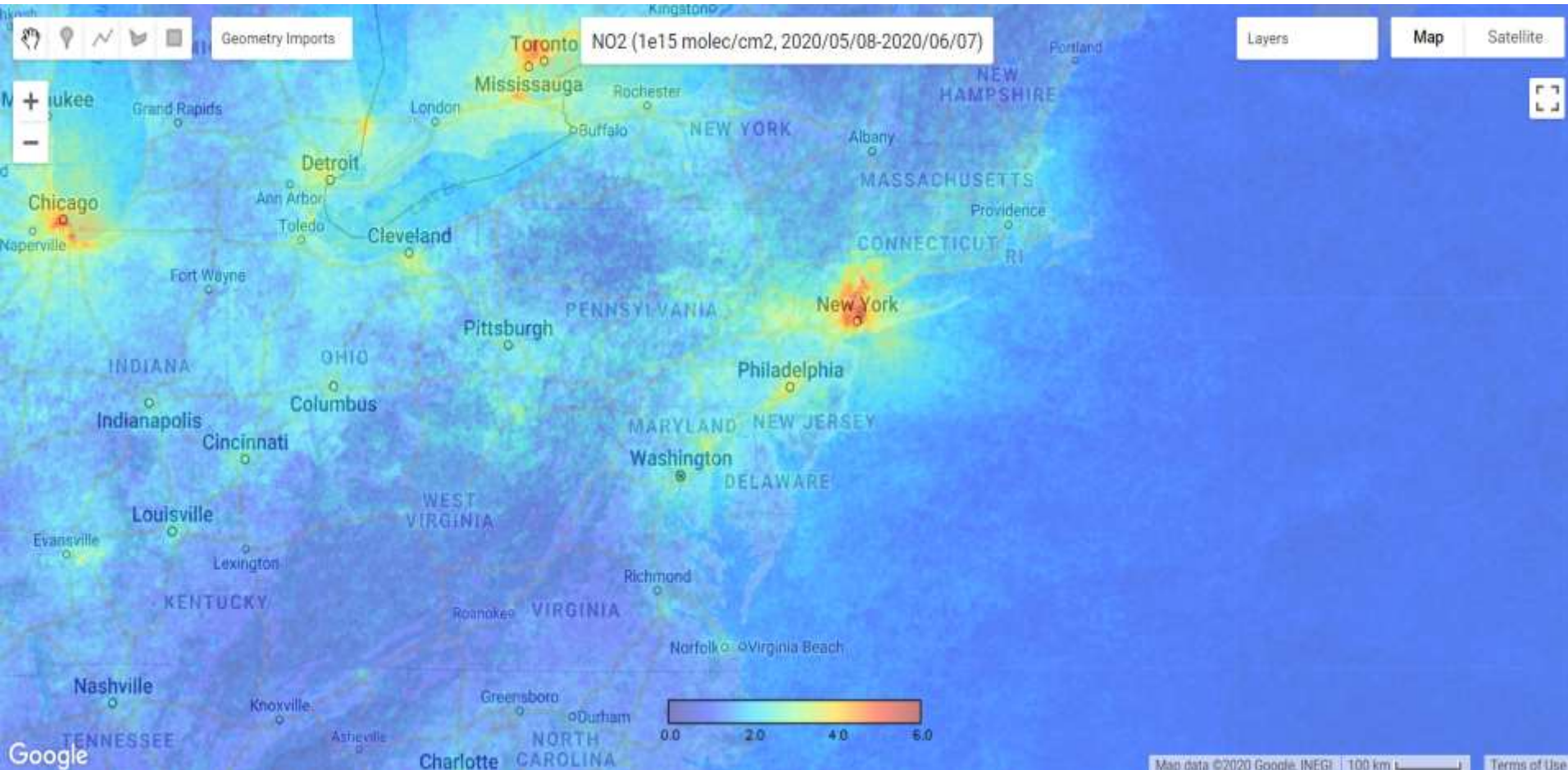
to

Sunday, June 7, 2020

# Regional NO<sub>2</sub> – Early May-Early June 2019

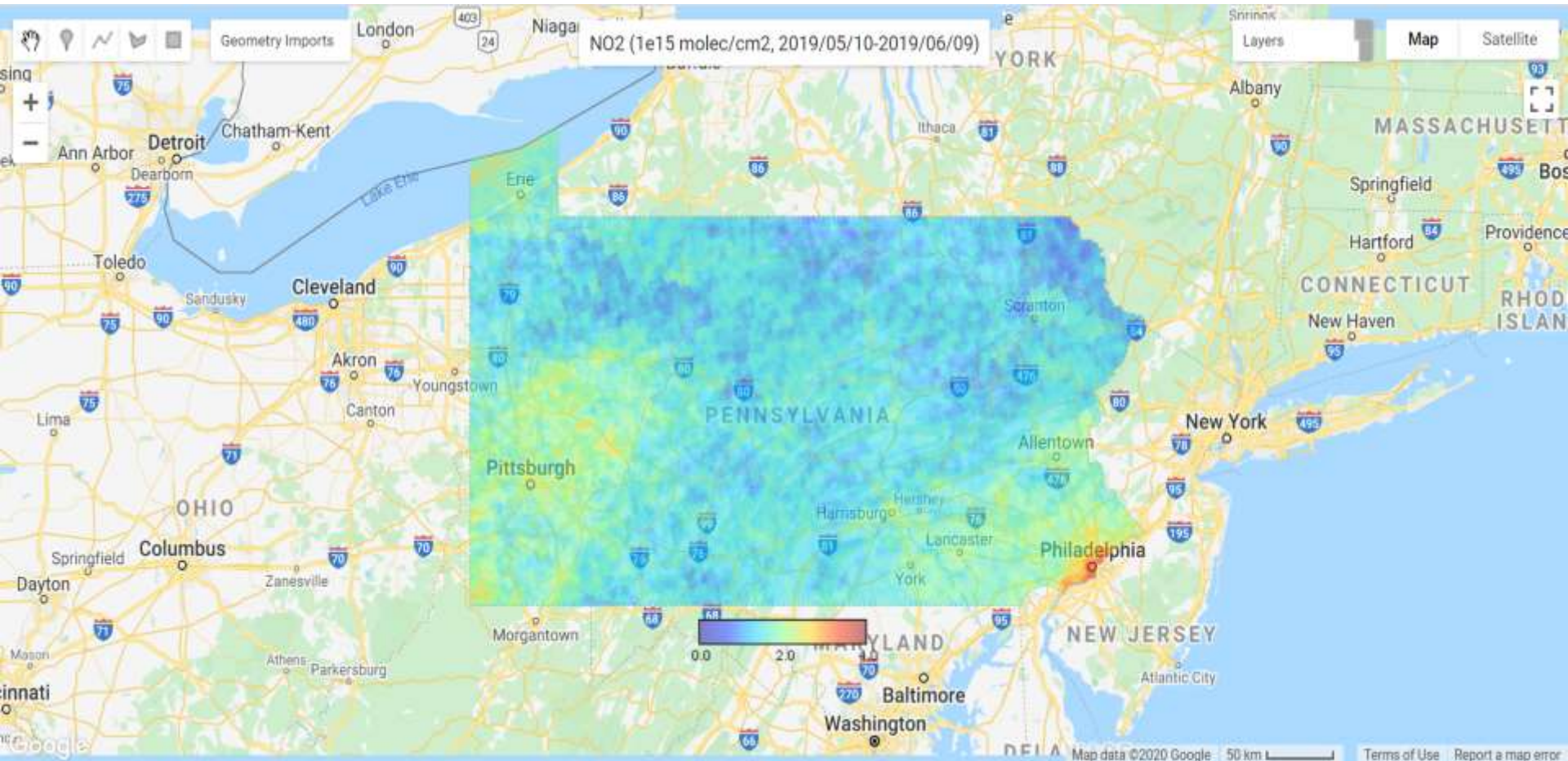


# Regional NO<sub>2</sub> – Early May-Early June 2020

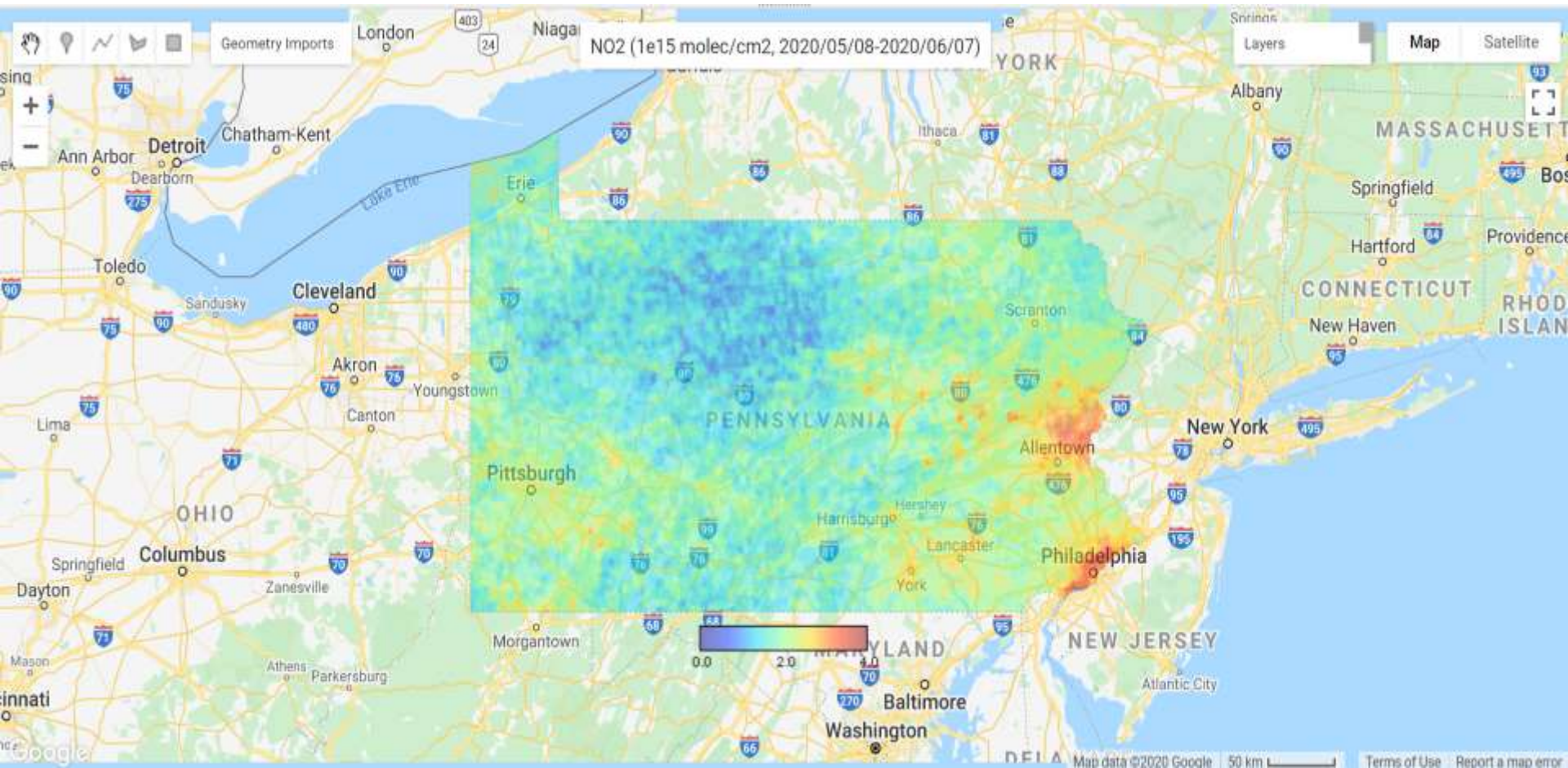




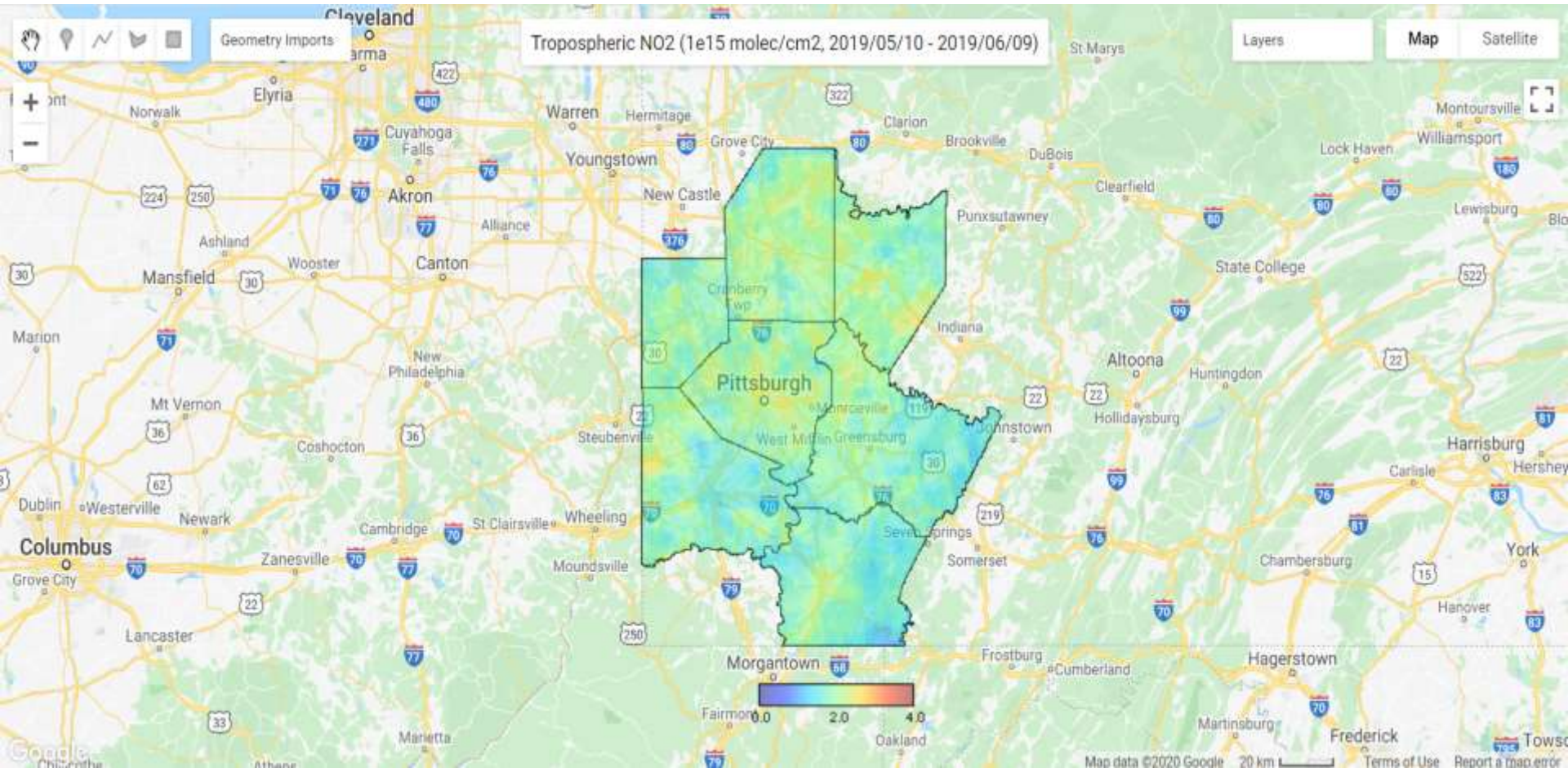
# PA NO<sub>2</sub> – Early May-Early June 2019



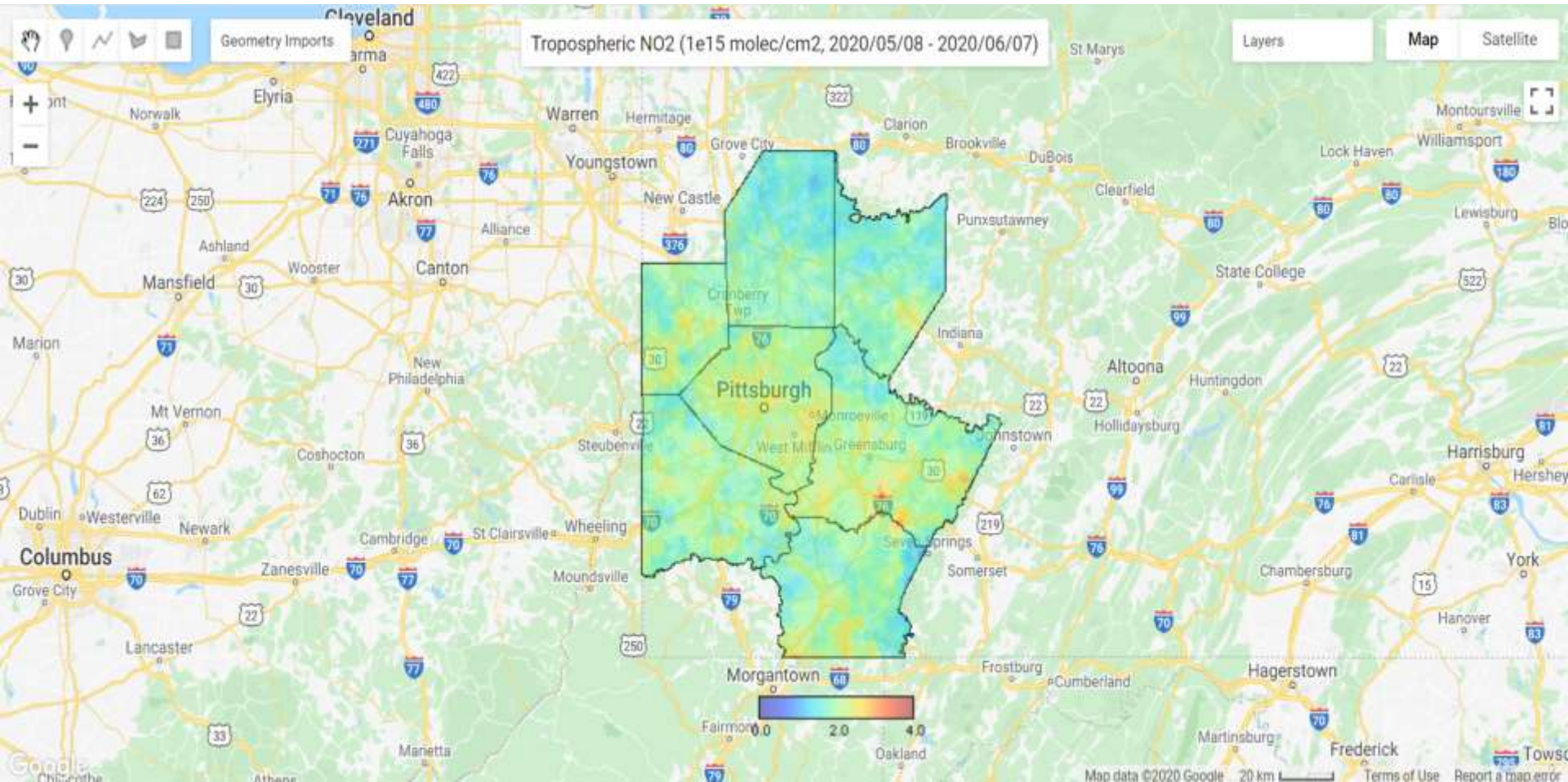
# PA NO<sub>2</sub> – Early May-Early June 2020



# Pitt NO<sub>2</sub> – Early May-Early June 2019

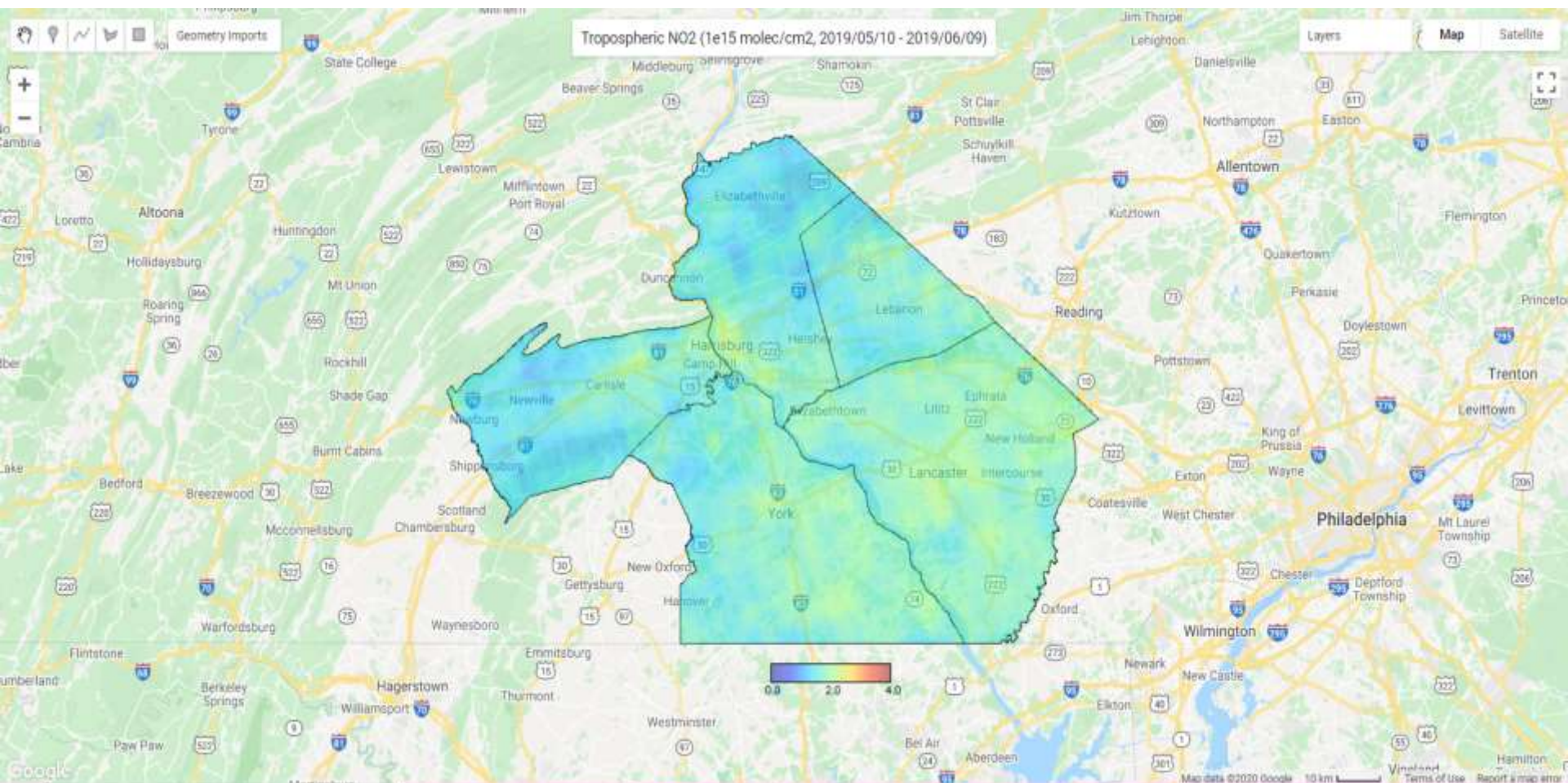


# Pitt NO<sub>2</sub> – Early May-Early June 2020

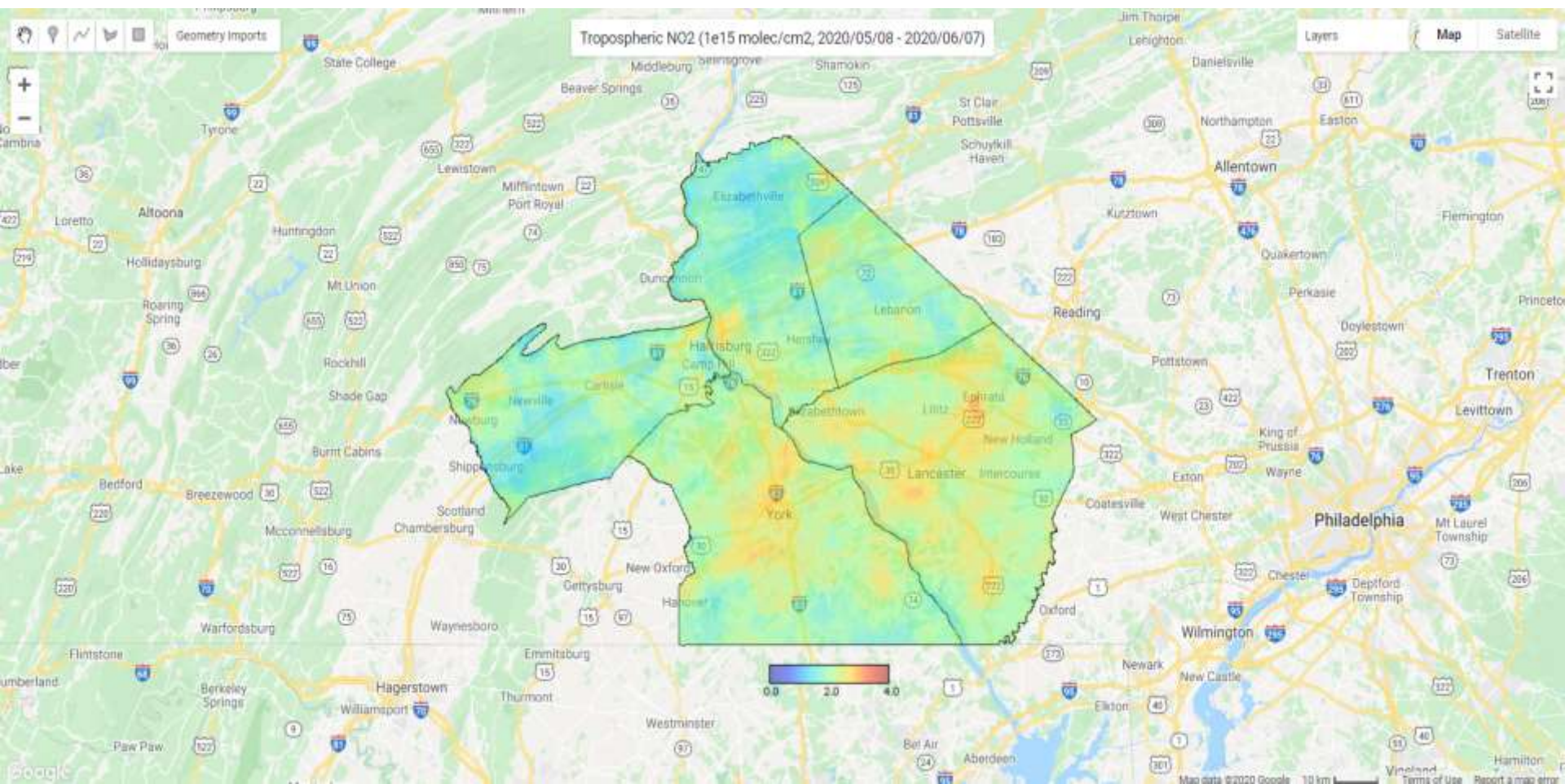


**Yellow** Phase – Most of Region Since  
May 15 (24 Days)

# Susq Valley NO<sub>2</sub> – Early May-Early June 2019

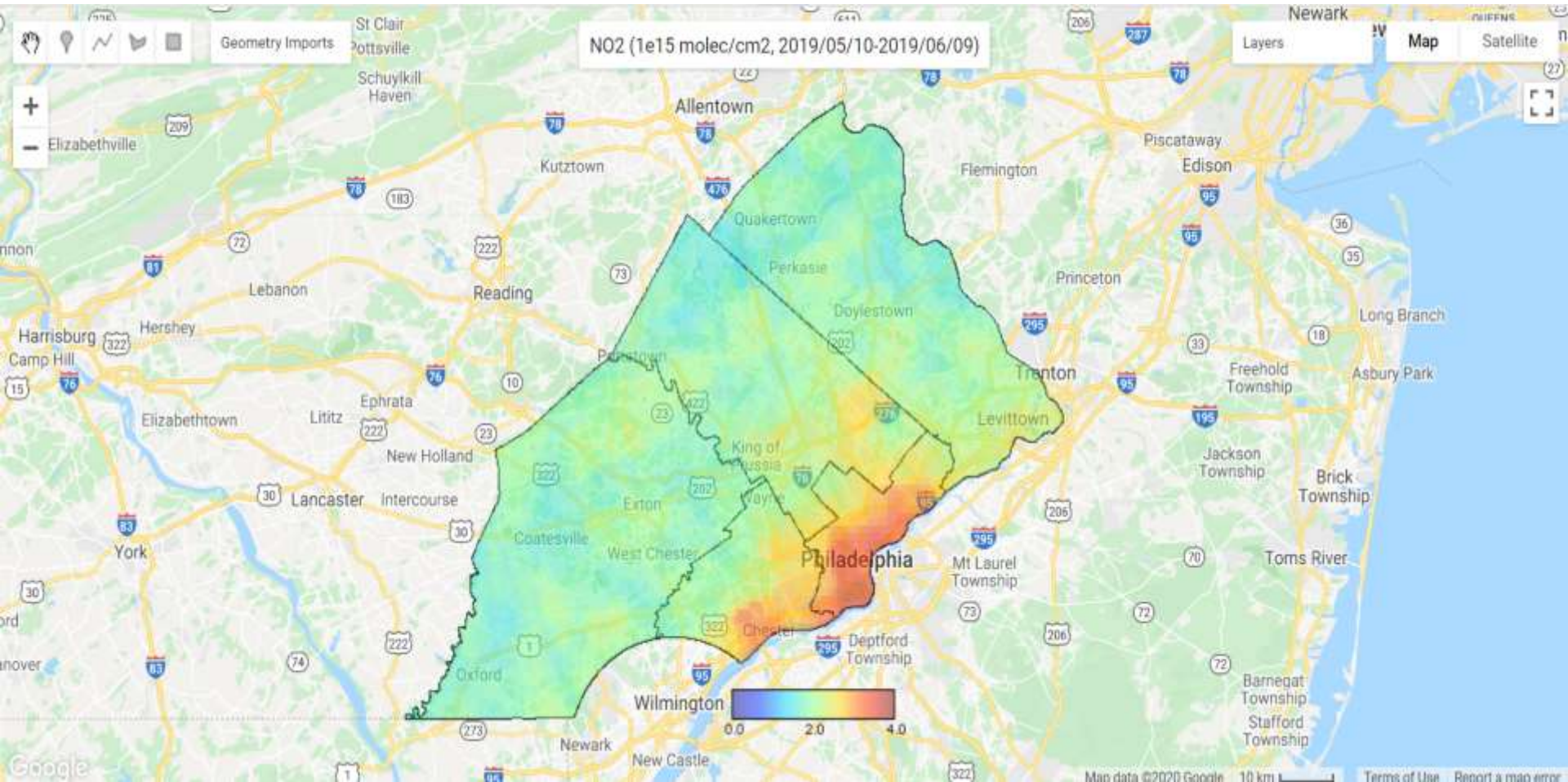


# Susq Valley NO<sub>2</sub> – Early May-Early June 2020

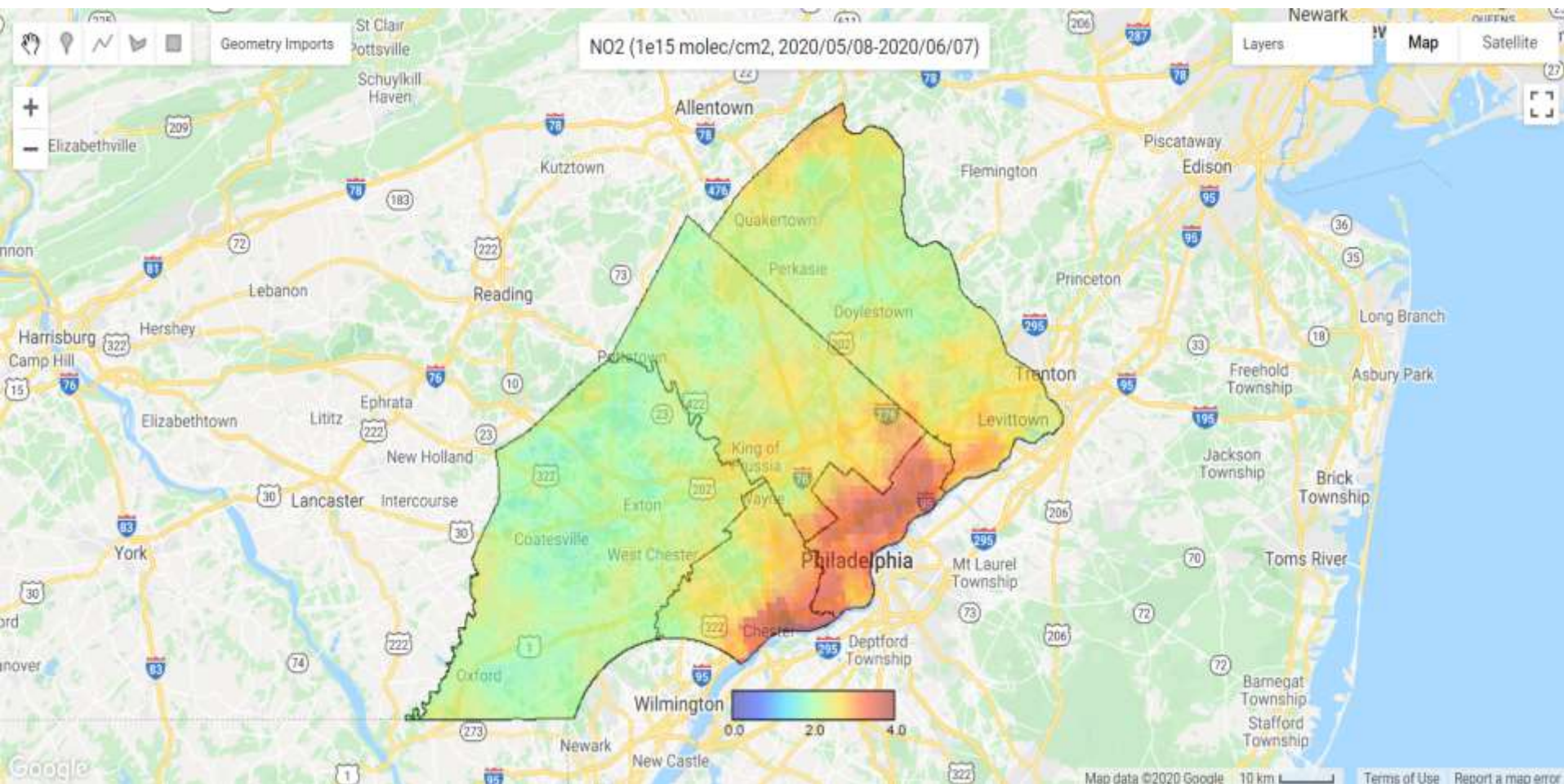


**Yellow** Phase – Most of Region Since  
May 22 (17 Days)

# Philly NO<sub>2</sub> – Early May-Early June 2019



# Philly NO<sub>2</sub> – Early May-Early June 2020

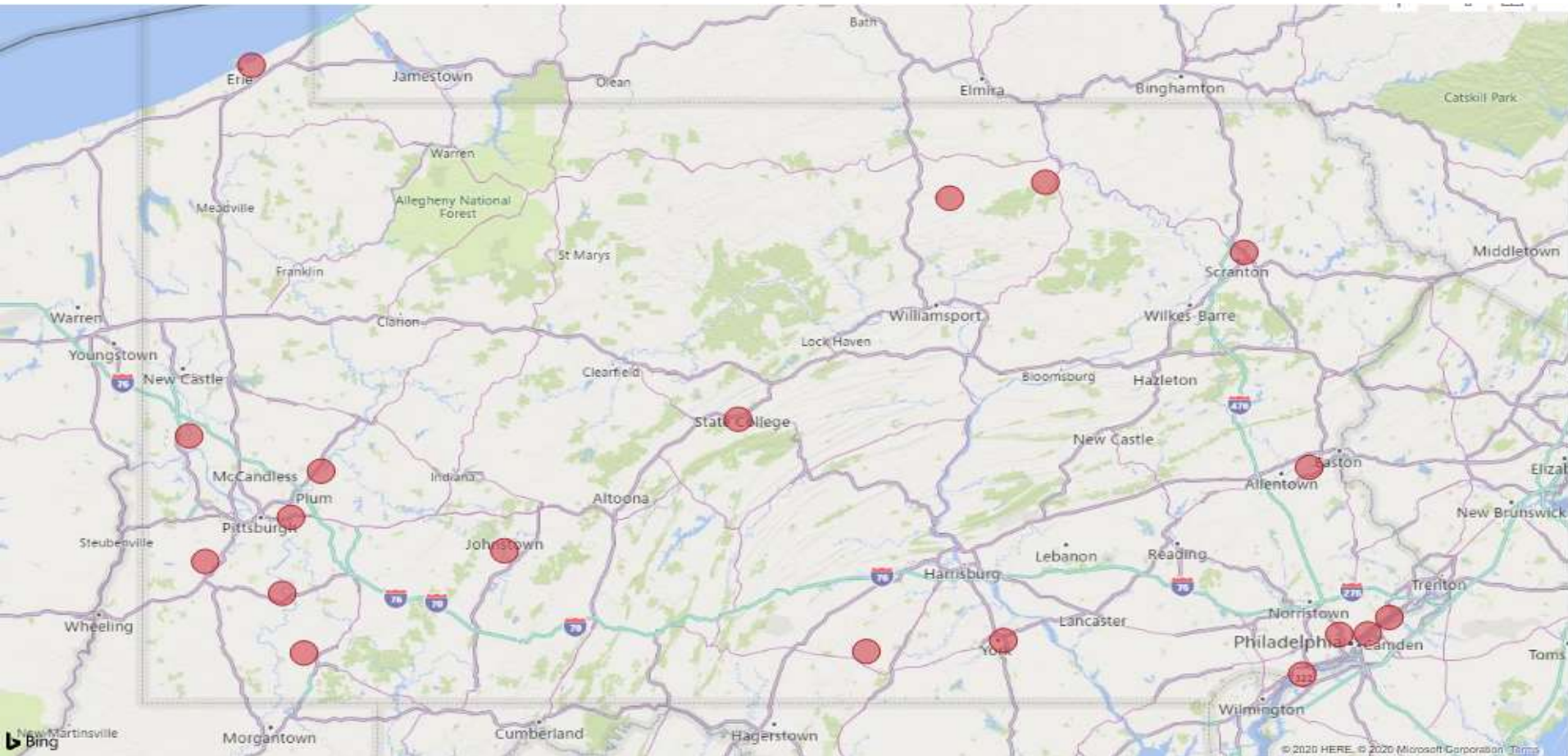


**Yellow** Phase – Most of Region Since  
June 5 (3 Days)

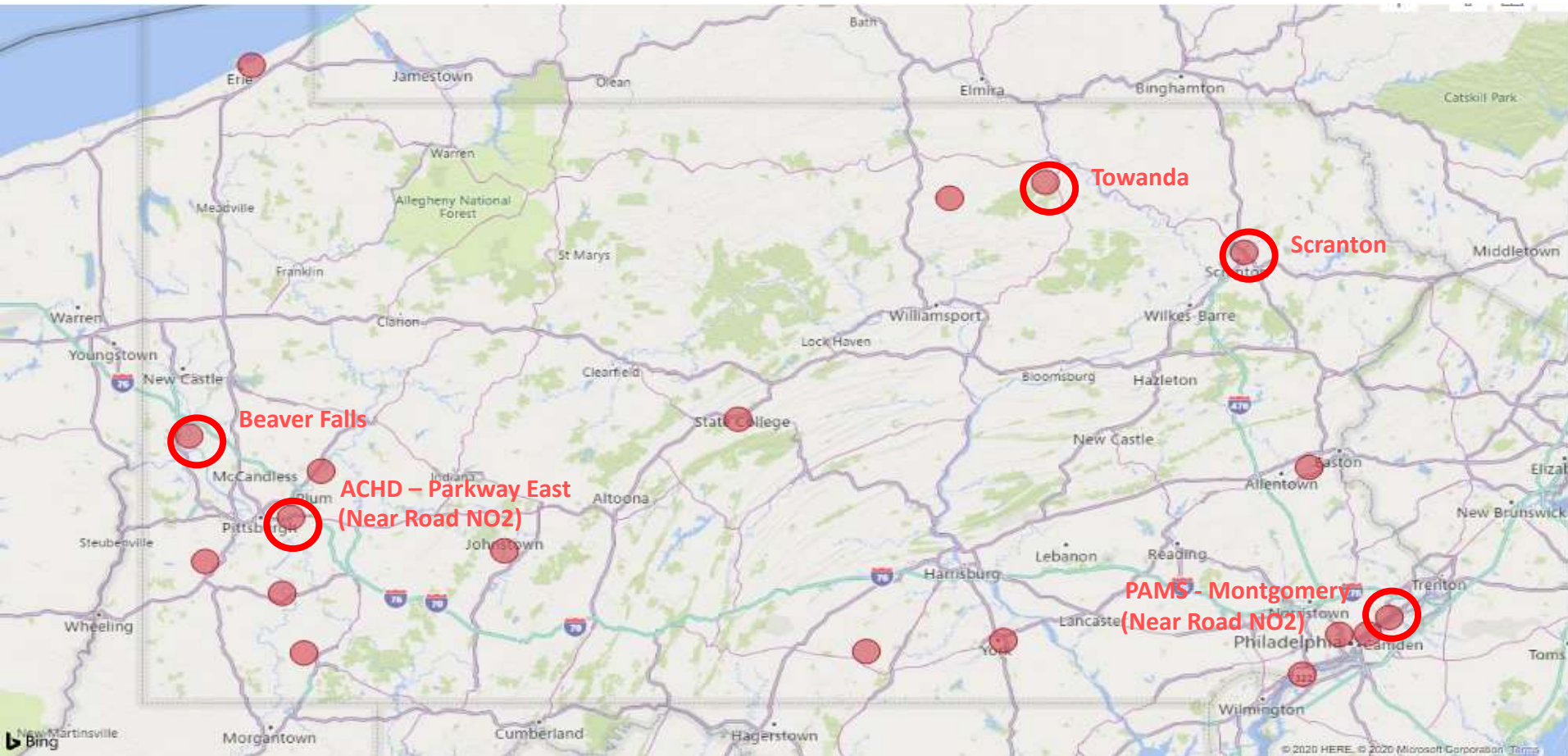


# PA Air Monitoring Data: 2019 vs. 2020

# PA NO<sub>2</sub> Monitor Locations



# PA NO<sub>2</sub> Monitor Locations (Focus Area)



## Stay At Home Period

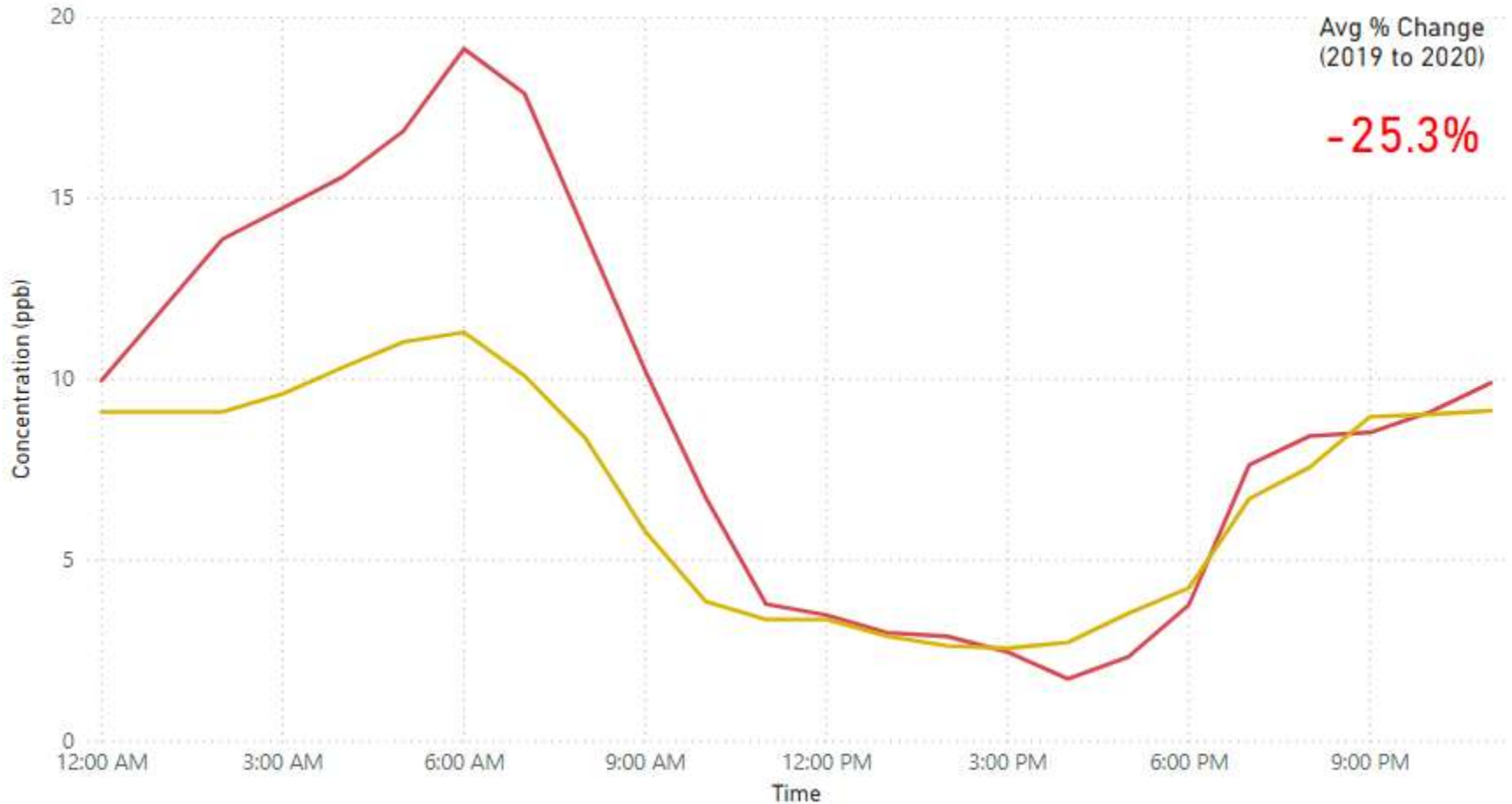
Monday, March 16, 2020

to

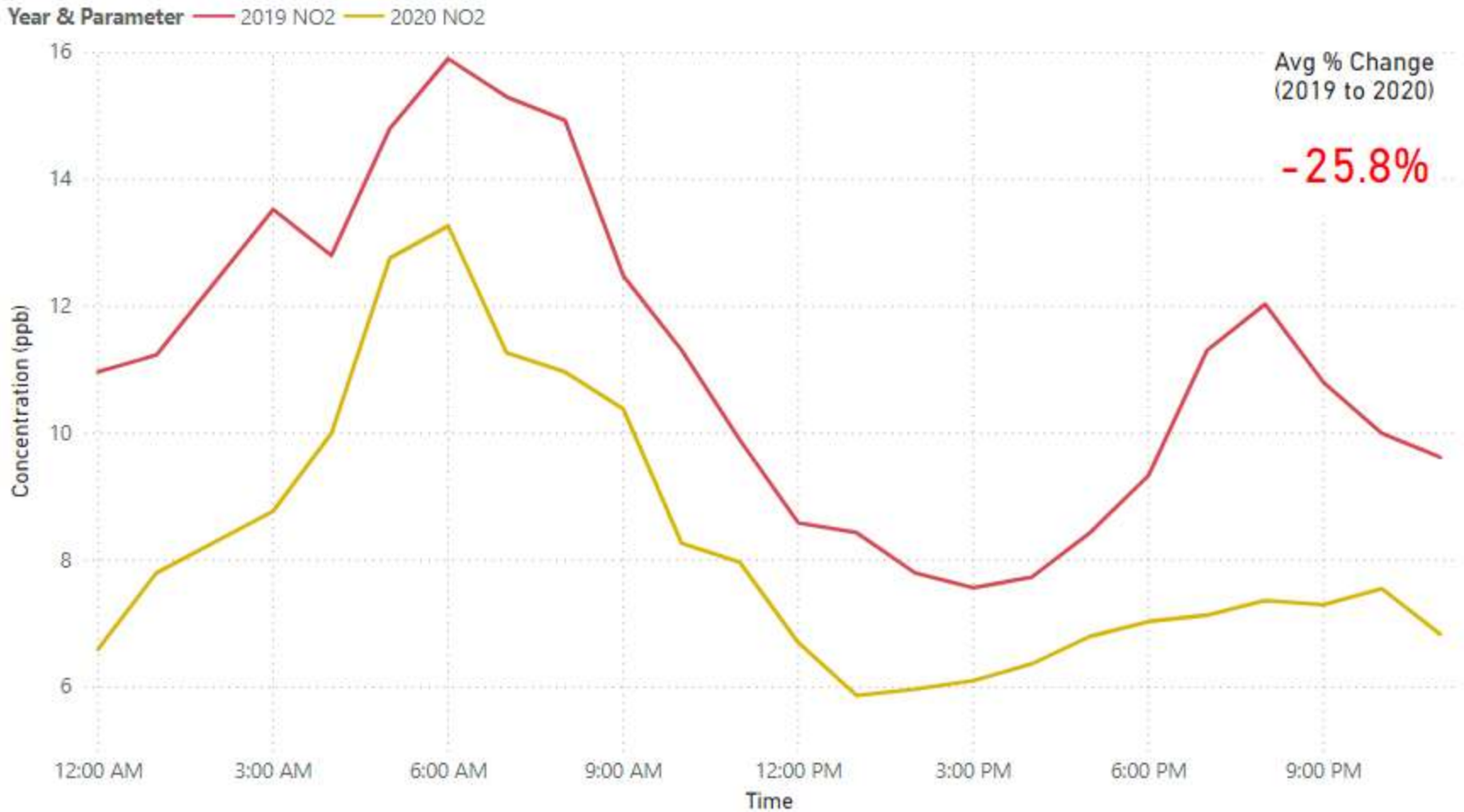
Sunday, April 26, 2020

# Weekday NO<sub>2</sub> Concentrations – Beaver Falls

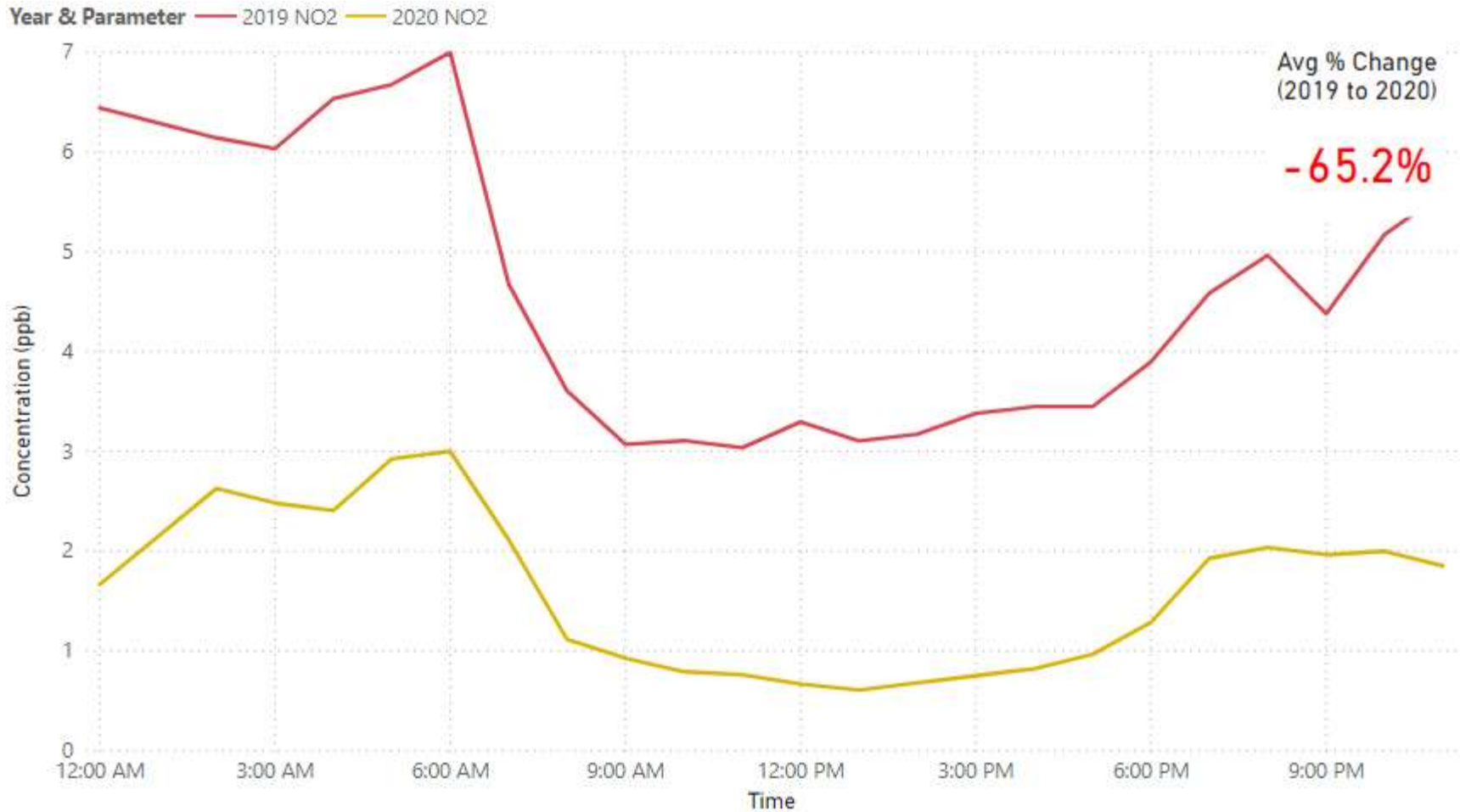
Year & Parameter — 2019 NO<sub>2</sub> — 2020 NO<sub>2</sub>



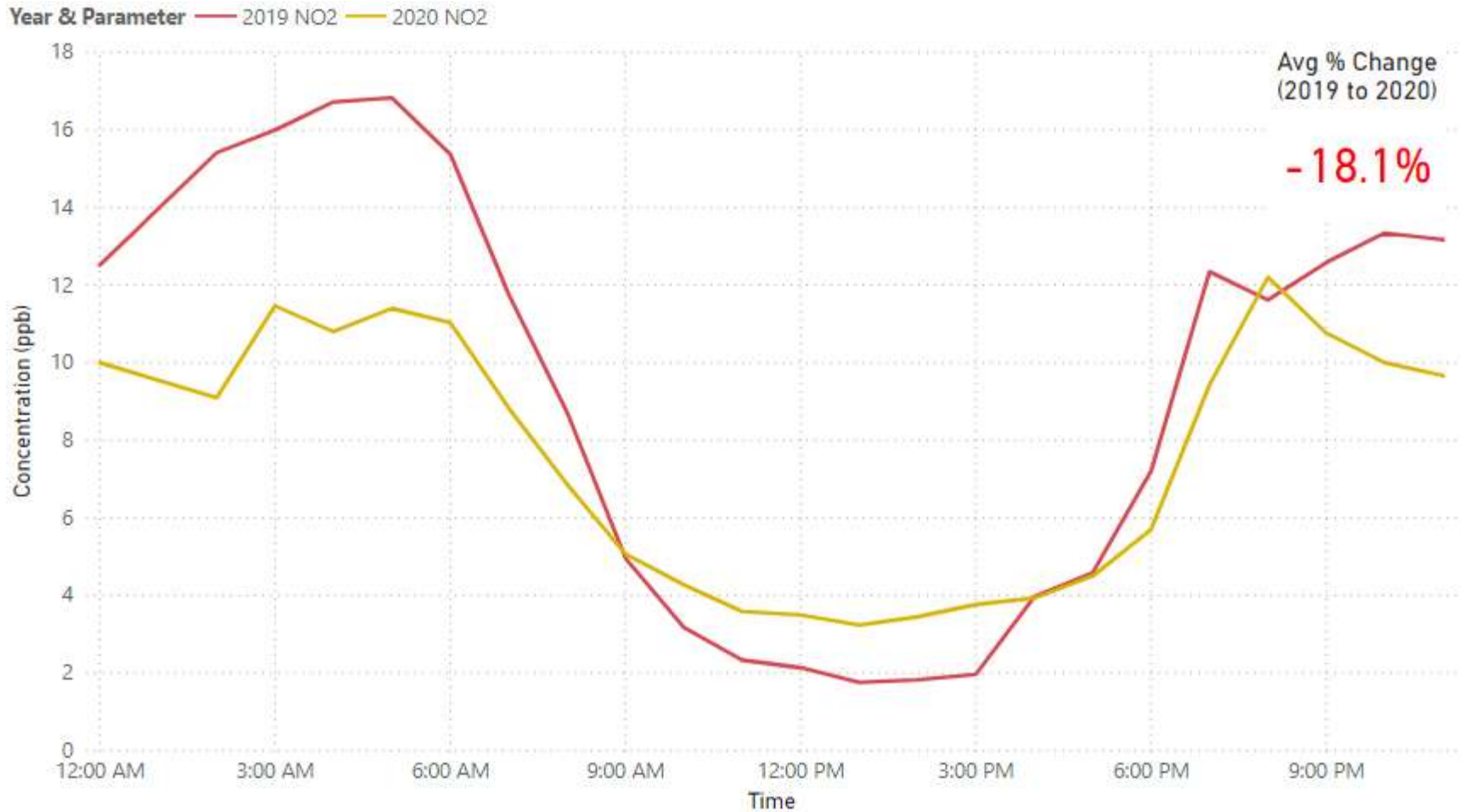
# Weekday NO<sub>2</sub> Concentrations – Parkway East



# Weekday NO<sub>2</sub> Concentrations – Towanda

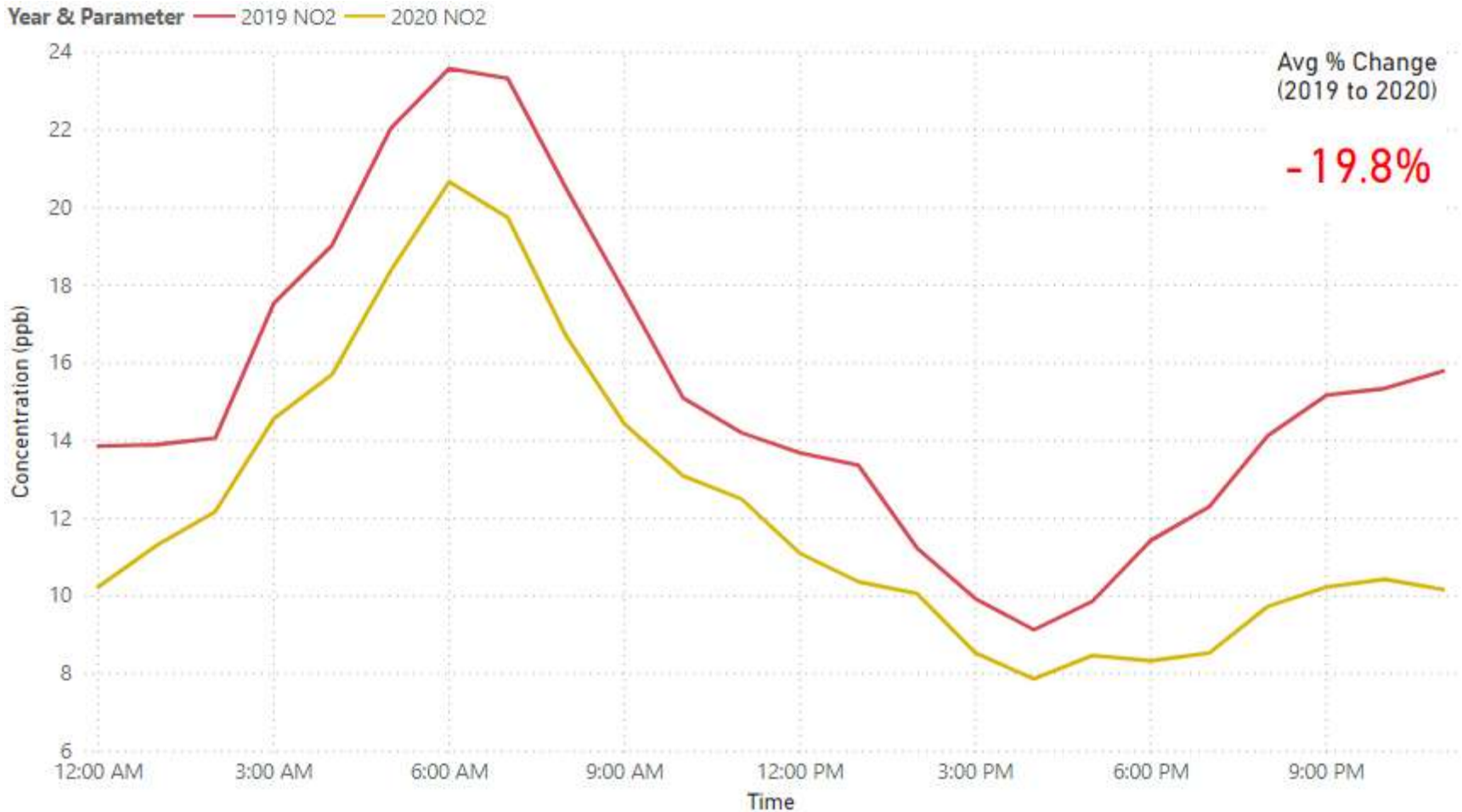


# Weekday NO<sub>2</sub> Concentrations – Scranton





# Weekday NO<sub>2</sub> Concentrations – Montgomery



# Weekend NO<sub>2</sub> Concentrations – Montgomery



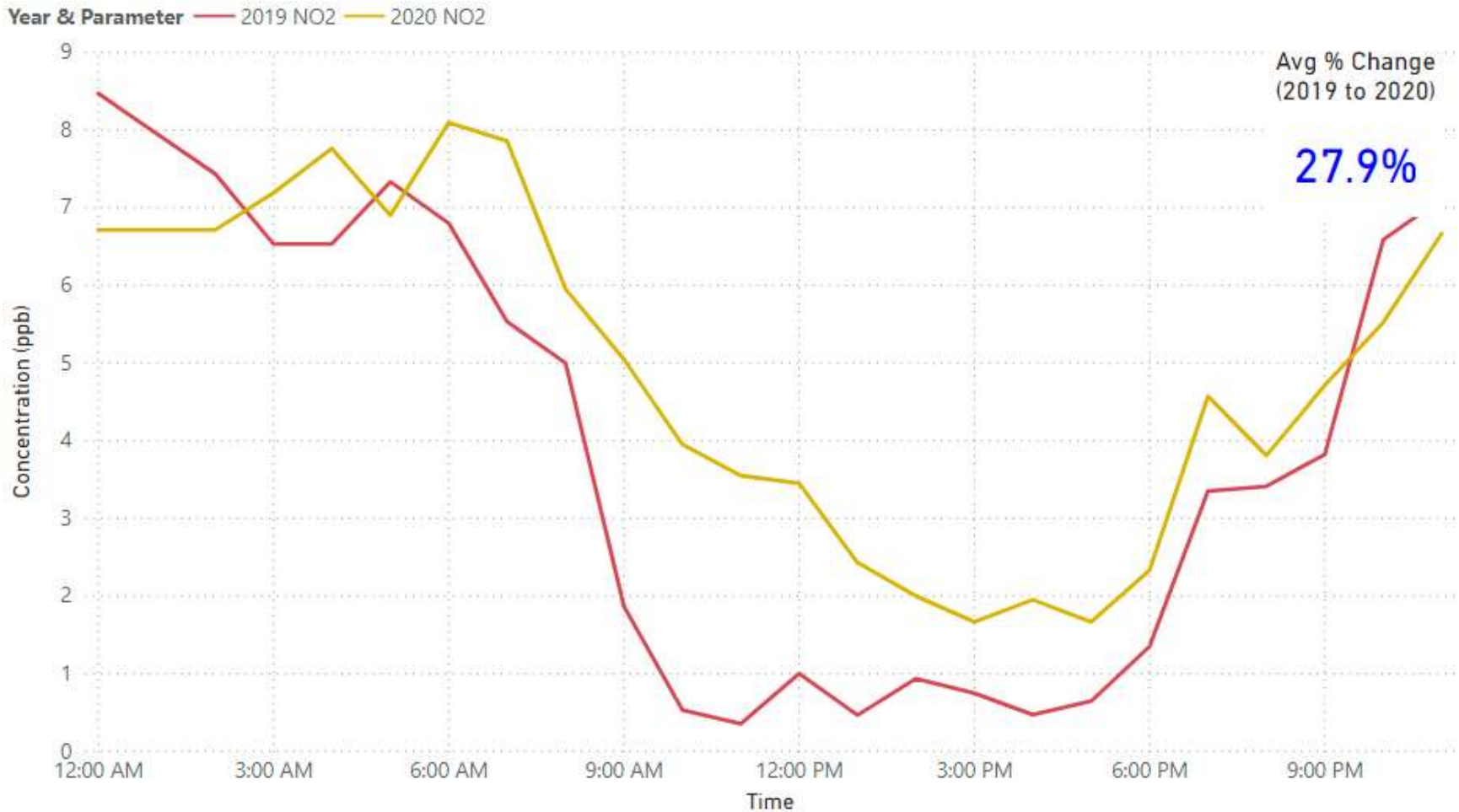
## Loosening Period

Friday, May 8, 2020

to

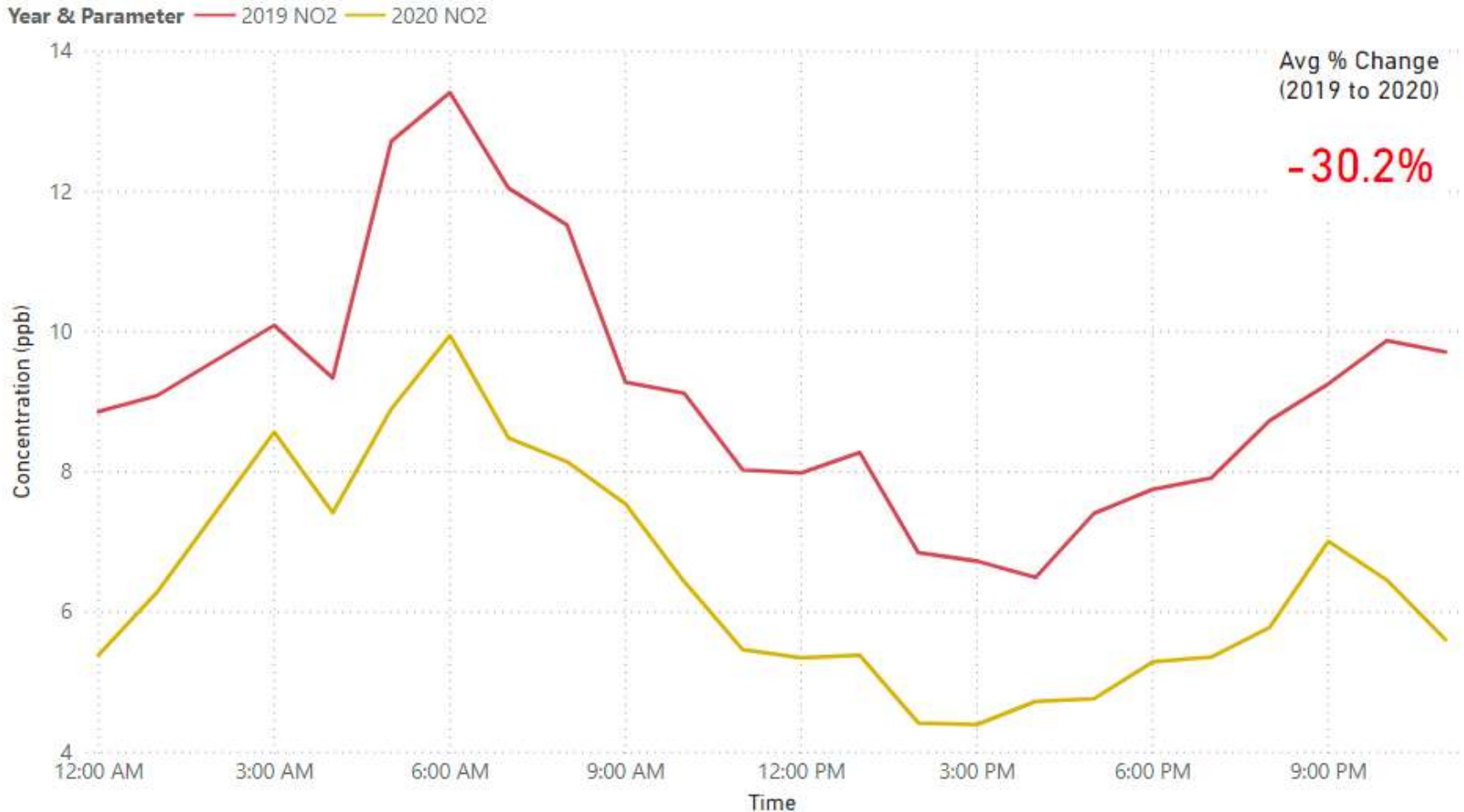
Sunday, June 7, 2020

# Weekday NO<sub>2</sub> Concentrations – Beaver Falls



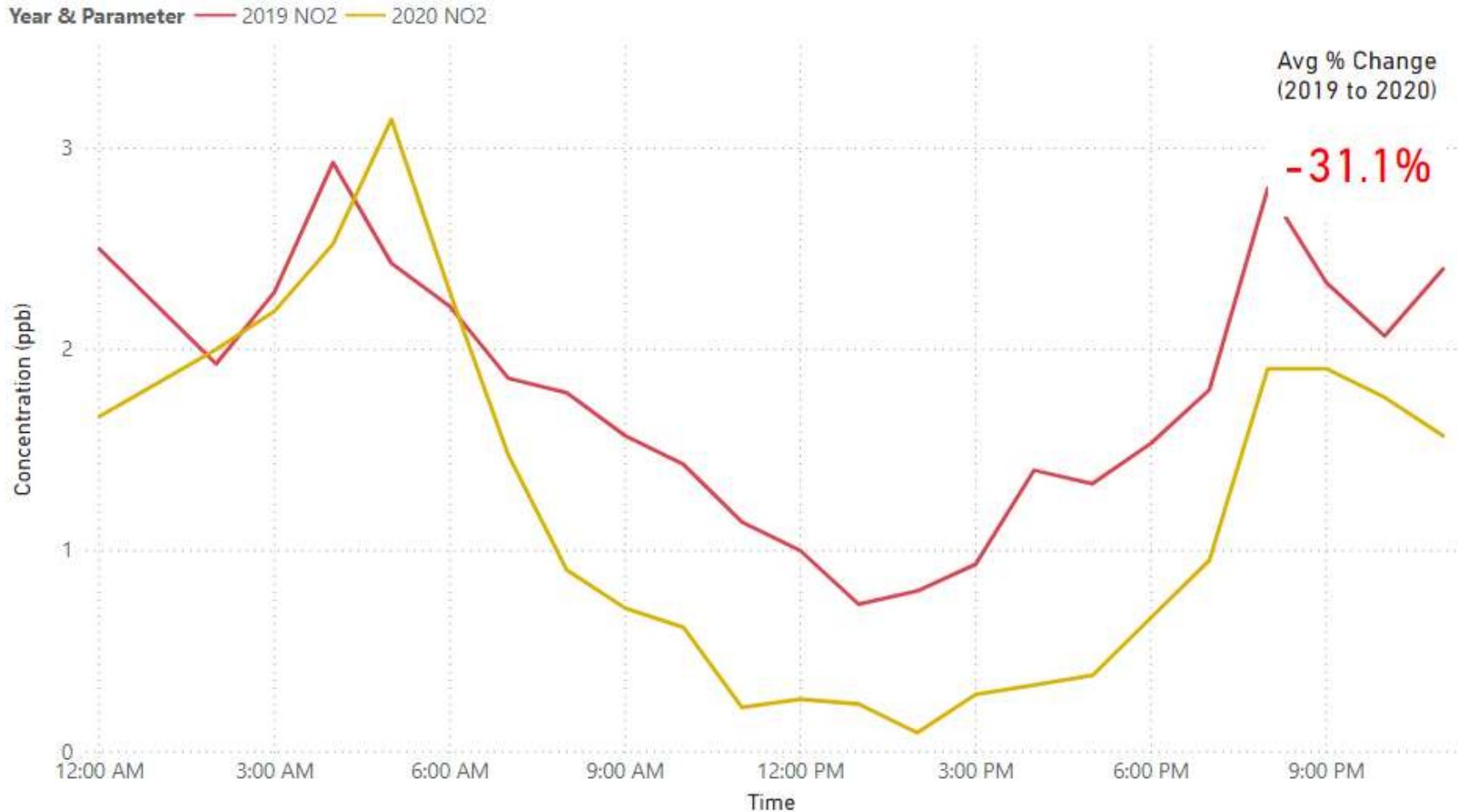
**Yellow** Phase – Since May 22 (17 Days)

# Weekday NO<sub>2</sub> Concentrations – Parkway East



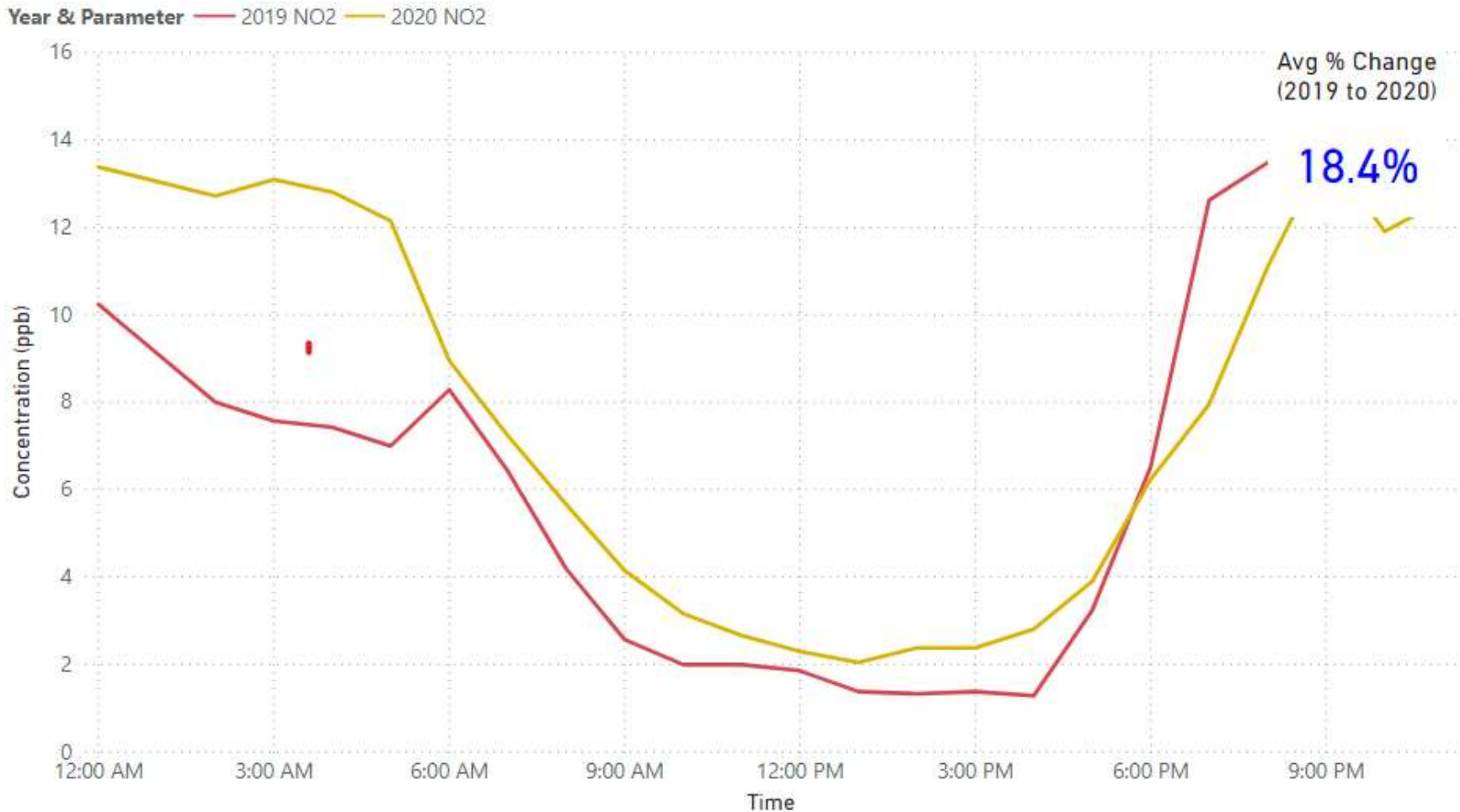
**Yellow** Phase – Since May 15 (24 Days)

# Weekday NO<sub>2</sub> Concentrations – Towanda



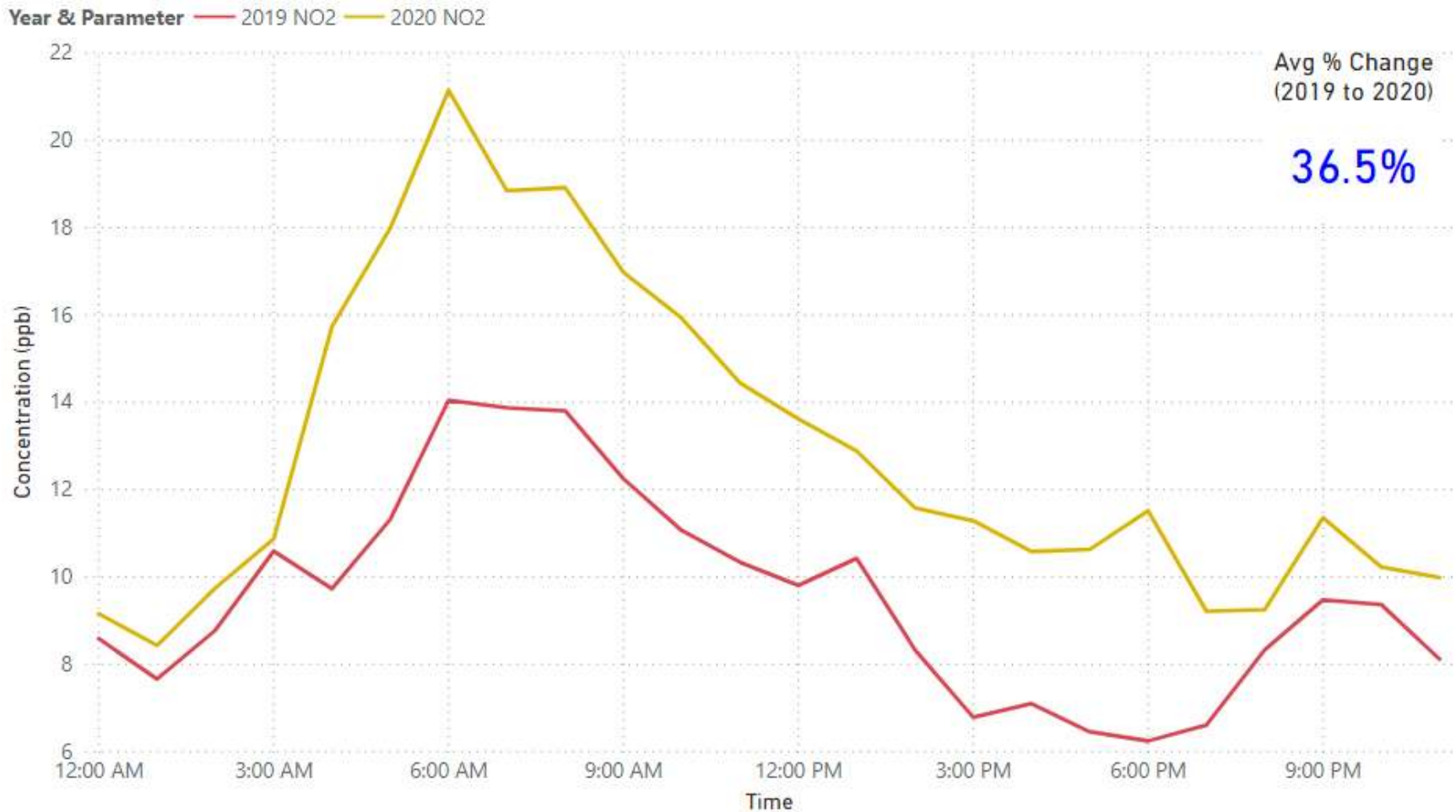
**Yellow** Phase – Since May 8 (31 Days)

# Weekday NO<sub>2</sub> Concentrations – Scranton



**Yellow** Phase – Since June 5 (3 Days)

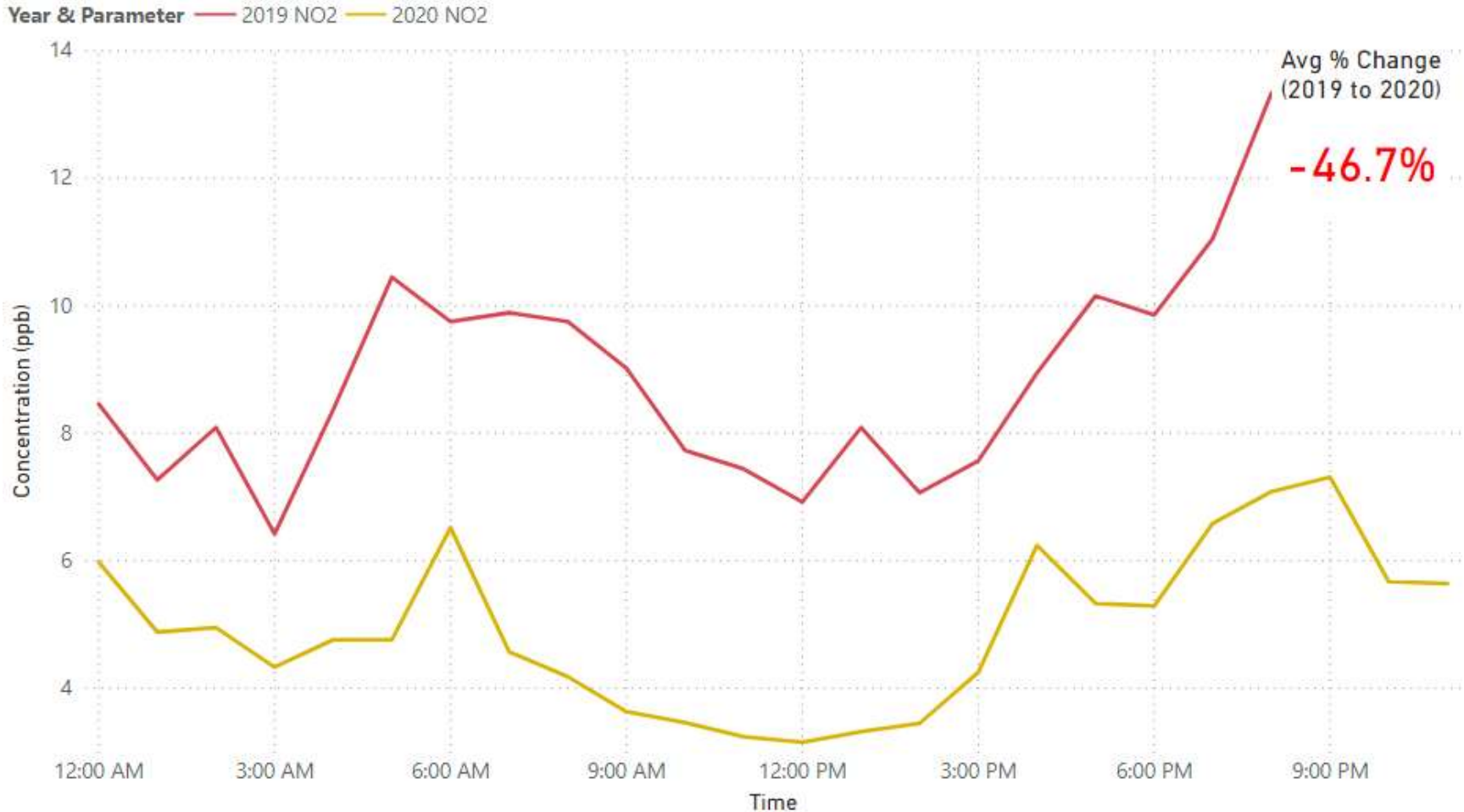
# Weekday NO<sub>2</sub> Concentrations – Montgomery



**Yellow** Phase – Since June 5 (3 Days)

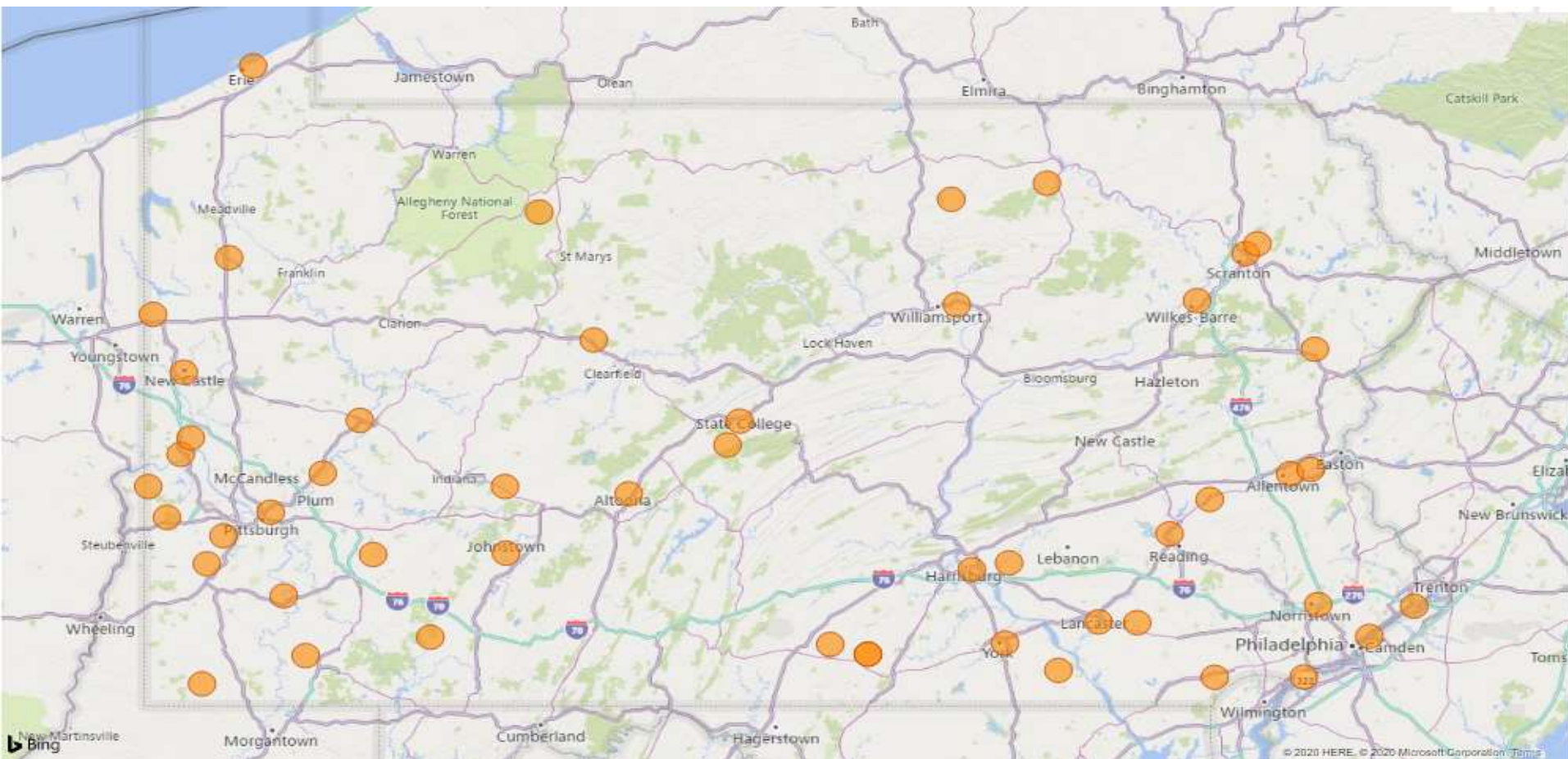


# Weekend NO<sub>2</sub> Concentrations – Montgomery

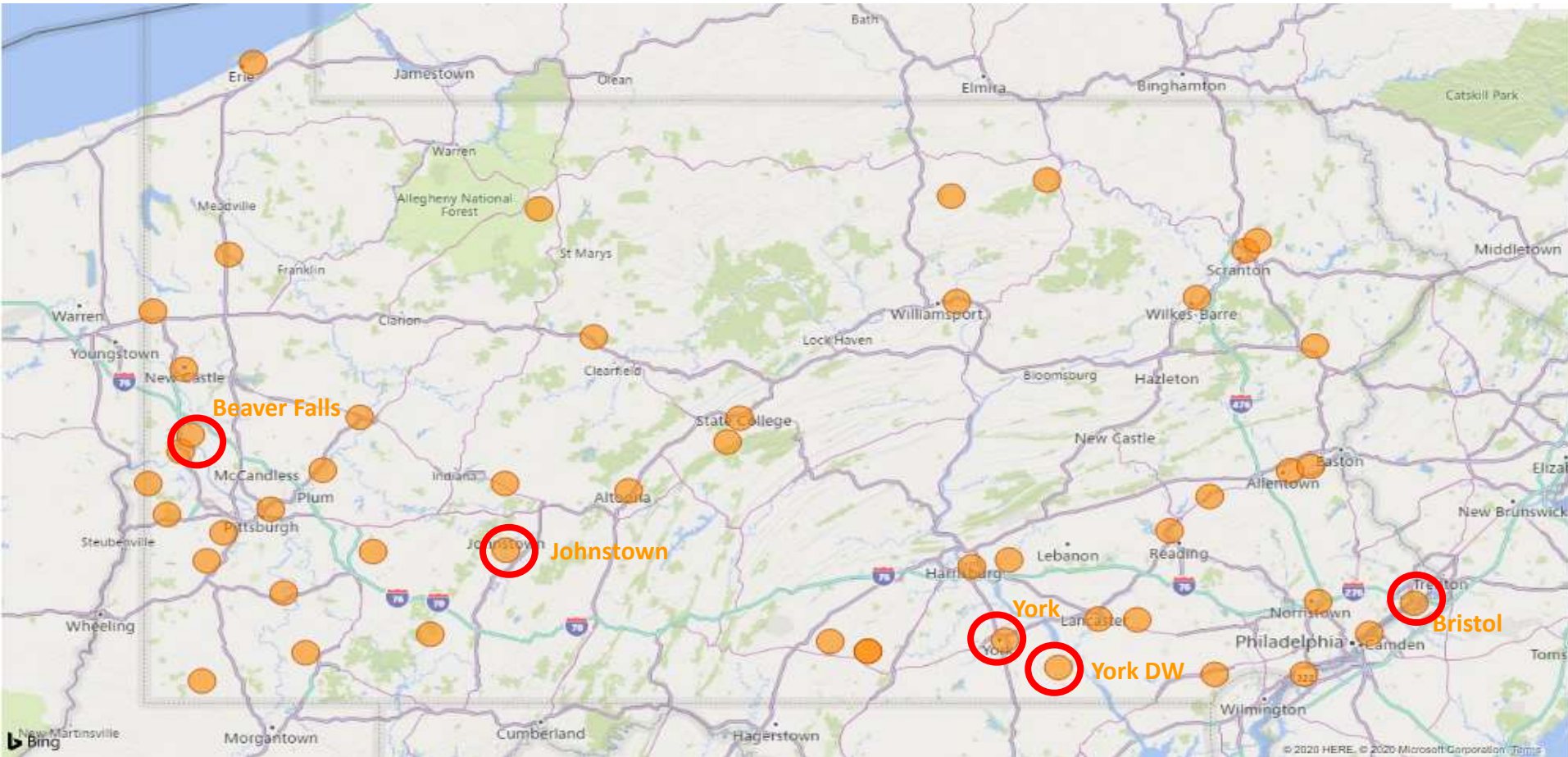


**Yellow** Phase – Since June 5 (3 Days)

# PA Ozone Monitor Locations



# PA Ozone Monitor Locations (Focus Area)



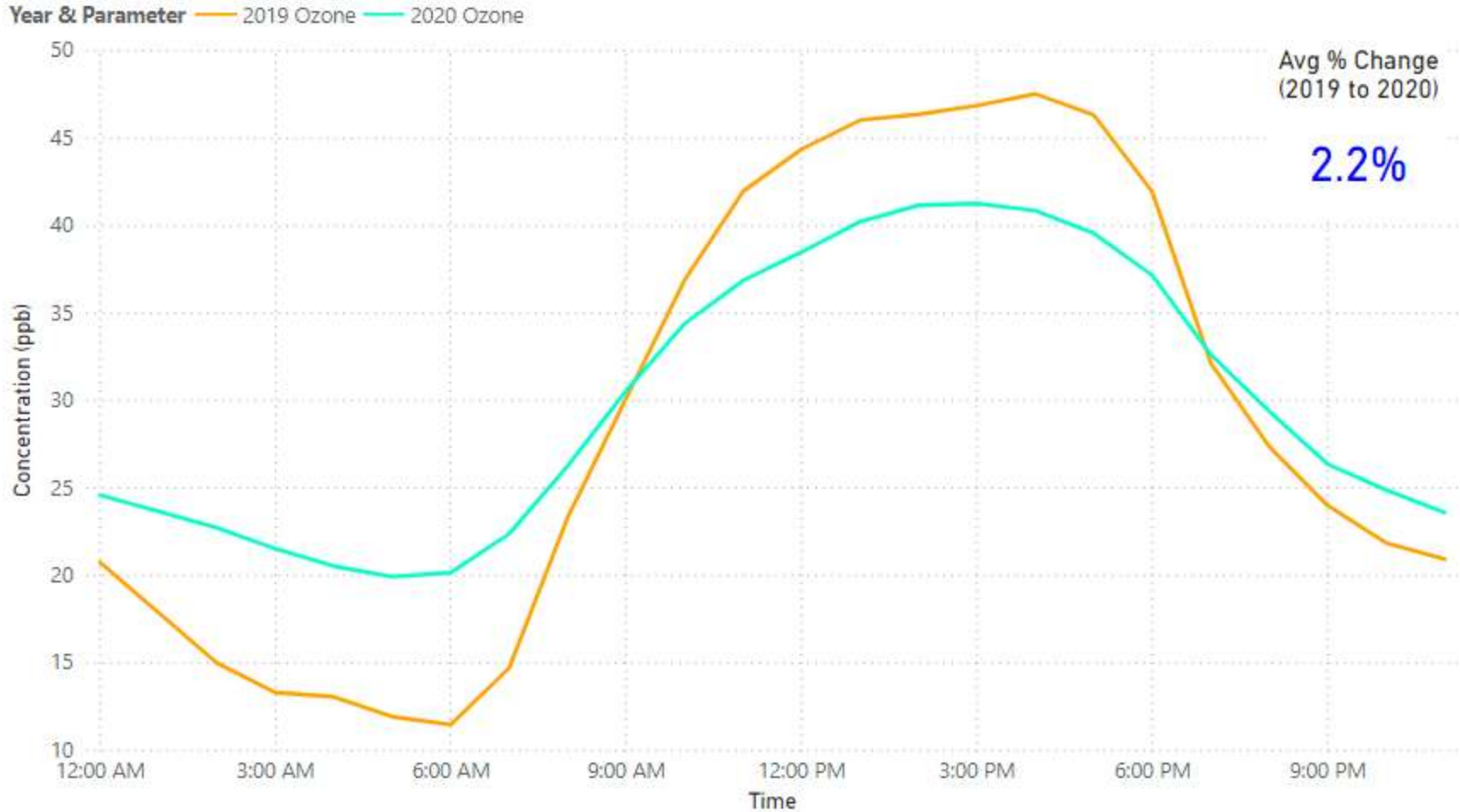
## Stay At Home Period

Monday, March 16, 2020

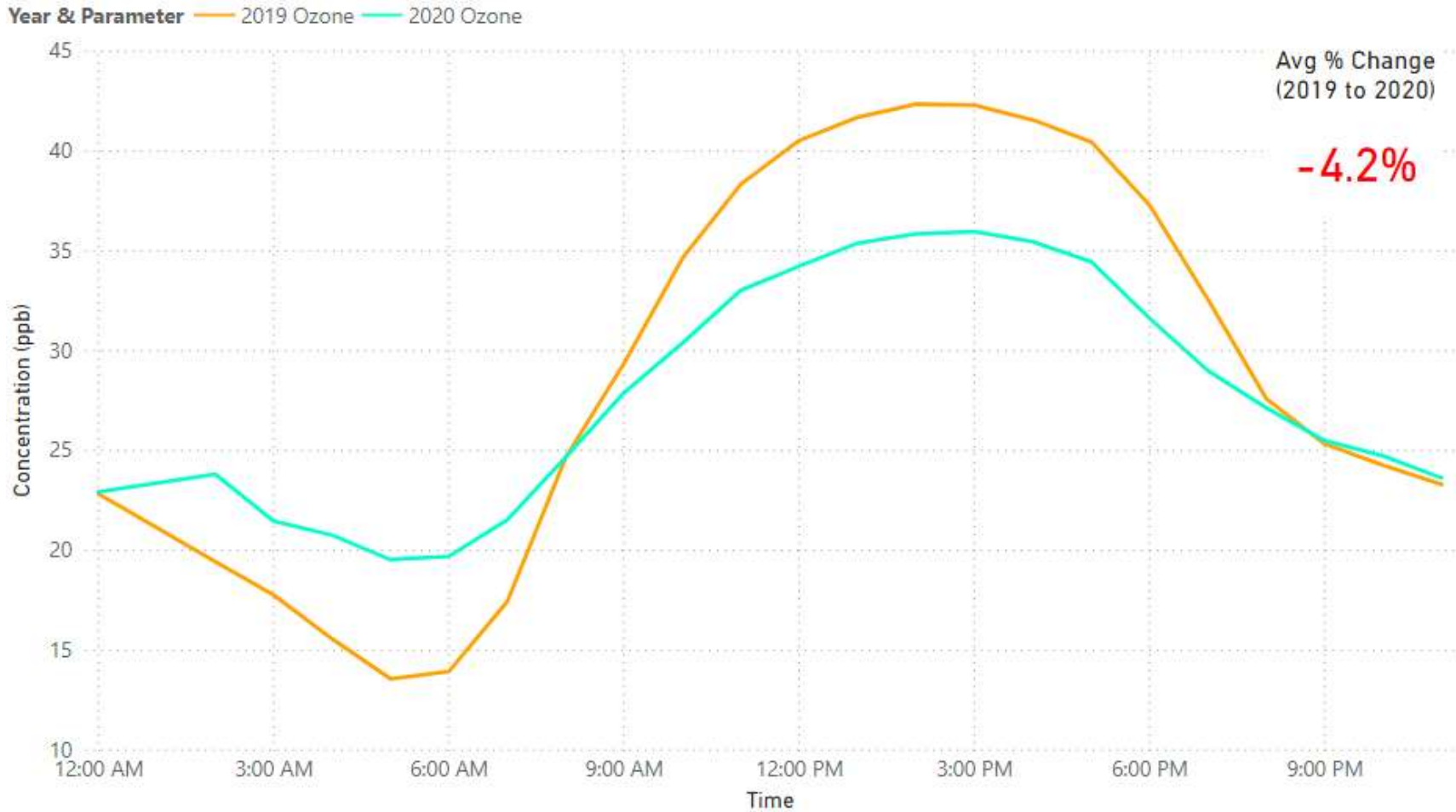
to

Sunday, April 26, 2020

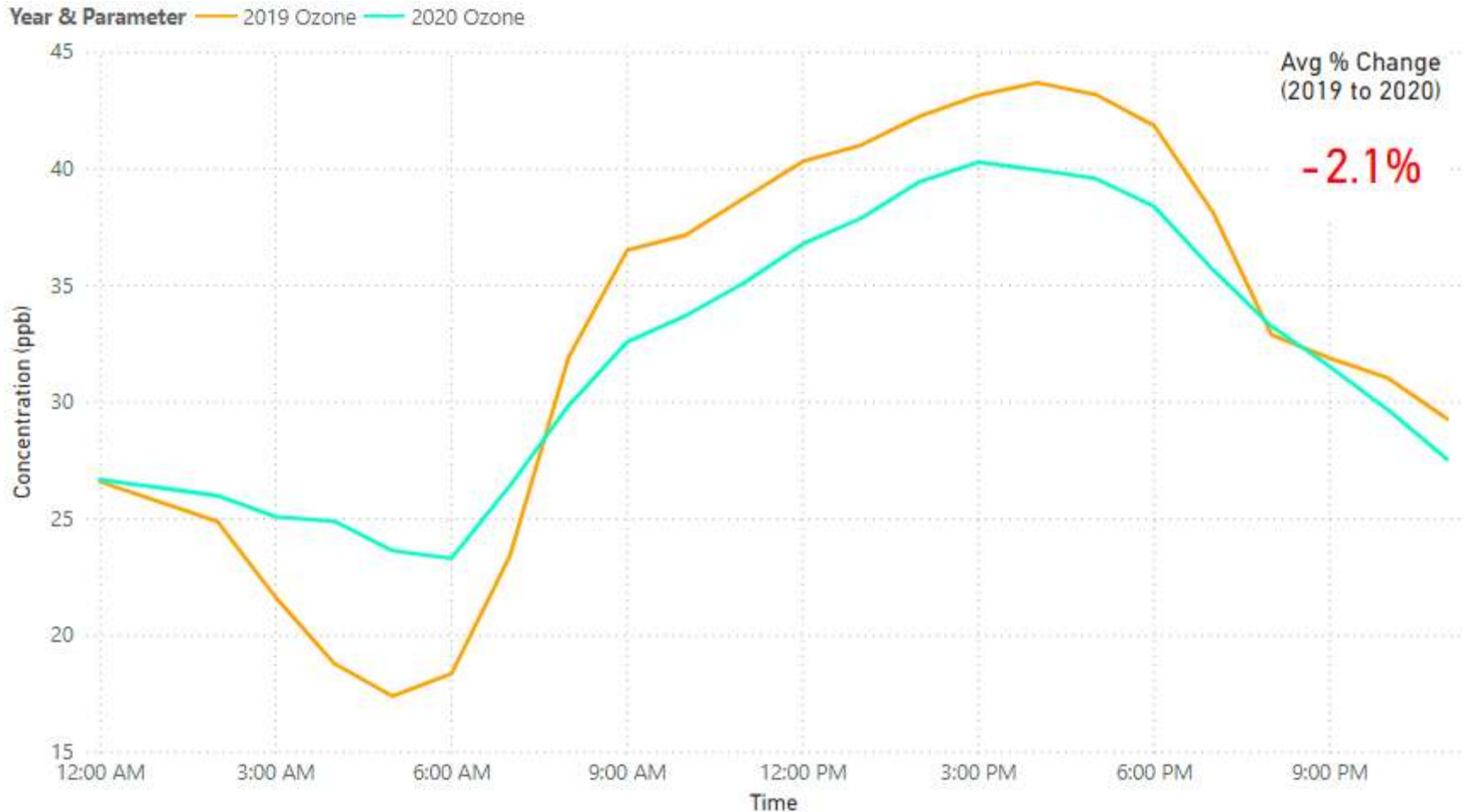
# Weekday Ozone Concentrations – Beaver Falls



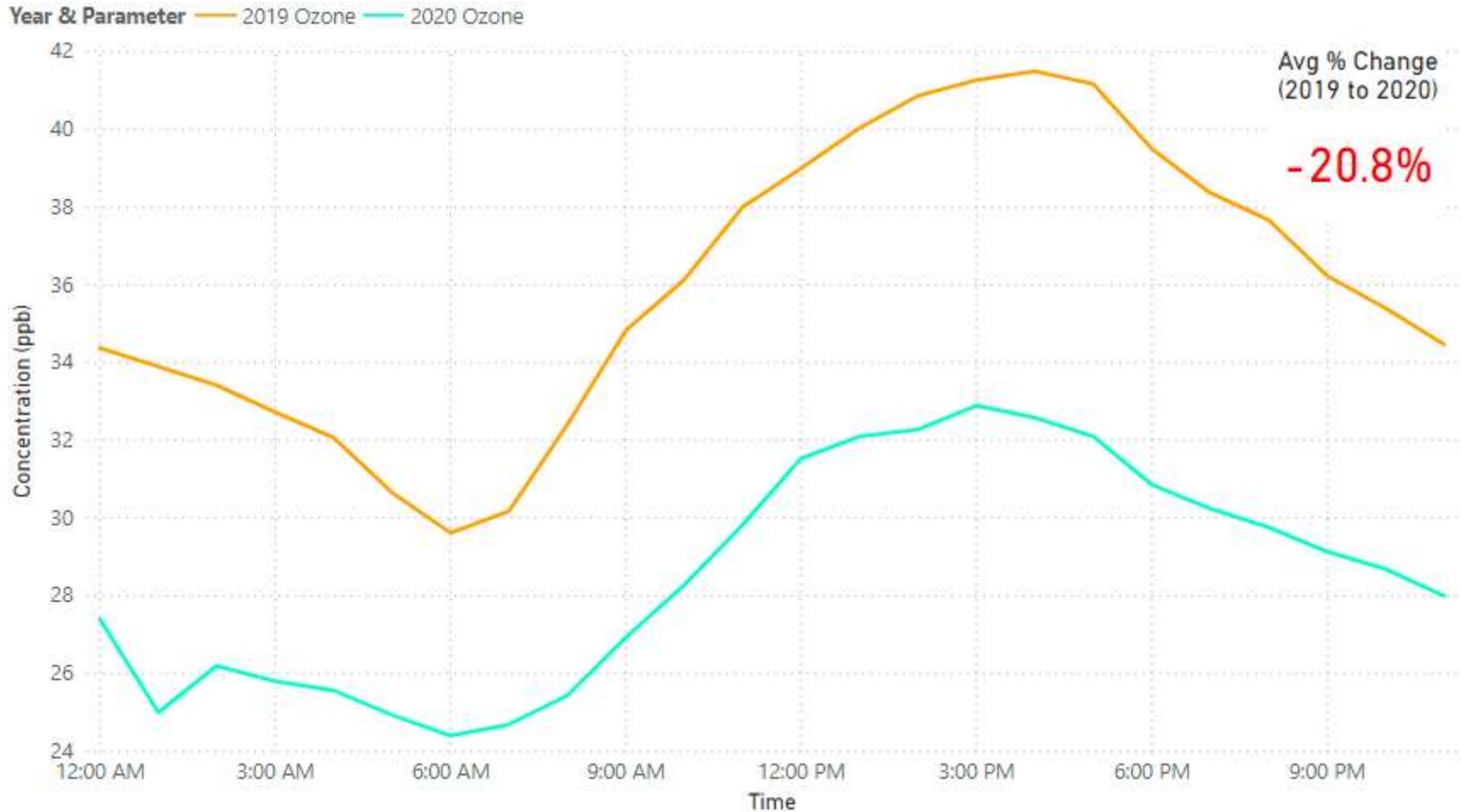
# Weekday Ozone Concentrations – Johnstown



# Weekday Ozone Concentrations – York

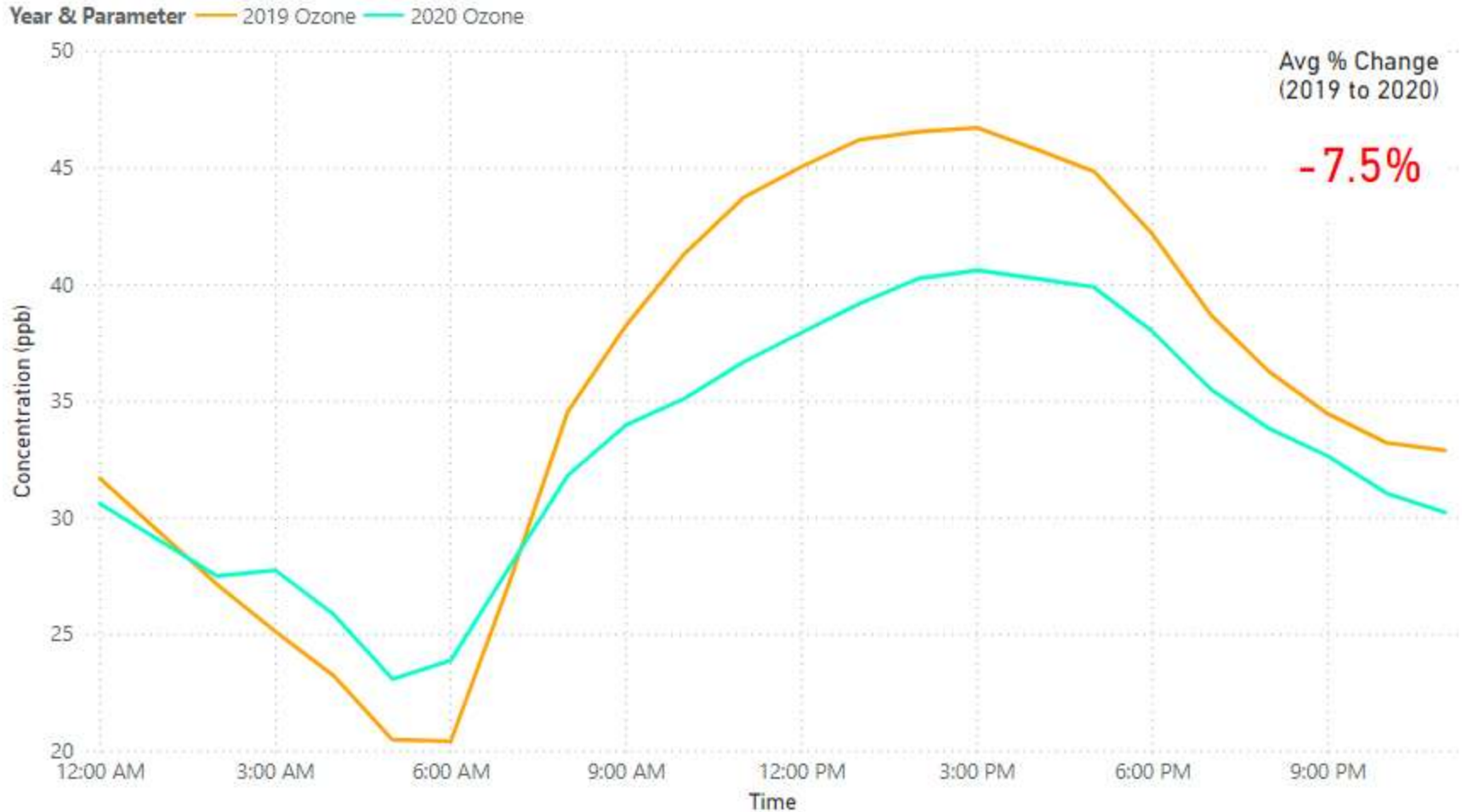


# Weekday Ozone Concentrations – York DW





# Weekday Ozone Concentrations – Bristol



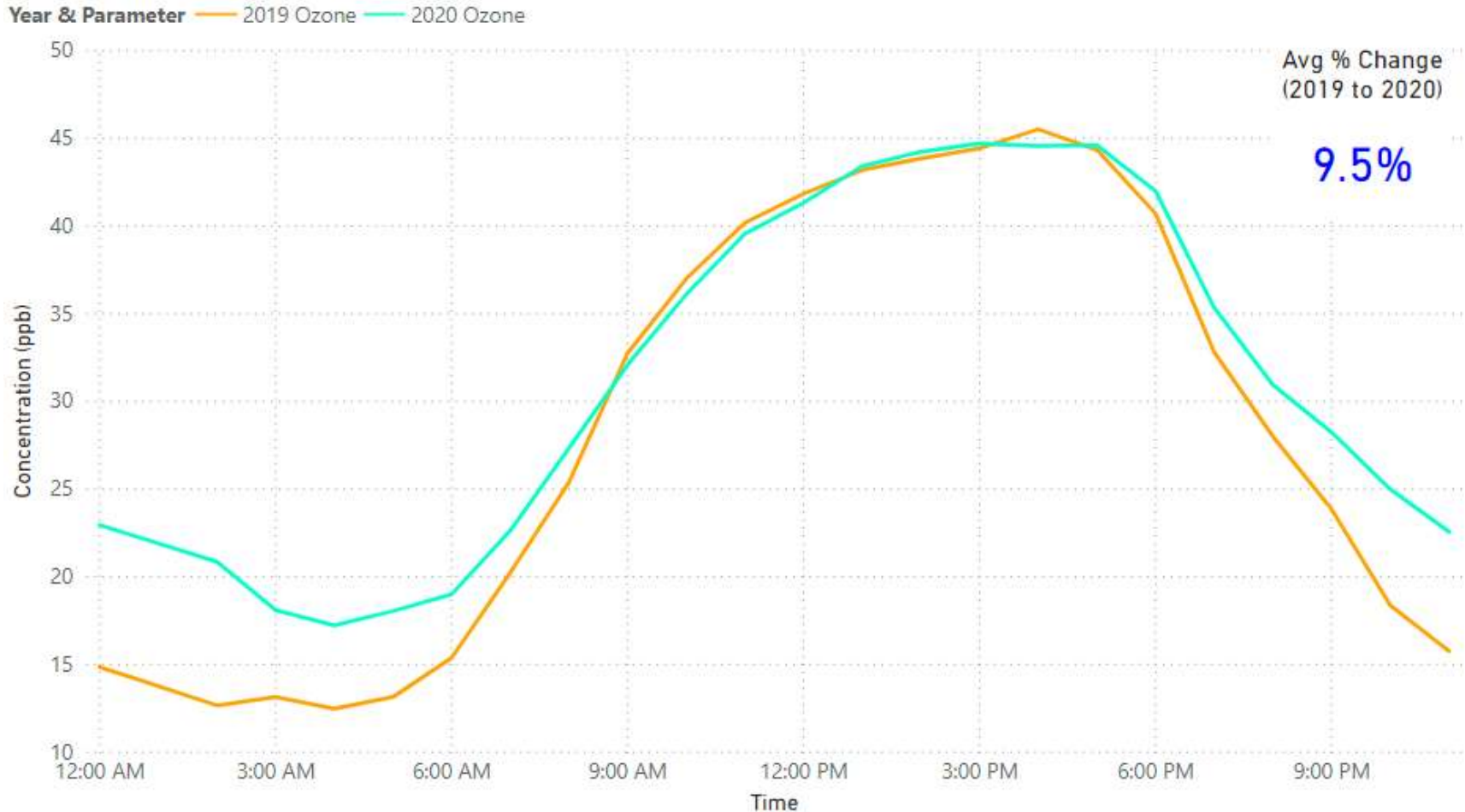
## Loosening Period

Friday, May 8, 2020

to

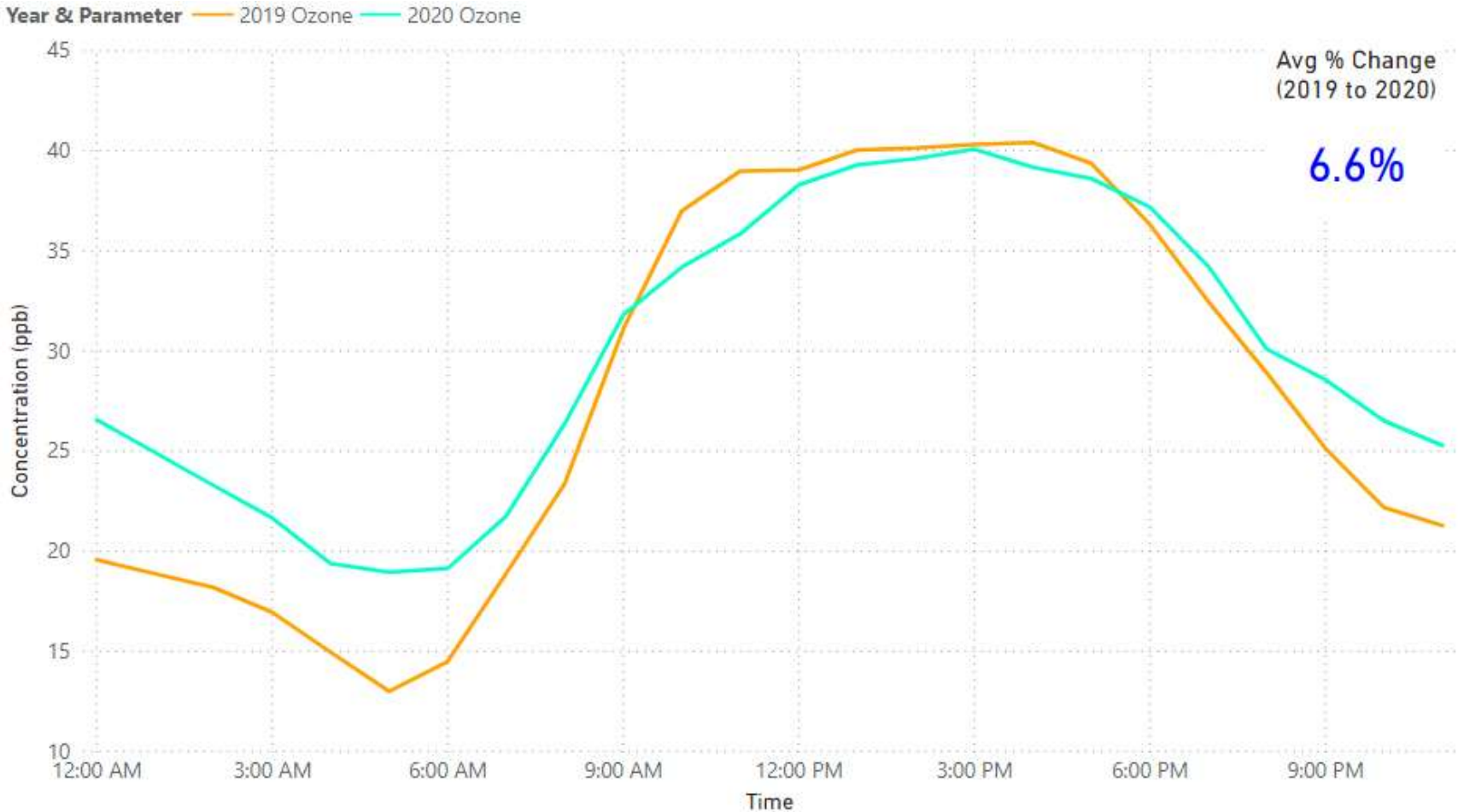
Sunday, June 7, 2020

# Weekday Ozone Concentrations – Beaver Falls



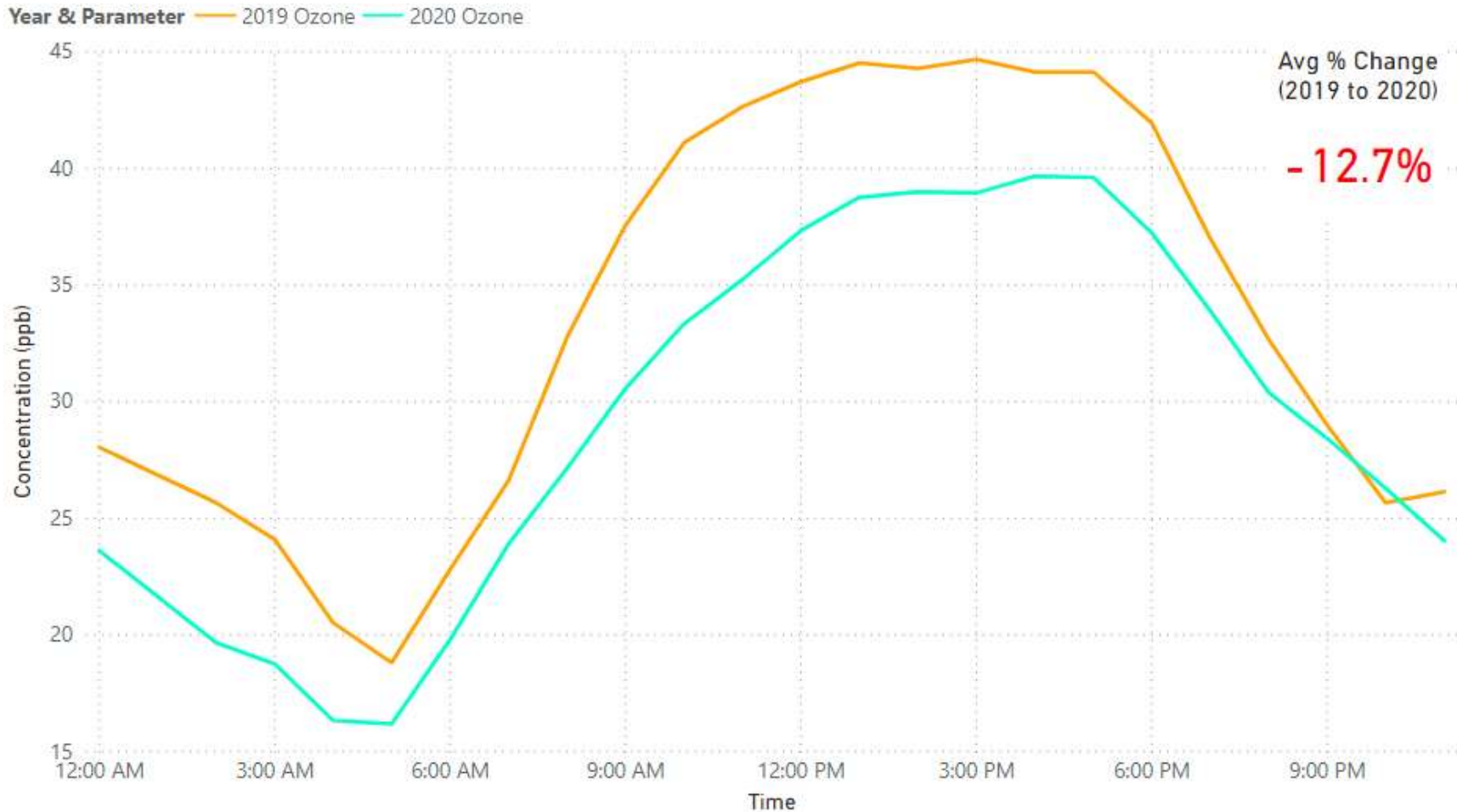
**Yellow** Phase – Since May 22 (17 Days)

# Weekday Ozone Concentrations – Johnstown



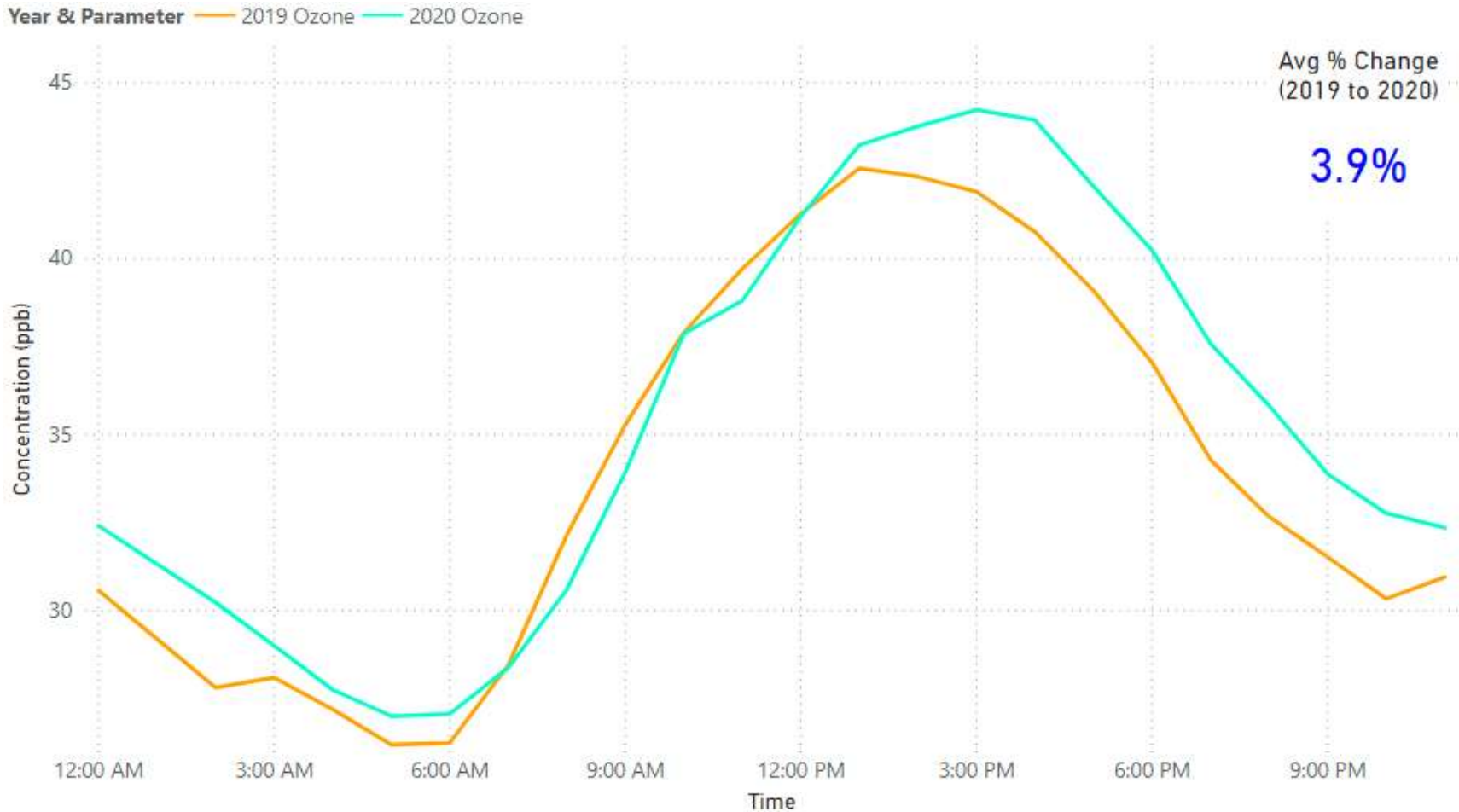
**Yellow** Phase – Since May 15 (24 Days)

# Weekday Ozone Concentrations – York



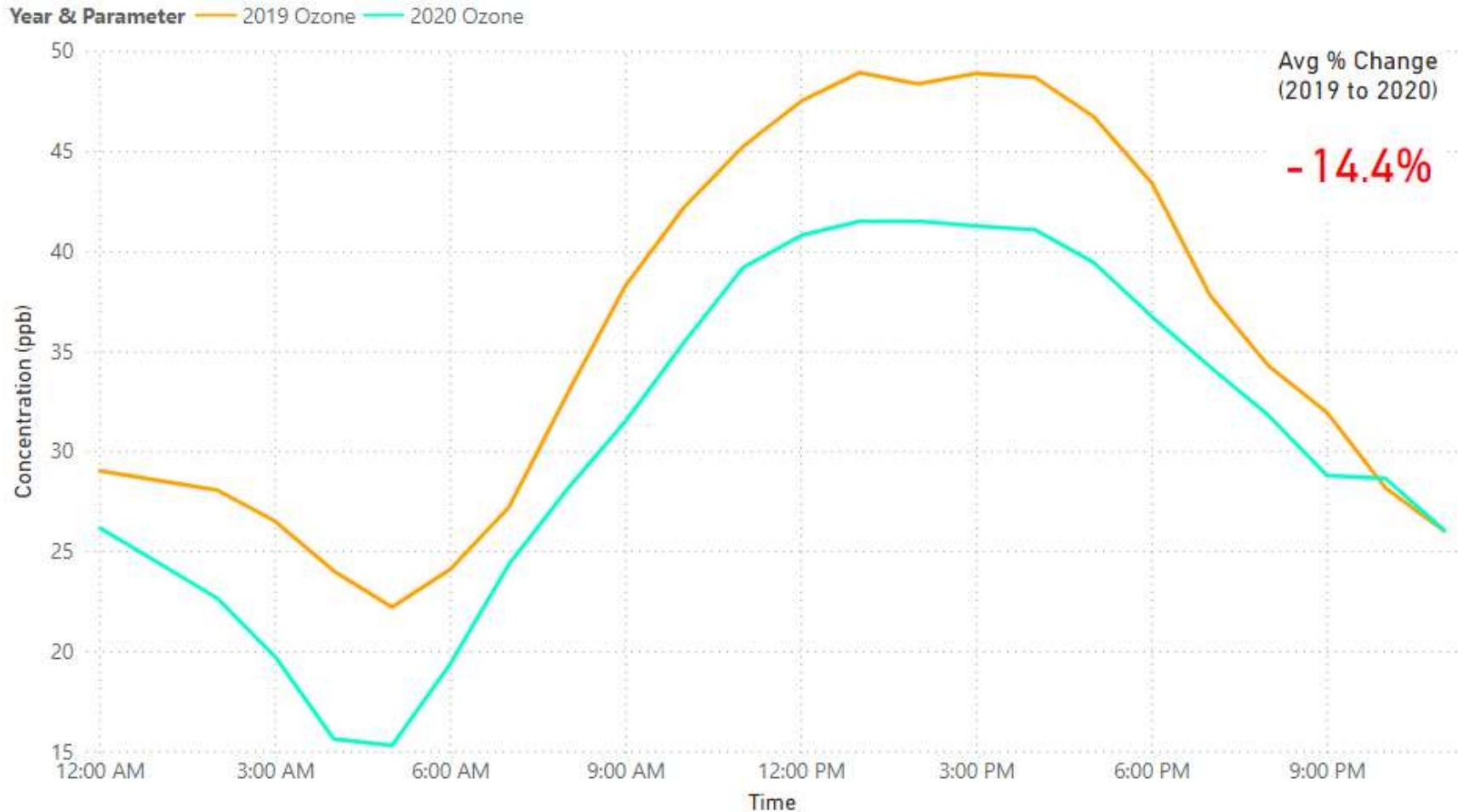
**Yellow** Phase – Since May 22 (17 Days)

# Weekday Ozone Concentrations – York DW



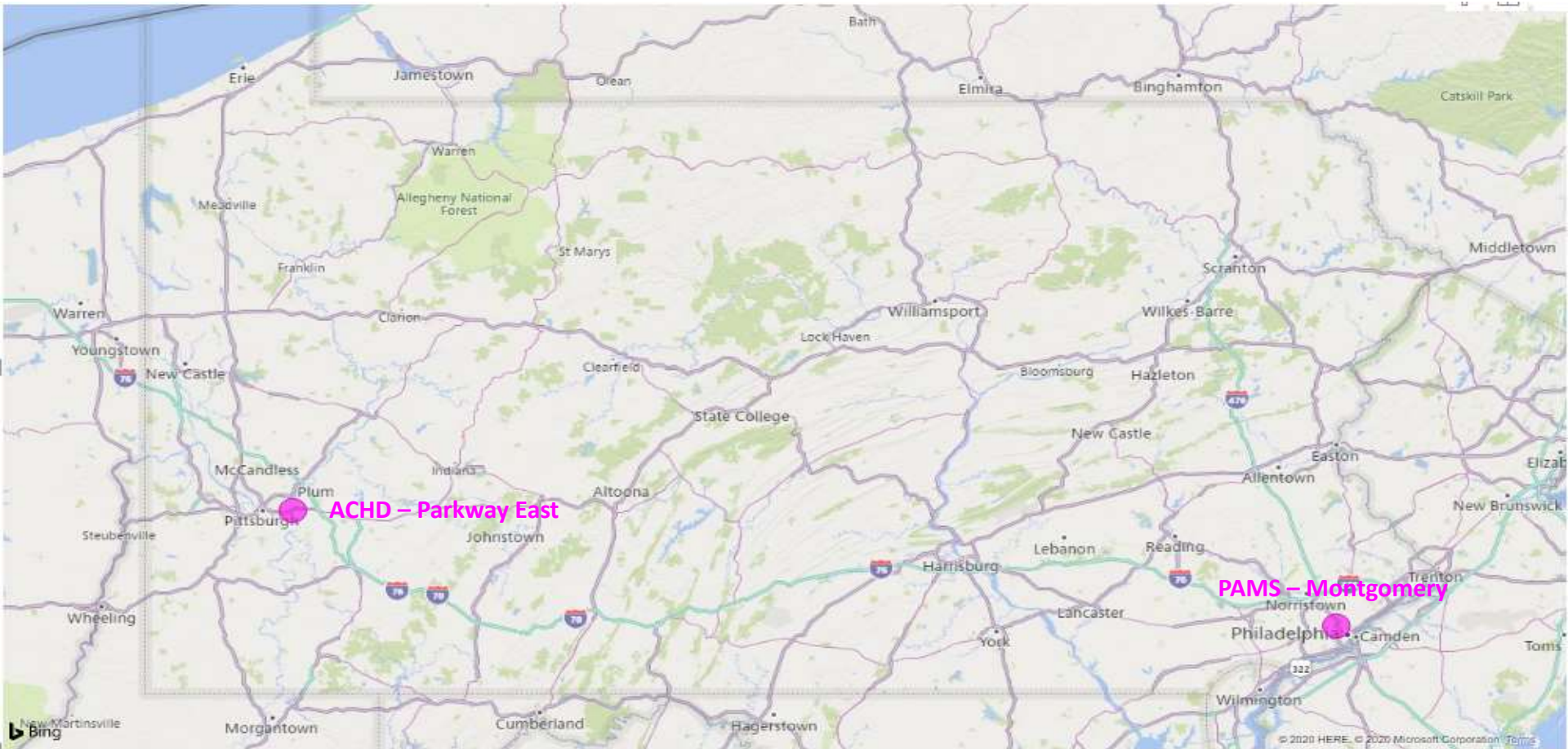
**Yellow** Phase – Since May 22 (17 Days)

# Weekday Ozone Concentrations – Bristol



**Yellow** Phase – Since June 5 (3 Days)

# Black Carbon Monitor Locations





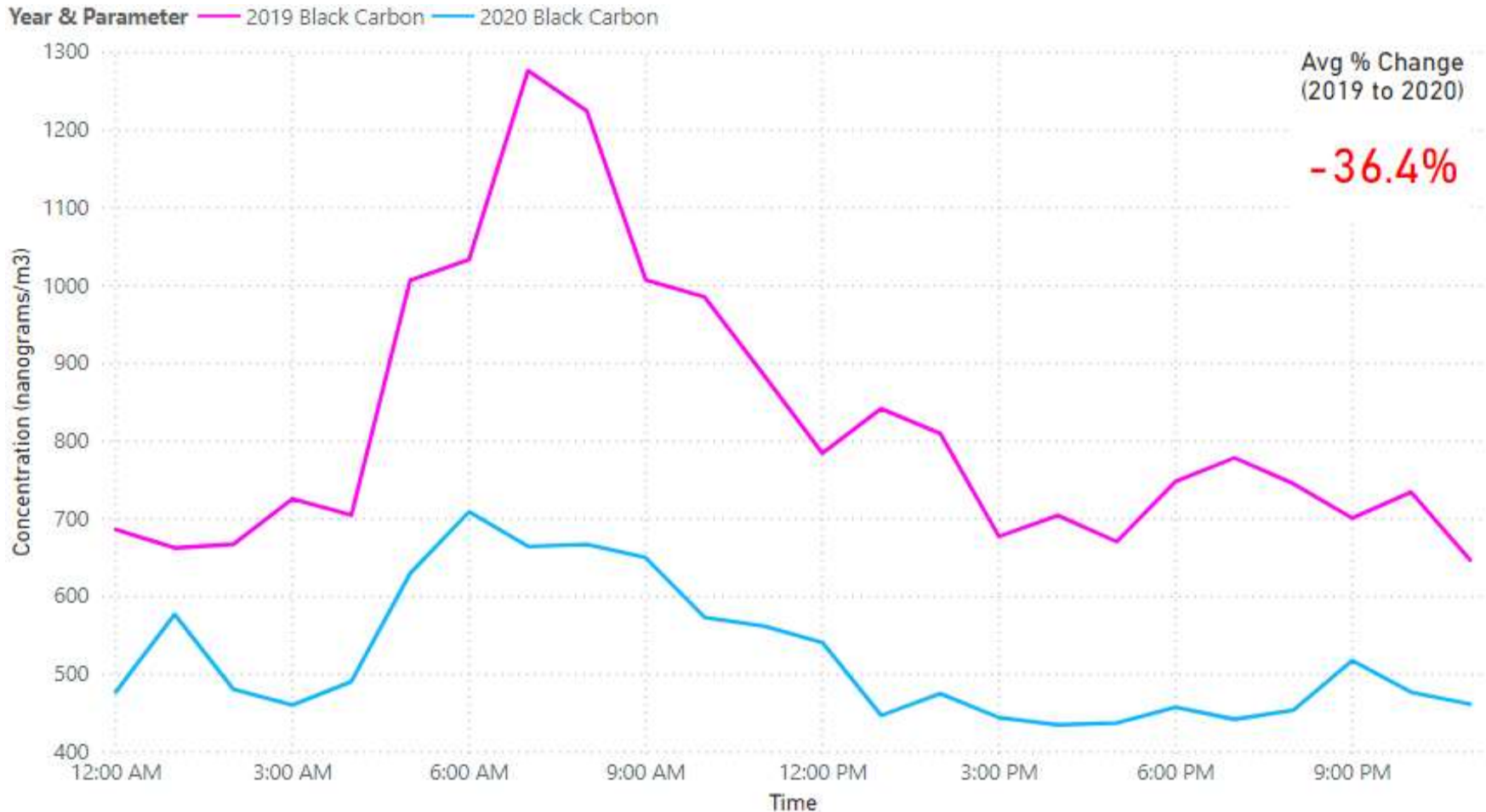
## Stay At Home Period

Monday, March 16, 2020

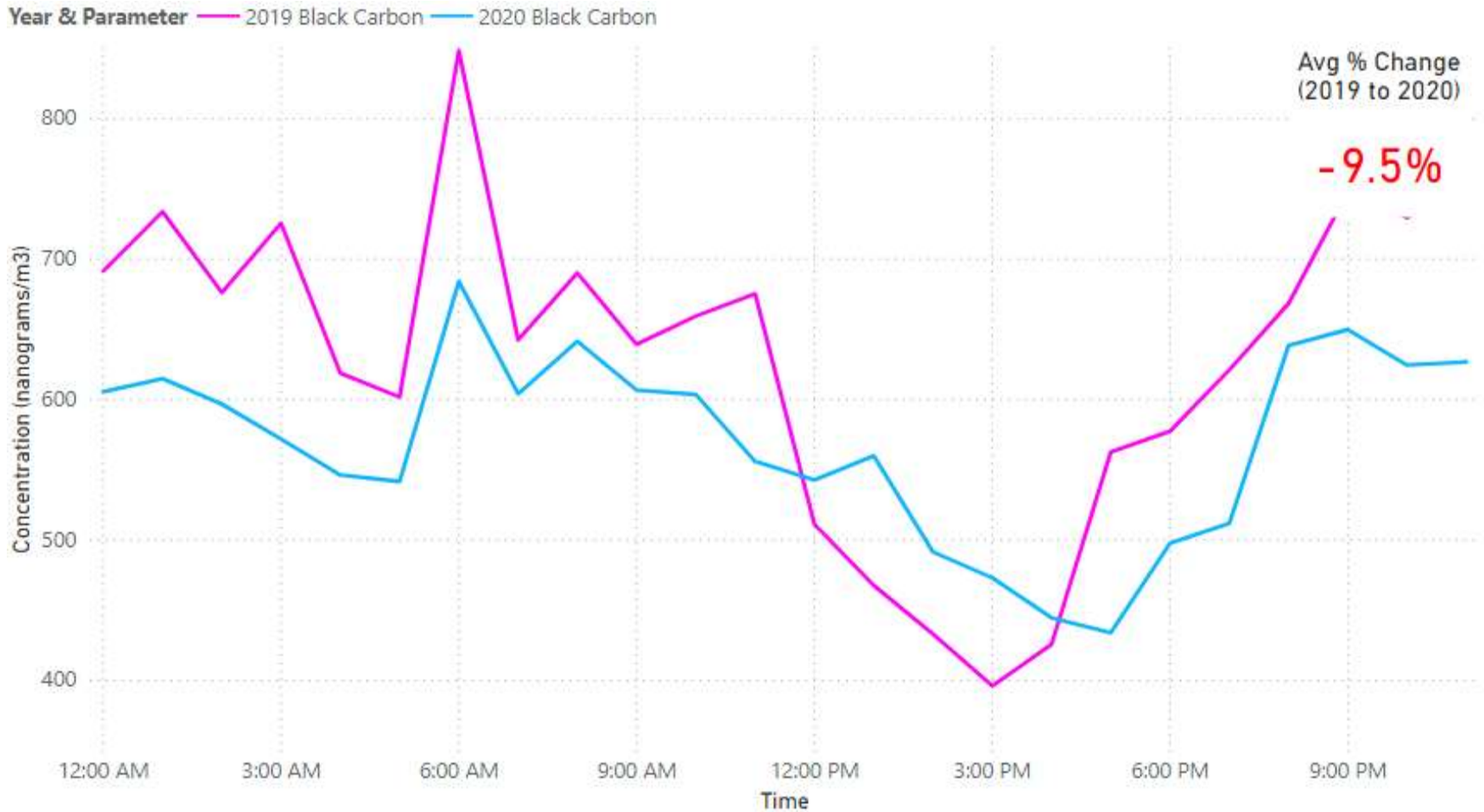
to

Sunday, April 26, 2020

# Weekday BC Concentrations – Parkway East

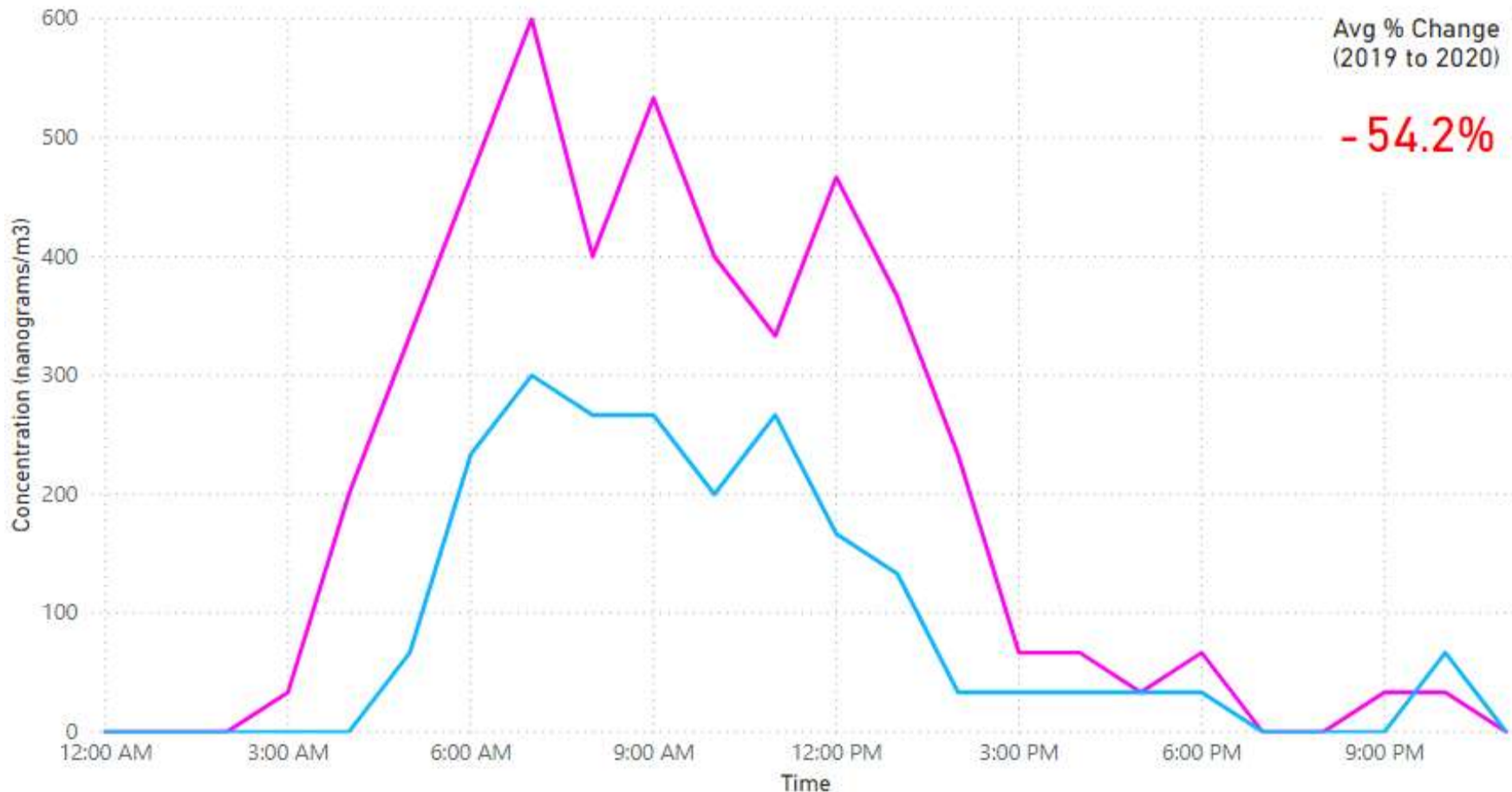


# Weekend BC Concentrations – Parkway East



# Weekday BC Concentrations – Montgomery

Year & Parameter — 2019 Black Carbon — 2020 Black Carbon



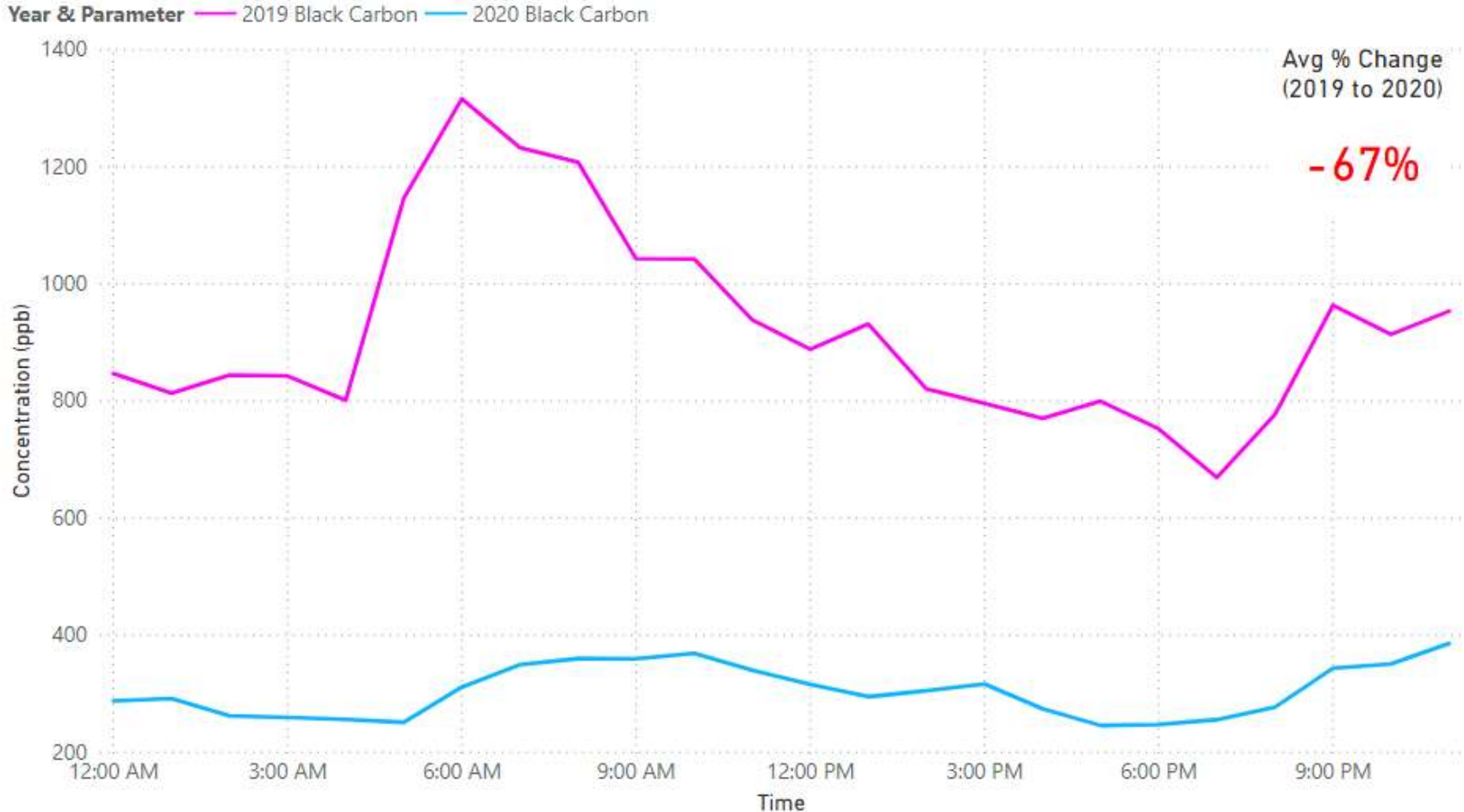
## Loosening Period

Friday, May 8, 2020

to

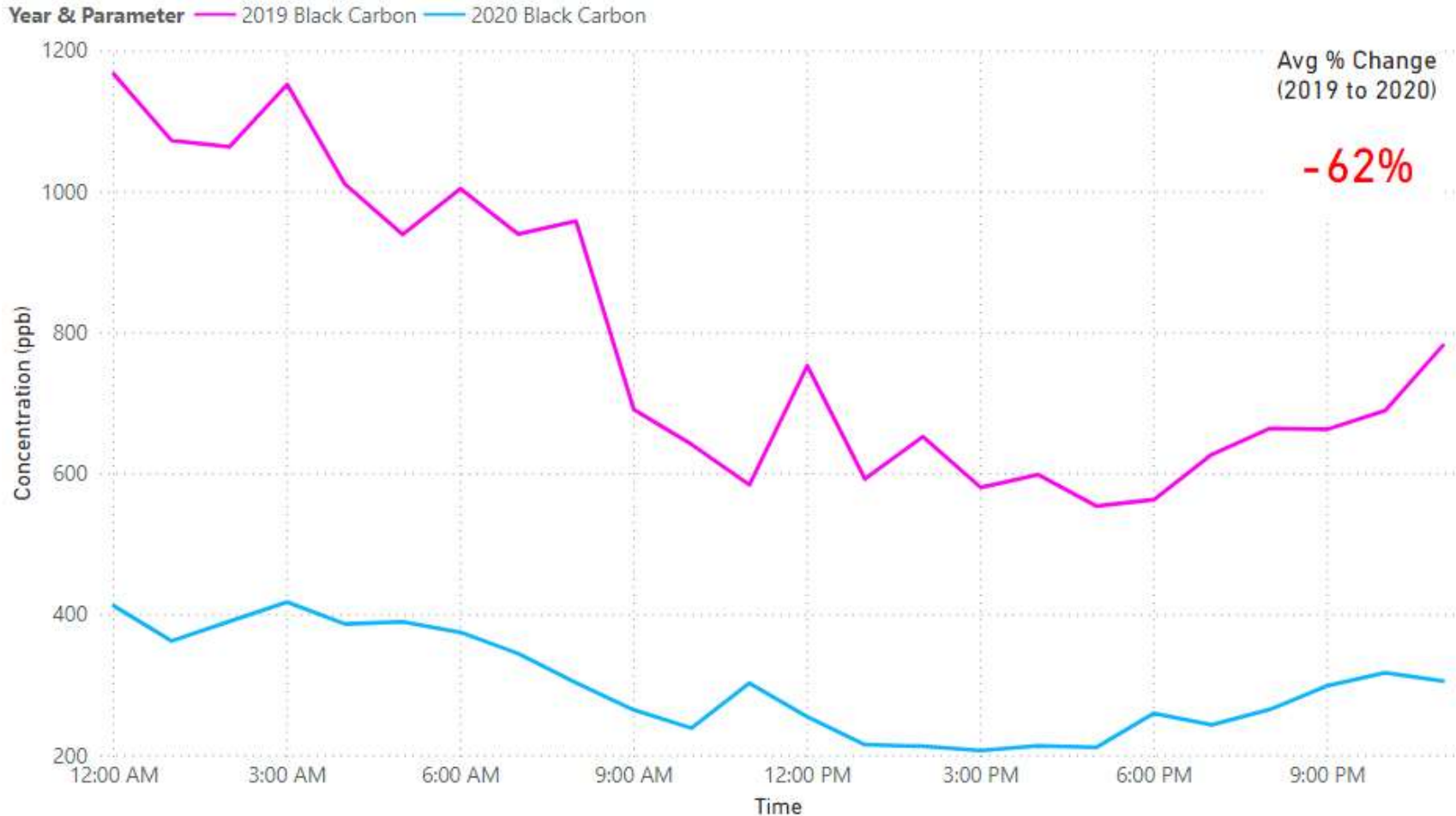
Sunday, June 7, 2020

# Weekday BC Concentrations – Parkway East



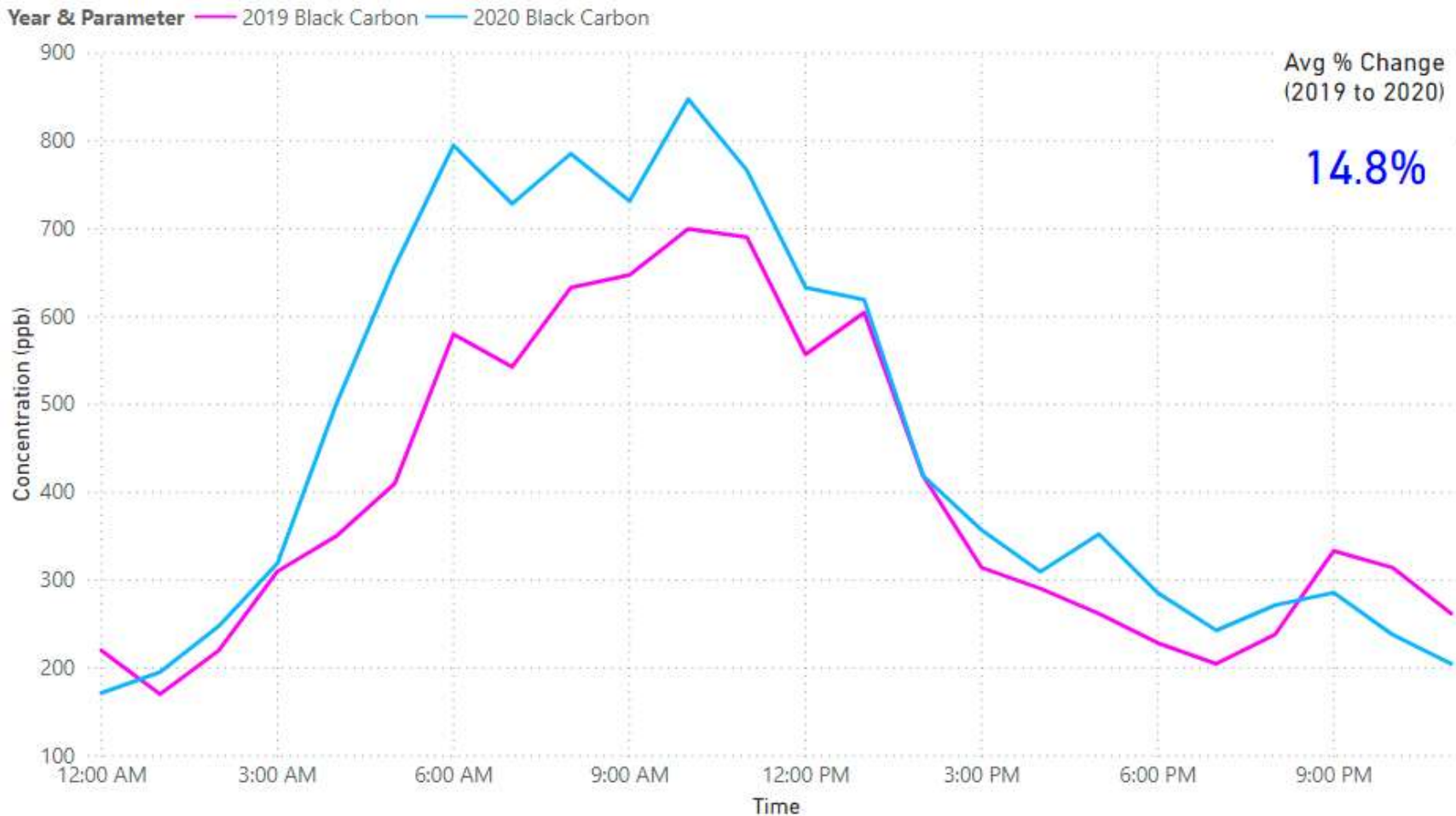
**Yellow** Phase – Since May 15 (24 Days)

# Weekend BC Concentrations – Parkway East



**Yellow** Phase – Since May 15 (24 Days)

# Weekday BC Concentrations – Montgomery



**Yellow** Phase – Since June 5 (3 Days)



# Summary

- Since the start of the Stay at Home period, there has been a reduction in total vehicles traveled across Pennsylvania. However, truck traffic remained relatively unchanged.
- As a result, PA saw a decline in its air monitoring data (NO<sub>2</sub>, ozone and black carbon). The greatest decline has been during weekdays.
- Over the latest 31 days (May 8 – June 7), as traffic levels have begun to increase, NO<sub>2</sub> levels have approached seasonal averages. Ozone is higher than 2019 in western PA and lower across eastern PA in urban areas (rural areas are higher). Compared to 2019, black carbon in 2020 has decreased in Pittsburgh and increased in Philadelphia.



**pennsylvania**

DEPARTMENT OF ENVIRONMENTAL PROTECTION

**Bureau of Air Quality**



**Sean Nolan**  
**Environmental Group Manager**  
**Air Quality Monitoring Division**  
**717-772-2303**  
**[senolan@pa.gov](mailto:senolan@pa.gov)**