

# Modeling Committee Update

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## OTC Committee Meeting

September 7, 2017

Washington, DC



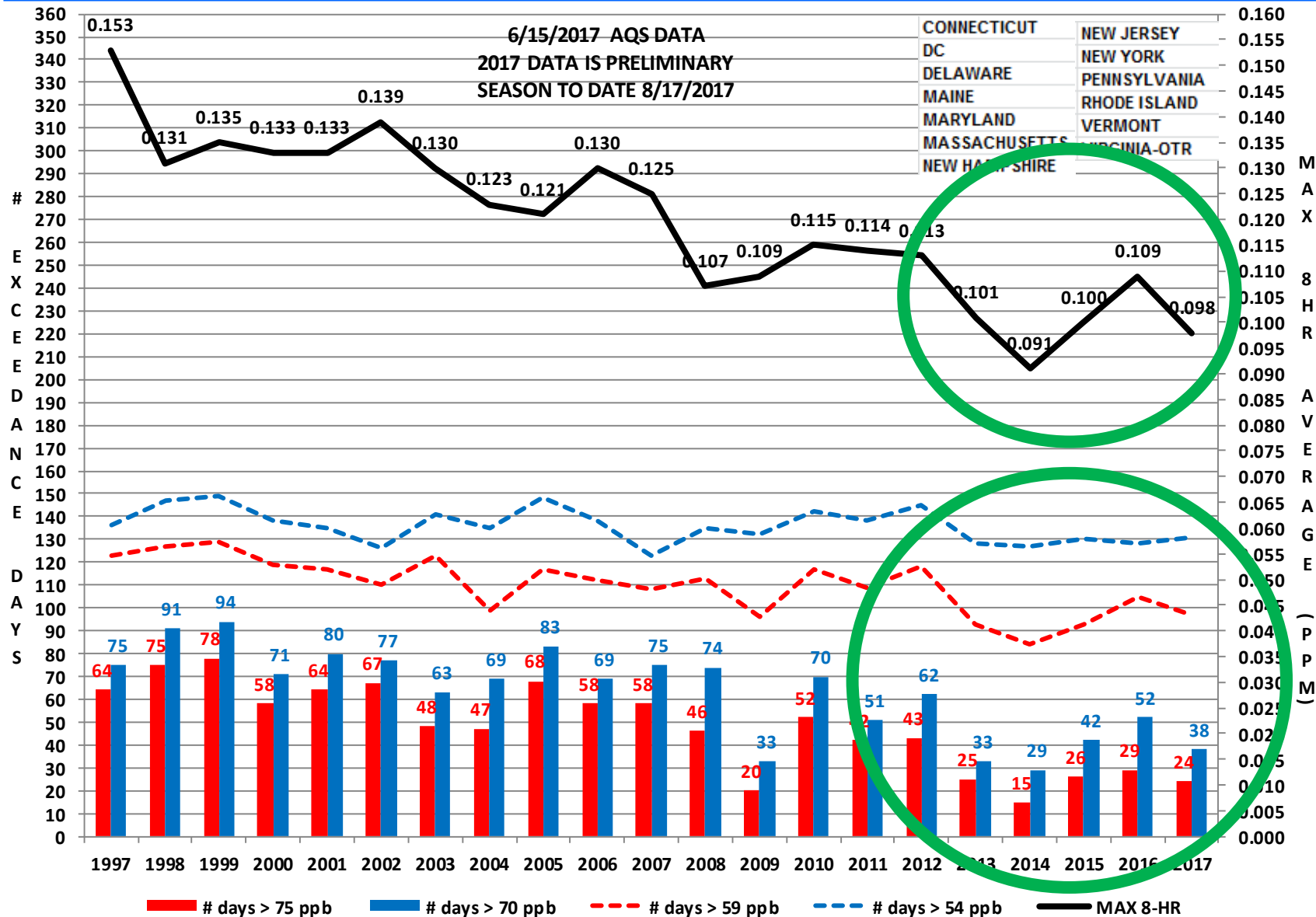
**OZONE** TRANSPORT COMMISSION

# Overview

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1. Ozone Monitoring Update
2. Ozone NAAQS Schedule
3. BenMap
4. OTC 2011 Modeling Platform
  - a) Inventory Status/Updates
  - b) Screening Modeling Status
5. New Modeling Platform Update
6. Enhanced Monitoring Plan (EMP)
7. Conceptual Model

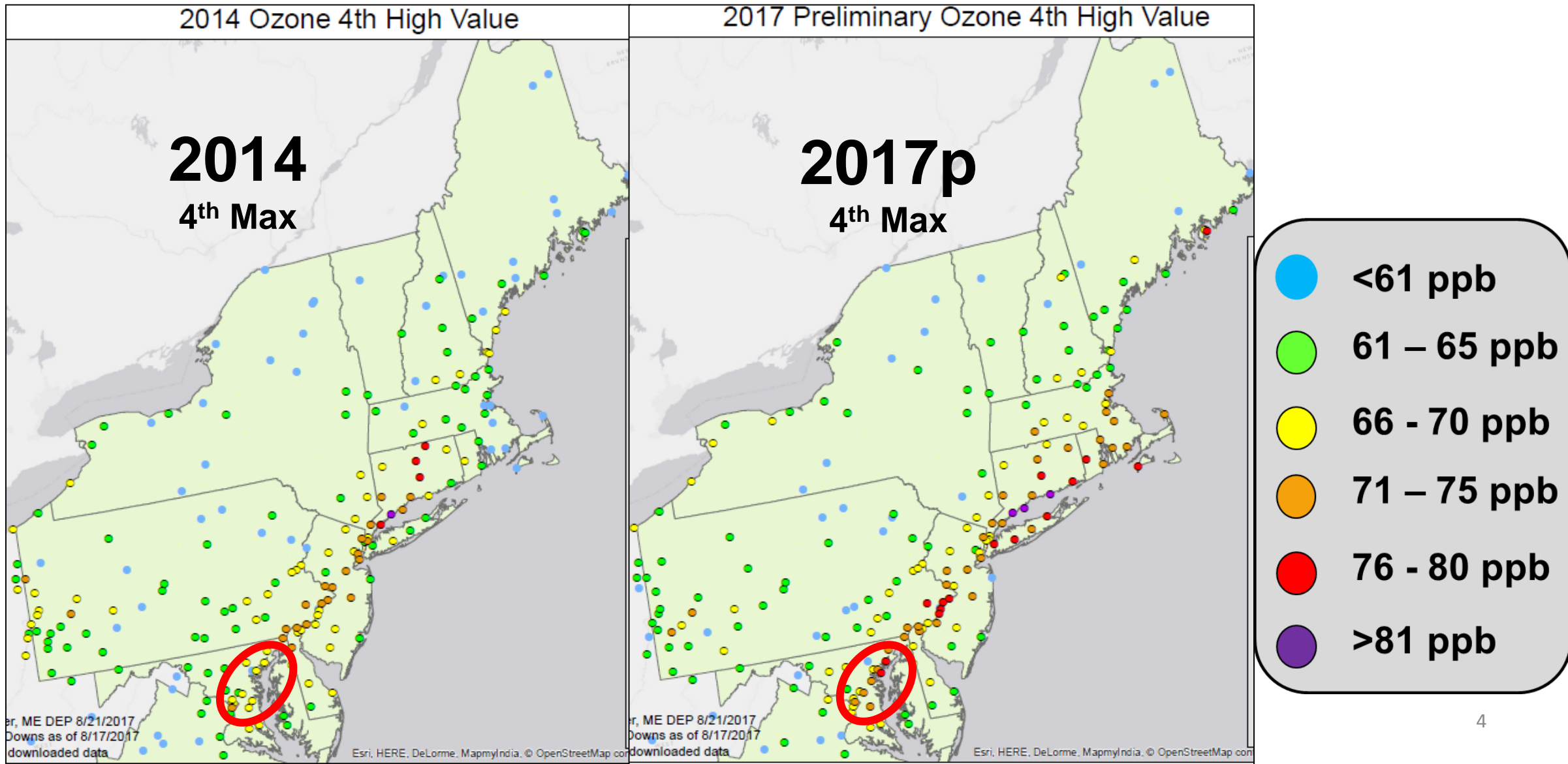
# 1. OTR 8-Hour Ozone Trend



Ozone in the OTR has been relatively flat or up slightly over the past 5 years with the exception of:

- 2014 was a low ozone year
- 2016 was a little higher than the other years

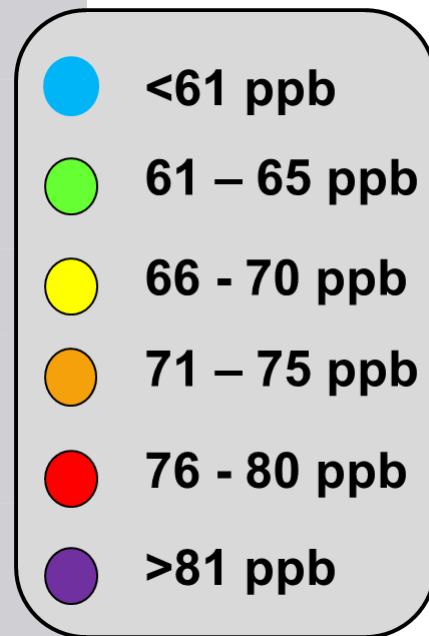
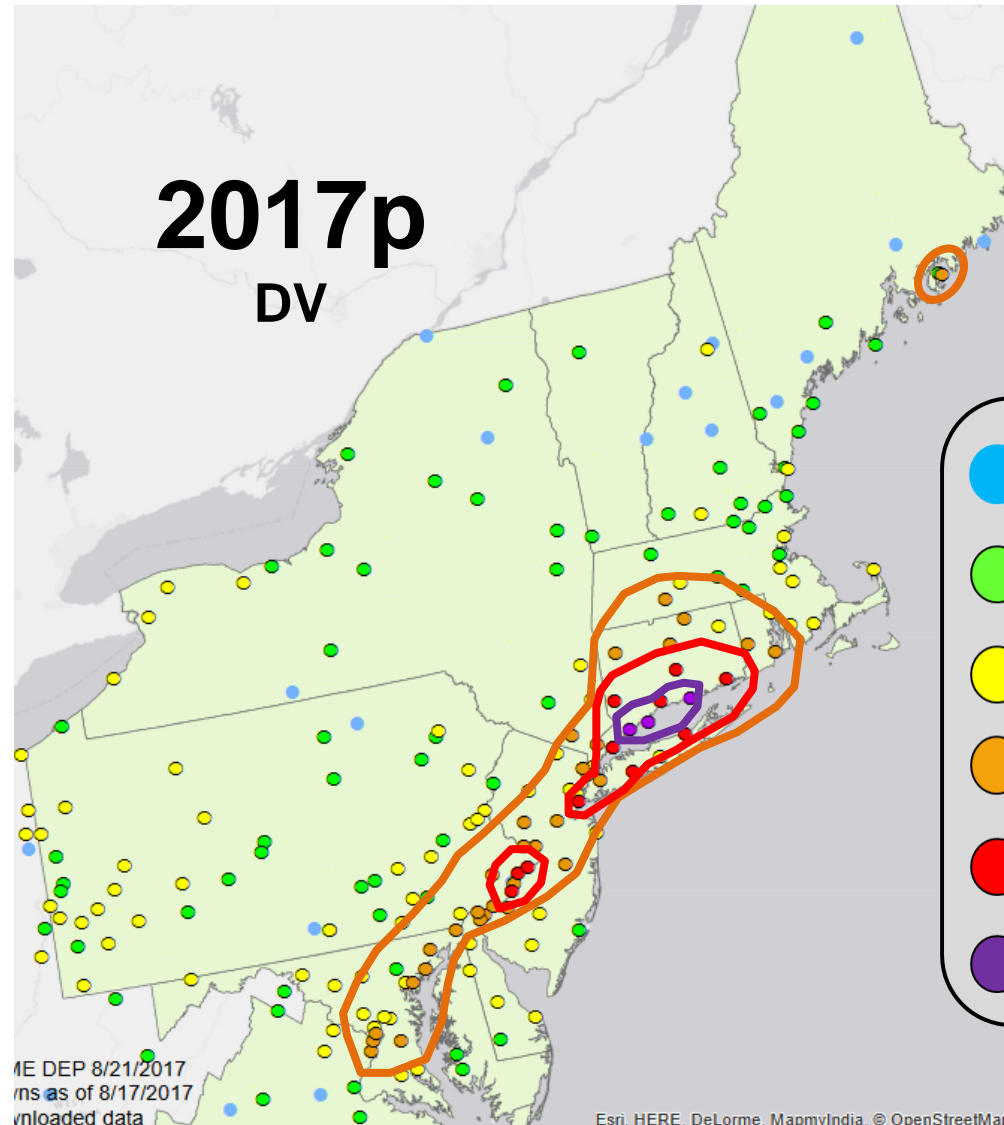
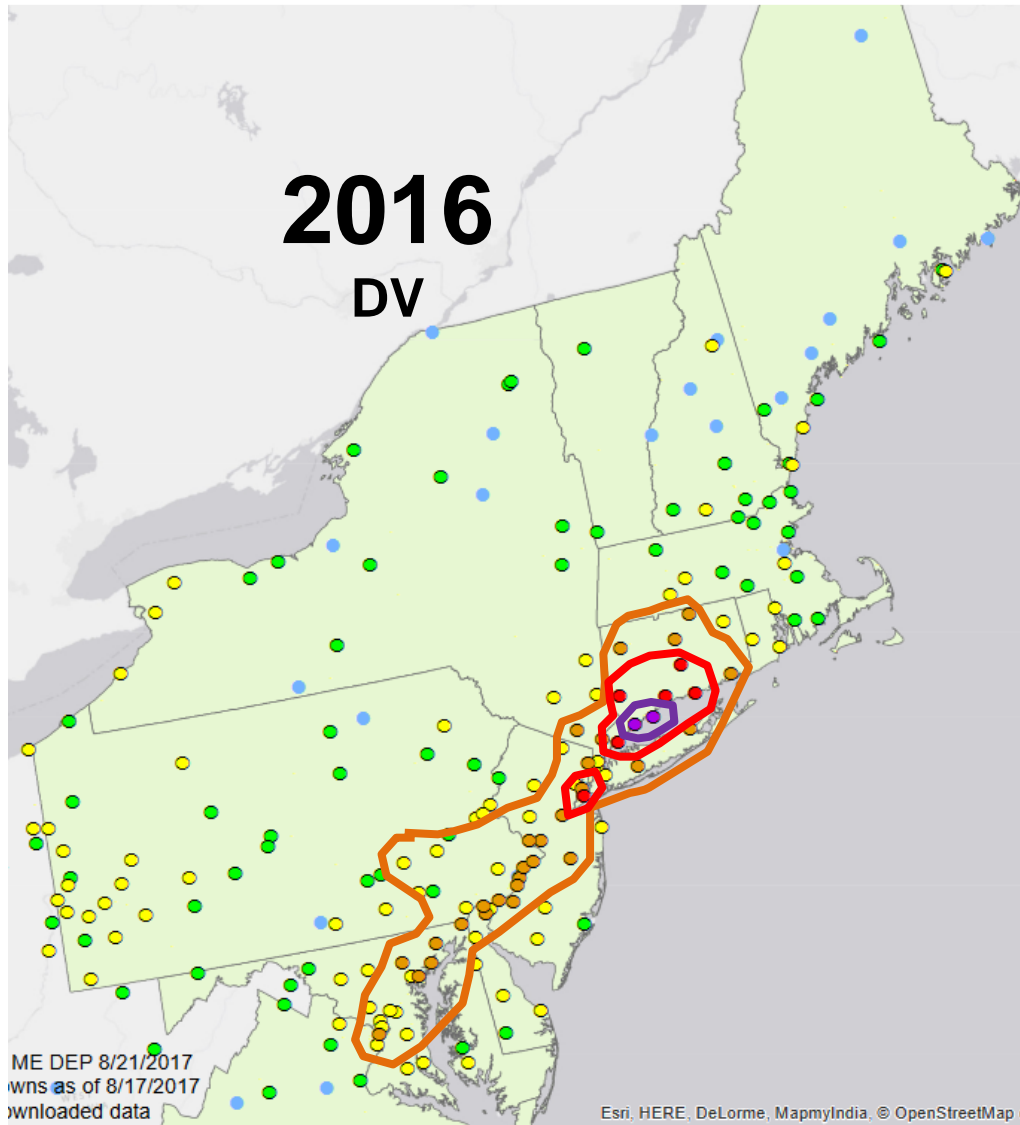
# 1. 2017 Replaces 2014 for Design Value



# 1. Change to 2015-17

## Preliminary 8-hour Ozone Design Values

(excluding potential exceptional events)

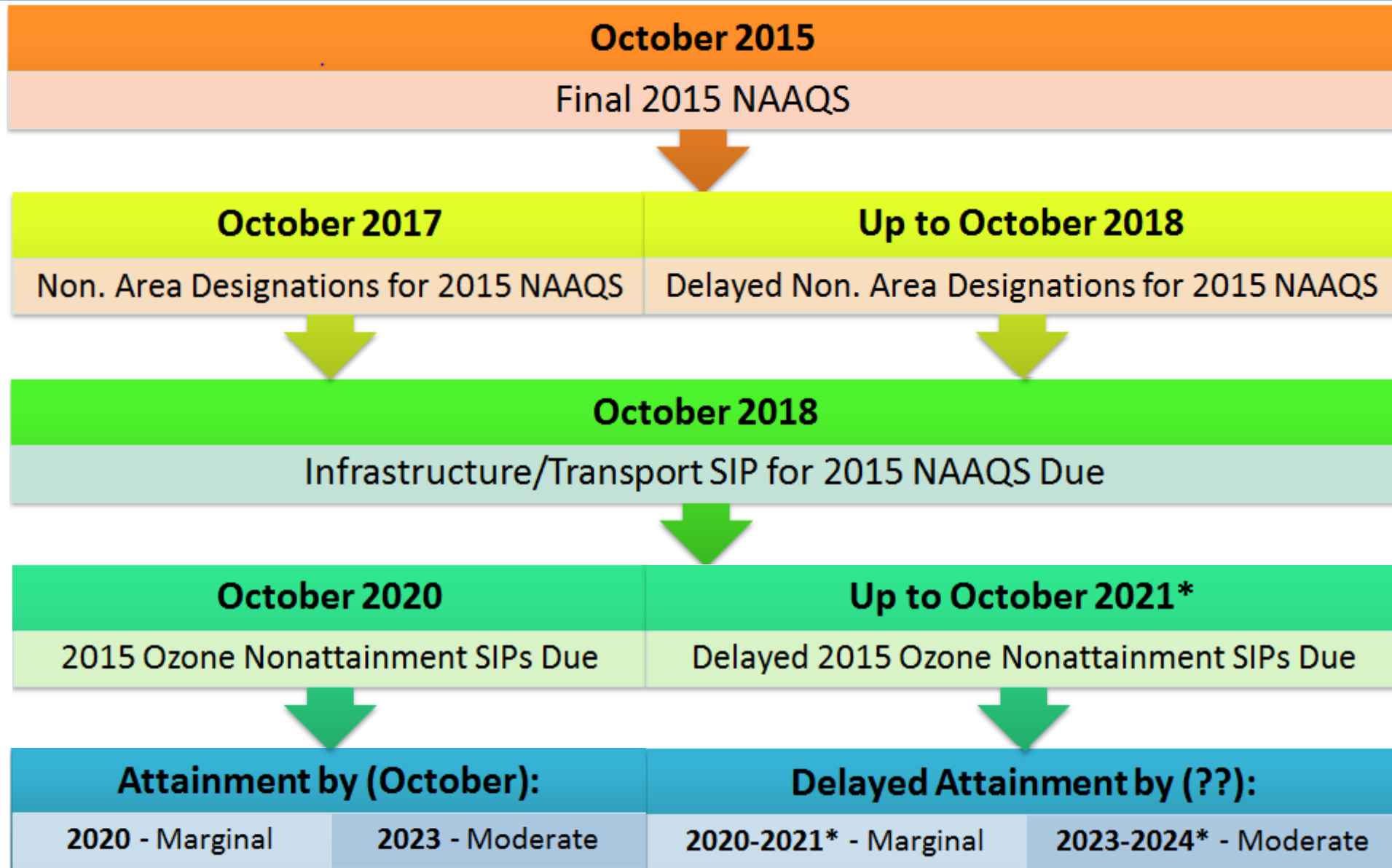


## 2. Delayed Designations

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- On June 28, 2017 EPA issued a delay of designations in the Federal Register
  - Justification cited Clean Air Act Section 107(d)(1)(B)(i)
  - EPA would have until October 2018 to designate
  - 2017 data would be certified at this point
- However on August 10, 2017 the delay withdrawn in the Federal Register
  - Likely will still be some delay in designations since 120 day letters had not gone out and would have had to in early June
  - Probably not enough of a delay for 2017 data to be considered

## 2. Ozone NAAQS Planning Timeline



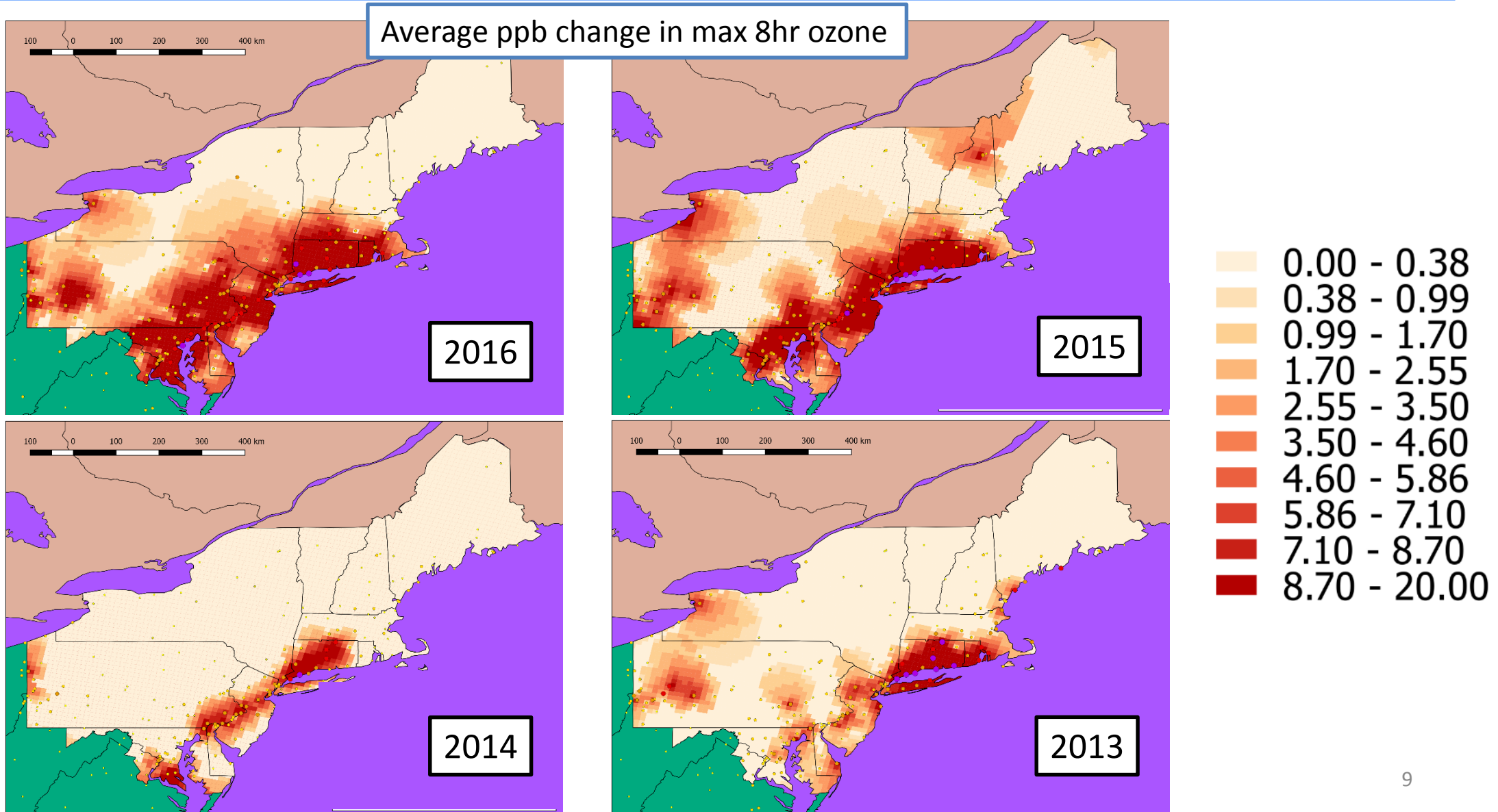
# 3. Ben Map Rollback Overview

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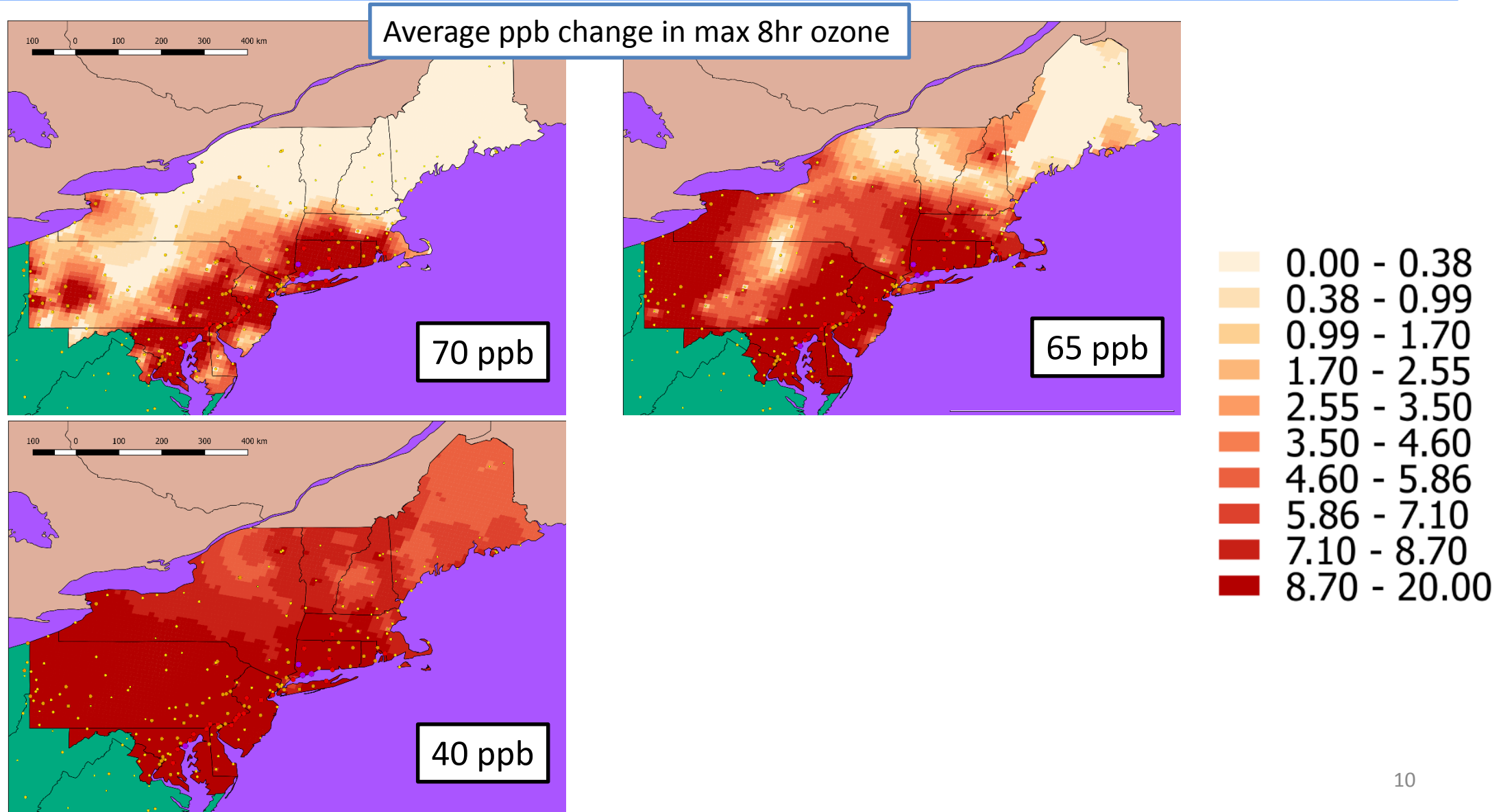
- BenMap provides estimates of air pollution health impacts and associated valuations
- Employed health functions and economic valuations that are used by EPA in RIAs
- Can be performed for monitored or modeled data
- OTC used it to estimate health impacts and valuation avoidance if monitored ozone were reduced to different thresholds
  - Considered four years of ozone monitoring (2013-2016)
  - Considered three ozone thresholds (70, 65, and 40ppb)
  - 2010 census data for OTR states
- Report out for public comment until September 29, 2017



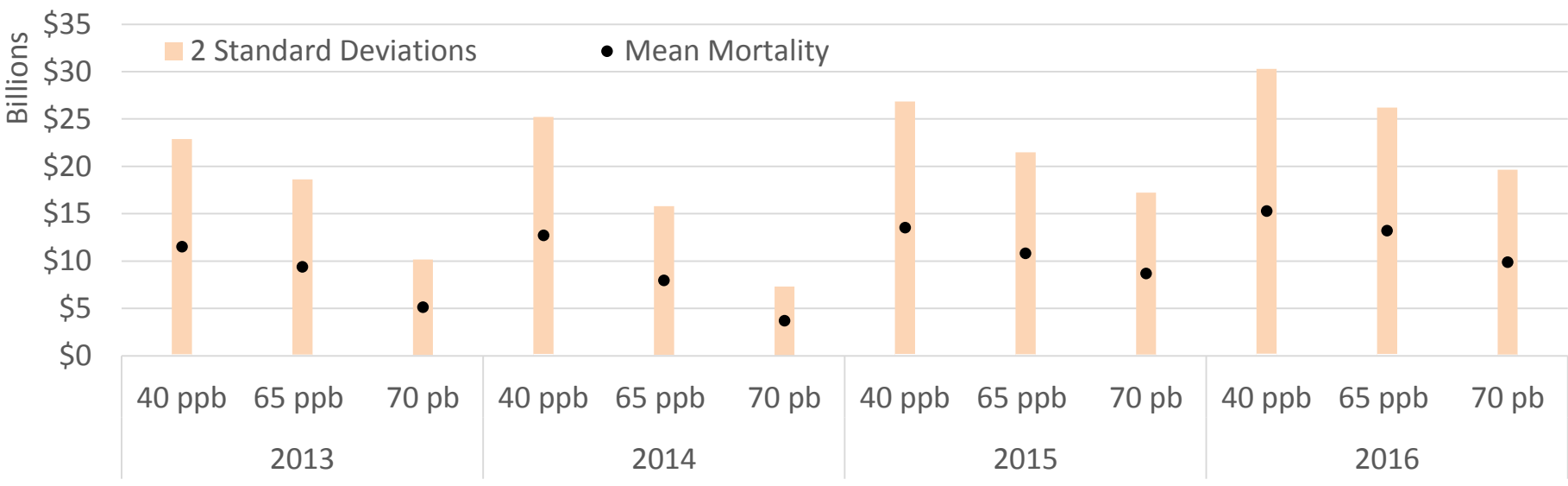
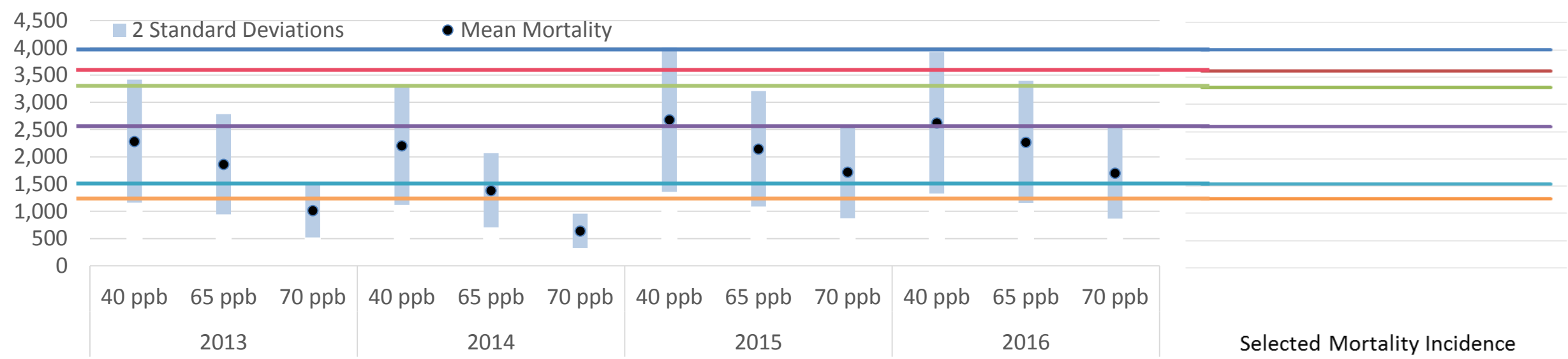
# 3. Changes in Ozone Concentration after Rollback to 70ppb



# 3. Changes in Ozone Concentration after Rollback in 2016 at 3 Ozone Levels



# 3. Mortality Incidence Reduced and Economic Benefits for Reducing Ozone to 3 Levels in the OTR



Selected Mortality Incidence in 2016 in the OTR

- Bladder Cancer
- Oesophagus Cancer
- Ovary Cancer
- Homicide
- HIV/AIDS
- Hepatitis C

# 4. 2011 Modeling Platform

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- Still the focus of:
  - 2008 Ozone NAAQS SIP Modeling Efforts (primarily CMAQ)
  - 2018-21 Regional Haze SIP Modeling for MANE-VU (CMAQ)
  - Contribution assessment research (CAMx)
- Emission Inventories have been updated to MARAMA Gamma for 2011, 2020, and 2023
  - MARAMA Alpha 2028 still currently in use for regional haze modeling

# 4. OTC Photochemical Modeling Plan

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## 2011 Gamma Emission Inventory Base Case

- To ensure consistent inventories and update chemistry

## 2017 Beta Emission Inventory Base Case – CAMx Emission Tags

- For use in transport modeling

## 2023 Gamma Emission Inventory Base Case – CAMx Emission Tags

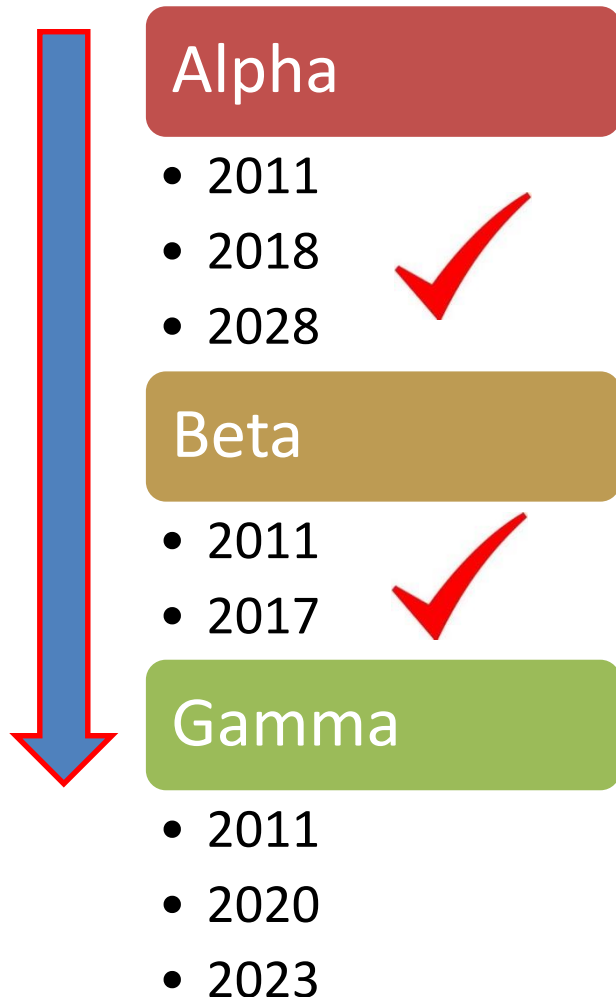
- For Use in Transport Modeling
- Guidance information for 2015 Ozone NAAQS

## 2020 Gamma Emission Inventory Base Case – CMAQ

- For use in Serious 2008 NAAQS Nonattainment Ozone SIPs

## Update Gamma Emission Inventory Documentation

# 4. Near-Term OTC/MARAMA Emission Inventories



## ■ Gamma Inventory Improvements are Underway

- Project future year to **2023 & 2020**
- Upgrade to **ERTAC v2.7 w/ C-SAPR Update**
- 2023 Mobile: EPA MOVES & Nonroad
- 2020 Mobile: 2017→2023 Interpolation
- Remove rules no longer considered OTB
- EMF Growth for point & maybe area
- For 2020 some sectors interpolated
- Other updates for 2011/2023 from EPA v6.3

## ■ Review by States & Stakeholders beginning

# 4. OTC Contribution Modeling – Emission Source Tagging

## ■ Emission Years

1. 2023 – Moderate 2015 NAAQS
2. 2017 – Least Projected

## ■ States/Anthropogenic Sectors to tag

- **All States (& partial states) in Domain**

- EGU,
- Area,
- NonRoad,
- Marine
- Non-EGUs (cement kilns, MWT, & others),
- OnRoad (diesel & others),
- Oil & Gas (area & point)

That's 385 Tags

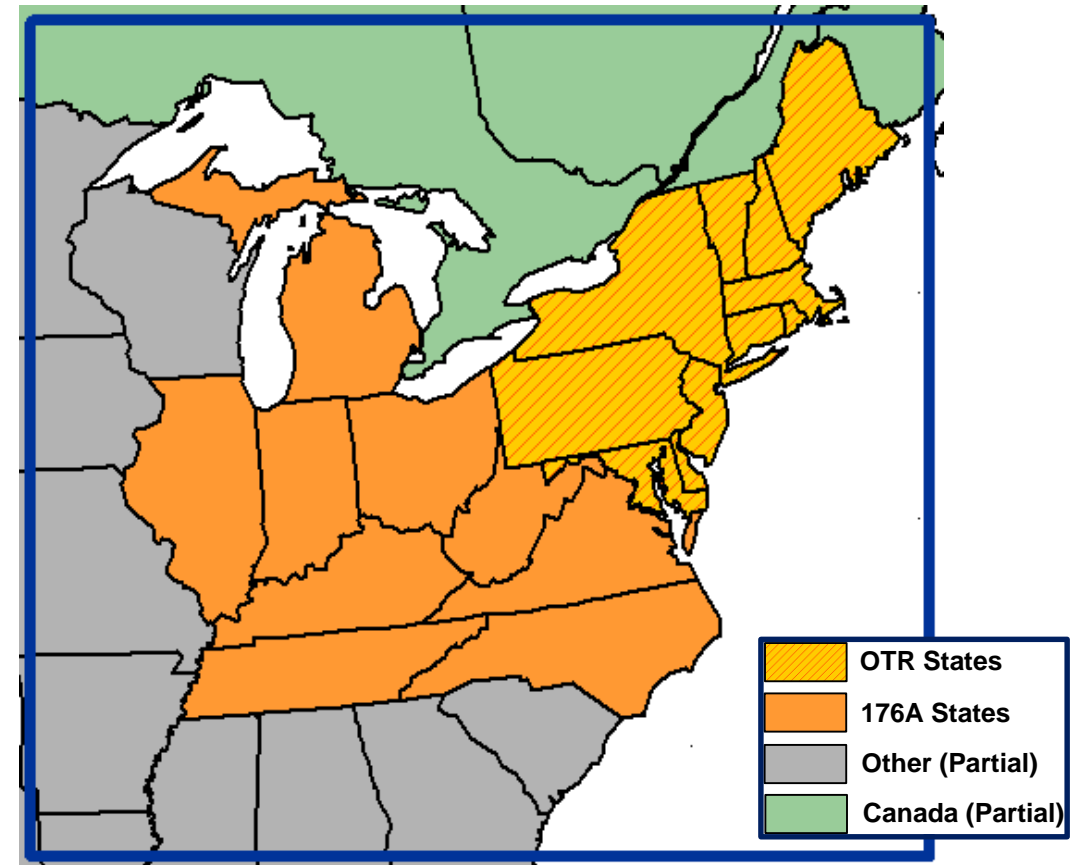
- **Only OTC States individually**

- RWC, Fires

- **Entire Domain**

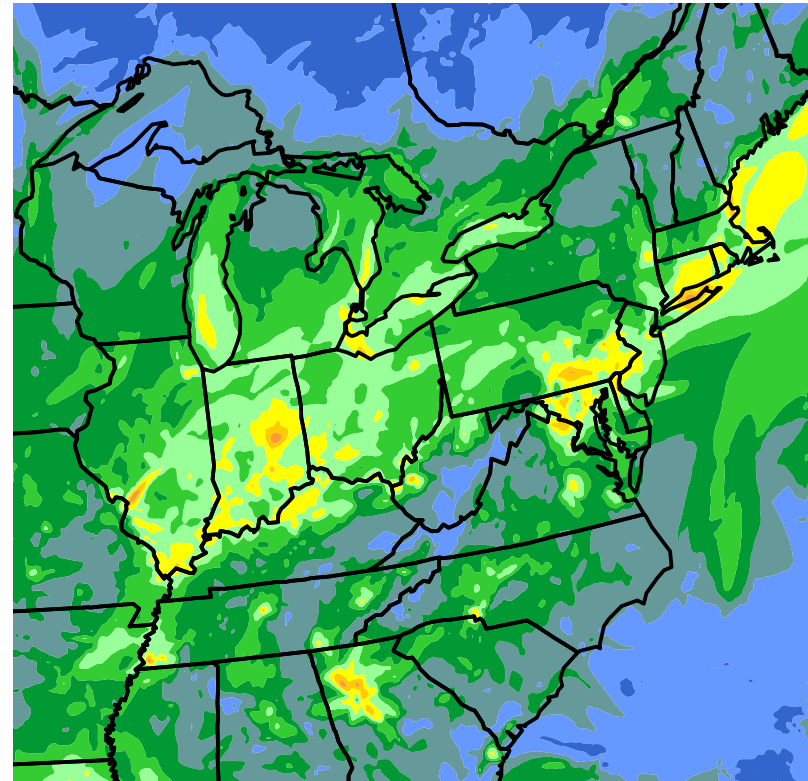
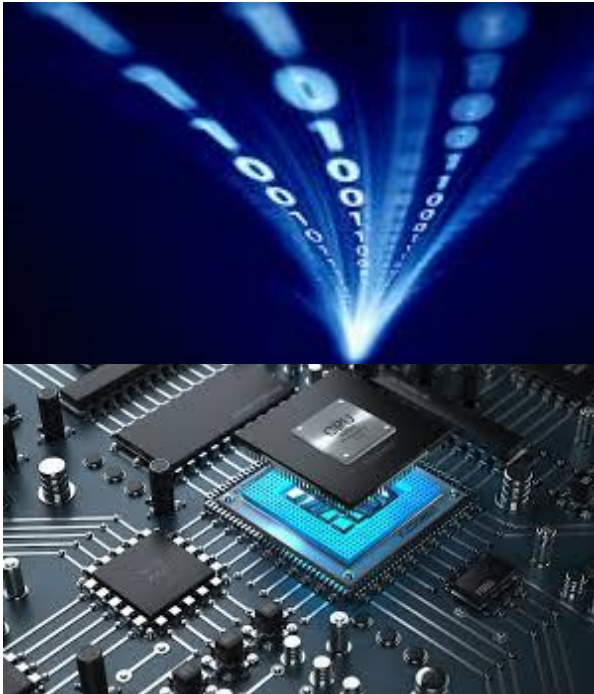
- Biogenics, Initial Conditions, Boundary Conditions, Canada, EEZ (Exclusive Economic Zone – US Territorial Waters)

OTC Modeling Domain



# 5. New OTC Modeling Platform – Under Development

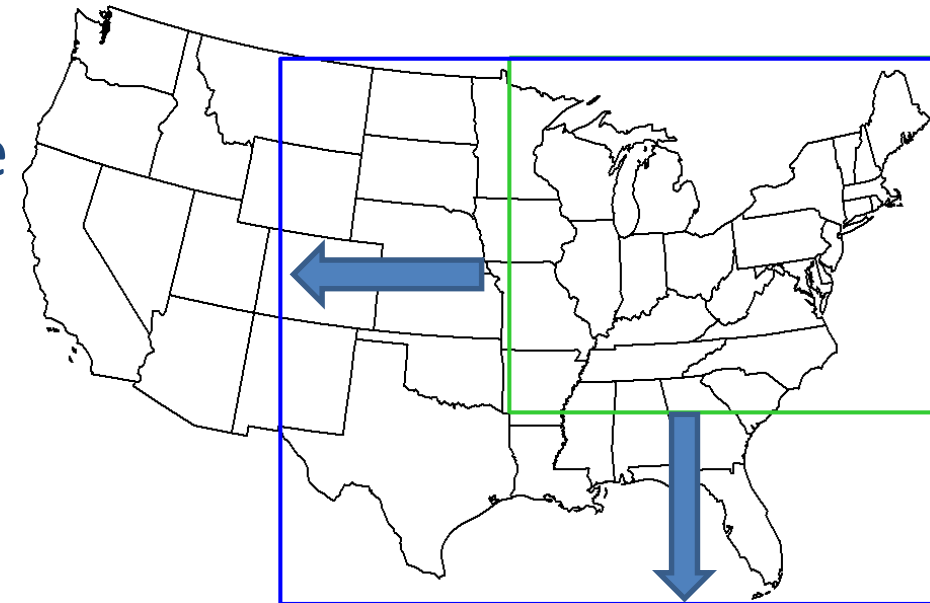
- EPA will likely do early work with this new platform
  - Won't be SIP quality for state work for at least two year (resource depending)





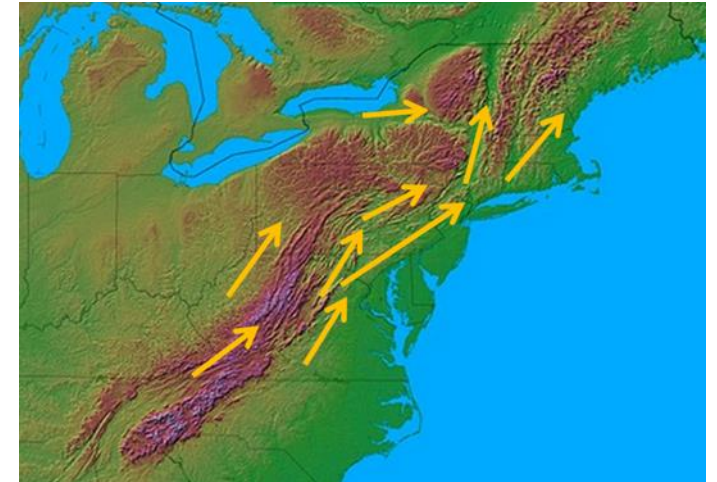
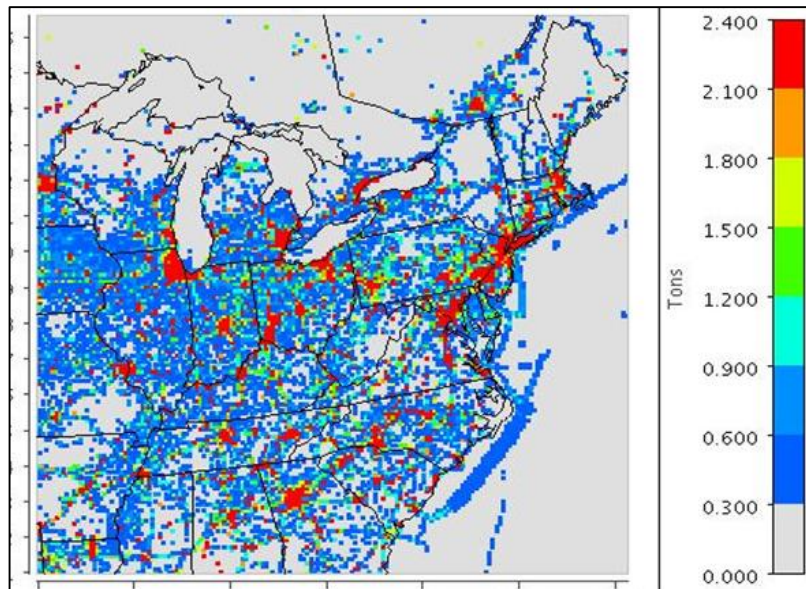
# 5. New OTC Modeling Platform – Under Development

- In partnership with EPA and other regions nationally for 2015 Ozone NAAQS and for Regional Haze 2021 submittals
- Likely to use a unified domain
  - OTC likely to utilize a larger portion of the national domain than in the past (i.e., east of the Rocky Mountains)
  - Common emission inventories where possible
    - 2014 NEI represents update to 2011
    - 2017 NEI will not be available until 2019
  - 2016 meteorology focus, possibly supplemented with 2015 episodes
  - Projected years, TBD



# 6. OTR Enhanced Monitoring Plan (EMP)

- An opportunity to enhance monitoring network in a coordinated way to collect data for:
  - Better understanding emissions
  - Improve science of transport in the region
  - Meeting attainment in all portions of the OTR



## 6. Enhanced Monitoring Plans (EMP)

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- Requires states with moderate or above ozone NAA & OTR states to submit an EMP as part of 2015 Ozone NAAQS process
- Plans due to EPA on 10/1/2019, or 2 years after moderate or above designation\*      **Region 1, 2 and 3 states plan to submit early**
- Effort underway to coordinate between states & EPA through OTC workgroup
  - Gain regional benefits from plans
  - More knowledge on transport
  - More knowledge of air/sea affect on ozone
  - Information to improve model performance
- Will be future updates at OTC meetings and opportunity for comment

# 6. Required Monitoring

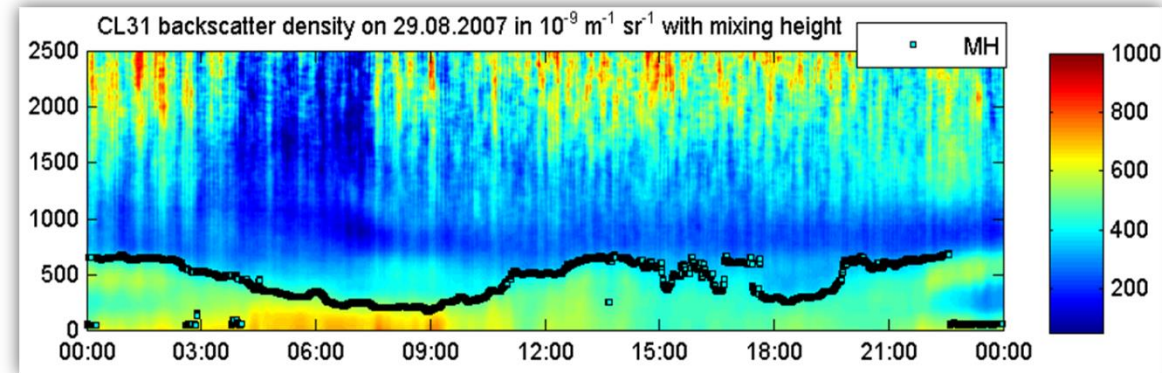
- EPA has worked with the states to identify non-required monitoring and opportunities to reduce monitoring expenses
  - Not required under federal regulation (location not needed, reasonably covered by another location, low pollution concentrations)
- EPA's 2015 ozone NAAQS implementation rule
  - Revises enhanced monitoring requirements (PAMS)
    - NCORE locations in MSAs larger than 1 million people
    - Areas classified as Moderate nonattainment for the 2015 ozone NAAQS (NCORE)
  - Requires Enhanced Monitoring Plans for areas classified as Moderate nonattainment for the 2015 ozone NAAQS and all OTR states



## 6. Monitoring can include:

- Upgraded monitoring equipment

- Trace level monitors (CO)
- True NO<sub>2</sub>
- Interference free monitors



- Use of tools not previously realistic options

- Ceilometers (measure cloud base – mixing height)
- Radar Wind Profilers and RASS (winds, temp, mixing height)
- SODAR (wind and mixing heights)
- LIDAR (high resolution wind and mixing heights)
- Microwave Radiometry (temperature, relative humidity (RH), liquid water)
- PANDORA Spectrometer (total column O<sub>3</sub>, SO<sub>2</sub>, formaldehyde, BrO, NO<sub>2</sub> and H<sub>2</sub>O)



# 6. Can Also Consider Measurements

- Aloft – Airplanes, balloons, etc.
- Over water – boats, buoys
- Coordination with satellite data



# 7. Conceptual Model

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- Conceptual Model last updated August 2010
- Have been advances in our understanding of Ozone since then
  - DISCOVER-AQ Campaign
  - Land-Water Interface
  - NO<sub>x</sub> Tipping Point
  - Changing Weather Patterns
  - More Advanced Inventories
- Workgroup is updating several documents with the new information
  - Presentation
  - Technical Document

# 8. Conclusions & Next Steps

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- Ozone design values in the OTR are up this year
  - Ozone exceedances in 2017 ozone season similar to 2015 and 2016, but more than in 2014
- OTC BenMap modeling indicates that:
  - Reducing Ozone levels will substantially reduce mortality and other health issues related to ozone in the OTR
- Emissions inventories for next round of modeling include:
  - 2011 Gamma and updated model chemistry
  - 2017 Beta with emission tagging
  - 2020 Gamma
  - 2023 Gamma with emission tagging
- Enhanced Monitoring Plans (EMPs) still in early planning discussions



# Questions

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