

MANE-VU Technical Support Committee Update

OTC/MANE-VU Committee Meeting: September 7, 2017

Hall of the States, Washington, DC

Overview

1. Action Plan & Schedule Updates
2. Monitoring Data
3. Selections of States
4. MANE-VU Ask
5. Winter NOX Analysis
6. HEDD Analysis

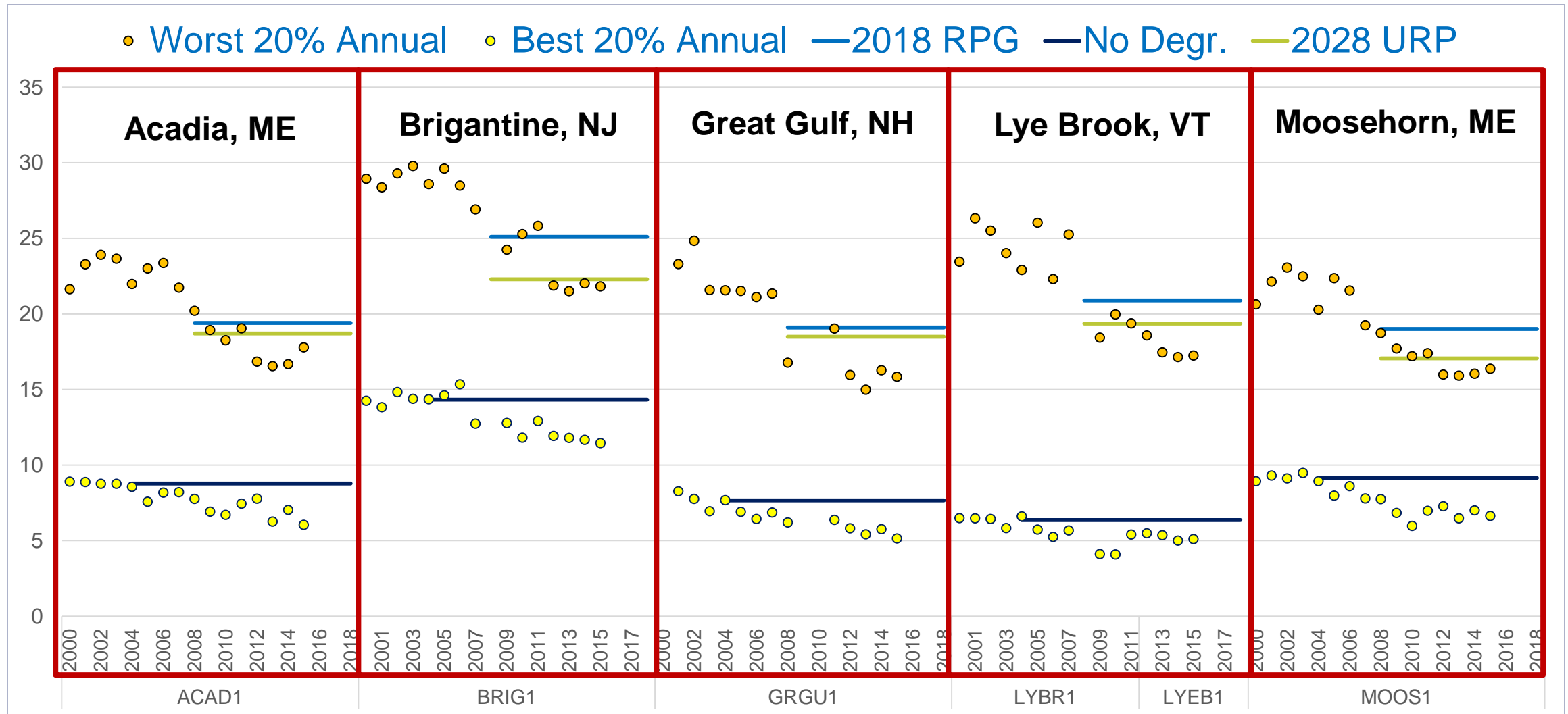
Regional Haze SIP 2nd Planning Period - Schedule

IMPROVE Data Analysis	<ul style="list-style-type: none"> • Decisions on Methods • Calculations, QA, and TSD 	<p>Complete</p> <p>Complete (in Back Traj. Report)</p>
Inventory Development & Analysis	<ul style="list-style-type: none"> • 2011/2028 Alpha 2 & TSD • Emissions Trends Analysis 	<p>Complete</p> <p>Spring 2018</p>
Modeling	<ul style="list-style-type: none"> • 2011 Base Case Modeling • 2028 Base Case Modeling • 2028 Control Case Modeling • Document Modeling Platform and Results 	<p>Complete</p> <p>Complete</p> <p>Winter 2018</p> <p>Complete (Except Control Case)</p>
Four-Factor Analysis/Contribution Assessment	<ul style="list-style-type: none"> • Qc/d • CALPUFF Assessment • Back Trajectory & IMPROVE Data Analysis • 4-Factor Data Collection • HEDD Analysis • Winter EGU NOX Control • Synthesize Assessments 	<p>Complete</p> <p>Complete</p> <p>Complete</p> <p>Complete</p> <p>Fall 2017</p> <p>Fall 2017</p> <p>Complete</p>
Updating RPGs	<ul style="list-style-type: none"> • Draft RPGs and Document 	<p>Winter 2018</p>
Consultation	<ul style="list-style-type: none"> • Establish Consultation Process • Intra-RPO Consultation • Inter-RPO Consultation 	<p>Complete</p> <p>Complete</p> <p>Fall 2017</p>
SIP Submission	<ul style="list-style-type: none"> • Rule Adoption • SIP Submission 	<p>2018</p> <p>Summer 2018</p>

Why Target July 2018 SIP Submittal?

- ▶ In 2016 EPA finalized updated Regional Haze regulations
 - ▶ SIP deadline was extended to 2021
- ▶ Why not wait?
 - ▶ OTC developed a 2011-based SIP quality modeling platform for states in nonattainment of the 2008 ozone NAAQS
 - ▶ MANE-VU Air Directors agreed that 2011 should also be used for regional haze modeling rather than develop an entirely new modeling platform
 - ▶ EPA has all but said 2011 based work would not be acceptable for SIPs targeting a 2021 submittal date, but would be acceptable for 2018 submittals
 - ▶ Its not just sunk costs
 - 50-70% of the work completed was done using Federal money rolled over from first planning period
 - EPA will not be providing additional funding for work
 - States contribute to MANE-VU, but not at a level to redo all of the completed work
 - ▶ EPA's not yet finalized draft guidance called for far more extensive analyses than we think is necessary

Progress at Monitored Class I States in MANE-VU using 20% Worst Day IMPROVE Algorithm



Revised Weighted Contribution Assessment

- ▶ Estimated which states contribute more to visibility impairment than others
- ▶ Examined trajectories for each regional Class I area on 20% most impaired visibility days as a Quality Assurance check
- ▶ Updated based on feedback from upwind states and environmental groups
 - ▶ Revised all analyses to be based on 2015 data or 2011 data adjusted to 2015
 - ▶ Excluded states that did not contribute much mass
 - ▶ Used state-wide Q/d so that mobile and area sources were considered
 - ▶ Didn't consider Texas CALPUFF results due to locations outside of the domain

Weighted Contribution Assessment: Data Sources

Data Sources Used:

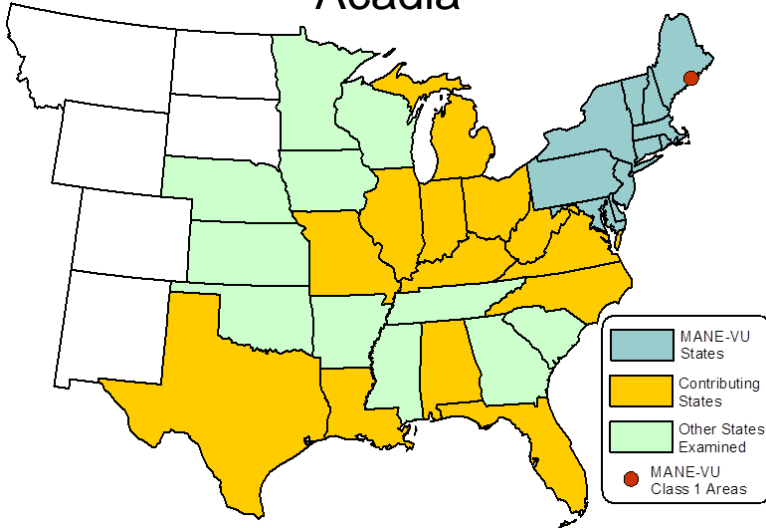
CALPUFF	2015	EGU	NO _x & SO ₂	95th daily %tile	Used for impact and to provide NO ₃ /SO ₄ chemistry ratio estimates for Q/d
	2011	EGU	NO _x & SO ₂	95th daily %tile	Used to insert into 2015 for EGUs only modeled using 2011 emissions
	2011	ICI	NO _x & SO ₂	typical day	Used for impact and to provide NO ₃ /SO ₄ chemistry ratio estimates for Q/d
Q/d	2011	EGU	SO ₄	annual	Used to validate Q/d State-wide data for SO ₄
	2011	State-wide	SO ₄	annual	Used to estimate 2015 statewide Q/d SO ₄

Data Sources Created:

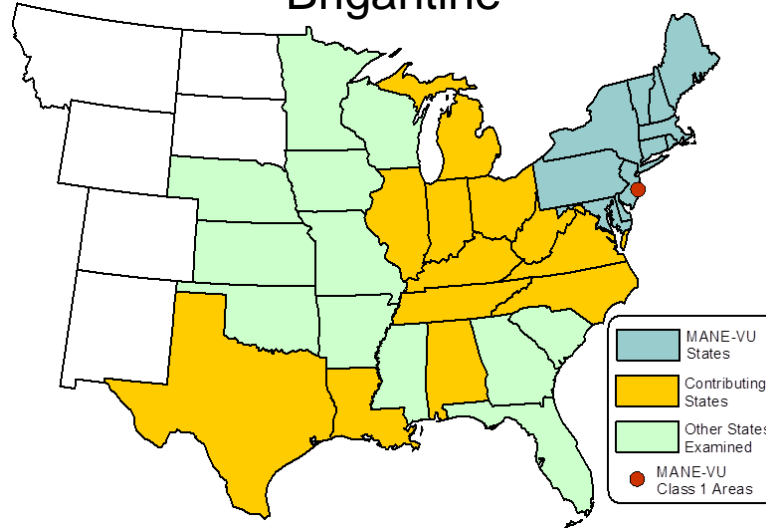
Q/d	2015	State-wide	SO ₄	annual	Used for impact
	2015	State-wide	NO ₃	annual	Used for impact

Weighted Contribution Assessment: Impact by Class I Area

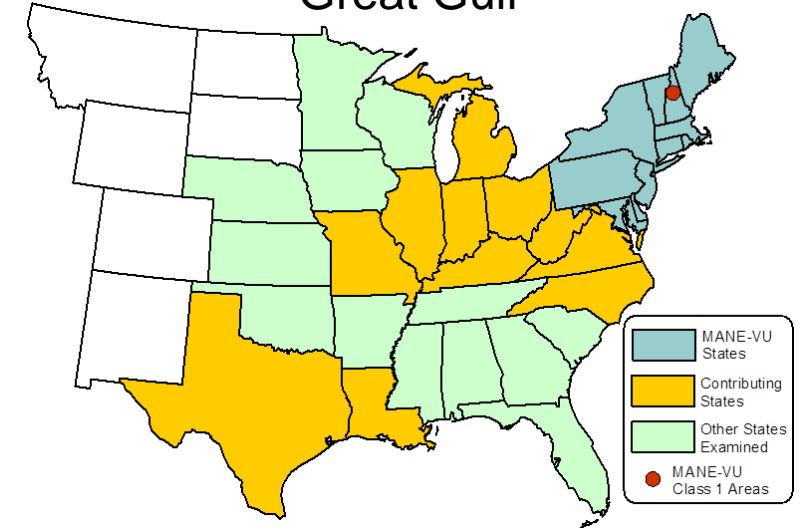
Acadia



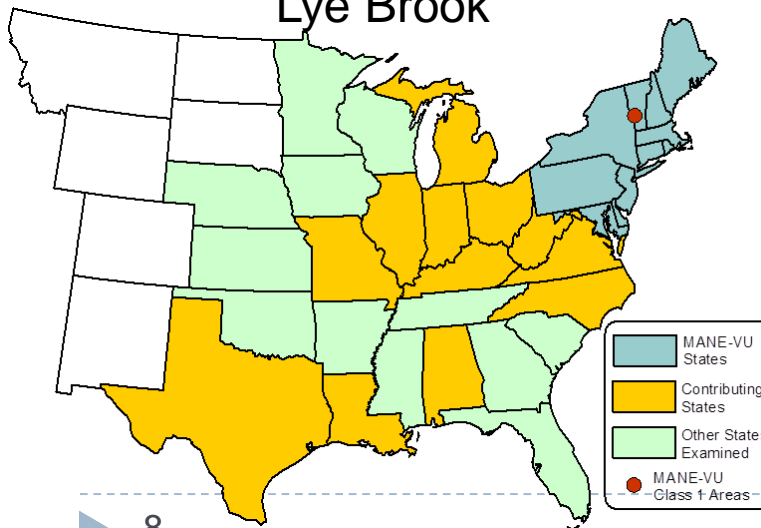
Brigantine



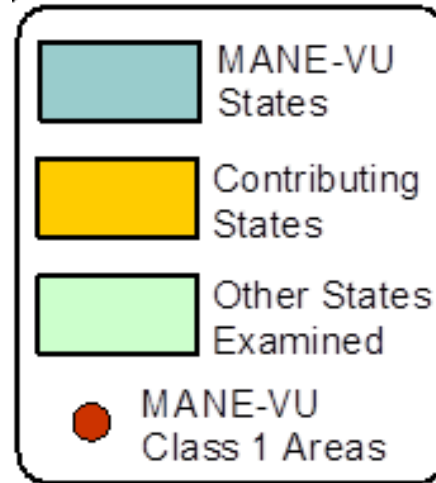
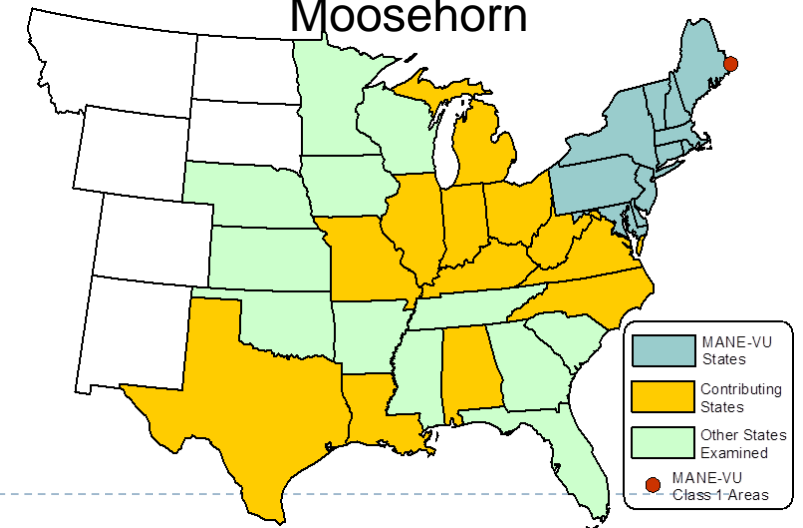
Great Gulf



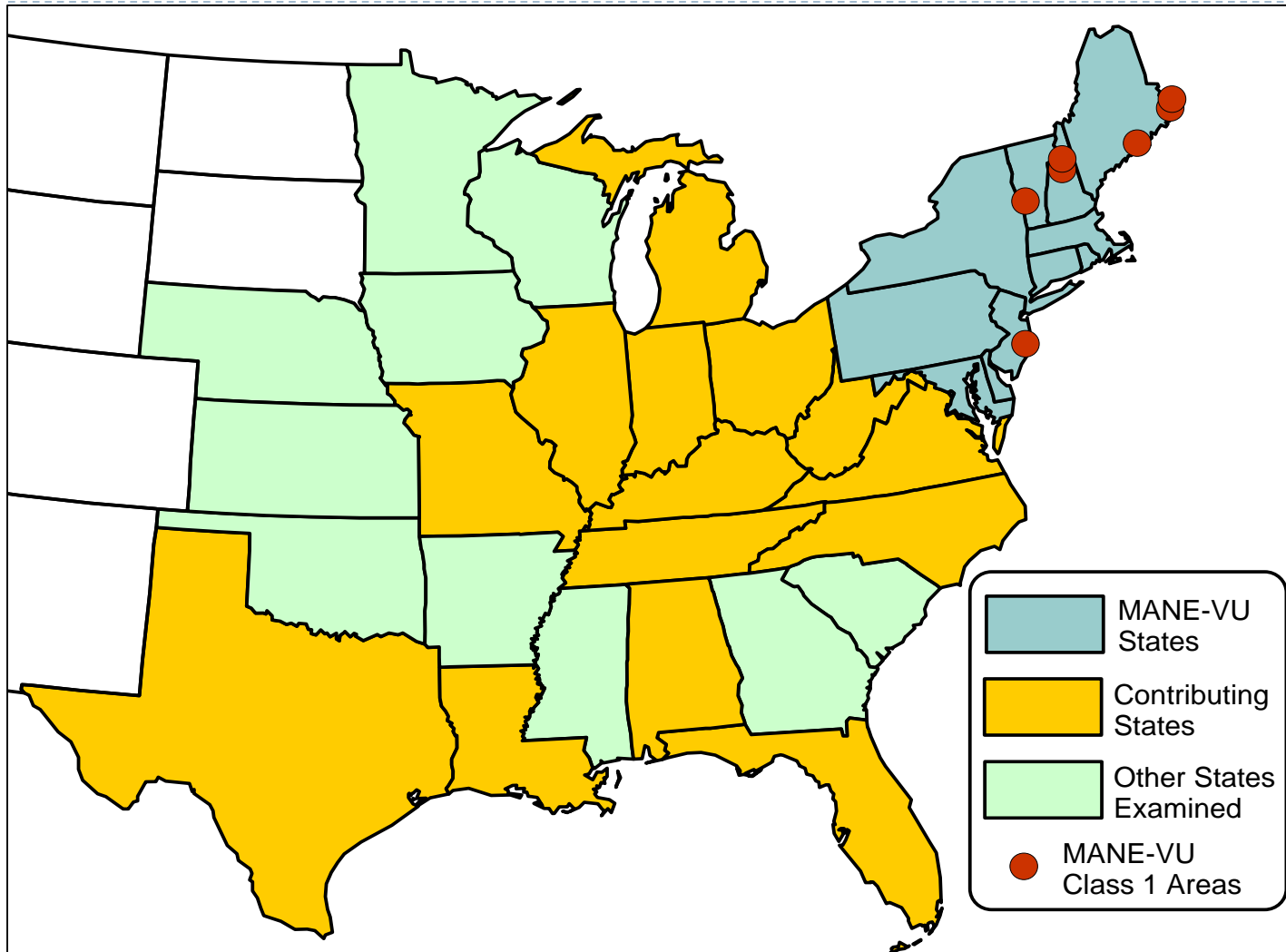
Lye Brook



Moosehorn



Weighted Contribution Assessment: Maximum Contribution



Contributing States

1. Contributed $\geq 2\%$ to any Class I Area
2. Contributed $\geq 1\%$ weight by mass averaged using the four techniques

MANE-VU Consultation Plan

▶ State consultation

✓ Phase 1: Intra-RPO consultation

- ▶ MANE-VU states, tribes, EPA, and FLMs
- ▶ by webinar and in-person at OTC/MANE-VU meetings

▶ Phase 2: Inter-RPO consultation

- ▶ Between MANE-VU and contributing states, as identified using weighted contribution analysis
- ▶ by webinar, following intra-RPO consultation
- ▶ facilitates consultation between contributing states and affected Class I states

▶ FLM consultation

- ▶ Invited to intra- and inter-RPO consultations, and special FLM webinars

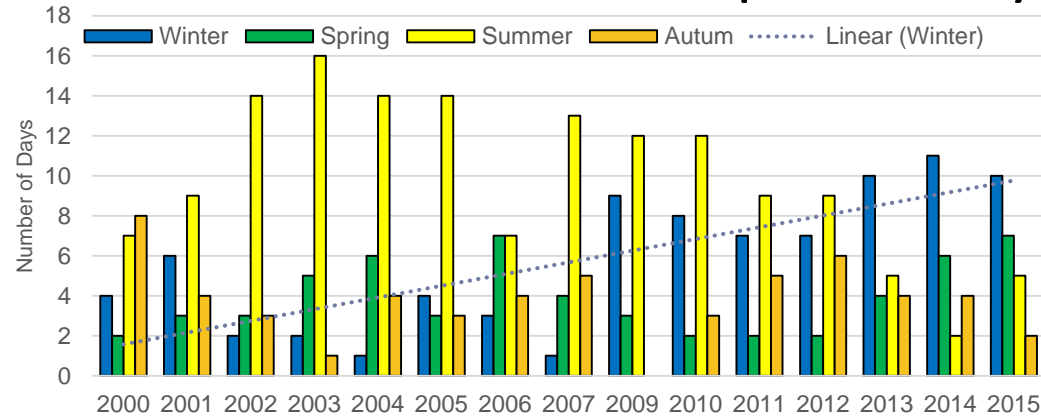
Consultation Overview: MANE-VU “Ask”

- ▶ 3 Documents – MANE-VU States, Upwind States, FLMs/EPA
- ▶ Signed August 25, 2017
- ▶ “Ask” to States:
 1. Ensure effective use of installed SCRs and scrubbers on EGUs (≥ 25 MW) year-round
 2. Perform 4-factor analysis for most important sources (based on 3Mm^{-1} extinction)
 3. Complete low sulfur fuel oil rule of 2007 in all of MANE-VU and outside of MANE-VU
 4. Update permits and/or rules to reflect already achieved rates for SO_2 , NO_x , and $\text{PM}_{2.5}$
 5. Strive to meet particular NO_x emissions standards or perform 4-factor analysis on HEDD units [*MANE-VU states only*]
 6. Initiate measures to increase energy efficiency and implement CHP or other DG
- ▶ “Ask” to FLMs/EPA:
 1. FLMs to consult with MANE-VU Class I States when scheduling prescribed burns
 2. EPA to develop measures that will further reduce emissions from heavy-duty onroad vehicles
 3. EPA to ensure that Class I Area state “Asks” are addressed in “contributing” state SIPs prior to approval.

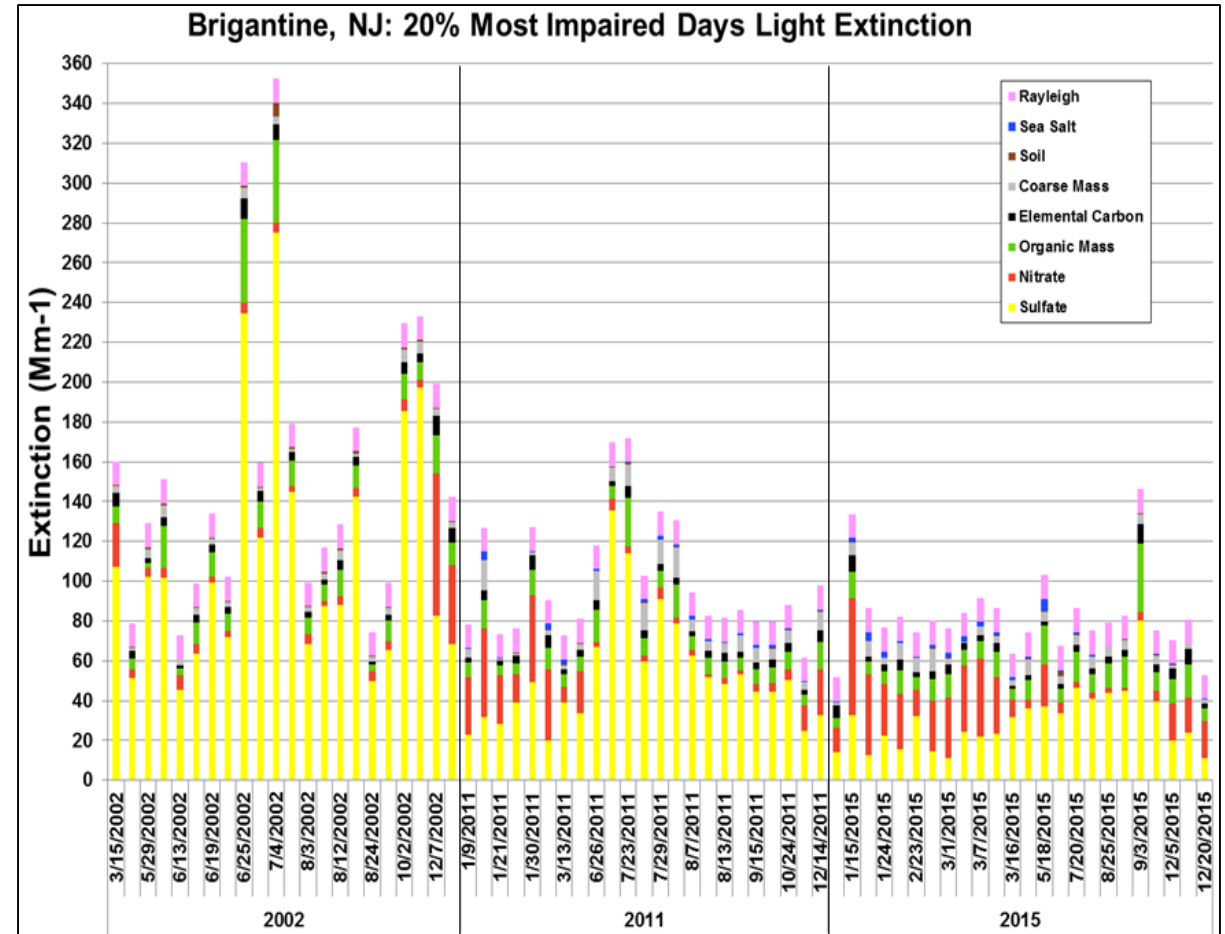


Winter NO_x & EGUs: Why?

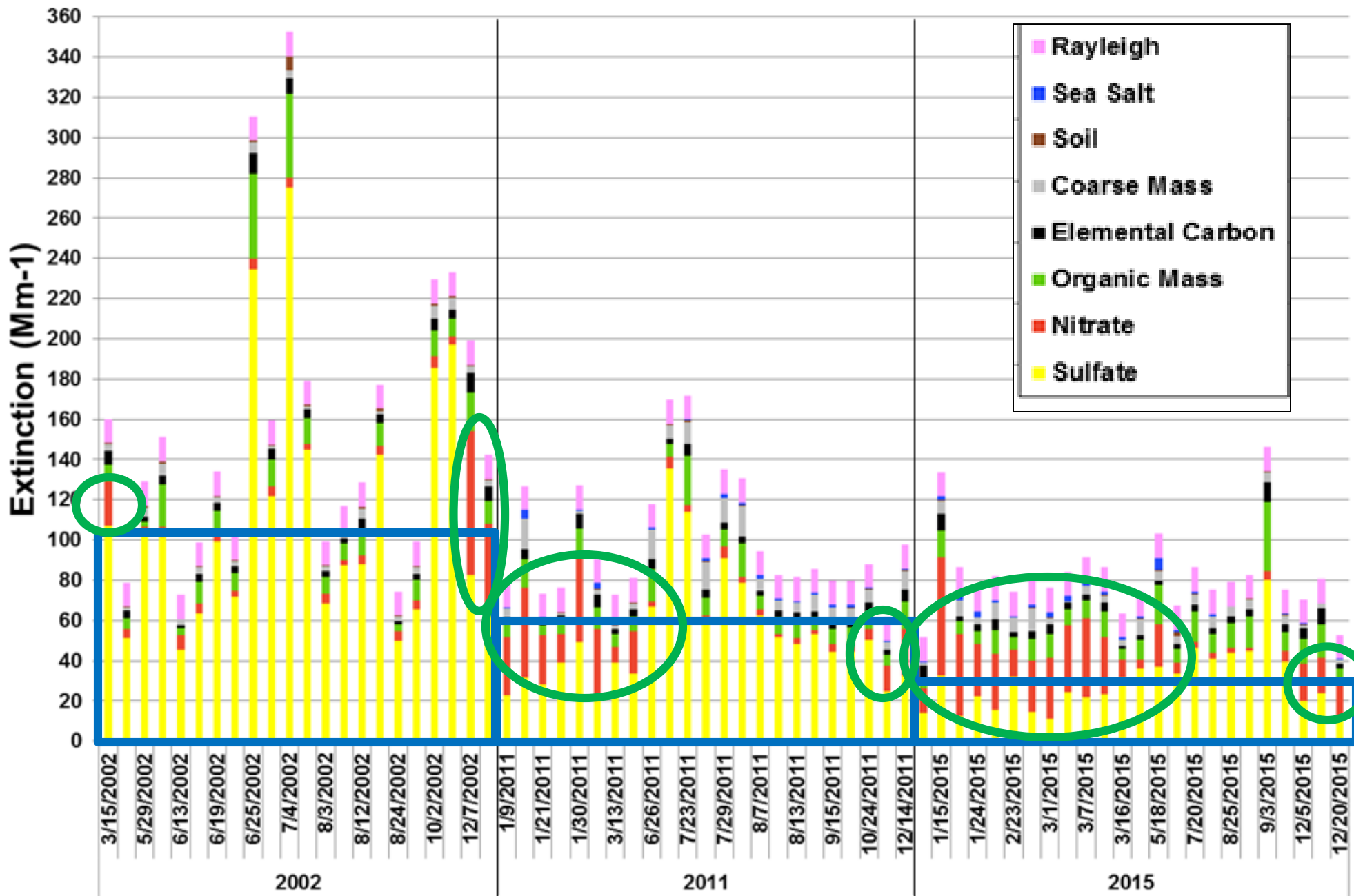
- ▶ Increase in 20% Most Impaired Days during the winter, especially at Brigantine



- ▶ Winter days are often more impaired by Nitrate, especially at Brigantine



Brigantine, NJ: 20% Most Impaired Days Light Extinction



Percent of summer sulfate on most impaired days decreases

Percent of Nitrate on most impaired days increases

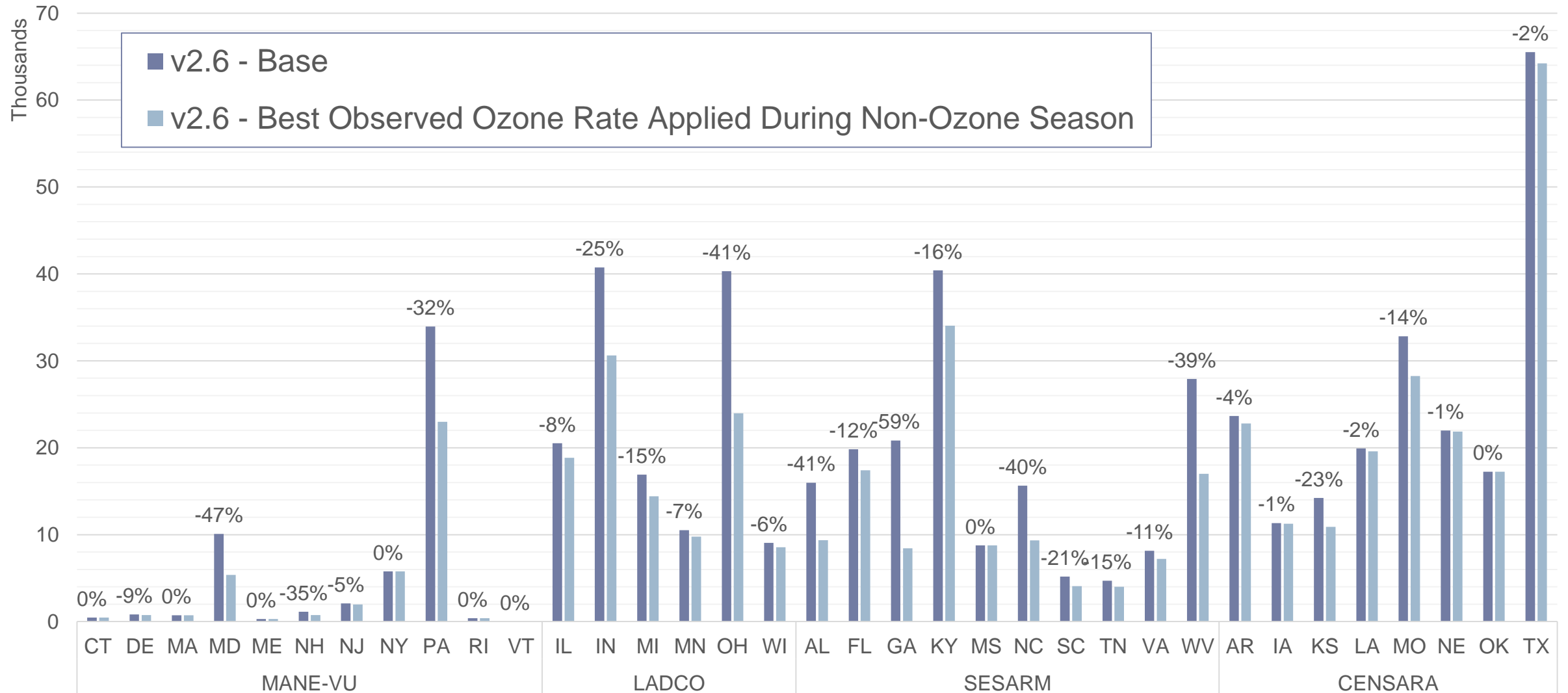
Winter NO_x & EGUs: Why? (continued)

- ▶ Inventories show EGUs are the second highest emitter of NO_x in 2011 and 2018
- ▶ Did not focus on mobile sources which do have a large overall contribution for the following:
 - ▶ States have more regulatory authority over effective NO_x controls from EGUs
 - ▶ The Clean Air Act Section 209 preempts individual states from regulating emission standards from mobile sources
 - ▶ Other mobile controls (e.g., idling reduction) are not nearly as effective
 - ▶ Mobile sources emit close to ground level
 - ▶ More dry deposition and lack of mixing and transport, unlike emissions from EGU which form a greater amount of secondary organic aerosols and transport further.
 - ▶ Running existing controls on EGUs has been found to be possibly the most cost effective way to control NO_x emissions. EPA found that the following costs to restart idled NO_x controls
 - ▶ SCR - \$1,400 per ton
 - ▶ SNCR - \$3,400 per ton
- ▶ For all of these reasons focusing on running controls on EGUs to reduce the impact of nitrates on visibility impairment during the colder months a reasonable approach that should be considered.

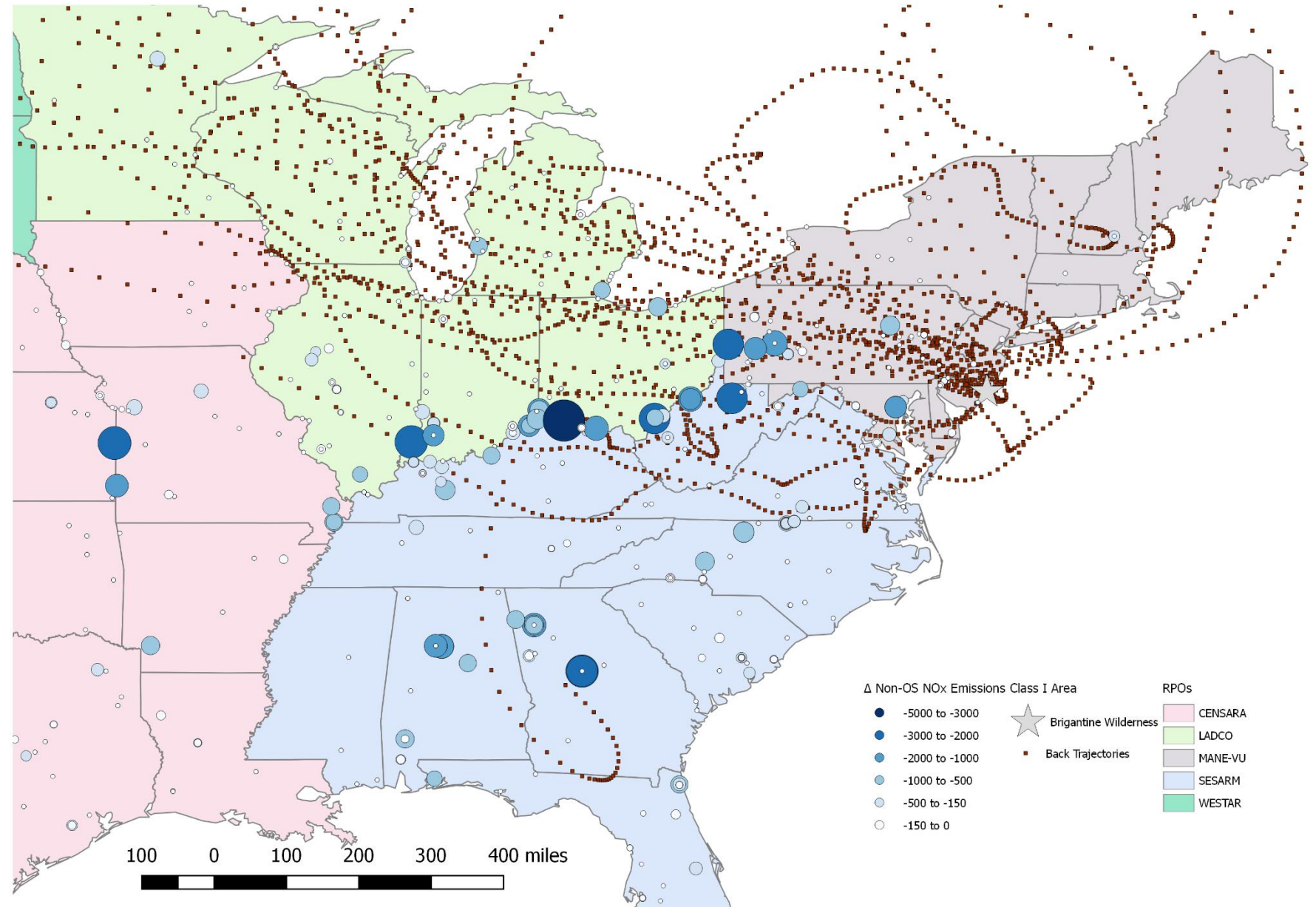
Winter NO_x & EGUs: Analysis

- ▶ Used Best Observed Ozone Season NO_x Emission Rates (BORs) from 2002-2015 CAMD data
 - ▶ Ozone Season rates should be achievable year round from the engineering perspective
 - ▶ Non-Ozone Season rates are typically higher due to less strict regulatory regimes
- ▶ Used ERTAC EGU v2.6
- ▶ Applied BORs during the Non-ozone Season months to EGUs with higher non-ozone season NO_x emission rate
- ▶ Ran the control scenario using ERTAC EGU projection tool

Winter NO_x & EGUs: Change in Non-Ozone Season NO_x Emissions (tons)



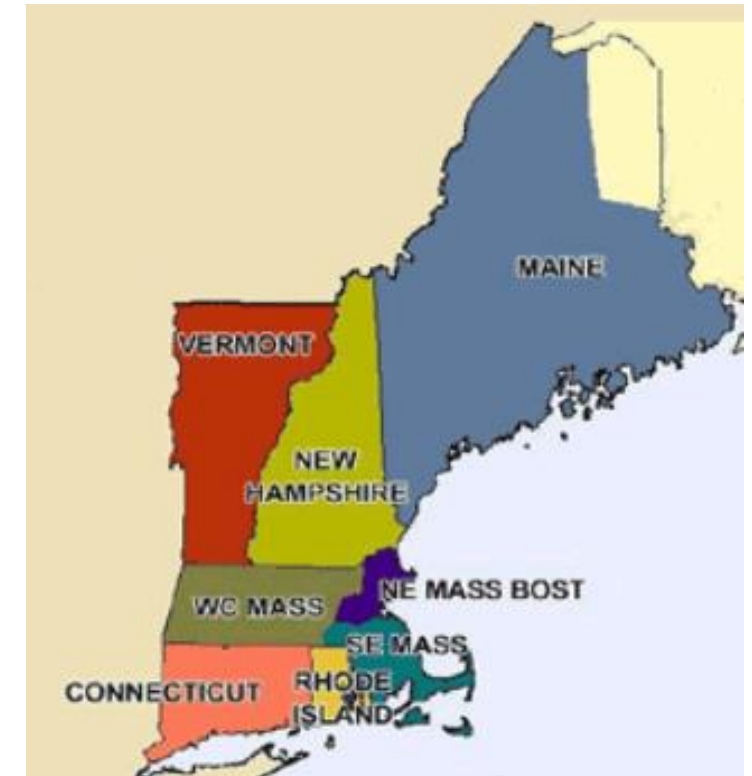
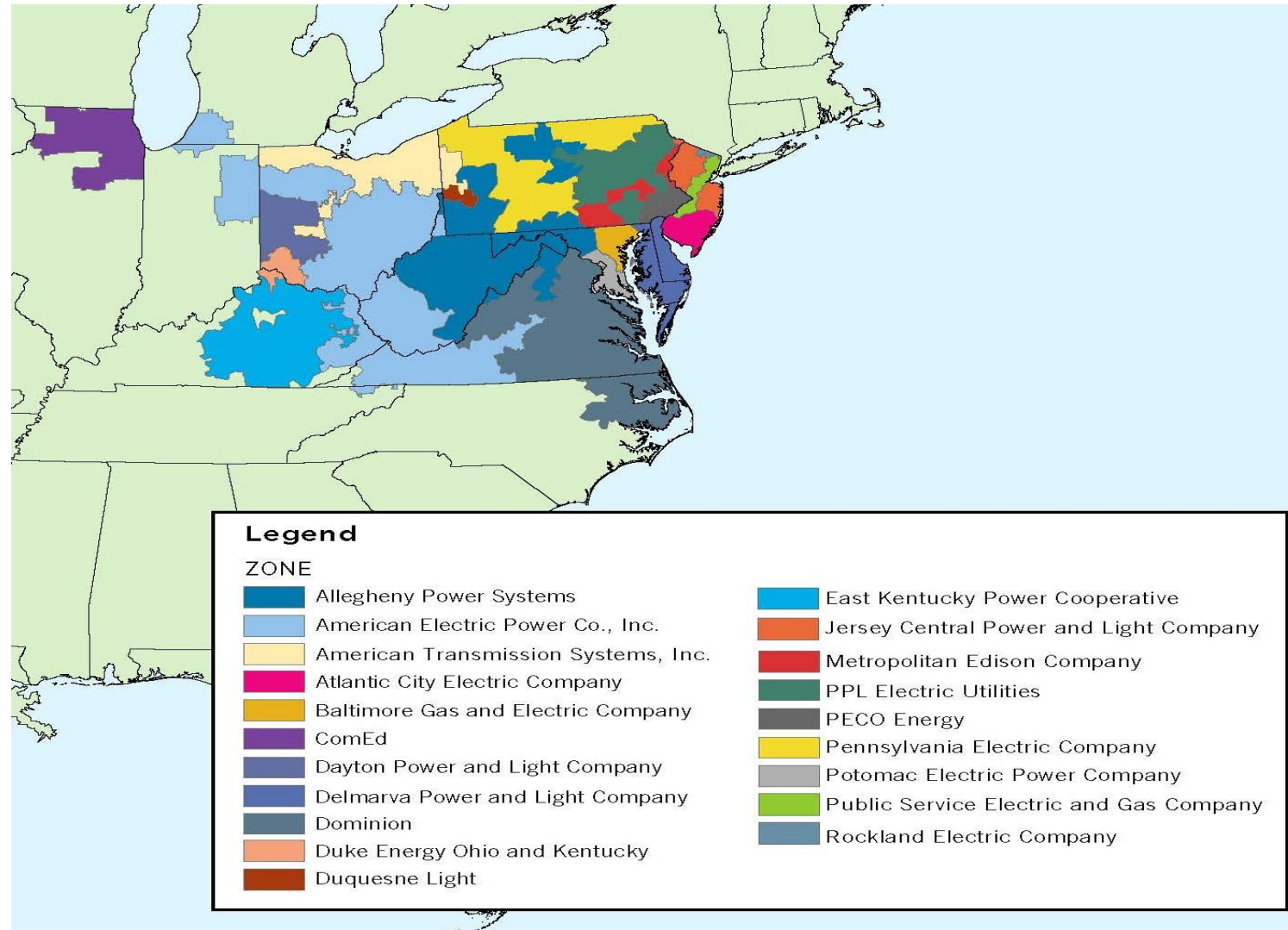
- Δ Non-Ozone Season NO_x Emissions (tons) at EGUs
- Back Trajectories from Brigantine
 - Winter Days in 2011 & 2015
 - More impairment from Nitrates



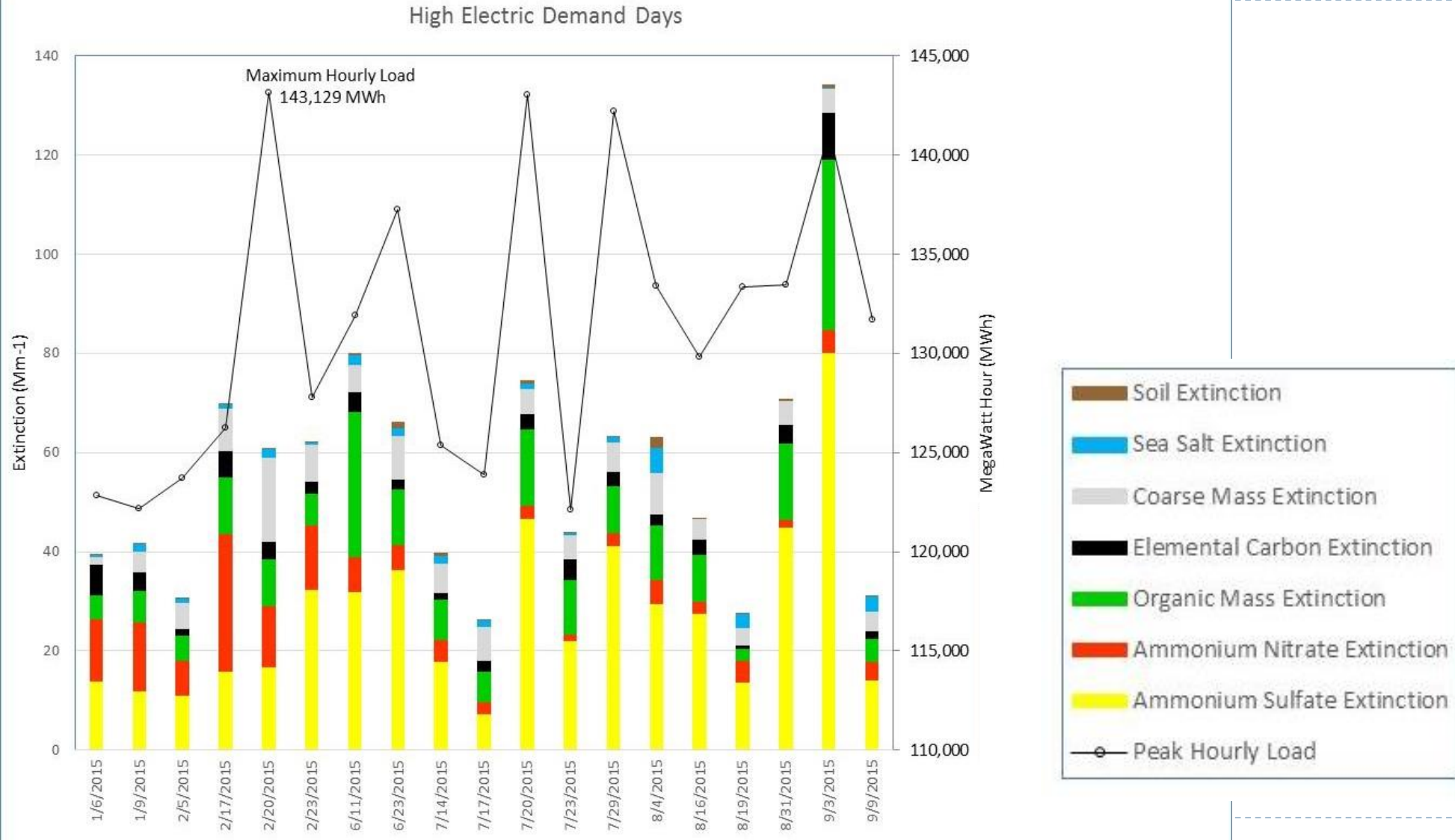
HEDD and Visibility Analysis

- ▶ Goal is to determine what relationship exists between HEDDs and visibility impairment
- ▶ Looked at 2015 PJM data, 2013 and 2015 NE ISO data
- ▶ Used the 85th percentile in terms of generation as the definition of HEDD
- ▶ Compared HEDDs to visibility impairment and back trajectories
- ▶ No notable difference between
 - ▶ 2015 and 2013 generation data
 - ▶ 85thtile of load and 85thtile of load on days monitored by IMPROVE
- ▶ Expect draft for public review in November

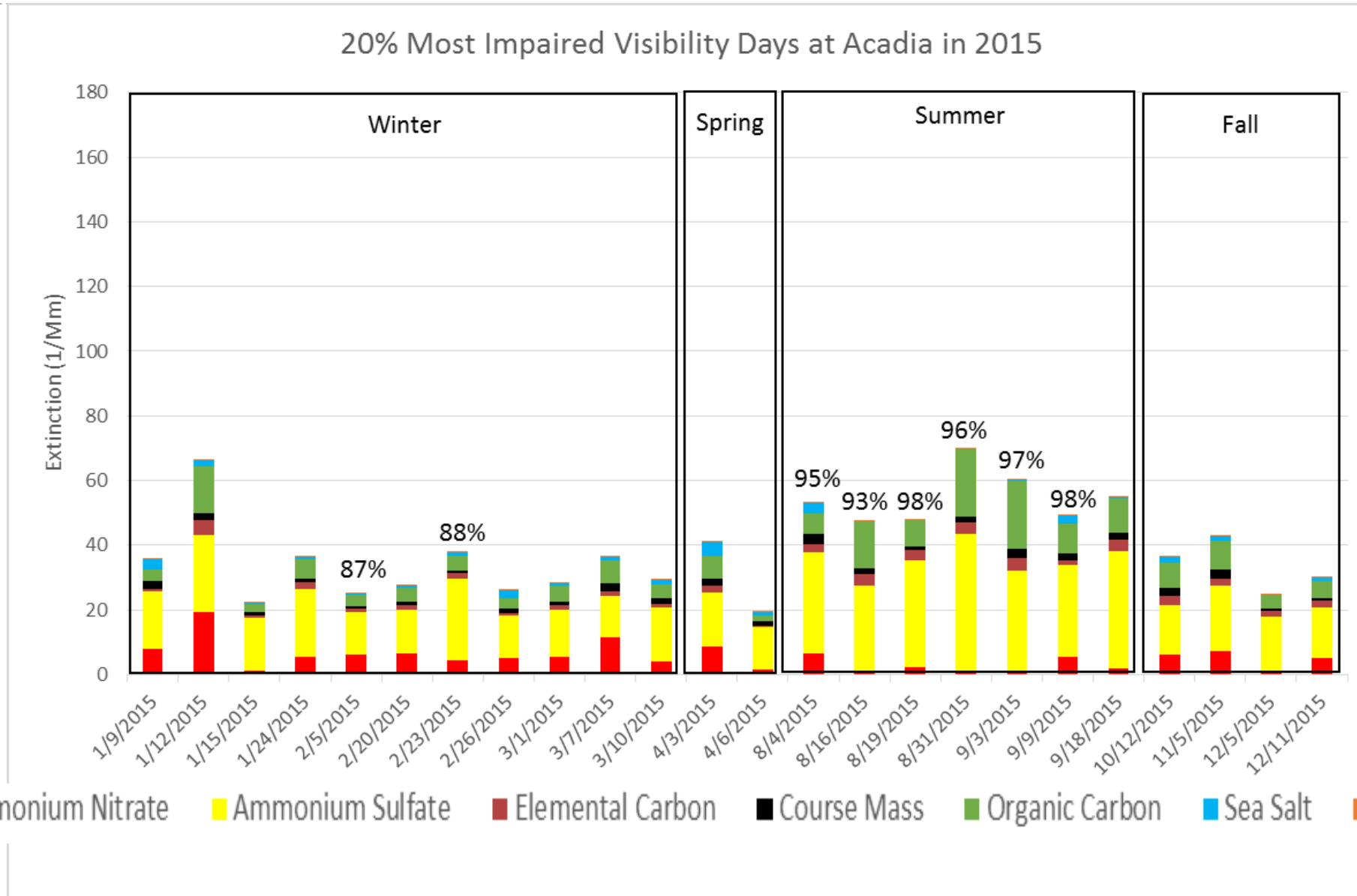
PJM and NE ISO Grid Structures



Relationship between 2015 HEDDs in PJM and visibility at Brigantine

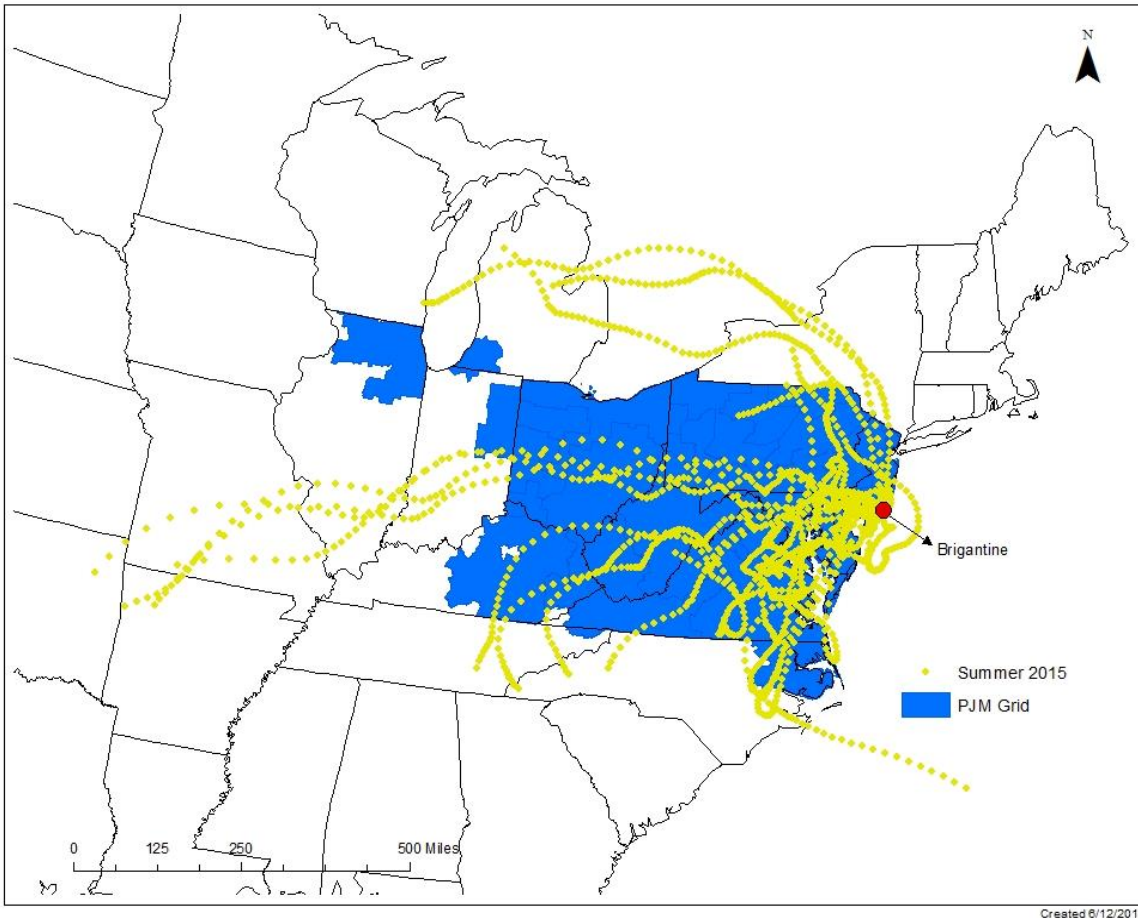


Relationship between 2015 HEDDs in NEISO and visibility at Acadia

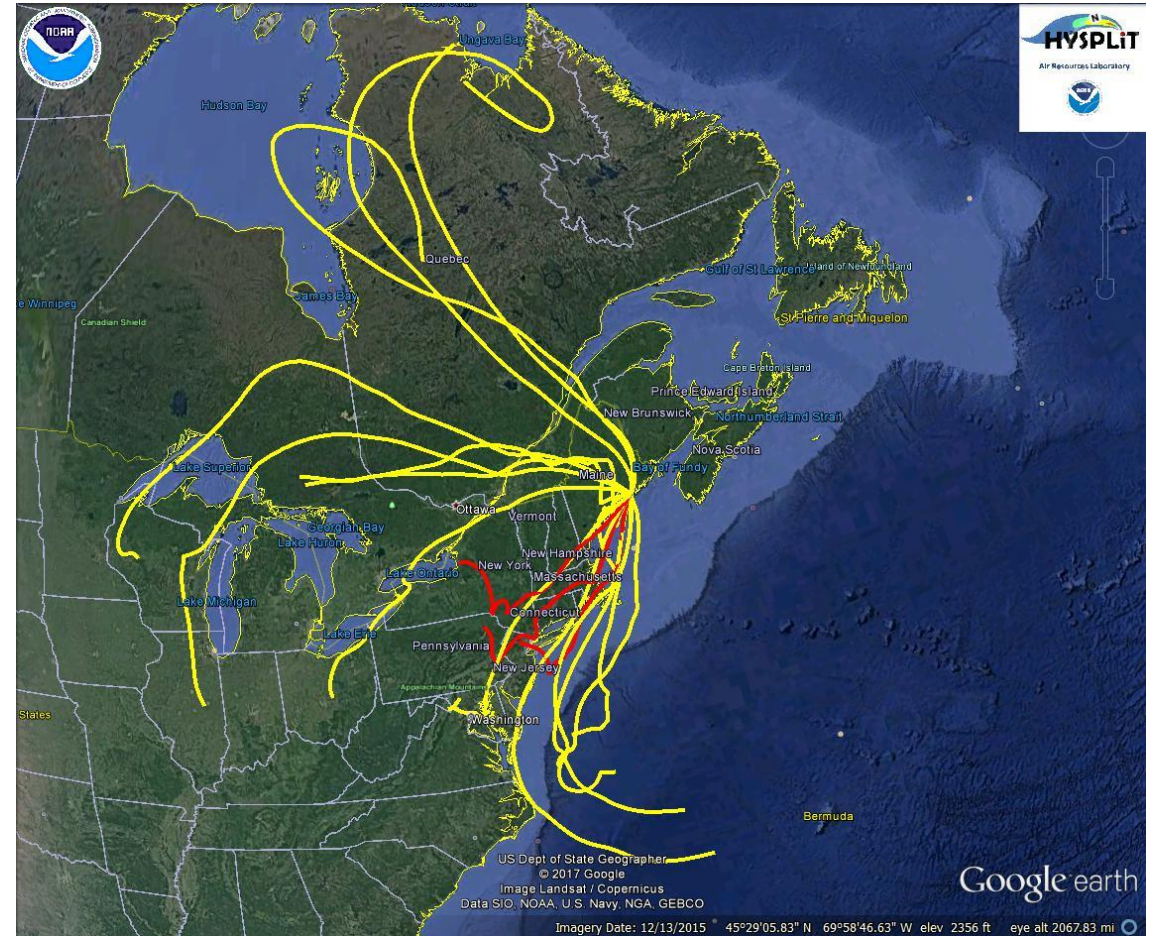


Back Trajectories on 2015 Most Impaired Summer Days

Brigantine at 500m

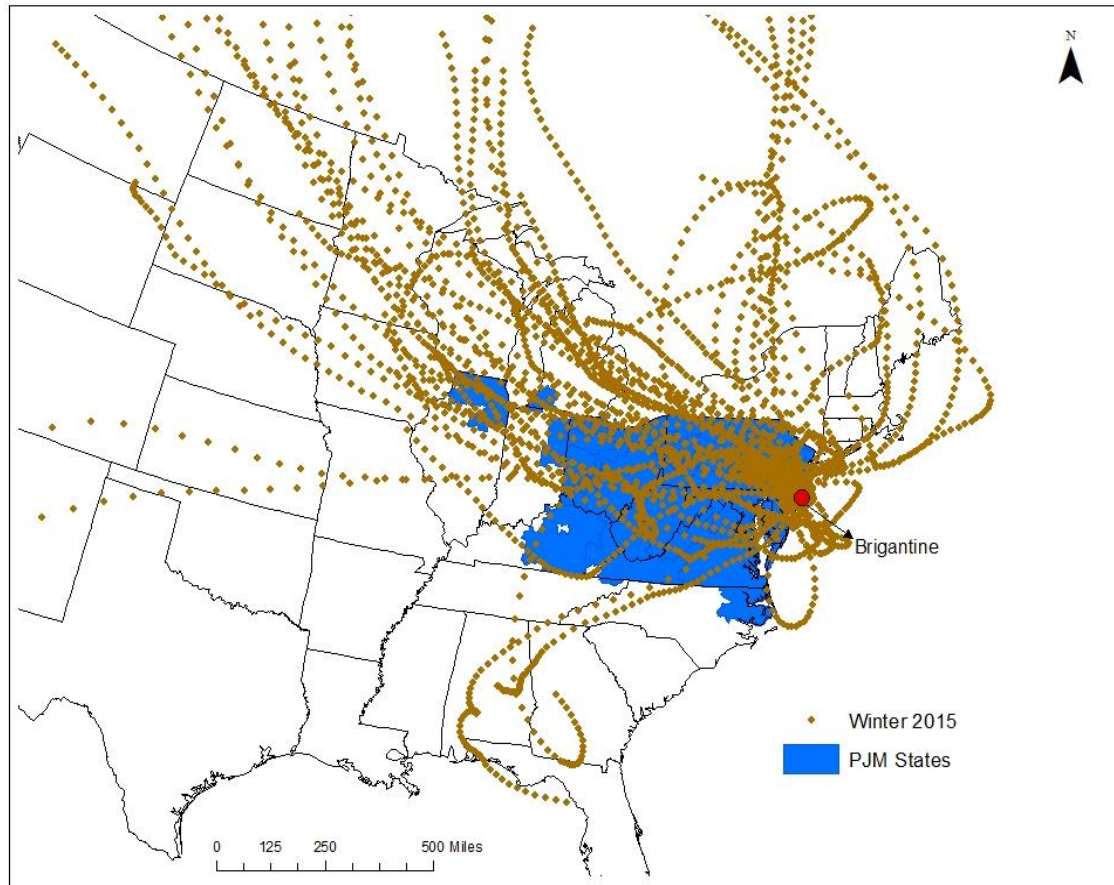


Acadia at 1000m, 500m, and 100m

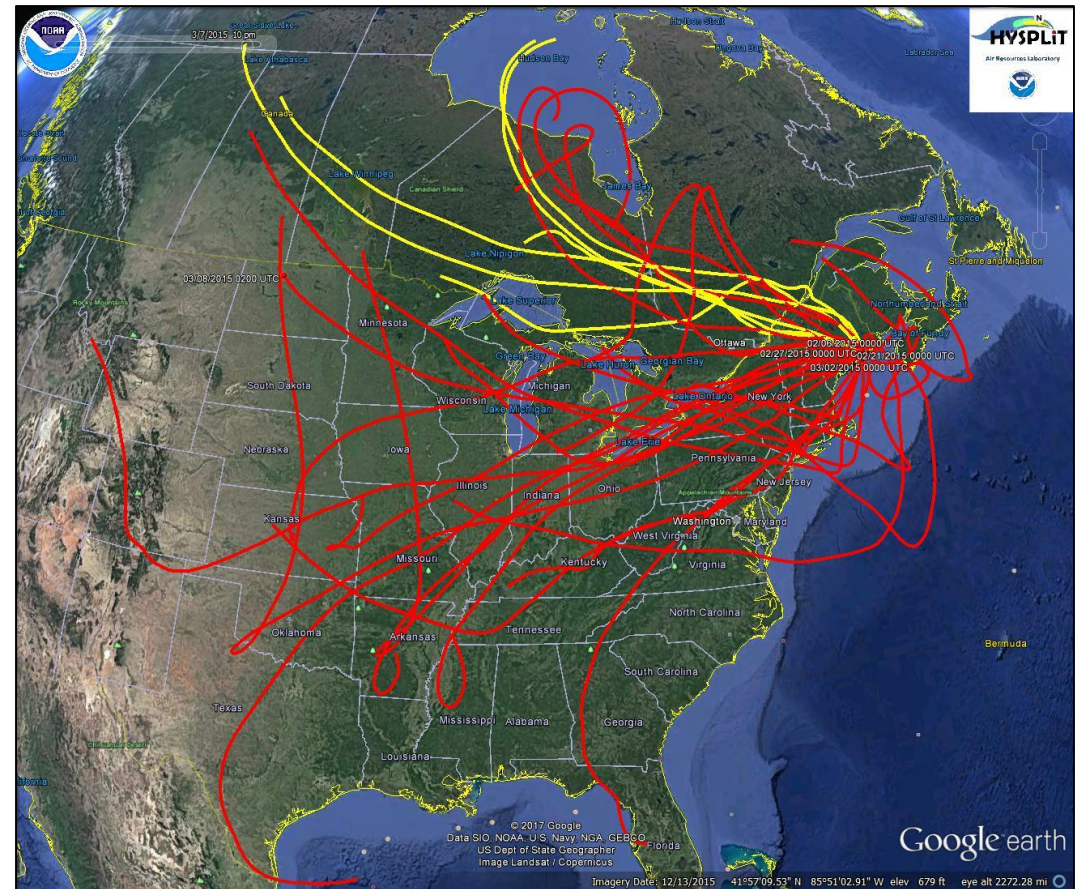


Back Trajectories on 2015 Most Impaired Winter Days

Brigantine at 500m



Acadia at 1000m, 500m, and 100m



HEDD and Visibility Summary

▶ Relationship

- ▶ Appears to be a potential relationship between PJM HEDDs and visibility impairment at Brigantine
- ▶ Unclear of any relationship between NE ISO HEDDs and visibility impairment at any Class I site
- ▶ Even if every HEDD doesn't lead to visibility impairment, some clearly do and should be controlled

▶ More Work Needed

- ▶ Merging Analyses
- ▶ Does PJM impair visibility in New England?
- ▶ Inclusion of NY ISO Data
- ▶ Examination of HEDD unit inventory

In Summary

- ▶ Nearing completion of 2nd Planning Period Regional Haze SIP work
- ▶ “Selection of States” is final and posted on otcair.org/mane-vu
- ▶ MANE-VU states have finalized the “ask” for the 2nd Planning Period
- ▶ MANE-VU states are moving onto intra-RPO consultation
- ▶ Running NO_x controls on EGUs during the winter is a cost effective, reasonable approach to improving visibility
- ▶ In PJM there appears to be a relationship between HEDDs and visibility degradation, but more work is needed.
- ▶ Comments on Winter NO_x Paper are due September 29, 2017 to jjakuta@otcair.org