

# VISTAS Regional Haze Project Update

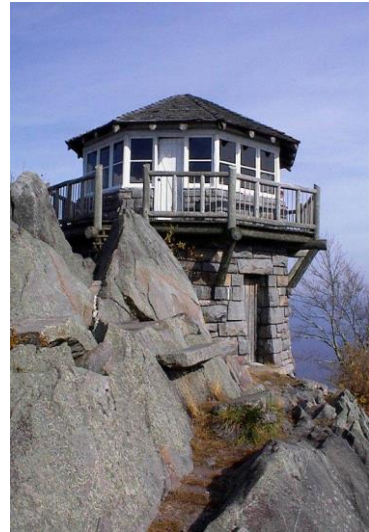


**Jim Boylan (GA DNR), Randy Strait (NC DAQ), and  
John Hornback (Metro 4/SESARM)**

**EPA Region 4 Fall Air Director's Meeting  
Gulfport, MS - October 17, 2019**

## Outline

- Background
- 2028 Model Projections
- AOI Results
- PSAT Results
- Next Steps

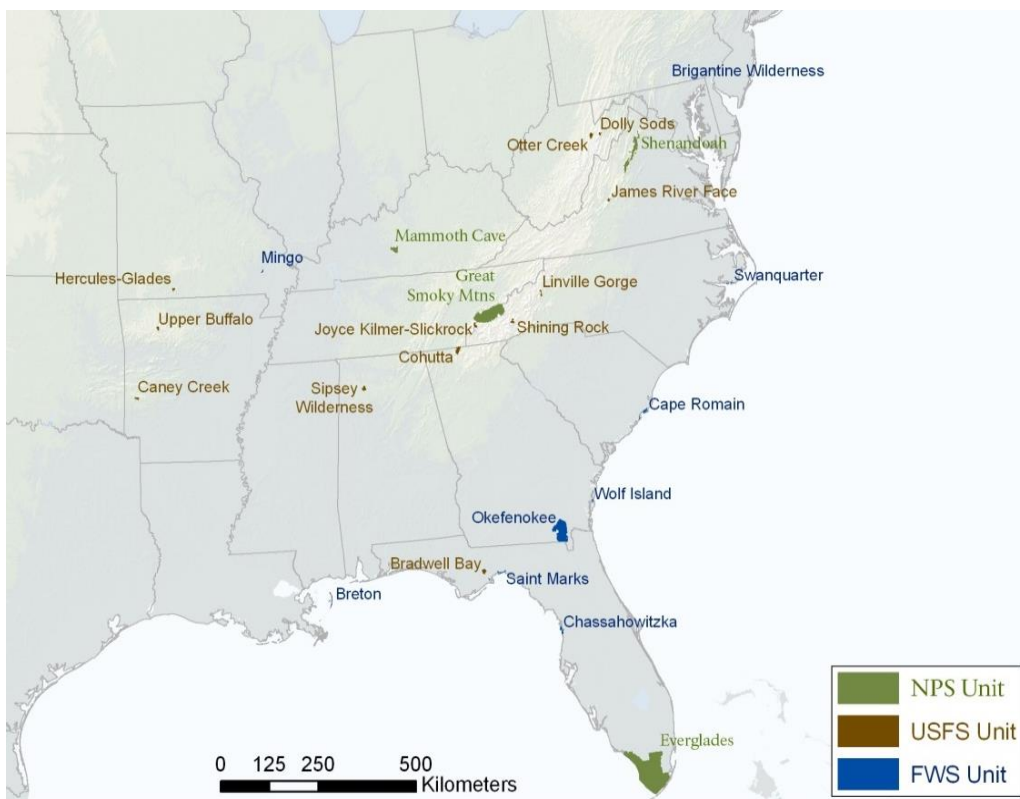


# BACKGROUND

## 1999/2017 Regional Haze Rule

- Reduction of visibility impairment on the 20% “most impaired days” (anthropogenic impairment) in national park and wilderness (Class I) areas to natural conditions by 2064.
- No worsening of visibility on the 20% “clearest” days.
- Development of State Implementation Plans (SIPs) every 10 years to address emissions that contribute to regional haze.
- **Round 2 SIP deadline extended to July 31, 2021**

# Class I Areas of Interest to VISTAS States



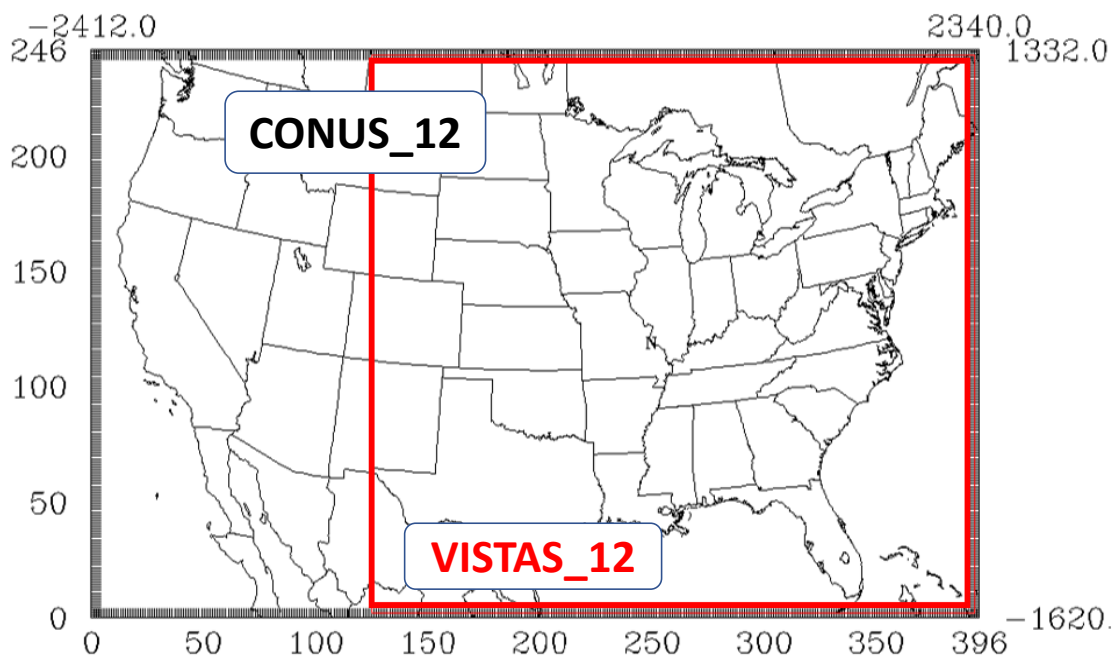
## VISTAS Class I Areas

VISTAS FEDERAL CLASS I AREAS	
AL – Sipsey Wilderness Area (SIPS)	USDA Forest Service
FL – Chassahowitzka Wilderness Area (CHAS)	USDI Fish and Wildlife Service
FL – Everglades National Park (EVER)	USDI National Park Service
FL – Saint Marks Wilderness Area (SAMA)	USDI Fish and Wildlife Service
GA – Cohutta Wilderness Area (COHU)	USDA Forest Service
GA – Okefenokee Wilderness Area (OKEF)	USDI Fish and Wildlife Service
GA – Wolf Island Wilderness Area (WOLF)*	USDI Fish and Wildlife Service
KY – Mammoth Cave National Park (MACA)	USDI National Park Service
NC – Linville Gorge Wilderness Area (LIGO)	USDA Forest Service
NC – Shining Rock Wilderness Area (SHRO)	USDA Forest Service
NC – Swanquarter Wilderness Area (SWAN)	USDI Fish and Wildlife Service
SC – Cape Romain Wilderness Area (ROMA)	USDI Fish and Wildlife Service
TN/NC – Great Smoky Mountains National Park (GRSM)	USDI National Park Service
TN/NC – Joyce Kilmer-Slickrock Wilderness Area (JOYC)*	USDA Forest Service
VA – James River Face Wilderness Area (JARI)	USDA Forest Service
VA – Shenandoah National Park (SHEN)	USDI National Park Service
WV – Dolly Sods Wilderness Area (DOSO)	USDA Forest Service
WV – Otter Creek Wilderness Area (OTCR)*	USDA Forest Service

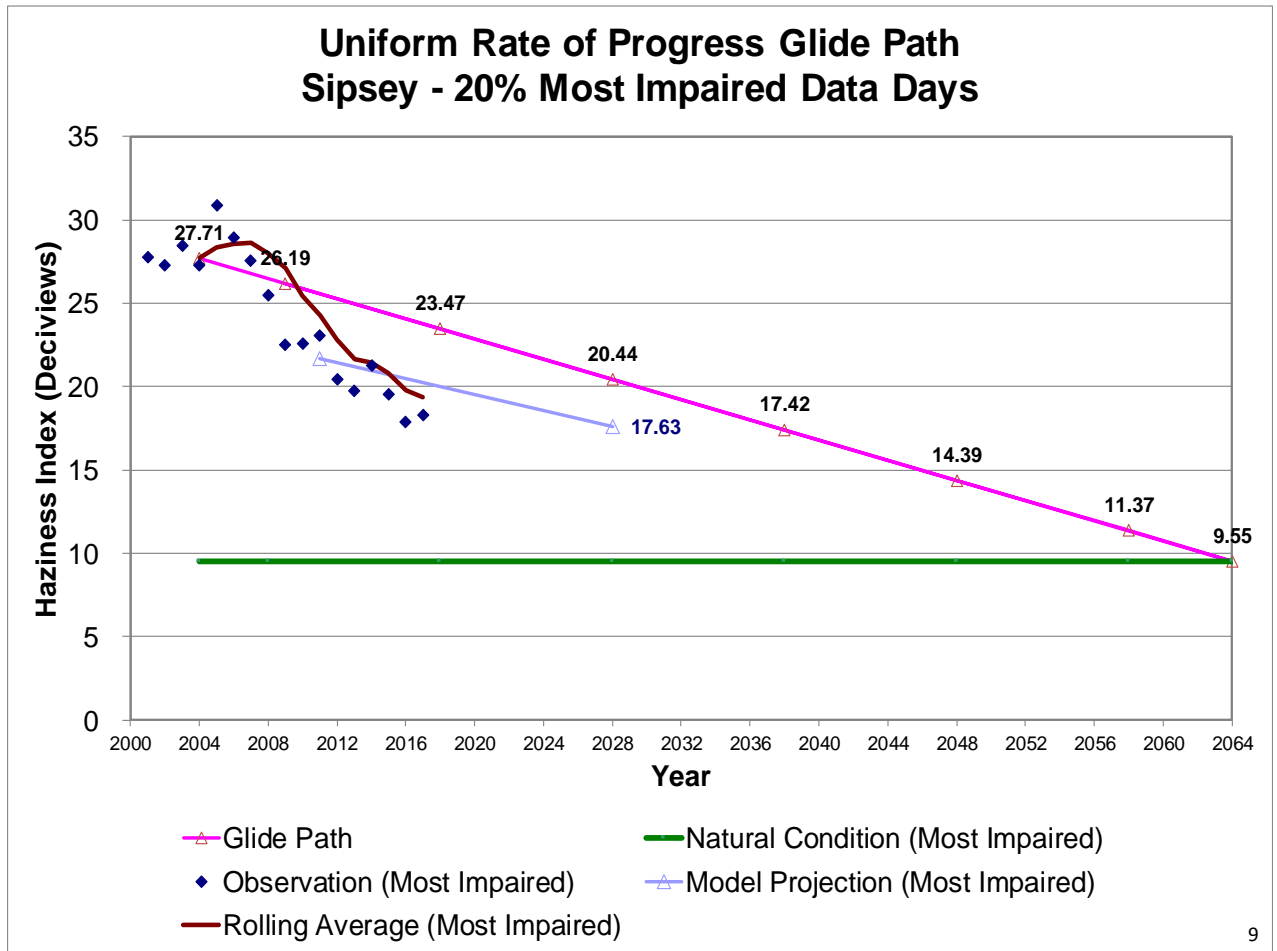
\*This Class I Area does not have an IMPROVE monitor and will be represented by measurement data from a nearby Class I Area with an IMPROVE monitor.

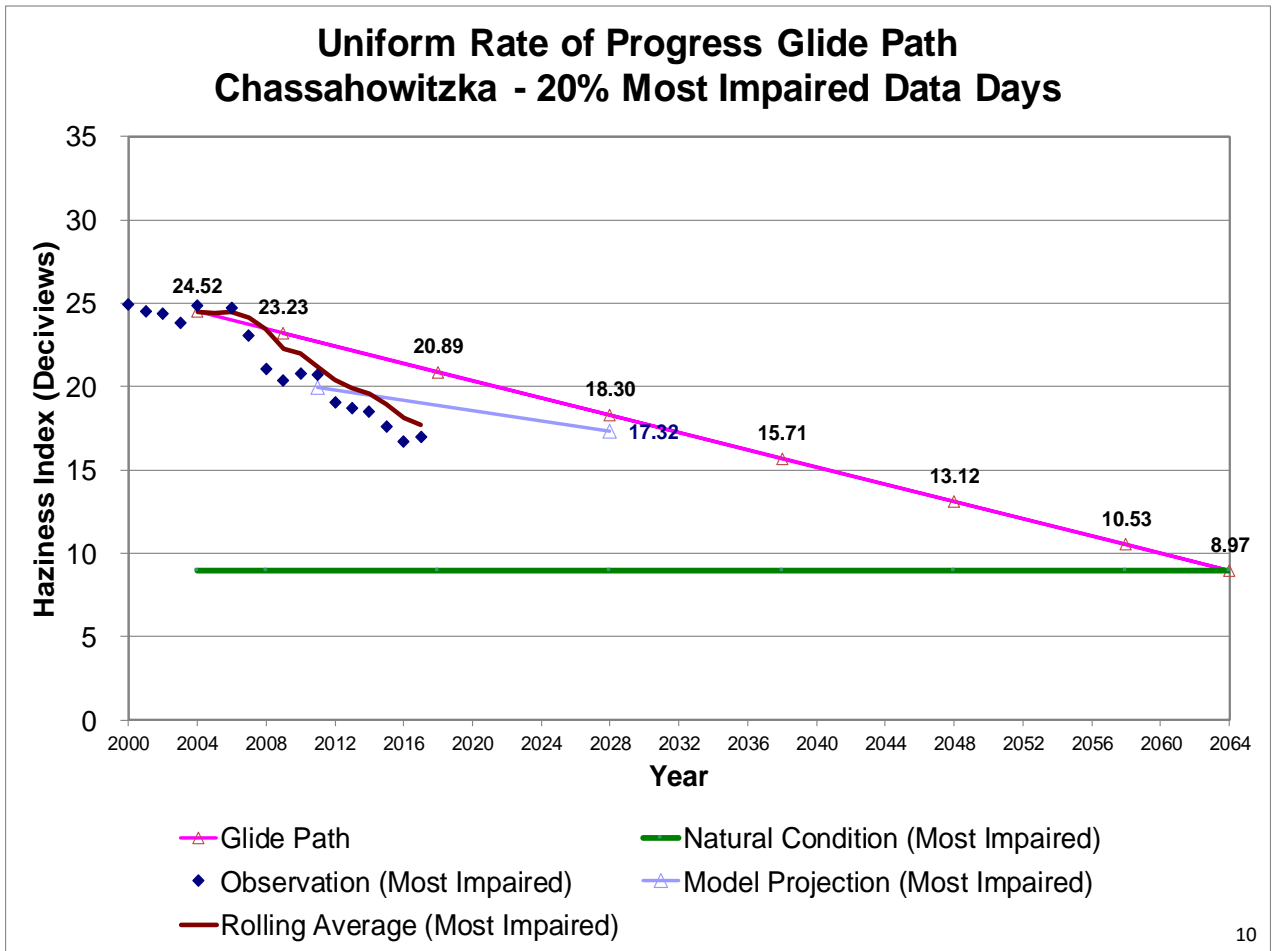
# 2028 MODEL PROJECTIONS

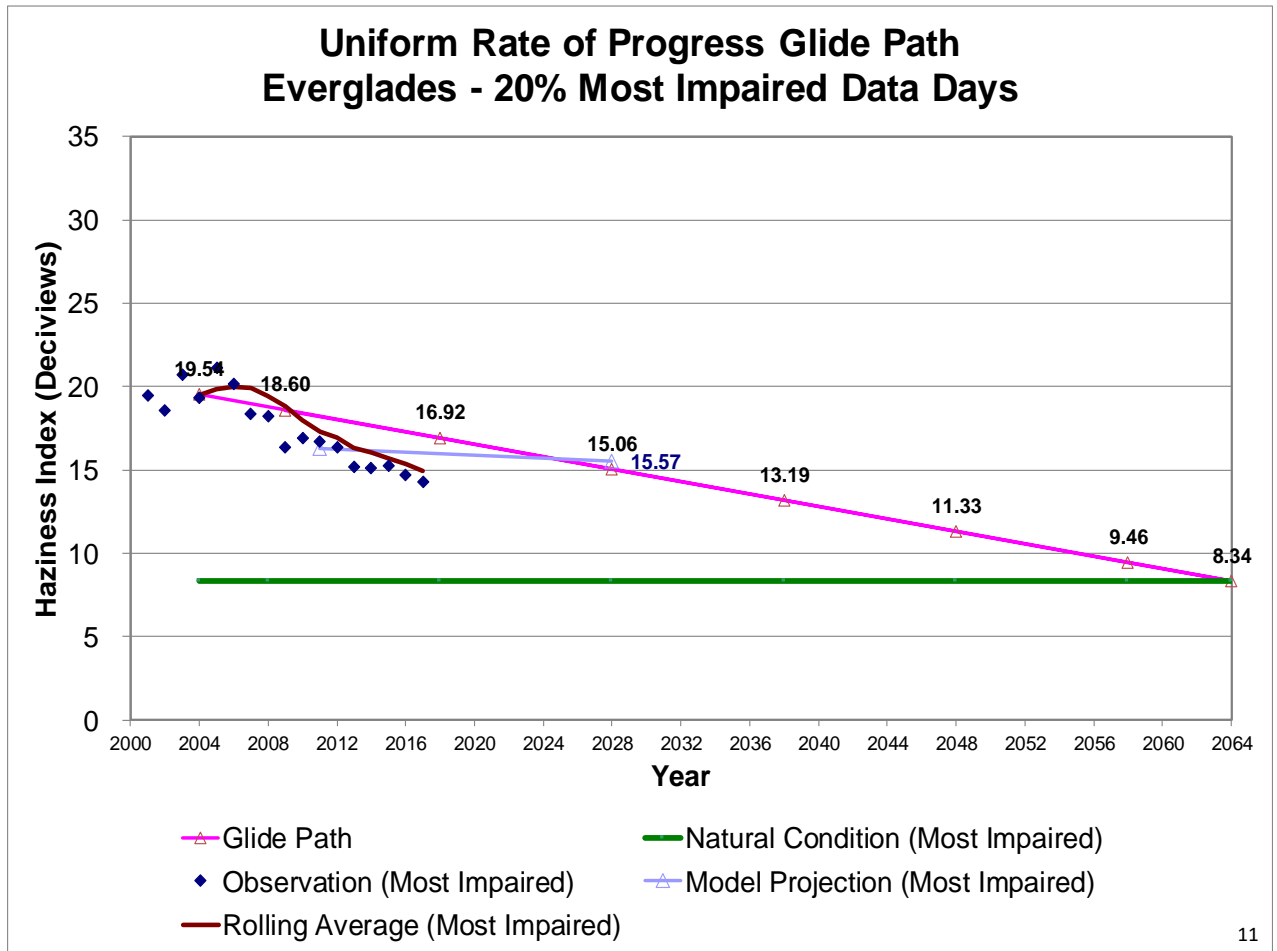
# VISTAS Modeling Domains



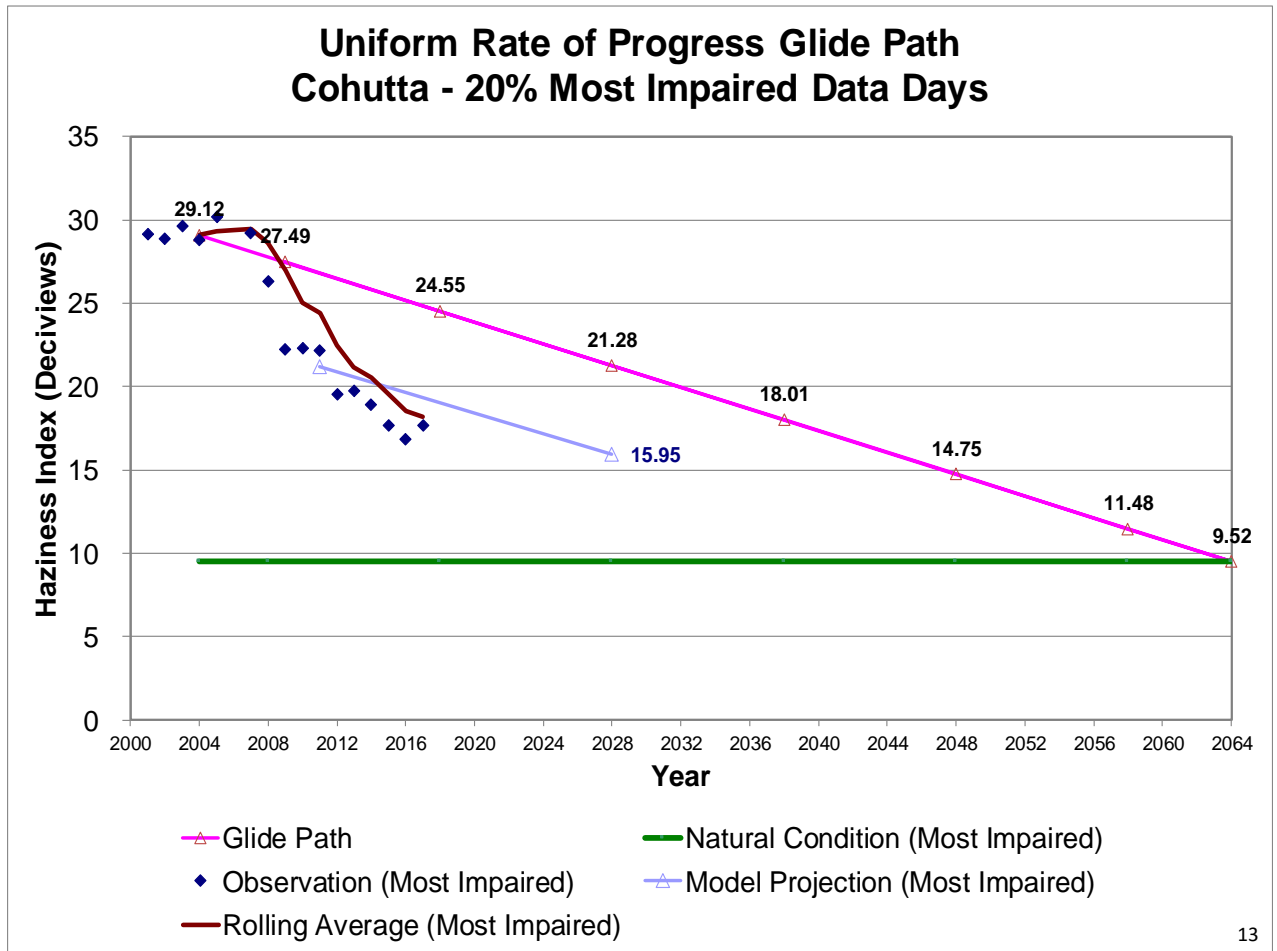




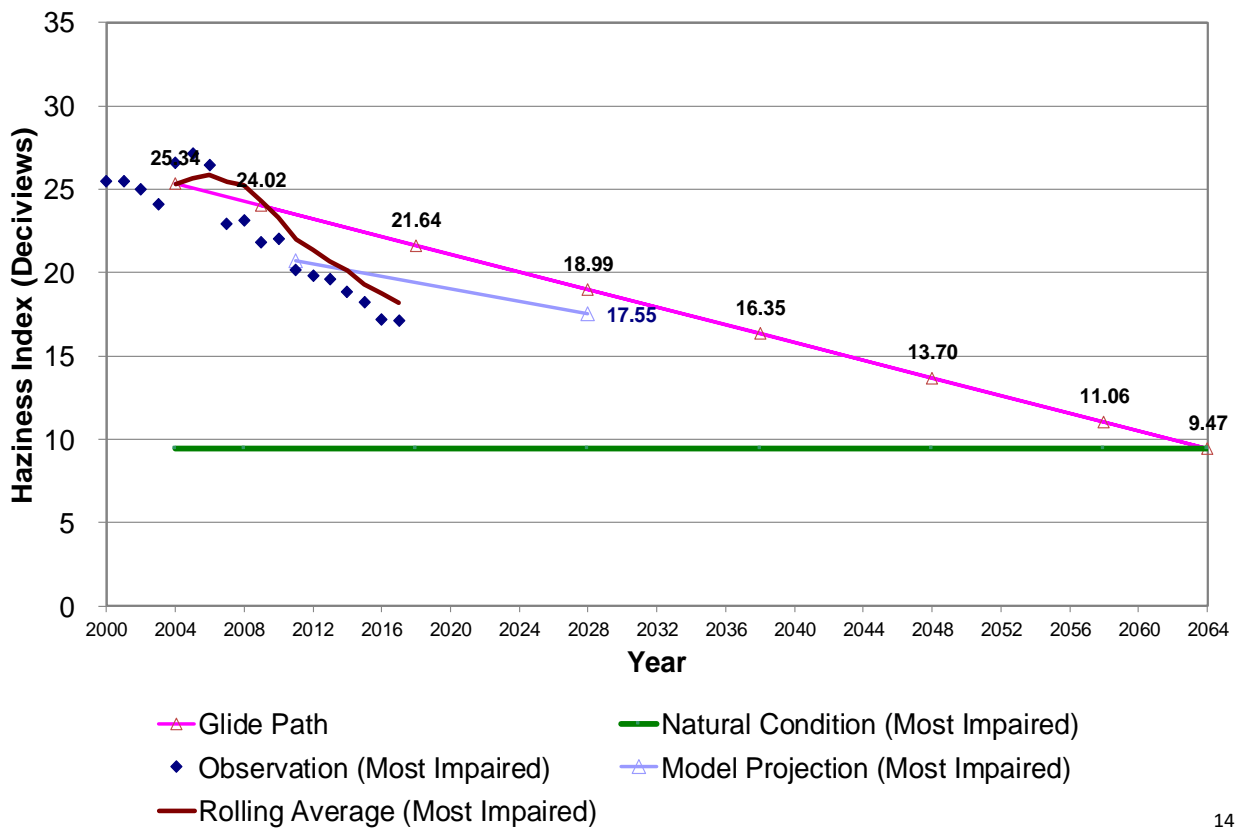


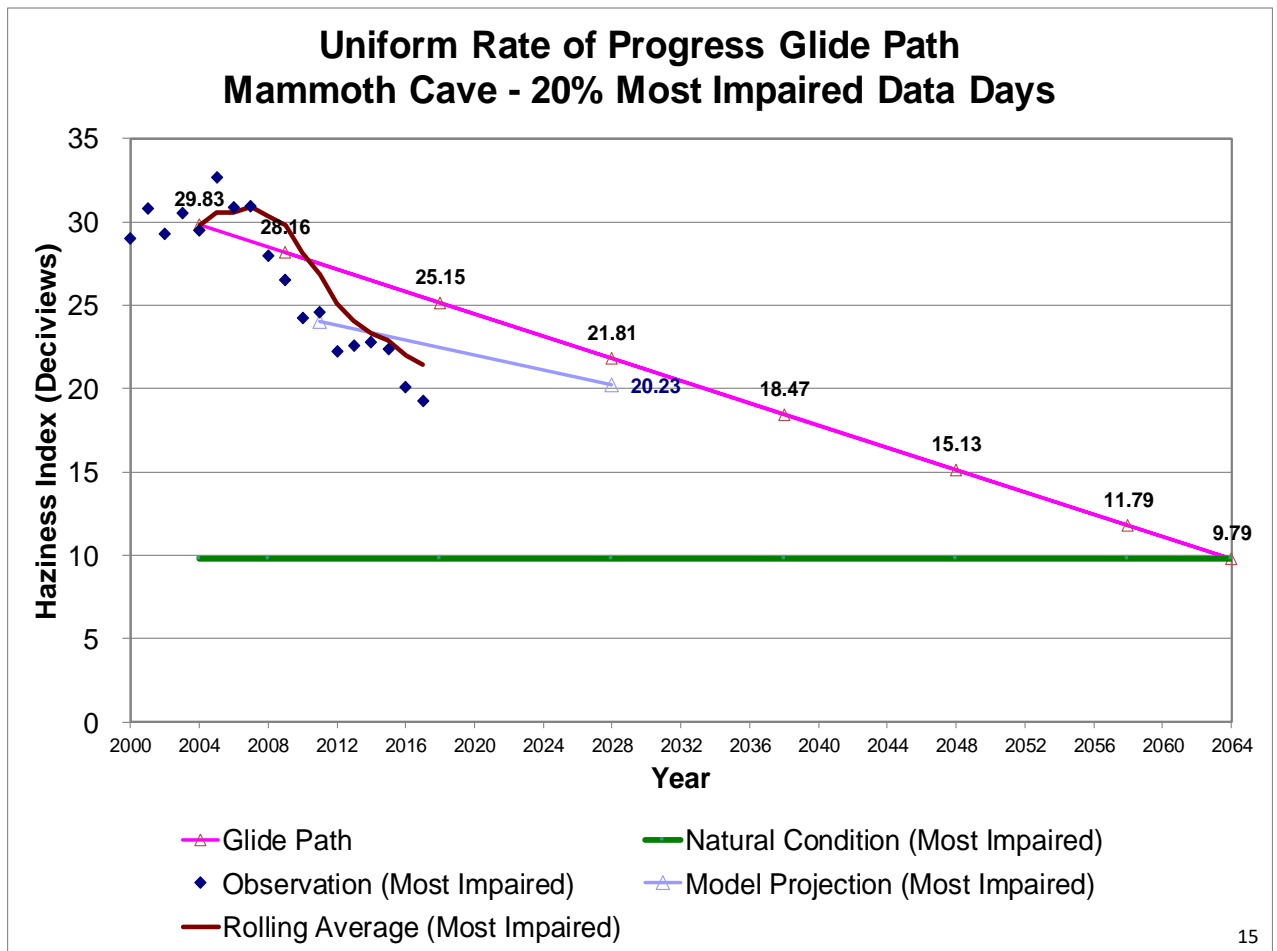


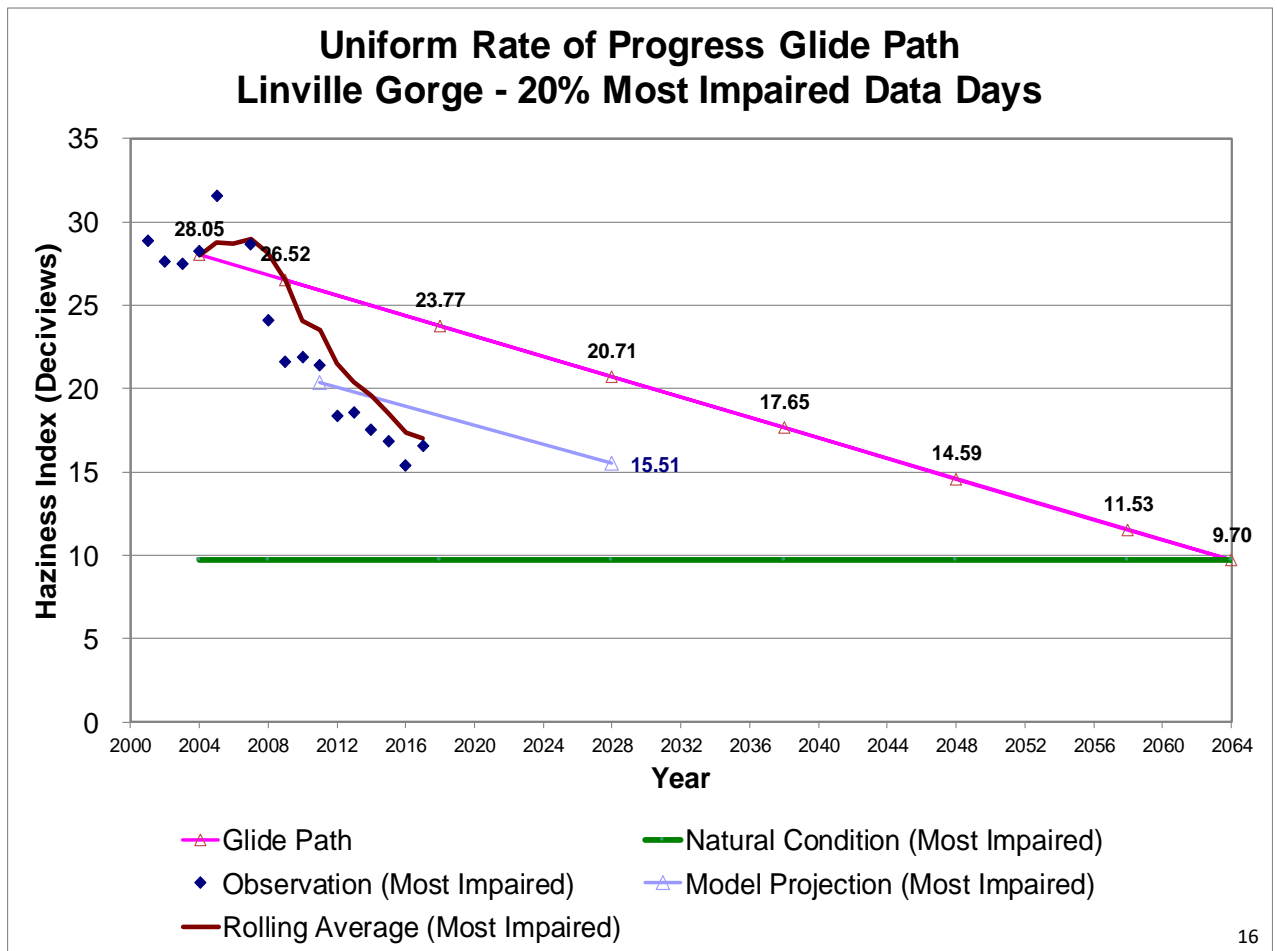




### Uniform Rate of Progress Glide Path Okefenokee - 20% Most Impaired Data Days

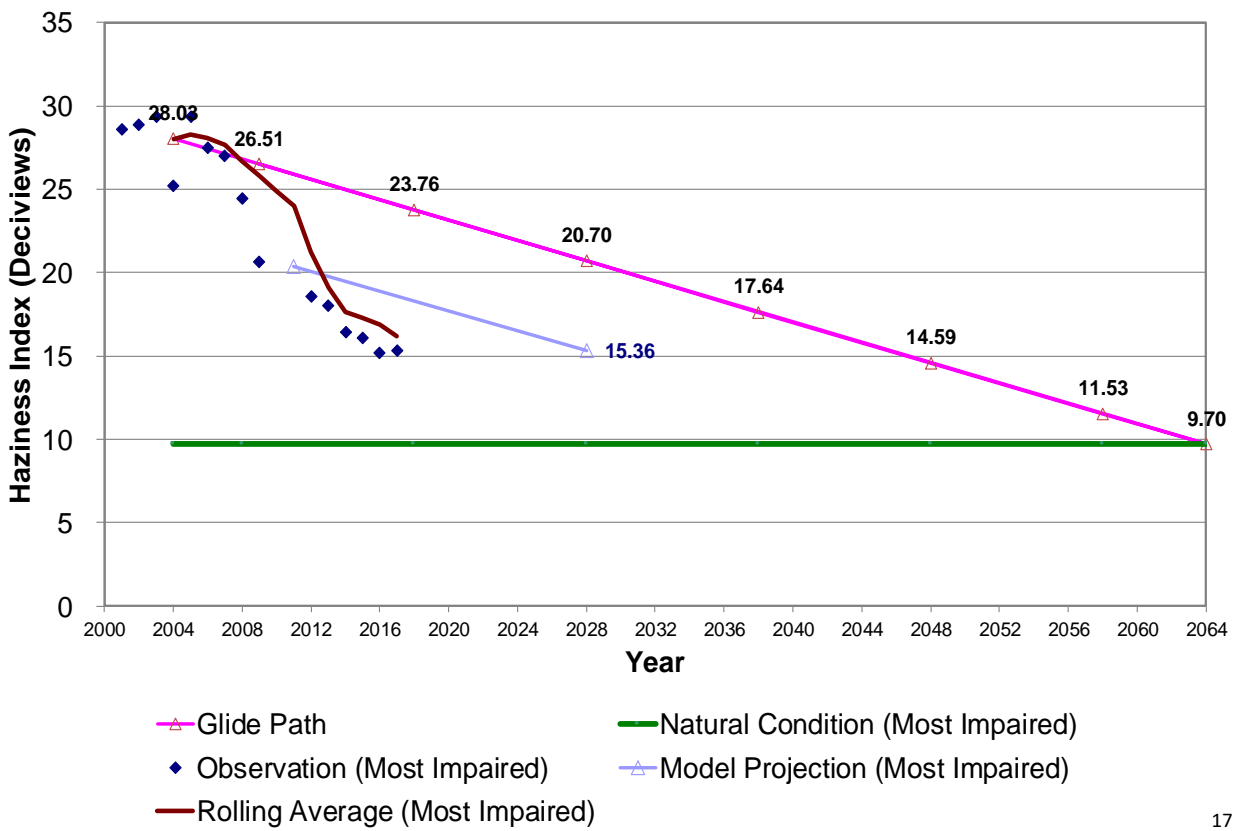




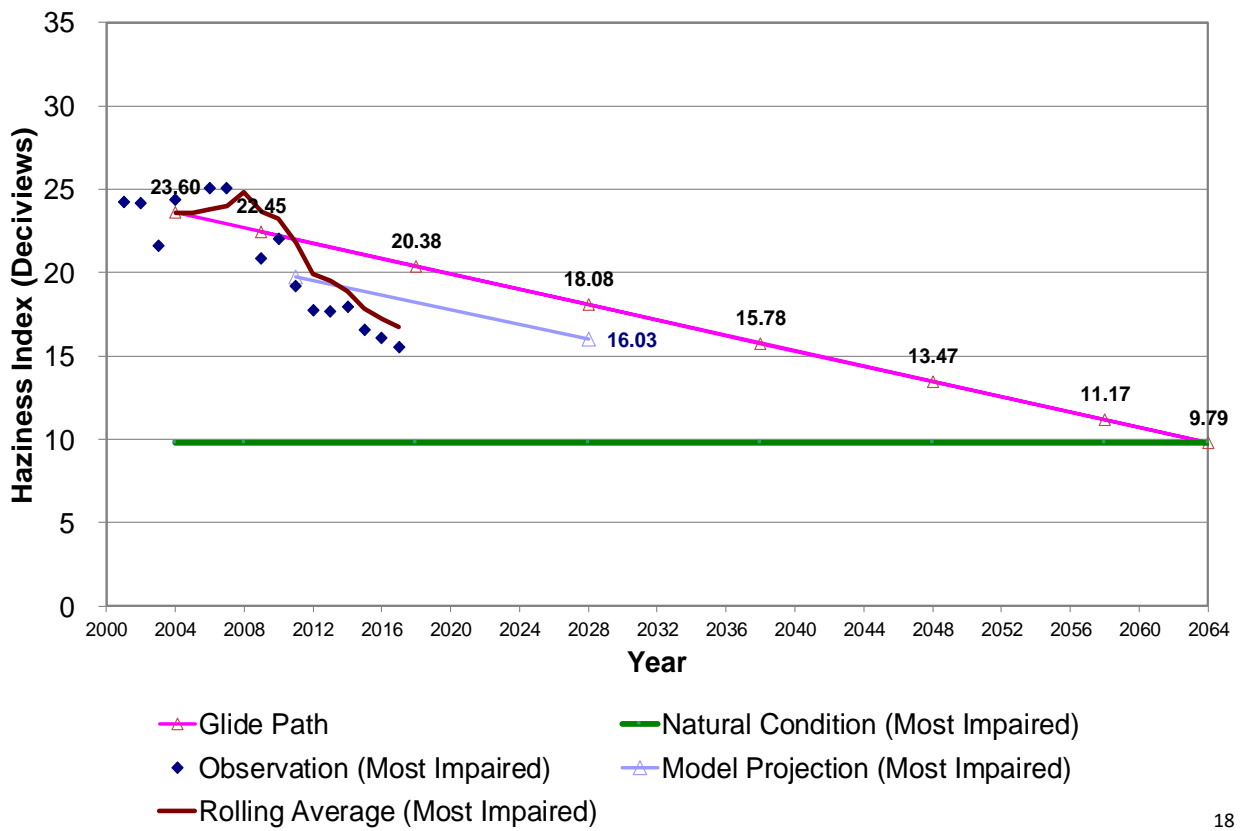


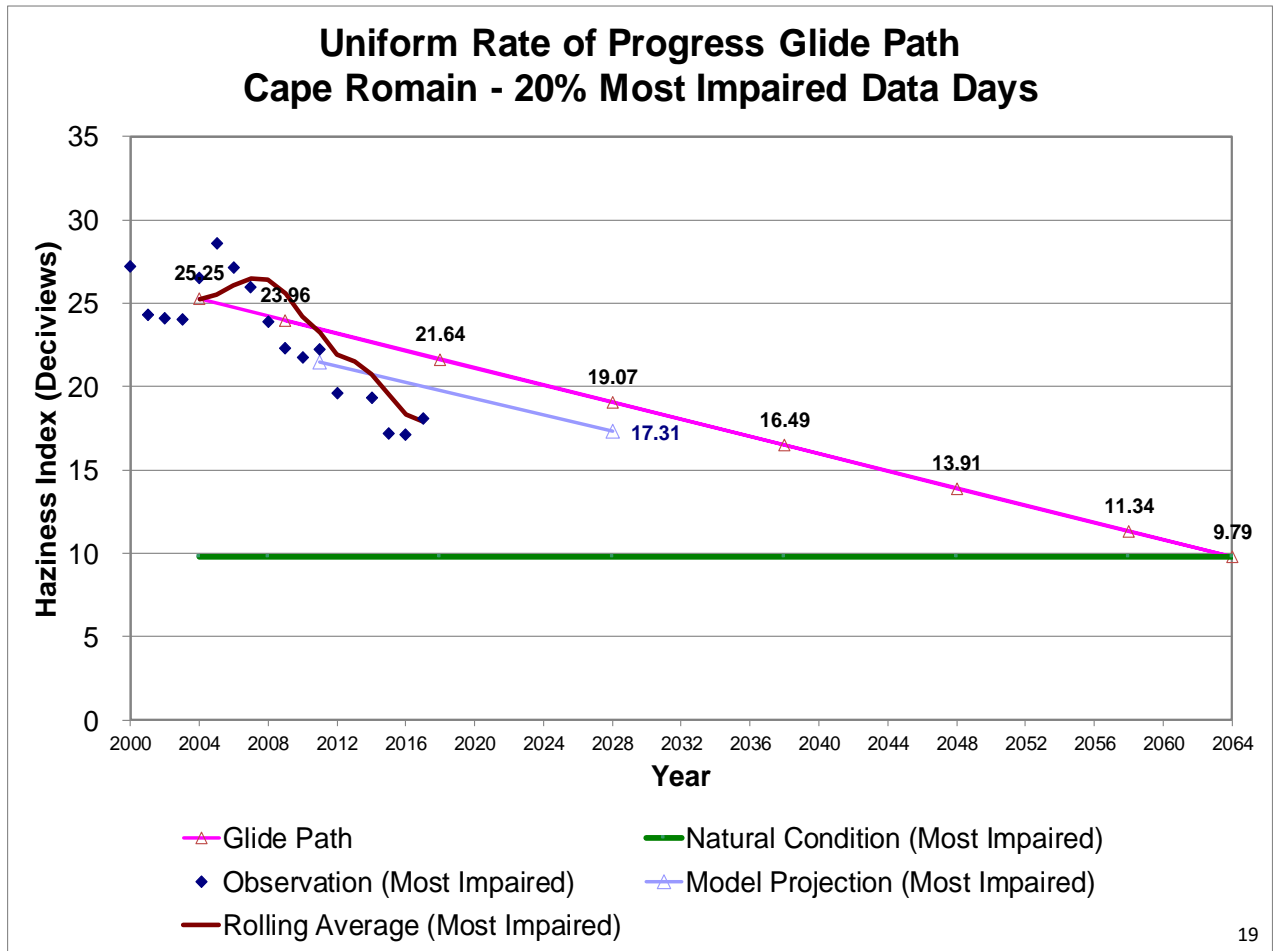


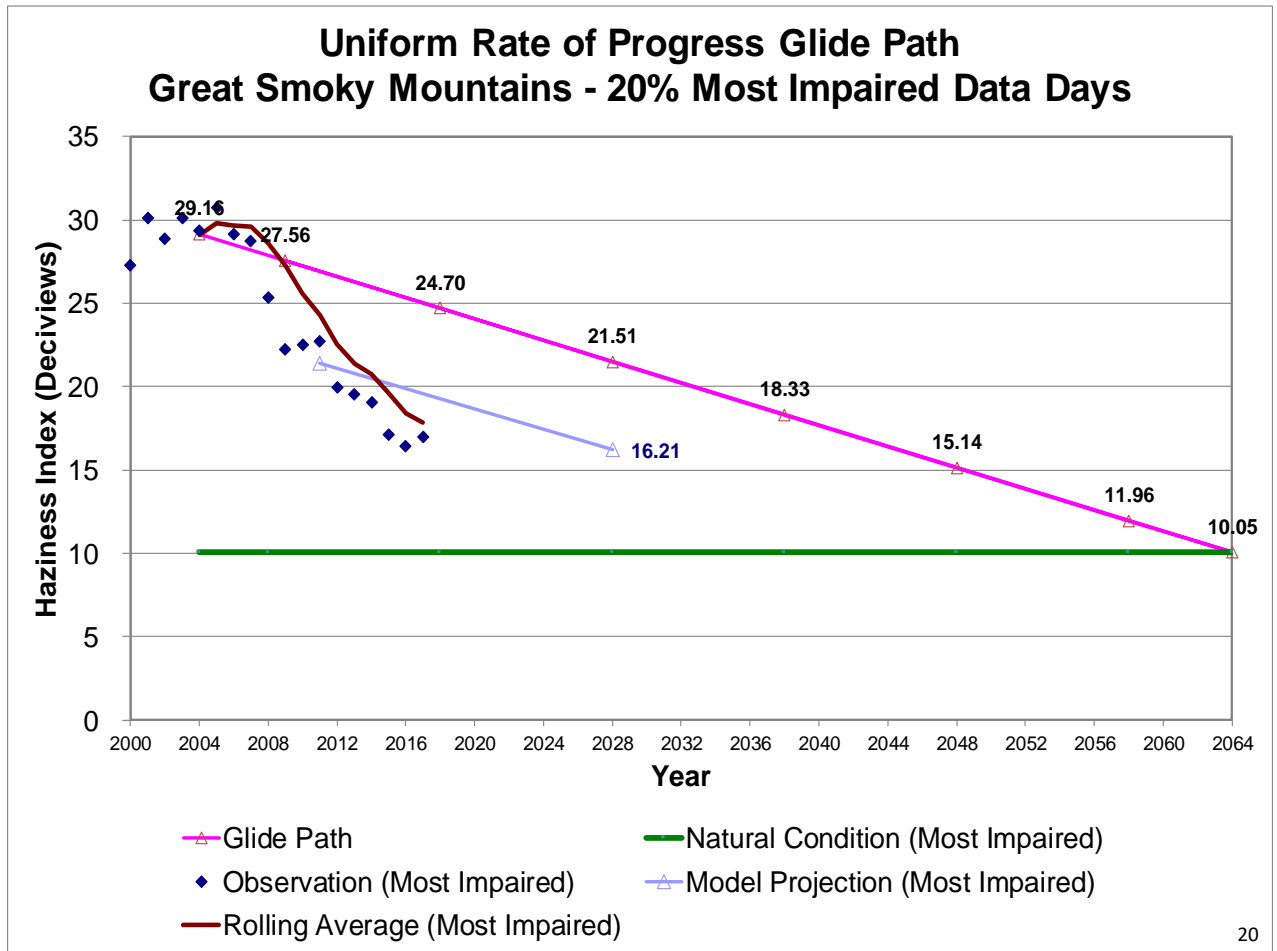
### Uniform Rate of Progress Glide Path Shining Rock - 20% Most Impaired Data Days

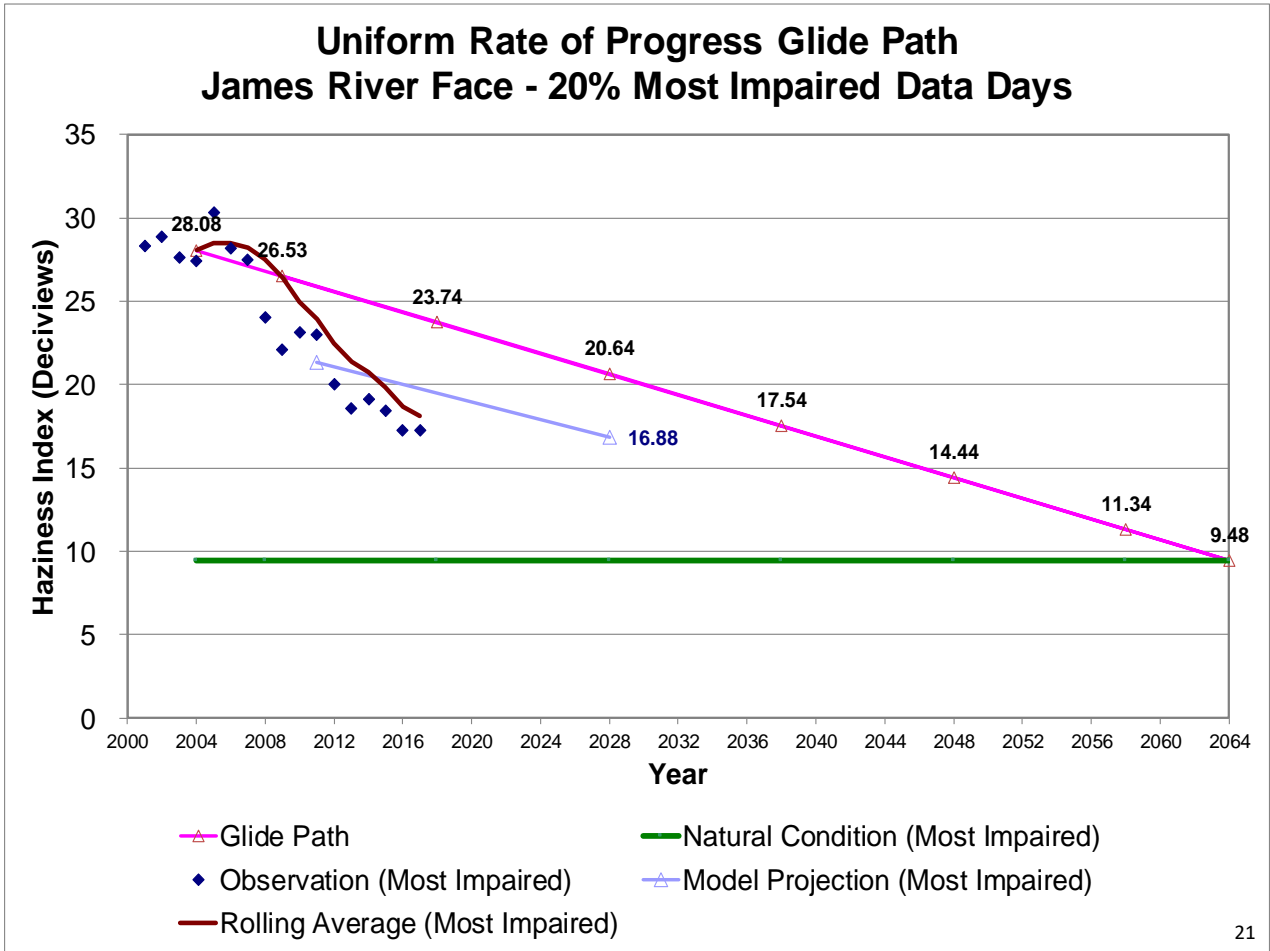


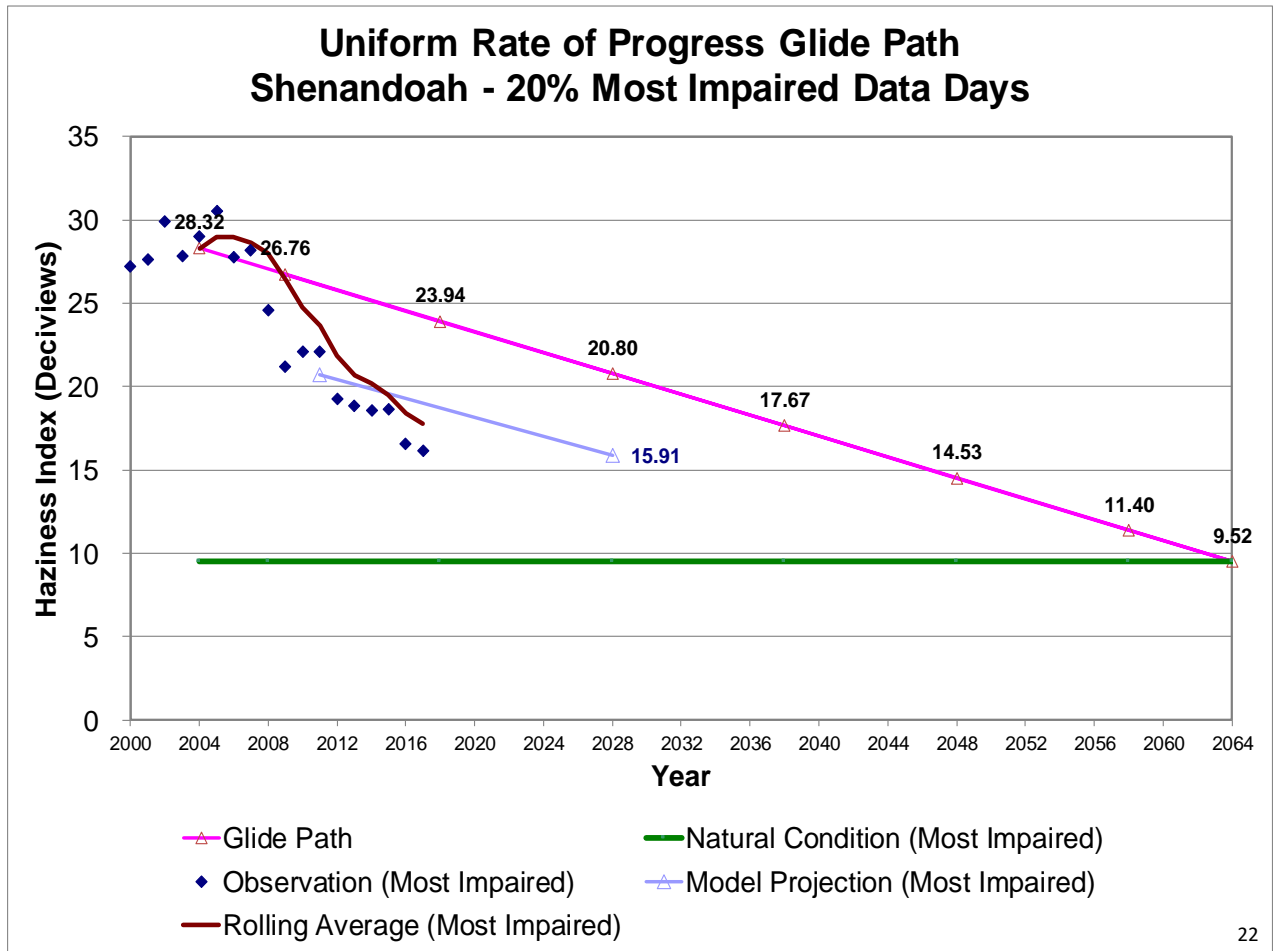
### Uniform Rate of Progress Glide Path Swanquarter - 20% Most Impaired Data Days

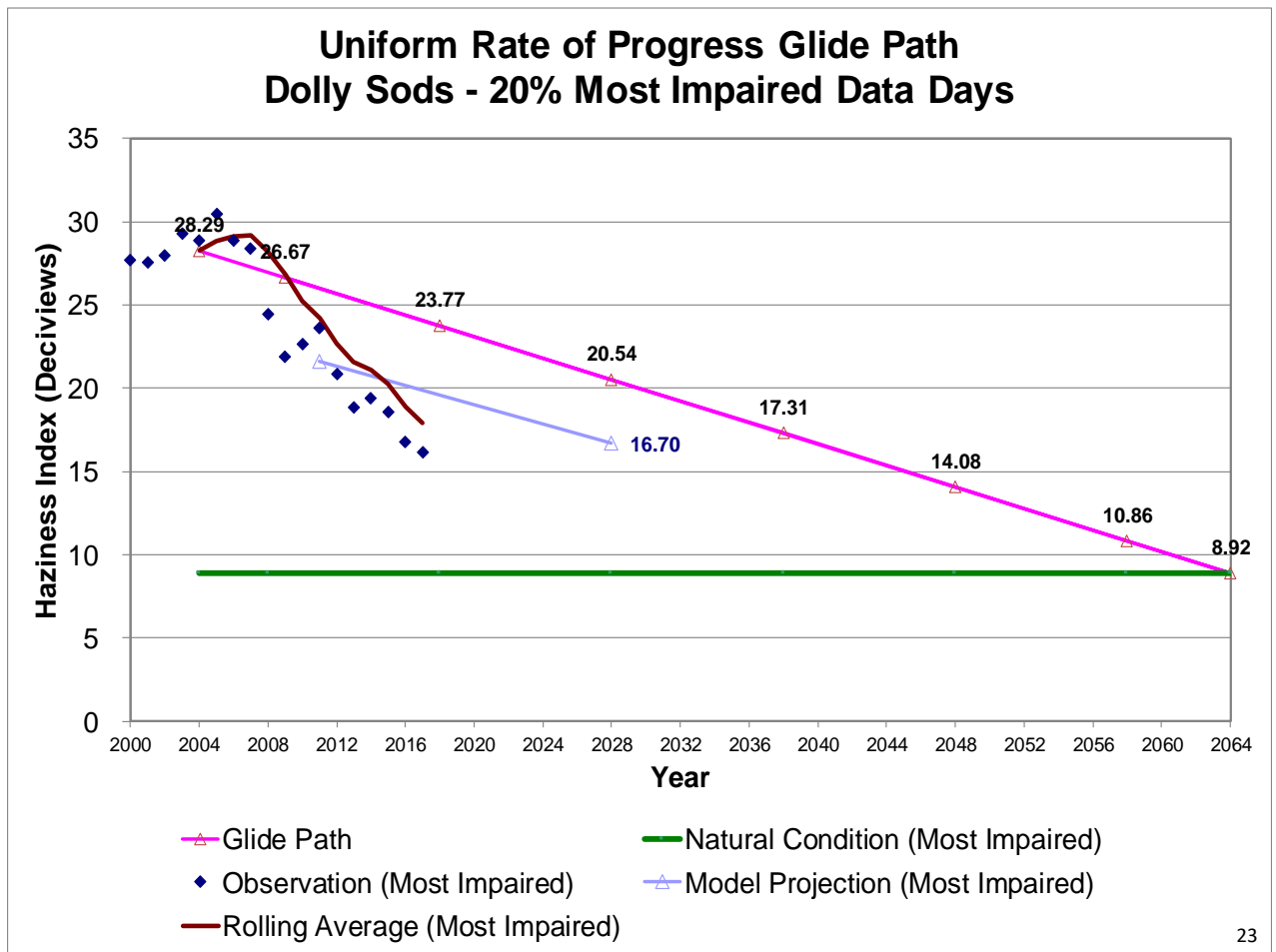


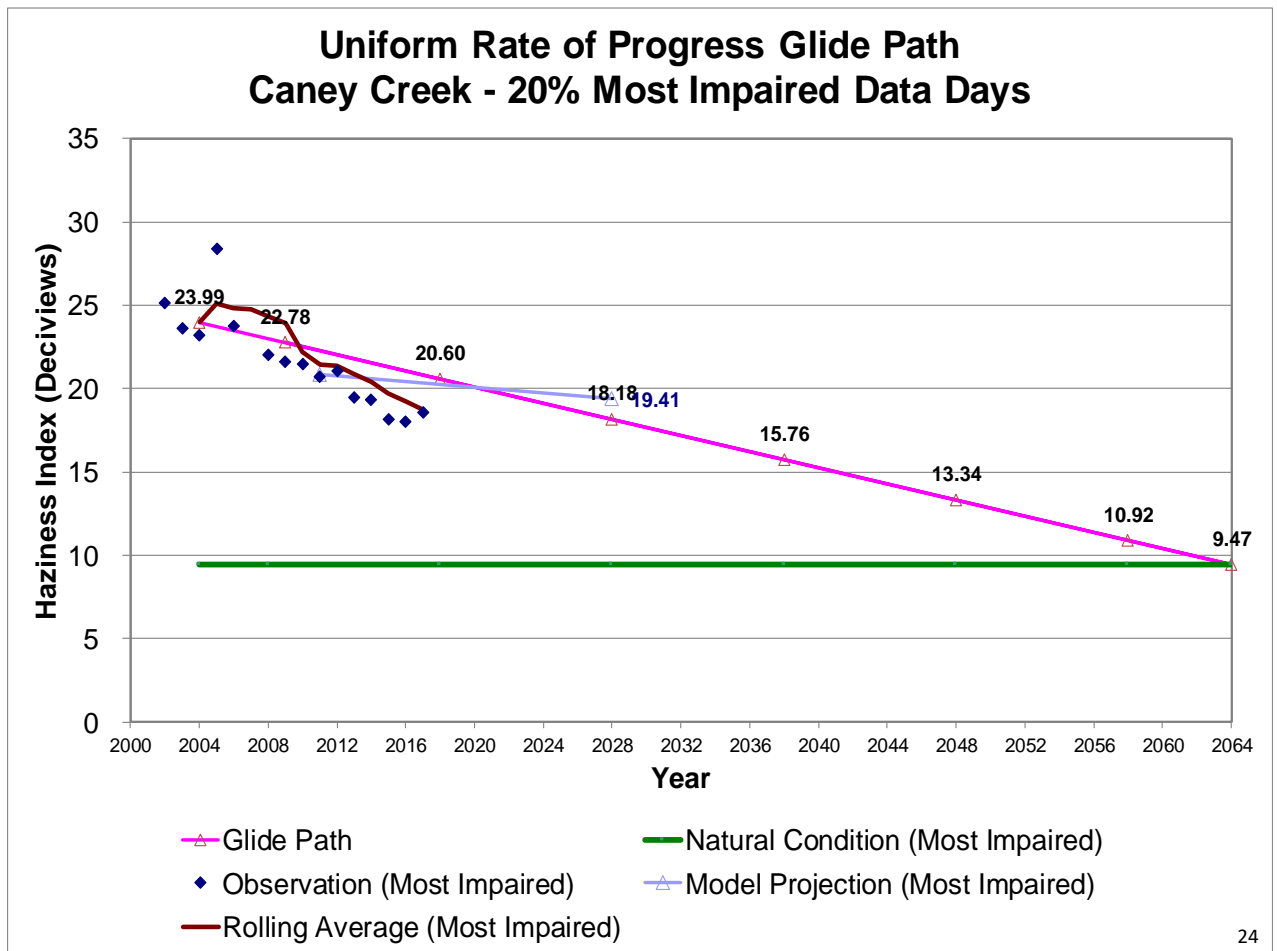






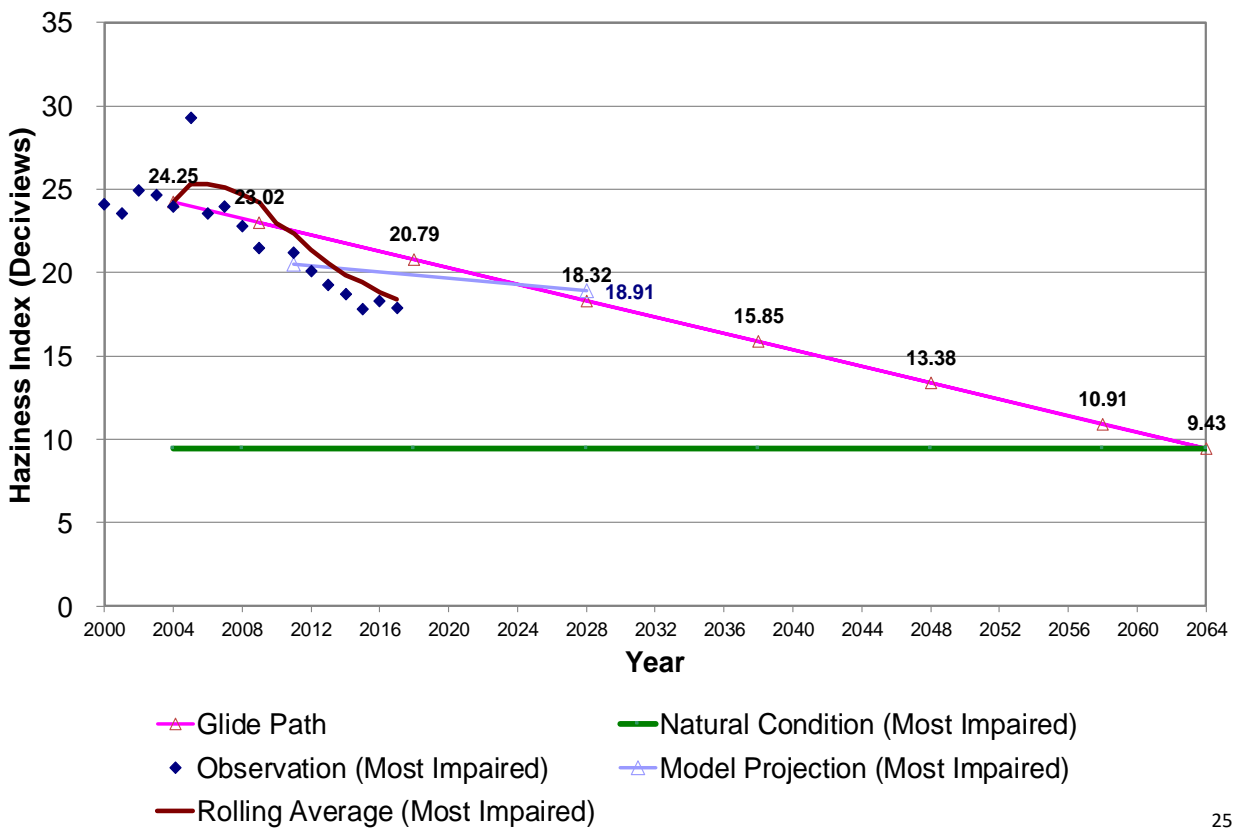


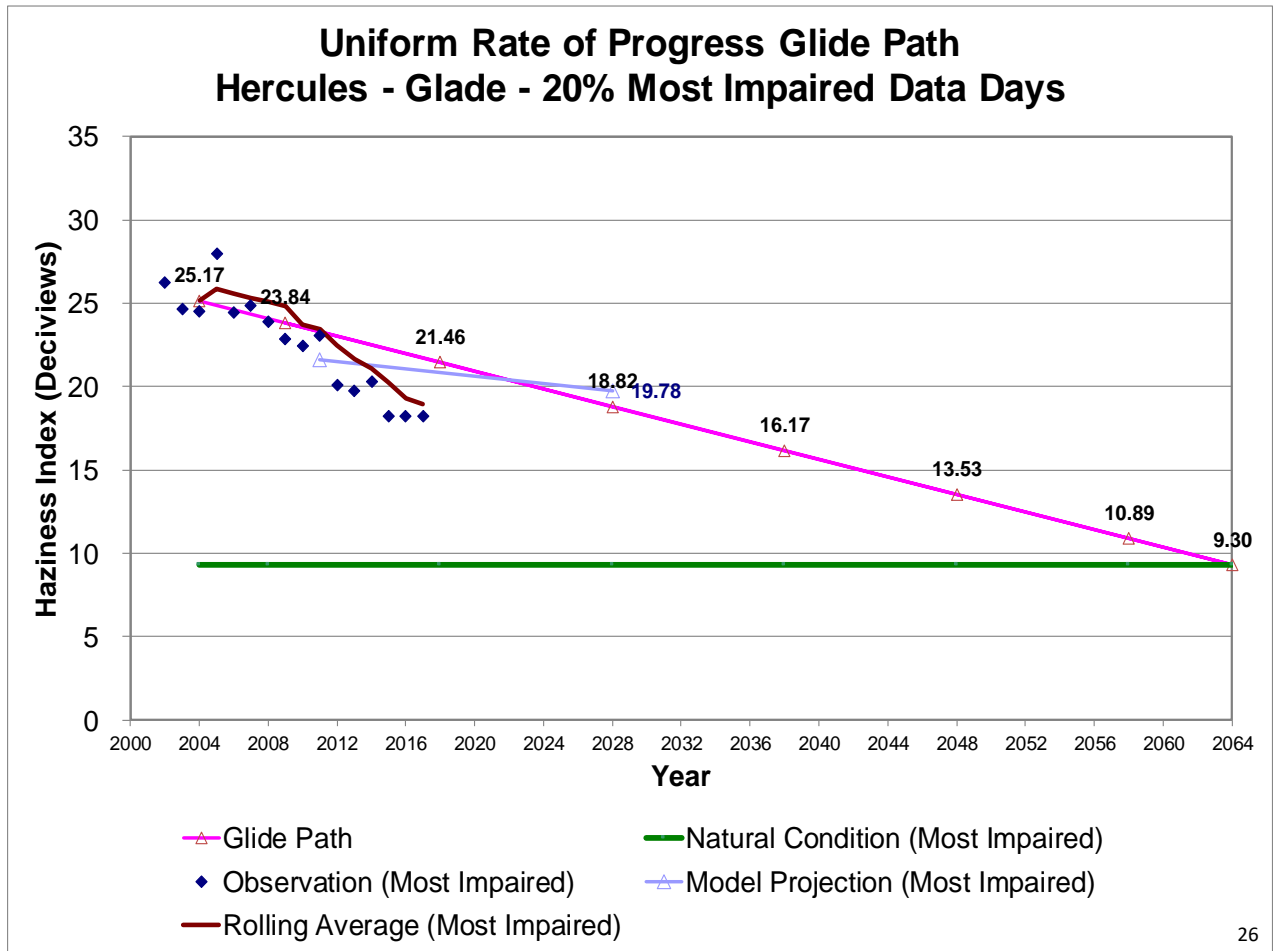


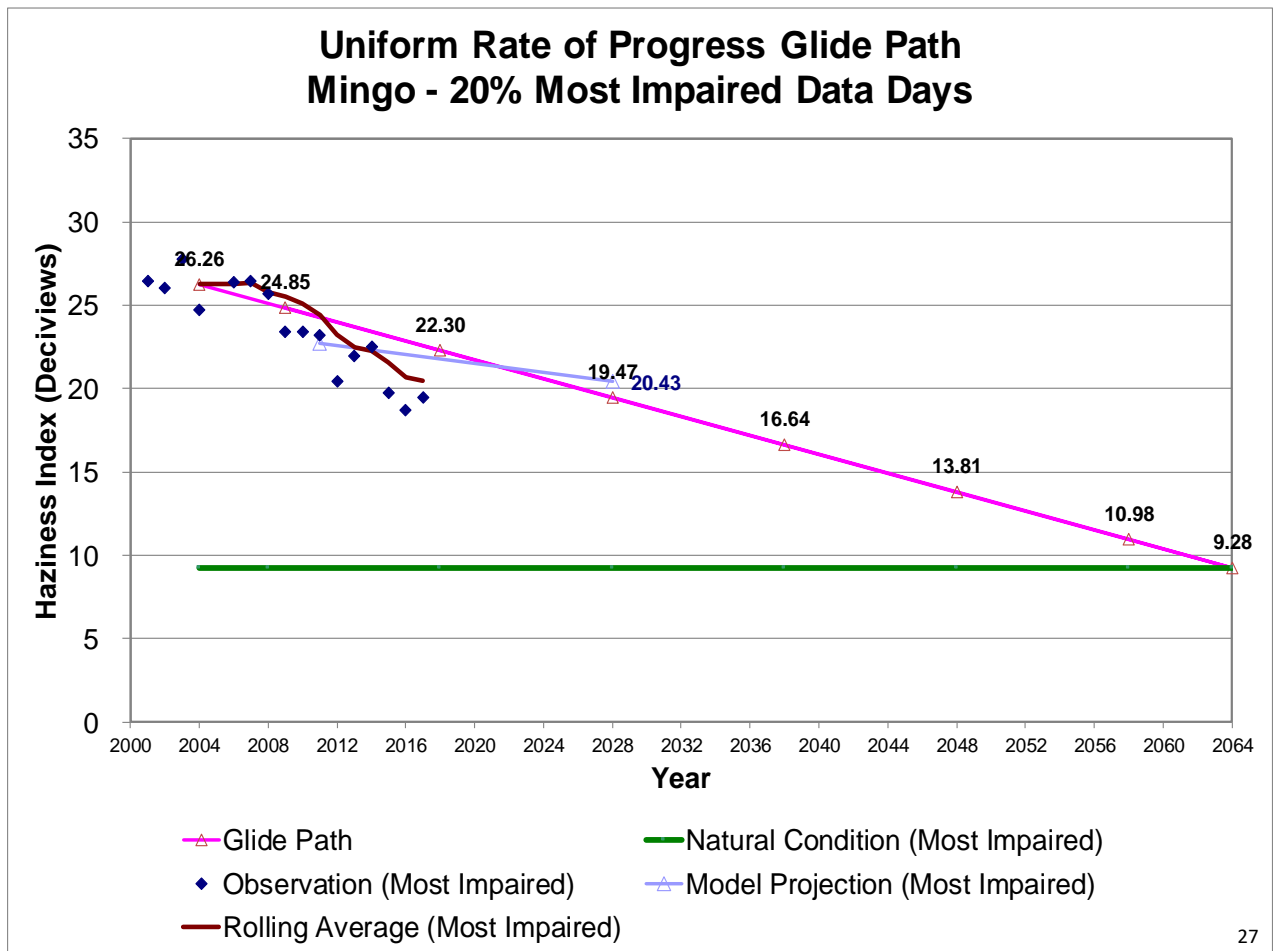


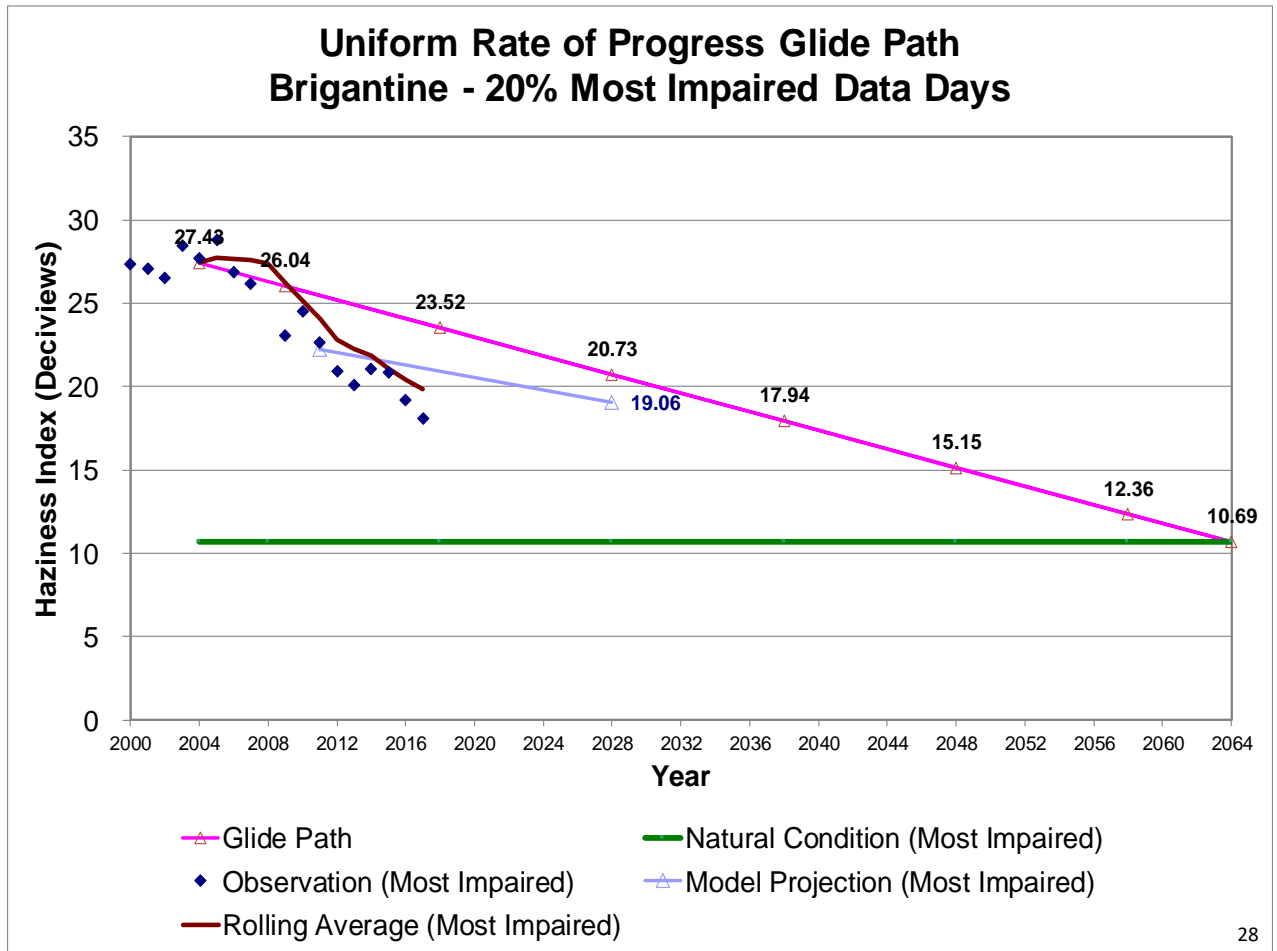


### Uniform Rate of Progress Glide Path Upper Buffalo - 20% Most Impaired Data Days



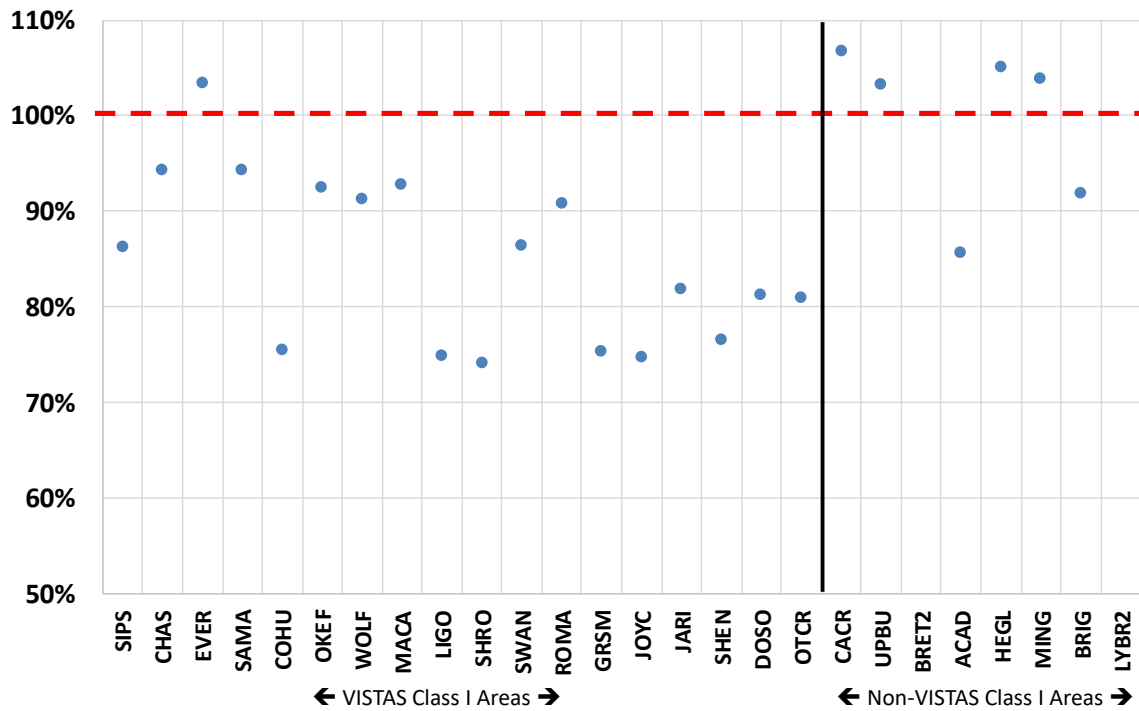






# Summary of 2028 Modeling Results

## Ratio of 2028 Model Results to 2028 Uniform Rate of Progress



# AOI RESULTS

## Area of Influence (AOI) Analysis

- Evaluates emissions (Q), distance to Class I area (d), and extinction weighted residence time (EWRT) in model grid cells (point) or counties (source categories)
- Formula:  $(Q/d)*EWRT$
- Establishes each county's and each facility's contribution to light extinction at each Class I area on the 20% most impaired days
- Can use contributions to rank and screen facilities for the 4-factor analysis

## AOI Source Categories for COHU

<b>SOURCE CATEGORY</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>2</sub></b>	<b>TOTAL</b>
NONPOINT	3.2%	5.1%	8.3%
NONROAD_MAR	3.4%	0.1%	3.5%
NONROAD_OTHER	2.5%	0.2%	2.7%
ONROAD	6.6%	0.6%	7.2%
POINT	8.1%	67.0%	75.1%
PT_FIRES_PRESCRIBED	0.5%	2.6%	3.2%
<b>TOTAL</b>	<b>24.3%</b>	<b>75.7%</b>	<b>100.0%</b>



## AOI Point Contributions for COHU

State	FACILITY NAME	DISTANCE (km)	NOx_2028 (tons/year)	SO2_2028 (tons/year)	NOx Contribution	SO2 Contribution
<b>GA</b>	<b>Ga Power Company - Plant Bowen</b>	<b>78.0</b>	<b>6,643.3</b>	<b>10,453.4</b>	<b>1.15%</b>	<b>19.58%</b>
IN	INDIANA MICHIGAN POWER DBA AEP ROCKPORT	410.1	8,806.8	30,536.3	0.13%	4.68%
<b>GA</b>	<b>International Paper – Rome</b>	<b>87.4</b>	<b>1,773.4</b>	<b>1,791.0</b>	<b>0.18%</b>	<b>4.66%</b>
IN	Gibson	487.1	12,280.3	23,117.2	0.10%	2.31%
IN	INDIANAPOLIS POWER & LIGHT PETERSBURG	477.0	10,665.3	18,141.9	0.16%	2.18%
KY	Tennessee Valley Authority (TVA) - Shawnee Fossil Plant	457.2	7,007.3	19,504.7	0.07%	2.18%
TN	TVA KINGSTON FOSSIL PLANT	124.0	1,687.4	1,886.1	0.13%	2.17%
OH	General James M. Gavin Power Plant (0627010056)	512.0	8,122.5	41,595.8	0.02%	1.71%
TN	TVA CUMBERLAND FOSSIL PLANT	327.0	4,916.5	8,427.3	0.09%	1.38%
KY	Big Rivers Electric Corp - Wilson Station	369.0	1,151.9	6,934.2	0.01%	1.07%
OH	Duke Energy Ohio, Wm. H. Zimmer Station (1413090154)	454.6	7,150.0	22,133.9	0.06%	1.05%
<b>GA</b>	<b>Ga Power Company - Plant Wansley</b>	<b>156.8</b>	<b>2,052.5</b>	<b>4,856.0</b>	<b>0.04%</b>	<b>1.05%</b>
KY	KY Utilities Co - Ghent Station	441.5	7,939.9	10,169.3	0.08%	1.05%
IL	Joppa Steam	466.9	4,706.3	20,509.3	0.02%	1.04%
<b>GA</b>	<b>Mohawk Industries Inc</b>	<b>32.0</b>	<b>66.5</b>	<b>77.1</b>	<b>0.07%</b>	<b>1.02%</b>
TN	EASTMAN CHEMICAL COMPANY	269.8	6,900.3	6,420.2	0.09%	0.99%
MO	AMEREN MISSOURI-LABADIE PLANT	695.4	9,685.5	41,740.3	0.01%	0.96%
IL	Newton	564.0	1,934.9	10,631.6	0.01%	0.91%
<b>GA</b>	<b>Chemical Products Corporation</b>	<b>71.9</b>	<b>19.5</b>	<b>513.8</b>	<b>0.00%</b>	<b>0.89%</b>
IN	INDIANA KENTUCKY ELECTRIC CORPORATION	444.4	6,188.5	9,038.1	0.04%	0.76%

# PSAT RESULTS

## Source Apportionment Modeling

- Quantifies visibility impacts from individual point sources, source sectors, and geographic regions
- NO<sub>x</sub> and SO<sub>2</sub> tagging
- Used for further evaluation of AOI results
- Refines information on contributions to visibility impairment
- Can be used to adjust future year visibility projections to account for additional emission controls
- VISTAS contract with ERG allows for up to 250 tags

## PSAT SO<sub>2</sub> and NO<sub>x</sub> Tags (209)

### **Round 1 (122 tags)**

- Total SO<sub>2</sub> tags for 10 individual VISTAS states + 3 MJOs = 13 tags
- Total NO<sub>x</sub> tags for 10 individual VISTAS states + 3 MJOs = 13 tags
- EGU point SO<sub>2</sub> tags for 10 individual VISTAS states + 3 MJOs = 13 tags
- EGU point NO<sub>x</sub> tags for 10 individual VISTAS states + 3 MJOs = 13 tags
- SO<sub>2</sub> tags for individual VISTAS facilities = 50 tags
- NO<sub>x</sub> tags for individual VISTAS facilities = 20 tags

### **Round 2 (87 tags)**

- Non-EGU point SO<sub>2</sub> for 10 individual VISTAS states + 3 MJOs = 13 tags
- Non-EGU point NO<sub>x</sub> for 10 individual VISTAS states + 3 MJOs = 13 tags
- SO<sub>2</sub> and NO<sub>x</sub> for N/S/W/E boundaries = 8 tags
- SO<sub>2</sub> tags for individual VISTAS facilities = 10 tags
- NO<sub>x</sub> tags for individual VISTAS facilities = 16 tags
- SO<sub>2</sub> tags for individual non-VISTAS facilities = 17 tags
- NO<sub>x</sub> tags for individual non-VISTAS facilities = 10 tags

## VISTAS Round 1 Facility Tags

Facility State	Facility RPO	FACILITY_ID_STD	FACILITY_NAME_STD	NOx Tag	SO2 Tag
AL	VISTAS	01053-7440211	Escambia Operating Company LLC		1
AL	VISTAS	01053-985111	Escambia Operating Company LLC		1
AL	VISTAS	01073-1018711	DRUMMOND COMPANY, INC.		1
AL	VISTAS	01097-1056111	Ala Power - Barry		1
AL	VISTAS	01097-1061611	Union Oil of California - Chunchula Gas Plant		1
AL	VISTAS	01097-949811	Akzo Nobel Chemicals Inc		1
AL	VISTAS	01103-1000011	Nucor Steel Decatur LLC		1
AL	VISTAS	01109-985711	Sanders Lead Co		1
FL	VISTAS	12005-535411	ROCKTENN CP LLC		1
FL	VISTAS	12017-640611	DUKE ENERGY FLORIDA, INC. (DEF)	1	1
FL	VISTAS	12031-640211	JEA		1
FL	VISTAS	12033-752711	GULF POWER - Crist		1
FL	VISTAS	12047-769711	WHITE SPRINGS AGRICULTURAL CHEMICALS,INC		1
FL	VISTAS	12057-538611	TAMPA ELECTRIC COMPANY (TEC)		1
FL	VISTAS	12057-716411	MOSAIC FERTILIZER, LLC		1
FL	VISTAS	12089-753711	ROCK TENN CP, LLC	1	1
FL	VISTAS	12089-845811	RAYONIER PERFORMANCE FIBERS LLC	1	
FL	VISTAS	12105-717711	MOSAIC FERTILIZER LLC		1
FL	VISTAS	12105-919811	MOSAIC FERTILIZER, LLC		1
FL	VISTAS	12123-752411	BUCKEYE FLORIDA, LIMITED PARTNERSHIP		1

## VISTAS Round 1 Facility Tags

Facility State	Facility RPO	FACILITY_ID_STD	FACILITY_NAME_STD	NOx Tag	SO2 Tag
GA	VISTAS	13015-2813011	Ga Power Company - Plant Bowen		1
GA	VISTAS	13051-3679811	International Paper - Savannah		1
GA	VISTAS	13127-3721011	Brunswick Cellulose Inc		1
KY	VISTAS	21091-7352411	Century Aluminum of KY LLC		1
KY	VISTAS	21145-6037011	Tennessee Valley Authority (TVA) - Shawnee Fossil Plant		1
KY	VISTAS	21177-5196711	Tennessee Valley Authority - Paradise Fossil Plant		1
KY	VISTAS	21183-5561611	Big Rivers Electric Corp - Wilson Station		1
NC	VISTAS	37013-8479311	PCS Phosphate Company, Inc. - Aurora		1
NC	VISTAS	37087-7920511	Blue Ridge Paper Products - Canton Mill		1
SC	VISTAS	45015-4834911	ALUMAX OF SOUTH CAROLINA		1
SC	VISTAS	45019-4973611	KAPSTONE CHARLESTON KRAFT LLC	1	1
SC	VISTAS	45043-5698611	INTERNATIONAL PAPER GEORGETOWN MILL		1
TN	VISTAS	47001-6196011	TVA BULL RUN FOSSIL PLANT	1	1
TN	VISTAS	47093-4979911	Cemex - Knoxville Plant	1	1
TN	VISTAS	47105-4129211	TATE & LYLE, Loudon	1	1
TN	VISTAS	47145-4979111	TVA KINGSTON FOSSIL PLANT		1
TN	VISTAS	47161-4979311	TVA CUMBERLAND FOSSIL PLANT		1
TN	VISTAS	47163-3982311	EASTMAN CHEMICAL COMPANY		1

## VISTAS Round 1 Facility Tags

Facility State	Facility RPO	FACILITY_ID_STD	FACILITY_NAME_STD	NOx Tag	SO2 Tag
VA	VISTAS	51023-5039811	Roanoke Cement Company		1
VA	VISTAS	51027-4034811	Jewell Coke Company LLP		1
VA	VISTAS	51580-5798711	Meadwestvaco Packaging Resource Group		1
WV	VISTAS	54023-6257011	Dominion Resources, Inc. - MOUNT STORM POWER STATION	1	1
WV	VISTAS	54033-6271711	ALLEGHENY ENERGY SUPPLY CO, LLC-HARRISON	1	1
WV	VISTAS	54041-6900311	EQUITRANS - COPLEY RUN CS 70	1	
WV	VISTAS	54049-4864511	AMERICAN BITUMINOUS POWER-GRANT TOWN PLT	1	1
WV	VISTAS	54051-6902311	MITCHELL PLANT	1	1
WV	VISTAS	54061-16320111	LONGVIEW POWER	1	1
WV	VISTAS	54061-6773611	MONONGAHELA POWER CO.- FORT MARTIN POWER	1	1
WV	VISTAS	54061-6773811	MORGANTOWN ENERGY ASSOCIATES	1	1
WV	VISTAS	54073-4782811	MONONGAHELA POWER CO-PLEASANTS POWER STA	1	1
WV	VISTAS	54079-6789111	APPALACHIAN POWER COMPANY - JOHN E AMOS PLANT	1	1
WV	VISTAS	54083-6790511	GLADY 6C4350	1	
WV	VISTAS	54083-6790711	FILES CREEK 6C4340	1	
WV	VISTAS	54093-6327811	KINGSFORD MANUFACTURING COMPANY	1	1

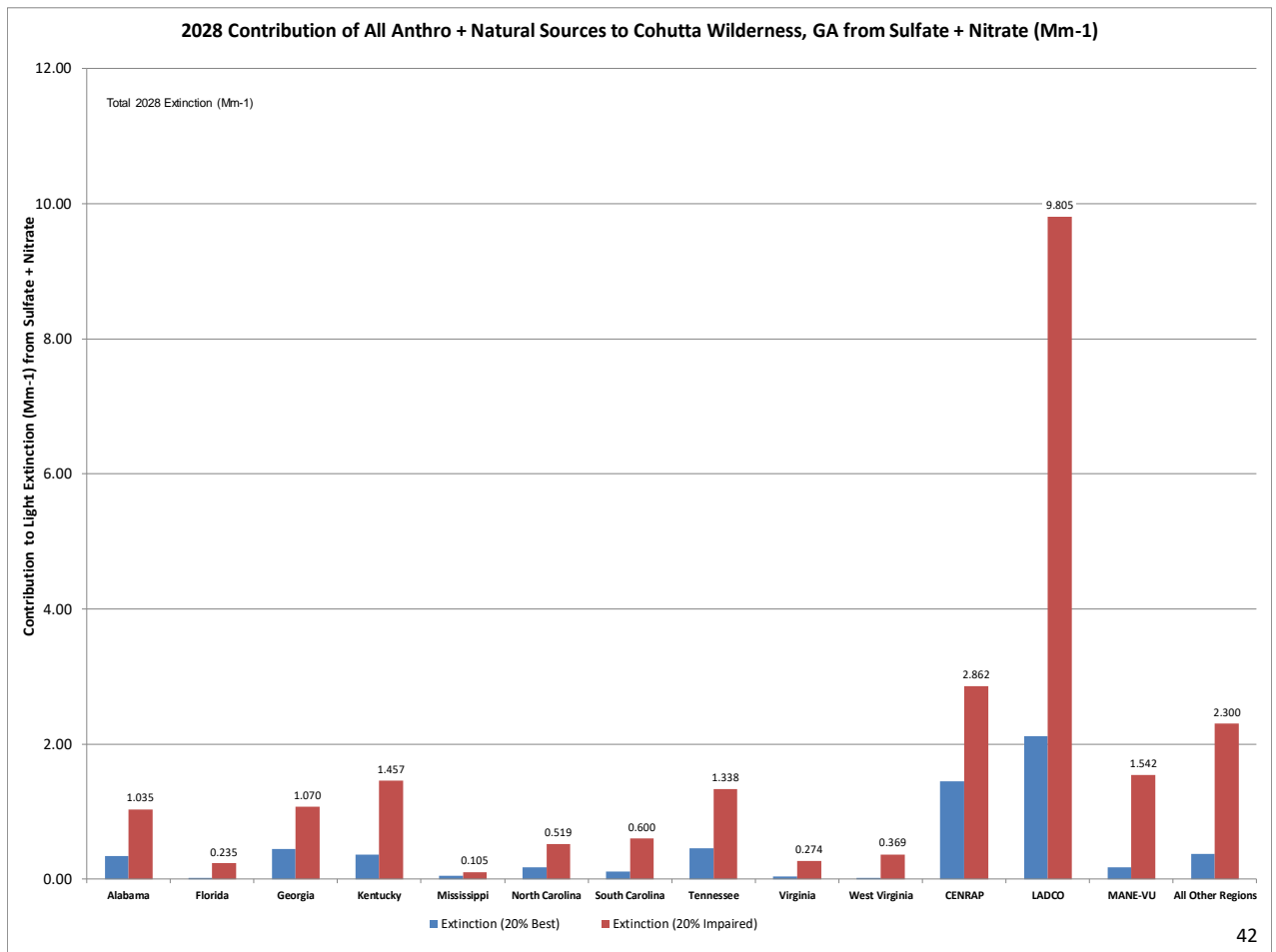
## VISTAS Round 2 Facility Tags

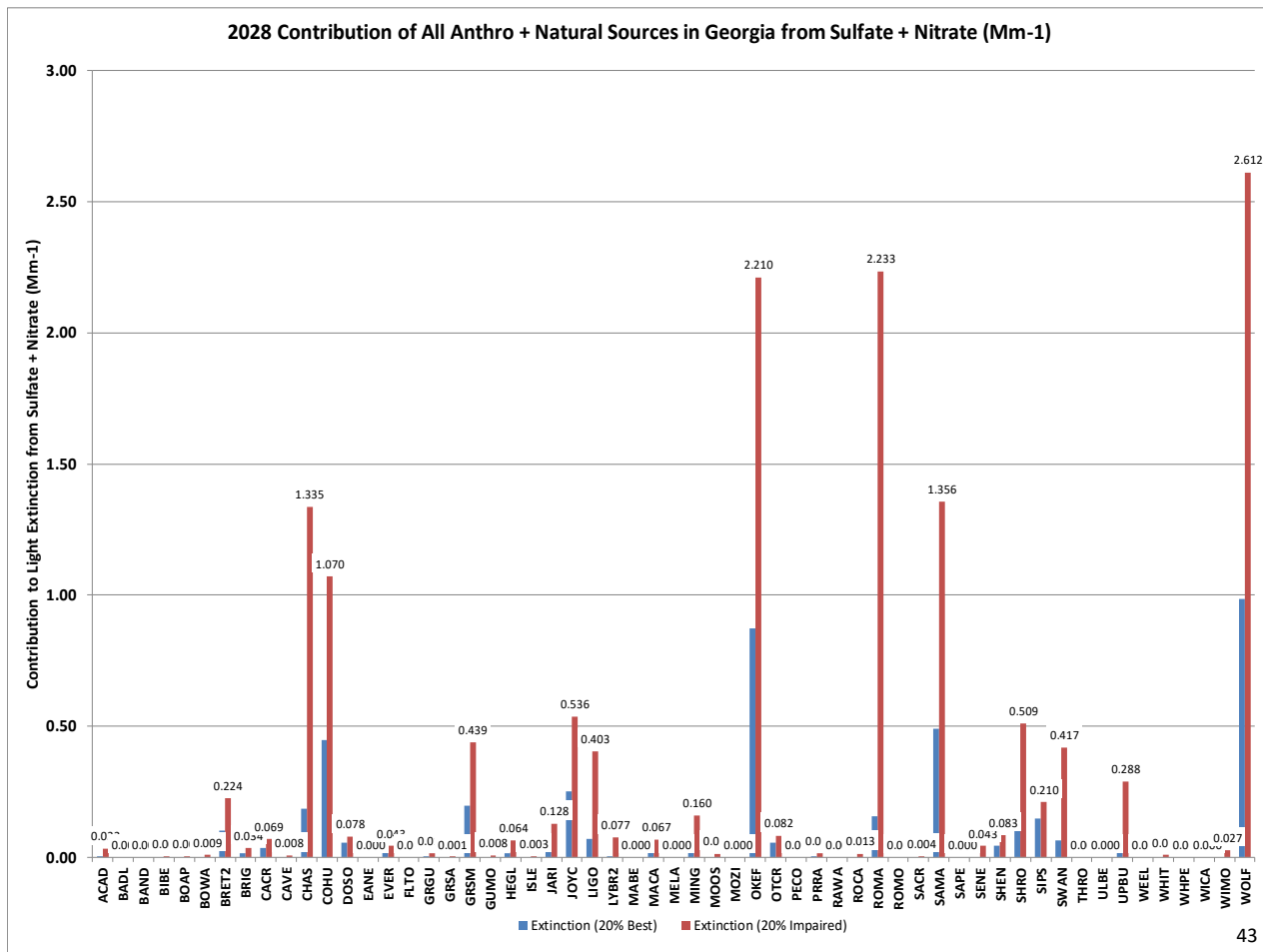
Facility State	Facility RPO	FACILITY_ID_STD	FACILITY_NAME_STD	NOx Tag	SO2 Tag
AL	VISTAS	01129-1028711	American Midstream Chatom, LLC		1
FL	VISTAS	12123-752411	BUCKEYE FLORIDA, LIMITED PARTNERSHIP	1	
FL	VISTAS	12086-900111	CEMEX CONSTRUCTION MATERIALS FL. LLC.	1	
FL	VISTAS	12086-900011	FLORIDA POWER & LIGHT (PTF)	1	
FL	VISTAS	12086-3532711	HOMESTEAD CITY UTILITIES	1	
FL	VISTAS	12129-2731711	TALLAHASSEE CITY PURDOM GENERATING STA.	1	
FL	VISTAS	12086-899911	TARMAC AMERICA LLC	1	
GA	VISTAS	13127-3721011	Brunswick Cellulose Inc	1	
GA	VISTAS	13103-536311	Georgia-Pacific Consumer Products LP (Savannah River Mill)		1
GA	VISTAS	13115-539311	International Paper – Rome		1
MS	VISTAS	28059-8384311	Chevron Products Company, Pascagoula Refinery	1	1
MS	VISTAS	28059-6251011	Mississippi Power Company, Plant Victor J Daniel	1	
NC	VISTAS	37087-7920511	Blue Ridge Paper Products - Canton Mill	1	
NC	VISTAS	37117-8049311	Domtar Paper Company, LLC	1	1
NC	VISTAS	37035-8370411	Duke Energy Carolinas, LLC - Marshall Steam Station	1	1
NC	VISTAS	37013-8479311	PCS Phosphate Company, Inc. - Aurora	1	
NC	VISTAS	37023-8513011	SGL Carbon LLC		1
SC	VISTAS	45015-4120411	SANTEE COOPER CROSS GENERATING STATION		1
SC	VISTAS	45043-6652811	SANTEE COOPER WINYAH GENERATING STATION		1
SC	VISTAS	45015-8306711	SCE&G WILLIAMS		1
VA	VISTAS	51027-4034811	Jewell Coke Company LLP	1	
VA	VISTAS	51580-5798711	Meadwestvaco Packaging Resource Group	1	
VA	VISTAS	51023-5039811	Roanoke Cement Company	1	

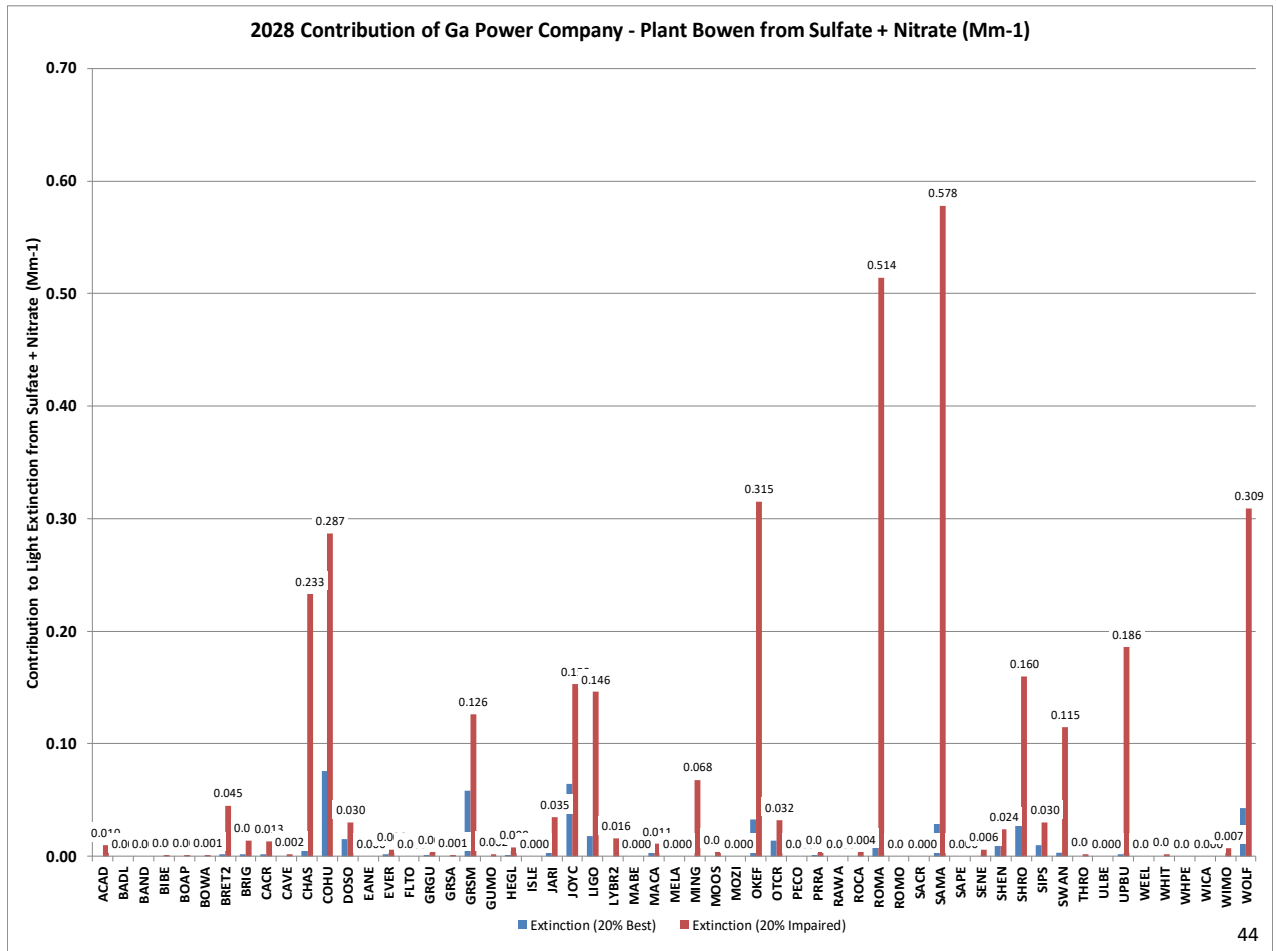


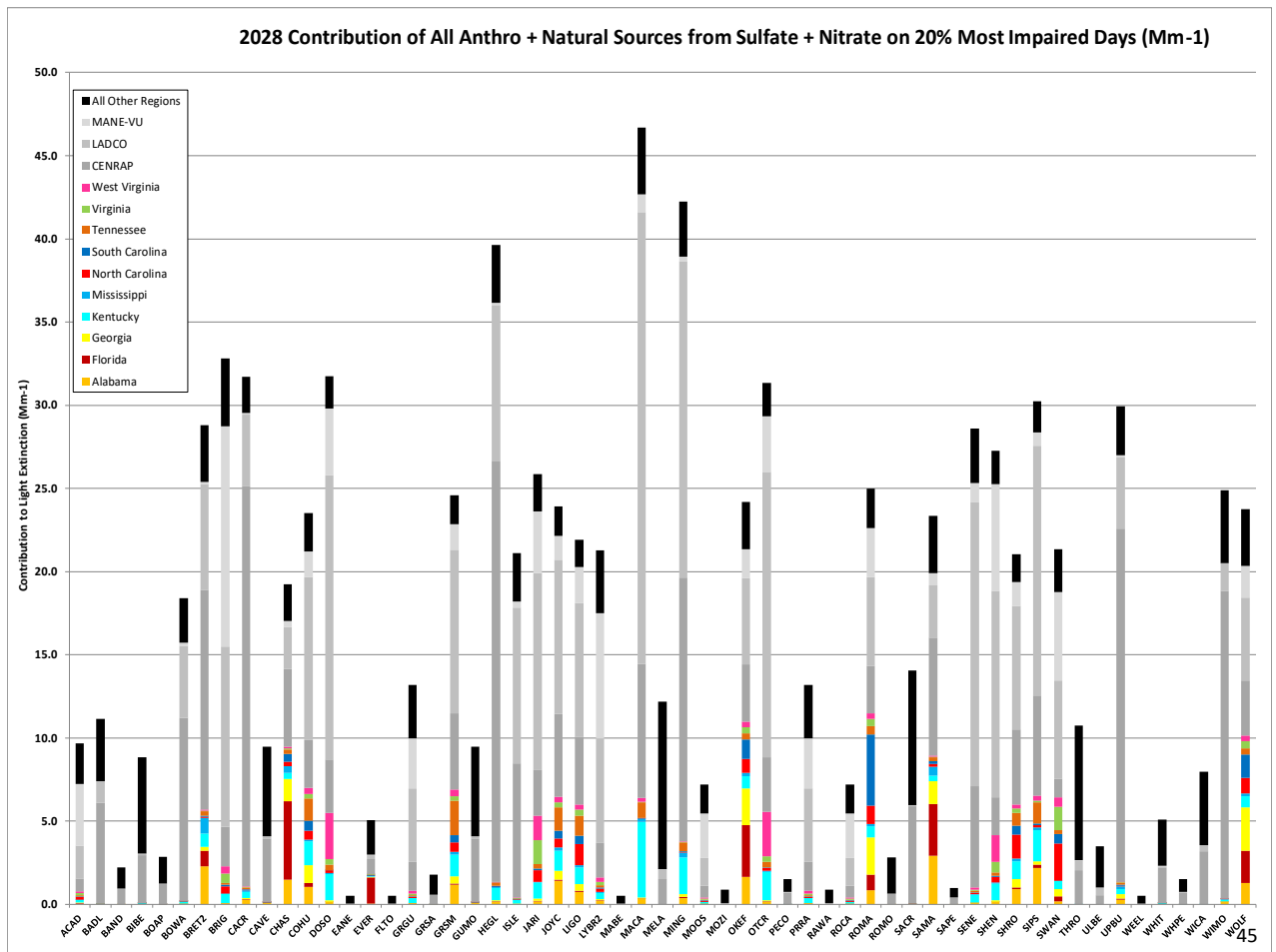
## Non-VISTAS Round 2 Facility Tags

Facility State	Facility RPO	FACILITY_ID_STD	FACILITY_NAME_STD	NOx Tag	SO2 Tag
AR	CENRAP	05063-1083411	ENTERGY ARKANSAS INC-INDEPENDENCE PLANT		1
MO	CENRAP	29143-5363811	NEW MADRID POWER PLANT-MARSTON		1
MD	MANE-VU	24001-7763811	Luke Paper Company	1	1
PA	MANE-VU	42005-3866111	GENON NE MGMT CO/KEYSTONE STA	1	1
PA	MANE-VU	42063-3005211	HOMER CITY GEN LP/ CENTER TWP	1	1
PA	MANE-VU	42063-3005111	NRG WHOLESALE GEN/SEWARD GEN STA	1	1
IL	LADCO	17127-7808911	Joppa Steam		1
IN	LADCO	18173-8183111	Alcoa Warrick Power Plt Agc Div of AL		1
IN	LADCO	18051-7363111	Gibson		1
IN	LADCO	18147-8017211	INDIANA MICHIGAN POWER DBA AEP ROCKPORT	1	1
IN	LADCO	18125-7362411	INDIANAPOLIS POWER & LIGHT PETERSBURG		1
IN	LADCO	18129-8166111	Sigeco AB Brown South Indiana Gas & Ele		1
OH	LADCO	39081-8115711	Cardinal Power Plant (Cardinal Operating Company) (0641050002)	1	1
OH	LADCO	39031-8010811	Conesville Power Plant (0616000000)	1	1
OH	LADCO	39025-8294311	Duke Energy Ohio, Wm. H. Zimmer Station (1413090154)	1	1
OH	LADCO	39053-8148511	General James M. Gavin Power Plant (0627010056)	1	1
OH	LADCO	39053-7983011	Ohio Valley Electric Corp., Kyger Creek Station (0627000003)	1	1

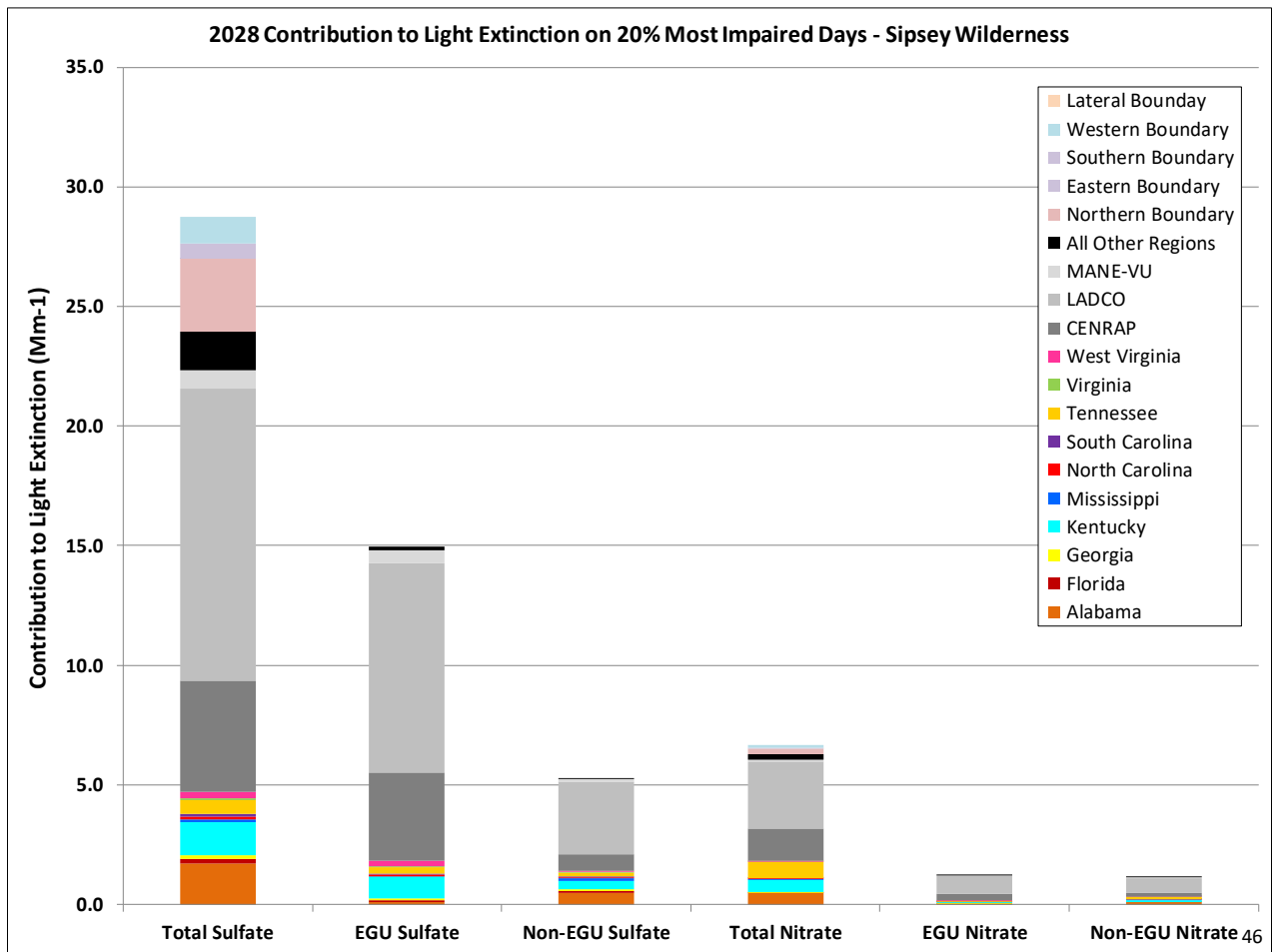


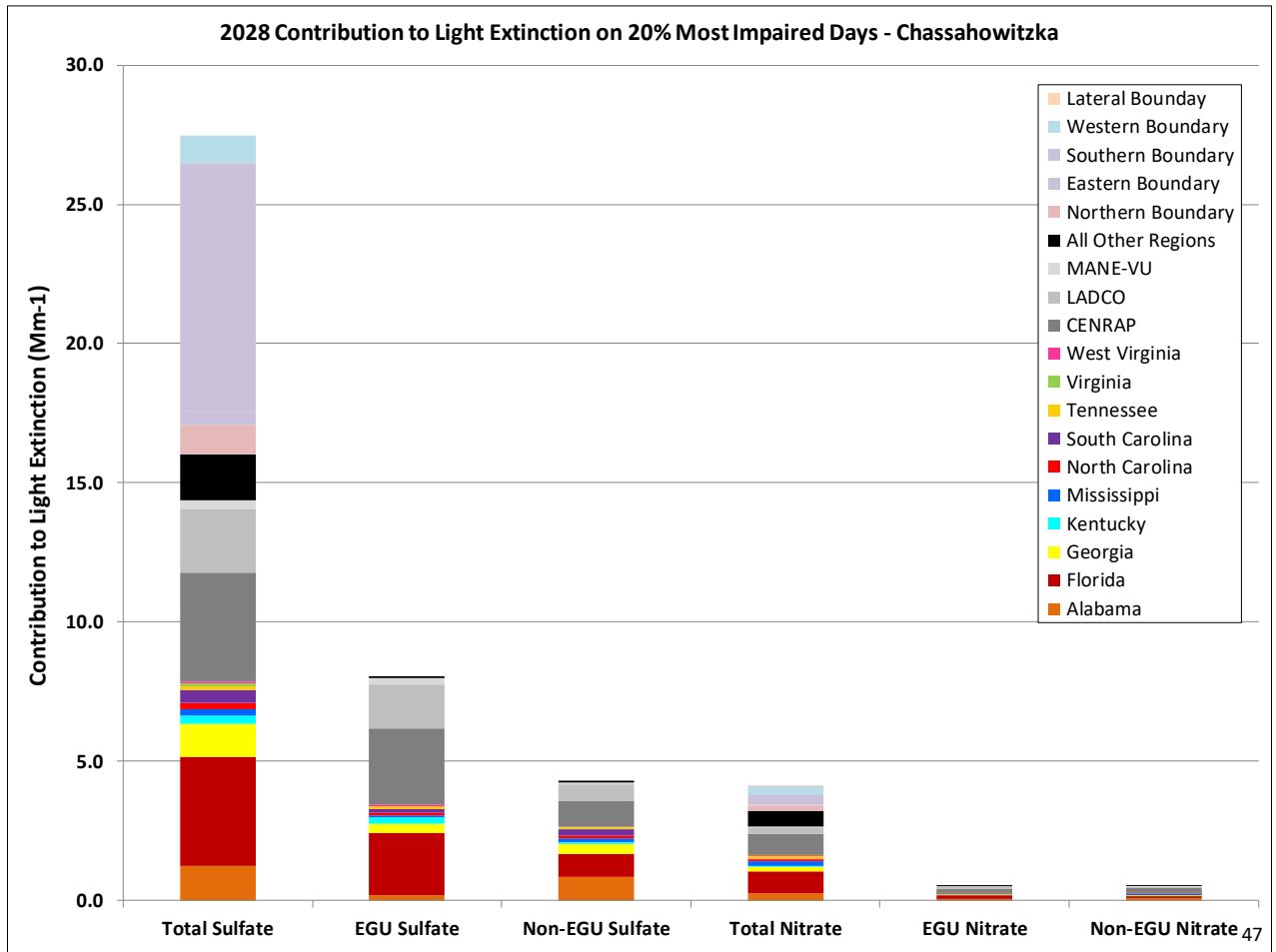


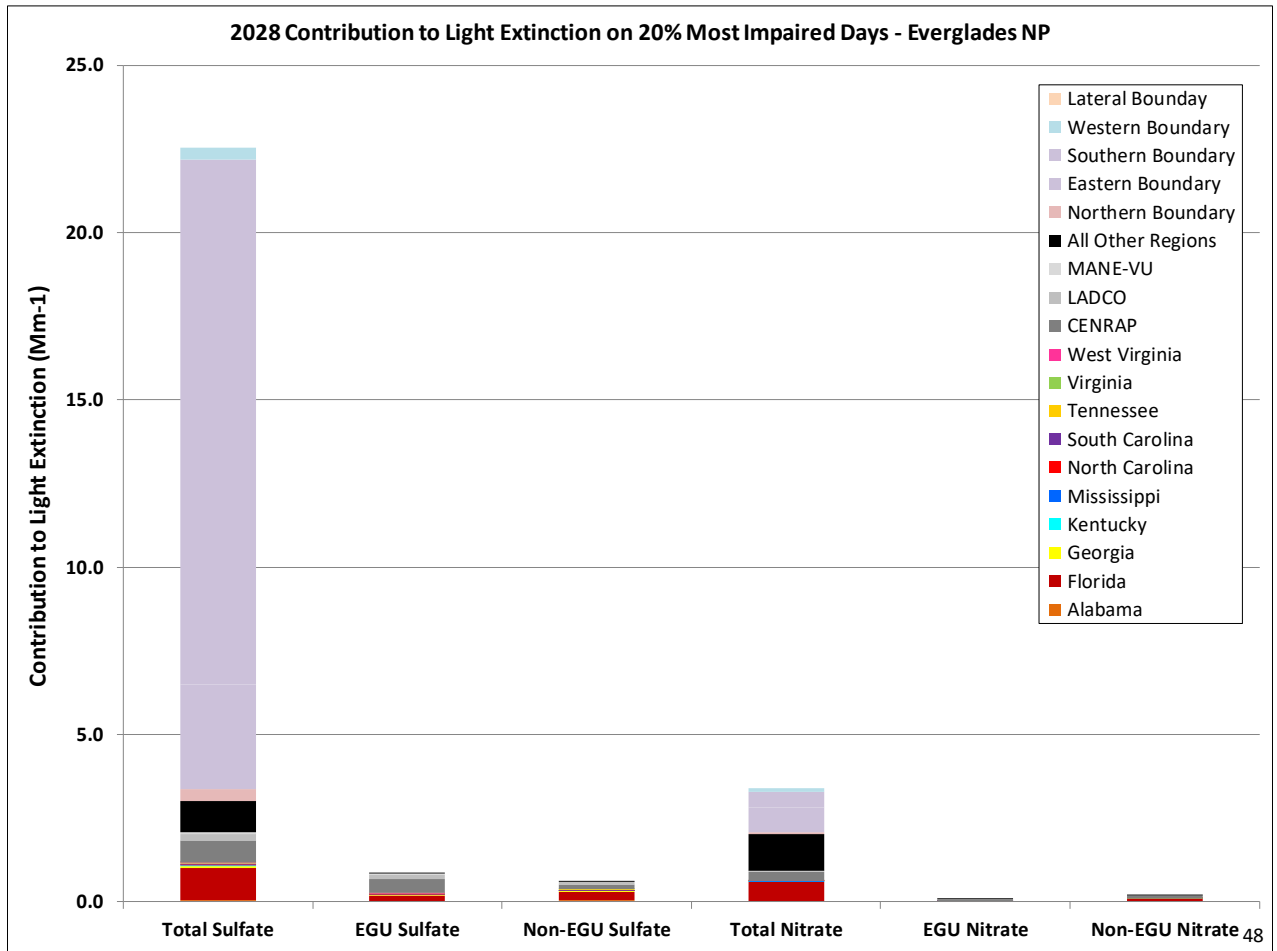




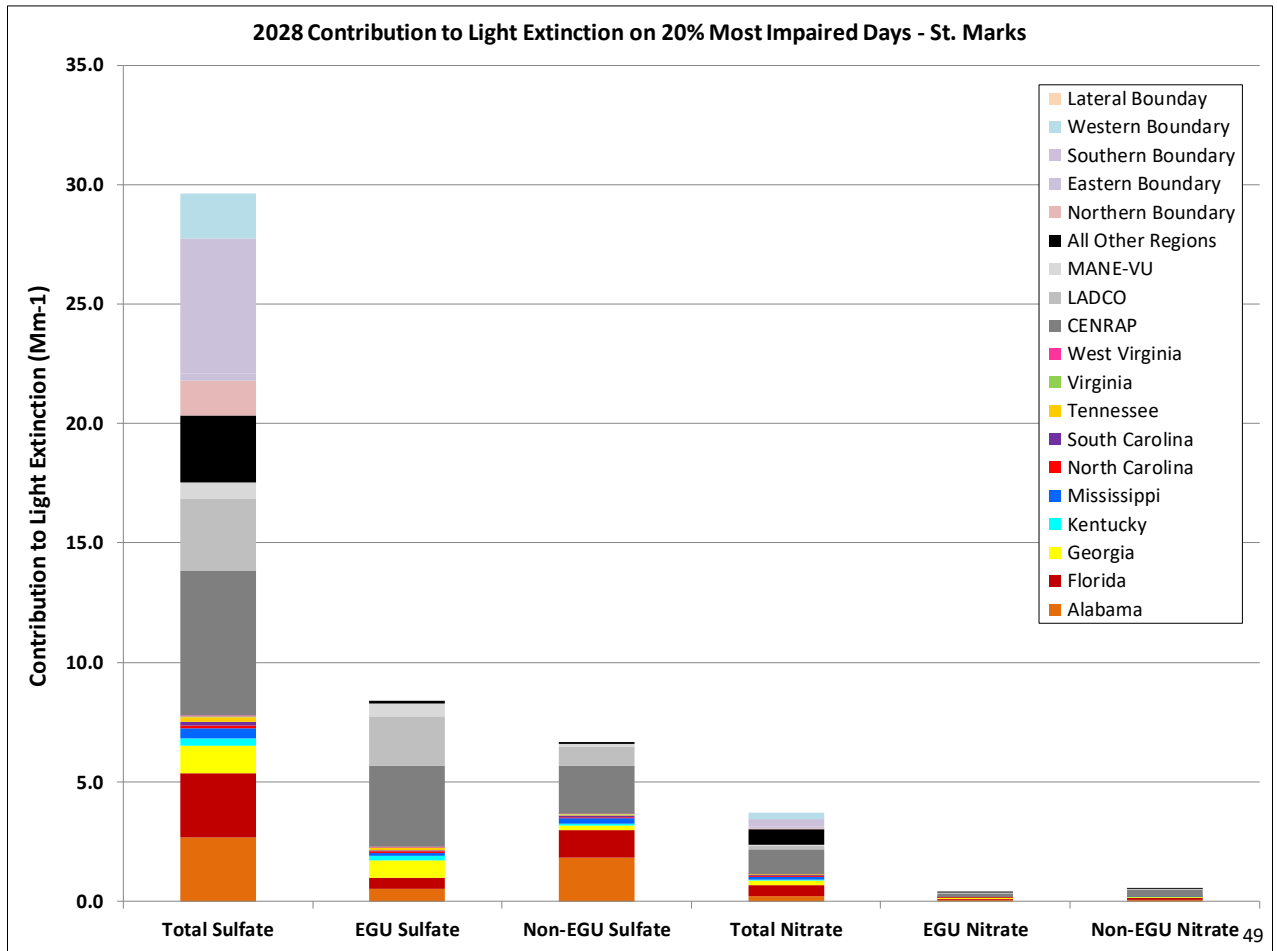
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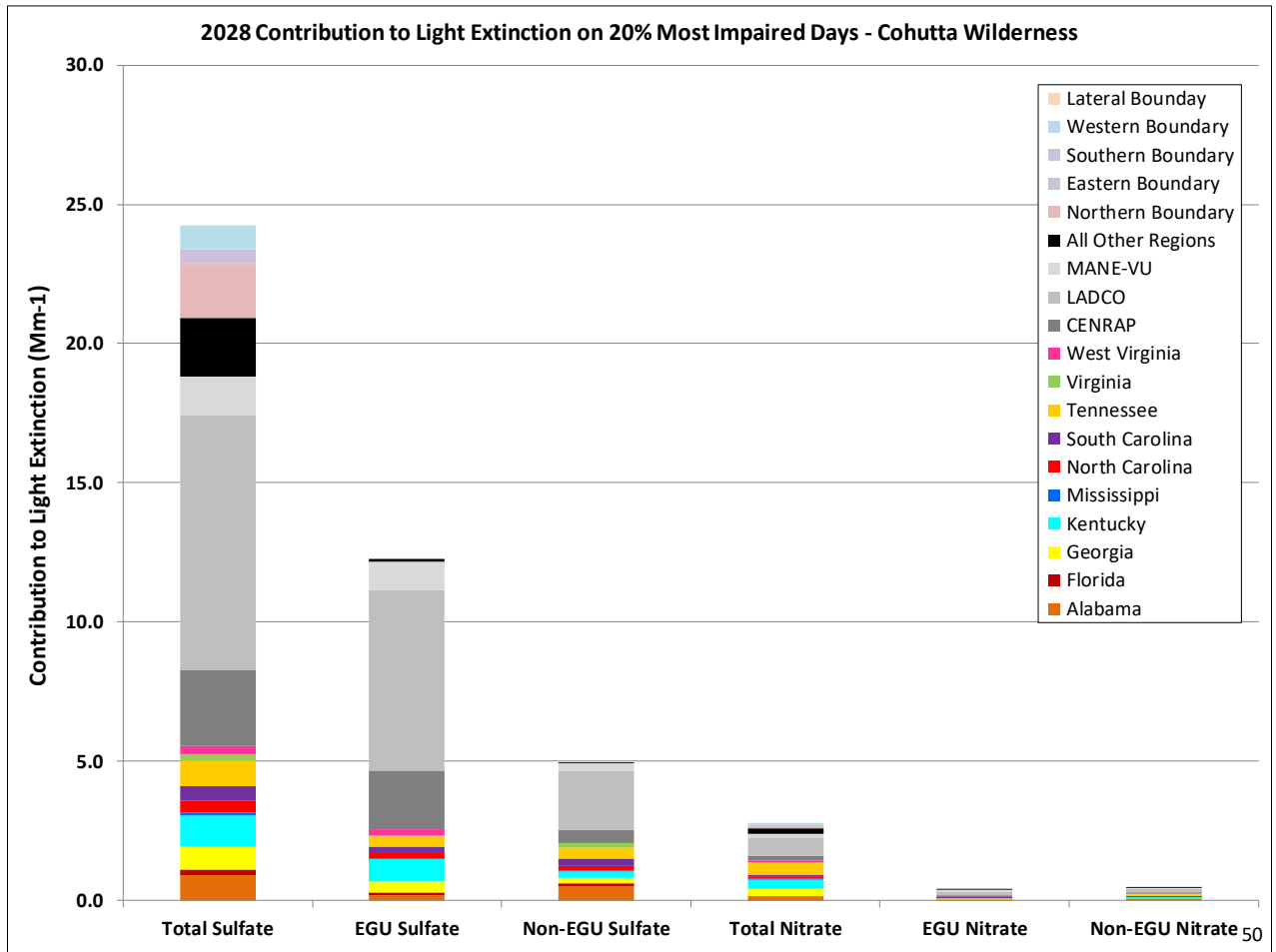


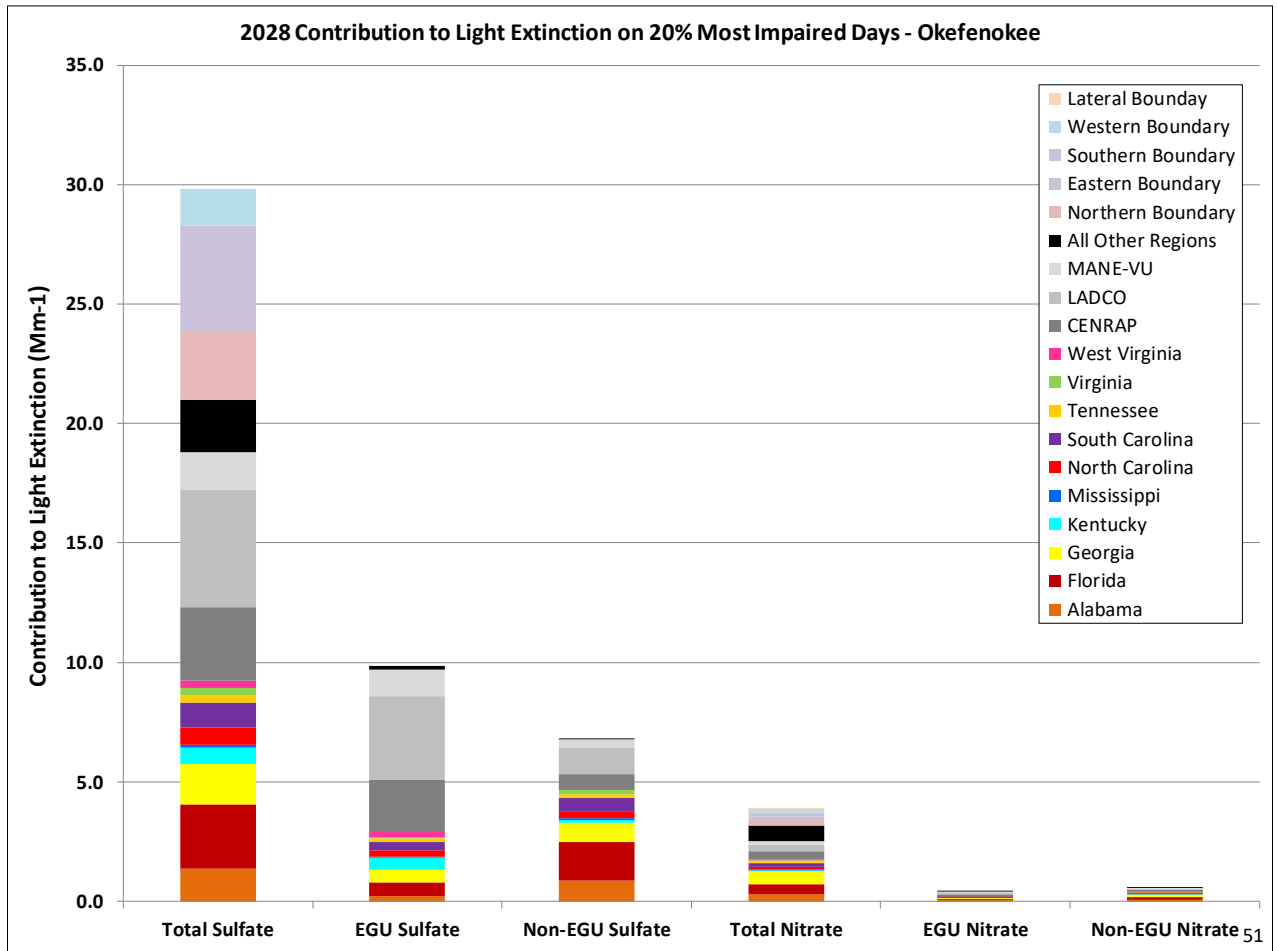




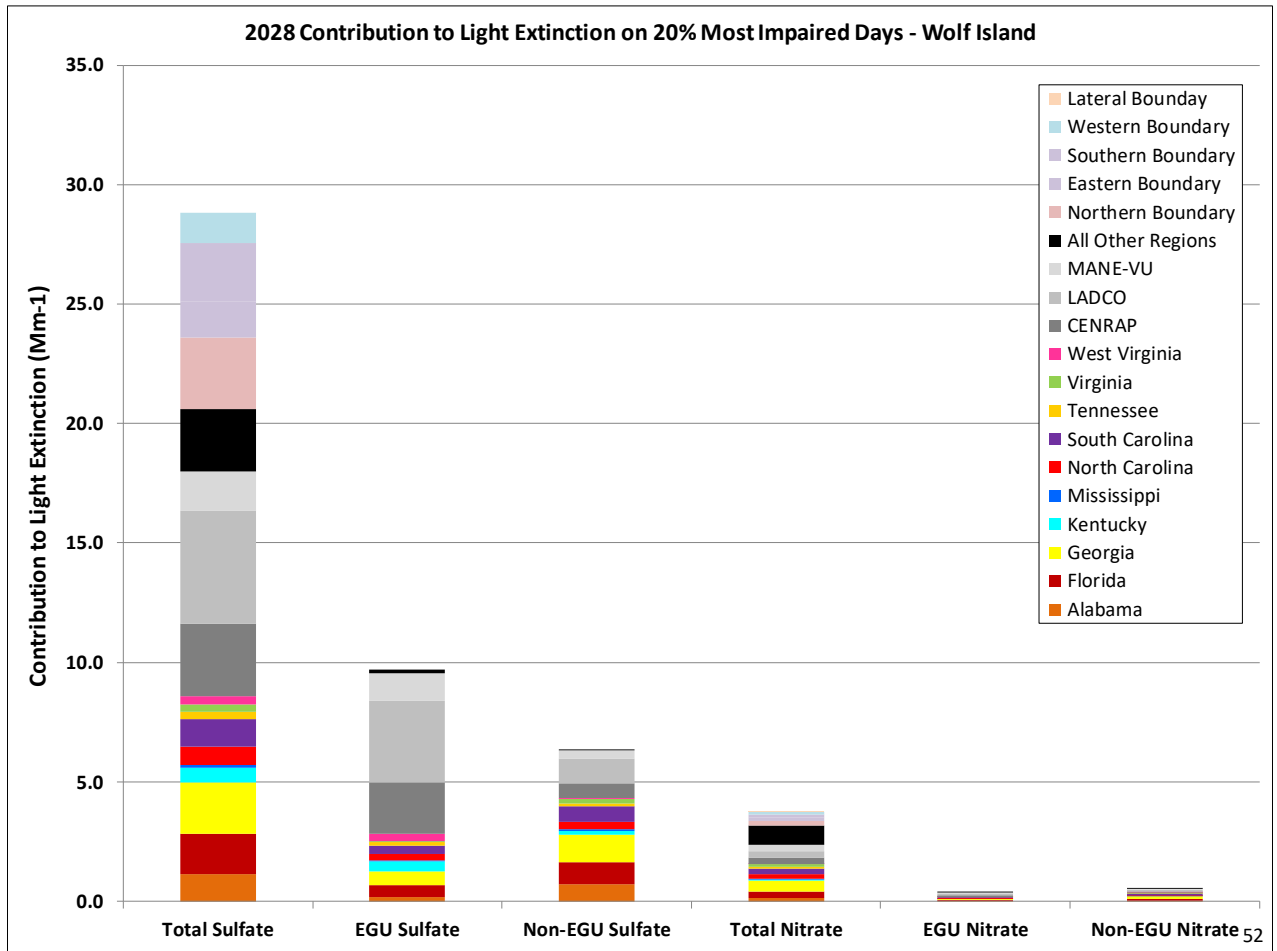


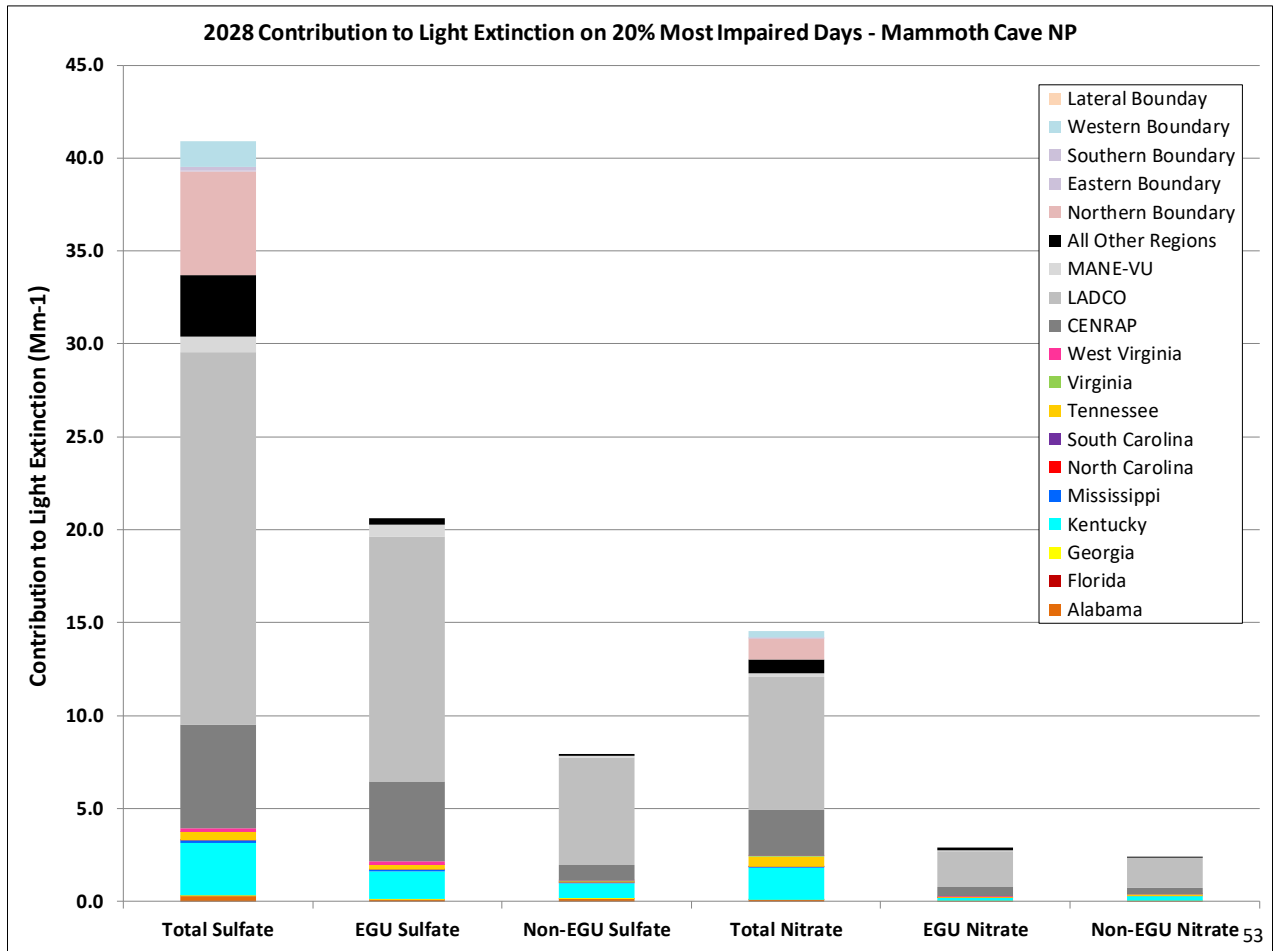


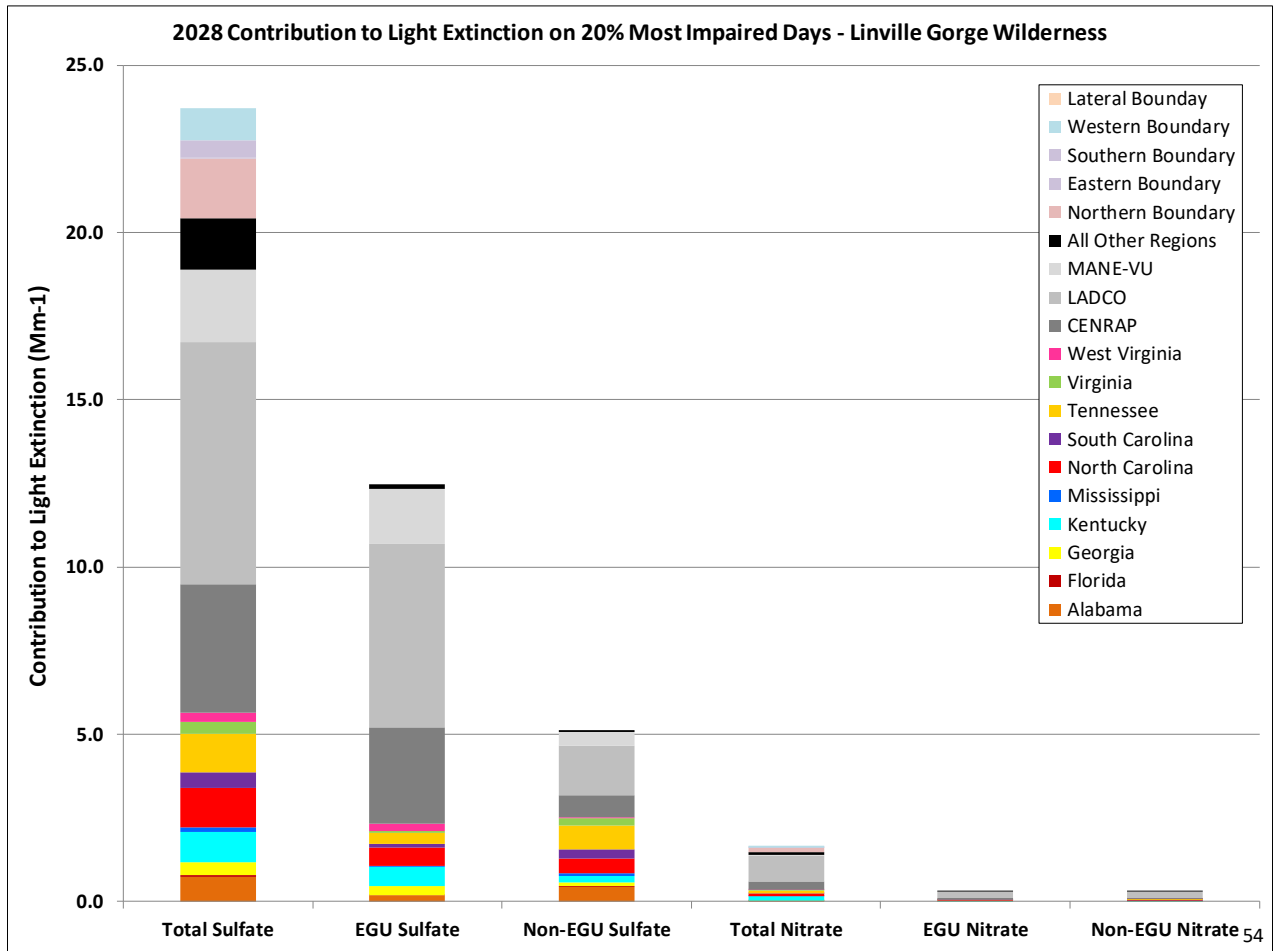


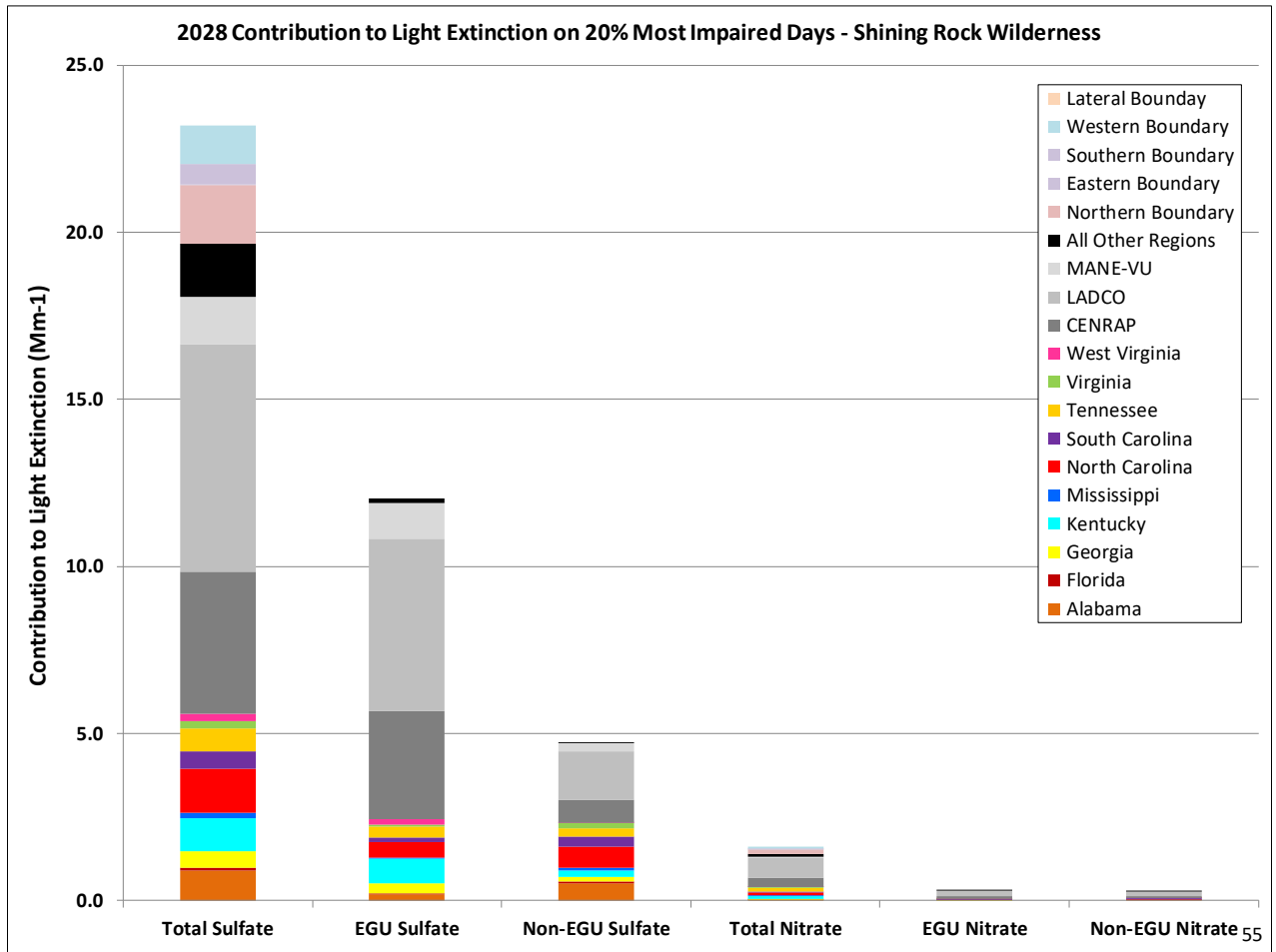


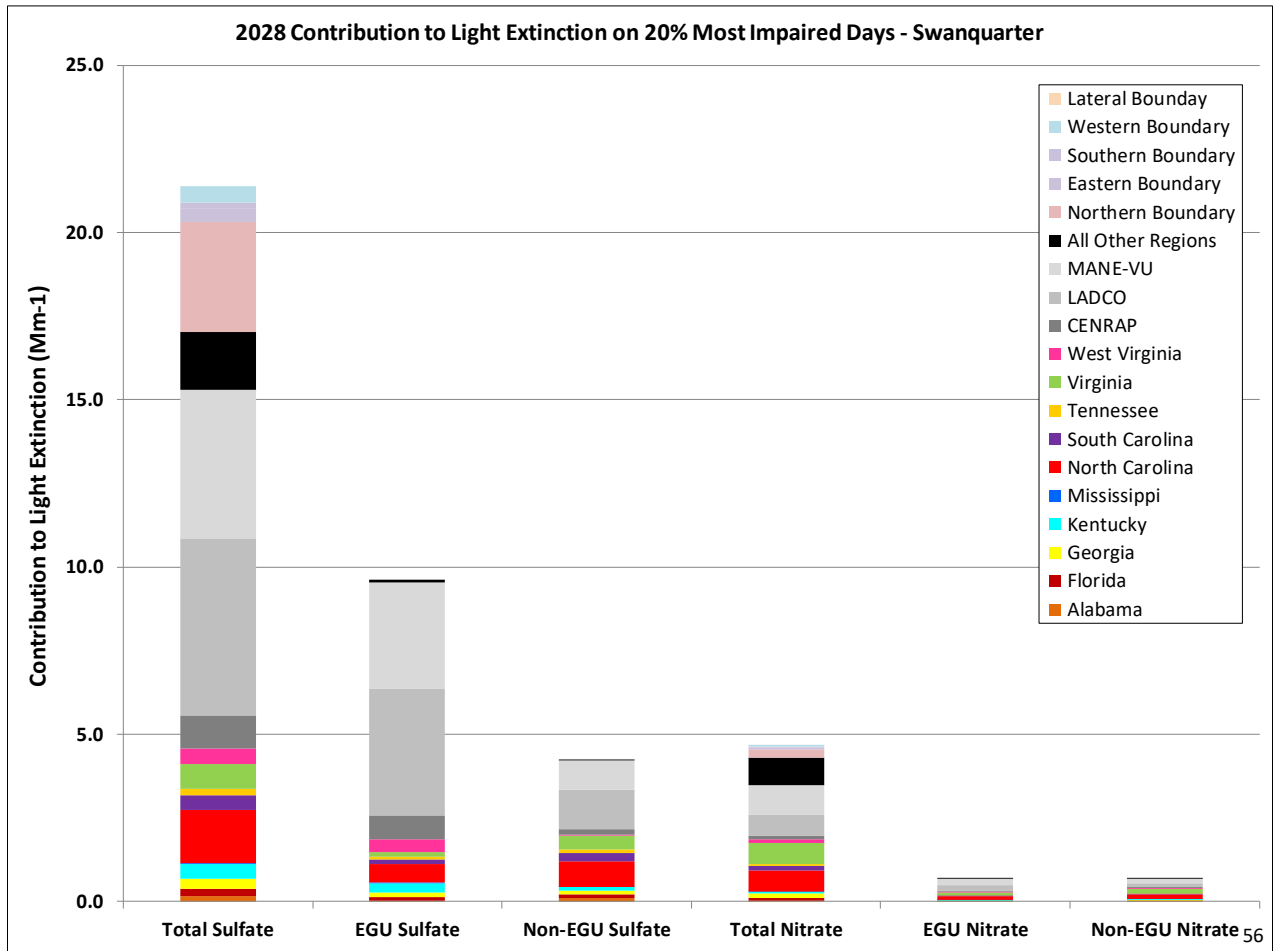
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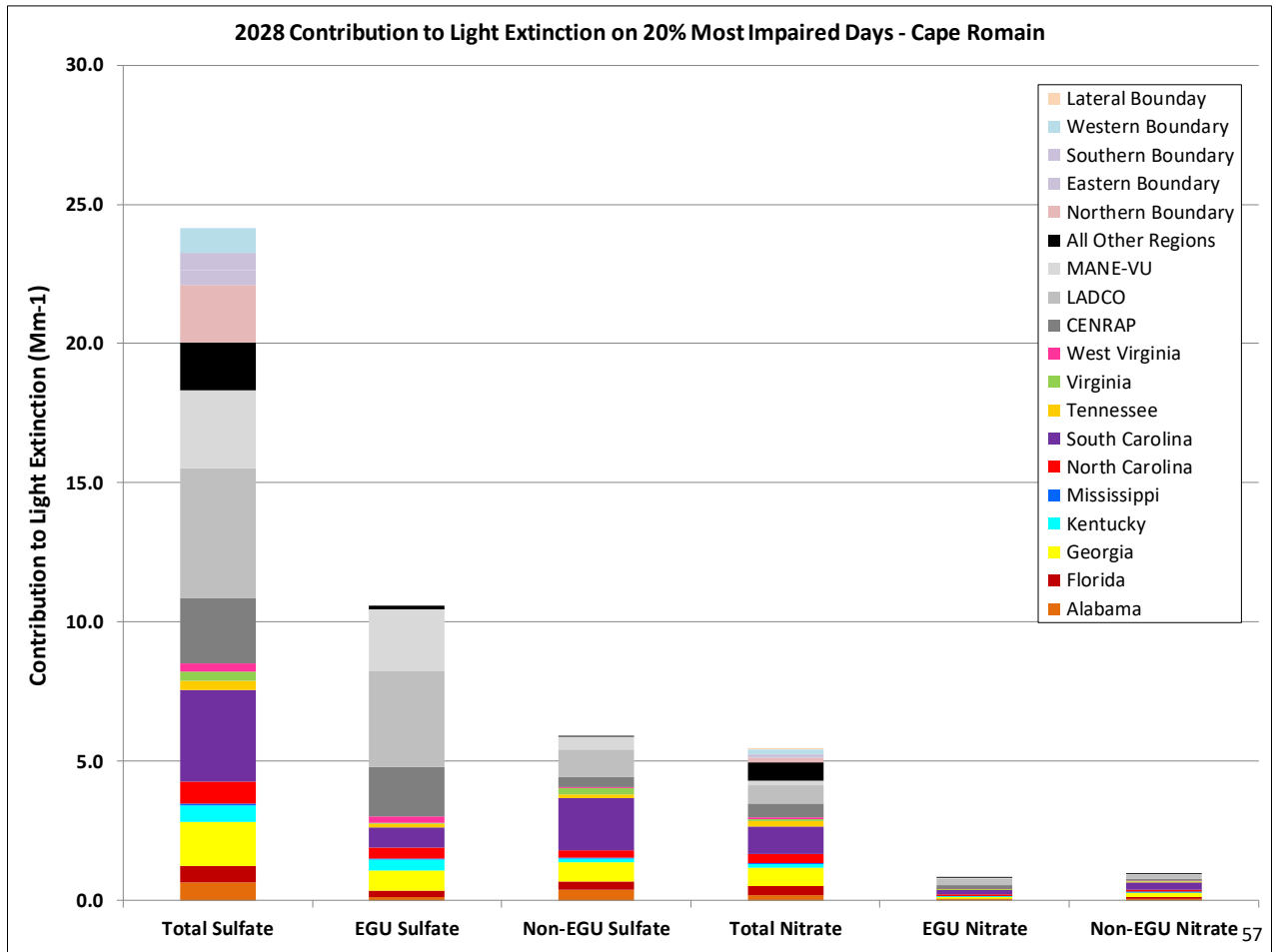


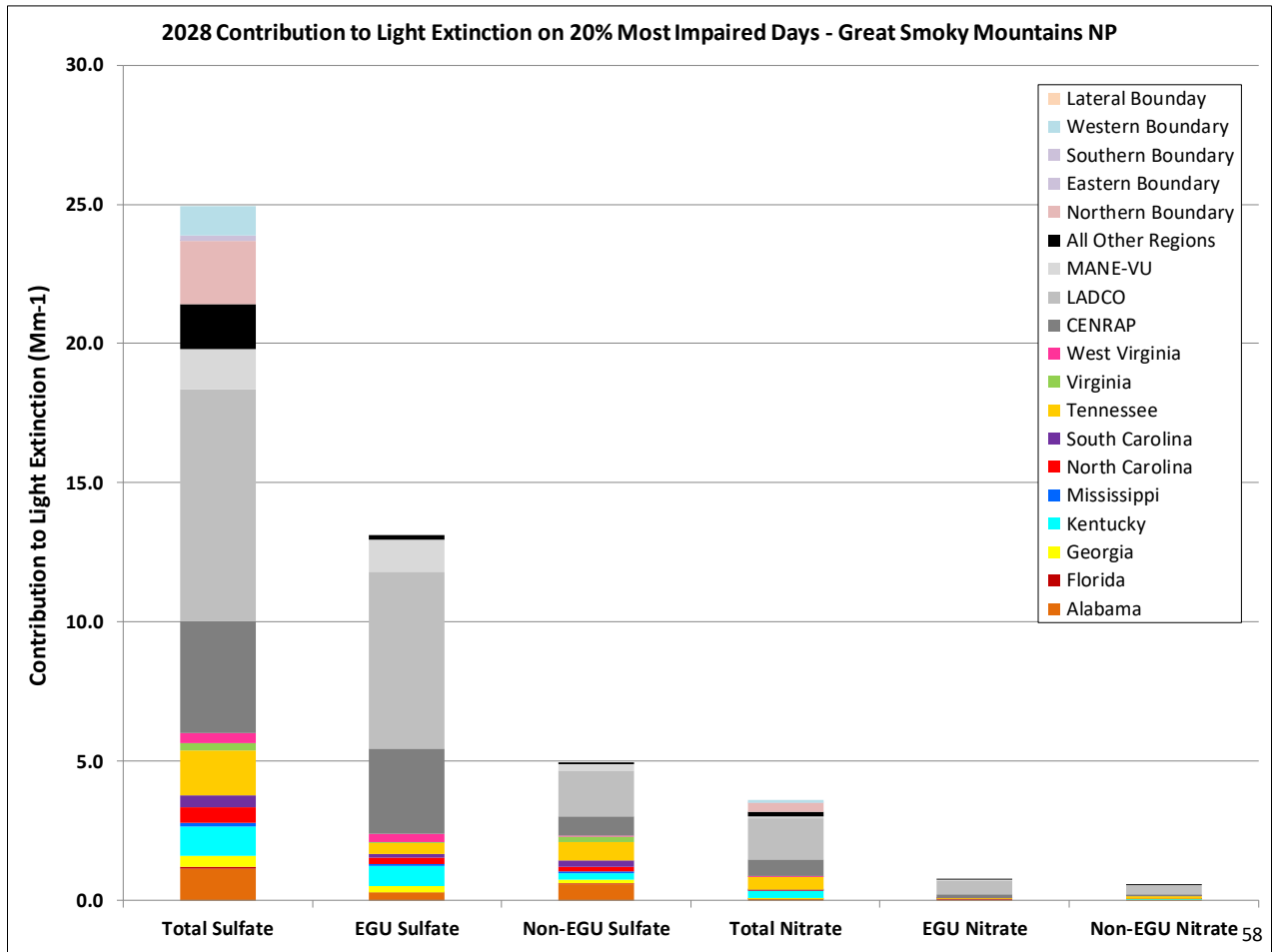


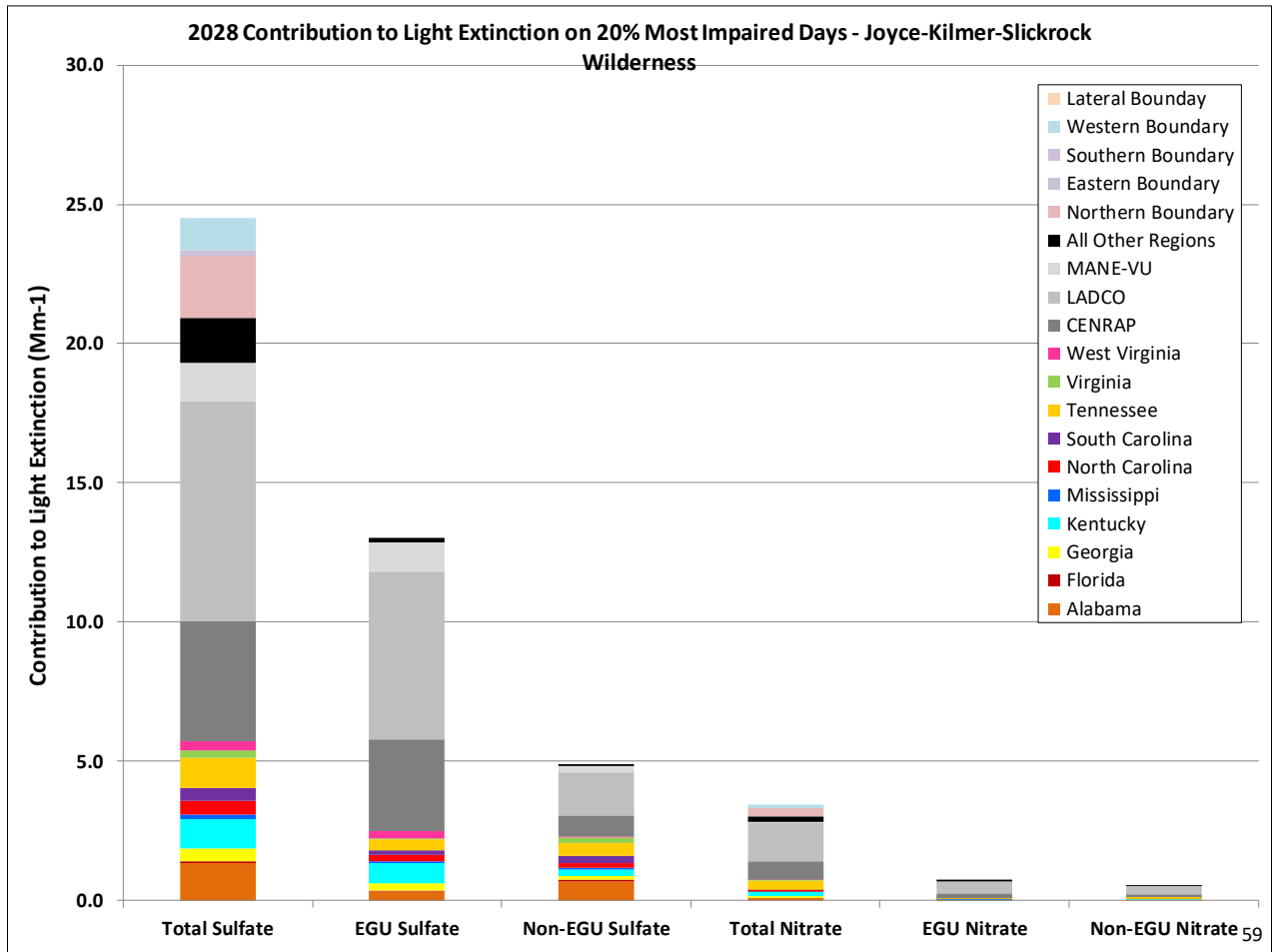


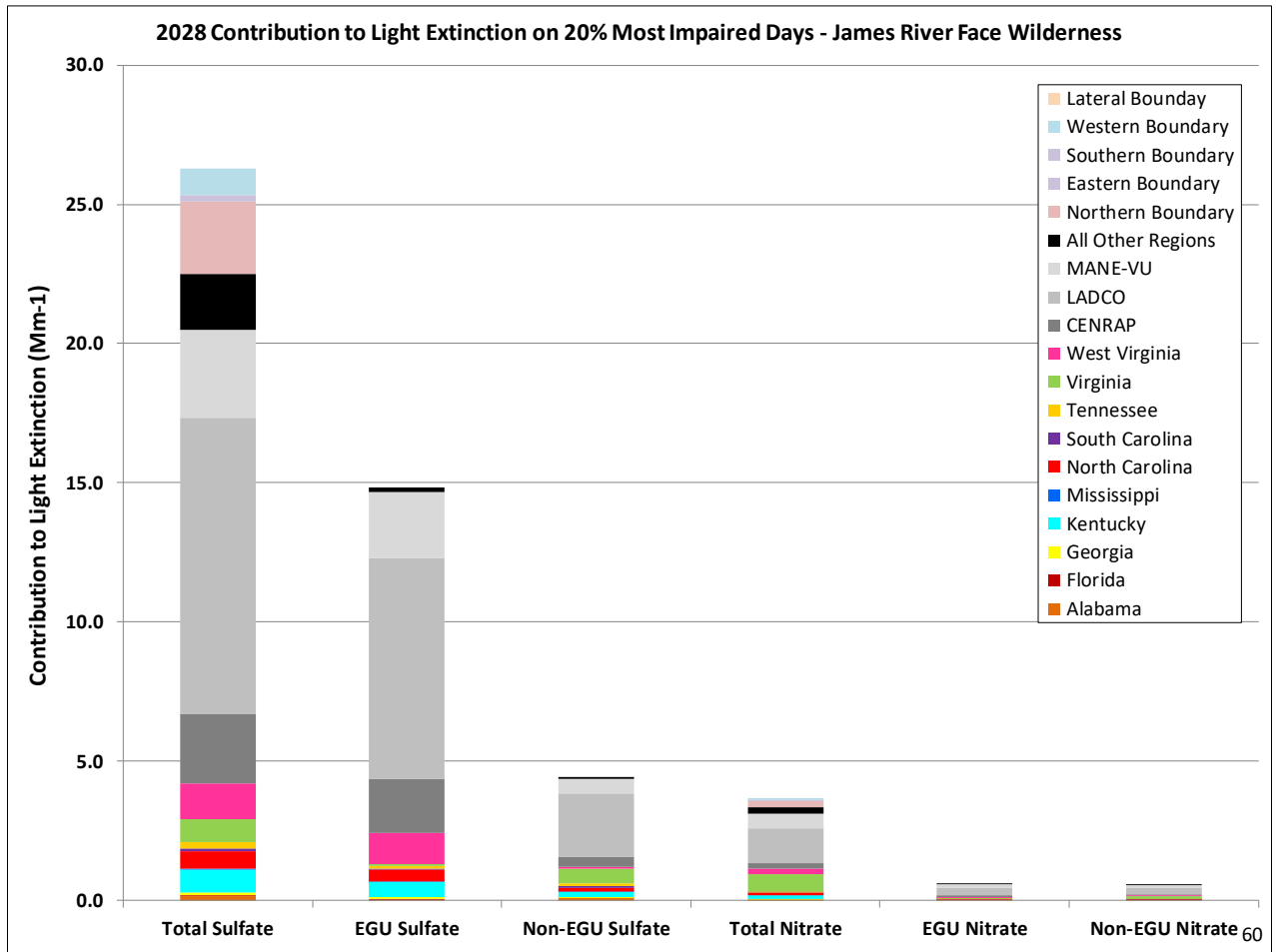


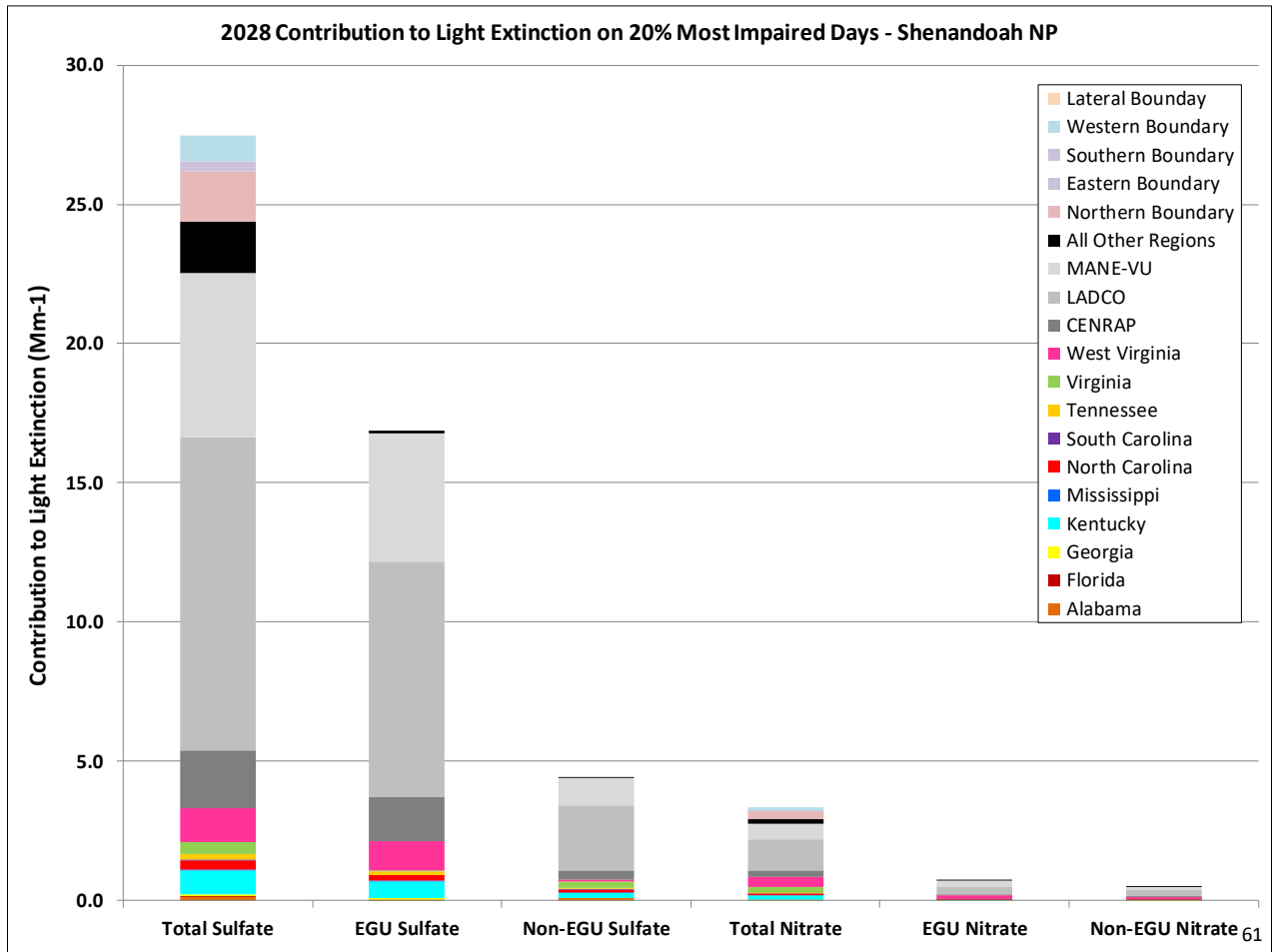


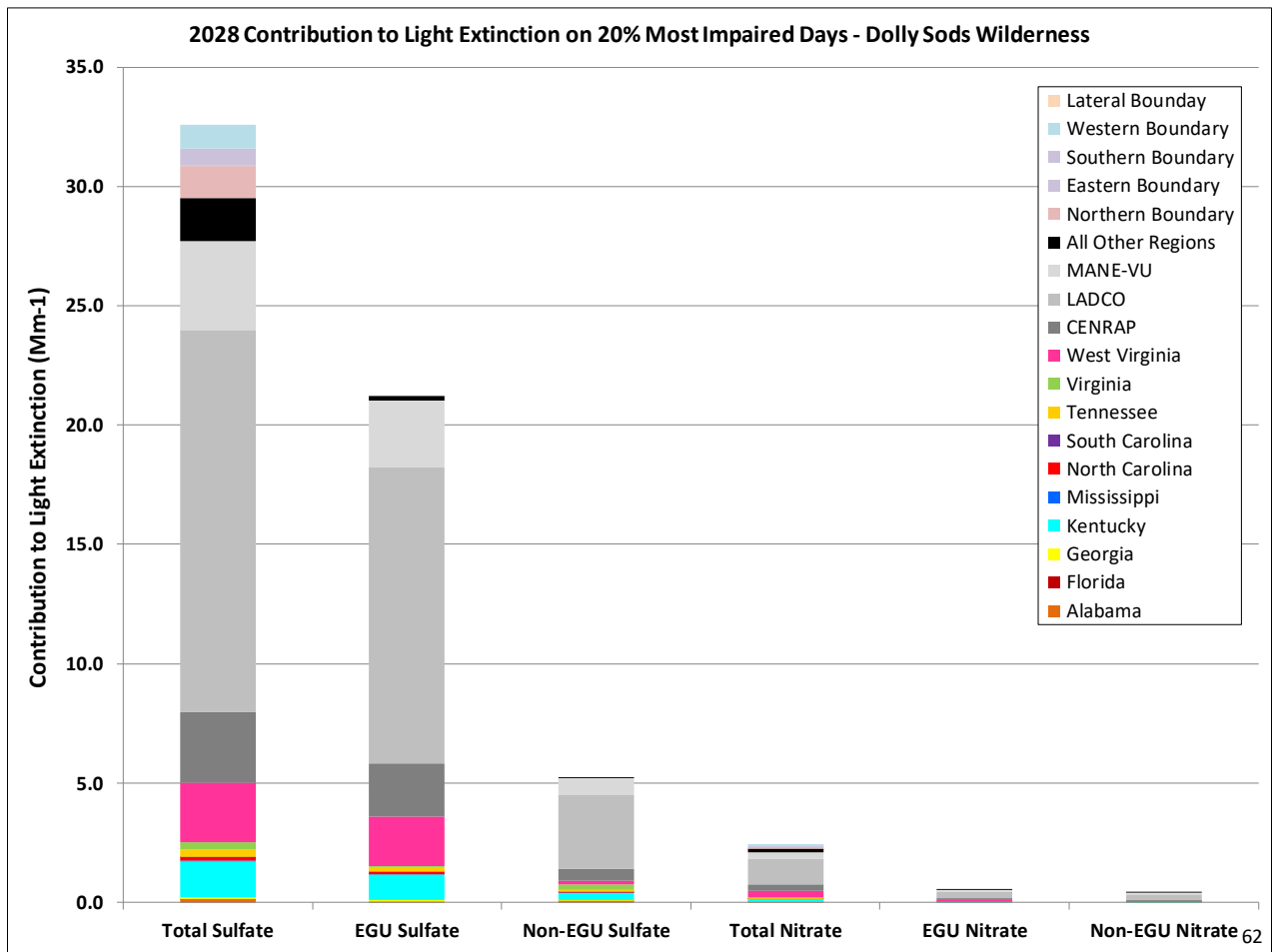


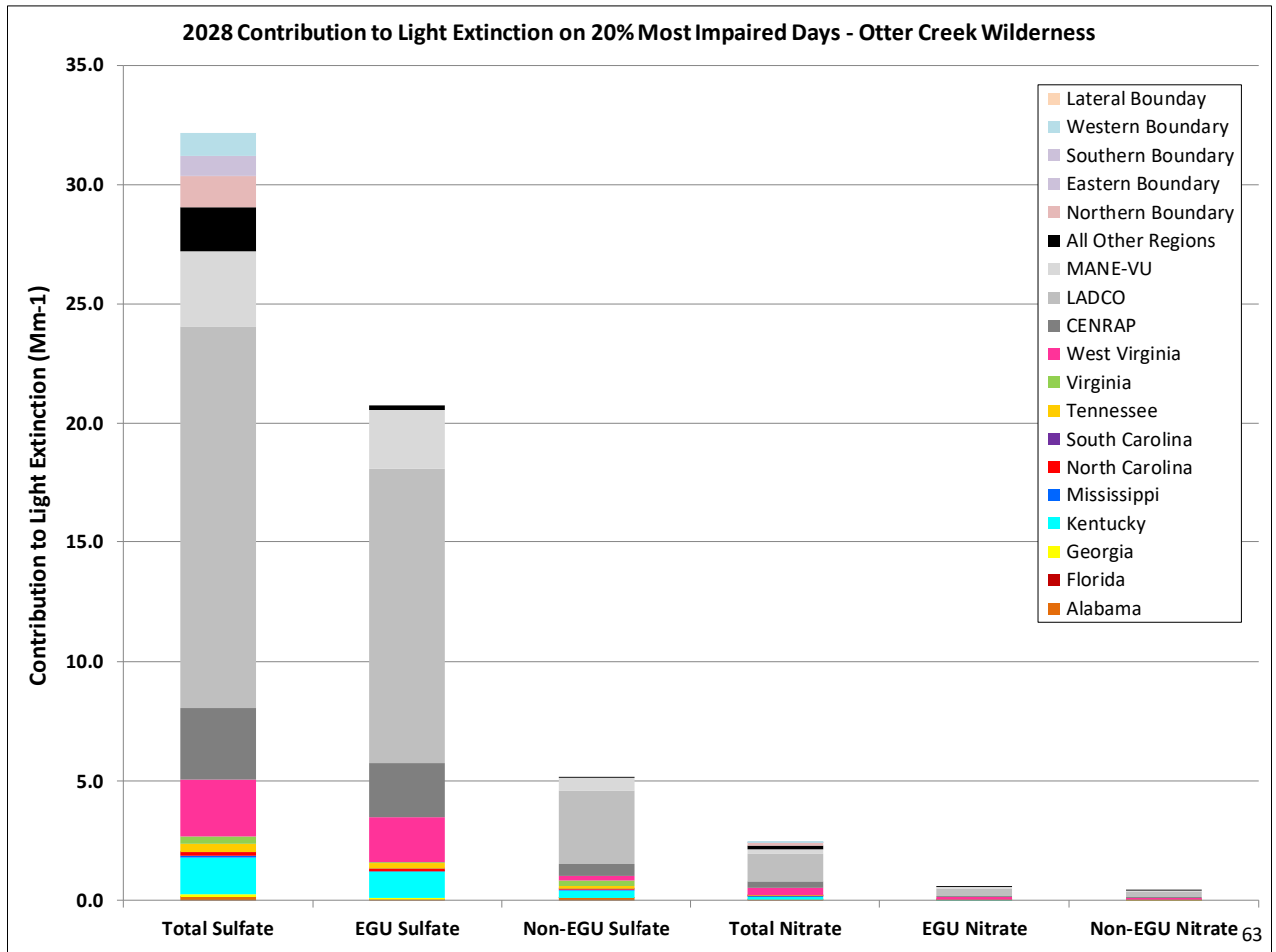


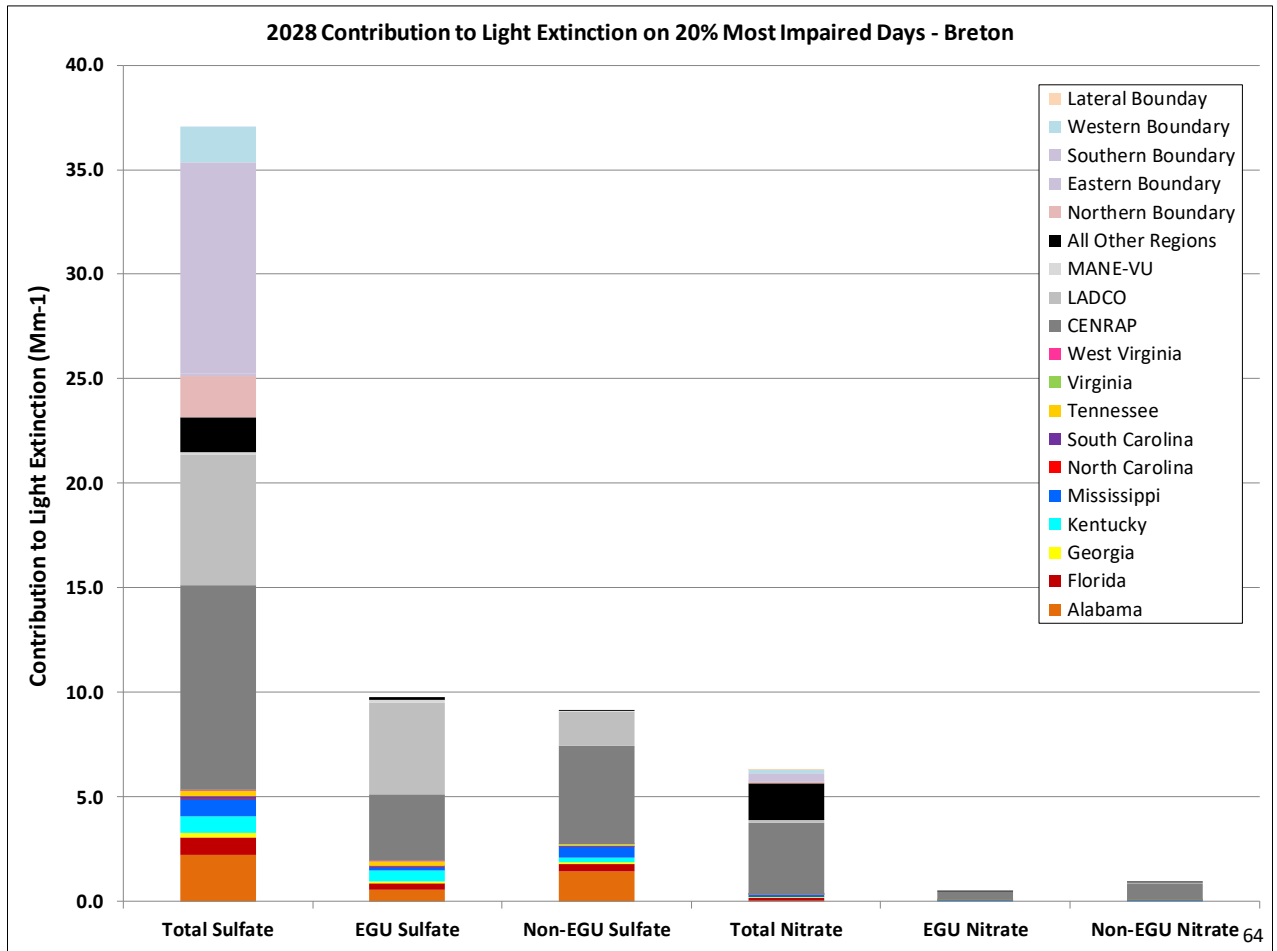




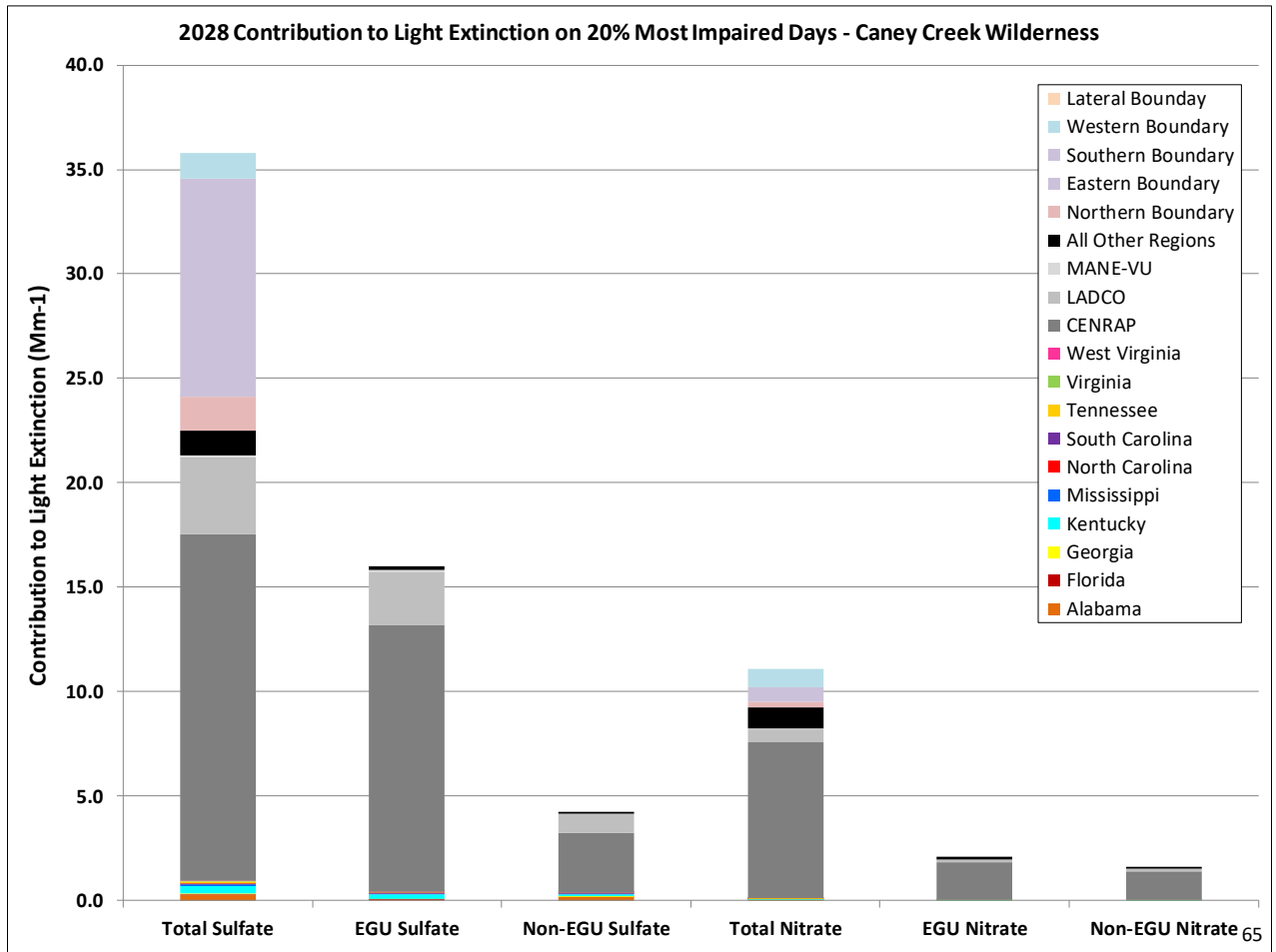




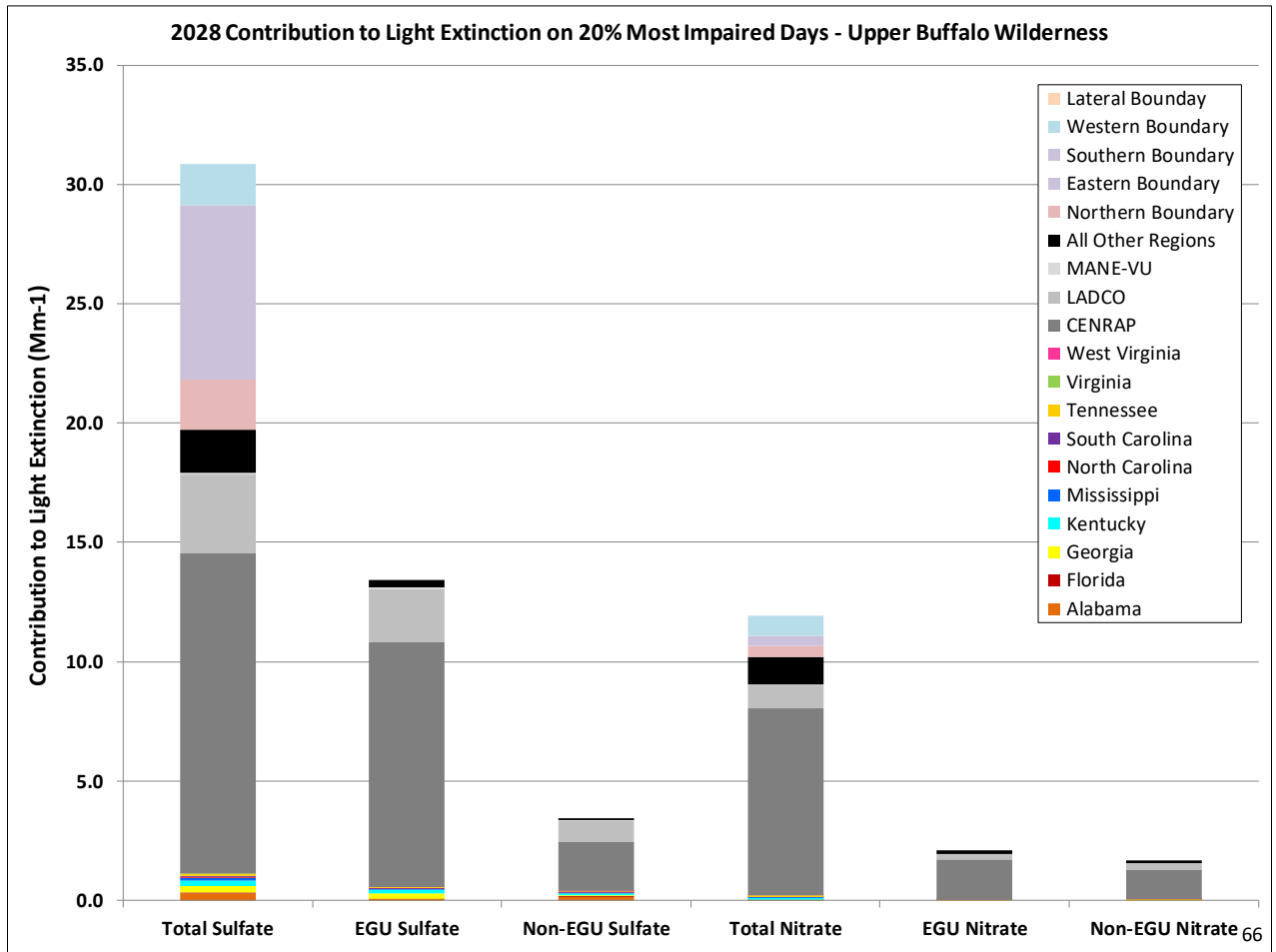


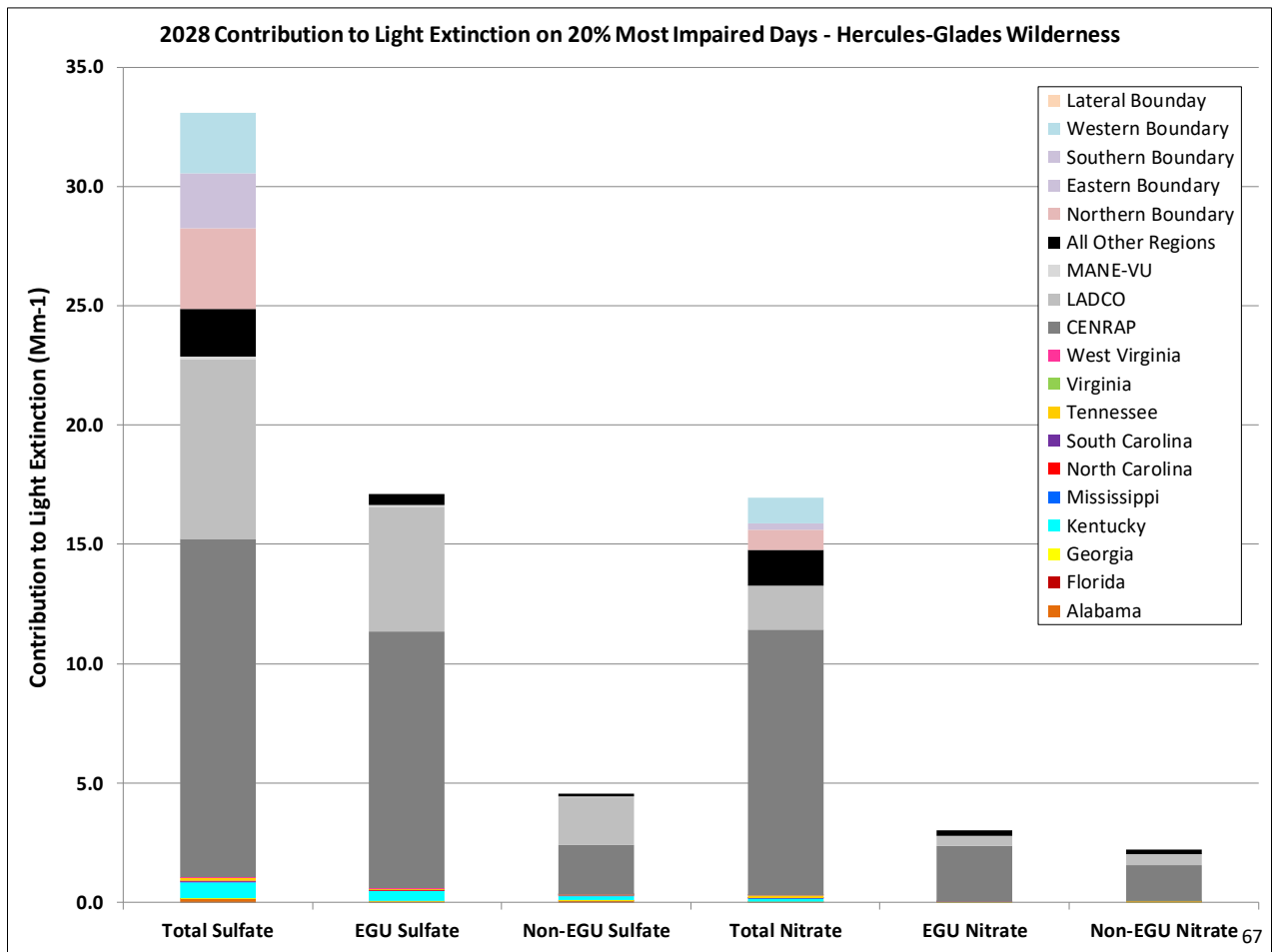


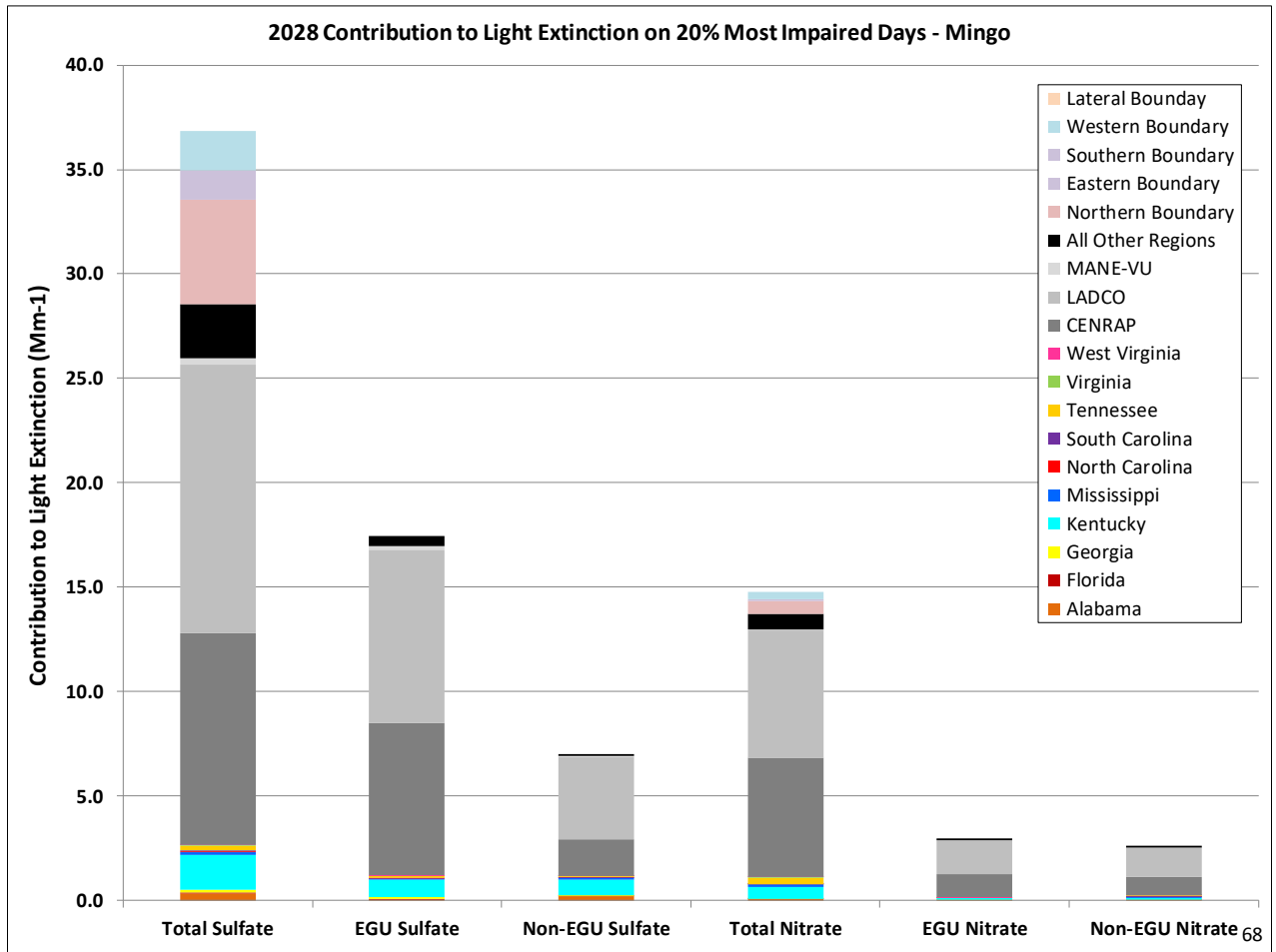


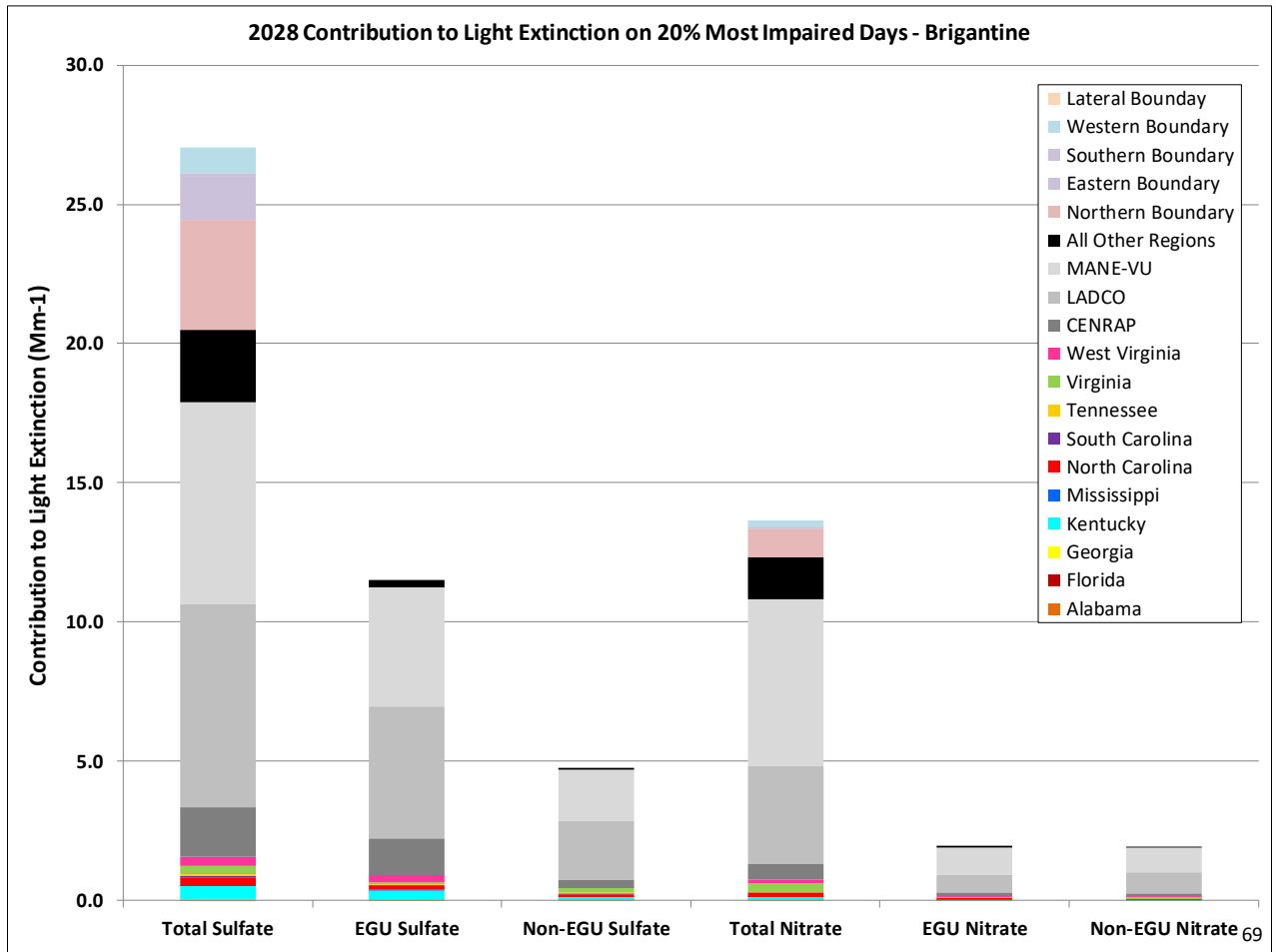


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# NEXT STEPS

## Screening for 4-Factor Analysis

- States are in the process of selecting sources for the reasonable progress 4-factor analysis
- State need to make decisions on screening thresholds:
  - Most states will likely use a screening threshold based on a facility's percent contribution to point source contributions
    - Likely range is between 2% to 5%
  - Sulfate vs. nitrate vs. combination
  - AOI contributions vs. PSAT contributions vs. combination
    - In some cases, the AOI contributions are significantly different than the PSAT contributions

## Remaining Work Schedule

Task	Schedule
Additional PSAT tagging runs?	Necessity uncertain
Best and final 2028 run?	Necessity uncertain
Final reports and documentation	February 2020
Website updates and postings	Ongoing task
<b>Regional Haze SIPs Due to EPA</b>	<b>July 31, 2021</b>



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