

# **Appendix E-7b**

## **Roadmap for PSAT Scaled Adjustments**

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# **VISTAS Roadmap for Calculations Associated with the Initial Screening of Sources for Reasonable Progress (Four-Factor Analyses)**



March 24, 2021

## **Overview**

This document describes the calculations associated with the initial screening of sources for reasonable progress (four-factor analyses). The original PSAT results were determined based on the modeled elv3 2028 SO<sub>2</sub> and NO<sub>x</sub> emissions. The 2028 EGU and non-EGU (NEG) point emissions were updated for a new 2028 model run based on the elv5 emissions inventory, but the original PSAT runs were not redone. Therefore, the original PSAT results have been adjusted using the methodology described below to reflect the updated 2028 emissions.

## **Task 2: Emission Inventories**

<https://www.metro4-sesarm.org/content/task-2-emission-inventories>

*VISTAS Emissions 2028 Comparisons Remodeling 200902.xlsx*

- The “STATE\_LEVEL\_COMPARISON” tab contains EGU and NEGU state-level comparisons for the original (elv3 modeled) and revised (elv5 inventory) SO<sub>2</sub> and NO<sub>x</sub> emissions in the VISTAS 12-km domain.
- The “FACILITY\_COMPARISON” tab contains facility-by-facility comparisons for the original and revised SO<sub>2</sub> and NO<sub>x</sub> emissions in the VISTAS 12-km domain.
- The “PSAT\_ANALYSIS” tab contains facility-by-facility comparisons for the original and revised SO<sub>2</sub> and NO<sub>x</sub> emissions for the 87 facilities with PSAT tags. The ratio of revised SO<sub>2</sub> to original SO<sub>2</sub> emissions is contained in Column Q. The ratio of revised NO<sub>x</sub> to original NO<sub>x</sub> emissions is contained in Column R. These ratios are used to adjust the original facility PSAT results under Task 7 in “ATTACHMENT\_A\_PSAT\_TAG\_RESULTS.xlsm” to account for emission increases/decreases associated with the revised SO<sub>2</sub> and NO<sub>x</sub> emissions. The file containing the adjusted impacts is called "ATTACHMENT\_A\_PSAT\_TAG\_RESULTS\_adjusted\_09-02-2020.xlsx." The facility ratios are shown in Appendix A.
- The “Ratios” tab contains the state level data for VISTAS states and the RPO level data for states outside of VISTAS states. This tab calculates the emissions ratio for NO<sub>x</sub> and for SO<sub>2</sub> between the elv3 modeled values and the elv5 inventory values for each state within VISTAS. It also calculates the RPO level ratios for NO<sub>x</sub> and SO<sub>2</sub> for CENSARA, MANE-VU, LADCO, and WRAP. These ratios are used to adjust estimated impacts from the EGU and NEG sectors to each Class I area. Adjusted PSAT results are found in the spreadsheet called, "ATTACHMENT\_A\_PSAT\_TAG\_RESULTS\_adjusted\_09-02-2020.xlsx." The state and regional ratios are shown in Appendix B. Within the "Ratios" tab contained in the spreadsheet, "VISTAS Emissions 2028 Comparisons Remodeling 200902.xlsx":
  - The sulfate ratio for EGUs for each VISTAS state (Column E) is the value in column D (SO<sub>2</sub> EGUelv5 Inv) divided by the value in column C (SO<sub>2</sub> EGU elv3 Mod).
  - The sulfate ratio for NEG for each VISTAS state (Column H) is the value in column G (SO<sub>2</sub> NEG elv5 inv) divided by the value in column F (SO<sub>2</sub> NEG elv3 Mod).
  - The nitrate ratio for EGUs for each VISTAS state (Column K) is the value in column J (NO<sub>x</sub> EGU elv5 Inv) divided by the value in column I (NO<sub>x</sub> EGU elv3 Mod).
  - The nitrate ratio for NEG for each VISTAS state (Column N) is the value in column M (NO<sub>x</sub> NEG elv5 Inv) divided by the value in column L (NO<sub>x</sub> NEG elv3 Mod).
  - The sulfate ratio for EGUs for each RPO other than VISTAS (Column E) is the sum of the SO<sub>2</sub> emissions for that RPO in column D (SO<sub>2</sub> EGUelv5 Inv) divided by the sum of SO<sub>2</sub> emissions for that RPO in column C (SO<sub>2</sub> EGUelv5 Inv).

- The nitrate ratio for EGUs for each RPO other than VISTAS (Column K) is the sum of the NO<sub>x</sub> emissions for that RPO in column J (NO<sub>x</sub> EGU elv5 Inv) divided by the sum of NO<sub>x</sub> emissions for that RPO in column I (NO<sub>x</sub> EGU elv3 Mod).
- The sulfate ratio for NEGUs for each RPO other than VISTAS (Column H) is the sum of the NO<sub>x</sub> emissions for that RPO in column M (NO<sub>x</sub> NEG elv5 Inv) divided by the sum of NO<sub>x</sub> emissions for that RPO in column L (NO<sub>x</sub> NEG elv3 Mod).

### **Task 5: Area of Influence Analysis**

<https://www.metro4-sesarm.org/content/task-5-area-influence-analysis>

*VISTAS AOI Data Summary.xlsx*

This Excel file contains a summary of the facility information and AOI contributions from the “POINT” worksheet contained in the AOI spreadsheets for each Class I area. Only facilities contributing more than 0.1% combination of sulfate + nitrate (Column AS) are included in this summary for each Class I area.

Each worksheet identifies one of the pertinent Class I areas. The AOI contributions for the following are identified in each sheet:

- $(\text{facility nitrate}) / (\text{total EGU+NEGU sulfate+nitrate}) \rightarrow$  Column AQ  
(Combined\_NO3\_2028\_fraction)
- $(\text{facility sulfate}) / (\text{total EGU+NEGU sulfate+nitrate}) \rightarrow$  Column AR  
(Combined\_SO4\_2028\_fraction)
- $(\text{facility sulfate} + \text{facility nitrate}) / (\text{total EGU+NEGU sulfate+nitrate}) \rightarrow$  Column AS  
(Combined\_SO4\_NO3\_2028\_EWRT.Qd)

### **Task 7: Source Apportionment Modeling/Tagging**

<https://www.metro4-sesarm.org/content/source-apportionment-modelingtagging>

*ATTACHMENT\_A\_PSAT\_TAG\_RESULTS\_adjusted\_09-02-2020.xlsx*

The data tabs in this spreadsheet (rh\_results\_SEC\_v4\_adj, rh\_results\_SEC\_BCv4\_adj, rh\_results\_INdv3\_adj) contain the original PSAT results in columns identified with the heading delta\_extw (20% most impaired days) and delta\_extb (20% clearest days). Scaled values using the ratios developed from the elv5 inventory are in columns designated delta\_extb\_adj and delta\_extw\_adj. The adjusted PSAT results are based on emission ratios calculated in “*VISTAS Emissions 2028 Comparisons Remodeling 200902.xlsx*” (see Appendix B).

- Revised Facility EGU Sulfate PSAT Results = Original EGU Sulfate PSAT Results \* SO<sub>2</sub> EGU Ratio  
where,  $SO_2 \text{ EGU Ratio} = (\text{Revised EGU } SO_2 \text{ emissions}) / (\text{Original EGU } SO_2 \text{ emissions})$
- Revised Facility NEGU Sulfate PSAT Results = Original NEGU Sulfate PSAT Results \* SO<sub>2</sub> NEGU Ratio  
where,  $SO_2 \text{ NEGU Ratio} = (\text{Revised NEGU } SO_2 \text{ emissions}) / (\text{Original NEGU } SO_2 \text{ emissions})$
- Revised Facility EGU Nitrate PSAT Results = Original EGU Nitrate PSAT Results \* NO<sub>x</sub> EGU Ratio  
where,  $NO_x \text{ EGU Ratio} = (\text{Revised EGU } NO_x \text{ emissions}) / (\text{Original EGU } NO_x \text{ emissions})$

- Revised Facility NEGU Nitrate PSAT Results = Original NEGU Nitrate PSAT Results \* NOx NEGU Ratio where,  $NOx\ NEGU\ Ratio = (Revised\ NEGU\ NOx\ emissions)/(Original\ NEGU\ NOx\ emissions)$

To adjust the total EGU+NEG, sulfate+nitrate contribution to visibility impairment at each Class I area, the EGU sulfate, EGU nitrate, NEG sulfate, and NEG nitrate contributions at each Class I area were adjusted by the respective ratio for that area (state or RPO), sector (EGU or NEG), and pollutant (sulfate or nitrate). These adjusted values were summed to determine the scaled EGU+NEG, sulfate+nitrate impact on each Class I area.

Since impacts of any facility are reviewed as a percentage of the total EGU+NEG, sulfate+nitrate impact on a Class I area, revisions to the inventory affect both the numerator of the equation (the scaled PSAT estimate of sulfate or nitrate impact from a particular facility) and the denominator of the equation (the scaled PSAT estimate of sulfate + nitrate impact from all EGUs and NEG's on a Class I area). Appendix C provides the original and adjusted EGU + NEG impacts for each Class I area as well as the ratios developed from this information. To calculate the changes to the denominator, the Ratio\_Class\_I\_Area may be used:

- $Ratio\_Class\_I\_Area = (Original\ EGU\ sulfate + NEGU\ sulfate + EGU\ nitrate + NEGU\ nitrate) / (Revised\ EGU\ sulfate + NEGU\ sulfate + EGU\ nitrate + NEGU\ nitrate)$

This methodology allows a user to calculate a singular value for a particular Class I area and sector impact. To make the wholesale updates to the PSAT estimated impacts at each Class I area, a pivot table approach was used to create the ATTACHMENT\_A\_PSAT\_TAG\_RESULTS\_adjusted\_09-02-2020.xlsx file.

### **Task 7: Source Apportionment Modeling/Tagging**

<https://www.metro4-sesarm.org/content/source-apportionment-modelingtagging>

#### *VISTAS PSAT Percent Contribution Rankings 02-09-2021.xlsx*

The VISTAS PSAT Percent Contribution Ranking 02-09-2021.xlsx, tab "comb SO4+NO3>0.0001-copy" worksheet combines AOI information from the database provided by the VISTAS contractor (AOI\_SPREADSHEET\_ANALYSIS\_POINT.zip) for all facilities with a Combined\_SO4\_NO3\_2028\_EWRT.Qd of at least 0.01% (0.0001) with original and adjusted PSAT information from "ATTACHMENT\_A\_PSAT\_TAG\_RESULTS\_adjusted\_09-02-2020.xlsx".

Tab "Facility Ratios" shows the emissions estimate for each tagged facility from the AOI analysis, the elv3 modeling, and the elv5 modeling. It also shows the ratio applied to each facility. This information originates in the Excel file called, "VISTAS Emissions 2028 Comparisons Remodeling 200902.xlsx."

Tab "Facility Tagging Results" shows the original, elv3 PSAT tagging results and the adjusted PSAT tagging results based on the elv5 inventory for each facility. This information originates in the Excel file called, "ATTACHMENT\_A\_PSAT\_TAG\_RESULTS\_adjusted\_09-02-2020.xlsx," tab "rh\_results\_INDv3\_adj."

Tab "Class I EGU+NEG, S+N" shows the original, elv3 PSAT tagging results for the impact of sulfate and nitrate from EGUs and NEG's on each Class I area for 20% most impaired days and 20% clearest days. The tab also shows the adjusted values for each Class I area and the ratio of the original value to the adjusted value. This information originates in the Excel file called, "ATTACHMENT\_A\_PSAT\_TAG\_RESULTS\_adjusted\_09-02-2020.xlsx," tab "rh\_results\_SEC+BECv4\_adj." This information is provided in Appendix C.

Tab "Tagged Facilities Xwalk" shows the facility identification for each tagged facility, which allow comparison of tagged and AOI results. . This information originates in the Excel file called, "ATTACHMENT\_A\_PSAT\_TAG\_RESULTS\_adjusted\_09-02-2020.xlsx," tab "Facility Name xwalk."

Certain facilities were tagged for NO<sub>x</sub> and SO<sub>2</sub> twice. Since multiple tags for a facility produced identical PSAT results, such facilities are only listed once in tab "comb SO4+NO3>0.0001-copy." These facilities are as follows:

**Table 1: Facilities Tagged Twice**

State	Tag Numbers	Facility FIPS and EIS ID	Facility Name
FL	020/074	12123-752411	Buckeye Florida, Limited Partnership
GA	023/080	13127-3721011	Brunswick Cellulose Inc
NC	028/088	37013-8479311	PCS Phosphate Company, Inc - Aurora
NC	029/085	37087-7920511	Blue Ridge Paper Products – Canton Mill
VA	040/095	51023-5039811	Roanoke Cement Company
VA	041/093	51027-4034811	Jewell Coke Company LLP
VA	042/094	51580-5798711	Meadwestvaco Packaging Resource Group

Two facilities are scheduled to be shut down prior to 2028 but were tagged in the elv3 PSAT run. These facilities are listed in Table 2. Under the tab "Facility Ratios," each facility is listed as having zero NO<sub>x</sub> and SO<sub>2</sub> emissions in 2028. State emissions totals were adjusted accordingly and are reflected in the scaled values for EGU+NEG, Sulfate+Nitrate impacts on Class I areas in the tab "Class I EGU+NEG S+N." These facilities are not shown in tab "comb SO4+NO3>0.0001-copy."

**Table 2: Facilities with Aoi of zero but included in the PSAT tagging**

State	Tag Numbers	Facility FIPS and EIS ID	Facility Name
AL	002	01053-085111	Escambia Operating Company LLC
TN	033	47001-6196011	TVA Bull Run Fossil Plant

## Appendix A

This table provides the ratio of revised to original SO<sub>2</sub> and NO<sub>x</sub> emissions for the 87 facilities with PSAT tags. Green indicates emission reductions, and red indicates emission increases.

State	RPO	Facility FIPS - EIS ID	Facility Name	SO <sub>2</sub> ratio, remodeled/original	NO <sub>x</sub> ratio, remodeled/original
AL	VISTAS	01053-7440211	Escambia Operating Company LLC	0.199	1.000
AL	VISTAS	01053-985111	Escambia Operating Company LLC	0.010	0.000
AL	VISTAS	01073-1018711	DRUMMOND COMPANY, INC.	1.000	1.000
AL	VISTAS	01097-1056111	Ala Power - Barry	0.499	1.000
AL	VISTAS	01097-1061611	Union Oil of California - Chunchula Gas Plant	0.000	0.000
AL	VISTAS	01097-949811	Akzo Nobel Chemicals Inc	1.000	1.000
AL	VISTAS	01103-1000011	Nucor Steel Decatur LLC	1.000	1.000
AL	VISTAS	01109-985711	Sanders Lead Co	1.000	1.000
AL	VISTAS	01129-1028711	American Midstream Chatom, LLC	0.000	0.000
FL	VISTAS	12005-535411	ROCKTENN CP LLC	1.000	1.000
FL	VISTAS	12017-640611	DUKE ENERGY FLORIDA, INC. (DEF)	0.493	0.421
FL	VISTAS	12031-640211	JEA	1.027	1.591
FL	VISTAS	12033-752711	GULF POWER - Crist	0.219	0.382
FL	VISTAS	12047-769711	WHITE SPRINGS AGRICULTURAL CHEMICALS,INC	0.487	0.909
FL	VISTAS	12057-538611	TAMPA ELECTRIC COMPANY (TEC)	1.000	1.000
FL	VISTAS	12057-716411	MOSAIC FERTILIZER, LLC	0.595	1.057
FL	VISTAS	12086-3532711	HOMESTEAD CITY UTILITIES	1.000	1.000
FL	VISTAS	12086-899911	TARMAC AMERICA LLC	1.000	2.701
FL	VISTAS	12086-900011	FLORIDA POWER & LIGHT (PTF)	1.000	1.000
FL	VISTAS	12086-900111	CEMEX CONSTRUCTION MATERIALS FL. LLC.	1.000	2.856
FL	VISTAS	12089-753711	ROCK TENN CP, LLC	1.000	1.000
FL	VISTAS	12089-845811	RAYONIER PERFORMANCE FIBERS LLC	1.000	1.000
FL	VISTAS	12105-717711	MOSAIC FERTILIZER LLC	0.568	1.000
FL	VISTAS	12105-919811	MOSAIC FERTILIZER, LLC	0.972	1.000
FL	VISTAS	12123-752411	BUCKEYE FLORIDA, LIMITED PARTNERSHIP	1.000	1.000
FL	VISTAS	12129-2731711	TALLAHASSEE CITY PURDOM GENERATING STA.	1.000	1.000
GA	VISTAS	13015-2813011	Ga Power Company - Plant Bowen	1.000	1.000
GA	VISTAS	13051-3679811	International Paper - Savannah	1.000	1.000
GA	VISTAS	13103-536311	Georgia-Pacific Consumer Products LP (Savannah River Mill)	1.000	1.000
GA	VISTAS	13115-539311	TEMPLE INLAND	1.000	1.000
GA	VISTAS	13127-3721011	Brunswick Cellulose Inc	1.000	1.000
KY	VISTAS	21091-7352411	Century Aluminum of KY LLC	0.441	1.000
KY	VISTAS	21145-6037011	Tennessee Valley Authority (TVA) - Shawnee Fossil Plant	1.000	1.000
KY	VISTAS	21177-5196711	Tennessee Valley Authority - Paradise Fossil Plant	0.004	0.238
KY	VISTAS	21183-5561611	Big Rivers Electric Corp - Wilson Station	1.000	1.000
MS	VISTAS	28059-6251011	Mississippi Power Company, Plant Victor J Daniel	1.000	1.000
MS	VISTAS	28059-8384311	Chevron Products Company, Pascagoula Refinery	1.000	1.000
NC	VISTAS	37013-8479311	PCS Phosphate Company, Inc. - Aurora	1.000	1.000
NC	VISTAS	37023-8513011	SGL Carbon LLC	1.000	1.000



State	RPO	Facility FIPS - EIS ID	Facility Name	SO <sub>2</sub> ratio, remodeled/original	NO <sub>x</sub> ratio, remodeled/original
NC	VISTAS	37035-8370411	Duke Energy Carolinas, LLC - Marshall Steam Station	0.641	0.713
NC	VISTAS	37087-7920511	Blue Ridge Paper Products - Canton Mill	0.359	0.978
NC	VISTAS	37117-8049311	Domtar Paper Company, LLC	1.000	1.000
SC	VISTAS	45015-4120411	SANTEE COOPER CROSS GENERATING STATION	1.000	1.000
SC	VISTAS	45015-4834911	ALUMAX OF SOUTH CAROLINA	1.000	1.000
SC	VISTAS	45015-8306711	SCE&G WILLIAMS	1.000	1.000
SC	VISTAS	45019-4973611	KAPSTONE CHARLESTON KRAFT LLC	1.000	1.000
SC	VISTAS	45043-5698611	INTERNATIONAL PAPER GEORGETOWN MILL	1.000	1.000
SC	VISTAS	45043-6652811	SANTEE COOPER WINYAH GENERATING STATION	1.000	1.000
TN	VISTAS	47001-6196011	TVA BULL RUN FOSSIL PLANT	0.000	0.000
TN	VISTAS	47093-4979911	Cemex - Knoxville Plant	1.000	1.000
TN	VISTAS	47105-4129211	TATE & LYLE, Loudon	0.352	0.261
TN	VISTAS	47145-4979111	TVA KINGSTON FOSSIL PLANT	0.225	0.225
TN	VISTAS	47161-4979311	TVA CUMBERLAND FOSSIL PLANT	1.000	1.000
TN	VISTAS	47163-3982311	EASTMAN CHEMICAL COMPANY	1.000	1.000
VA	VISTAS	51023-5039811	Roanoke Cement Company	1.000	1.000
VA	VISTAS	51027-4034811	Jewell Coke Company LLP	1.000	1.000
VA	VISTAS	51580-5798711	Meadwestvaco Packaging Resource Group	1.000	1.000
WV	VISTAS	54023-6257011	Dominion Resources, Inc. - MOUNT STORM POWER STATION	0.449	0.487
WV	VISTAS	54033-6271711	ALLEGHENY ENERGY SUPPLY CO, LLC-HARRISON	1.027	0.847
WV	VISTAS	54041-6900311	EQUITRANS - COPLEY RUN CS 70	1.000	1.000
WV	VISTAS	54049-4864511	AMERICAN BITUMINOUS POWER-GRANT TOWN PLT	1.278	1.394
WV	VISTAS	54051-6902311	MITCHELL PLANT	0.787	1.459
WV	VISTAS	54061-16320111	LONGVIEW POWER	1.010	1.437
WV	VISTAS	54061-6773611	MONONGAHELA POWER CO.- FORT MARTIN POWER	0.626	0.873
WV	VISTAS	54061-6773811	MORGANTOWN ENERGY ASSOCIATES	0.004	0.330
WV	VISTAS	54073-4782811	MONONGAHELA POWER CO-PLEASANTS POWER STA	0.684	1.042
WV	VISTAS	54079-6789111	APPALACHIAN POWER COMPANY - JOHN E AMOS PLANT	0.555	1.495
WV	VISTAS	54083-6790511	GLADY 6C4350	1.000	1.000
WV	VISTAS	54083-6790711	FILES CREEK 6C4340	1.000	1.000
WV	VISTAS	54093-6327811	KINGSFORD MANUFACTURING COMPANY	1.000	1.000
IL	Midwest RPO	17127-7808911	Joppa Steam	0.392	0.424
IN	Midwest RPO	18051-7363111	Gibson	0.562	0.702
IN	Midwest RPO	18125-7362411	INDIANAPOLIS POWER & LIGHT PETERSBURG	0.519	0.502
IN	Midwest RPO	18129-8166111	Sigeco AB Brown South Indiana Gas & Ele	0.000	0.018
IN	Midwest RPO	18147-8017211	INDIANA MICHIGAN POWER DBA AEP ROCKPORT	0.353	0.962
IN	Midwest RPO	18173-8183111	Alcoa Warrick Power Plt Agc Div of AL	0.288	0.271

State	RPO	Facility FIPS - EIS ID	Facility Name	SO <sub>2</sub> ratio, remodeled/original	NO <sub>x</sub> ratio, remodeled/original
OH	Midwest RPO	39025-8294311	Duke Energy Ohio, Wm. H. Zimmer Station (1413090154)	0.467	0.820
OH	Midwest RPO	39031-8010811	Conesville Power Plant (0616000000)	0.000	0.000
OH	Midwest RPO	39053-7983011	Ohio Valley Electric Corp., Kyger Creek Station (0627000003)	1.258	0.685
OH	Midwest RPO	39053-8148511	General James M. Gavin Power Plant (0627010056)	0.525	0.983
OH	Midwest RPO	39081-8115711	Cardinal Power Plant (Cardinal Operating Company) (0641050002)	1.326	1.639
MD	MANE-VU	24001-7763811	Luke Paper Company	0.436	1.000
PA	MANE-VU	42005-3866111	GENON NE MGMT CO/KEYSTONE STA	0.370	0.773
PA	MANE-VU	42063-3005111	NRG WHOLESALE GEN/SEWARD GEN STA	0.767	0.724
PA	MANE-VU	42063-3005211	HOMER CITY GEN LP/ CENTER TWP	0.782	0.951
AR	CENRAP	05063-1083411	ENTERGY ARKANSAS INC-INDEPENDENCE PLANT	0.426	0.317
MO	CENRAP	29143-5363811	NEW MADRID POWER PLANT-MARSTON	0.665	0.923

## Appendix B

The following table provides the ratio of revised emissions to original emissions for EGU SO<sub>2</sub>, NEGU SO<sub>2</sub>, EGU NO<sub>x</sub>, and NEGU NO<sub>x</sub> for each state and RPO. These calculations are contained in the spreadsheet called, "VISTAS Emissions 2028 Comparisons Remodeling 200902.xlsx." Green indicates emission reductions, and red indicates emission increases.

State/RPO	Sulfate EGU Ratio	Sulfate NEG Ratio	Nitrate EGU Ratio	Nitrate NEG Ratio
AL	0.455	0.715	0.635	0.967
FL	0.801	0.843	0.800	1.111
GA	0.944	0.997	0.929	0.998
KY	0.879	0.850	0.866	1.005
MS	0.494	0.362	0.642	1.020
NC	0.458	0.951	0.643	0.995
SC	0.951	1.001	0.813	1.033
TN	0.825	0.970	0.739	0.979
VA	0.525	1.005	0.614	1.043
WV	0.825	1.068	1.067	0.997
CENSARA	0.482	0.984	0.687	0.969
LADCO	0.571	0.956	0.687	0.966
MANE-VU	0.425	0.775	0.588	1.012

## Appendix C

The following table provides the original and adjusted, sulfate and nitrate, impacts of EGUs and NEGs on various Class I areas for the 20% most impaired days.

20% Most Impaired Days, 2028 Impacts, Inverse Megameters (Mm <sup>-1</sup> )															
Class I Area	EGU						NEG						EGU + NEG		
	Nitrate (N)		Sulfate (S)		N+S		Nitrate (N)		Sulfate (S)		N+S		N+S		
	Sum, delta_ extw	Sum, delta_ extw_ adj	Sum, delta_ extw	Sum, delta_ extw_ adj	Sum, delta_ extw	Sum, delta_ extw_ adj	Sum, delta_ extw	Sum, delta_ extw_ adj	Sum, delta_ extw	Sum, delta_ extw_ adj	Sum, delta_ extw	Sum, delta_ extw_ adj	Total, delta_ extw	Total, delta_ extw_ adj	Ratio
ACAD	0.317	0.205	2.940	1.575	3.257	1.780	0.362	0.362	1.395	1.221	1.757	1.583	5.014	3.363	1.491
BADL	0.605	0.509	4.435	2.539	5.040	3.048	0.373	0.367	1.143	1.113	1.516	1.480	6.556	4.528	1.448
BAND	0.047	0.038	0.514	0.290	0.561	0.328	0.091	0.089	0.250	0.247	0.341	0.336	0.902	0.664	1.359
BIBE	0.034	0.024	1.913	0.961	1.947	0.985	0.051	0.050	0.562	0.541	0.613	0.591	2.560	1.576	1.625
BOAP	0.094	0.076	0.566	0.311	0.660	0.387	0.185	0.182	0.242	0.236	0.427	0.418	1.087	0.805	1.350
BOWA	1.565	1.155	5.451	2.941	7.016	4.096	1.794	1.742	2.486	2.402	4.280	4.144	11.296	8.239	1.371
BRET2	0.493	0.344	9.773	5.610	10.266	5.954	0.934	0.910	9.175	8.182	10.109	9.092	20.375	15.046	1.354
BRIG	1.970	1.291	11.498	6.103	13.468	7.394	1.933	1.917	4.755	4.214	6.688	6.130	20.156	13.524	1.490
CACR	2.090	1.474	15.985	8.159	18.075	9.634	1.623	1.576	4.222	4.042	5.845	5.618	23.920	15.252	1.568
CAVE	0.071	0.050	2.253	1.133	2.324	1.183	0.216	0.210	0.746	0.712	0.962	0.922	3.286	2.106	1.561
CHAS	0.518	0.377	8.058	5.107	8.576	5.484	0.514	0.515	4.287	3.761	4.801	4.276	13.377	9.760	1.371
COHU	0.370	0.267	12.271	7.306	12.641	7.573	0.442	0.435	4.946	4.550	5.388	4.986	18.029	12.558	1.436
DOSO	0.557	0.417	21.211	12.494	21.768	12.911	0.403	0.395	5.242	4.867	5.645	5.261	27.413	18.173	1.508
EANE	0.032	0.032	0.077	0.063	0.109	0.095	0.044	0.044	0.044	0.044	0.088	0.088	0.197	0.182	1.080
EVER	0.077	0.056	0.855	0.513	0.932	0.569	0.185	0.194	0.603	0.541	0.788	0.735	1.720	1.303	1.320
FLTO	0.032	0.032	0.077	0.063	0.109	0.095	0.044	0.044	0.044	0.044	0.088	0.088	0.197	0.182	1.080
GRGU	0.194	0.133	6.092	3.287	6.286	3.420	0.203	0.200	2.065	1.872	2.268	2.071	8.554	5.491	1.558
GRSA	0.114	0.107	0.401	0.262	0.515	0.369	0.183	0.182	0.183	0.180	0.366	0.362	0.881	0.731	1.205
GRSM	0.790	0.565	13.104	7.588	13.894	8.153	0.556	0.541	4.948	4.531	5.504	5.072	19.398	13.226	1.467
GUMO	0.071	0.050	2.253	1.133	2.324	1.183	0.216	0.210	0.746	0.712	0.962	0.922	3.286	2.106	1.561
HEGL	3.007	2.142	17.092	9.135	20.099	11.278	2.204	2.142	4.537	4.351	6.741	6.493	26.840	17.771	1.510
ISLE	1.530	1.121	6.691	3.723	8.221	4.844	1.777	1.723	3.006	2.876	4.783	4.599	13.004	9.443	1.377
JARI	0.595	0.417	14.824	8.467	15.419	8.883	0.553	0.549	4.420	4.124	4.973	4.673	20.392	13.557	1.504
JOYC	0.749	0.538	13.018	7.535	13.767	8.073	0.534	0.520	4.883	4.438	5.417	4.958	19.184	13.031	1.472
LIGO	0.317	0.226	12.462	7.058	12.779	7.284	0.295	0.288	5.107	4.695	5.402	4.983	18.181	12.266	1.482
LYBR2	0.601	0.405	9.020	4.681	9.621	5.086	0.723	0.715	3.308	2.908	4.031	3.623	13.652	8.708	1.568
MABE	0.032	0.032	0.077	0.063	0.109	0.095	0.044	0.044	0.044	0.044	0.088	0.088	0.197	0.182	1.080
MACA	2.887	2.060	20.613	12.017	23.500	14.077	2.411	2.346	7.905	7.412	10.316	9.758	33.816	23.835	1.419
MELA	0.979	0.914	2.897	2.510	3.876	3.424	0.545	0.541	1.120	1.105	1.665	1.646	5.541	5.070	1.093
MING	2.982	2.092	17.462	9.824	20.444	11.917	2.603	2.528	7.005	6.578	9.608	9.106	30.052	21.023	1.430
MOOS	0.182	0.121	2.473	1.316	2.655	1.438	0.206	0.204	1.382	1.179	1.588	1.383	4.243	2.821	1.504

20% Most Impaired Days, 2028 Impacts, Inverse Megameters (Mm <sup>-1</sup> )															
Class I Area	EGU						NEG						EGU + NEG		
	Nitrate (N)		Sulfate (S)		N+S		Nitrate (N)		Sulfate (S)		N+S		N+S		
	Sum, delta_extw	Sum, delta_extw_adj	Sum, delta_extw	Sum, delta_extw_adj	Sum, delta_extw	Sum, delta_extw_adj	Sum, delta_extw	Sum, delta_extw_adj	Sum, delta_extw	Sum, delta_extw_adj	Sum, delta_extw	Sum, delta_extw_adj	Total, delta_extw	Total, delta_extw_adj	Ratio
MOZI	0.137	0.136	0.229	0.215	0.366	0.351	0.063	0.063	0.079	0.079	0.142	0.142	0.508	0.492	1.032
OKEF	0.417	0.301	9.853	5.989	10.270	6.291	0.572	0.580	6.812	6.084	7.384	6.664	17.654	12.955	1.363
OTCR	0.581	0.436	20.759	12.249	21.340	12.685	0.420	0.411	5.169	4.824	5.589	5.235	26.929	17.919	1.503
PECO	0.049	0.042	0.424	0.242	0.473	0.284	0.076	0.075	0.188	0.185	0.264	0.259	0.737	0.543	1.356
PRRA	0.194	0.133	6.092	3.287	6.286	3.420	0.203	0.200	2.065	1.872	2.268	2.071	8.554	5.491	1.558
RAWA	0.137	0.136	0.229	0.215	0.366	0.351	0.063	0.063	0.079	0.079	0.142	0.142	0.508	0.492	1.032
ROCA	0.182	0.121	2.473	1.316	2.655	1.438	0.206	0.204	1.382	1.179	1.588	1.383	4.243	2.821	1.504
ROMA	0.838	0.616	10.570	6.363	11.408	6.980	0.954	0.963	5.904	5.541	6.858	6.503	18.266	13.483	1.355
ROMO	0.189	0.174	0.483	0.351	0.672	0.525	0.372	0.371	0.212	0.211	0.584	0.582	1.256	1.107	1.135
SACR	0.234	0.177	2.614	1.324	2.848	1.501	1.286	1.264	1.330	1.310	2.616	2.574	5.464	4.074	1.341
SAMA	0.388	0.279	8.394	4.880	8.782	5.159	0.549	0.545	6.656	5.686	7.205	6.231	15.987	11.390	1.404
SAPE	0.021	0.018	0.218	0.125	0.239	0.143	0.038	0.037	0.118	0.116	0.156	0.154	0.395	0.296	1.333
SENE	2.203	1.601	8.090	4.584	10.293	6.185	3.004	2.912	4.598	4.361	7.602	7.273	17.895	13.458	1.330
SHEN	0.707	0.522	16.874	9.342	17.581	9.864	0.481	0.474	4.438	4.048	4.919	4.522	22.500	14.387	1.564
SHRO	0.313	0.223	12.041	6.925	12.354	7.148	0.267	0.261	4.740	4.337	5.007	4.598	17.361	11.746	1.478
SIPS	1.243	0.873	14.948	8.635	16.191	9.507	1.137	1.106	5.300	4.857	6.437	5.963	22.628	15.470	1.463
SWAN	0.683	0.459	9.621	5.261	10.304	5.720	0.684	0.688	4.240	3.883	4.924	4.571	15.228	10.292	1.480
THRO	0.879	0.791	2.997	2.475	3.876	3.266	0.527	0.522	1.011	0.996	1.538	1.518	5.414	4.785	1.132
ULBE	0.260	0.245	1.023	0.808	1.283	1.052	0.095	0.093	0.389	0.379	0.484	0.472	1.767	1.525	1.159
UPBU	2.103	1.498	13.415	7.003	15.518	8.501	1.689	1.642	3.424	3.257	5.113	4.899	20.631	13.400	1.540
WEEL	0.032	0.032	0.077	0.063	0.109	0.095	0.044	0.044	0.044	0.044	0.088	0.088	0.197	0.182	1.080
WHIT	0.045	0.034	1.335	0.681	1.380	0.715	0.126	0.123	0.519	0.503	0.645	0.627	2.025	1.341	1.510
WHPE	0.049	0.042	0.424	0.242	0.473	0.284	0.076	0.075	0.188	0.185	0.264	0.259	0.737	0.543	1.356
WICA	0.590	0.541	2.547	1.726	3.137	2.268	0.476	0.473	0.660	0.651	1.136	1.123	4.273	3.391	1.260
WIMO	1.491	1.083	6.734	3.555	8.225	4.637	2.219	2.154	2.277	2.198	4.496	4.352	12.721	8.990	1.415
WOLF	0.379	0.275	9.712	5.899	10.091	6.174	0.522	0.528	6.374	5.806	6.896	6.334	16.987	12.508	1.358