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VISTAS II Task 2A - Emission Inventory Updates Report (AOI and PSAT)

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Southeastern VISTAS II Regional Haze Analysis Project –Task 2A Emission Inventory Updates Report (AoI and PSAT)

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Abbreviations/Acronym List

AL	Alabama
AoI	Area of Influence
BEIS	Biogenic Emissions Inventory System
CAMx	Comprehensive Air Quality Model with Extension
CMV	Commercial Marine Vessel
CO	Carbon Monoxide
CONUS	Continental U.S.
CPP	Clean Power Plan
CSAPR	Cross-State Air Pollution Rule
EIS	Emission Inventory System
EPA	U.S. Environmental Protection Agency
ERG	Eastern Research Group, Inc.
ERTAC	Eastern Regional Technical Advisory Committee
EGU	Electricity Generating Unit
FF	Flat File
FL	Florida
FLM	Federal Land Manager
FR	Federal Register
FTP	File Transfer Protocol
GA	Georgia
GA DNR	Georgia Department of Natural Resources
IPM	Integrated Planning Model
KY	Kentucky
MARAMA	Mid-Atlantic Regional Air Management Association
MOVES	Motor Vehicles Emissions Simulator
MS	Mississippi
NAAQS	National Ambient Air Quality Standard
NC	North Carolina
NC DAQ	North Carolina Division of Air Quality
NC DEQ	North Carolina Department of Environmental Quality
NEI	National Emissions Inventory
NH_3	Ammonia
NODA	Notice of Data Availability
NO_x	Oxides of Nitrogen
PM	Particulate Matter
PM_{10}-PRI	Primary particulate matter ≤ 10 microns in aerodynamic diameter
$PM_{2.5}$-PRI	Primary particulate matter ≤2.5 microns in aerodynamic diameter
PSAT	Particulate Source Apportionment Technology
QA/QC	Quality Assurance/Quality Control
RHR	Regional Haze Rule
RTR	Risk and Technology Review
SC	South Carolina
SC DHEC	South Carolina Department of Health and Environmental Control
SCC	Source Classification Code

Abbreviations/Acronym List (cont.)

SESARM	Southeastern States Air Resource Managers, Inc.
SIP	State Implementation Plan
SMOKE	Sparse Matrix Operator Kernel Emissions
SO_2	Sulfur Dioxide
SQL	Structured Query Language
TDEC	Tennessee Department of Environment and Conservation
TN	Tennessee
tpy	Tons per year
TSD	Technical Support Document
U.S.	United States
VA	Virginia
VADEQ	Virginia Department of Environmental Quality
VISTAS	Visibility Improvement - State and Tribal Association of the Southeast
VOC	Volatile Organic Compound
WV	West Virginia

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1. INTRODUCTION

Southeastern States Air Resource Managers, Inc. (SESARM) has been designated by the United States Environmental Protection Agency (EPA) as the entity responsible for coordinating regional haze evaluations for the ten Southeastern states of Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia. The Eastern Band of Cherokee Indians and the Knox County, Tennessee local air pollution control agency are also participating agencies. These parties are collaborating through the Regional Planning Organization known as Visibility Improvement - State and Tribal Association of the Southeast (VISTAS) in the technical analyses and planning activities associated with visibility and related regional air quality issues. VISTAS analyses will support the VISTAS states in their responsibility to develop, adopt, and implement their State Implementation Plans (SIPs) for regional haze.

The state and local air pollution control agencies in the Southeast are mandated to protect human health and the environment from the impacts of air pollutants. They are responsible for air quality planning and management efforts including the evaluation, development, adoption, and implementation of strategies controlling and managing all criteria air pollutants (including fine particles and ozone) as well as regional haze. This project will focus on regional haze and regional haze precursor emissions. Control of regional haze precursor emissions will have the additional benefit of reducing certain criteria pollutants as well.

The 1999 Regional Haze Rule (RHR) identified 18 Class I Federal areas (national parks greater than 6,000 acres and wilderness areas greater than 5,000 acres) in the VISTAS region and required states to define long-term strategies to improve visibility in these Federal Class I national areas. States were required to establish baseline visibility conditions for the period 2000-2004, natural visibility conditions in the absence of anthropogenic influences, and an expected rate of progress to reduce emissions and incrementally improve visibility to natural conditions by 2064. The original RHR required states to improve visibility on the 20% most impaired days and

protect visibility on the 20% least impaired days.[1] The RHR requires states to evaluate progress toward visibility improvement goals every five years and submit revised SIPs every ten years.

EPA finalized revisions to various requirements of the RHR in January 2017 (82 FR 3078) that were designed to strengthen, streamline, and clarify certain aspects of the agency's regional haze program including:

A. Strengthening the Federal Land Manager (FLM) consultation requirements to ensure that issues and concerns are brought forward early in the planning process.

B. Updating the SIP submittal deadlines for the second planning period from July 31, 2018 to July 31, 2021 to ensure that they align where applicable with other state obligations under the Clean Air Act. The end date for the second planning period remains 2028; that is, the focus of state planning will be to establish reasonable progress goals for each Class I area against which progress will be measured during the second planning period. This extension will allow states to incorporate planning for other federal programs while conducting their regional haze planning. These other programs include: the Mercury and Air Toxics Standards, the 2010 1-hour sulfur dioxide (SO_2) National Ambient Air Quality Standard (NAAQS); the 2012 annual fine particle ($PM_{2.5}$) NAAQS; and the 2008 and 2015 ozone NAAQS.

C. Adjusting interim progress report submission deadlines so that second and subsequent progress reports will be due by: January 31, 2025; July 31, 2033; and every ten years thereafter. This means that one progress report will be required midway through each planning period.

D. Removing the requirement for progress reports to take the form of SIP revisions. States will be required to consult with FLMs and obtain public comment on their progress reports before submission to the EPA. EPA will be reviewing but not formally approving or disapproving these progress reports.

The RHR defines "clearest days" as the 20% of monitored days in a calendar year with the lowest deciview index values. "Most impaired days" are defined as the 20% of monitored

[1] RHR summary data is available at: http://vista.cira.colostate.edu/Improve/rhr-summary-data/

days in a calendar year with the highest amounts of anthropogenic visibility impairment. The long-term strategy and the reasonable progress goals must provide for an improvement in visibility for the most impaired days and ensure no degradation in visibility for the clearest days since the baseline period.

Under SESARM Contract No. V-2018-03-01 to support the "Regional Haze Analysis Project," Eastern Research Group, Inc. (ERG) completed Task 2, "Emissions Inventory Development." For this task, ERG compiled, reviewed, updated, and prepared emissions inventory data to be used for emissions modeling.

This report is divided into five sections and five appendices:

- Section 1 provides an introduction and background for this report;
- Section 2 defines the study parameters;
- Section 3 describes the data sources used for this task and merging of the datasets;
- Section 4 summarizes the state review, revisions to the 2028 emissions, and steps to finalize the emissions;
- Section 5 presents summary emissions;
- Appendix A-1 supports Section 3 by listing the base year 2011 emission inventory datasets to be used for 2011 modeling;
- Appendix A-2 supports Section 3 by listing the future year 2028 emission inventory datasets retrieved;
- Appendix B supports Section 4 by providing point electricity generating unit (EGU) and non-EGU emission change maps from the original EPA 2028 emissions inventory and the revised 2028 emissions inventory;
- Appendix C supports Section 5 by comparing PM_{10}-PRI and $PM_{2.5}$-PRI unadjusted emissions to precipitation- and transport-adjusted emissions for paved and unpaved roads. Unadjusted emissions are presented in the emissions summary totals, while adjusted emissions are calculated for emissions modeling;
- Appendix D supports Section 5 by presenting Tier 1-level emissions for 2011 and 2028 for each VISTAS state; and
- Appendix E supports Section 5 with county summary emission changes maps from 2011 to 2028 for each state.

This emissions inventory report (completed August 28, 2018 and revised August 20, 2020) documents revisions to the 2028 emissions inventory that were used to support the Area of Influence (AoI) analysis and the Particulate Source Apportionment Technology (PSAT) modeling, as well as initial modeling of 2028 visibility (elv3 results) for each Class I Federal area. The 2028 projection data used in the AoI and PSAT analyses were based on 2028 emissions in the "el" platform projected from a 2011 base year that states updated based on best available knowledge of in-state EGU and non-EGU point facilities.

After completion of this analytical work, additional updates to the 2028 inventory were needed to include more recent 2028 data projections, newer Eastern Regional Technical Advisor Committee (ERTAC) EGU projections using 2016 continuous emissions monitoring (CEM) data as the base year input, and other significant point source inventory changes. These subsequent changes were included in updated 2028 visibility projections (elv5). However, AoI and PSAT analyses were not updated due to resource and time constraints. This report fully documents the 2028 emissions inventory used to develop the AoI and PSAT analyses. The Task 2B report documents changes made to the 2028 projection year inventory that supports the final modeling of reasonable progress goals for 2028 at each Class I Federal area (elv5).

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2. STUDY PARAMETERS

ERG was directed by SESARM to use EPA's 2011el-based air quality modeling platform which includes emissions, meteorology, and other inputs for 2011 as the base year for the modeling described in EPA's TSD entitled "Preparation of Emissions Inventories for the Version 6.3, 2011 Emissions Modeling Platform", dated August 2016.[2] EPA projected the 2011 base year emissions to a 2028 future year base case scenario described in EPA's TSD entitled, "Documentation for the EPA's Preliminary 20208 Regional Haze Modeling", October 2017.[3] This 2028 inventory was used as the foundation for review and revising the 2028 emissions used for the AoI analysis and PSAT modeling. As noted in EPA's TSD, the 2011 base year emissions and methods for projecting these emissions to 2028 are in large part similar to the data and methods used by EPA in the final Cross-State Air Pollution Rule (CSAPR) Update[4] and the subsequent notice of data availability (NODA)[5] to support ozone transport modeling for the 2015 8-hour ozone NAAQS.

2.1 Study Area of Interest

The area of interest for this study is the VISTAS_12 domain. As presented in Figure 2-1, the U.S. EPA continental U.S. (CONUS) modeling domain is divided into three sections:

- VISTAS_12 Domain, VISTAS states: Alabama (AL), Florida (FL), Georgia (GA), Kentucky (KY), Mississippi (MS), North Carolina (NC), South Carolina (SC), Tennessee (TN), Virginia (VA), and West Virginia (WV).

- Non-VISTAS States/Areas in VISTAS_12 Domain
  - States – Arkansas, Colorado (partial), Connecticut, Delaware, Illinois, Indiana, Iowa, Kansas, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Montana (partial), Nebraska, New Hampshire, New Jersey, New Mexico (partial), New York, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Dakota, Texas, Vermont, Wisconsin, Wyoming (partial).

[2] https://www.epa.gov/air-emissions-modeling/2011-version-63-technical-support-document

[3] https://www3.epa.gov/ttn/scram/reports/2028_Regional_Haze_Modeling-TSD.pdf

[4] https://www.epa.gov/airmarkets/final-cross-state-air-pollution-rule-update

[5] https://www.epa.gov/airmarkets/notice-data-availability-preliminary-interstate-ozone-transport-modeling-data-2015-ozone

- Areas – District of Columbia, Gulf of Mexico (U.S.), Northeastern Mexico, Southern Canada (Manitoba province through New Brunswick), and International offshore areas off the Atlantic Ocean.

- States/Areas Outside of VISTAS_12 Domain:
  - States – Arizona, California, Colorado (partial), Idaho, Montana (partial), Nevada, New Mexico (partial), Oregon, Utah, Washington, and Wyoming.
  - Areas – Northwestern and Southern Mexico, Southwestern Canada (Alberta through Saskatchewan), and International offshore areas off the Pacific Ocean.

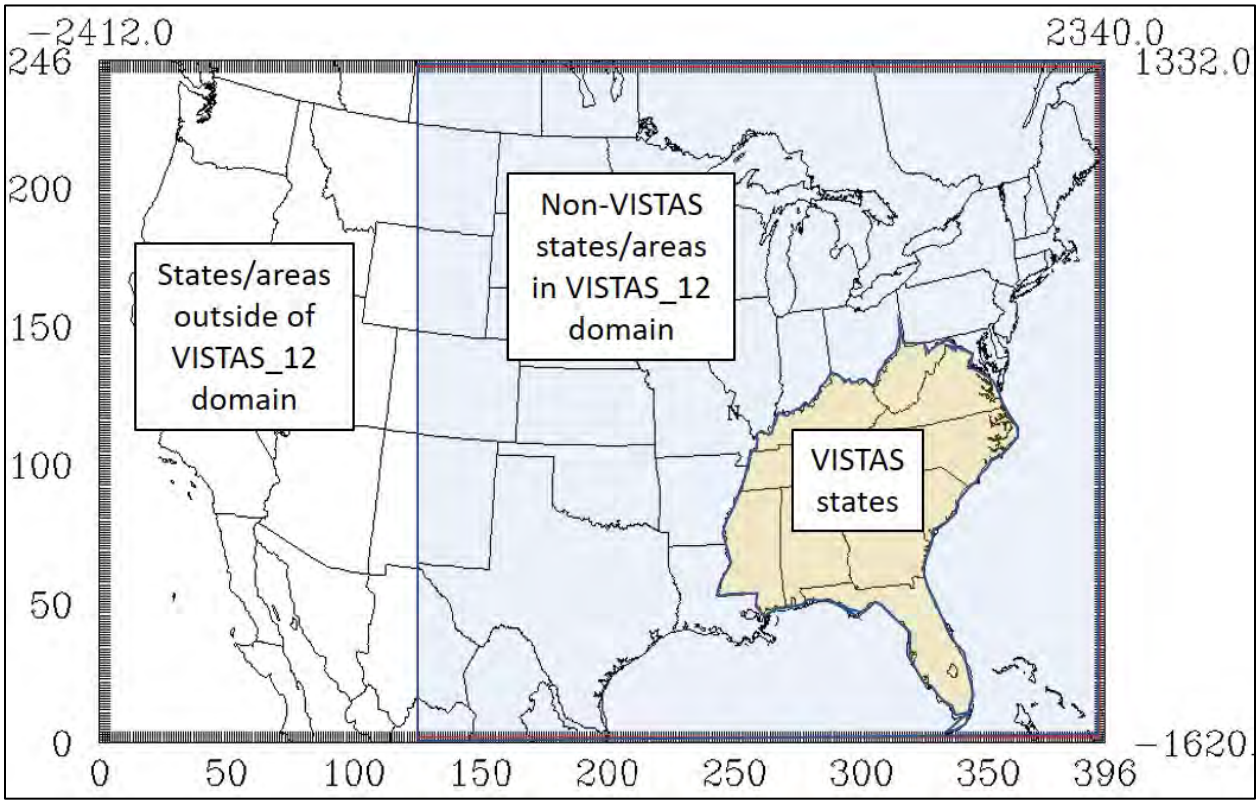

Figure 2-1. Geographic Areas for the VISTAS II Regional Haze Analysis Project

2.2 Pollutants of Interest

The pollutants of interest are the following criteria pollutants: carbon monoxide (CO); oxides of nitrogen (NO_x); particulate matter (PM) less than 10 microns (PM_{10}-PRI); PM less than 2.5 microns ($PM_{2.5}$-PRI); sulfur dioxide (SO_2); and volatile organic compounds (VOCs). Additionally, ammonia (NH_3) was also of interest as a precursor pollutant for PM.

2.3 Sectors and Years of Interest

For emissions modeling, all sectors were compiled for base year 2011 and projected year 2028. These include:

- Point Sources: Electric-generating units (EGU), non-EGU sources, railyards, and aircrafts activities (e.g., landing/takeoffs; ground-support equipment, and idling);
- Point-Fires: Fires data with emission release point locations;
- Nonpoint Sources: Nonpoint area sources, locomotives (outside the railyards), and commercial marine vessels (CMVs);
- Onroad Sources: Cars, trucks, buses, motorcycles, and Stage 2 refueling;
- Nonroad Sources: Off-road engines, such as for construction, lawn and garden, and recreational marine vessels; and
- Biogenics: Biogenic emissions from vegetation and soils using EPA's Biogenic Emissions Inventory System (BEIS) software.

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3. DATA SOURCES

The 2011 and 2028 emissions used for EPA's regional haze modeling are described in the documents:

- "Preparation of Emissions Inventories for the Version 6.3, 2011 Emissions Modeling Platform" dated August 2016;[2]
- "Technical Support Document (TSD) Updates to Emissions Inventories for the Version 6.3 2011 Emissions Modeling Platform for the Year 2028" dated October 2017[6]; and
- "EPA Base Case v.5.16 for 2023 Ozone Transport NODA Using IPM Incremental Documentation" dated December 2016.[7]

Appendix A-1 summarizes the 2011 "el" emissions inventory datasets (includes some "ek" files) retrieved from EPA's FTP site: ftp://ftp.epa.gov/EmisInventory/2011v6/v3platform/2011emissions/.

Appendix A-2 summarizes the 2028 "el" emissions inventory datasets retrieved from EPA's FTP site: ftp://ftp.epa.gov/EmisInventory/2011v6/v3platform/2028emissions/.

Additionally, ERG obtained the 2023 "el" emissions inventory datasets from EPA's FTP site: ftp://ftp.epa.gov/EmisInventory/2011v6/v3platform/2023emissions/.

Finally, ERG obtained from the Mid-Atlantic Regional Air Management Association (MARAMA) a 2028 emissions inventory for EGUs generated by the ERTAC EGU projection tool[8] from the CONUS 2.7 run.

3.1 Data Processing

All 2011, 2023, and 2028 emissions data were uploaded into Microsoft SQL Server and Microsoft Access. The data were then extracted for the ten VISTAS states for the pollutants of interest. ERG reviewed the data fields for completeness. The datasets were then merged together

[6] https://www.epa.gov/air-emissions-modeling/updates-2011-and-2028-emissions-version-63-technical-support-document

[7] https://www.epa.gov/airmarkets/epa-base-case-v516-2015-ozone-naaqs-transport-noda-using-ipm-incremental-documentation

[8] http://www.marama.org/2013-ertac-egu-forecasting-tool-documentation

to provide side-by-side analysis of emissions. ERG matched the emissions summaries published by EPA[9] to the extracted emissions for the ten VISTAS states.

3.2 2011 Base Year Emissions

The emissions data in the 2011 platform are primarily based on the 2011NEIv2 for point sources, nonpoint sources, CMVs, nonroad mobile sources, and fires. The onroad mobile source emissions are similar to those in the 2011NEIv2, but were generated using the released 2014a version of the Motor Vehicle Emissions Simulator (MOVES2014a). Fugitive dust emissions from anthropogenic sources (i.e., agricultural tilling and unpaved roads) are included in the nonpoint sector of the inventory, but wind-blown dust from natural sources is not accounted for in the inventory.

CAMx-ready emission inputs for 2011 were generated by EPA mainly by the SMOKE and BEIS emissions models. CAMx requires two emission input files for each day: (1) low level gridded emissions that are emitted directly into the first layer of the model from sources at the surface with little or no plume rise; and (2) elevated point sources (stacks) containing stack parameters from which the model can calculate plume rise.

EPA's 2011el emission platform in CAMx-ready format will be used without exception.

3.3 2028 Projection Year Emissions

Certain 2011 emission sectors were also projected by EPA to 2028 using various sector dependent methodologies. Onroad and nonroad mobile source emissions were created for 2028 using the MOVES and NONROAD models, respectively. Nonpoint area source emissions were prepared using growth and control factors simulating changes in economic conditions and environmental regulations anticipated to be fully implemented by calendar year 2028.

For projected year 2028 EGU point sources, states considered the EPA 2028el, the EPA 2023en, or 2028 emissions from the ERTAC EGU projection tool from the most recent CONUS 2.7 run. The EPA 2028el emissions inventory for EGUs considered the impacts of the Clean Power Plan (CPP), which was later vacated. Impacts of the CPP assumed that coal-fired EGUs

[9] State-level pollutant emissions by SCC were retrieved from: ftp://newftp.epa.gov/air/emismod/2011/v3platform/reports/2011el_and_2023el/2011el_2011ek_2017ek_2023el_state_fullSCC_summary.xlsx

would be shutdown and replaced by natural gas-fired EGUs. Thus, the EPA 2028el projected emissions for EGU emissions are not reflective of probable emissions for 2028. The ERTAC EGU emissions did not consider the impacts of the CPP.

For projected year 2028 non-EGU point sources, most states considered the EPA 2023en and EPA 2028el emissions, as well as providing their own emissions. For example, NC developed their own 2028 non-EGU point source emissions inventory by applying growth and control factors and facility closures to the data in EPA's 2016 modeling platform Georgia used 2016 emissions (or 2014 emissions if 2016 was not available) to represent 2028 emissions for the 33 non-EGU facilities with over 100 tons per year (tpy) of SO_2 in 2011 (does not include Hartsfield-Jackson Atlanta International Airport).

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4. STATE EMISSIONS REVIEW

ERG worked with SESARM on the final format of the comparison tables, including additional fields useful for review of the 2011, 2023, and 2028 emissions. For point sources, additional information included: facility information; source classification code (SCC) descriptions; Tier descriptions; unit, process, and release point descriptions; ORIS boiler identifiers; control information; and absolute and percentage differences between each selected pair of different vintage emissions inventories. The point sources were split between EGUs and non-EGUs. The "Point EGU" file included all EGU emission process records plus all non-EGU emission process records occurring at EGUs (e.g., commercial-sized boilers operating at the EGU). The "Point Non-EGU" file included industrial/commercial/institutional emission sources plus point source location emissions from aircrafts (e.g., landing/takeoffs) and railyards.

For all other sectors, county-level emissions summaries included SCC and Tier level descriptions to go along with absolute and percentage differences between each selected pair of emissions inventories.

4.1 Incorporation of Reviewer Comments

States were given three weeks to review the emissions summaries. After review of the emissions summary tables, states were asked to:

- Provide updated emissions, add new emission records, and to mark emission records for deletion;[10]
- Provide updated or new stack parameters; and

[10] VA Department of Environmental Quality (VADEQ) noted via e-mail and attachments to ERG on 6/7/2018 that four sources in the 2011 NEI did not match their internal emissions inventory:
1) Meadwestvaco Covington (EIS Facility ID = 5798711): EPA's 2011 NEI facility summary spreadsheet shows 356.2 tons of SO_2 from this facility in 2011. Emissions reported to VA DEQ for 2011 are 7,850 tons of SO_2.
2) Chemical Lime Company (EIS Facility ID 4184511): The 2011 NEI data reflect values submitted by the facility (514.9 tons NO_X, 896.8 tons SO_2). The facility has since submitted updated emissions factors such that 2011 emissions for this facility are estimated to be 1,395 tons NO_X and 5,710 tons SO_2.
3) Old Virginia Brick Company (EIS Facility ID = 8517811): EPA's 2011 NEI facility data show 1,178 tons of NO_X emitted from this facility. Virginia's internal database shows 5.8 tons of NO_X in 2011 from this facility. The facility has since permanently shut down.
4) Celanese (EIS Facility ID = 4004311)/Duke Energy of Narrows (EIS Facility ID 10698711): VADEQ noted that SO_2 and NO_X emissions from the steam plant at Celanese Acetate (EIS Facility ID = 4004311) were not included in the EPA 2011 modeling inventory. These emissions are included in the 2011 NEI under EIS Facility ID = 10698711 since at that time the steam plant was under separate ownership and therefore was considered a separate, support facility. In 2012 ownership of the steam plant reverted to Celanese, and from 2012 on, emissions from the steam plant were included with Celanese's emissions. The 2011 modeling inventory for VA does not appear to account for 3,540 tons of NO_X and 6,540 tons of SO_2 from EIS facility # 10698711.

- Comment on whether updates to nonpoint, onroad, nonroad, and point-fires will be provided.

ERG worked with the states to review the emissions adjustments and ensure that the revised values are reasonable. All states provided at least one update to the EGU and non-EGU emissions inventory.

Table 4-1 presents a summary of action items provided by each VISTAS state in preparing the 2028 EGU emissions inventory. An action item is generally applied to all pollutants for the emission process records provided for state review, unless otherwise noted.

Table 4-1. Summary of Point EGU Action Items for the Revised 2028 Projections Year

Action Item	AL	FL	GA	KY	MS	NC	SC	TN	VA	WV
EGU Retired for 2028; set EPA 2028 pollutant emissions to 0.	15	185	2	122	86	66	181	0	172	6
Do not use 2028 pollutant emission records; not likely to exist.	43	255	0	18	151	574	14	154	100	256
Use EPA 2011 emissions for all pollutants.	0	0	0	23	0	0	16	28	4	0
Use EPA 2023 emissions for all pollutants.	0	68	362	626	0	0	18	10	39	0
Use EPA 2023 emissions for all pollutants except NO_x. For NO_x, use state-provided emissions.	0	0	0	0	0	0	0	0	4	0
Use EPA 2028 emissions for all pollutants.	325	344	0	1	0	0	406	73	160	0
Use ERTAC 2028 emissions for all pollutants.	75	254	0	2	72	222	155	359	167	64
Use ERTAC 2028 emissions for all pollutants except NH_3. For NH_3, use state-provided emissions.	0	0	0	0	0	0	1	0	0	0
Use ERTAC 2028 emissions for all pollutants except PM_{10}-PRI and $PM_{2.5}$-PRI. For those, use state-provided emissions.	0	0	0	0	0	0	0	0	2	0
Use state-provided 2028 emissions for all pollutants.	0	11	0	0	4	8	29	0	59	0
Totals	**458**	**1,117**	**364**	**792**	**313**	**870**	**820**	**624**	**707**	**326**

Table 4-2 presents a summary of action items provided by each VISTAS state in preparing the 2028 non-EGU emissions inventory. An action item is generally applied to all pollutants for the emission process records provided for state review, unless otherwise noted.

Table 4-2. Summary of Point Non-EGU Action Items for the Revised 2028 Projections Year

Action Item	AL	FL	GA	KY	MS	NC	SC	TN	VA	WV
Adjust state-provided facility-level 2028 emissions for all pollutants to the process-level using process-level emission proportions from EPA 2023.	0	0	950	0	0	0	0	0	0	0
Do not use 2028 pollutant emission records; not likely to exist.	104	244	0	16	437	4,816	132	57	0	404
Unit Retired for 2028; set EPA 2028 pollutant emissions to 0.	75	21	0	1,212	0	0	316	6	54	149
Use EPA 2011 emissions for all pollutants.	0	0	0	979	0	0	30	1	22	0
Use EPA 2014 NEI data for all pollutants.	0	0	0	0	0	0	0	165	0	0
Use EPA 2023 emissions for all pollutants.	0	0	5,784	31,171	0	0	0	0	1	0
Use EPA 2023 emissions for all pollutants except NO_x. For NO_x, use state-provided emissions.	0	0	0	0	0	0	0	0	3	0
Use EPA 2028 emissions for all pollutants.	6,575	7,464	0	21	5,565	0	8,379	6,818	4,314	3,999
Use EPA 2028 emissions for all pollutants except CO. For CO, use state-provided emissions.	0	0	0	0	0	0	0	0	0	1
Use EPA 2028 emissions for all pollutants except CO, NO_x, and SO_2. For the pollutants, use state-provided emissions.	0	0	0	0	0	0	0	0	0	1
Use EPA 2028 emissions for all pollutants except CO, NO_x, and VOC. For the pollutants, use state-provided emissions.	0	0	0	0	0	0	0	0	0	7
Use EPA 2028 emissions for all pollutants except NO_x. For NO_x, use state-provided emissions.	0	0	0	0	0	0	0	1	0	27
Use EPA 2028 emissions for all pollutants except NO_x, NH_3, and VOC. For these pollutants, use state-provided emissions.	0	0	0	0	0	0	0	0	0	1

Table 4-2. Summary of Point Non-EGU Action Items for the Revised 2028 Projections Year

Action Item	AL	FL	GA	KY	MS	NC	SC	TN	VA	WV
Use EPA 2028 emissions for all pollutants except SO_2. For SO_2, use state-provided emissions.	0	0	0	0	0	0	0	0	0	1
Use EPA 2028 emissions for all pollutants except VOC. For VOC, use state-provided emissions.	0	0	0	0	0	0	0	0	0	1
Use state-provided 2028 emissions for all pollutants.	0	0	0	0	0	16,914	0	0	0	1
Use state-provided 2028 emissions for all pollutants except NH_3. For NH_3, use EPA 2028.	0	0	2	0	2	0	214	181	15	93
Use state-provided 2028 emissions for all pollutants except NH_3, PM_{10}-PRI and $PM_{2.5}$-PRI. For these pollutants, use EPA 2028.	0	0	0	0	0	0	0	0	0	3
Use state-provided 2028 emissions for all pollutants except PM_{10}-PRI and $PM_{2.5}$-PRI. For these pollutants, use EPA 2028.	0	0	0	0	0	0	0	0	0	1
Use state-provided 2028 emissions for all pollutants except SO_2. For SO_2, use EPA 2028.	0	0	0	0	0	0	0	0	0	1
Use state-provided 2028 emissions for all pollutants except VOC. For VOC, use EPA 2028.	0	0	0	0	0	0	0	0	0	1
Totals	**6,754**	**7,729**	**6,736**	**33,399**	**6,004**	**21,730**	**9,071**	**7,229**	**4,409**	**4,691**

Once updates were made, ERG provided revised files for states to approve. Where updates to emissions and/or stack parameters were made, ERG documented these changes in the final Excel worksheets. In some situations, ERG was directed by the state agency to make additional updates not provided in the Excel worksheets.[11,12]

The following states provided stack parameter information on new and modified sources:

- GA Department of Natural Resources (GA DNR): One facility
  - GA Power Company - Plant Scherer (Facility ID = 8354711) – thirteen emission release points.

- NC Department of Environmental Quality (NC DEQ): Eight facilities
  - Asheville EGU (Facility ID = NEW_2706) – two emission release points;
  - Cleveland County Generation (Facility ID = 16600211) – four emission release points;
  - Duke Energy Carolinas, LLC - Buck Steam Station (Facility ID = 8506911) – one emission release point;
  - Duke Energy Carolinas, LLC - Cliffside Steam Station (Facility ID = 8300611) – one emission release point;
  - Duke Energy Carolinas, LLC - Dan River Combined Cycle Facility (Facility ID = 8009611) – one emission release point;
  - Duke Energy Progress - H.F. Lee Steam Electric Plant (Facility ID = 7265811) – one emission release point;
  - Duke Energy Progress, L.V. Sutton Electric Plant (Facility ID = 8547211) – two emission release points; and
  - NCEMC - Hamlet Plant (Facility ID = 10631811) – two emission release points.

- TN Department of Environment and Conservation (TDEC): Four facilities
  - Eastman Chemical Company (Facility ID = 3982311) – one emission release point;
  - Holston Army Ammunition Plant (HSAAP) (Facility ID = 5018911) – four emission release points;
  - Tate & Lyle, Loudon (Facility ID = 4129211) – two emission release points; and
  - TVA Gallatin Fossil Plant (Facility ID = 5610411) – two emission release points.

[11] In an e-mail dated June 12, 2018, the Tennessee Department of Environment and Conservation (TDEC) directed ERG to use the 2014 NEI Version 2 emissions data for Bowater (EIS Facility ID = 6444111) for 2028 projected emissions. These emissions were not in the 2011el or 2028el emission inventories.

[12] In an e-mail dated June 13, 2018, the Georgia Department of Natural Resources (GA DNR) provided facility-level emissions updates for the 2028 projected emissions. GA DNR directed ERG to scale the 2028 facility-level emissions in proportion to EPA's 2023en process-level emissions.

4.2 QA/QC of Stack Parameters

For the final 2028 EGU and non-EGU emissions, stack parameters were checked for completeness of six data fields: 1) stack height; 2) stack diameter; 3) exit gas temperature; 4) exit gas velocity; 5) exit gas flowrate; and 6) emission release type. EPA's Emission Inventory System (EIS) does allow for two of the following three parameters to be updated: stack diameter, exit gas velocity, and exit gas flowrate. As such, if two of the three parameters are populated, then the third can be calculated. If stack height and/or exit gas temperature were missing, then ERG used defaults by SCC to gap-fill. These stack parameter defaults were generated for EPA's Risk and Technology Review (RTR) program. If emission release point type was not populated, then the SCC and/or associated stack parameters (e.g., exit gas velocity) were reviewed to determine if the process emits through a stack or is fugitive. If all six stack parameter fields were missing, then ERG populated missing stack parameters with the RTR stack parameter defaults by SCC.

The following facilities had stack parameters not populated, and were thus populated with SCC defaults:

- GA: One facility
  - Albany Green Energy (Facility ID = ORIS60340) – one emission release point.
- KY: One facility
  - PJM_West_KY_Combustion Turbine (Facility ID = ORIS84024) – one emission release point.
- NC: One facility
  - Cleveland County Generation (Facility ID = 16600211) – four emission release points.
- SC: Six facilities[13]
  - Dominion Carolina Gas Trans, LLC Moore (Facility ID = 2060-0528) – eleven emission release points;
  - Georgia Pacific Wood Products (Facility ID = 16860811) – twenty-four emission release points;
  - Michelin North America Inc. US10 (Facility ID = 16862511) – four emission release points;

[13] SC DHEC notes that stack parameter data were available for these facilities, but due to time constraints, the information was not obtained by ERG.

- S_VACA_SC_O/G Steam (Facility ID = ORIS84032) – one emission release point;
- Sumter Heat and Power LLC (Facility ID = 17630111) – one emission release point; and
- Union Renewable Energy (Facility ID = 17630411) – two emission release points.

- VA: Nine facilities
  - AOL (Facility ID = ORIS83003) – one emission release point;
  - AOL (Facility ID = ORIS83004) – one emission release point;
  - AOL (Facility ID = ORIS83006) – one emission release point;
  - Bristol Plant (Facility ID = ORIS60222) – twelve emission release points;
  - DuPont Fabros (Facility ID = ORIS83007) – one emission release point;
  - MCI (Facility ID = ORIS83005) – one emission release point;
  - Micron Technology Incorporated (Facility ID = ORIS59614) – one emission release point;
  - Monterey Diesel Generation Facility (Facility ID = ORIS83002) – ten emission release points; and
  - Quest Diagnostics (Facility ID = ORIS83001) – one emission release point.

- WV: Four facilities
  - Marathon Petroleum Butane Cavern (Facility ID = 16886511) – one emission release point;
  - Marathon Petroleum Neal Propane Cavern (Facility ID = 16886611) – one emission release point;
  - Williams Ohio Valley Midstream Fort Beeler Station (Facility ID = 16886211) – seven emission release points; and
  - Williams Ohio Valley Midstream Moundsville (Facility ID = 16886311) – two emission release points.

4.3 QA/QC of Emissions

For the nonpoint, onroad, nonroad, and point-fires categories, no state agencies provided formal updates.[14] For the point EGU and point non-EGU source categories, emission estimates for 2028 were prepare in Flat File 2010 (FF10) format. ERG compared emission estimates to ensure that all data were accounted for:

- Emissions from the revised spreadsheets for point EGU and point non-EGU matched the master ERG database;

[14] SC DHEC noted in an e-mail to ERG on 6/11/2018 that new cement manufacturing emissions in the EPA 2028el nonpoint inventory were inserted for Dorchester County, SC. SC DHEC does not believe that this new facility/process will exist in 2028. The NO_x emissions for 2028 are 1,139 tpy and the SO_2 emissions for 2028 are 527 tpy. However, SC DHEC agreed to retain the new cement emissions for modeling purposes.

- Emissions from the master ERG database matched the FF10 files for point EGU and point non-EGU sources.

Additionally, all key data fields necessary for emissions modeling were populated for completeness.

4.4 Point EGU and Non-EGU Emissions Comparison by State

Table 4-3 summarizes the revised 2028 point EGU and non-EGU emissions for Alabama.

Table 4-3. Alabama 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Revised 2028 EGU Emissions (tpy)	EPA 2028el EGU Emissions (tpy)	% Diff for EGU	Revised 2028 Non-EGU Emissions (tpy)	EPA 2028el Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	11,845	27,988	-57.7%	65,588	63,285	3.6%
NH_3	862	2,007	-57.0%	1,522	1,399	8.8%
NO_x	27,964	23,699	18.0%	52,426	53,438	-1.9%
PM_{10}-PRI	3,836	6,495	-40.9%	18,496	18,336	0.9%
$PM_{2.5}$-PRI	2,679	4,999	-46.4%	15,246	15,104	0.9%
SO_2	17,031	28,892	-41.1%	70,670	72,276	-2.2%
VOC	1,266	2,422	-47.7%	24,976	23,958	4.2%

Table 4-4 summarizes the revised 2028 point EGU and non-EGU emissions for Florida.

Table 4-4. Florida 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Revised 2028 EGU Emissions (tpy)	EPA 2028el EGU Emissions (tpy)	% Diff for EGU	Revised 2028 Non-EGU Emissions (tpy)	EPA 2028el Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	26,658	65,259	-59.2%	100,250	94,837	5.7%
NH_3	3,520	4,129	-14.8%	1,177	2,440	-51.8%
NO_x	27,659	44,775	-38.2%	40,347	38,233	5.5%
PM_{10}-PRI	9,716	10,231	-5.0%	13,646	12,585	8.4%
$PM_{2.5}$-PRI	8,478	7,917	7.1%	11,802	10,777	9.5%
SO_2	29,220	54,015	-45.9%	34,281	35,648	-3.8%
VOC	1,406	2,811	-50.0%	26,536	25,669	3.4%

Table 4-5 summarizes the revised 2028 point EGU and non-EGU emissions for Georgia.

Table 4-5. Georgia 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Revised 2028 EGU Emissions (tpy)	EPA 2028el EGU Emissions (tpy)	% Diff for EGU	Revised 2028 Non-EGU Emissions (tpy)	EPA 2028el Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	9,986	25,058	-60.1%	57,245	67,860	-15.6%
NH_3	1,178	1,508	-21.9%	5,595	5,678	-1.5%
NO_x	25,927	13,163	97.0%	41,270	45,540	-9.4%
PM_{10}-PRI	5,227	3,876	34.8%	12,382	15,695	-21.1%
$PM_{2.5}$-PRI	4,340	3,374	28.6%	9,653	12,502	-22.8%
SO_2	18,474	27,533	-32.9%	18,591	23,519	-21.0%
VOC	1,062	885	19.9%	24,524	27,198	-9.8%

Table 4-6 summarizes the revised 2028 point EGU and non-EGU emissions for Kentucky.

Table 4-6. Kentucky 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Revised 2028 EGU Emissions (tpy)	EPA 2028el EGU Emissions (tpy)	% Diff for EGU	Revised 2028 Non-EGU Emissions (tpy)	EPA 2028el Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	11,851	24,801	-52.2%	85,720	86,082	-0.4%
NH_3	681	705	-3.4%	449	508	-11.5%
NO_x	37,019	43,411	-14.7%	29,221	31,048	-5.9%
PM_{10}-PRI	8,293	12,180	-31.9%	15,902	16,253	-2.2%
$PM_{2.5}$-PRI	6,475	9,409	-31.2%	10,458	10,619	-1.5%
SO_2	56,319	81,304	-30.7%	18,821	19,083	-1.4%
VOC	1,271	1,212	4.9%	43,373	46,814	-7.4%

Table 4-7 summarizes the revised 2028 point EGU and non-EGU emissions for Mississippi.

Table 4-7. Mississippi 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Revised 2028 EGU Emissions (tpy)	EPA 2028el EGU Emissions (tpy)	% Diff for EGU	Revised 2028 Non-EGU Emissions (tpy)	EPA 2028el Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	4,939	18,160	-72.8%	36,787	34,061	8.0%
NH_3	614	1,288	-52.3%	1,925	1,784	7.9%
NO_x	18,735	11,210	67.1%	33,880	32,503	4.2%
PM_{10}-PRI	1,483	1,923	-22.9%	9,169	9,184	-0.2%
$PM_{2.5}$-PRI	1,181	1,777	-33.5%	7,749	7,765	-0.2%
SO_2	6,530	6,253	4.4%	14,250	19,255	-26.0%
VOC	473	2,183	-78.3%	27,102	25,389	6.7%

Table 4-8 summarizes the revised 2028 point EGU and non-EGU emissions for North Carolina.

Table 4-8. North Carolina 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Revised 2028 EGU Emissions (tpy)	EPA 2028el EGU Emissions (tpy)	% Diff for EGU	Revised 2028 Non-EGU Emissions (tpy)	EPA 2028el Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	12,053	22,086	-45.4%	46,358	33,823	37.1%
NH_3	105	1,284	-91.8%	1,356	1,271	6.7%
NO_x	27,811	18,528	50.1%	38,053	30,418	25.1%
PM_{10}-PRI	4,127	3,203	28.9%	12,838	8,590	49.4%
$PM_{2.5}$-PRI	3,568	2,763	29.1%	8,875	5,866	51.3%
SO_2	19,734	11,548	70.9%	15,498	21,407	-27.6%
VOC	640	1,075	-40.4%	47,066	29,129	61.6%

Table 4-9 summarizes the revised 2028 point EGU and non-EGU emissions for South Carolina.

Table 4-9. South Carolina 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Revised 2028 EGU Emissions (tpy)	EPA 2028el EGU Emissions (tpy)	% Diff for EGU	Revised 2028 Non-EGU Emissions (tpy)	EPA 2028el Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	13,676	11,181	22.3%	89,997	89,363	0.7%
NH_3	913	657	38.9%	1,704	1,657	2.8%
NO_x	11,458	12,303	-6.9%	24,594	22,613	8.8%
PM_{10}-PRI	3,486	6,611	-47.3%	6,441	6,322	1.9%
$PM_{2.5}$-PRI	2,751	4,159	-33.9%	4,638	4,530	2.4%
SO_2	10,774	18,231	-40.9%	18,827	17,885	5.3%
VOC	1,864	1,847	0.9%	20,763	22,387	-7.3%

Table 4-10 summarizes the revised 2028 point EGU and non-EGU emissions for Tennessee.

Table 4-10. Tennessee 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Revised 2028 EGU Emissions (tpy)	EPA 2028el EGU Emissions (tpy)	% Diff for EGU	Revised 2028 Non-EGU Emissions (tpy)	EPA 2028el Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	4,403	5,837	-24.6%	48,950	45,967	6.5%
NH_3	189	419	-54.8%	991	1,019	-2.7%
NO_x	10,086	10,025	0.6%	35,793	36,007	-0.6%
PM_{10}-PRI	3,860	5,608	-31.2%	11,074	10,755	3.0%
$PM_{2.5}$-PRI	3,398	3,919	-13.3%	8,171	7,892	3.5%
SO_2	12,114	28,429	-57.4%	11,333	8,781	29.1%
VOC	635	416	52.6%	33,238	33,717	-1.4%

Table 4-11 summarizes the revised 2028 point EGU and non-EGU emissions for Virginia.

Table 4-11. Virginia 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Revised 2028 EGU Emissions (tpy)	EPA 2028el EGU Emissions (tpy)	% Diff for EGU	Revised 2028 Non-EGU Emissions (tpy)	EPA 2028el Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	5,949	31,807	-81.3%	33,899	32,019	5.9%
NH_3	444	1,379	-67.8%	1,396	1,400	-0.3%
NO_x	13,338	10,207	30.7%	29,872	31,321	-4.6%
PM_{10}-PRI	2,979	853	249.2%	5,764	5,849	-1.5%
$PM_{2.5}$-PRI	1,568	747	109.7%	4,571	4,607	-0.8%
SO_2	3,389	2,335	45.2%	16,450	16,967	-3.0%
VOC	1,016	650	56.2%	17,400	17,498	-0.6%

Table 4-12 summarizes the revised 2028 point EGU and non-EGU emissions for West Virginia.

Table 4-12. West Virginia 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Revised 2028 EGU Emissions (tpy)	EPA 2028el EGU Emissions (tpy)	% Diff for EGU	Revised 2028 Non-EGU Emissions (tpy)	EPA 2028el Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	12,968	11,894	9.0%	33,399	33,581	-0.5%
NH_3	70	840	-91.7%	187	215	-12.9%
NO_x	46,722	27,315	71.0%	18,332	22,530	-18.6%
PM_{10}-PRI	11,499	11,311	1.7%	3,214	4,292	-25.1%
$PM_{2.5}$-PRI	9,574	7,604	25.9%	2,217	2,963	-25.2%
SO_2	57,829	46,075	25.5%	5,575	15,151	-63.2%
VOC	1,100	779	41.3%	7,596	8,046	-5.6%

Figures 4-1 through 4-7 present pollutant emission bubble maps highlighting emission changes for the point EGU sector from the EPA 2028el inventory to the revised VISTAS 2028 inventory. Similarly, Figures 4-8 through 4-14 present pollutant emission bubble maps highlighting emission changes for the point non-EGU sector from the EPA 2028el inventory to the revised VISTAS 2028 inventory. Appendix B presents these maps at the state-pollutant level. Decreasing emissions are presented in shades of blue (i.e., where the EPA2028el emissions were higher than the revised VISTAS 2028 emissions), while increasing emissions are presented in shades of red (i.e., where the EPA2028el emissions were lower than the revised VISTAS 2028 emissions).

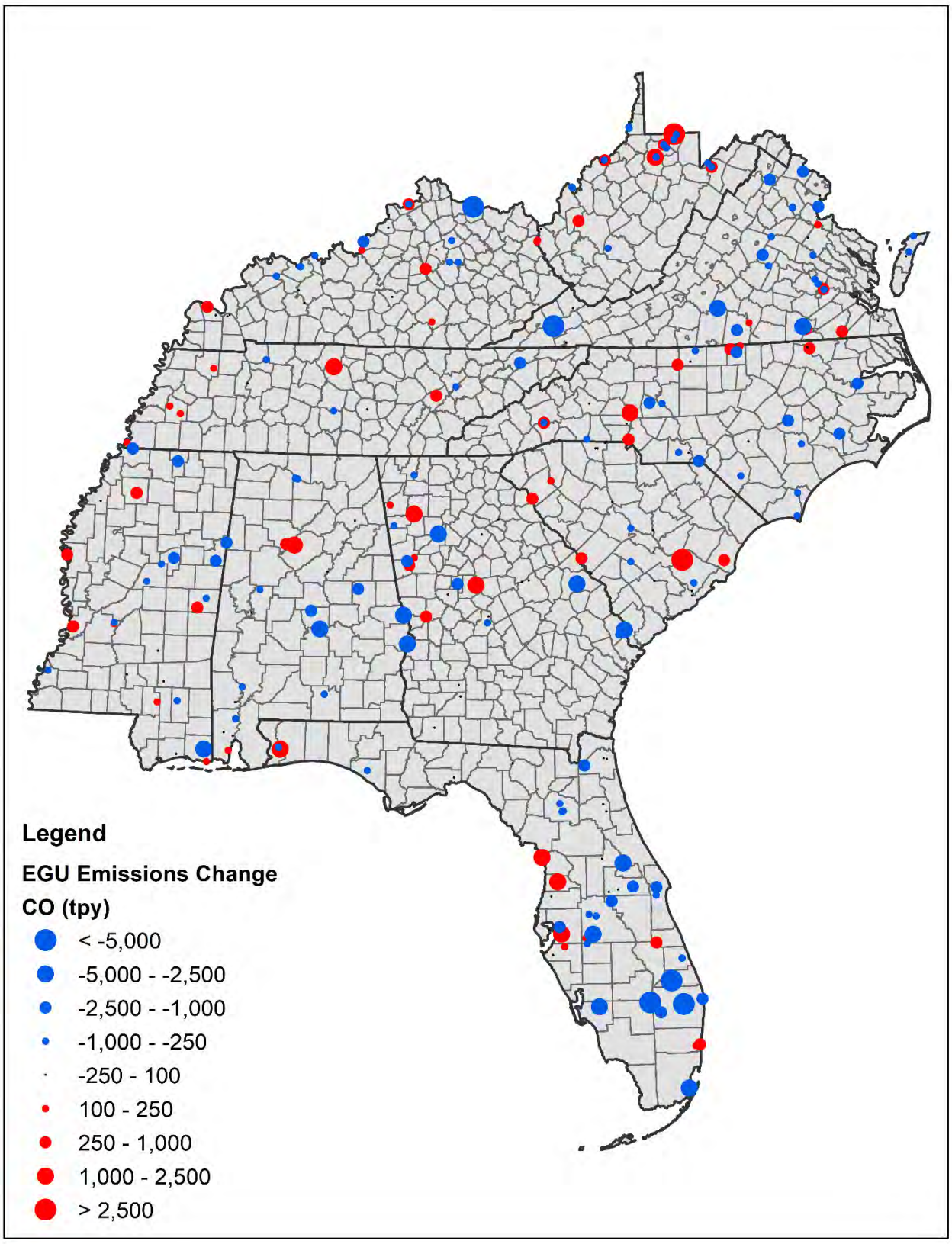

Figure 4-1. Point EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

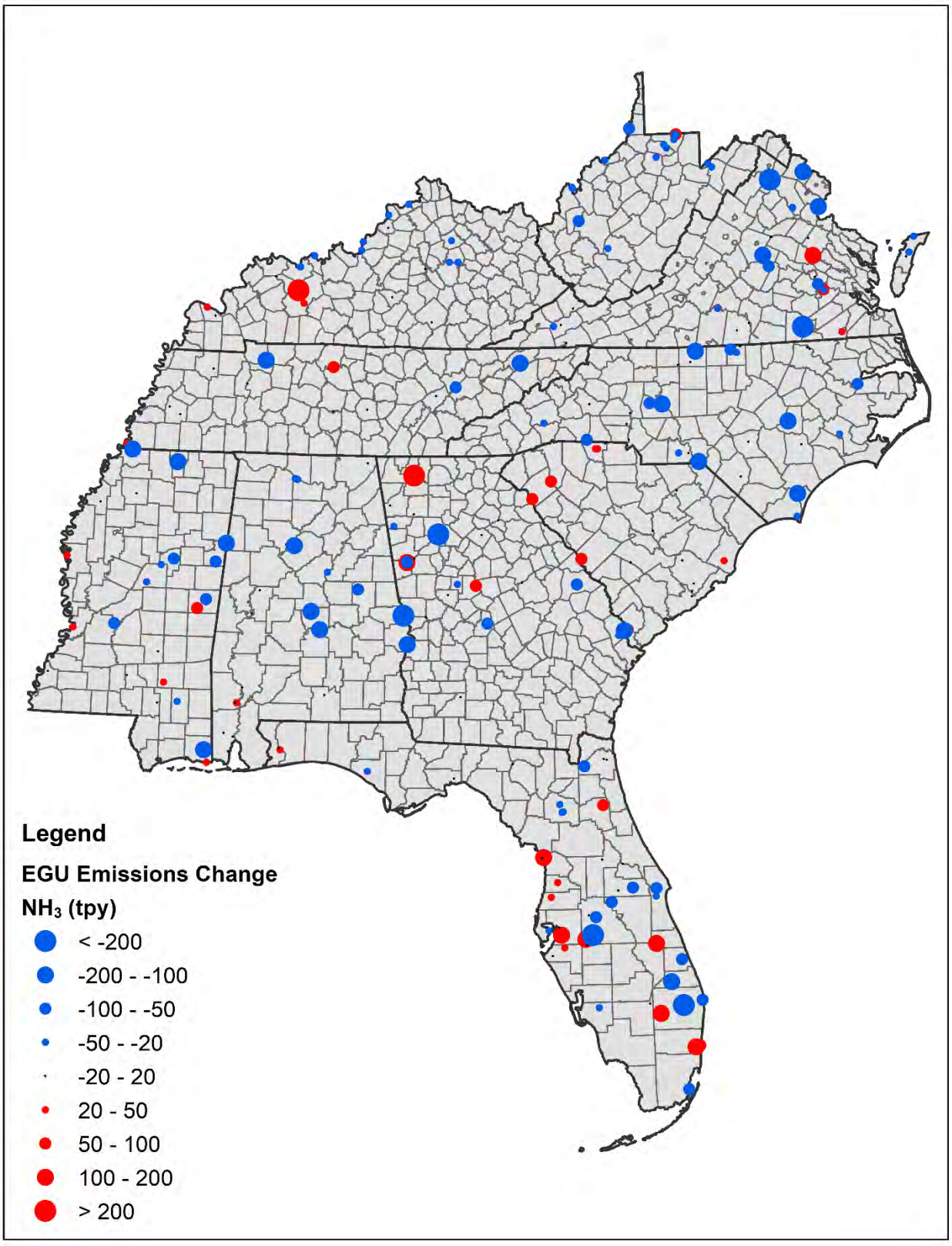

Figure 4-2. Point EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

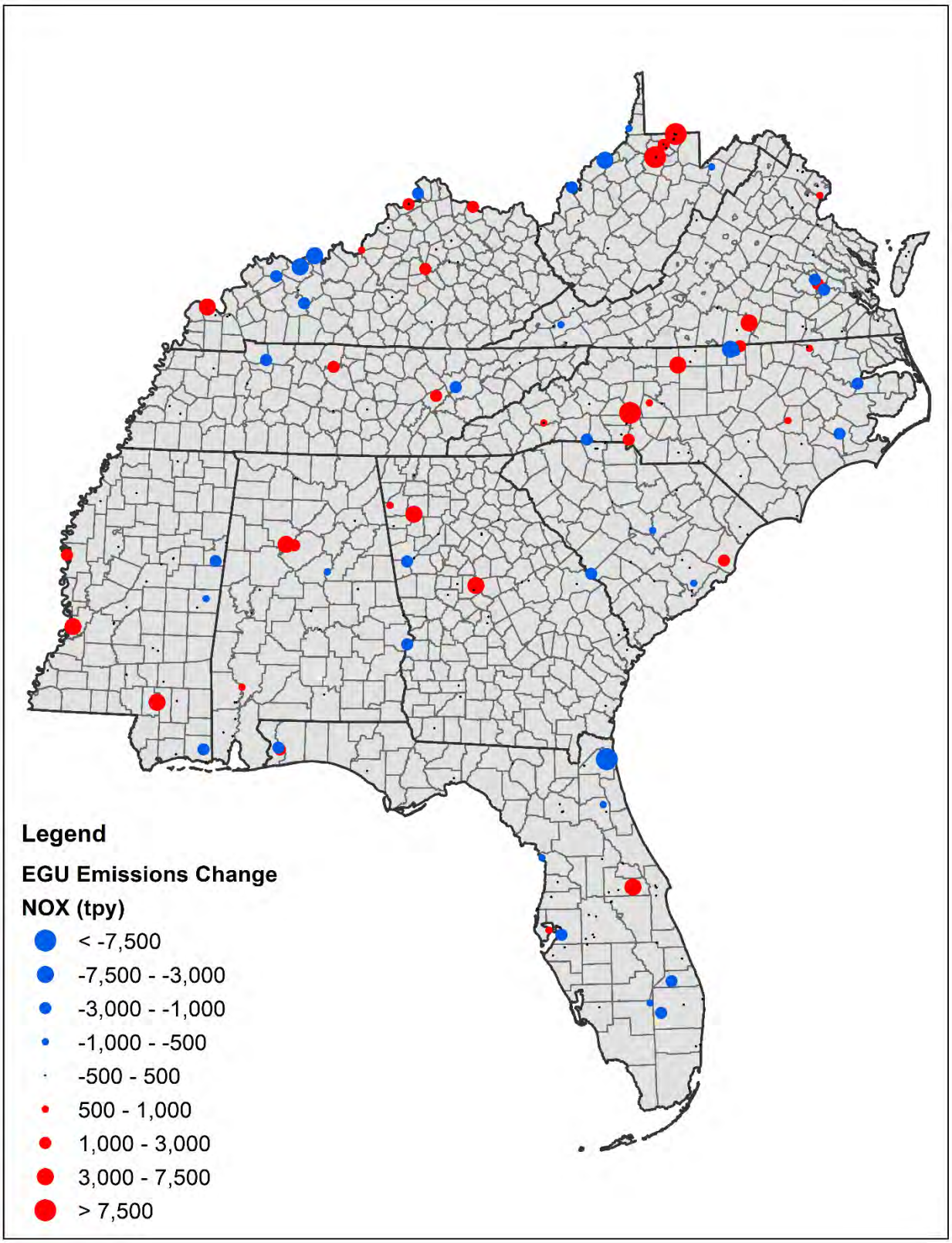

Figure 4-3. Point EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

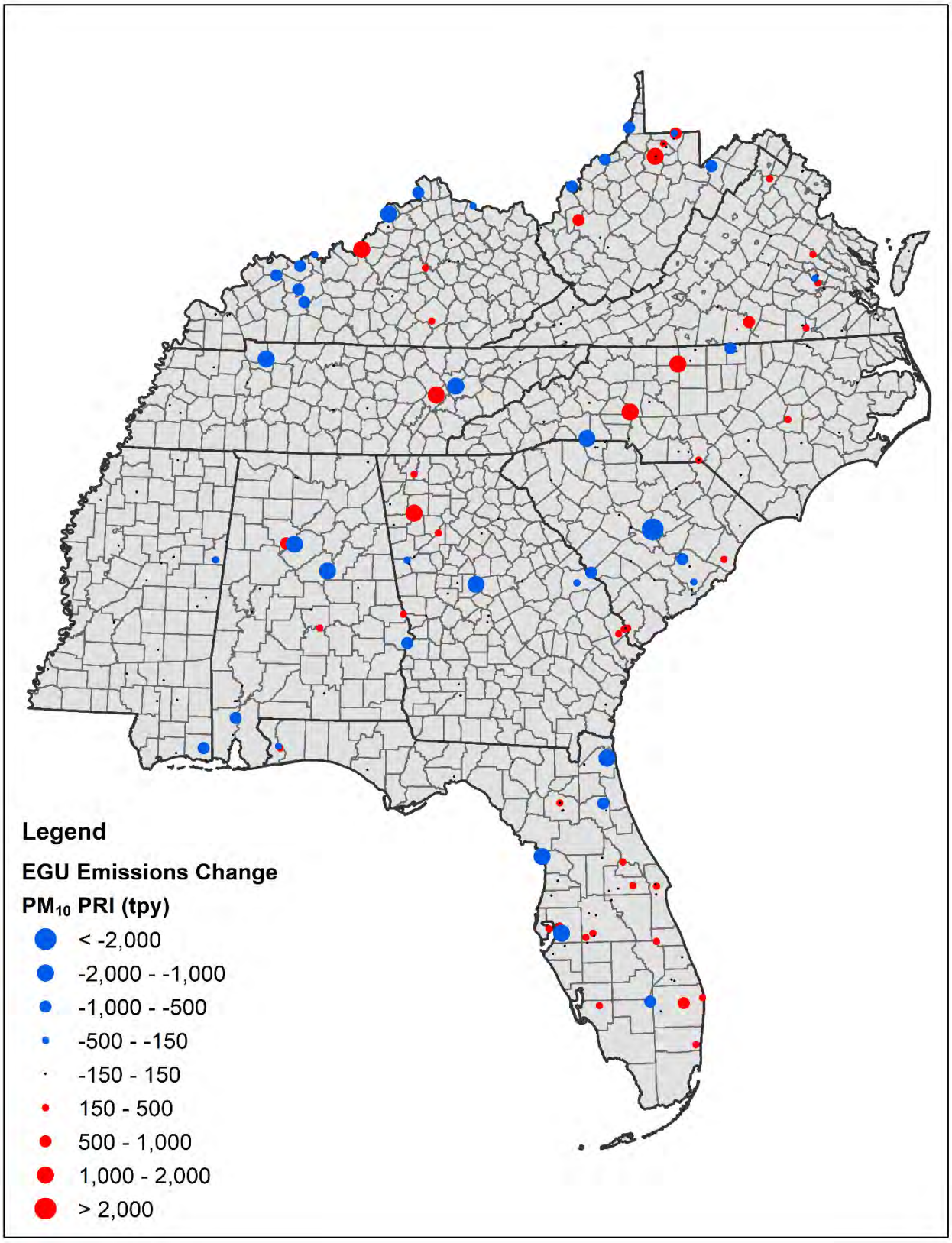

Figure 4-4. Point EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

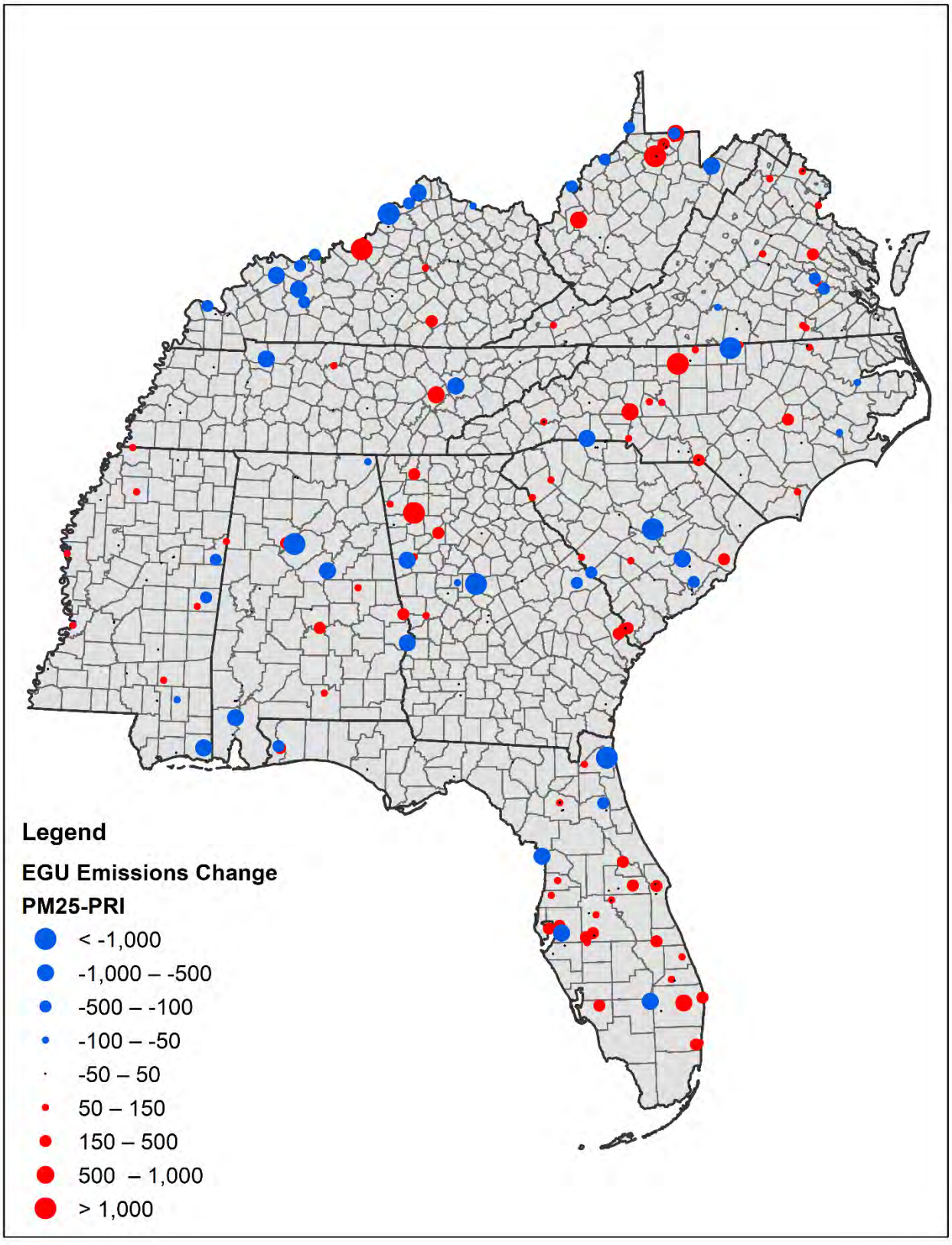

Figure 4-5. Point EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

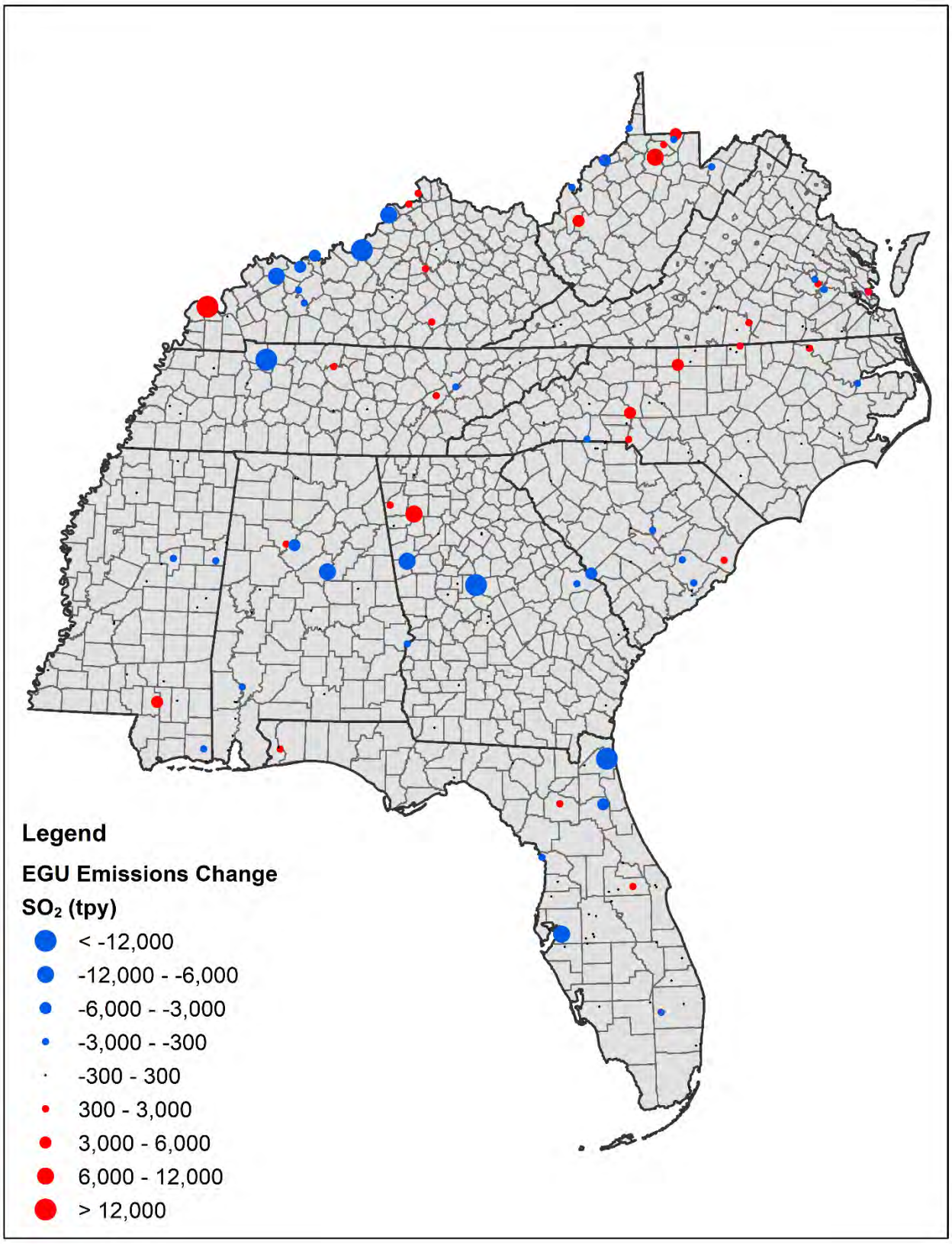

Figure 4-6. Point EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

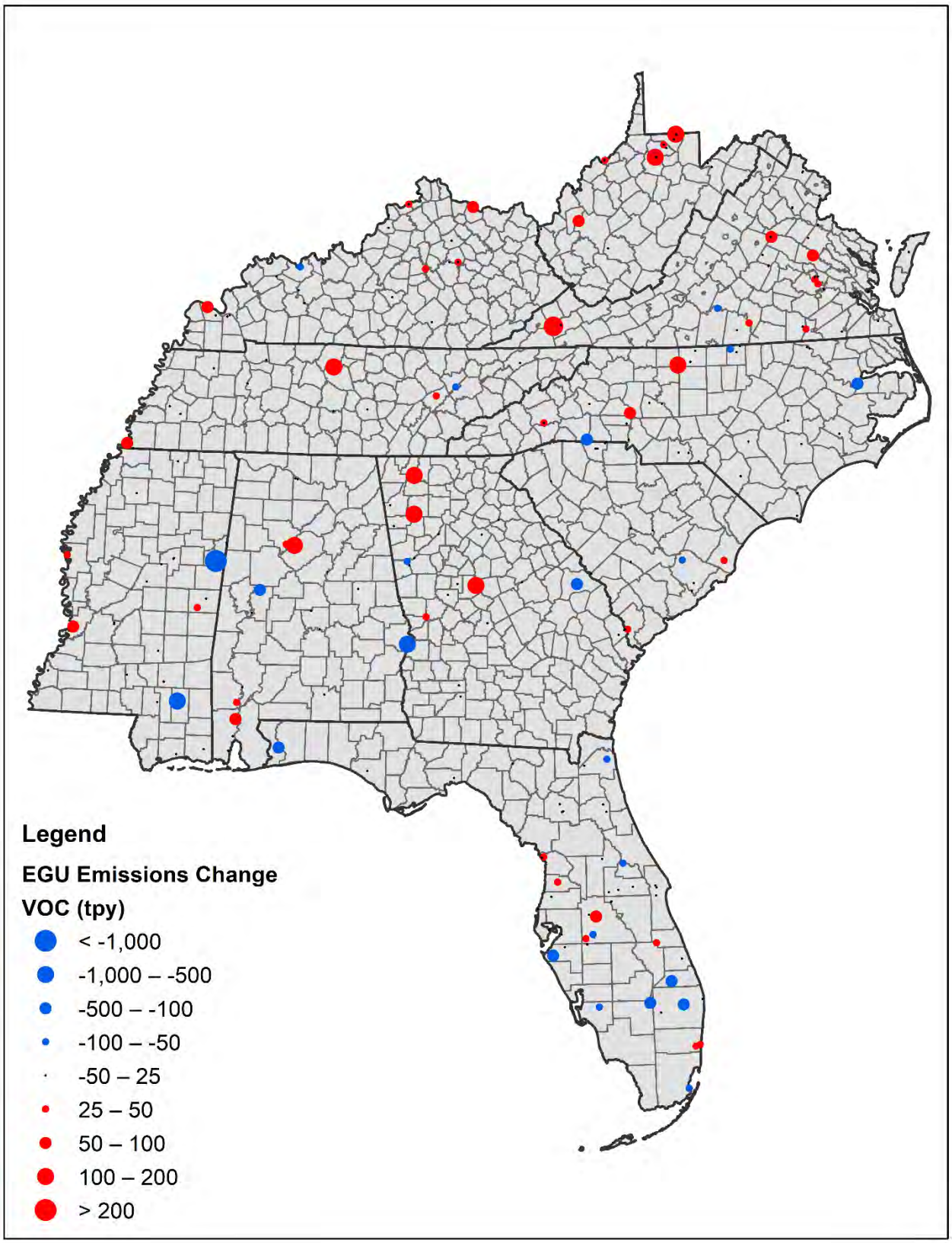

Figure 4-7. Point EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

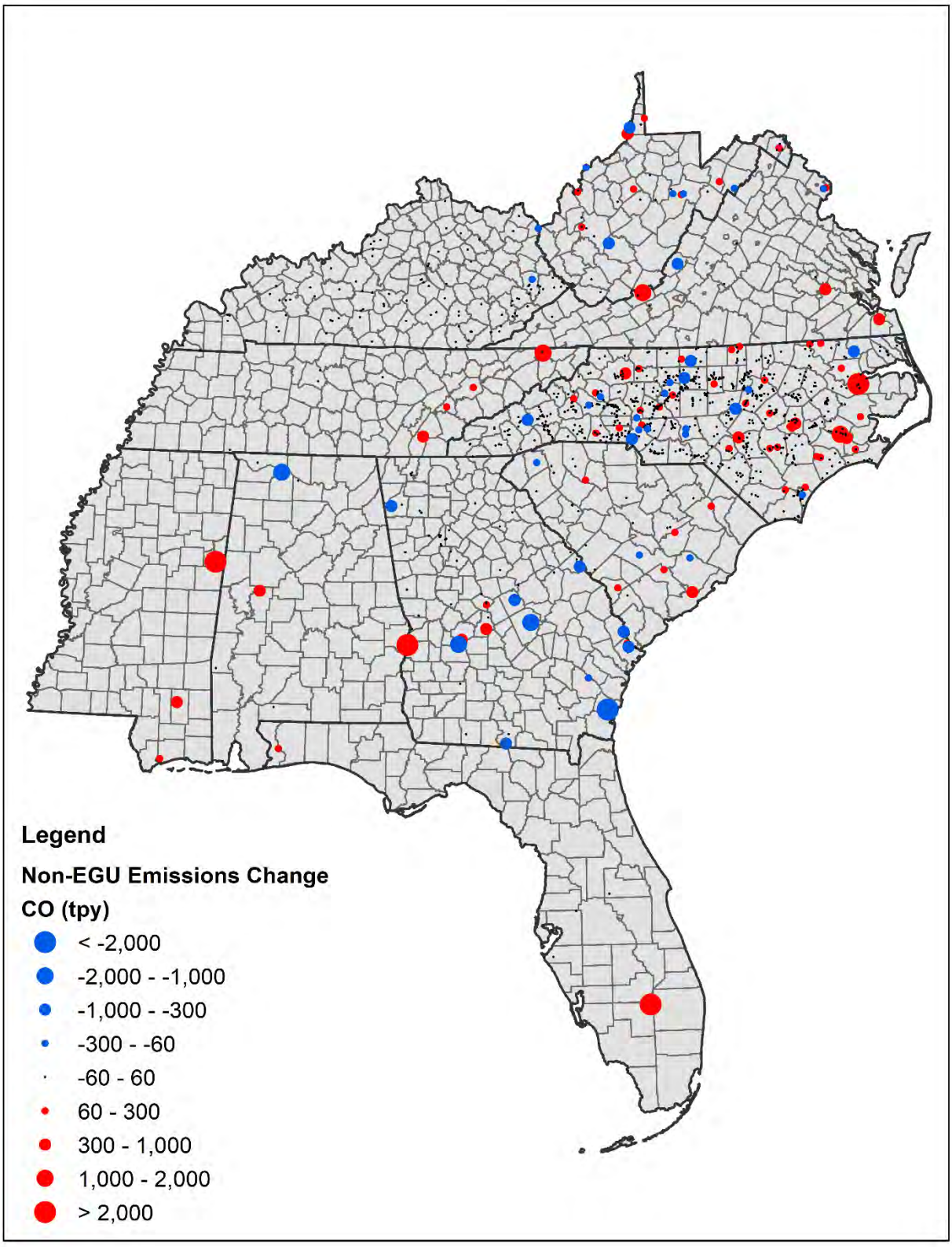

Figure 4-8. Point Non-EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

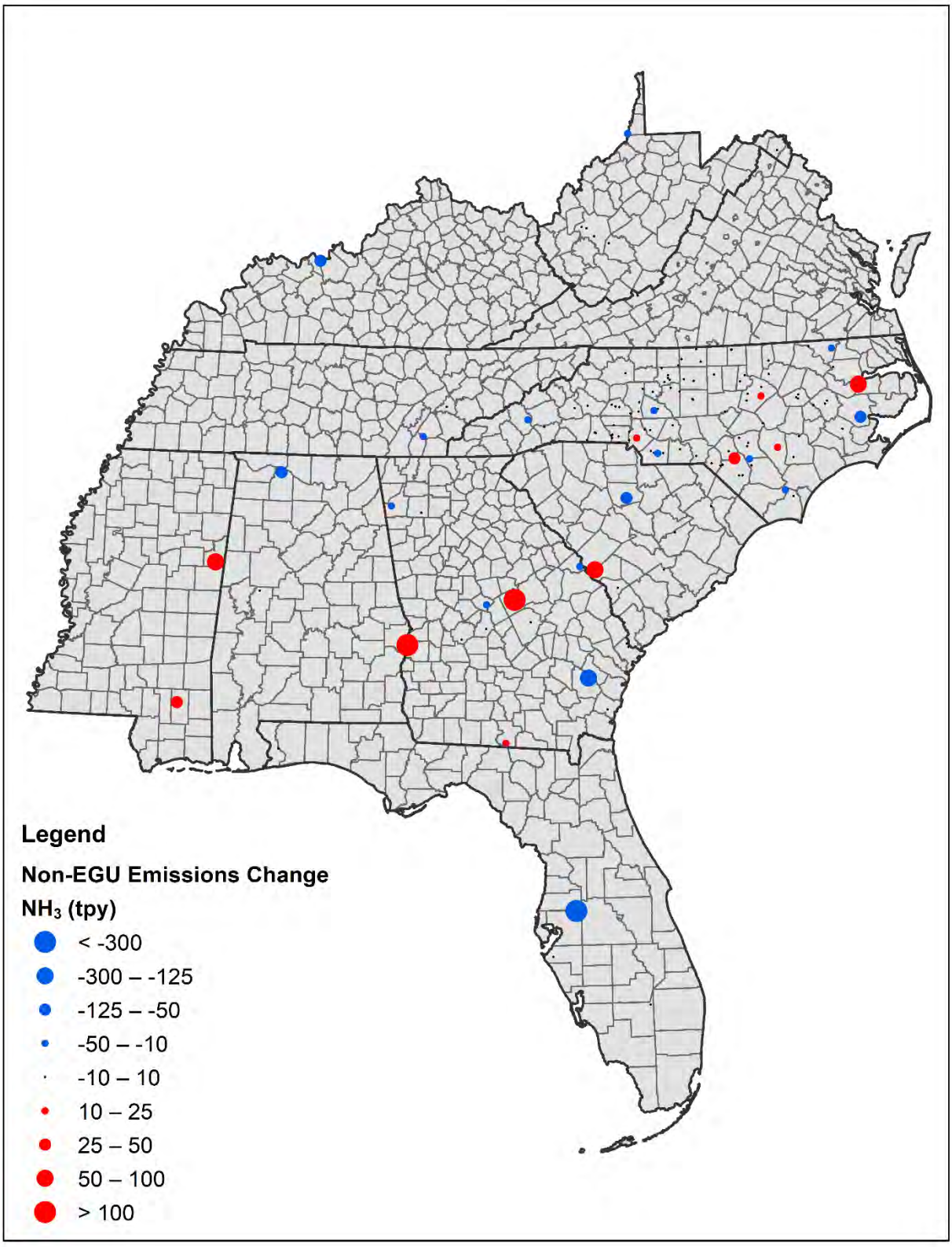

Figure 4-9. Point Non-EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

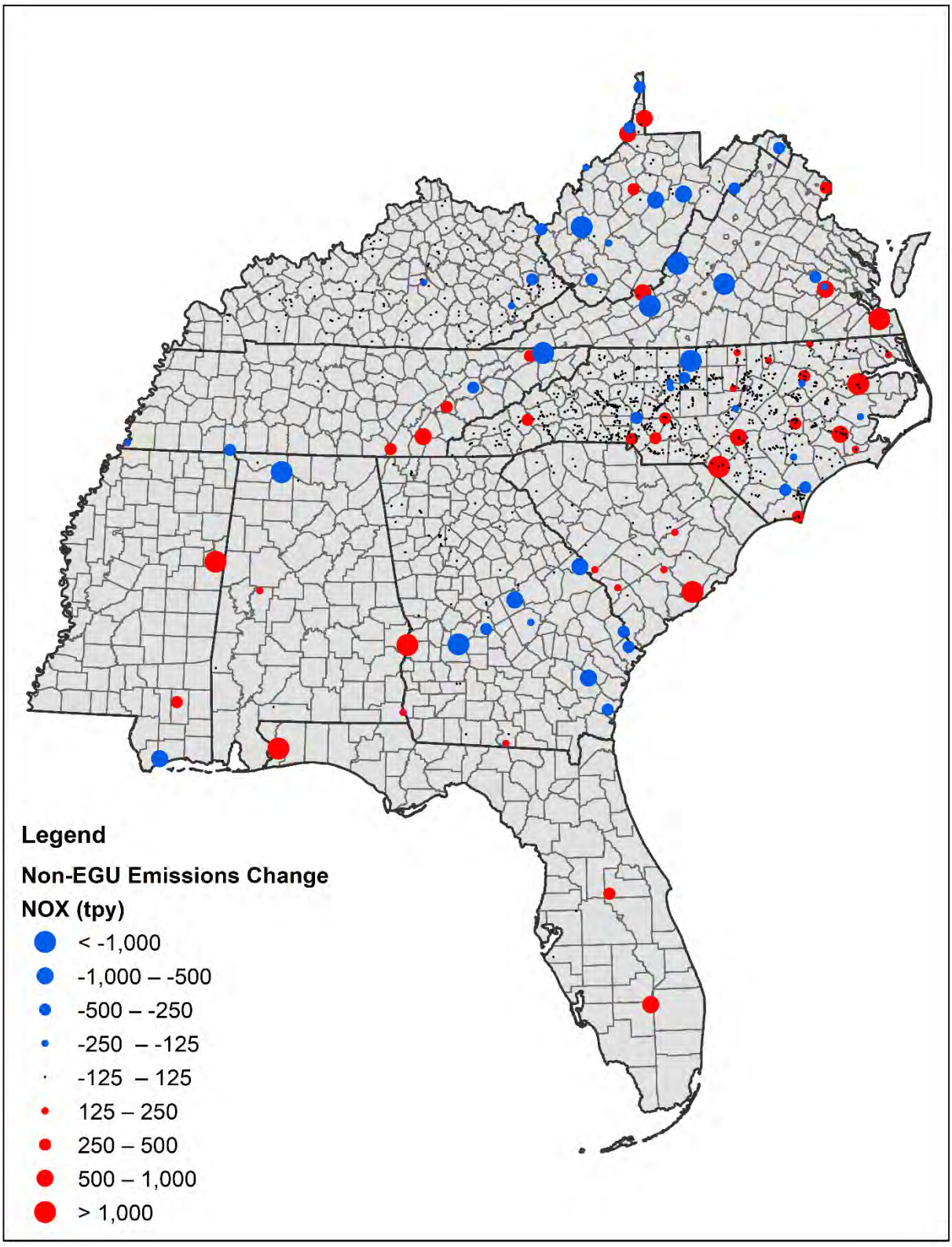

Figure 4-10. Point Non-EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

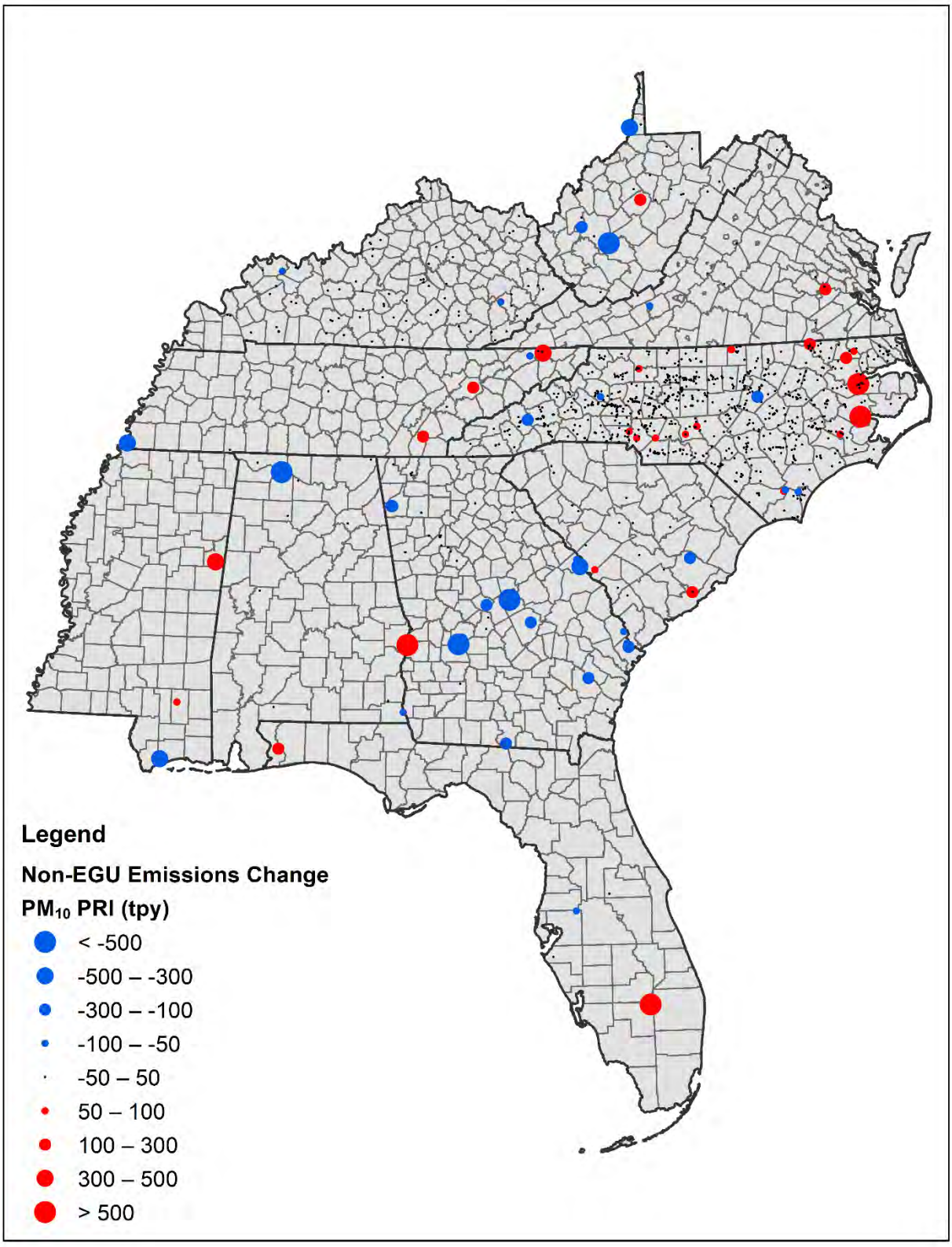

Figure 4-11. Point Non-EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

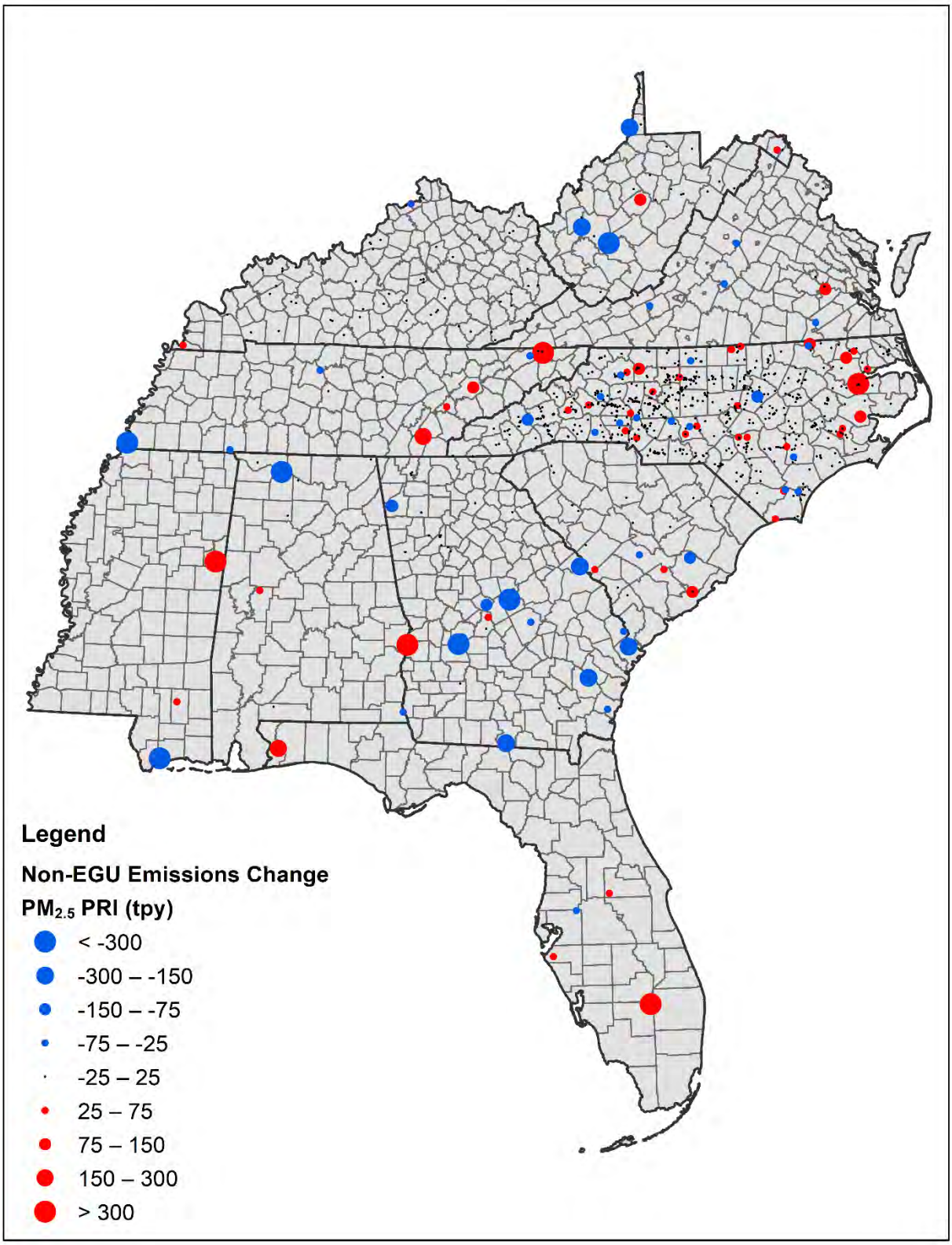

Figure 4-12. Point Non-EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

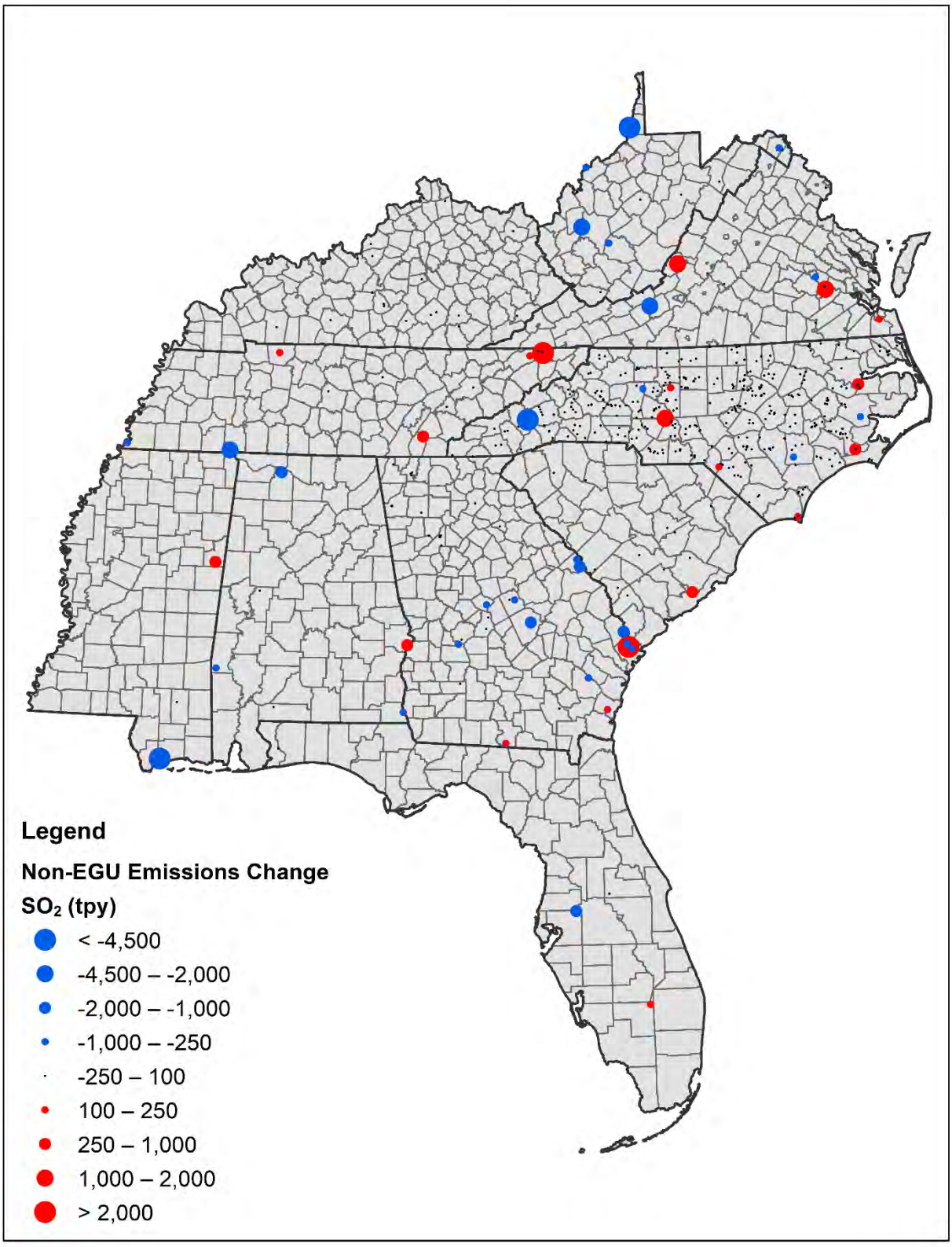

Figure 4-13. Point Non-EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

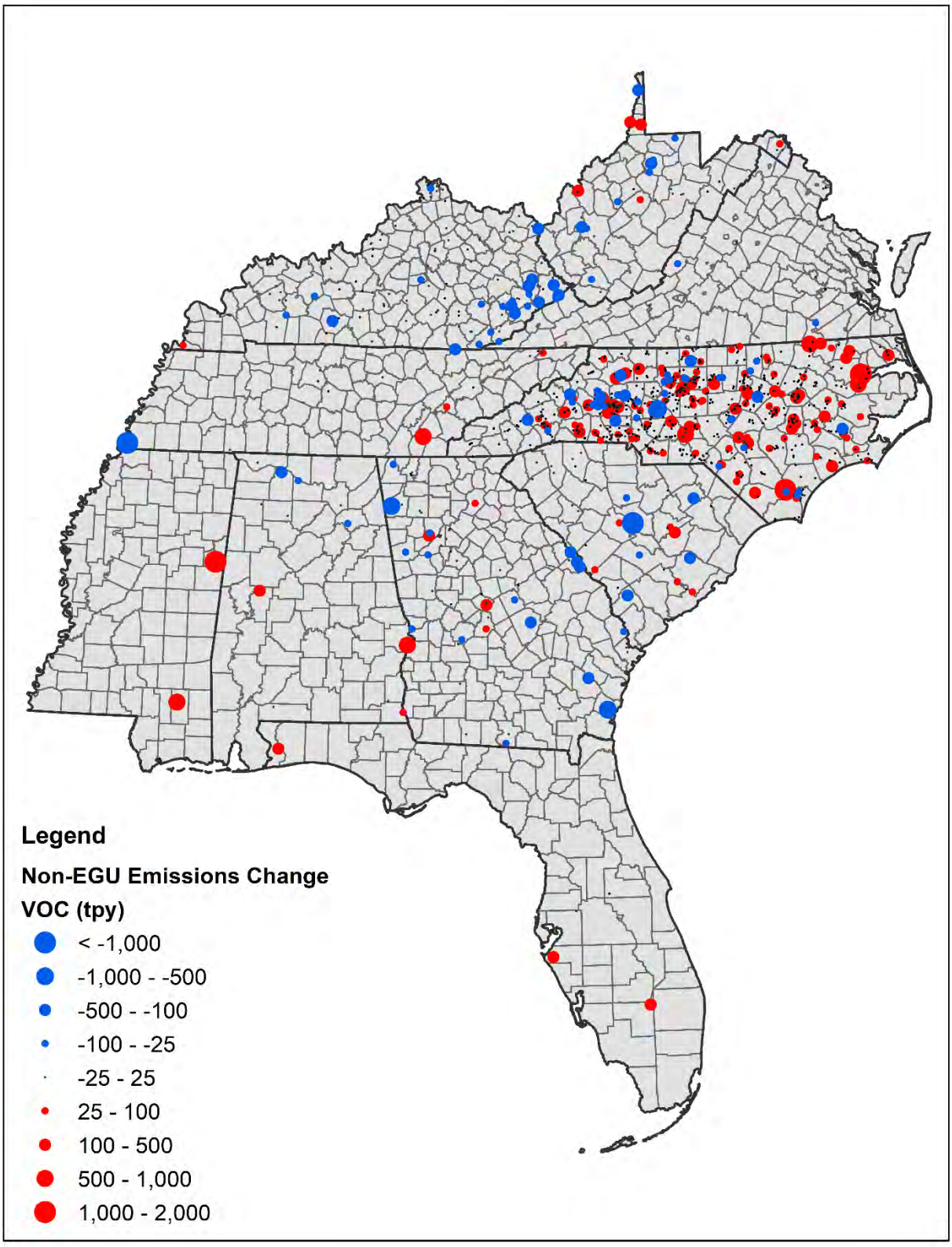

Figure 4-14. Point Non-EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

4.5 Revisions to the Non-VISTAS States in the VISTAS_12 Domain

Under the direction of SESARM, ERG replaced the EPA 2028el EGU emission with the 2028 ERTAC EGU emissions for the non-VISTAS states in the VISTAS_12 domain. No other emission changes were considered for this part of the VISTAS_12 domain. Summary emissions for the Non-VISTAS states in the VISTAS_12 domain are presented in the Task 3A report for Emissions Processing.

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5. EMISSION SUMMARIES

State-level emission summaries for the base year 2011 and revised 2028 projection year are presented in this section. Fugitive dust emissions from source categories are included in the "afdust" sector. In this report, the tables and charts that include PM_{10}-PRI and $PM_{2.5}$-PRI emissions from the "afdust" sector include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for those categories. For air quality modeling, the emissions for the "afdust" sector are adjusted downward to account for the effects of precipitation and the amount of emissions that are transported by physical forces (e.g., wind, vehicle traffic). Appendix C identifies the source categories included in the "afdust" sector and provides a state-level summary of the unadjusted and adjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for those categories.

5.1 VISTAS State-Level Emissions

Table 5-1 summarizes 2011 state-level emissions by pollutant.[15]

Table 5-1. 2011 Pollutant Emissions by State, All Sectors Combined (except Biogenic)

State	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Alabama	1,822,482	77,408	359,822	544,218	179,105	278,364	393,465
Florida	4,074,019	68,056	608,367	502,180	210,376	172,701	867,062
Georgia	2,821,707	111,705	452,317	967,825	289,072	234,700	415,106
Kentucky	1,088,525	58,131	327,756	276,088	88,386	272,922	273,603
Mississippi	1,049,833	65,600	205,895	1,026,163	164,587	63,940	274,537
North Carolina	1,890,559	175,499	369,497	256,650	88,483	118,721	335,887
South Carolina	1,100,985	37,776	210,544	328,503	87,125	103,247	232,159
Tennessee	1,287,181	42,346	322,564	204,145	76,357	160,323	291,002
Virginia	1,268,463	52,578	313,457	196,881	70,829	107,819	295,360
West Virginia	482,008	12,084	172,944	124,409	41,192	121,618	139,527
Totals[a]	**16,885,761**	**701,183**	**3,343,164**	**4,427,062**	**1,295,512**	**1,634,354**	**3,517,706**

[a] Total emissions may not add up due to rounding

[15] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Table 5-2 summarizes 2028 state-level emissions by pollutant.[16]

Table 5-1. 2028 Pollutant Emissions by State, All Sectors Combined (except Biogenic)

State	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Alabama	1,287,276	82,180	167,681	584,798	180,657	104,477	298,010
Florida	2,938,603	66,097	263,448	577,298	209,451	77,497	617,650
Georgia	2,062,878	118,241	206,140	1,094,094	289,364	49,002	291,033
Kentucky	756,920	59,045	177,472	291,097	83,504	79,141	225,363
Mississippi	676,453	70,055	101,181	1,237,255	178,739	24,373	204,858
North Carolina	949,572	188,530	145,916	274,614	84,004	43,530	228,865
South Carolina	758,251	39,076	92,735	378,619	83,242	33,985	164,889
Tennessee	765,859	42,528	139,878	213,278	73,186	26,374	198,572
Virginia	936,713	53,964	138,488	202,322	68,087	27,083	236,207
West Virginia	366,490	12,439	122,060	121,793	39,605	68,802	195,256
Totals[a]	**11,499,015**	**732,154**	**1,555,000**	**4,975,169**	**1,289,838**	**534,264**	**2,660,703**

[a] Total emissions may not add up due to rounding

Table 5-3 presents the percent change by pollutant from the 2011 state-level emissions to the revised 2028 state-level emissions.[16]

Table 5-2. Percent Change in Emissions by State, All Sectors Combined (except Biogenic)

State	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	% Difference						
Alabama	-29%	6%	-53%	7%	1%	-62%	-24%
Florida	-28%	-3%	-57%	15%	-0.4%	-55%	-29%
Georgia	-27%	6%	-54%	13%	0.1%	-79%	-30%
Kentucky	-30%	2%	-46%	5%	-6%	-71%	-18%
Mississippi	-36%	7%	-51%	21%	9%	-62%	-25%
North Carolina	-50%	7%	-61%	7%	-5%	-63%	-32%
South Carolina	-31%	3%	-56%	15%	-4%	-67%	-29%
Tennessee	-41%	0%	-57%	4%	-4%	-84%	-32%
Virginia	-26%	3%	-56%	3%	-4%	-75%	-20%
West Virginia	-24%	3%	-29%	-2%	-4%	-43%	40%
Total	-32%	4%	-53%	12%	-0.4%	-67%	-24%

[16] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

5.2 VISTAS States: Tier 1 Pollutant Emissions

Table 5-4 summarizes the Base Year 2011 Tier 1 emissions by pollutant for the ten VISTAS states, while Table 5-5 summarizes the revised 2028 Tier 1 emissions by pollutant. Table 5-6 presents the percent change by pollutant from the 2011 Tier 1 emissions to the revised 2028 Tier 1 emissions. Appendix D presents these data at the state-level.

Table 5-3. 2011 Tier 1 Pollutant Emissions (except Biogenic) for the Ten VISTAS States[17]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Chemical & Allied Product Mfg	34,883	6,762	17,238	5,022	3,837	39,482	20,714
Fuel Comb. Elec. Util.	151,802	6,471	488,453	85,656	61,846	1,191,386	10,576
Fuel Comb. Industrial	264,348	2,696	250,349	120,862	97,403	177,103	19,668
Fuel Comb. Other	277,771	7,390	70,985	39,401	38,003	27,359	47,920
Highway Vehicles	7,549,047	32,263	1,574,943	88,017	47,390	8,027	791,993
Metals Processing	163,506	123	12,501	15,160	12,650	33,405	9,833
Miscellaneous[17]	3,953,133	633,365	106,762	3,732,801	827,631	41,197	740,642
Off-Highway	3,710,940	604	626,217	49,059	46,279	34,422	541,514
Other Industrial Processes[17]	105,113	8,737	98,400	194,381	78,734	44,820	148,394
Petroleum & Related Industries	95,162	120	73,588	2,963	2,459	33,046	145,163
Solvent Utilization	318	190	367	910	796	48	668,718
Storage & Transport	2,886	284	497	7,448	3,462	89	323,577
Waste Disposal & Recycling	576,851	2,177	22,864	85,381	75,021	3,971	48,995
Totals	**16,885,761**	**701,183**	**3,343,164**	**4,427,062**	**1,295,512**	**1,634,354**	**3,517,706**

[17] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Table 5-4. 2028 Tier 1 Pollutant Emissions (except Biogenic) for the Ten VISTAS States[18]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Chemical & Allied Product Mfg	28,357	4,987	10,592	5,300	3,708	35,496	20,707
Fuel Comb. Elec. Util.	115,627	7,608	244,706	49,625	40,397	229,708	9,434
Fuel Comb. Industrial	274,608	3,075	207,420	127,056	107,579	79,113	18,126
Fuel Comb. Other	262,447	7,318	67,126	36,710	35,651	16,893	43,053
Highway Vehicles	2,371,974	21,976	341,421	63,604	16,147	3,117	192,413
Metals Processing	162,305	143	12,403	14,572	12,095	32,729	9,245
Miscellaneous[18]	3,778,975	675,213	99,091	4,362,444	890,359	37,923	727,086
Off-Highway	3,676,988	742	349,374	23,899	22,227	7,646	301,285
Other Industrial Processes[18]	104,406	8,478	97,274	192,736	76,665	41,408	149,490
Petroleum & Related Industries	144,989	122	101,783	6,207	5,864	46,286	233,019
Solvent Utilization	337	165	379	919	819	25	687,863
Storage & Transport	990	219	509	6,711	3,275	91	219,387
Waste Disposal & Recycling	577,013	2,107	22,922	85,386	75,052	3,828	49,596
Totals	**11,499,015**	**732,154**	**1,555,000**	**4,975,169**	**1,289,838**	**534,264**	**2,660,703**

[18] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Table 5-5. Percent Change in Emissions by Tier 1 Level, All Sectors Combined (except Biogenic)[19]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	% Difference						
Chemical & Allied Product Mfg	-19%	-26%	-39%	6%	-3%	-10%	-0.04%
Fuel Comb. Elec. Util.	-24%	18%	-50%	-42%	-35%	-81%	-11%
Fuel Comb. Industrial	4%	14%	-17%	5%	10%	-55%	-8%
Fuel Comb. Other	-6%	-1%	-5%	-7%	-6%	-38%	-10%
Highway Vehicles	-69%	-32%	-78%	-28%	-66%	-61%	-76%
Metals Processing	-1%	16%	-1%	-4%	-4%	-2%	-6%
Miscellaneous[19]	-4%	7%	-7%	17%	8%	-8%	-2%
Off-Highway	-1%	23%	-44%	-51%	-52%	-78%	-44%
Other Industrial Processes[19]	-1%	-3%	-1%	-1%	-3%	-8%	1%
Petroleum & Related Industries	52%	1%	38%	109%	138%	40%	61%
Solvent Utilization	6%	-13%	3%	1%	3%	-48%	3%
Storage & Transport	-66%	-23%	2%	-10%	-5%	2%	-32%
Waste Disposal & Recycling	0.03%	-3%	0.25%	0.01%	0.04%	-4%	1%
Totals	-32%	4%	-53%	12%	-0.4%	-67%	-24%

[19] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

5.3 Point EGU and Non-EGU Emissions Comparison by State[20]

Table 5-7 compares the Base Year 2011 and revised 2028 point EGU and non-EGU emissions for Alabama.

Table 5-6. Alabama Base Year 2011 and Revised 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Base Year 2011 EGU Emissions (tpy)	Revised 2028 EGU Emissions (tpy)	% Diff for EGU	Base Year 2011 Non-EGU Emissions (tpy)	Revised 2028 Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	12,888	11,845	-8.1%	68,197	65,588	-3.8%
NH_3	556	862	55.0%	1,937	1,522	-21.4%
NO_x	64,008	27,964	-56.3%	59,791	52,426	-12.3%
PM_{10}-PRI	8,026	3,836	-52.2%	19,981	18,496	-7.4%
$PM_{2.5}$-PRI	5,591	2,679	-52.1%	16,418	15,246	-7.1%
SO_2	186,219	17,031	-90.9%	59,672	70,670	18.4%
VOC	1,163	1,266	8.9%	25,594	24,976	-2.4%

Table 5-8 compares the Base Year 2011 and revised 2028 point EGU and non-EGU emissions for Florida.

Table 5-7. Florida Base Year 2011 and Revised 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Base Year 2011 EGU Emissions (tpy)	Revised 2028 EGU Emissions (tpy)	% Diff for EGU	Base Year 2011 Non-EGU Emissions (tpy)	Revised 2028 Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	43,819	26,658	-39.2%	85,603	100,250	17.1%
NH_3	3,394	3,520	3.7%	2,462	1,177	-52.2%
NO_x	68,655	27,659	-59.7%	40,973	40,347	-1.5%
PM_{10}-PRI	13,069	9,716	-25.7%	13,768	13,646	-0.9%
$PM_{2.5}$-PRI	10,882	8,478	-22.1%	11,406	11,802	3.5%
SO_2	95,423	29,220	-69.4%	37,440	34,281	-8.4%
VOC	3,332	1,406	-57.8%	26,268	26,536	1.0%

[20] "Point EGU Emissions" included all EGU emission process records plus all non-EGU emission process records occurring at EGUs (e.g., commercial-sized boilers operating at the EGU). "Point Non-EGU Emissions" included non-EGU sources, such as industrial/commercial/institutional emission sources plus point source location emissions from aircrafts (e.g., landing/takeoffs), commercial marine vessels, and railyards.

Table 5-9 compares the Base Year 2011 and revised 2028 point EGU and non-EGU emissions for Georgia.

Table 5-8. Georgia Base Year 2011 and Revised 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Base Year 2011 EGU Emissions (tpy)	Revised 2028 EGU Emissions (tpy)	% Diff for EGU	Base Year 2011 Non-EGU Emissions (tpy)	Revised 2028 Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	12,146	9,986	-17.8%	64,554	57,245	-11.3%
NH_3	899	1,178	31.1%	5,809	5,595	-3.7%
NO_x	54,911	25,927	-52.8%	48,234	41,270	-14.4%
PM_{10}-PRI	8,921	5,227	-41.4%	15,671	12,382	-21.0%
$PM_{2.5}$-PRI	6,189	4,340	-29.9%	12,471	9,653	-22.6%
SO_2	186,799	18,474	-90.1%	28,999	18,591	-35.9%
VOC	1,140	1,062	-6.8%	27,437	24,524	-10.6%

Table 5-10 compares the Base Year 2011 and revised 2028 point EGU and non-EGU emissions for Kentucky.

Table 5-9. Kentucky Base Year 2011 and Revised 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Base Year 2011 EGU Emissions (tpy)	Revised 2028 EGU Emissions (tpy)	% Diff for EGU	Base Year 2011 Non-EGU Emissions (tpy)	Revised 2028 Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	14,804	11,851	-19.9%	84,931	85,720	0.9%
NH_3	757	681	-10.0%	507	449	-11.4%
NO_x	92,279	37,019	-59.9%	31,537	29,221	-7.3%
PM_{10}-PRI	13,841	8,288	-40.1%	18,775	15,902	-15.3%
$PM_{2.5}$-PRI	9,453	6,480	-31.5%	12,466	10,458	-16.1%
SO_2	247,413	56,319	-77.2%	21,723	18,821	-13.4%
VOC	1,568	1,271	-18.9%	44,495	43,373	-2.5%

Table 5-11 compares the Base Year 2011 and revised 2028 point EGU and non-EGU emissions for Mississippi.

Table 5-10. Mississippi Base Year 2011 and Revised 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Base Year 2011 EGU Emissions (tpy)	Revised 2028 EGU Emissions (tpy)	% Diff for EGU	Base Year 2011 Non-EGU Emissions (tpy)	Revised 2028 Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	7,317	4,939	-32.5%	33,953	36,787	8.3%
NH_3	402	614	52.6%	1,912	1,925	0.7%
NO_x	28,039	18,735	-33.2%	37,698	33,880	-10.1%
PM_{10}-PRI	2,378	1,483	-37.6%	9,653	9,169	-5.0%
$PM_{2.5}$-PRI	1,892	1,181	-37.6%	8,320	7,749	-6.9%
SO_2	43,349	6,530	-84.9%	14,793	14,250	-3.7%
VOC	535	473	-11.6%	26,908	27,102	0.7%

Table 5-12 compares the Base Year 2011 and revised 2028 point EGU and non-EGU emissions for North Carolina.

Table 5-11. North Carolina Base Year 2011 and Revised 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Base Year 2011 EGU Emissions (tpy)	Revised 2028 EGU Emissions (tpy)	% Diff for EGU	Base Year 2011 Non-EGU Emissions (tpy)	Revised 2028 Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	35,106	12,053	-65.7%	43,994	46,358	5.4%
NH_3	216	105	-51.4%	1,471	1,356	-7.8%
NO_x	48,813	27,811	-43.0%	35,138	38,053	8.3%
PM_{10}-PRI	9,915	4,127	-58.4%	10,129	12,838	26.7%
$PM_{2.5}$-PRI	7,572	3,568	-52.9%	6,982	8,875	27.1%
SO_2	79,022	19,734	-75.0%	27,050	15,498	-42.7%
VOC	956	640	-33.1%	37,172	47,066	26.6%

Table 5-13 compares the Base Year 2011 and revised 2028 point EGU and non-EGU emissions for South Carolina.

Table 5-12. South Carolina Base Year 2011 and Revised 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Base Year 2011 EGU Emissions (tpy)	Revised 2028 EGU Emissions (tpy)	% Diff for EGU	Base Year 2011 Non-EGU Emissions (tpy)	Revised 2028 Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	17,424	13,676	-21.5%	88,270	89,997	2.0%
NH_3	268	913	241.1%	1,835	1,704	-7.1%
NO_x	26,476	11,458	-56.7%	25,513	24,594	-3.6%
PM_{10}-PRI	10,519	3,486	-66.9%	7,364	6,441	-12.5%
$PM_{2.5}$-PRI	8,365	2,751	-67.1%	5,187	4,638	-10.6%
SO_2	68,307	10,774	-84.2%	26,593	18,827	-29.2%
VOC	750	1,864	148.6%	23,927	20,763	-13.2%

Table 5-14 compares the Base Year 2011 and revised 2028 point EGU and non-EGU emissions for Tennessee.

Table 5-13. Tennessee Base Year 2011 and Revised 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Base Year 2011 EGU Emissions (tpy)	Revised 2028 EGU Emissions (tpy)	% Diff for EGU	Base Year 2011 Non-EGU Emissions (tpy)	Revised 2028 Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	5,366	4,403	-17.9%	46,109	48,950	6.2%
NH_3	242	189	-21.8%	1,073	991	-7.7%
NO_x	27,000	10,086	-62.6%	38,354	35,793	-6.7%
PM_{10}-PRI	5,194	3,860	-25.7%	11,613	11,074	-4.6%
$PM_{2.5}$-PRI	4,162	3,398	-18.4%	8,330	8,171	-1.9%
SO_2	120,139	12,114	-89.9%	35,849	11,333	-68.4%
VOC	725	635	-12.4%	33,662	33,238	-1.3%

Table 5-15 compares the Base Year 2011 and revised 2028 point EGU and non-EGU emissions for Virginia.

Table 5-14. Virginia Base Year 2011 and Revised 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Base Year 2011 EGU Emissions (tpy)	Revised 2028 EGU Emissions (tpy)	% Diff for EGU	Base Year 2011 Non-EGU Emissions (tpy)	Revised 2028 Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	6,782	5,949	-12.3%	31,202	33,899	8.6%
NH_3	263	444	68.7%	1,549	1,396	-9.9%
NO_x	40,141	13,338	-66.8%	37,212	29,872	-19.7%
PM_{10}-PRI	6,380	2,979	-53.3%	5,856	5,764	-1.6%
$PM_{2.5}$-PRI	1,464	1,568	7.1%	4,585	4,571	-0.3%
SO_2	75,748	3,389	-95.5%	20,570	16,450	-20.0%
VOC	825	1,016	23.2%	17,257	17,400	0.8%

Table 5-16 compares the Base Year 2011 and revised 2028 point EGU and non-EGU emissions for West Virginia.

Table 5-15. West Virginia Base Year 2011 and Revised 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Base Year 2011 EGU Emissions (tpy)	Revised 2028 EGU Emissions (tpy)	% Diff for EGU	Base Year 2011 Non-EGU Emissions (tpy)	Revised 2028 Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	10,418	12,968	24.5%	34,111	33,399	-2.1%
NH_3	68	70	3.0%	216	187	-13.5%
NO_x	56,620	46,722	-17.5%	24,888	18,332	-26.3%
PM_{10}-PRI	11,469	11,499	0.3%	5,109	3,214	-37.1%
$PM_{2.5}$-PRI	9,483	9,574	1.0%	3,156	2,217	-29.7%
SO_2	100,108	57,829	-42.2%	15,710	5,575	-64.5%
VOC	1,024	1,100	7.4%	8,830	7,596	-14.0%

5.4 Nonpoint, Onroad, Nonroad, and Point-Fires Modeling Files Emissions Comparison by State

Emissions totals for each state from the modeling platform sector files are presented in this section. Specifically, state data emissions were extracted from these modeling sector files:

- Nonpoint data files:
  - 2011ek_cb6v2_v6_11g_inputs_nonpoint.zip;
  - 2011el_cb6v2_v6_11g_inputs_nonpoint.zip; and
  - 2028el_cb6v2_v6_11g_inputs_nonpoint.zip

- Onroad data files:
  - 2011ek_onroad_SMOKE_MOVES_MOVES2014a_forOTAQ_21jan2016_v2_AL_to_MO.zip;
  - 2011ek_onroad_SMOKE_MOVES_MOVES2014a_forOTAQ_21jan2016_v2_MT_to_WY.zip;
  - 2011el_onroad_SMOKE_MOVES2014a_ff10_part1.zip;
  - 2011el_onroad_SMOKE_MOVES2014a_ff10_part2.zip;
  - 2028el_onroad_SMOKE_MOVES2014a_ff10_part1.zip; and
  - 2028el_onroad_SMOKE_MOVES2014a_ff10_part2.zip

- Nonroad data files:
  - 2011ek_cb6v2_v6_11g_inputs_nonroad_part1.zip;
  - 2011ek_cb6v2_v6_11g_inputs_nonroad_part2.zip;
  - 2028el_cb6v2_v6_11g_inputs_nonroad_part1.zip; and
  - 2028el_cb6v2_v6_11g_inputs_nonroad_part2.zip

- Point-Fires data files:
  - 2011ek_cb6v2_v6_11g_inputs_ptfire.zip (used for both 2011 and 2028)

Table 5-17 compares the Base Year 2011 and final 2028 nonpoint, onroad, nonroad, and point fire emissions modeling files for Alabama.

Table 5-16. Alabama Base Year 2011 and Revised 2028 Nonpoint, Onroad, Nonroad, and Point-Fire Emissions Comparison

Pollutant	Base Year 2011 Emissions (tpy)	Final 2028 Emissions (tpy)	% Difference
Nonpoint Modeling Files			
CO	127,779	124,390	-3%
NH_3	61,118	67,011	10%
NO_x	45,871	31,534	-31%
PM_{10}-PRI[21]	433,089	483,650	12%
$PM_{2.5}$-PRI[21]	88,576	98,737	11%
SO_2	25,048	9,799	-61%
VOC	90,646	76,396	-16%
Onroad Modeling Files			
CO	701,397	182,602	-74%
NH_3	2,724	1,703	-37%
NO_x	152,732	30,113	-80%
PM_{10}-PRI	8,001	4,984	-38%
$PM_{2.5}$-PRI	4,611	1,322	-71%
SO_2	683	262	-62%
VOC	75,523	15,013	-80%
Nonroad Modeling Files			
CO	245,942	236,571	-4%
NH_3	32	40	26%
NO_x	22,869	11,092	-51%
PM_{10}-PRI	2,464	1,175	-52%
$PM_{2.5}$-PRI	2,336	1,100	-53%
SO_2	65	39	-40%
VOC	41,818	21,639	-48%
Point-Fires Modeling Files			
CO	666,279	666,279	0%
NH_3	11,041	11,041	0%
NO_x	14,551	14,551	0%
PM_{10}-PRI	72,656	72,656	0%
$PM_{2.5}$-PRI	61,573	61,573	0%
SO_2	6,677	6,677	0%
VOC	158,720	158,720	0%

[21] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Table 5-18 compares the Base Year 2011 and final 2028 nonpoint, onroad, nonroad, and point fire emissions modeling files for Florida.

Table 5-17. Florida Base Year 2011 and Revised 2028 Nonpoint, Onroad, Nonroad, and Point-Fire Emissions Comparison

Pollutant	Base Year 2011 Emissions (tpy)	Final 2028 Emissions (tpy)	% Difference
Nonpoint Modeling Files			
CO	121,431	96,505	-21%
NH_3	38,676	39,562	2%
NO_x	70,123	53,341	-24%
PM_{10}-PRI[22]	338,905	424,169	25%
$PM_{2.5}$-PRI[22]	80,117	91,158	14%
SO_2	27,743	3,283	-88%
VOC	262,124	225,801	-14%
Onroad Modeling Files			
CO	1,784,678	679,511	-62%
NH_3	7,465	5,737	-23%
NO_x	308,752	72,019	-77%
PM_{10}-PRI	21,329	19,834	-7%
$PM_{2.5}$-PRI	9,377	4,412	-53%
SO_2	2,104	823	-61%
VOC	183,609	51,019	-72%
Nonroad Modeling Files			
CO	1,078,298	1,075,489	-0.3%
NH_3	142	184	29%
NO_x	98,584	48,803	-50%
PM_{10}-PRI	10,126	4,950	-51%
$PM_{2.5}$-PRI	9,627	4,632	-52%
SO_2	275	173	-37%
VOC	162,907	84,066	-48%
Point-Fires Modeling Files			
CO	960,190	960,190	0%
NH_3	15,918	15,918	0%
NO_x	21,279	21,279	0%
PM_{10}-PRI	104,982	104,982	0%
$PM_{2.5}$-PRI	88,968	88,968	0%
SO_2	9,716	9,716	0%
VOC	228,822	228,822	0%

[22] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Table 5-19 compares the Base Year 2011 and final 2028 nonpoint, onroad, nonroad, and point fire emissions modeling files for Georgia.

Table 5-18. Georgia Base Year 2011 and Revised 2028 Nonpoint, Onroad, Nonroad, and Point-Fire Emissions Comparison

Pollutant	Base Year 2011 Emissions (tpy)	Final 2028 Emissions (tpy)	% Difference
Nonpoint Modeling Files			
CO	290,246	252,648	-13%
NH_3	92,275	100,237	9%
NO_x	42,536	31,117	-27%
PM_{10}-PRI[23]	772,828	912,072	18%
$PM_{2.5}$-PRI[23]	125,942	137,751	9%
SO_2	7,005	734	-90%
VOC	143,814	129,739	-10%
Onroad Modeling Files			
CO	1,018,645	305,264	-70%
NH_3	4,492	2,983	-34%
NO_x	223,223	48,973	-78%
PM_{10}-PRI	12,518	8,914	-29%
$PM_{2.5}$-PRI	6,829	2,289	-66%
SO_2	1,088	443	-59%
VOC	109,005	25,629	-76%
Nonroad Modeling Files			
CO	452,457	454,076	0.4%
NH_3	61	79	30%
NO_x	44,449	19,888	-55%
PM_{10}-PRI	4,732	2,344	-50%
$PM_{2.5}$-PRI	4,503	2,194	-51%
SO_2	125	75	-40%
VOC	58,581	34,950	-40%
Point-Fires Modeling Files			
CO	983,659	983,659	0%
NH_3	8,170	8,170	0%
NO_x	38,964	38,964	0%
PM_{10}-PRI	153,155	153,155	0%
$PM_{2.5}$-PRI	133,137	133,137	0%
SO_2	10,684	10,684	0%
VOC	75,128	75,128	0%

[23] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Table 5-20 compares the Base Year 2011 and final 2028 nonpoint, onroad, nonroad, and point fire emissions modeling files for Kentucky.

Table 5-19. Kentucky Base Year 2011 and Revised 2028 Nonpoint, Onroad, Nonroad, and Point-Fire Emissions Comparison

Pollutant	Base Year 2011 Emissions (tpy)	Final 2028 Emissions (tpy)	% Difference
Nonpoint Modeling Files			
CO	118,950	141,116	19%
NH_3	51,760	53,467	3%
NO_x	60,862	69,311	14%
PM_{10}-PRI[24]	216,674	243,588	12%
$PM_{2.5}$-PRI[24]	44,792	48,623	9%
SO_2	1,694	2,226	31%
VOC	104,019	108,990	5%
Onroad Modeling Files			
CO	498,702	157,636	-68%
NH_3	2,106	1,437	-32%
NO_x	115,685	27,819	-76%
PM_{10}-PRI	5,480	3,448	-37%
$PM_{2.5}$-PRI	3,345	1,015	-70%
SO_2	502	209	-58%
VOC	50,326	12,938	-74%
Nonroad Modeling Files			
CO	190,707	180,166	-6%
NH_3	30	39	29%
NO_x	24,375	11,084	-55%
PM_{10}-PRI	2,467	1,014	-59%
$PM_{2.5}$-PRI	2,354	956	-59%
SO_2	64	39	-39%
VOC	30,470	16,066	-47%
Point-Fires Modeling Files			
CO	180,432	180,432	0%
NH_3	2,972	2,972	0%
NO_x	3,018	3,018	0%
PM_{10}-PRI	18,852	18,852	0%
$PM_{2.5}$-PRI	15,976	15,976	0%
SO_2	1,526	1,526	0%
VOC	42,725	42,725	0%

[24] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Table 5-21 compares the Base Year 2011 and final 2028 nonpoint, onroad, nonroad, and point fire emissions modeling files for Mississippi.

Table 5-20. Mississippi Base Year 2011 and Revised 2028 Nonpoint, Onroad, Nonroad, and Point-Fire Emissions Comparison

Pollutant	Base Year 2011 Emissions (tpy)	Final 2028 Emissions (tpy)	% Difference
Nonpoint Modeling Files			
CO	104,572	57,361	-45%
NH_3	56,088	60,993	9%
NO_x	25,076	16,137	-36%
PM_{10}-PRI[25]	972,660	1,187,604	22%
$PM_{2.5}$-PRI[25]	120,310	138,504	15%
SO_2	2,183	238	-89%
VOC	94,802	76,414	-19%
Onroad Modeling Files			
CO	433,332	117,589	-73%
NH_3	1,794	1,115	-38%
NO_x	91,026	17,788	-80%
PM_{10}-PRI	4,491	3,100	-31%
$PM_{2.5}$-PRI	2,538	814	-68%
SO_2	405	165	-59%
VOC	46,084	9,317	-80%
Nonroad Modeling Files			
CO	145,614	134,734	-7%
NH_3	22	28	25%
NO_x	17,266	7,850	-55%
PM_{10}-PRI	1,811	729	-60%
$PM_{2.5}$-PRI	1,722	685	-60%
SO_2	46	28	-40%
VOC	28,862	14,206	-51%
Point-Fires Modeling Files			
CO	325,044	325,044	0%
NH_3	5,381	5,381	0%
NO_x	6,791	6,791	0%
PM_{10}-PRI	35,170	35,170	0%
$PM_{2.5}$-PRI	29,805	29,805	0%
SO_2	3,163	3,163	0%
VOC	77,346	77,346	0%

[25] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Table 5-22 compares the Base Year 2011 and final 2028 nonpoint, onroad, nonroad, and point fire emissions modeling files for North Carolina.

Table 5-21. North Carolina Base Year 2011 and Revised 2028 Nonpoint, Onroad, Nonroad, and Point-Fire Emissions Comparison

Pollutant	Base Year 2011 Emissions (tpy)	Final 2028 Emissions (tpy)	% Difference
Nonpoint Modeling Files			
CO	116,898	101,080	-14%
NH_3	168,537	183,531	9%
NO_x	31,121	24,308	-22%
PM_{10}-PRI[26]	207,809	235,279	13%
$PM_{2.5}$-PRI[26]	52,107	56,009	7%
SO_2	10,486	6,958	-34%
VOC	117,162	117,765	1%
Onroad Modeling Files			
CO	1,145,623	252,167	-78%
NH_3	4,486	2,730	-39%
NO_x	204,008	30,968	-85%
PM_{10}-PRI	10,447	6,512	-38%
$PM_{2.5}$-PRI	5,510	1,646	-70%
SO_2	1,082	311	-71%
VOC	112,173	21,709	-81%
Nonroad Modeling Files			
CO	462,851	451,827	-2%
NH_3	62	81	30%
NO_x	46,950	21,309	-55%
PM_{10}-PRI	4,799	2,307	-52%
$PM_{2.5}$-PRI	4,568	2,162	-53%
SO_2	131	78	-40%
VOC	61,753	35,012	-43%
Point-Fires Modeling Files			
CO	86,087	86,087	0%
NH_3	727	727	0%
NO_x	3,466	3,466	0%
PM_{10}-PRI	13,552	13,552	0%
$PM_{2.5}$-PRI	11,745	11,745	0%
SO_2	950	950	0%
VOC	6,671	6,671	0%

[26] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Table 5-23 compares the Base Year 2011 and final 2028 nonpoint, onroad, nonroad, and point fire emissions modeling files for South Carolina.

Table 5-22. South Carolina Base Year 2011 and Revised 2028 Nonpoint, Onroad, Nonroad, and Point-Fire Emissions Comparison

Pollutant	Base Year 2011 Emissions (tpy)	Final 2028 Emissions (tpy)	% Difference
Nonpoint Modeling Files			
CO	84,986	73,221	-14%
NH_3	30,215	31,686	5%
NO_x	22,008	18,573	-16%
PM_{10}-PRI[27]	280,076	341,478	22%
$PM_{2.5}$-PRI[27]	49,289	55,352	12%
SO_2	5,878	2,230	-62%
VOC	74,281	63,679	-14%
Onroad Modeling Files			
CO	475,876	155,913	-67%
NH_3	2,104	1,410	-33%
NO_x	109,374	23,263	-79%
PM_{10}-PRI	6,618	4,504	-32%
$PM_{2.5}$-PRI	3,766	1,152	-69%
SO_2	504	215	-57%
VOC	51,164	12,546	-75%
Nonroad Modeling Files			
CO	233,460	224,476	-4%
NH_3	31	40	28%
NO_x	23,155	10,831	-53%
PM_{10}-PRI	2,343	1,128	-52%
$PM_{2.5}$-PRI	2,228	1,057	-53%
SO_2	65	39	-40%
VOC	34,267	18,266	-47%
Point-Fires Modeling Files			
CO	200,969	200,969	0%
NH_3	3,323	3,323	0%
NO_x	4,017	4,017	0%
PM_{10}-PRI	21,583	21,583	0%
$PM_{2.5}$-PRI	18,290	18,290	0%
SO_2	1,900	1,900	0%
VOC	47,771	47,771	0%

[27] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Table 5-24 compares the Base Year 2011 and final 2028 nonpoint, onroad, nonroad, and point fire emissions modeling files for Tennessee.

Table 5-23. Tennessee Base Year 2011 and Revised 2028 Nonpoint, Onroad, Nonroad, and Point-Fire Emissions Comparison

Pollutant	Base Year 2011 Emissions (tpy)	Final 2028 Emissions (tpy)	% Difference
Nonpoint Modeling Files			
CO	78,166	73,680	-6%
NH_3	35,917	37,108	3%
NO_x	40,792	32,375	-21%
PM_{10}-PRI[28]	160,910	176,868	10%
$PM_{2.5}$-PRI[28]	43,771	47,181	8%
SO_2	2,321	1,378	-41%
VOC	102,554	91,016	-11%
Onroad Modeling Files			
CO	739,041	233,423	-68%
NH_3	3,017	2,130	-29%
NO_x	182,796	44,927	-75%
PM_{10}-PRI	9,927	6,734	-32%
$PM_{2.5}$-PRI	5,778	1,811	-69%
SO_2	769	338	-56%
VOC	80,463	20,483	-75%
Nonroad Modeling Files			
CO	294,062	280,967	-4%
NH_3	40	52	29%
NO_x	31,193	14,268	-54%
PM_{10}-PRI	3,189	1,430	-55%
$PM_{2.5}$-PRI	3,035	1,342	-56%
SO_2	86	51	-40%
VOC	44,035	23,638	-46%
Point-Fires Modeling Files			
CO	124,436	124,436	0%
NH_3	2,057	2,057	0%
NO_x	2,430	2,430	0%
PM_{10}-PRI	13,312	13,312	0%
$PM_{2.5}$-PRI	11,282	11,282	0%
SO_2	1,159	1,159	0%
VOC	29,563	29,563	0%

[28] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Table 5-25 compares the Base Year 2011 and final 2028 nonpoint, onroad, nonroad, and point fire emissions modeling files for Virginia.

Table 5-24. Virginia Base Year 2011 and Revised 2028 Nonpoint, Onroad, Nonroad, and Point-Fire Emissions Comparison

Pollutant	Base Year 2011 Emissions (tpy)	Final 2028 Emissions (tpy)	% Difference
Nonpoint Modeling Files			
CO	134,660	129,368	-4%
NH_3	44,658	47,102	5%
NO_x	52,907	40,758	-23%
PM_{10}-PRI[29]	156,518	170,012	9%
$PM_{2.5}$-PRI[29]	42,217	44,144	5%
SO_2	9,258	5,472	-41%
VOC	129,987	132,858	2%
Onroad Modeling Files			
CO	566,315	232,611	-59%
NH_3	3,341	2,242	-33%
NO_x	145,507	35,427	-76%
PM_{10}-PRI	7,106	4,302	-39%
$PM_{2.5}$-PRI	4,368	1,309	-70%
SO_2	711	279	-61%
VOC	63,152	18,550	-71%
Nonroad Modeling Files			
CO	364,630	370,012	1%
NH_3	48	62	30%
NO_x	34,799	16,203	-53%
PM_{10}-PRI	3,676	1,922	-48%
$PM_{2.5}$-PRI	3,495	1,797	-49%
SO_2	97	59	-40%
VOC	45,062	27,307	-39%
Point-Fires Modeling Files			
CO	164,874	164,874	0%
NH_3	2,718	2,718	0%
NO_x	2,890	2,890	0%
PM_{10}-PRI	17,344	17,344	0%
$PM_{2.5}$-PRI	14,699	14,699	0%
SO_2	1,435	1,435	0%
VOC	39,078	39,078	0%

[29] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Table 5-26 compares the Base Year 2011 and final 2028 nonpoint, onroad, nonroad, and point fire emissions modeling files for West Virginia.

Table 5-25. West Virginia Base Year 2011 and Revised 2028 Nonpoint, Onroad, Nonroad, and Point-Fire Emissions Comparison

Pollutant	Base Year 2011 Emissions (tpy)	Final 2028 Emissions (tpy)	% Difference
Nonpoint Modeling Files			
CO	81,184	94,327	16%
NH_3	9,640	10,265	6%
NO_x	41,832	42,223	1%
PM_{10}-PRI[30]	96,024	96,523	1%
$PM_{2.5}$-PRI[30]	18,977	19,534	3%
SO_2	4,926	4,639	-6%
VOC	73,665	152,452	107%
Onroad Modeling Files			
CO	185,437	55,258	-70%
NH_3	734	489	-33%
NO_x	41,840	10,124	-76%
PM_{10}-PRI	2,101	1,273	-39%
$PM_{2.5}$-PRI	1,269	375	-70%
SO_2	179	72	-60%
VOC	20,493	5,208	-75%
Nonroad Modeling Files			
CO	84,687	84,367	-0.4%
NH_3	10	12	26%
NO_x	6,495	3,390	-48%
PM_{10}-PRI	856	434	-49%
$PM_{2.5}$-PRI	808	406	-50%
SO_2	19	11	-42%
VOC	15,158	8,543	-44%
Point-Fires Modeling Files			
CO	86,171	86,171	0%
NH_3	1,416	1,416	0%
NO_x	1,269	1,269	0%
PM_{10}-PRI	8,849	8,849	0%
$PM_{2.5}$-PRI	7,499	7,499	0%
SO_2	676	676	0%
VOC	20,356	20,356	0%

[30] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

5.5 County-level Comparisons

Figures 5-1 through 5-7 present county-level emissions changes for each pollutant across the VISTAS ten-state area from the 2011 Base Year to the revised 2028 projection year. Decreasing emissions are presented in shades of blue, while increasing emissions are presented in shades of red. Appendix D presents county-level emissions changes for each pollutant by state.

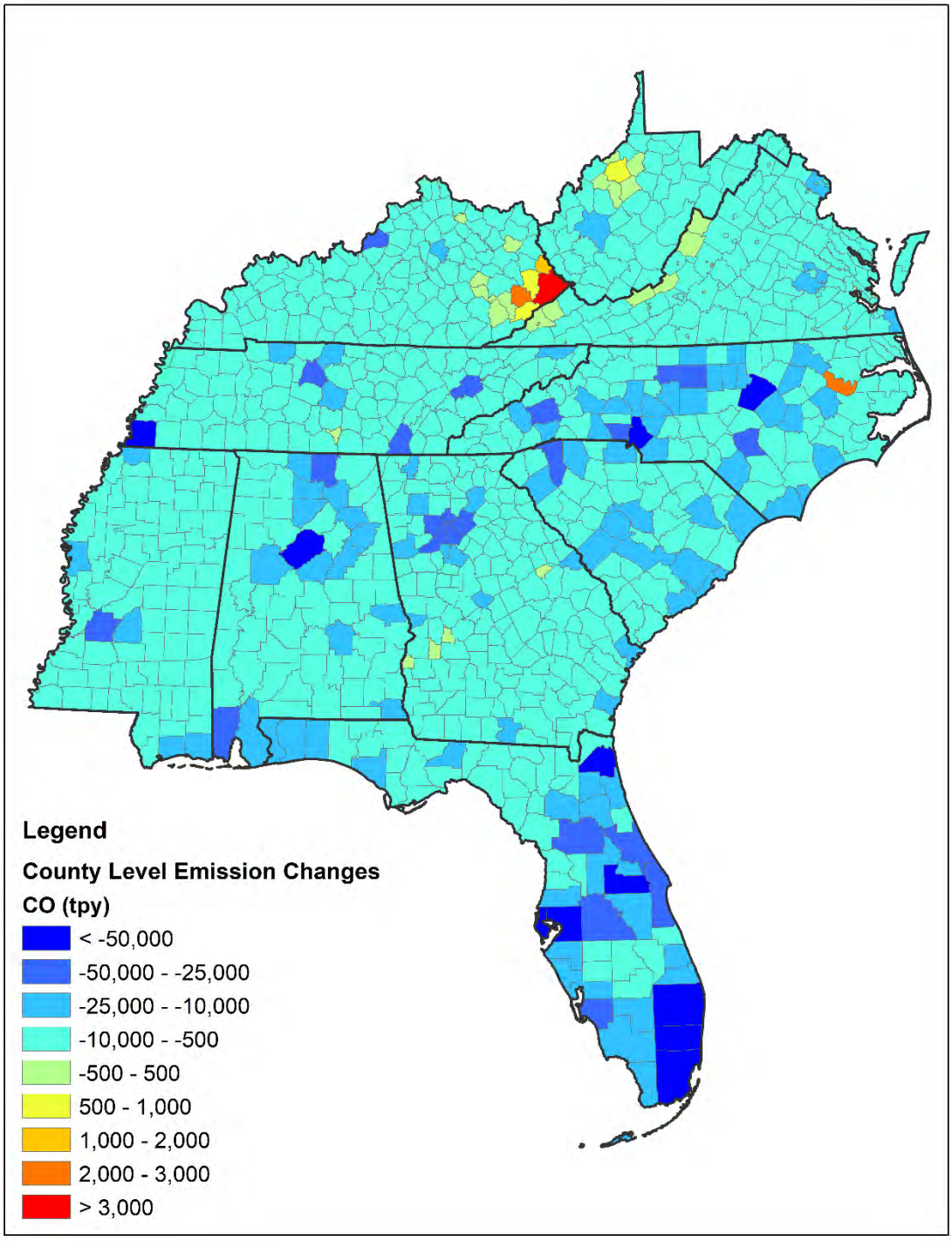

Figure 5-1. County Level CO Emission Changes for the VISTAS Ten States from the Base Year Emissions to the Modeled 2028 2011 Emissions (except Biogenic)

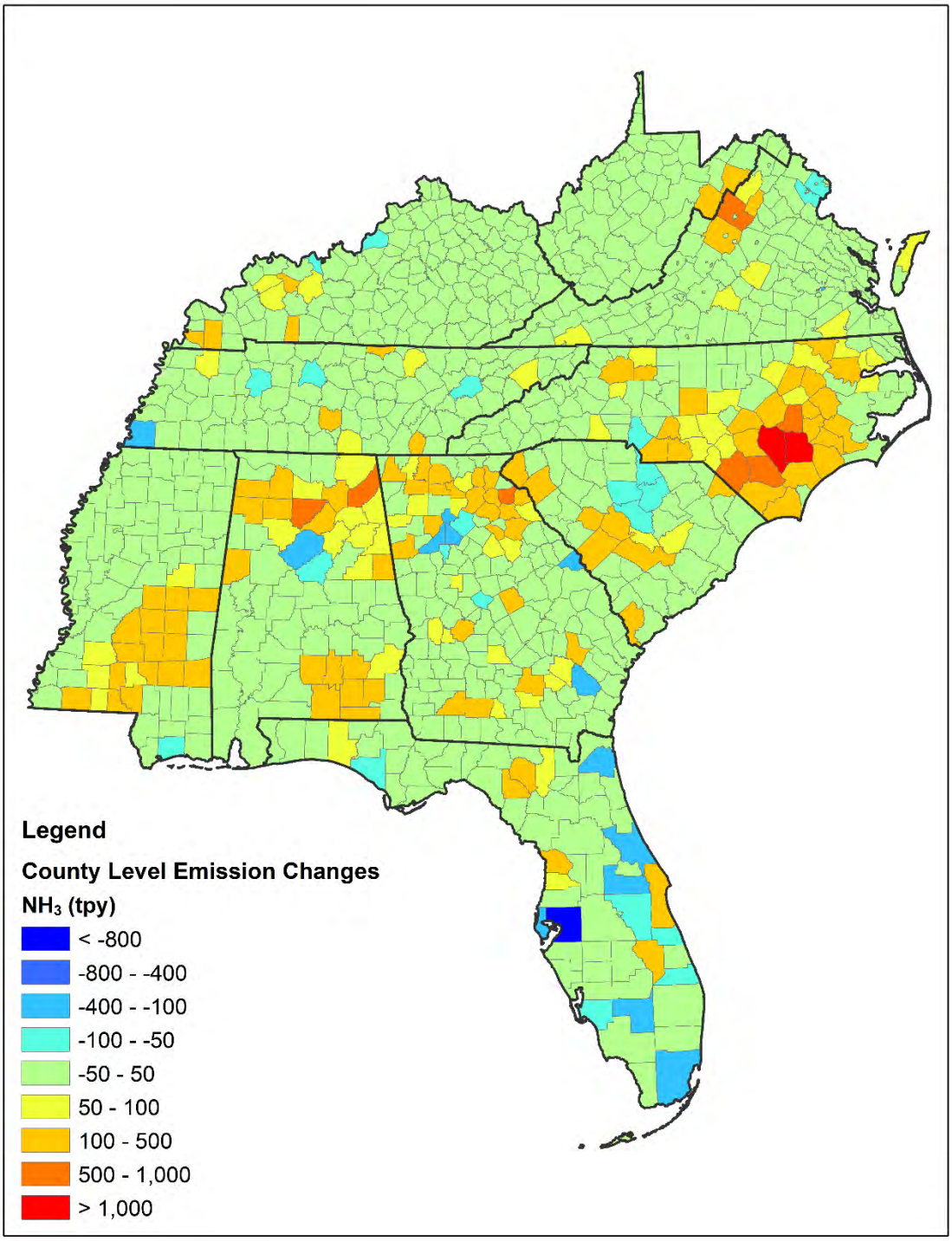

Figure 5-2. County Level NH_3 Emission Changes for the VISTAS Ten States from the Base Year Emissions to the Modeled 2028 2011 Emissions (except Biogenic)

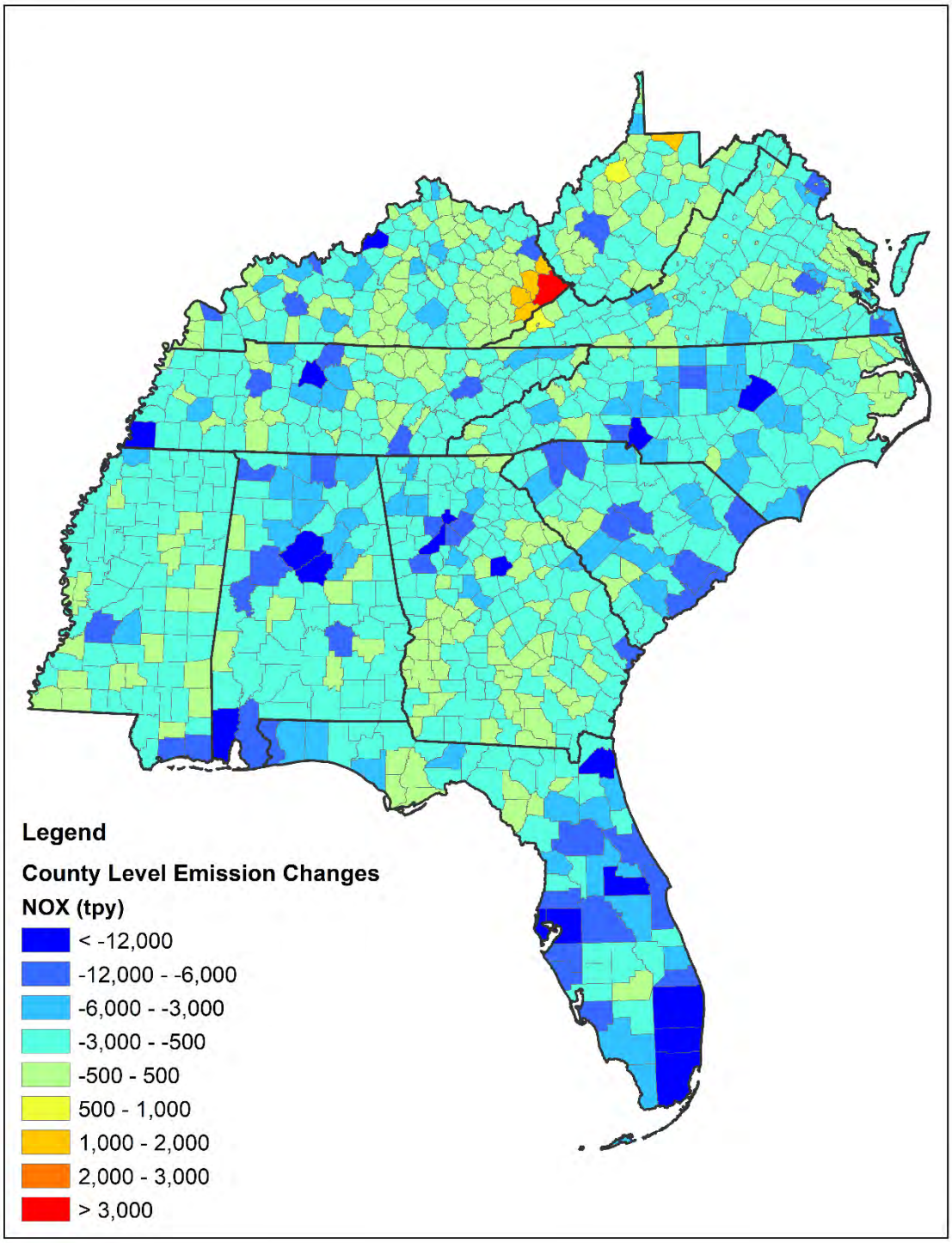

Figure 5-3. County Level NO_x Emission Changes for the VISTAS Ten States from the Base Year Emissions to the Modeled 2028 2011 Emissions (except Biogenic)

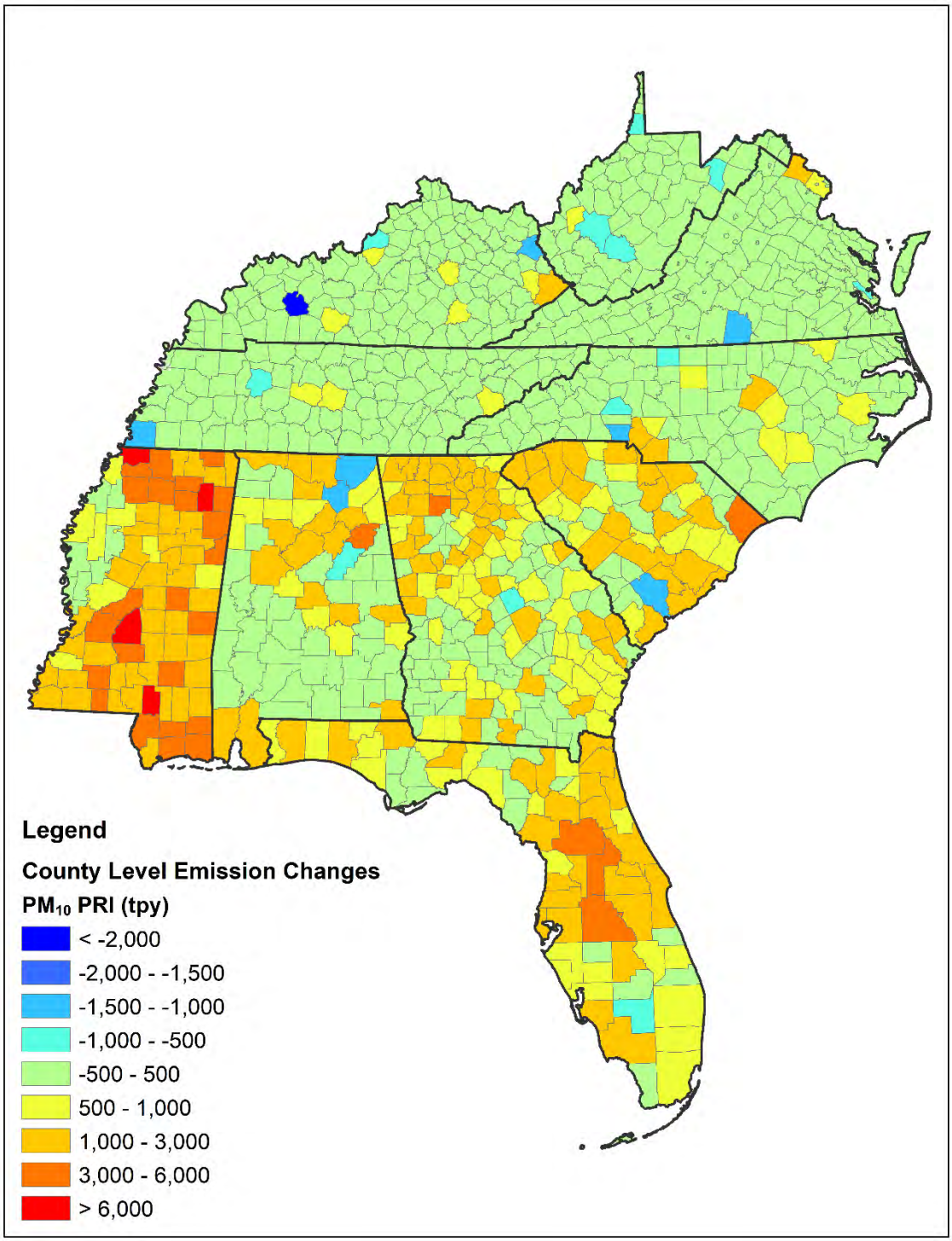

Figure 5-4. County Level PM_{10}-PRI Emission Changes for the VISTAS Ten States from the Base Year Emissions to the Modeled 2028 2011 Emissions (except Biogenic)[31]

[31] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

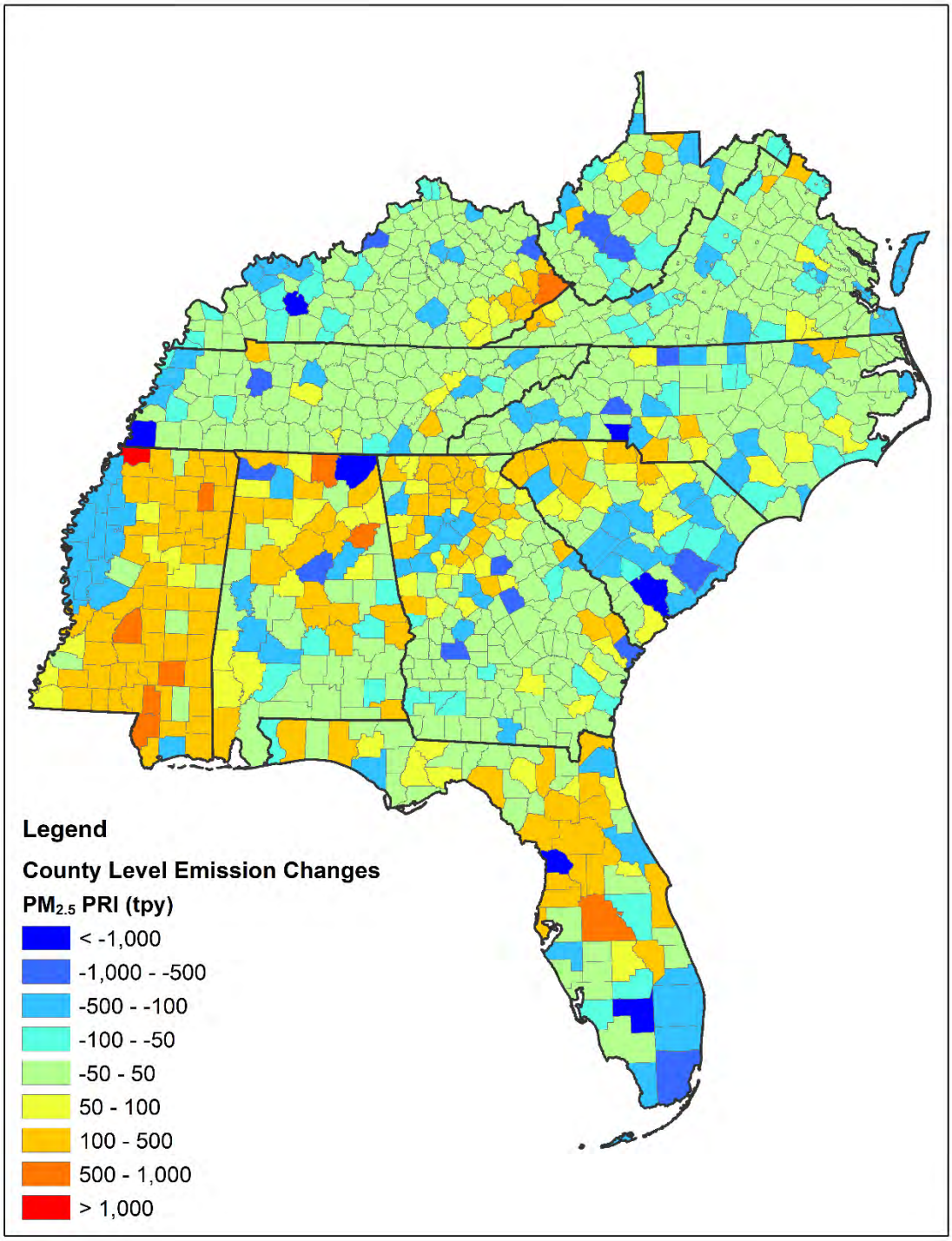

Figure 5-5. County Level $PM_{2.5}$-PRI Emission Changes for the VISTAS Ten States from the Base Year Emissions to the Modeled 2028 2011 Emissions (except Biogenic)[32]

[32] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

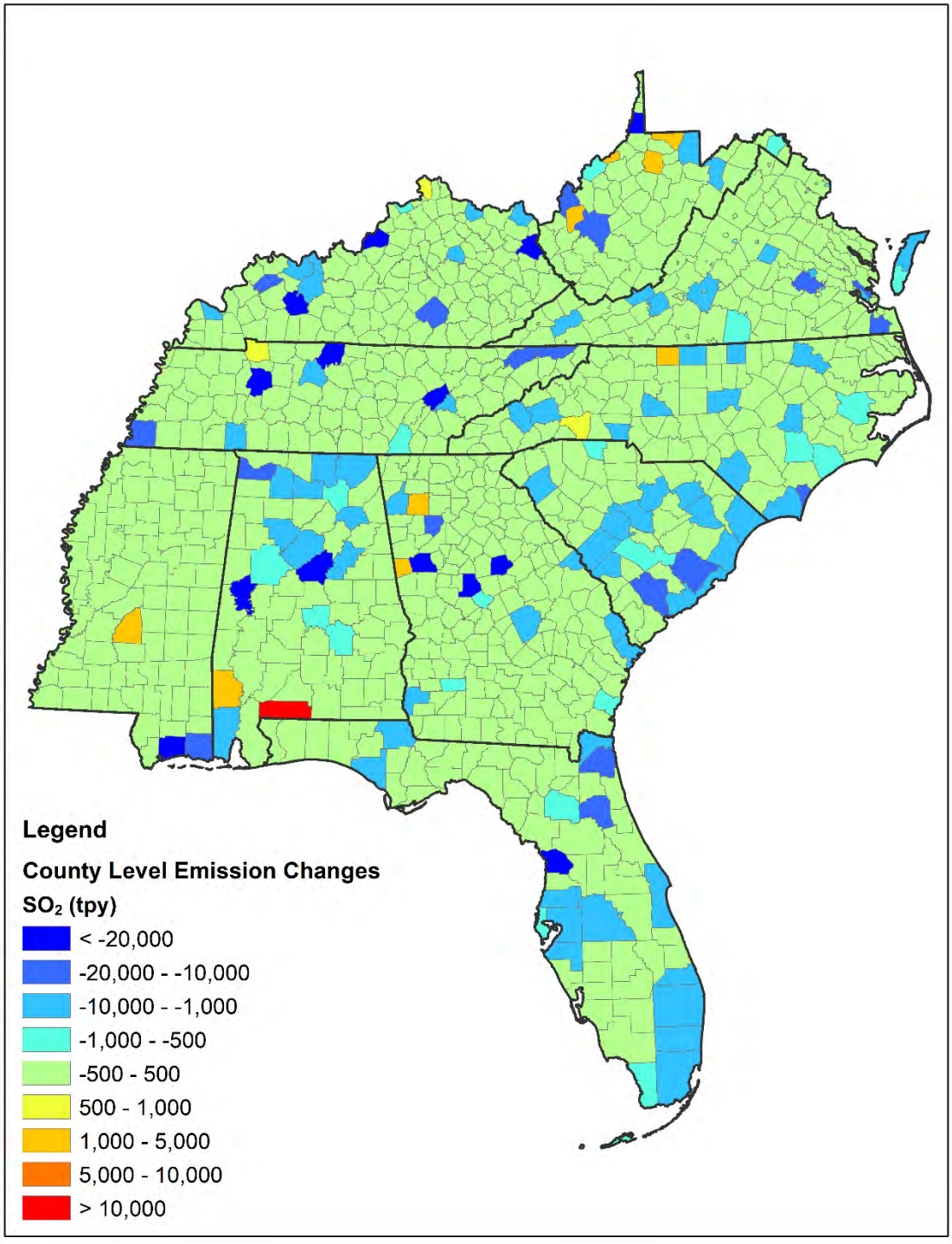

Figure 5-6. County Level SO_2 Emission Changes for the VISTAS Ten States from the Base Year Emissions to the Modeled 2028 2011 Emissions (except Biogenic)

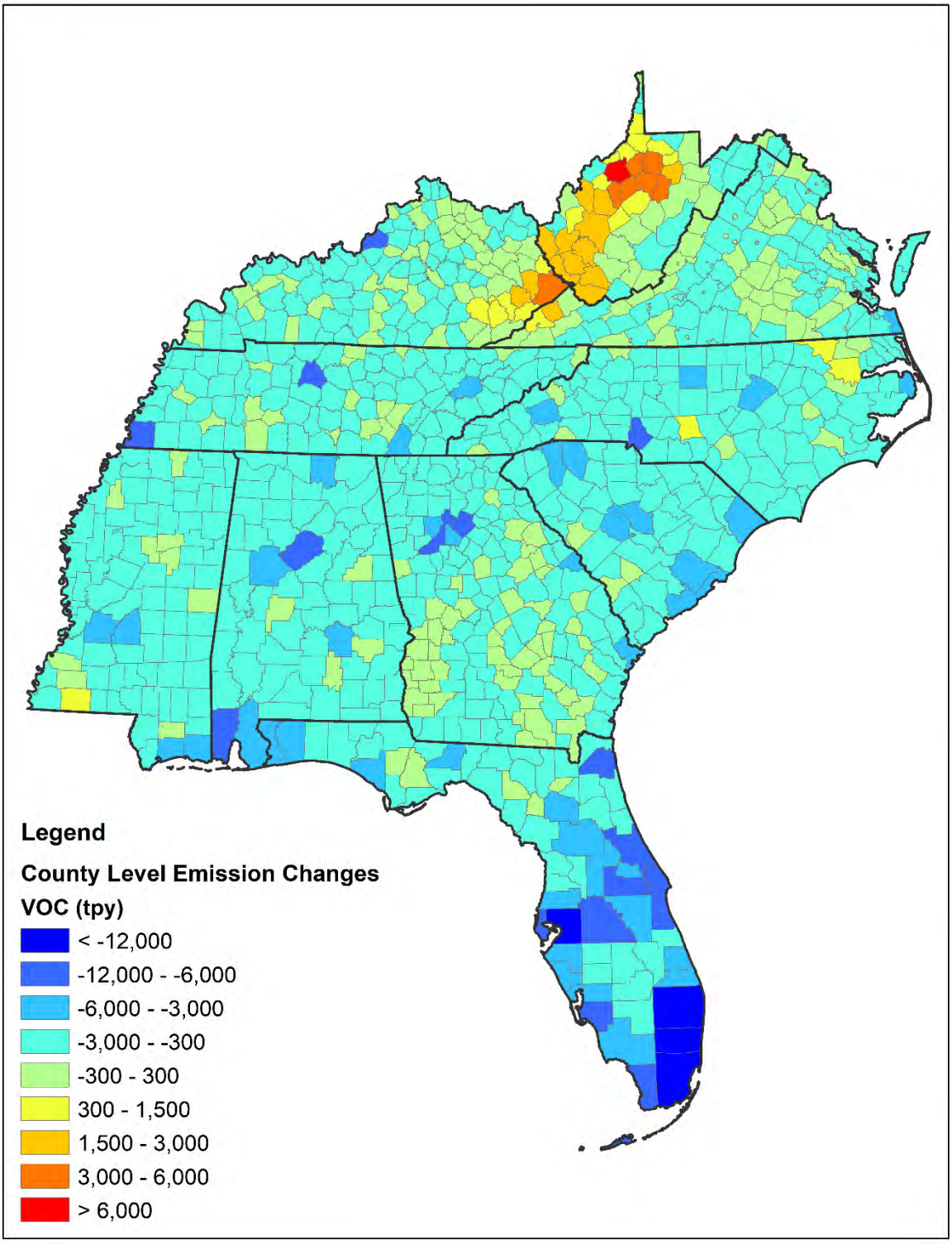

Figure 5-7. County Level VOC Emission Changes for the VISTAS Ten States from the Base Year Emissions to the Modeled 2028 2011 Emissions (except Biogenic)

Appendix A-1.

2011 Emissions Inventory Datasets for the 2011 Emissions Modeling for VISTAS_12 Domain

Appendix A-1. 2011 Emissions Inventory Datasets for the 2011 Emissions Modeling for VISTAS_12 Domain

File Name	File Description	Notes
2011ek_cb6v2_v6_11g_inputs_biogenics.zip	2011 biogenics	Use for all states in the VISTAS_12 Domain.
2011ek_cb6v2_v6_11g_inputs_cem.zip	2011 EGU hourly emissions	Use for all states in the VISTAS_12 Domain.
2011ek_cb6v2_v6_11g_inputs_nonpoint.zip	2011 emissions inventory for nonpoint sources in the U.S.	Use for all states/ areas in the VISTAS_12 Domain. 1. afdust 2. ag 3. agfire 4. cmv (c1c2c3) 5. nonpt (pfc, refueling) 6. np_oilgas 7. rail 8. rwc
2011ek_cb6v2_v6_11g_inputs_nonroad_part1.zip	2011 emissions inventory for nonroad (other) sources in the U.S., part 1	Use for all states in the VISTAS_12 Domain.
2011ek_cb6v2_v6_11g_inputs_nonroad_part2.zip	2011 emissions inventory for nonroad (other) sources in the U.S., part 2	Use for all states in the VISTAS_12 Domain.
2011ek_cb6v2_v6_11g_inputs_onroad.zip	2011 emissions inventory inputs for onroad sources in the U.S., part 1	Use for all states in the VISTAS_12 Domain (if needed). 1. VPOP 2. VMT

Appendix A-1. 2011 Emissions Inventory Datasets for the 2011 Emissions Modeling for VISTAS_12 Domain

File Name	File Description	Notes
		3. SPEED 4. HOTELLING
2011ek_cb6v2_v6_11g_inputs_oth.zip	2011 emissions inventory for U.S., Canada, and Mexico	1. ag (Canada) 2. c3marine (Canada) 3. Mexico and Canada nonpoint 4. Mexico and Canada nonroad 5. Mexico and Canada onroad 6. Mexico and Canada point 7. U.S. Offshore oil and gas platforms 8. afdust (Canada)
2011ek_cb6v2_v6_11g_inputs_point.zip	2011 emissions inventory for point sources in the U.S.	Use for all states in the VISTAS_12 Domain. 1. pt oilgas 2. pt nonipm 3. pt_EGU
2011ek_cb6v2_v6_11g_inputs_ptfire.zip	2011 emissions from point fires, part 1	U.S. fires; Use for all states in the VISTAS_12 Domain.
2011ek_onroad_SMOKE_MOVES_MOVES2014a_forOTAQ_21jan2016_v2_AL_to_MO.zip	2011 emissions inventory for onroad sources in the U.S., part 1	Use for all states in the VISTAS_12 Domain.

Appendix A-1. 2011 Emissions Inventory Datasets for the 2011 Emissions Modeling for VISTAS_12 Domain

File Name	File Description	Notes
2011ek_onroad_SMOKE_MOVES_MOVES2014a_forOTAQ_21jan2016_v2_MT_to_WY.zip	2011 emissions inventory for onroad sources in the U.S., part 2	Use for all states in the VISTAS_12 Domain.
2011el_cb6v2_v6_11g_inputs_nonpoint.zip	2011 emissions inventory for nonpoint sources in the U.S., part 2	Supplement to "ek" version. Use for all states/areas in the VISTAS_12 Domain. 1. cmv (c1c2c3) 2. rail
2011el_cb6v2_v6_11g_inputs_onroad.zip	2011 emissions inventory inputs for onroad sources in the U.S., part 2	Supplement to "ek" version. Use for all states in the VISTAS_12 Domain. 1. VPOP 2. VMT 3. SPEED 4. HOTELLING
2011el_cb6v2_v6_11g_inputs_oth_part1.zip	2011 nonpoint, onroad and nonroad emissions inventory for Canada and Mexico, part 1	Supplement to "ek" version. Use for all areas in the VISTAS_12 Domain. 1. ag (Canada) 2. c3marine (Canada) 3. Mexico and Canada nonpoint 4. Mexico and

Appendix A-1. 2011 Emissions Inventory Datasets for the 2011 Emissions Modeling for VISTAS_12 Domain

File Name	File Description	Notes
		Canada nonroad 5. Mexico (part 1) and Canada onroad
2011el_cb6v2_v6_11g_inputs_oth_part2.zip	2011 onroad emissions for Mexico and point emissions inventory for U.S. platforms, Canada and Mexico, part 2	Supplement to "ek" version. Use for all states in the VISTAS_12 Domain. 1. Mexico onroad (part 2) 2. Mexico and Canada point 3. U.S. Offshore oil and gas platforms
2011el_cb6v2_v6_11g_inputs_ptfire.zip	2011 emissions from point fires, part 2	Mexico and Canada fires. Use for all area in the VISTAS_12 Domain.
2011el_onroad_SMOKE_MOVES2014a_ff10_part1.zip	2011 emissions inventory for onroad sources in the U.S., part 1	Supplement to "ek" version. Use for all states in the VISTAS_12 Domain.

Appendix A-1. 2011 Emissions Inventory Datasets for the 2011 Emissions Modeling for VISTAS_12 Domain

File Name	File Description	Notes
2011el_onroad_SMOKE_MOVES2014a_ff10_part2.zip	2011 emissions inventory for onroad sources in the U.S., part 2	Supplement to "ek" version. Use for all states in the VISTAS_12 Domain.
2011RepCDBs_20151208.zip	2011 county databases for MOVES model	Use for all states in the VISTAS_12 Domain (if needed).

Appendix A-2.

2028 Emissions Inventory Datasets for the 2028 Emissions Modeling

Appendix A-2. 2028 Emissions Inventory Datasets for the 2028 Emissions Modeling

File Name	File Description	Notes
forsmokemonthly.7z	2028 projected EGU emissions	Use only for the Non-VISTAS states in the VISTAS_12 Domain. File developed by ERTAC and provided by NC DAQ.
2028el_cb6v2_v6_11g_inputs_point.zip	2028 projected emissions inventory for point sources in the U.S.	Use only for the Non-VISTAS states in the VISTAS_12 Domain 1. pt oilgas 2. pt nonipm 3. pt_EGU (do not use)
2028el_cb6v2_v6_11g_inputs_nonpoint.zip	2028 projected emissions inventory for nonpoint sources in the U.S.	Use for all states/areas in the VISTAS_12 Domain 1. afdust 2. ag 3. c1c2_offshore 4. cmv 5. nonpt 6. np_oilgas (pfc, refueling, cement kilns, biorefineries, other) 7. rail 8. rwc
2011ek_cb6v2_v6_11g_inputs_biogenics.zip	2011 biogenics	U.S. biogenics; carry-forward for the 2028 emissions. Use for all areas in the VISTAS_12 Domain.
2028el_cb6v2_v6_11g_inputs_nonroad_part1.zip	2028 projected emissions inventory for nonroad (other) sources in the U.S., part 1	Use for all areas in the VISTAS_12 Domain.
2028el_cb6v2_v6_11g_inputs_nonroad_part2.zip	2028 projected emissions inventory for nonroad (other) sources in the U.S., part 2	Use for all areas in the VISTAS_12 Domain.
2028el_cb6v2_v6_11g_inputs_onroad.zip	2028 projected emissions inventory inputs for onroad sources in the U.S.	Use for all states in the VISTAS_12 Domain (if needed).

Appendix A-2. 2028 Emissions Inventory Datasets for the 2028 Emissions Modeling

File Name	File Description	Notes
		1. VPOP 2. VMT 3. SPEED 4. HOTELLING
2028el_cb6v2_v6_11g_inputs_oth_part1.zip	2028 projected emissions inventory for Canada and Mexico, part 1	Use for all areas in the VISTAS_12 Domain. 1. ag (Canada) 2. c3marine (Canada) 3. Mexico and Canada nonpoint 4. Mexico and Canada nonroad 5. Mexico onroad (part 1) 6. Canada onroad
2028el_cb6v2_v6_11g_inputs_oth_part2.zip	2028 projected emissions inventory for Gulf of Mexico, Canada, and Mexico, part 1	Use for all areas in the VISTAS_12 Domain. 1. Mexico onroad (part 2) 2. Mexico point 3. Canada point 4. U.S. Offshore oil and gas platforms
2028el_onroad_SMOKE_MOVES2014a_ff10_part1.zip	2028 projected emissions inventory for onroad sources in the U.S., part 1	Use for all areas in the VISTAS_12 Domain
2028el_onroad_SMOKE_MOVES2014a_ff10_part2.zip	2028 projected emissions inventory for onroad sources in the U.S., part 2	Use for all areas in the VISTAS_12 Domain
2011ek_cb6v2_v6_11g_inputs_ptfire.zip	2011 emissions from point fires, part 1	U.S. fires; carry-forward for the 2028 emissions. Use for all states in the VISTAS_12 Domain
2011el_cb6v2_v6_11g_inputs_ptfire.zip	2011 emissions from point fires, part 2	Mexico and Canada fires; carry-forward for the 2028 emission. Use for all areas in the VISTAS_12 Domain.

Appendix A-2. 2028 Emissions Inventory Datasets for the 2028 Emissions Modeling

File Name	File Description	Notes
2028el_RepCDBs_20160820.zip	2028 county databases for MOVES model	Use for all states in the VISTAS_12 Domain (if needed).
2028el_CoST_Projection_Packets.zip	2028 projection and control factors, and closures	Use for all states/areas in the VISTAS_12 Domain (if needed).
NCDAQ_2028PY_NonEGU_Point_061918_Final.xlsx[1]	2028 point non-EGU dataset developed by North Carolina	Use only for North Carolina

[1] For non-EGU point sources, NC DAQ applied its own facility closures and growth and control factors to North Carolina's 2016 base year inventory to develop its 2028 projection year inventory.

Appendix B.

Point EGU and Point Non-EGU Emissions Change Maps

In the following figures, the color blue indicates reductions in the 2028 VISTAS modeling inventory as compared to the EPA 2028el inventory, while the color red indicates increases in the 2028 VISTAS modeling inventory as compared to the EPA 2028el inventory. The color black indicates little or no changes in emissions. The size of the circle indicates the magnitude of the change.

Appendix B-1. Alabama 2028 Point EGU and Point Non-EGU Comparisons

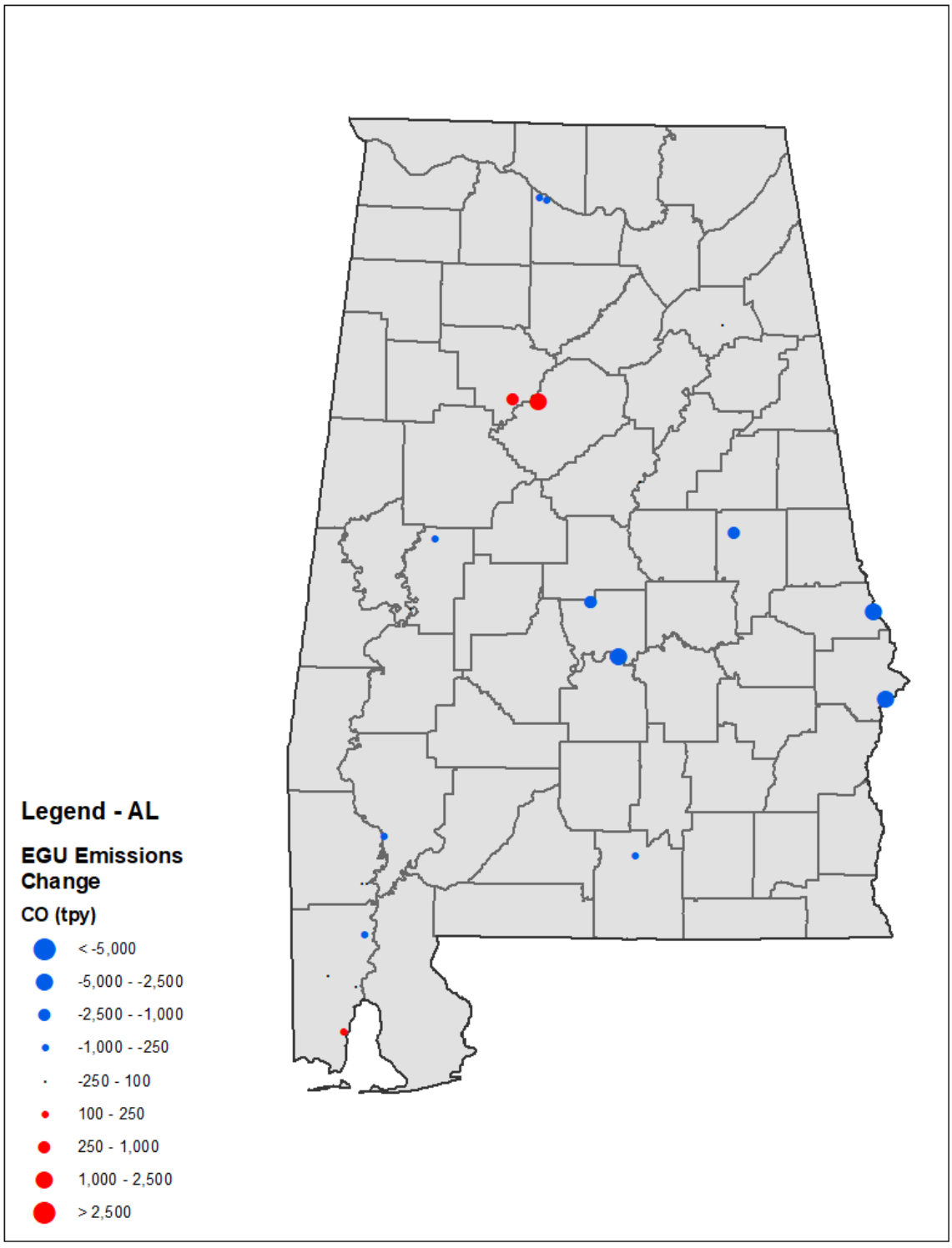

Figure B.1-1. Alabama Point EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory.

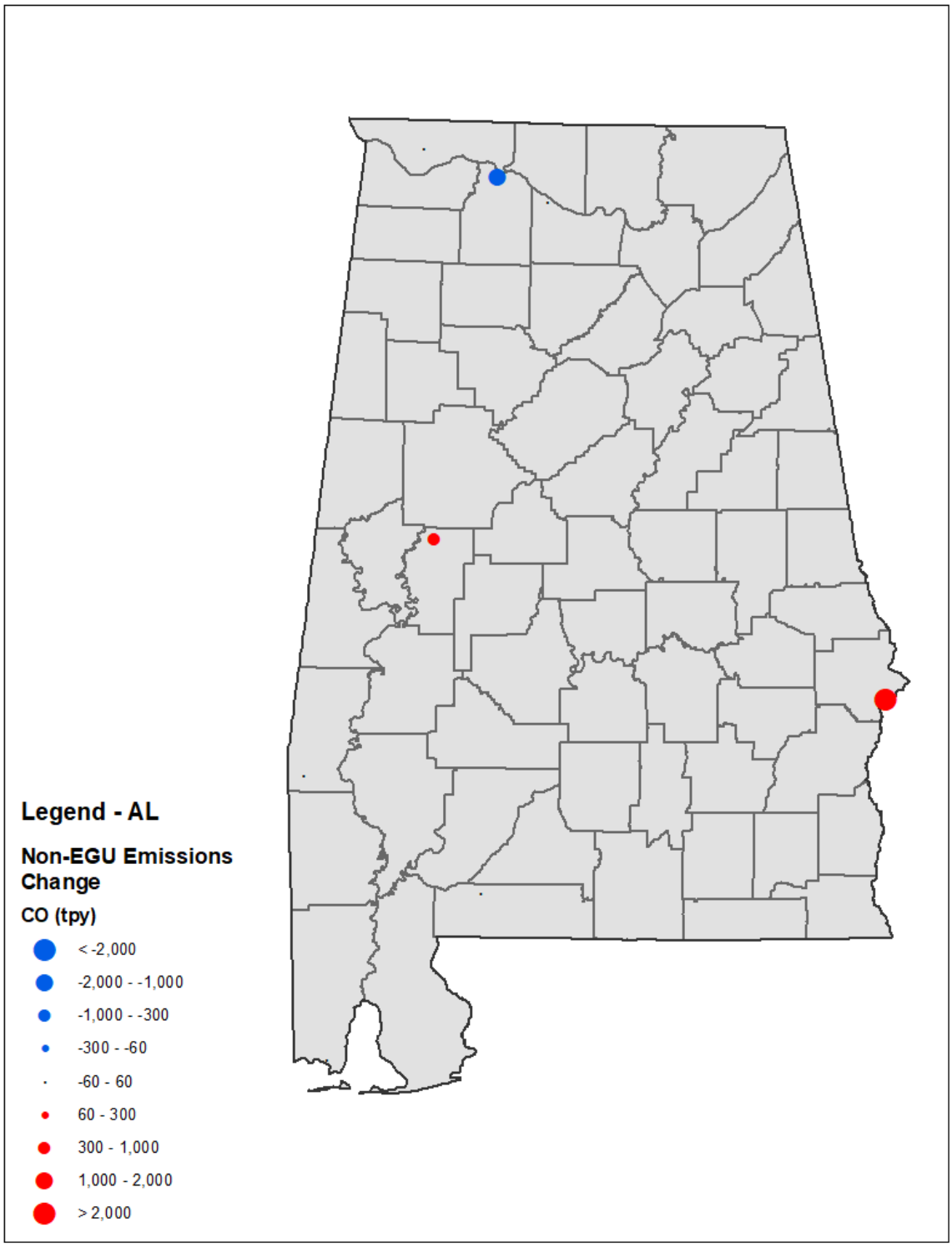

Figure B.1-2. Alabama Point Non-EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

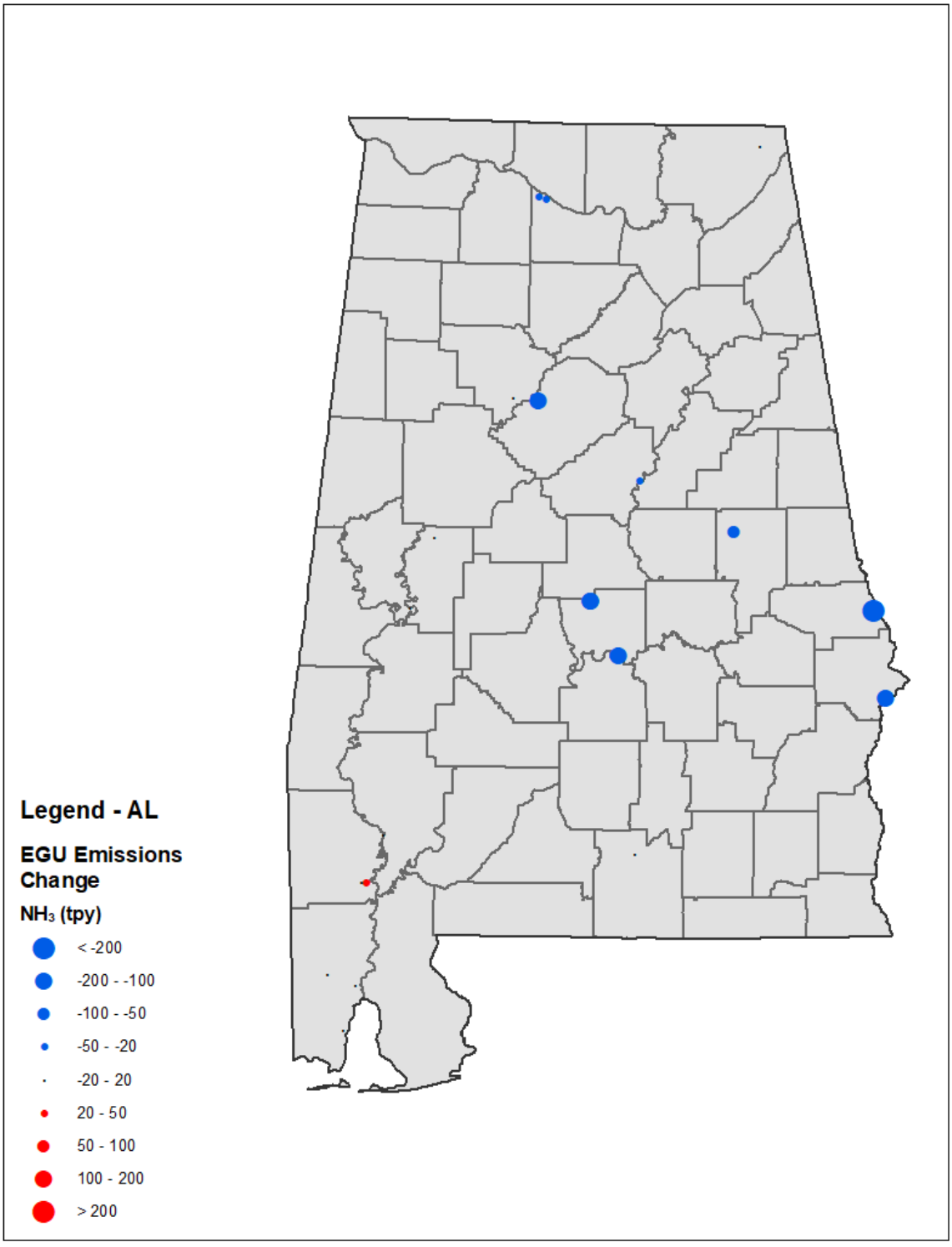

Figure B.1-3. Alabama Point EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

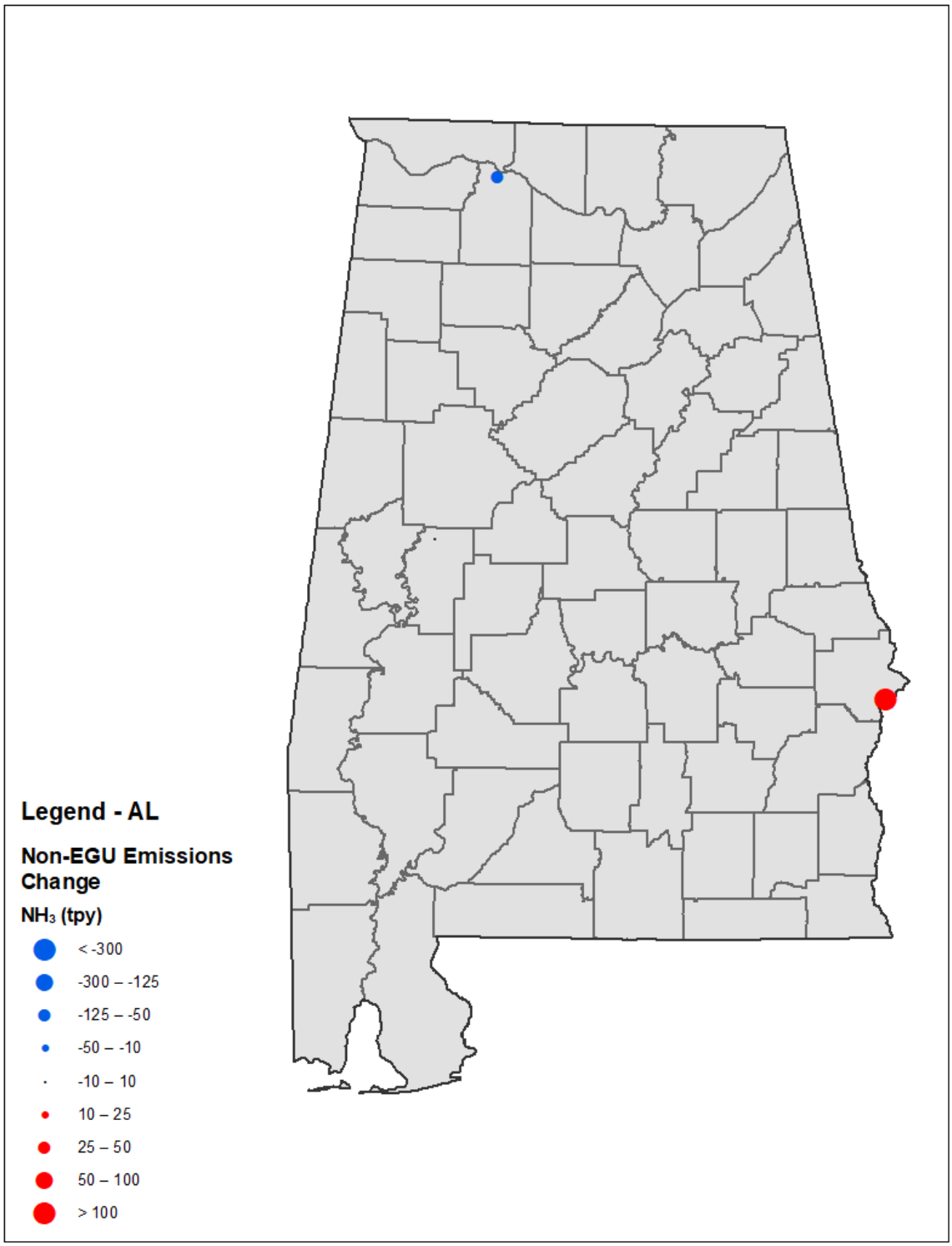

Figure B.1-4. Alabama Point Non-EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

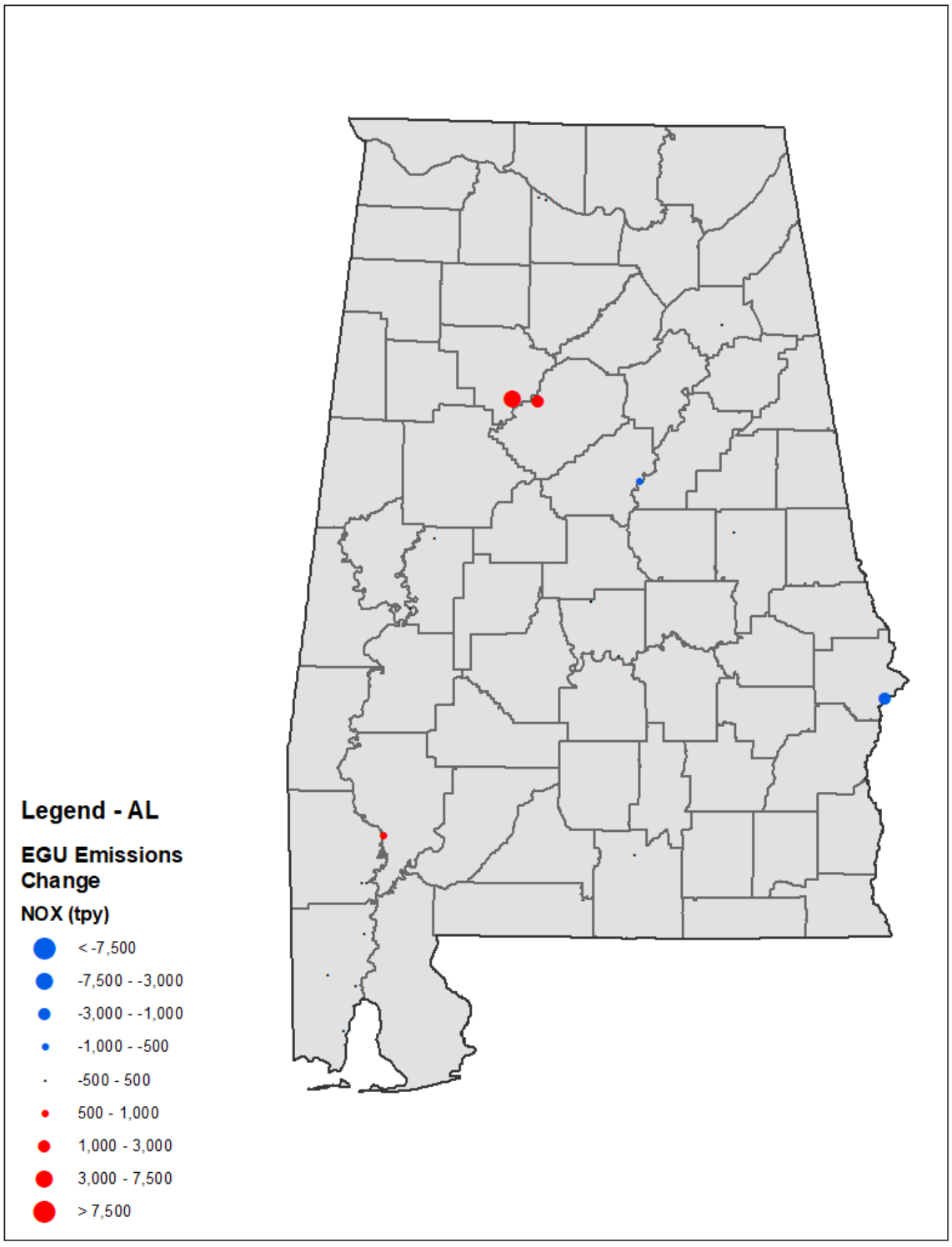

Figure B.1-5. Alabama Point EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

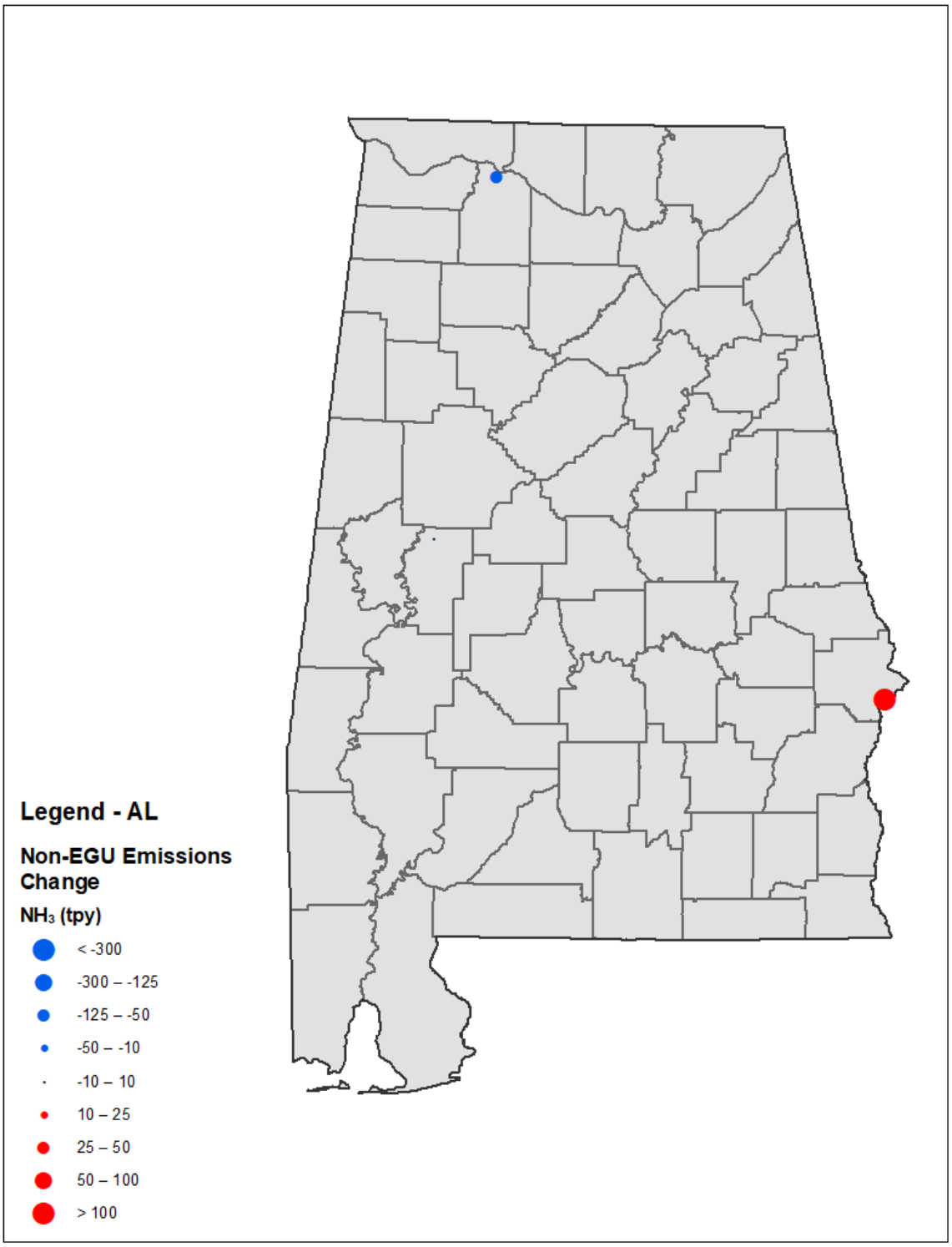

Figure B.1-6. Alabama Point Non-EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

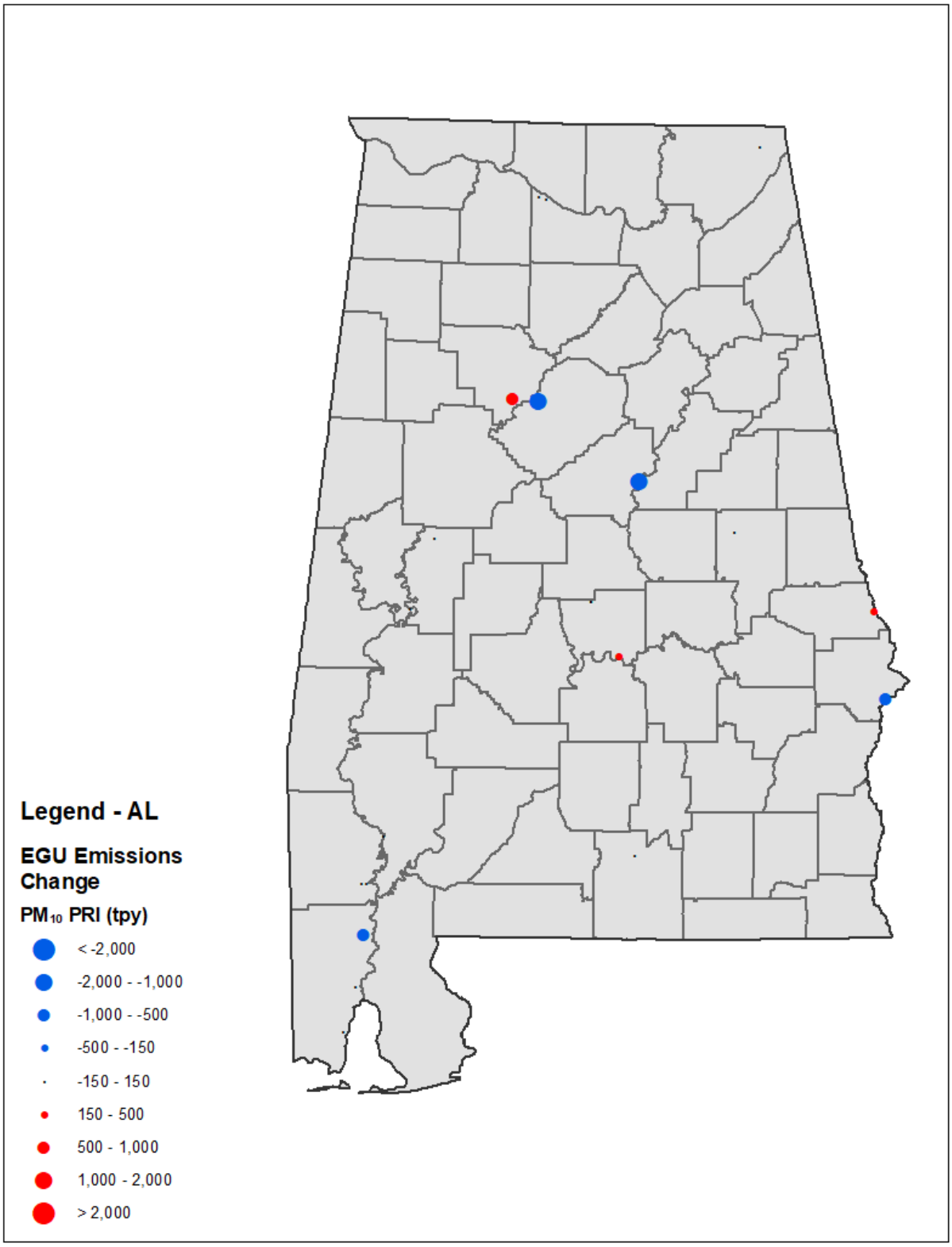

Figure B.1-7. Alabama Point EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

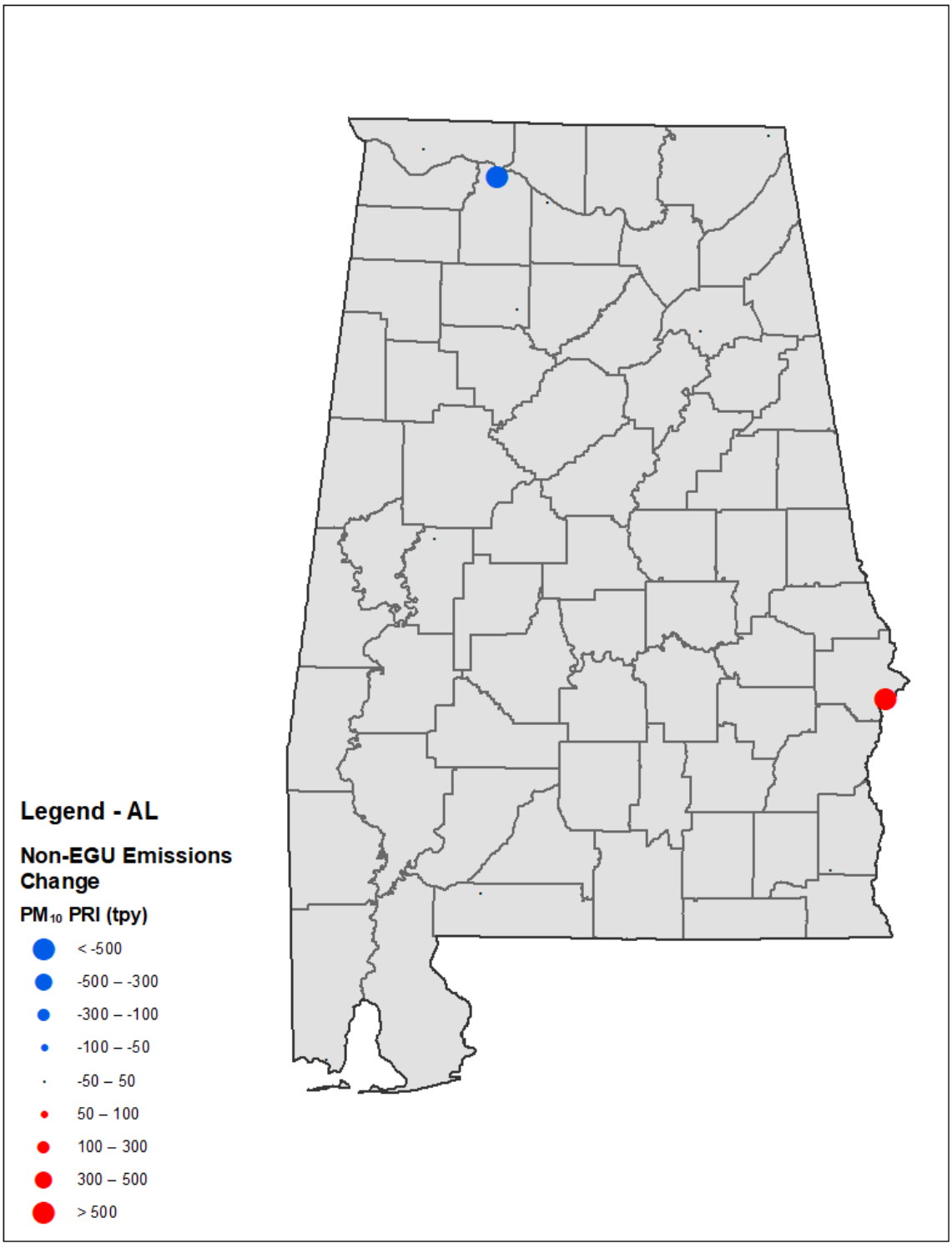

Figure B.1-8. Alabama Point Non-EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

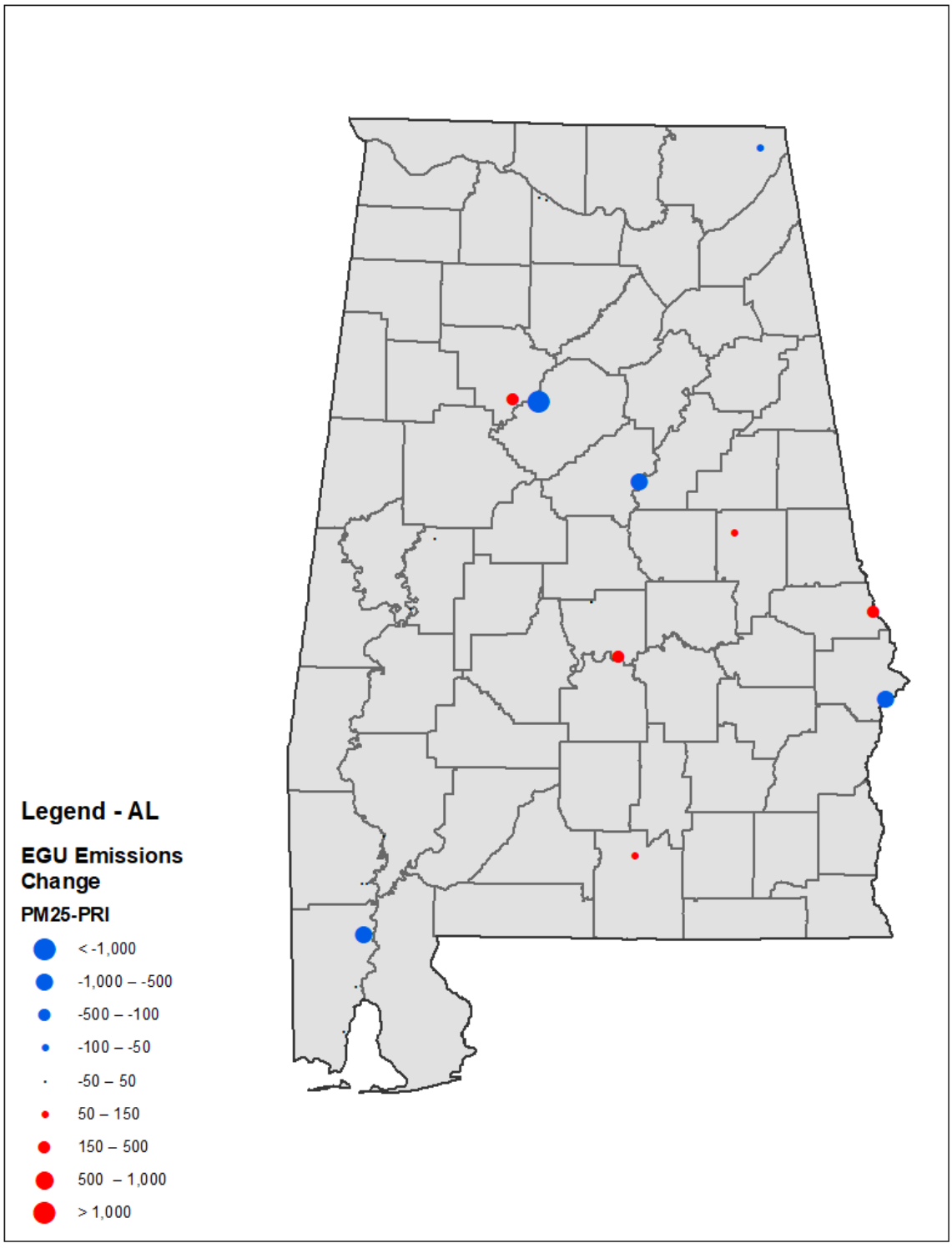

Figure B.1-9. Alabama Point EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

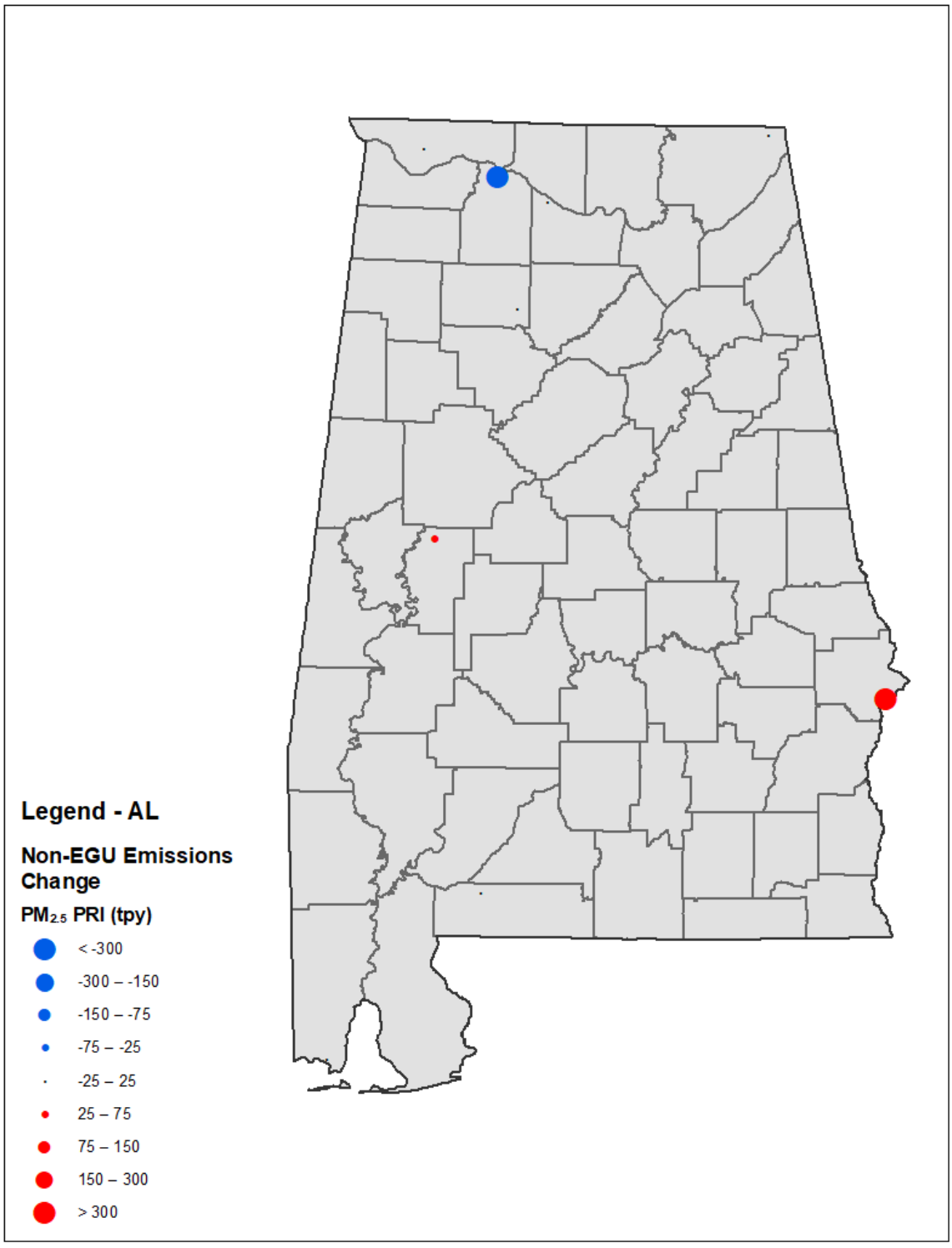

Figure B.1-10. Alabama Point Non-EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

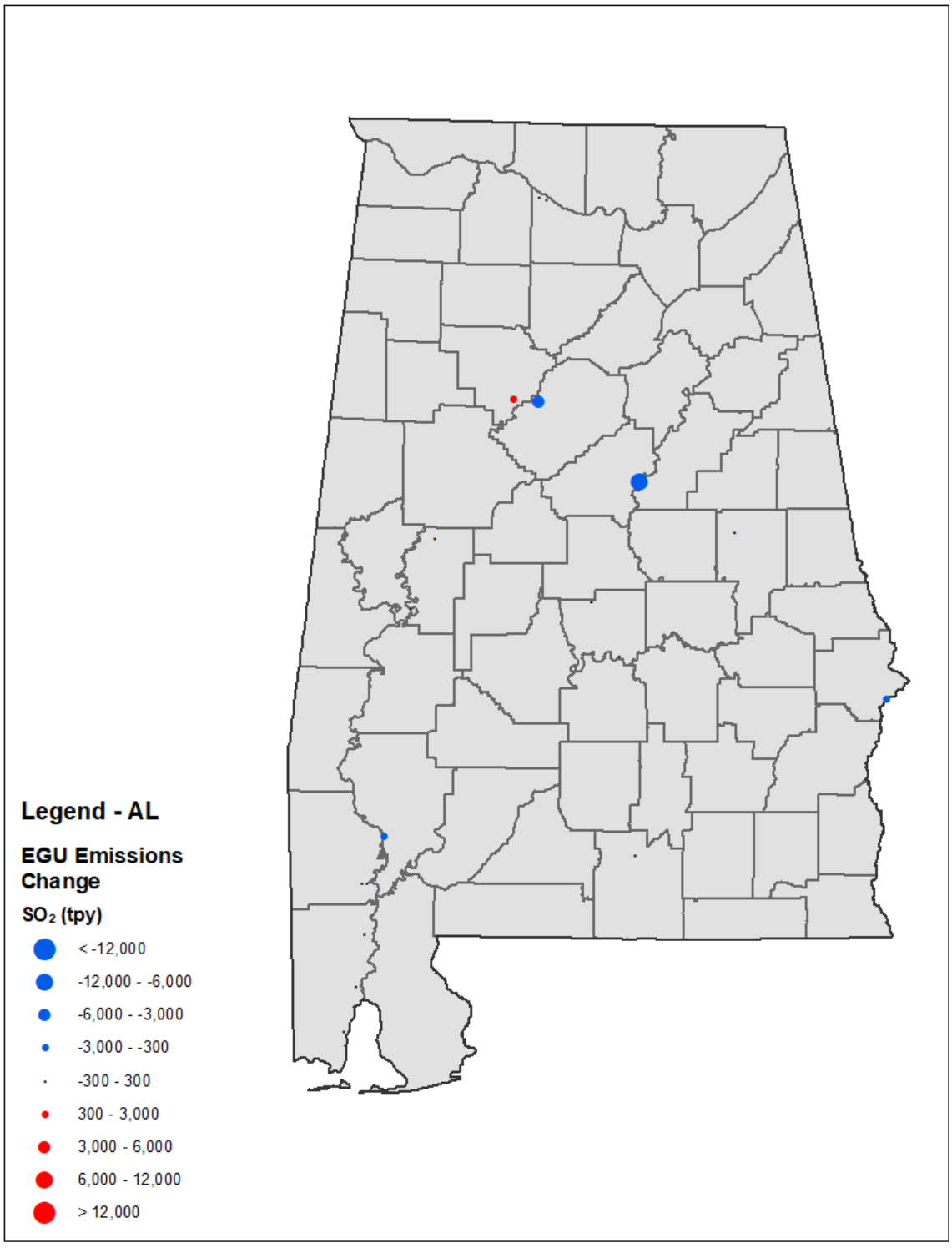

Figure B.1-11. Alabama Point EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

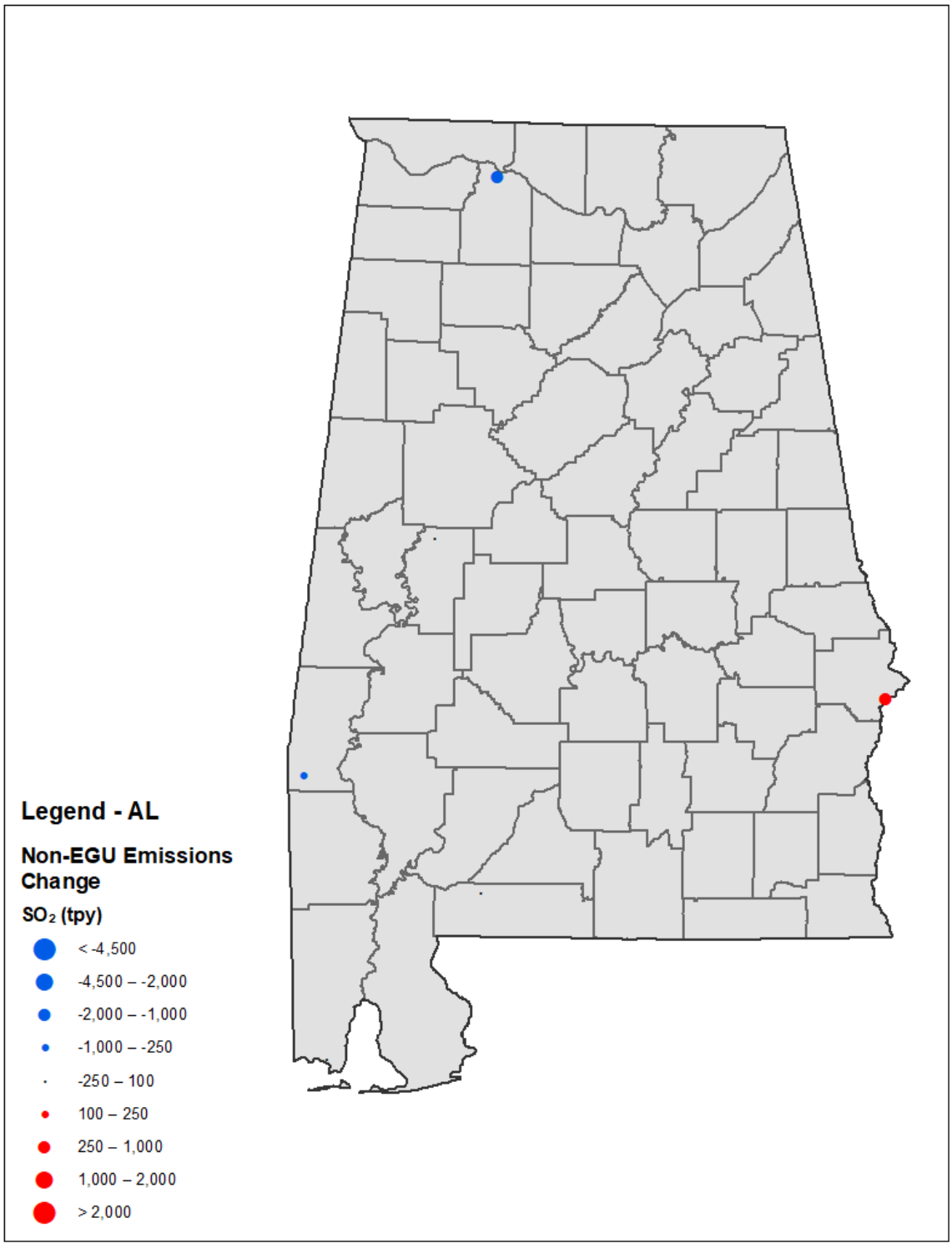

Figure B.1-12. Alabama Point Non-EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

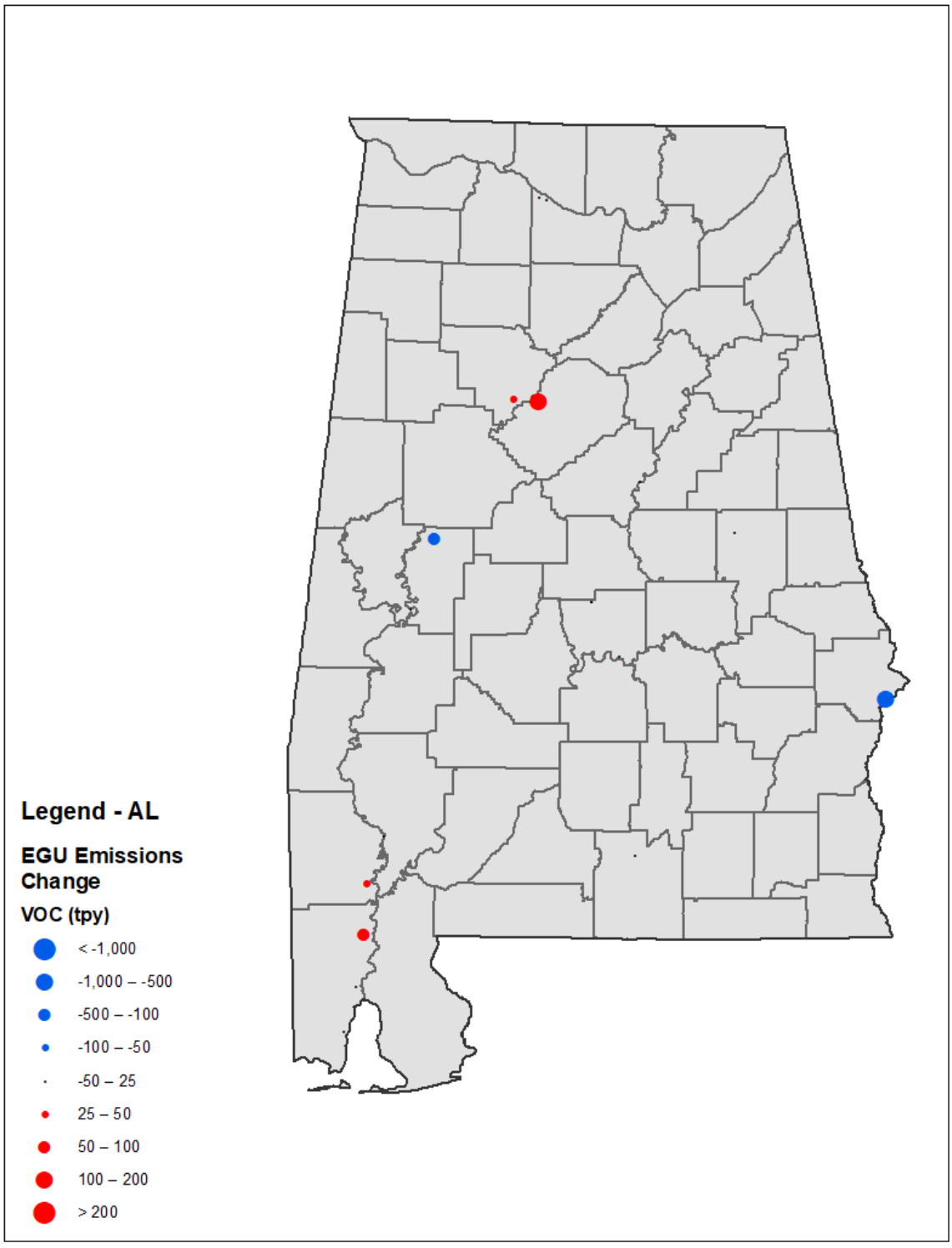

Figure B.1-13. Alabama Point EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

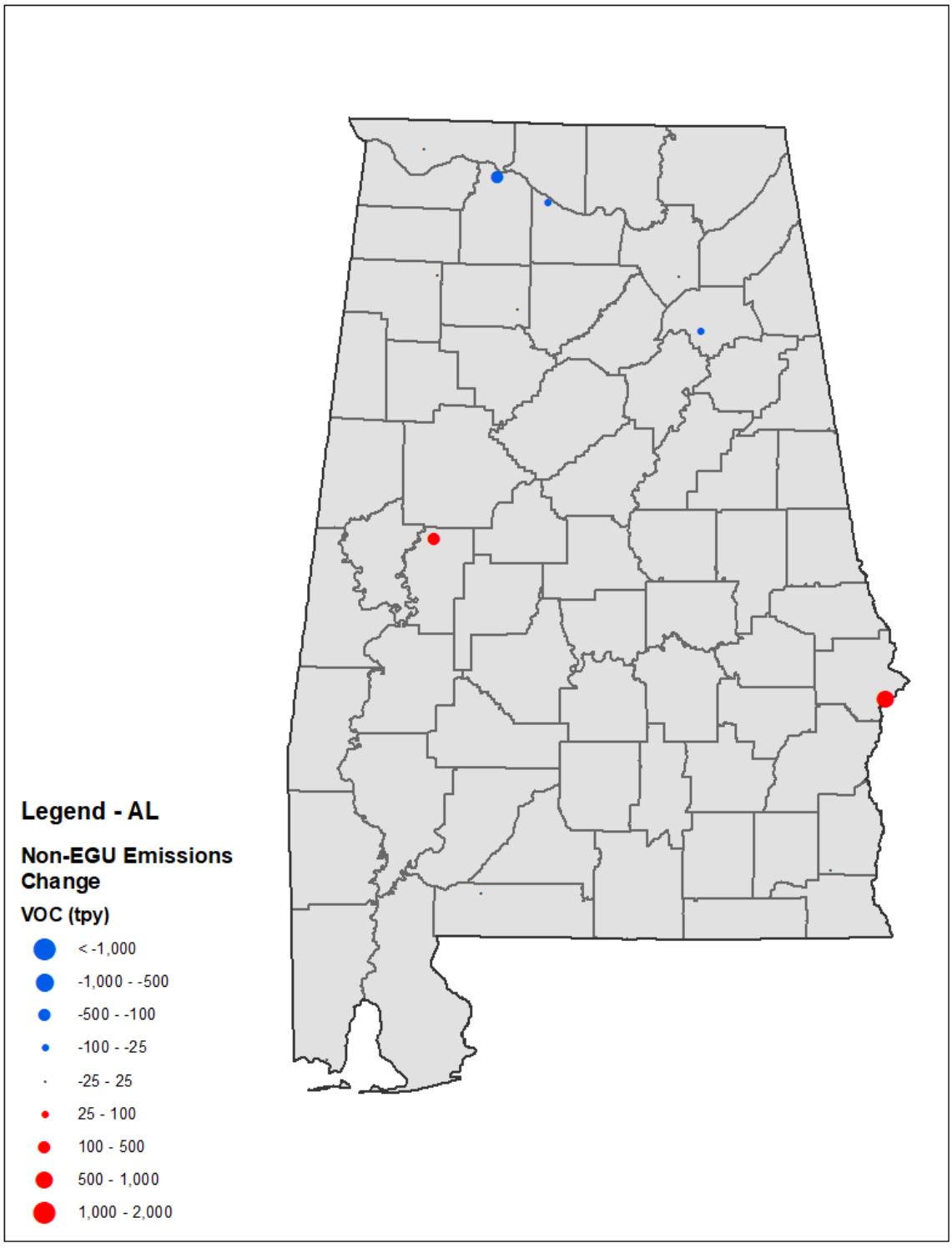

Figure B.1-14. Alabama Point Non-EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

Appendix B-2. Florida 2028 Point EGU and Point Non-EGU Comparisons

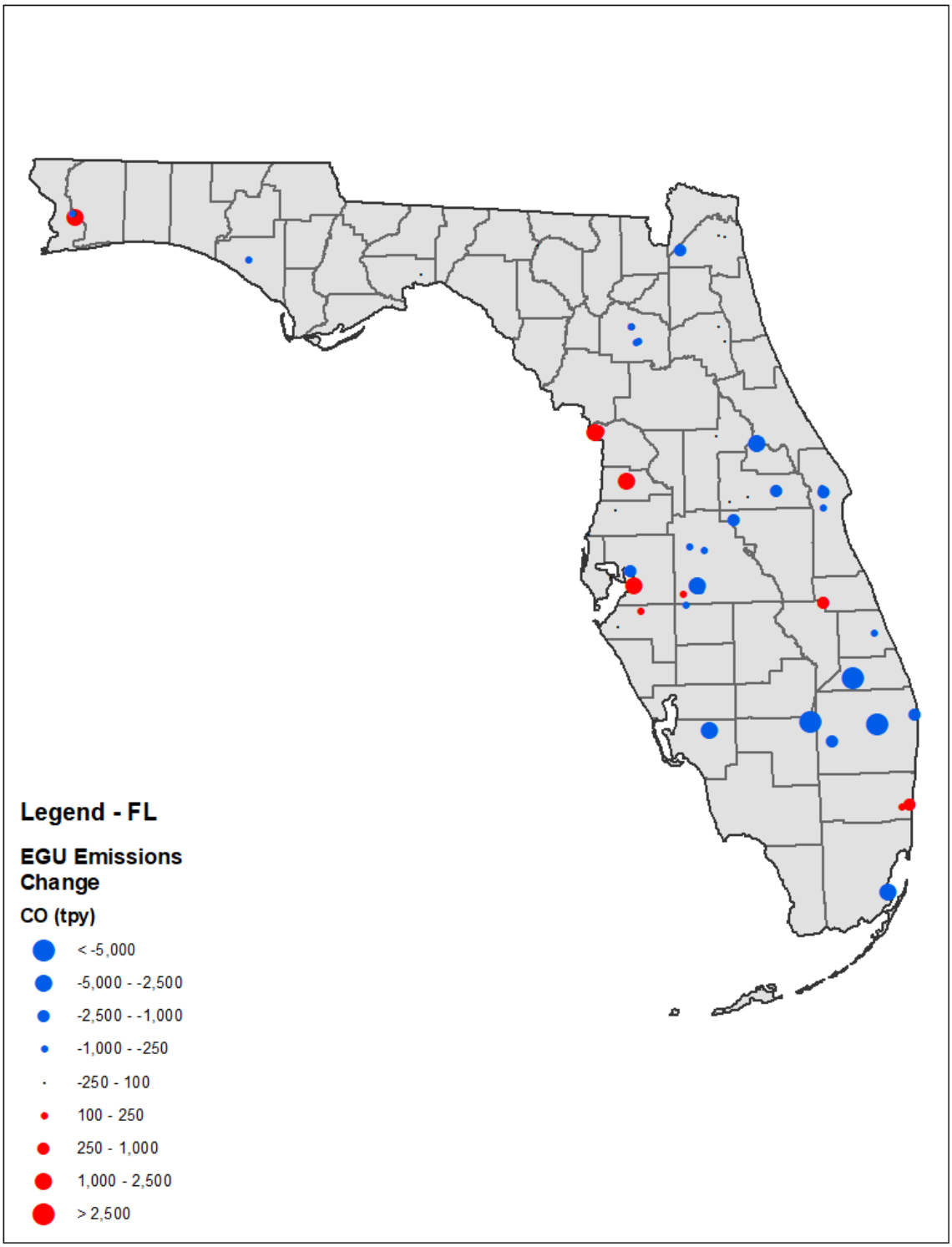

Figure B.2-1. Florida Point EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

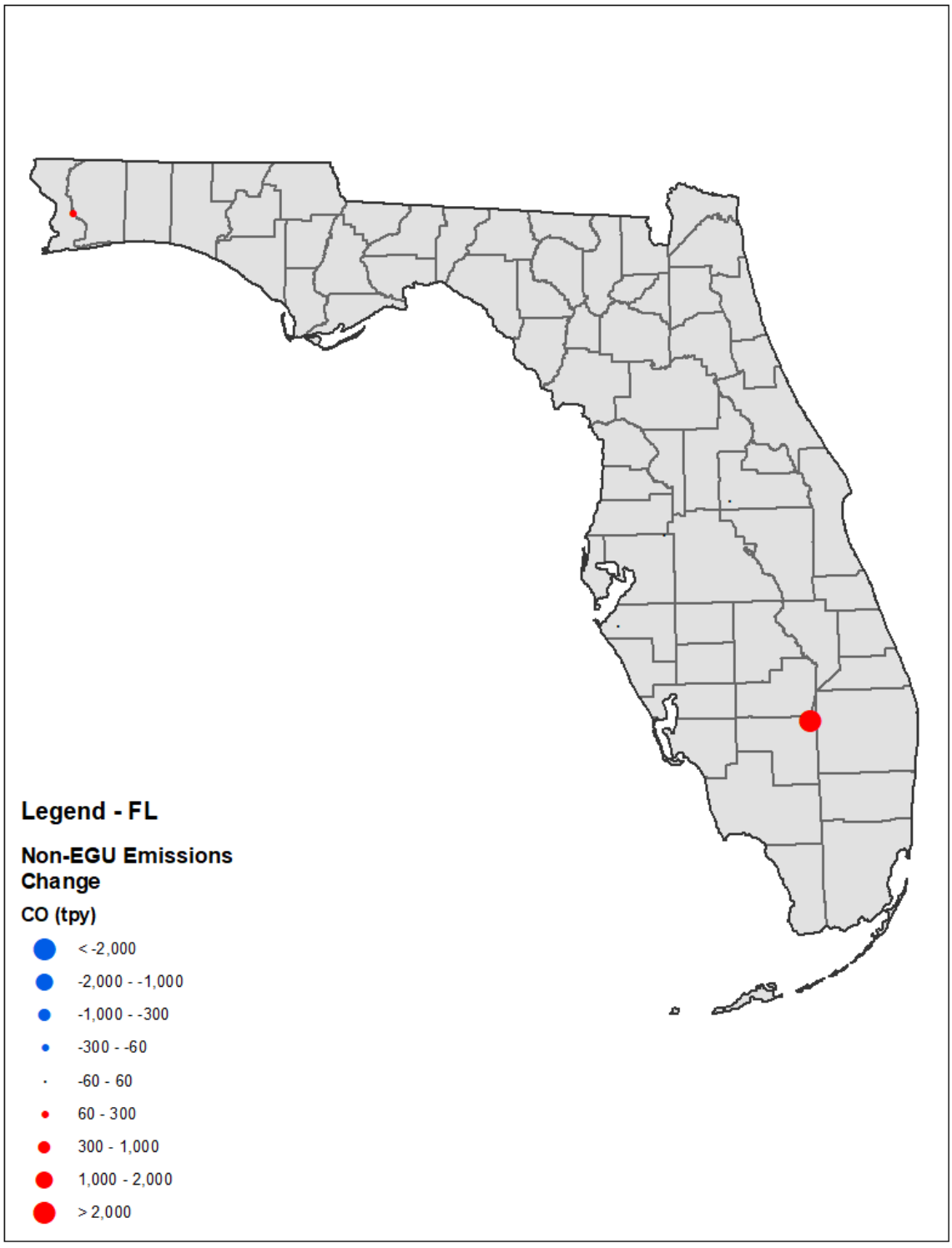

Figure B.2-2. Florida Point Non-EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

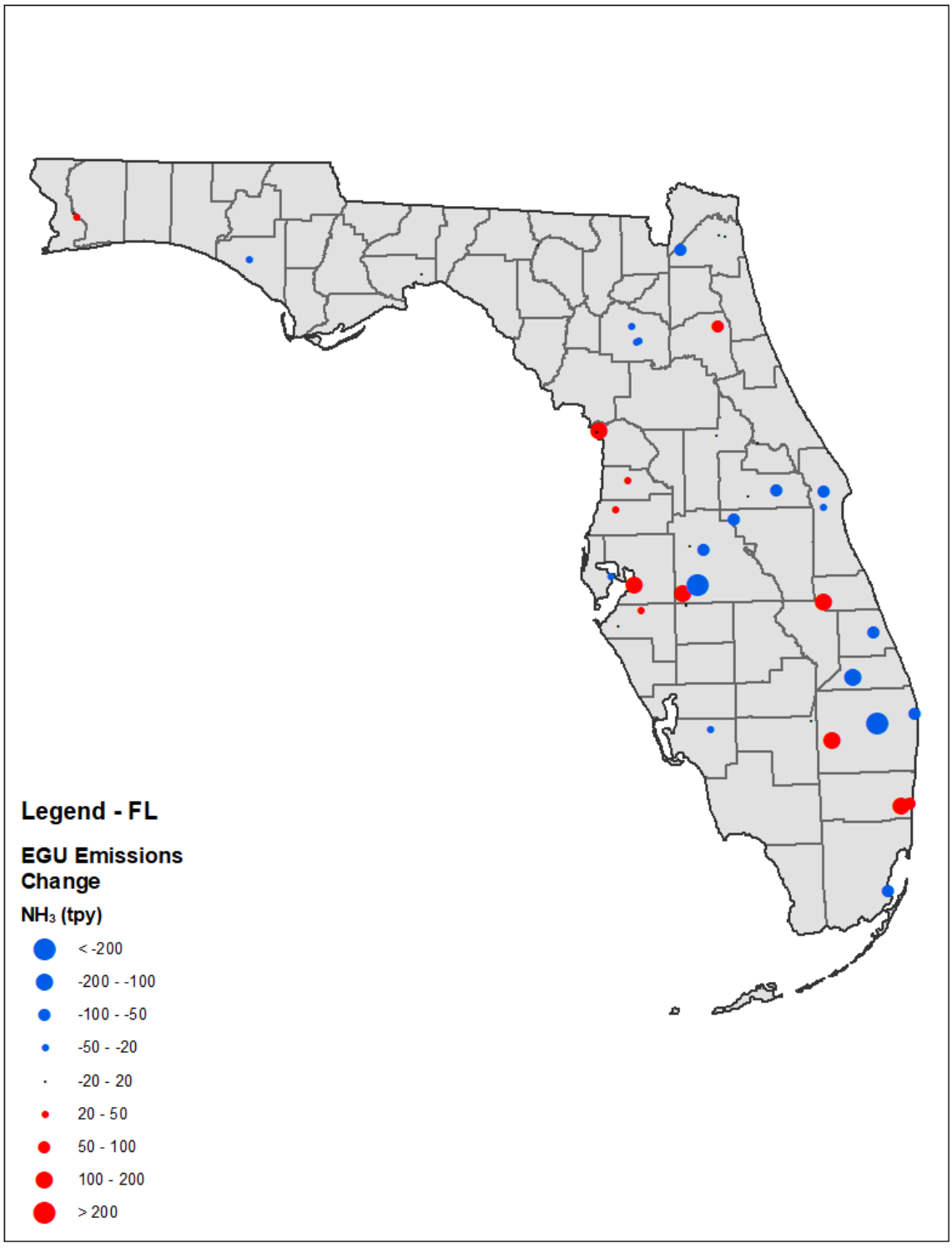

Figure B.2-3. Florida Point EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

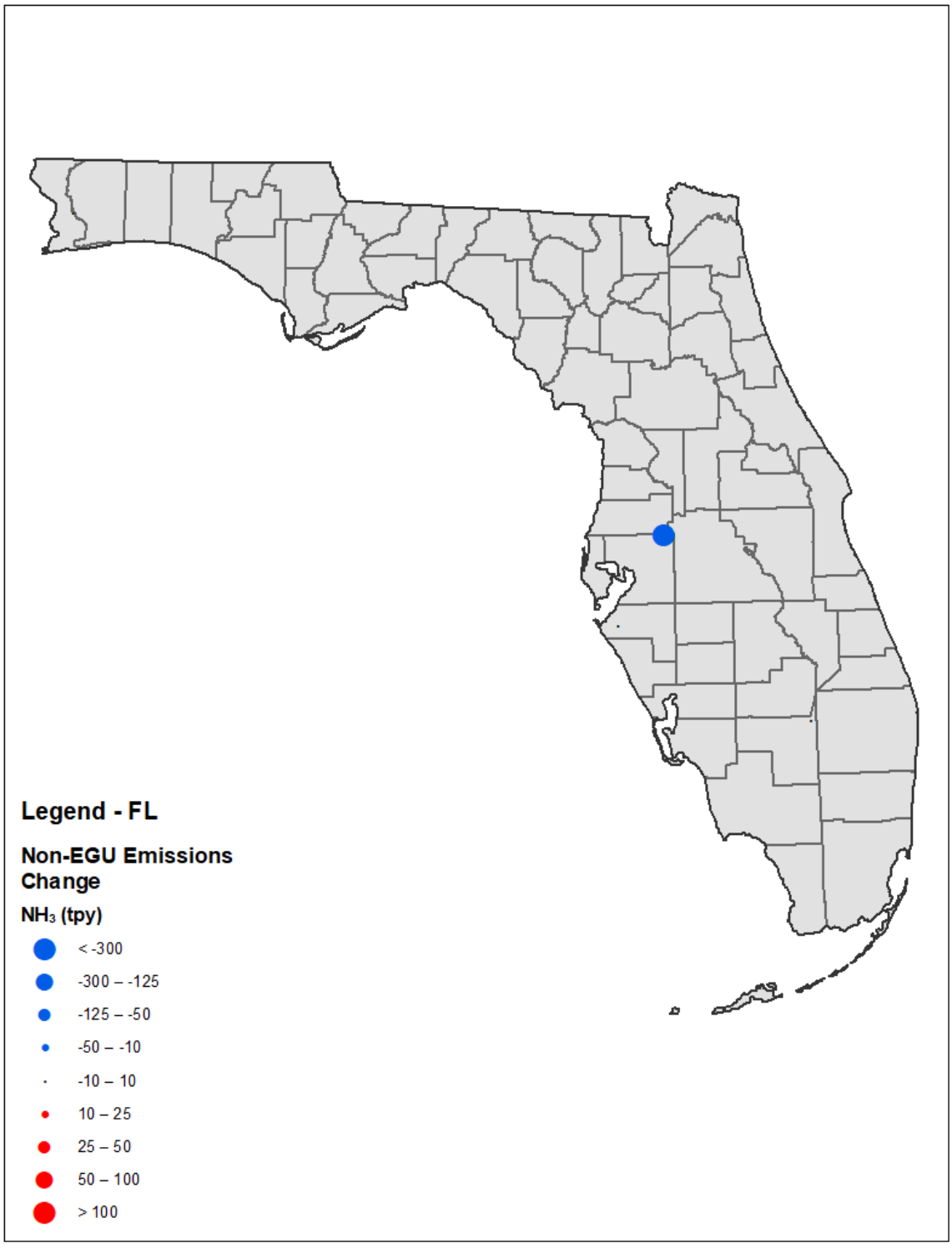

Figure B.2-4. Florida Point Non-EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

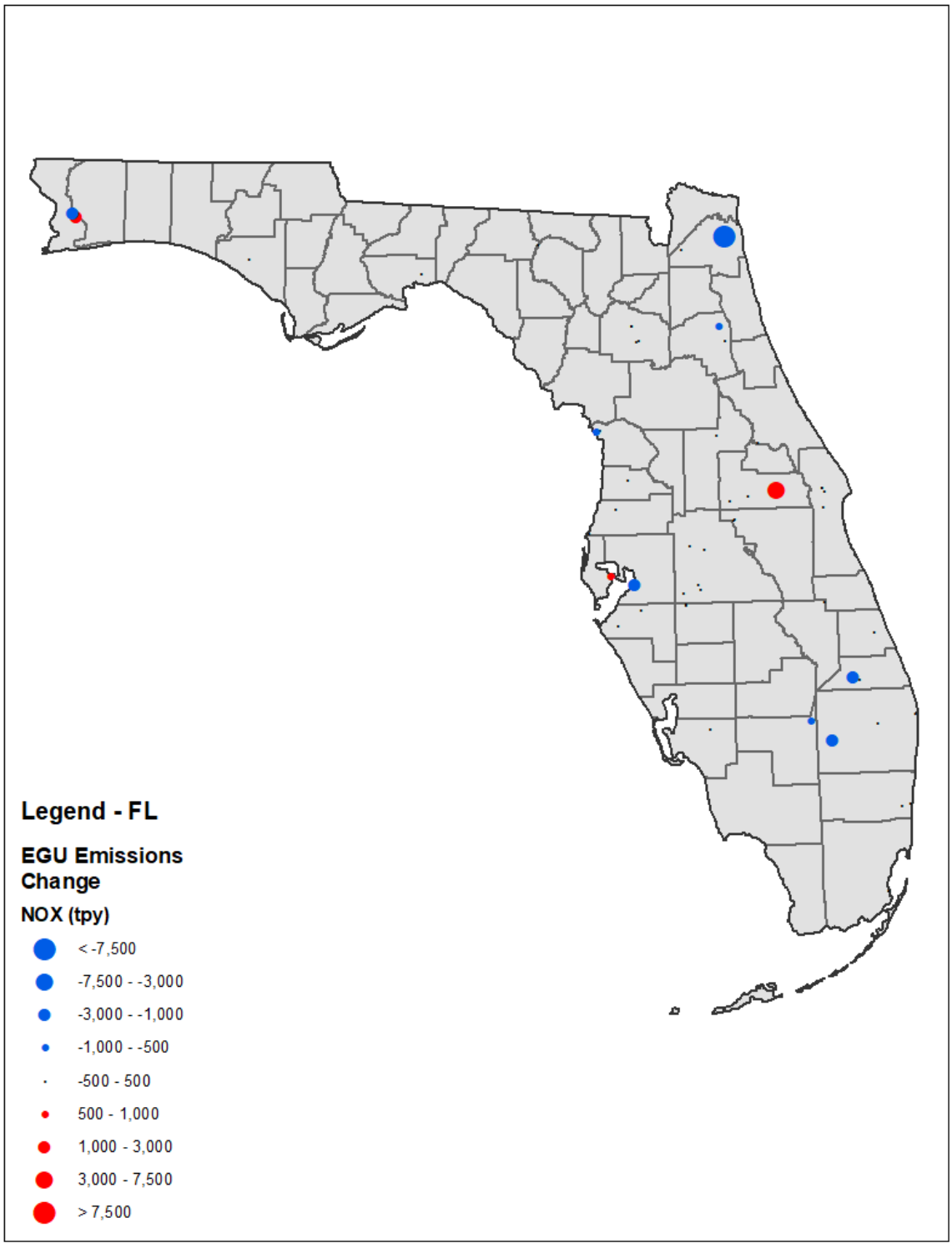

Figure B.2-5. Florida Point EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

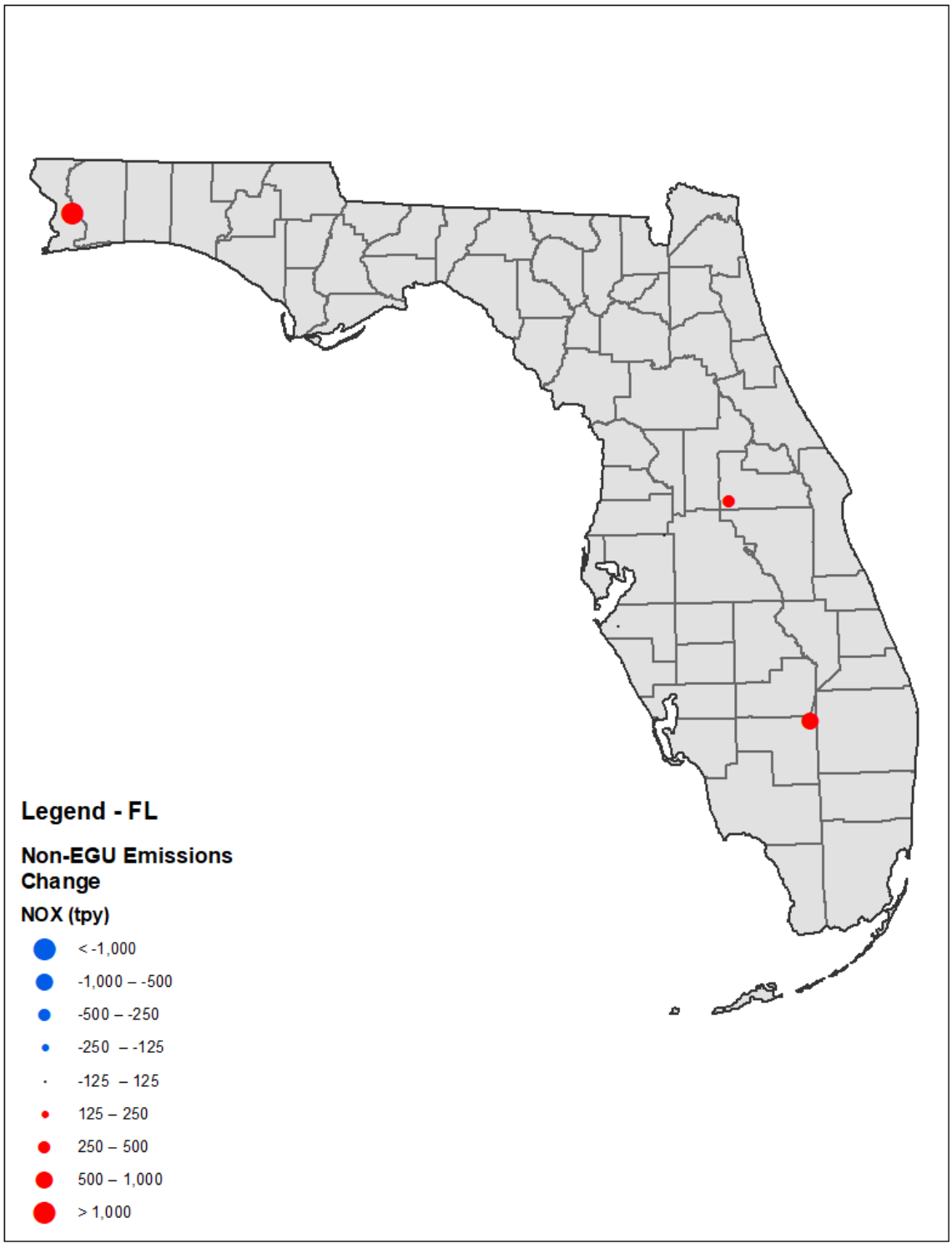

Figure B.2-6. Florida Point Non-EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

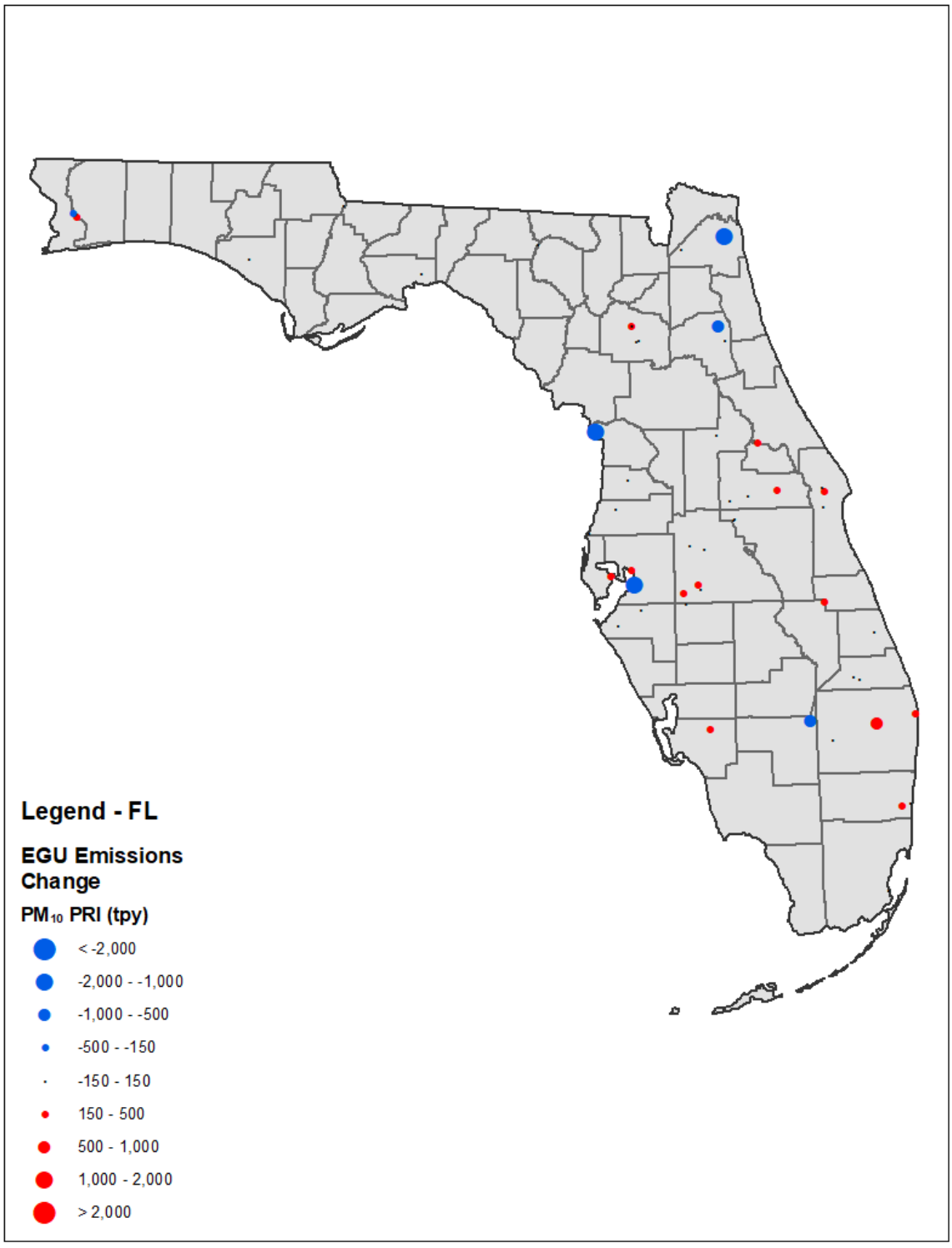

Figure B.2-7. Florida Point EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

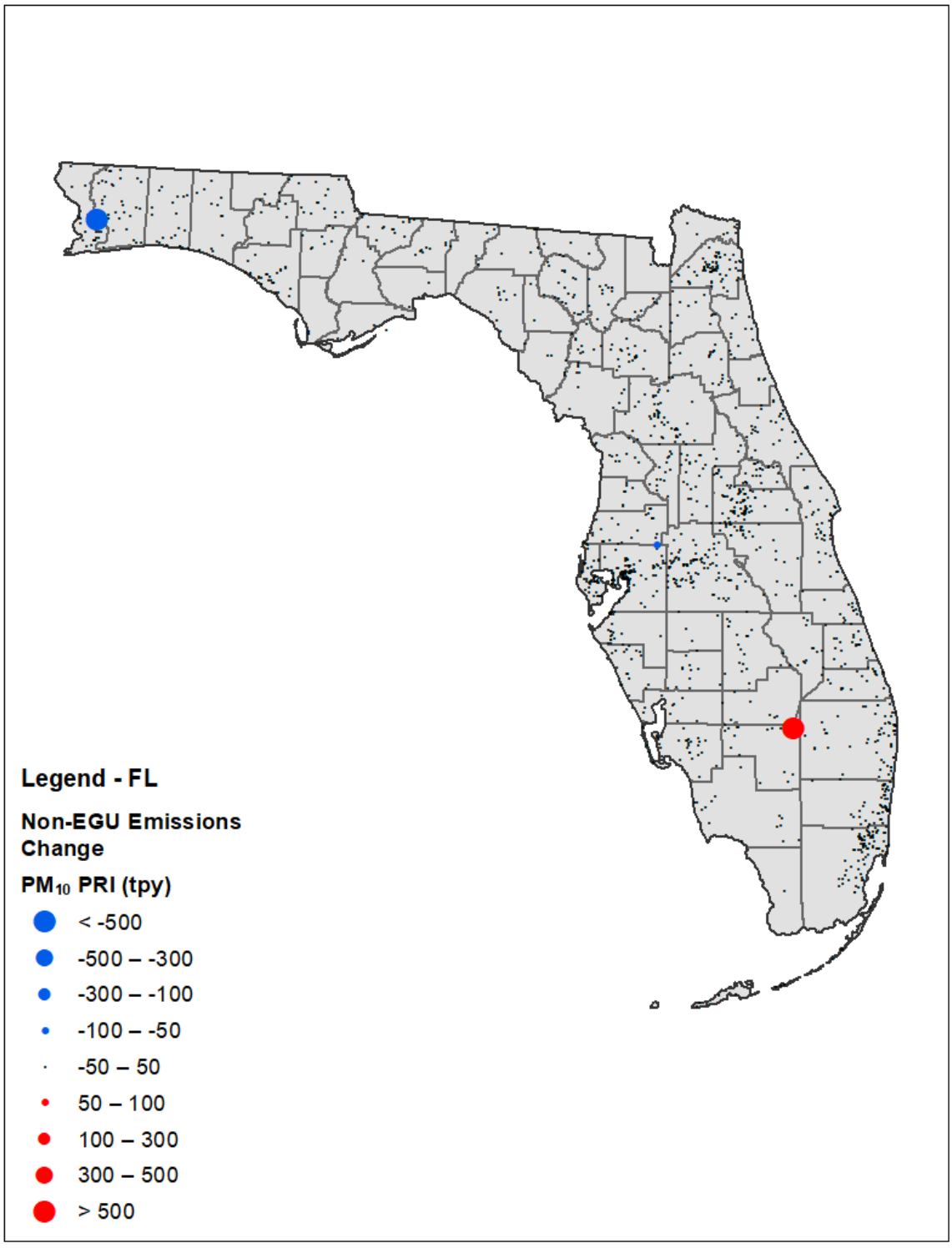

Figure B.2-8. Florida Point Non-EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

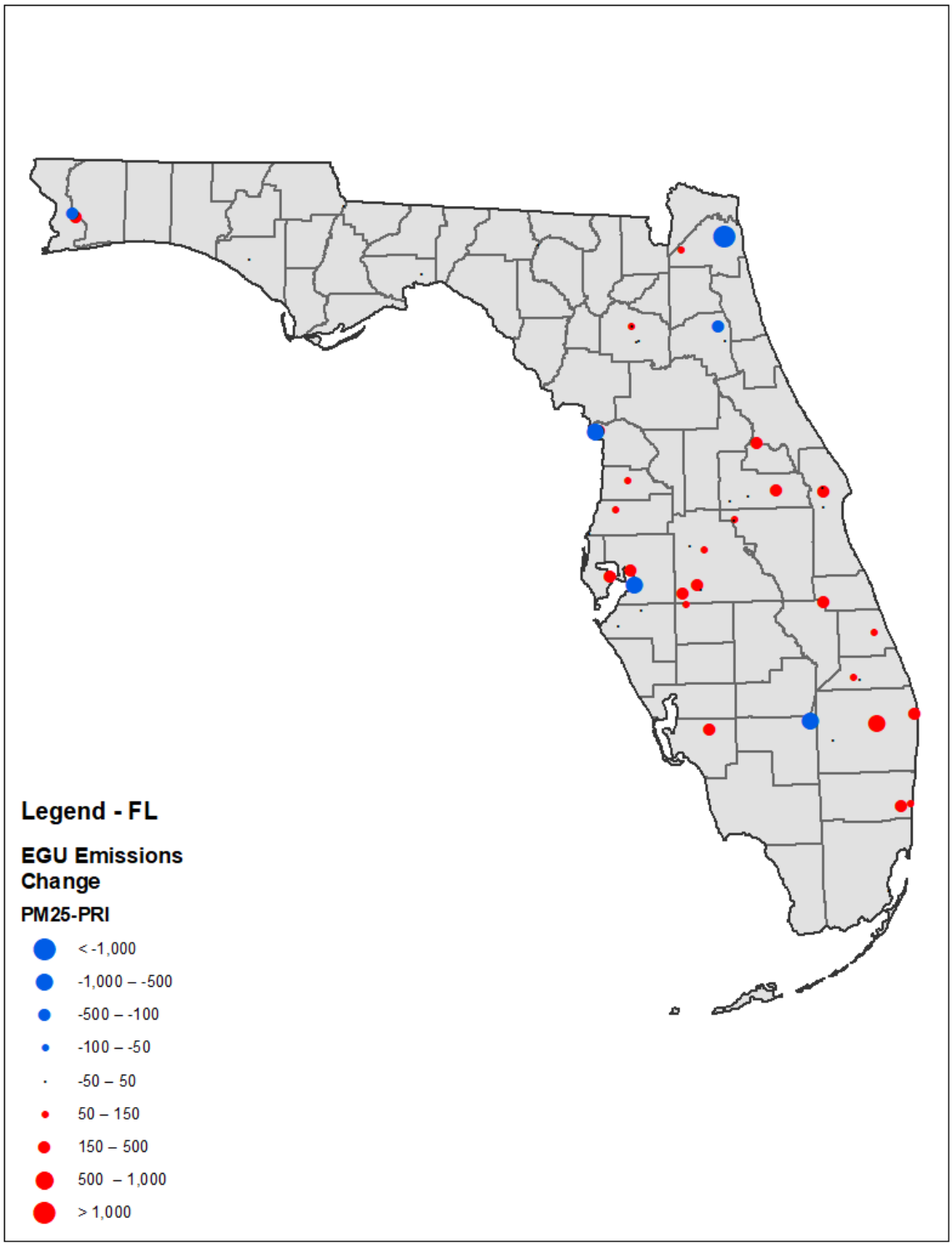

Figure B.2-9. Florida Point EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

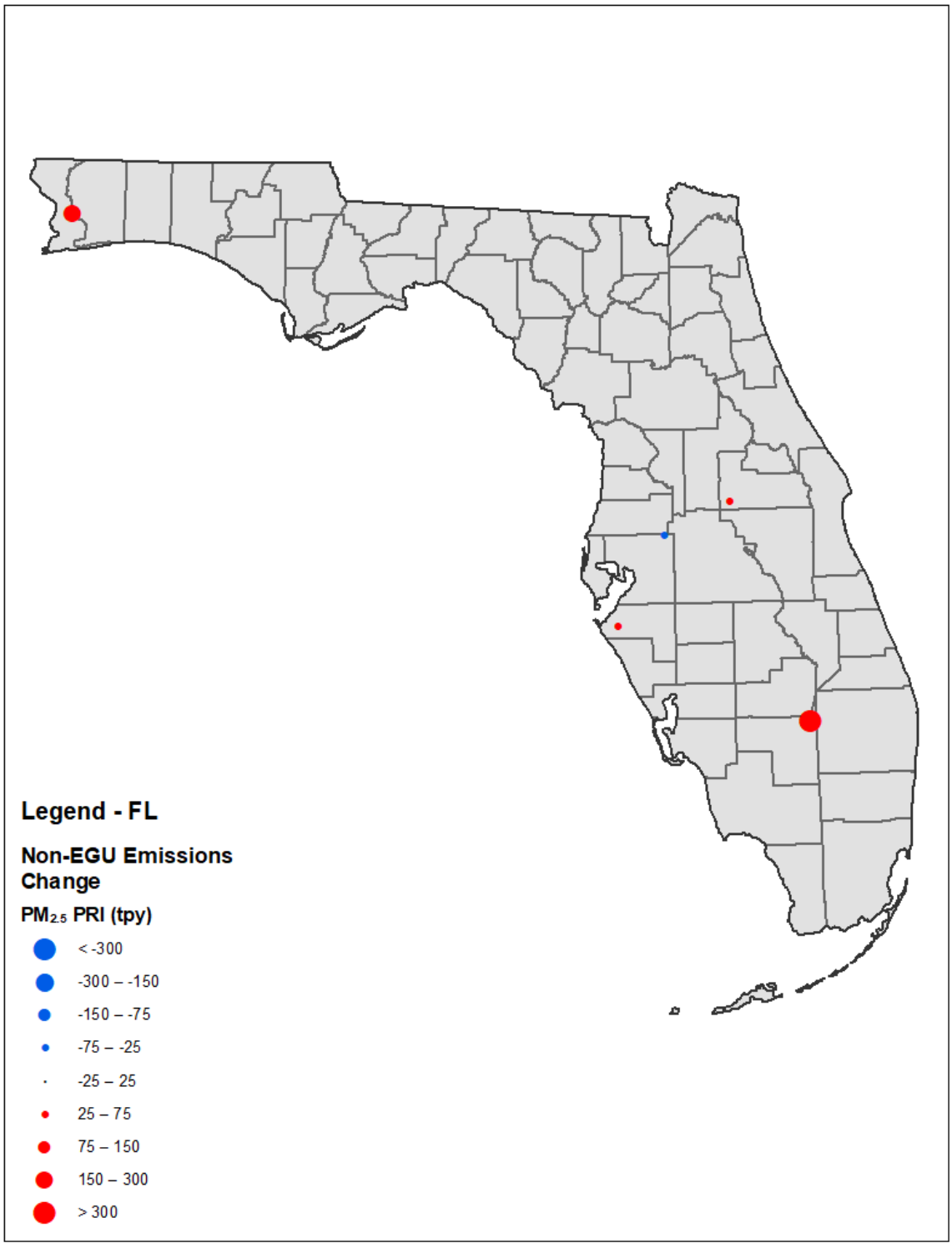

Figure B.2-10. Florida Point Non-EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

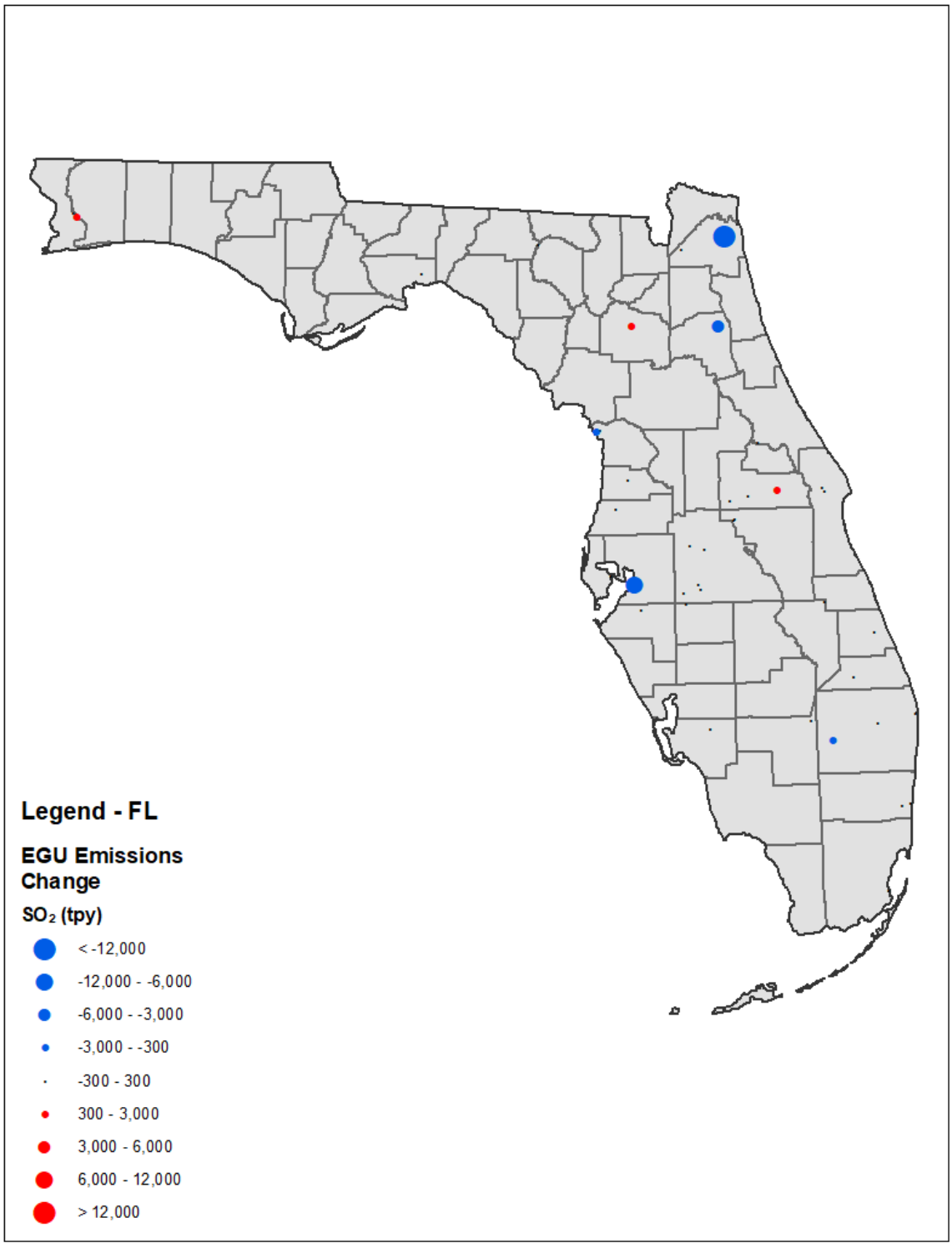

Figure B.2-11. Florida Point EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

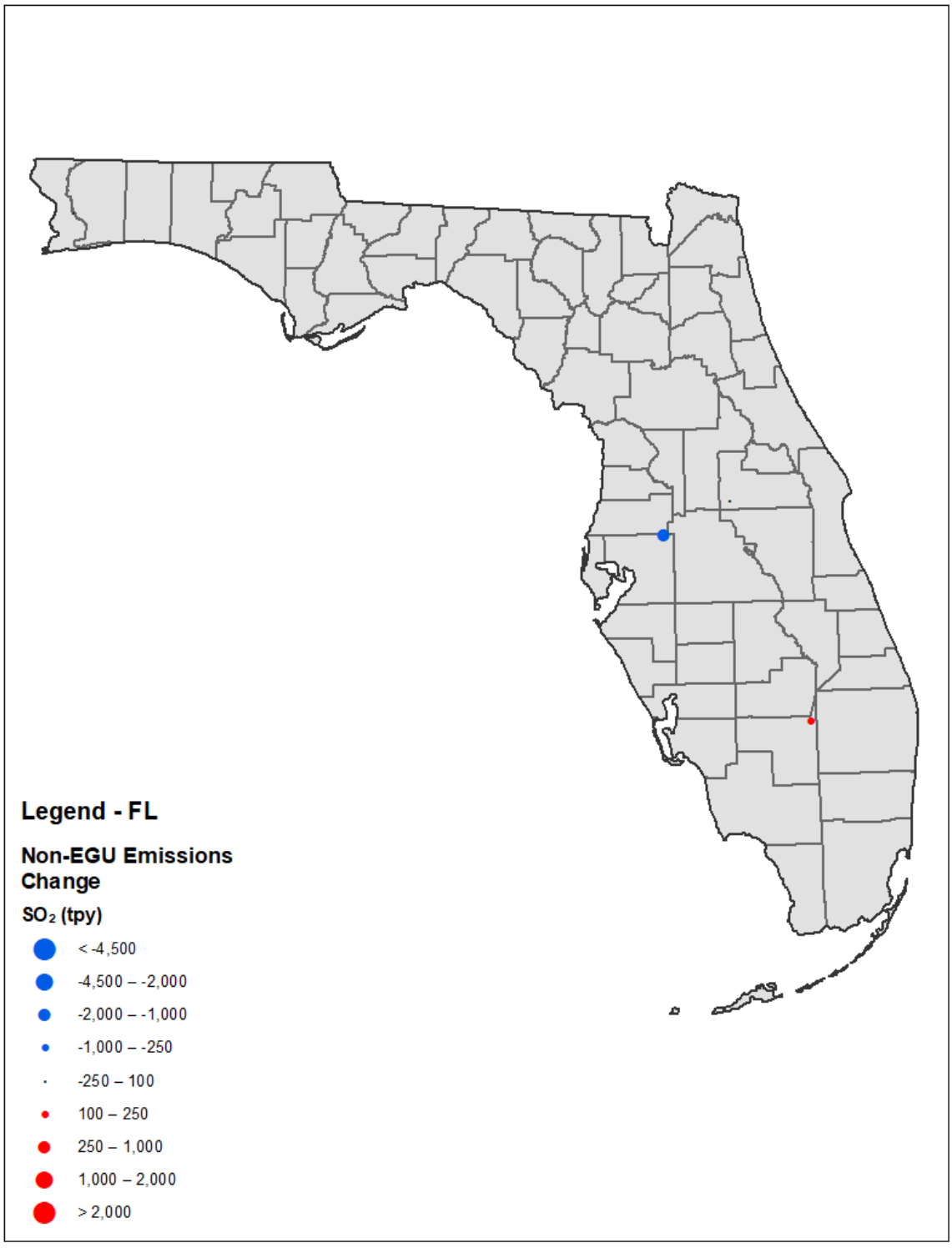

Figure B.2-12. Florida Point Non-EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

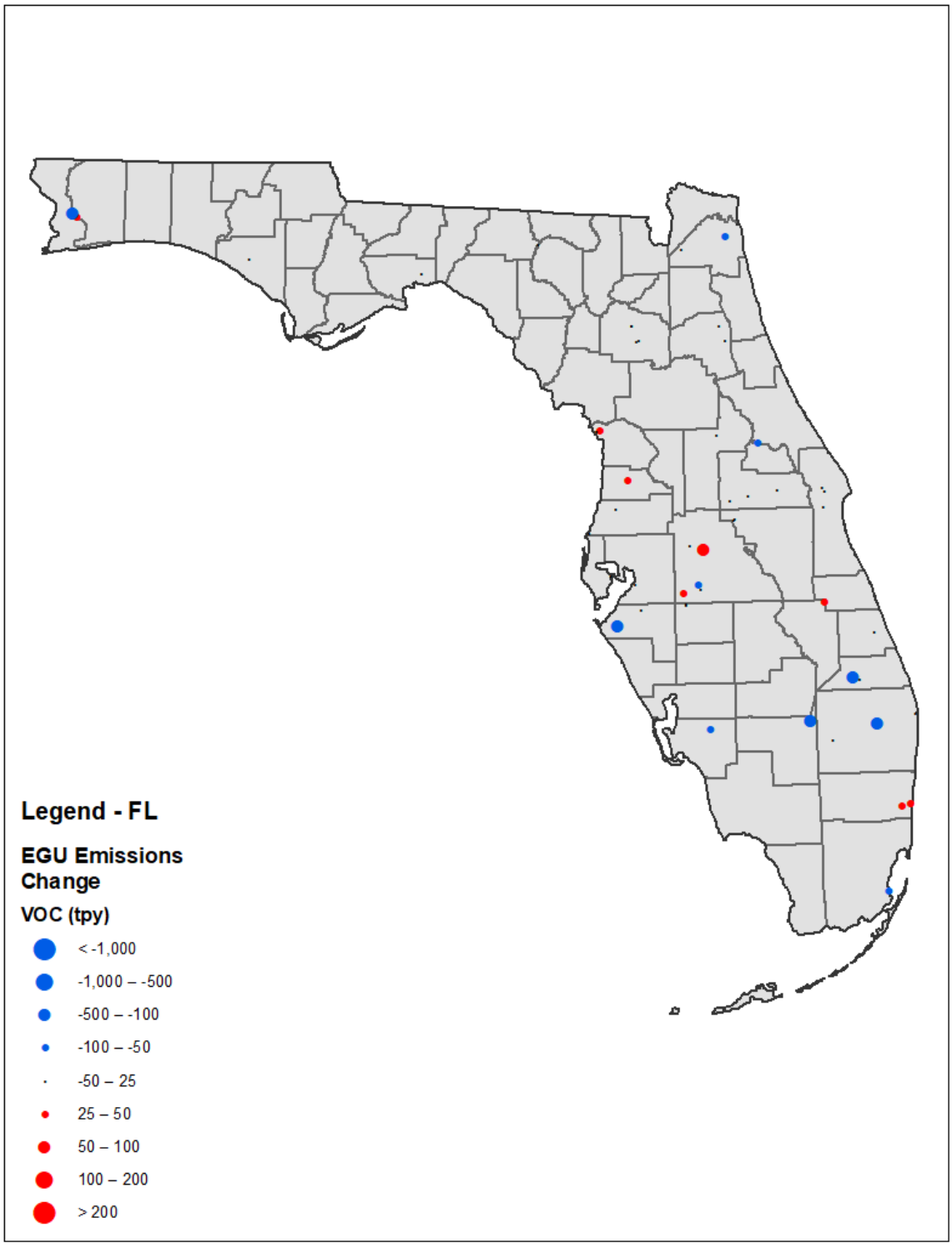

Figure B.2-13. Florida Point EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

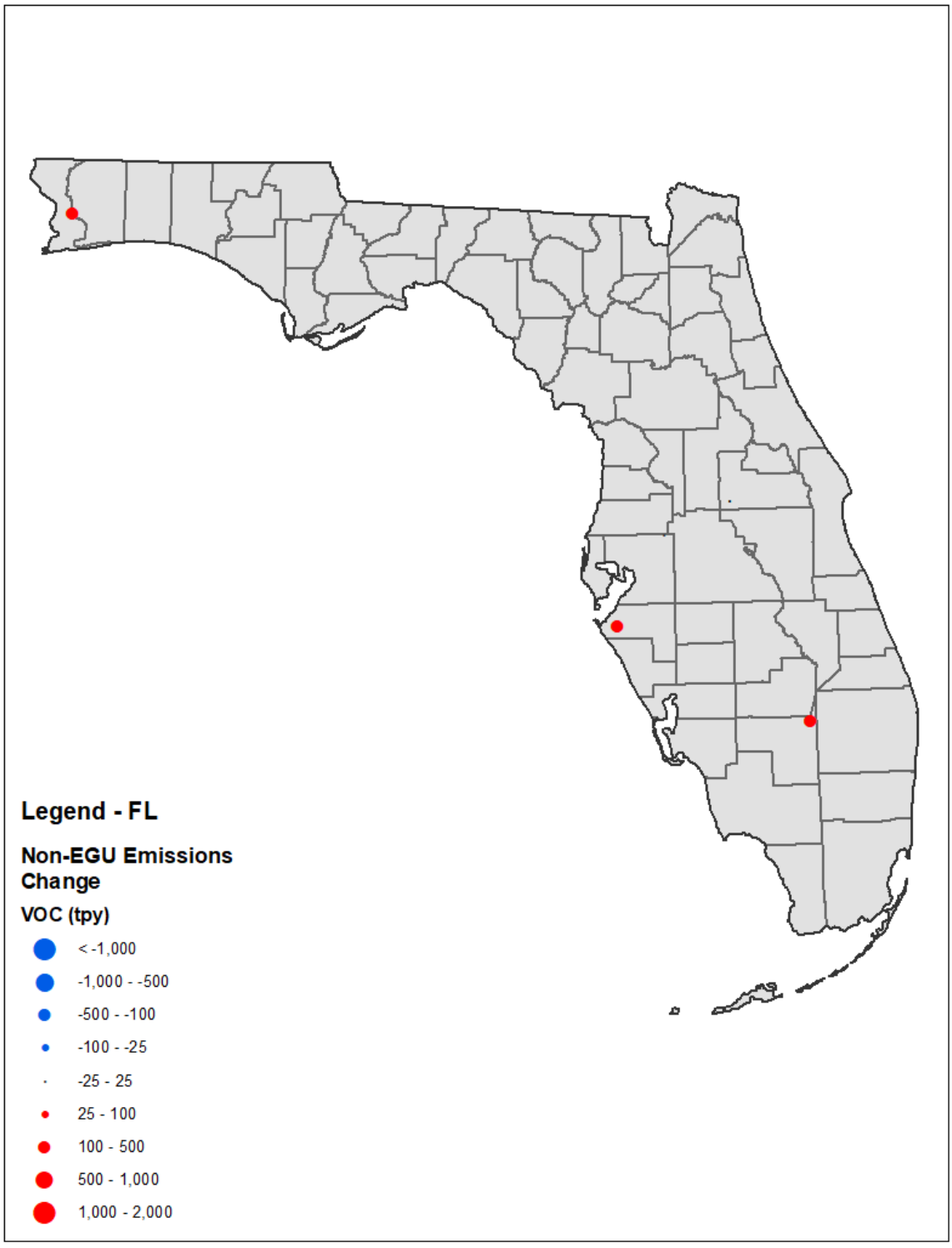

Figure B.2-14. Florida Point Non-EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

Appendix B-3. Georgia 2028 Point EGU and Point Non-EGU Comparisons

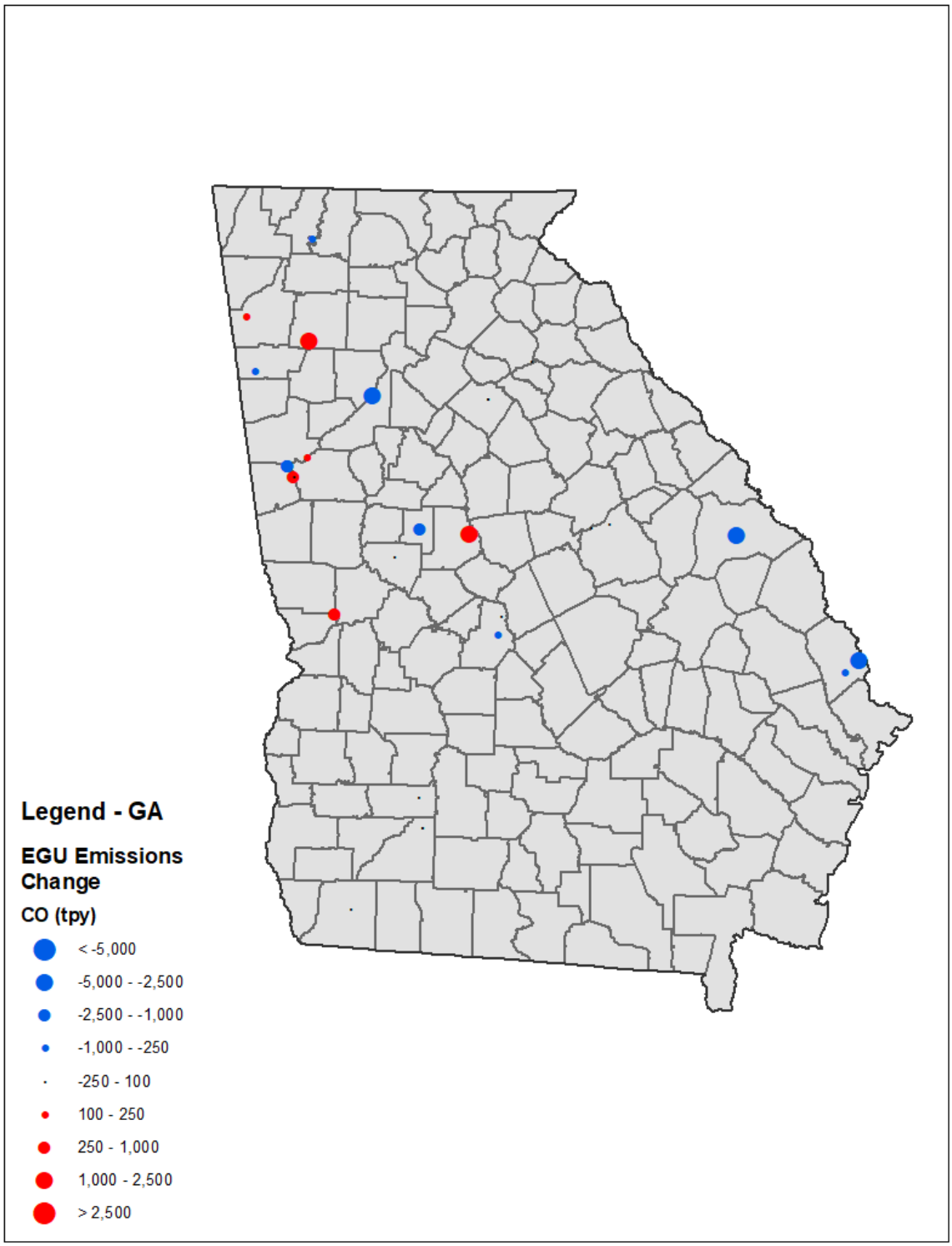

Figure B.3-1. Georgia Point EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

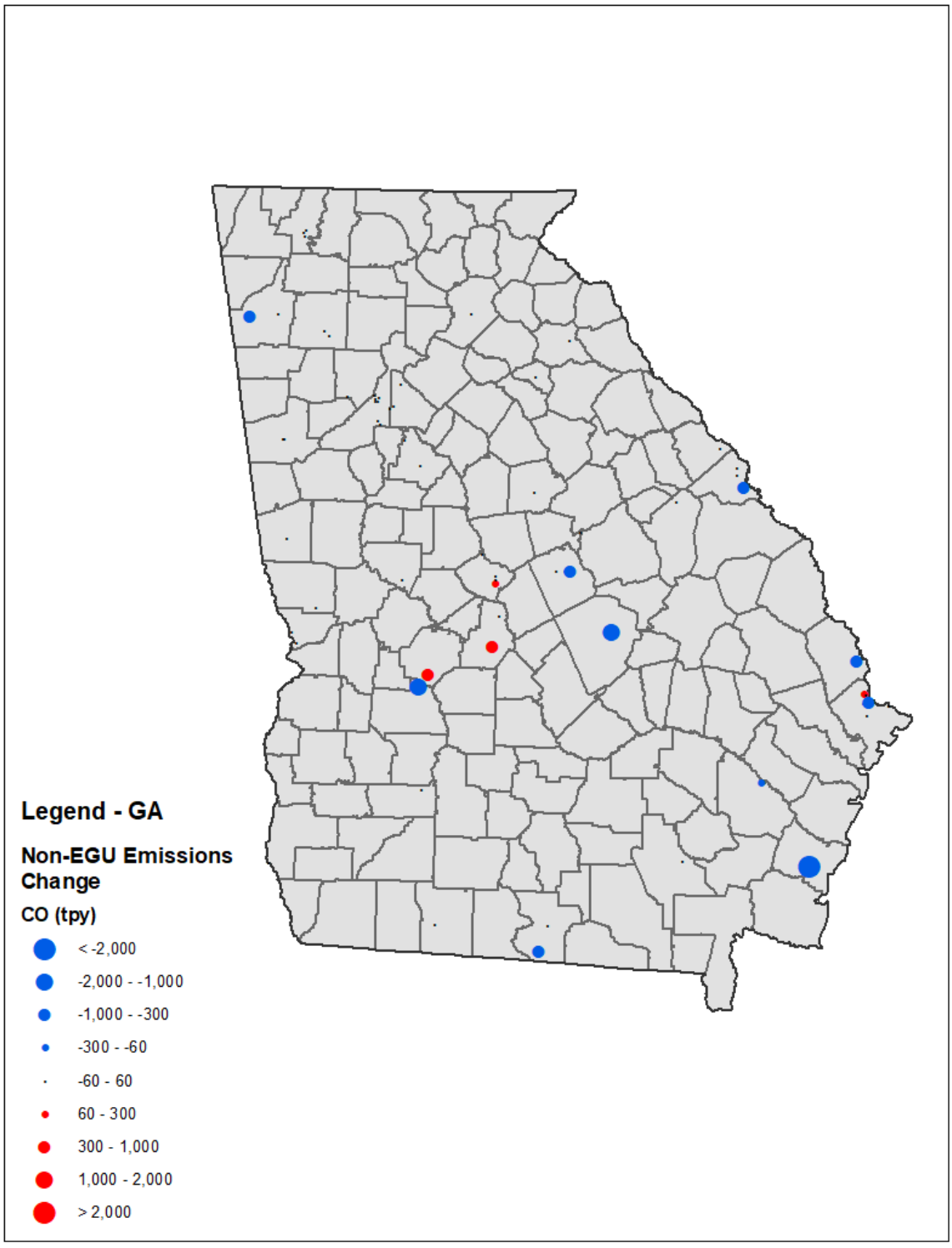

Figure B.3-2. Georgia Point Non-EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

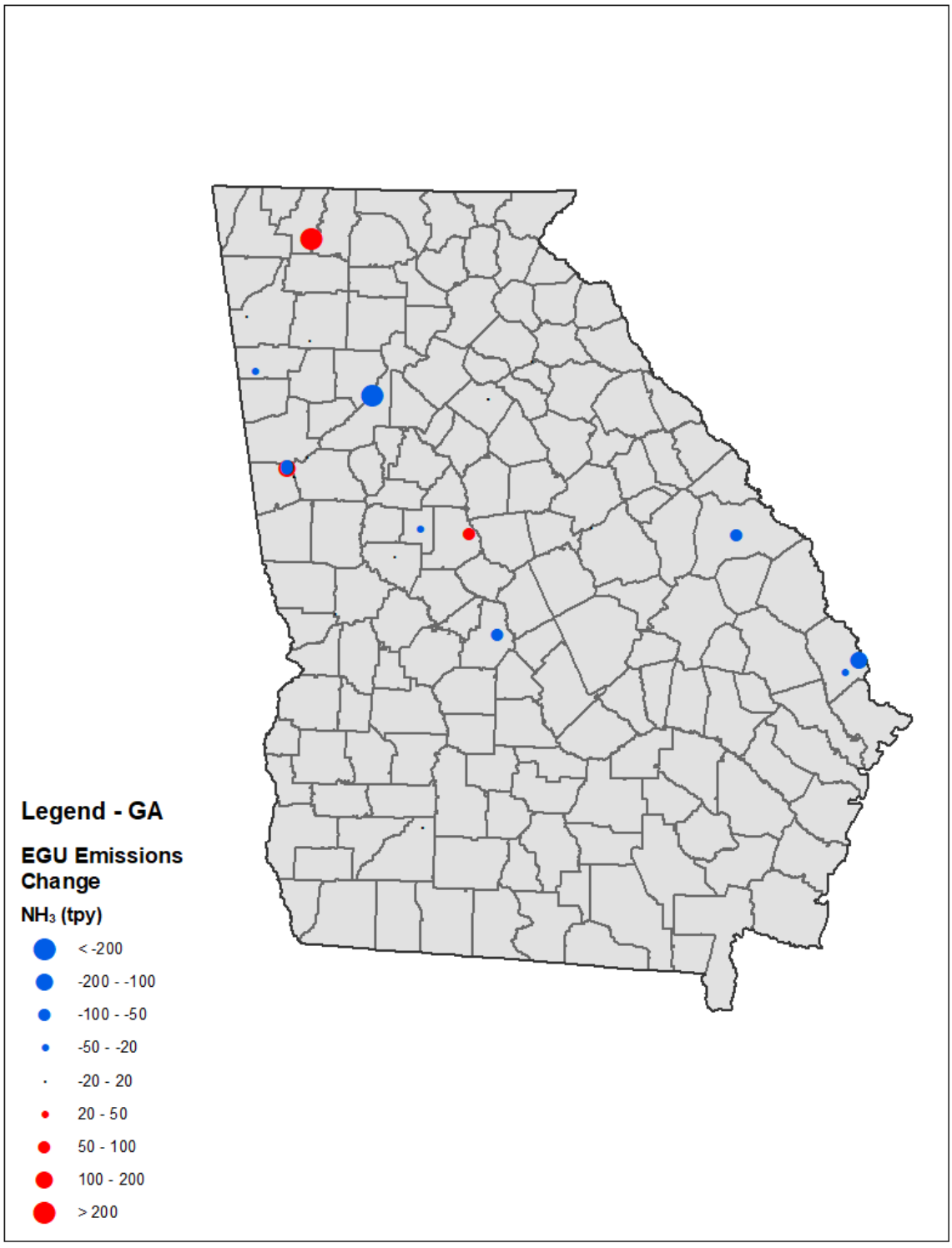

Figure B.3-3. Georgia Point EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

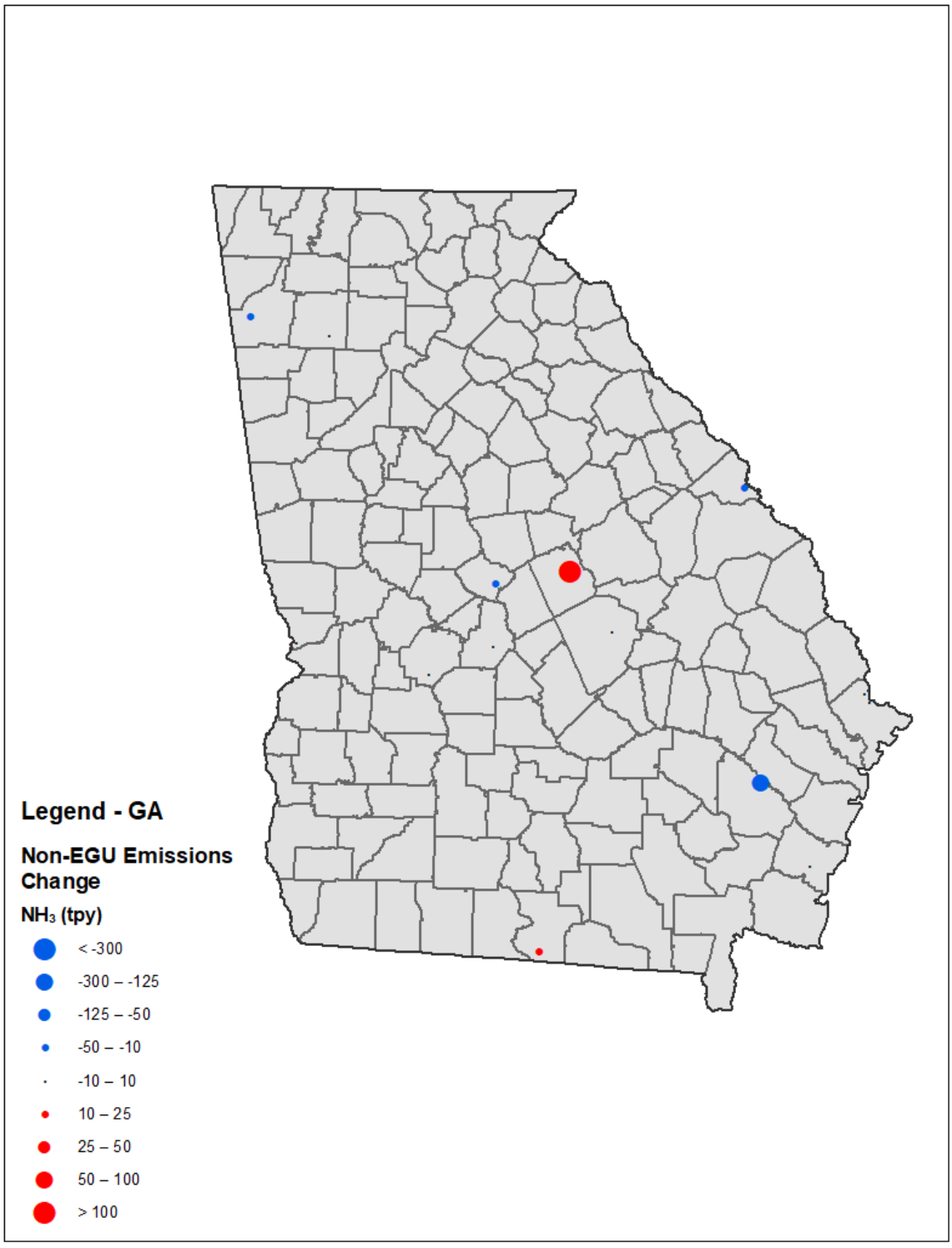

Figure B.3-4. Georgia Point Non-EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

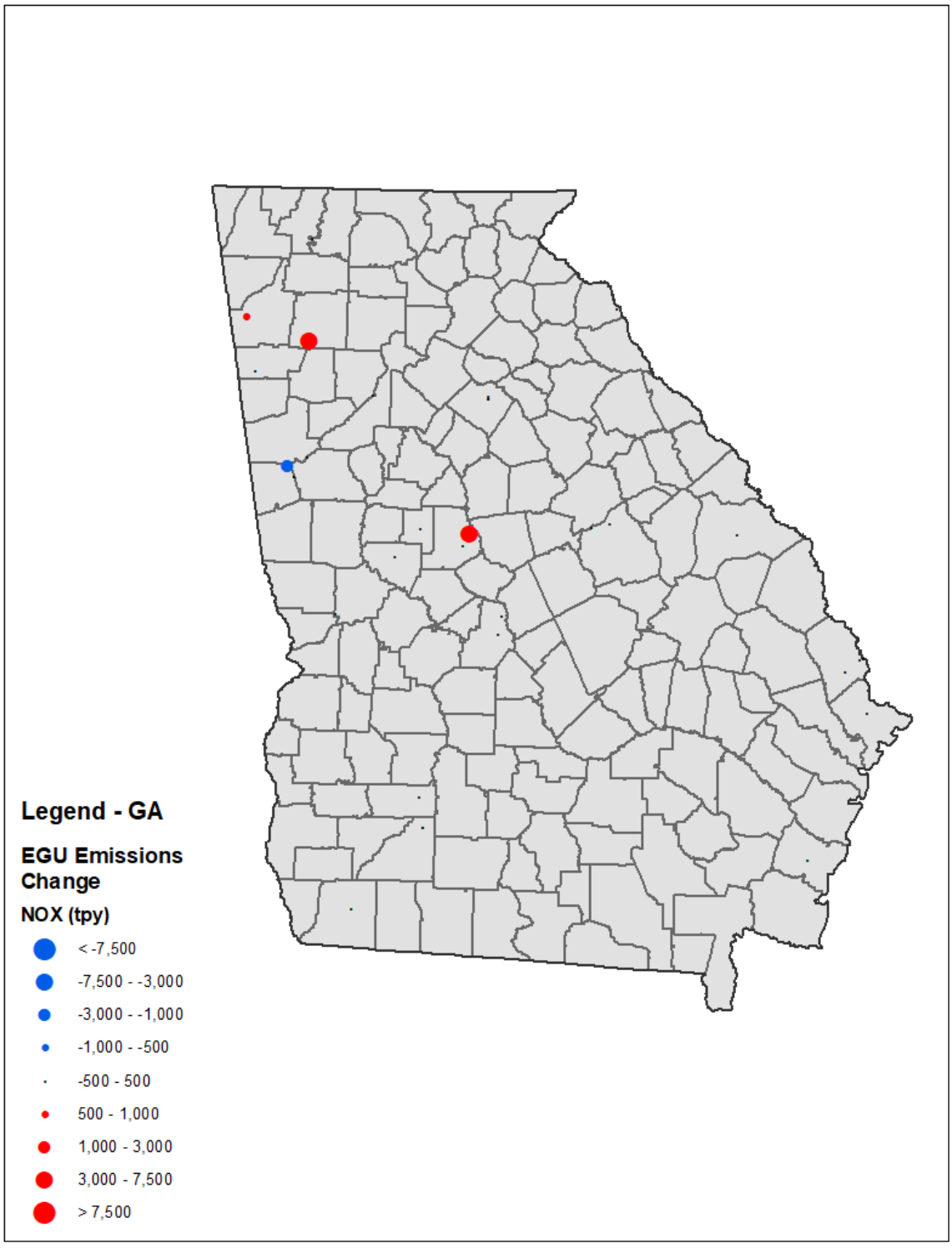

Figure B.3-5. Georgia Point EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

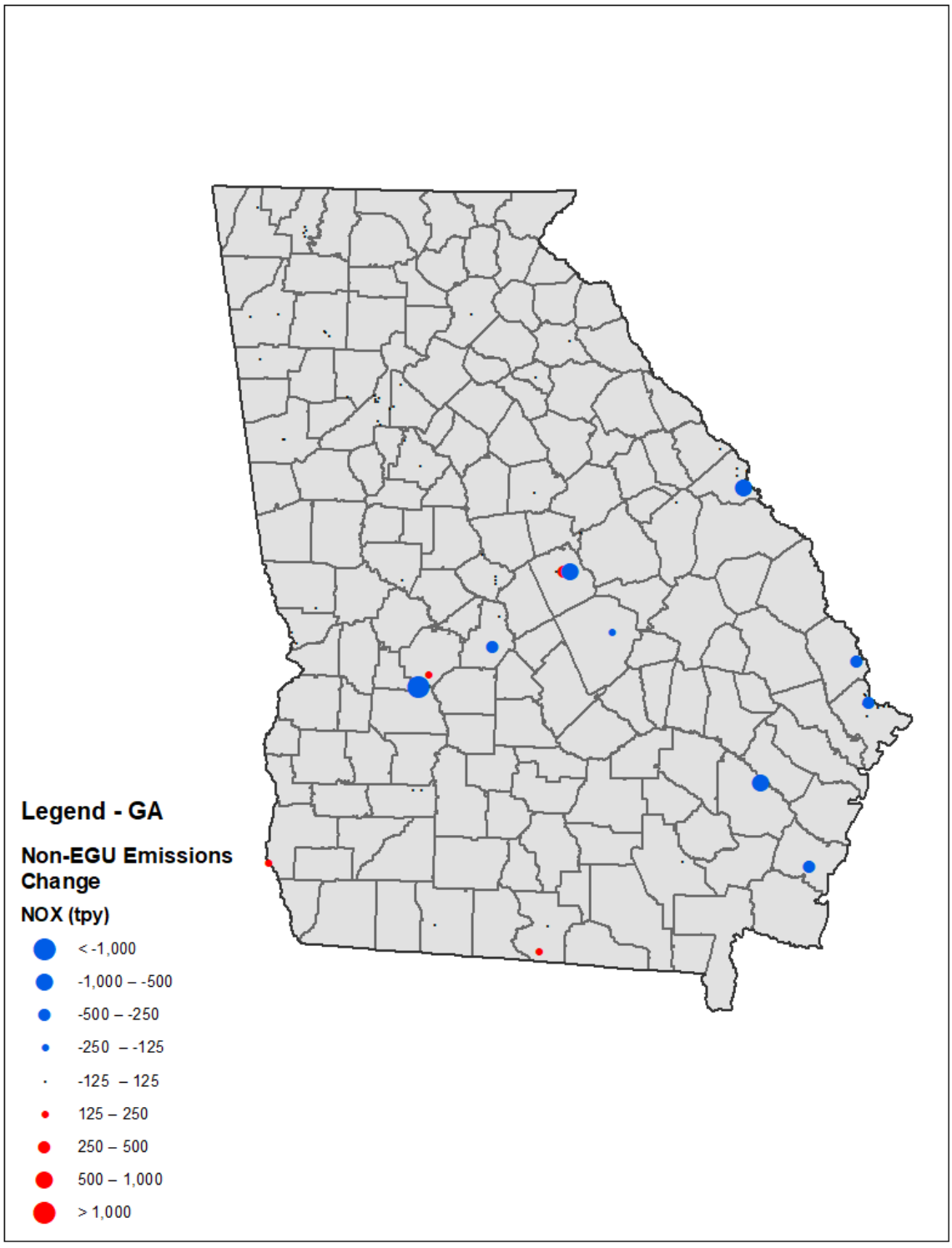

Figure B.3-6. Georgia Point Non-EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

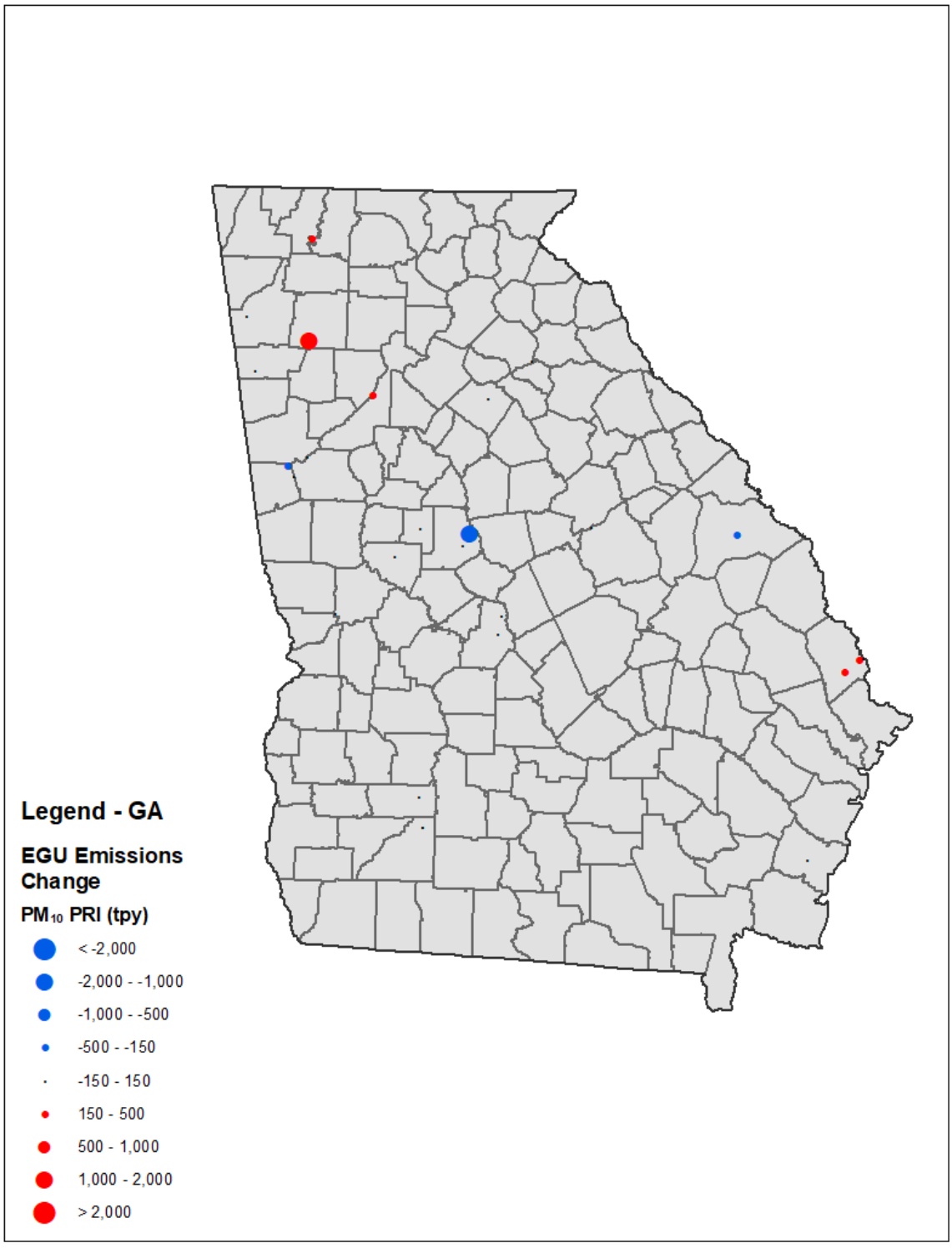

Figure B.3-7. Georgia Point EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

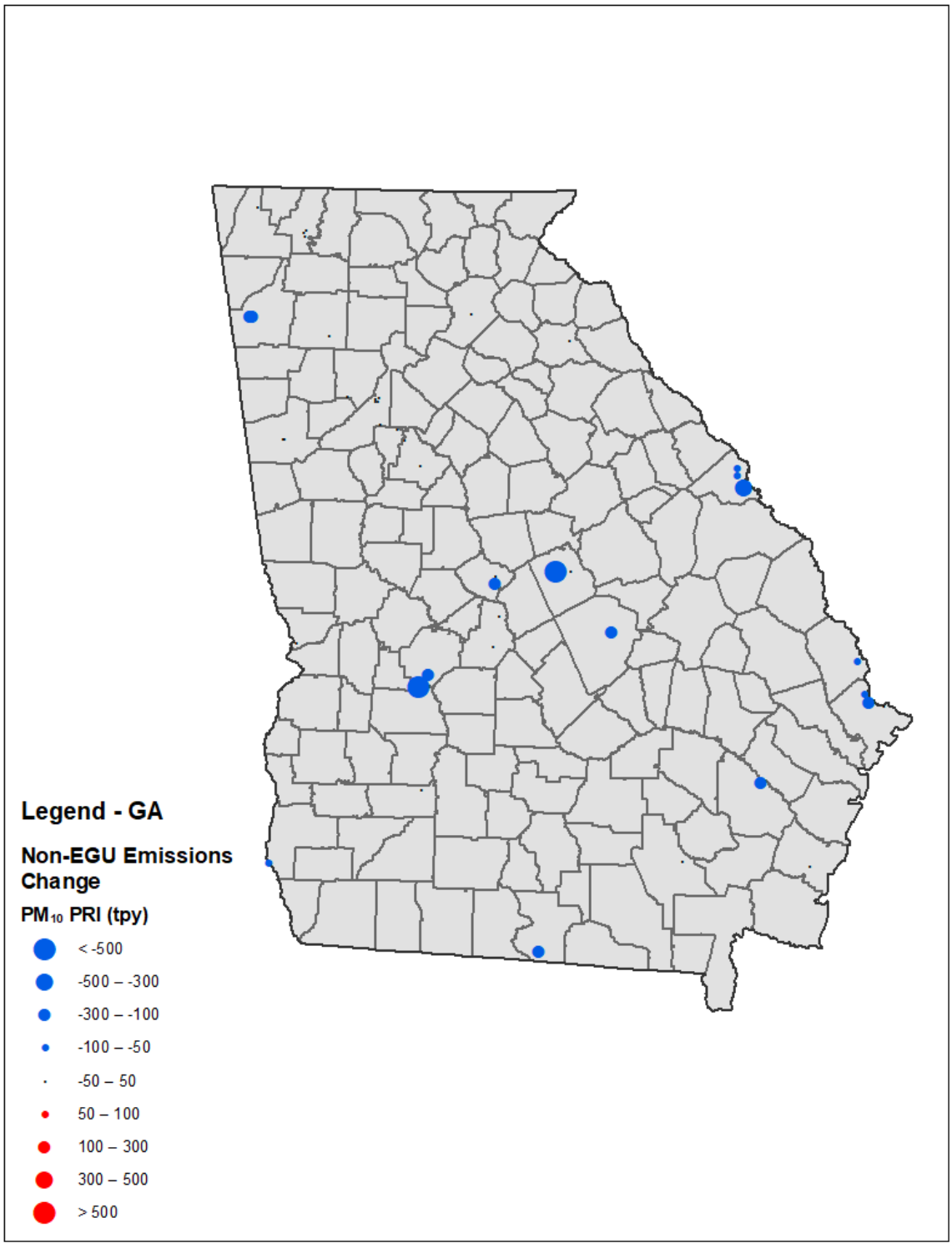

Figure B.3-8. Georgia Point Non-EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

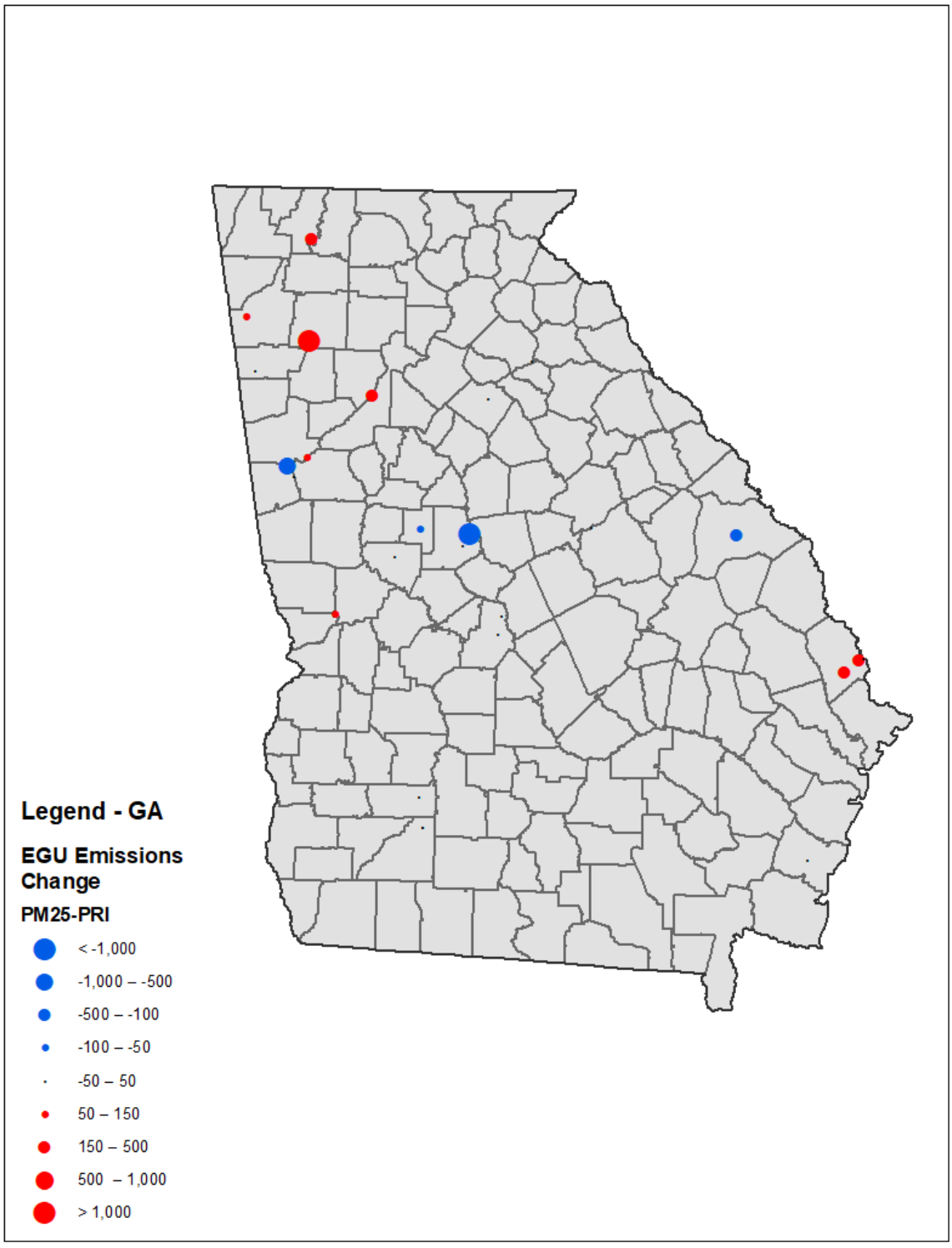

Figure B.3-9. Georgia Point EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

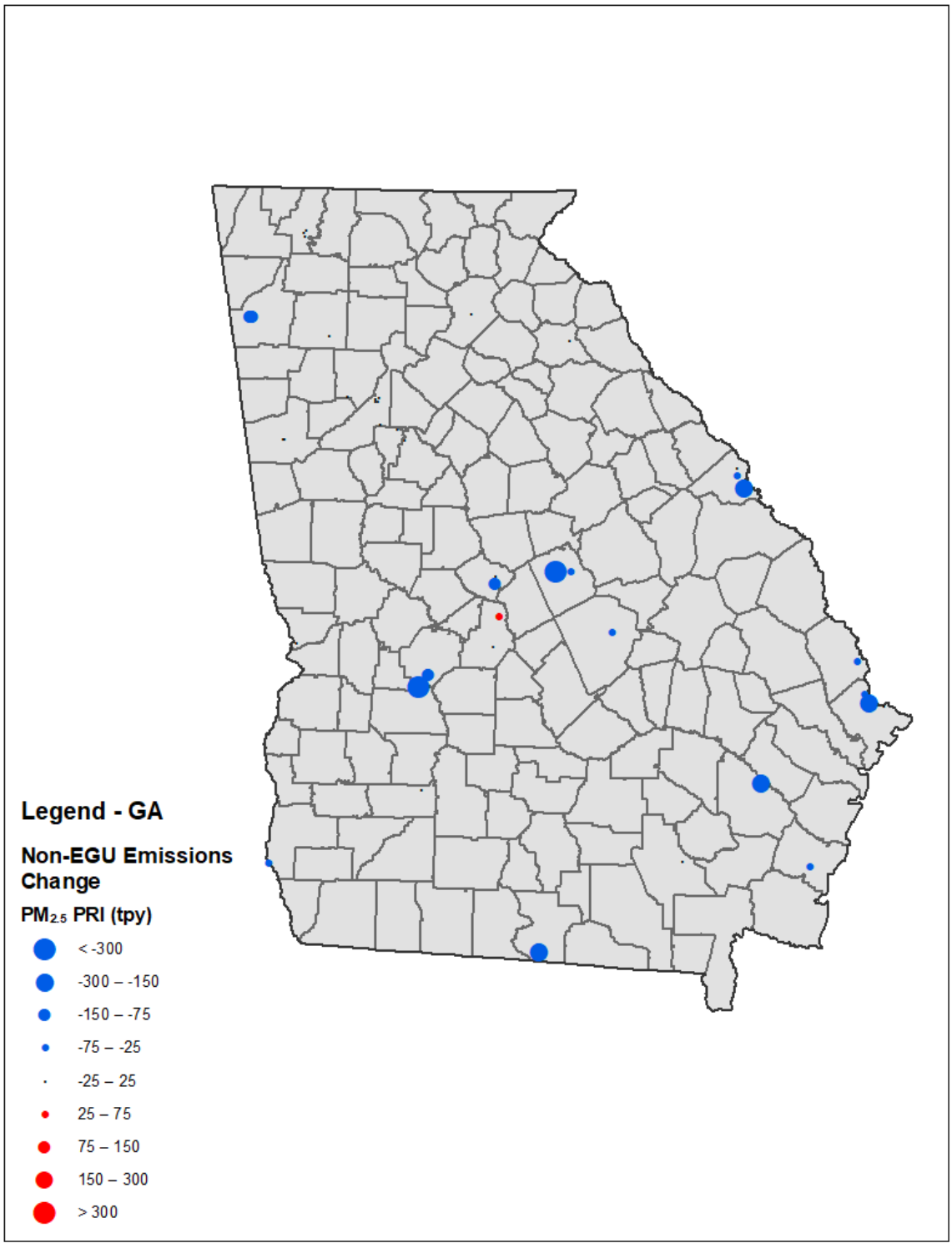

Figure B.3-10. Georgia Point Non-EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

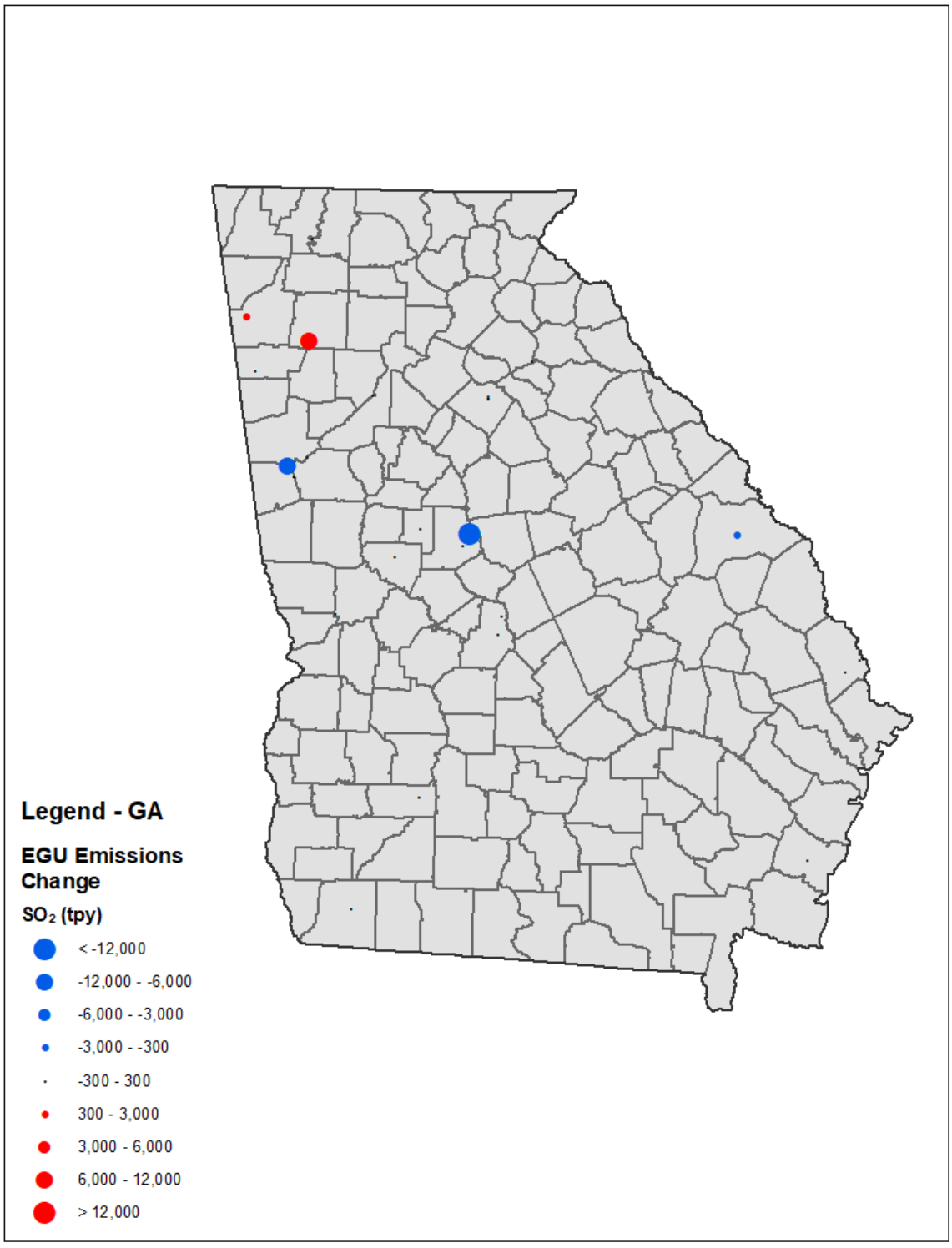

Figure B.3-11. Georgia Point EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

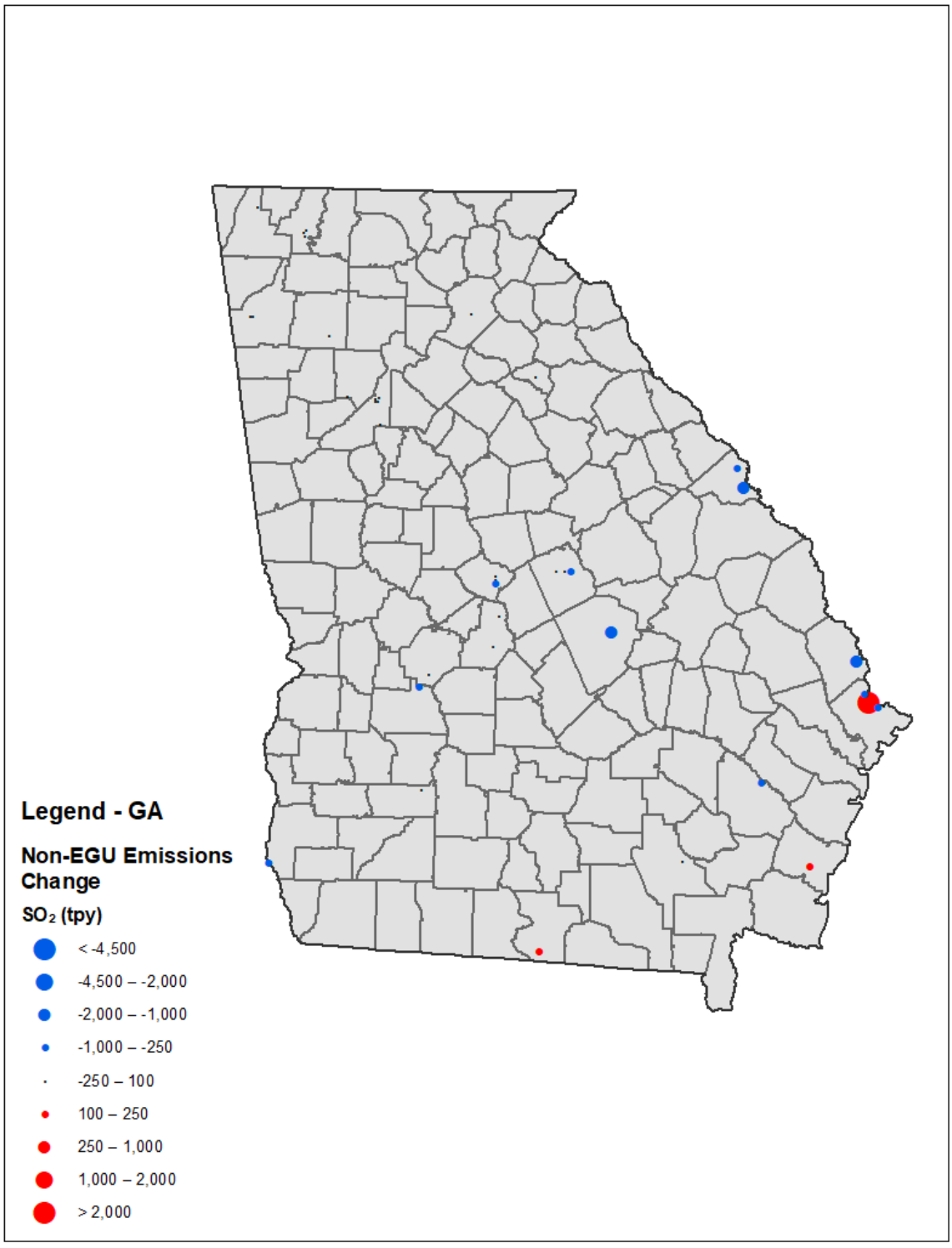

Figure B.3-12. Georgia Point Non-EGU SO_2 PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

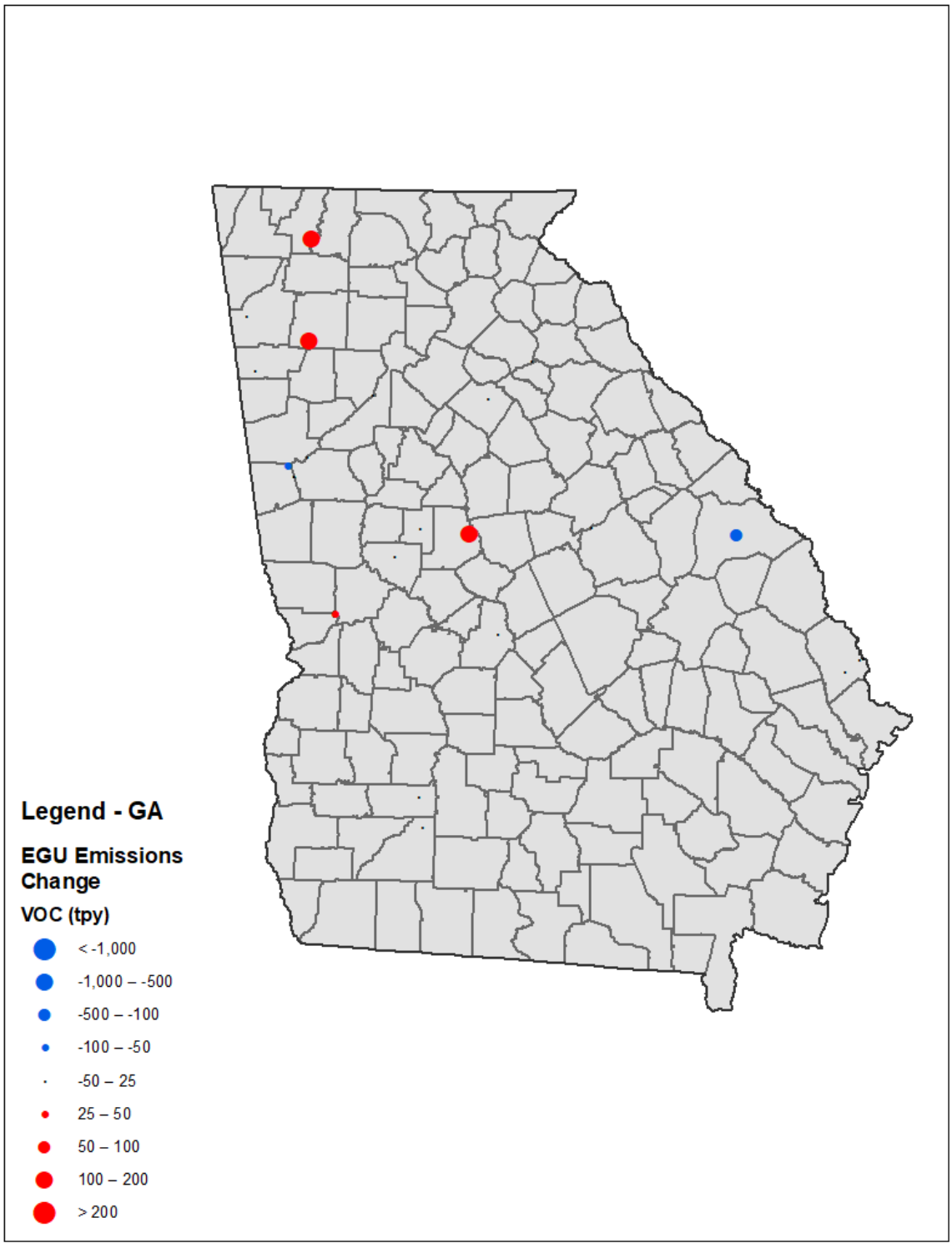

Figure B.3-13. Georgia Point EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

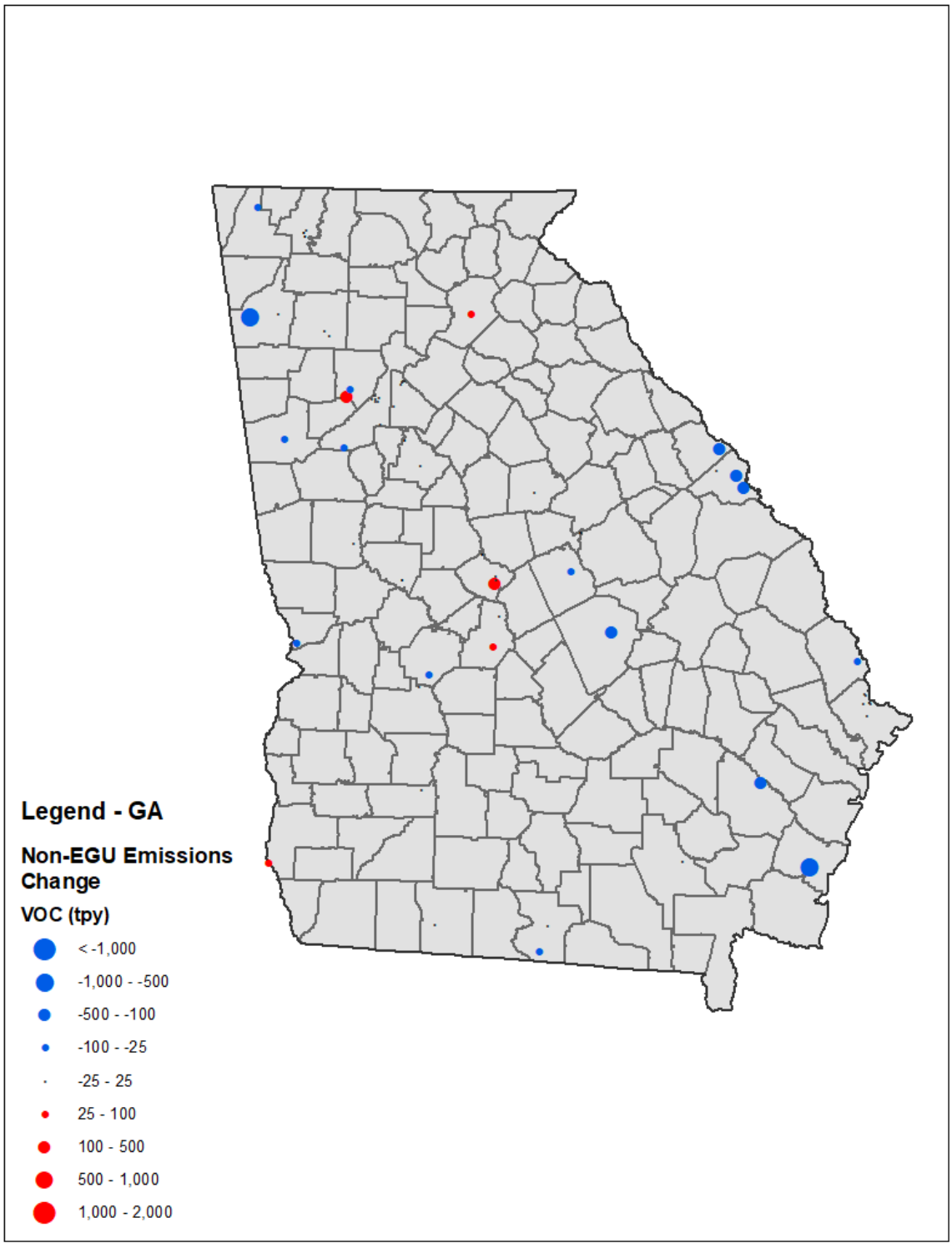

Figure B.3-14. Georgia Point Non-EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

Appendix B-4. Kentucky 2028 Point EGU and Point Non-EGU Comparisons

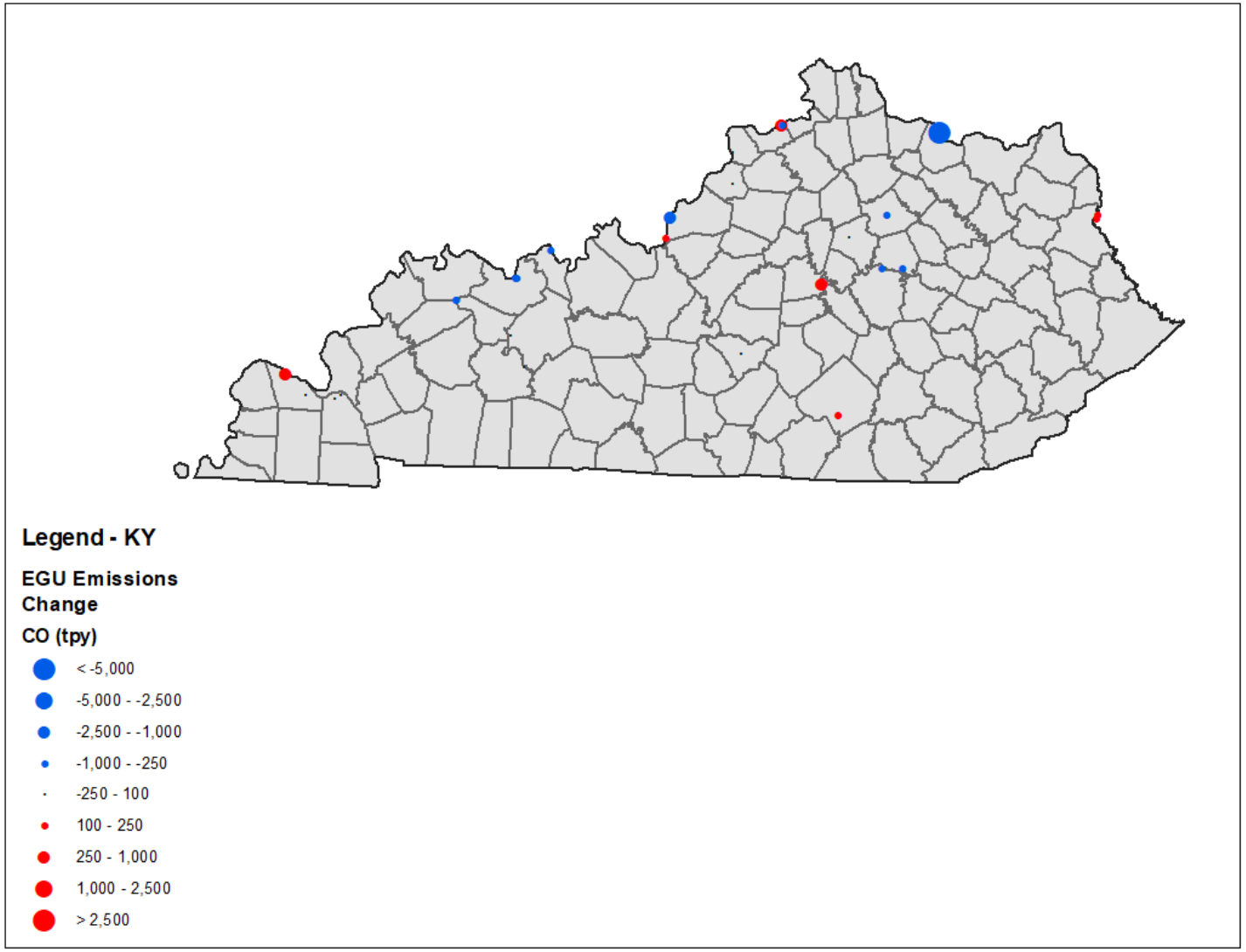

Figure B.4-1. Kentucky Point EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

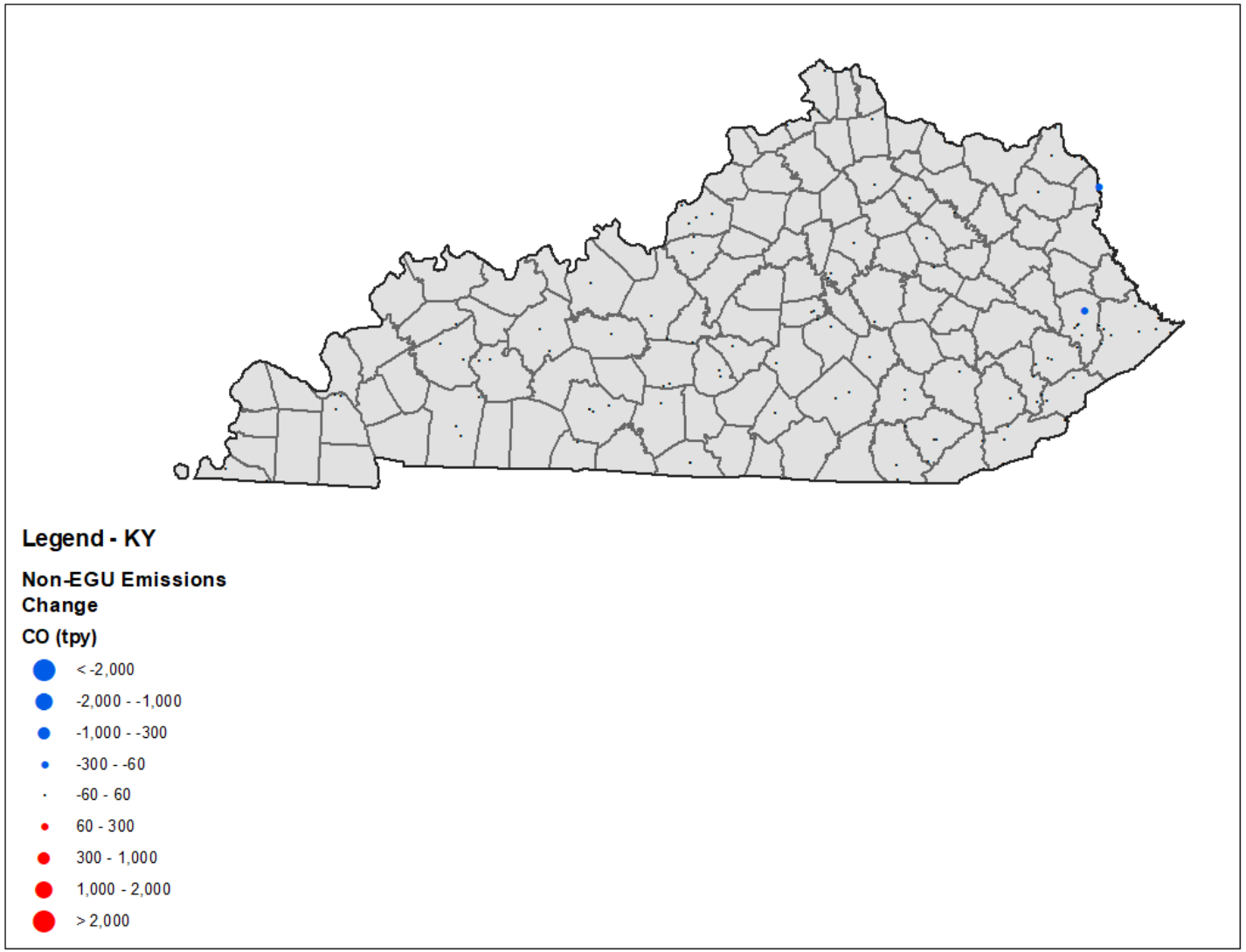

Figure B.4-2. Kentucky Point Non-EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

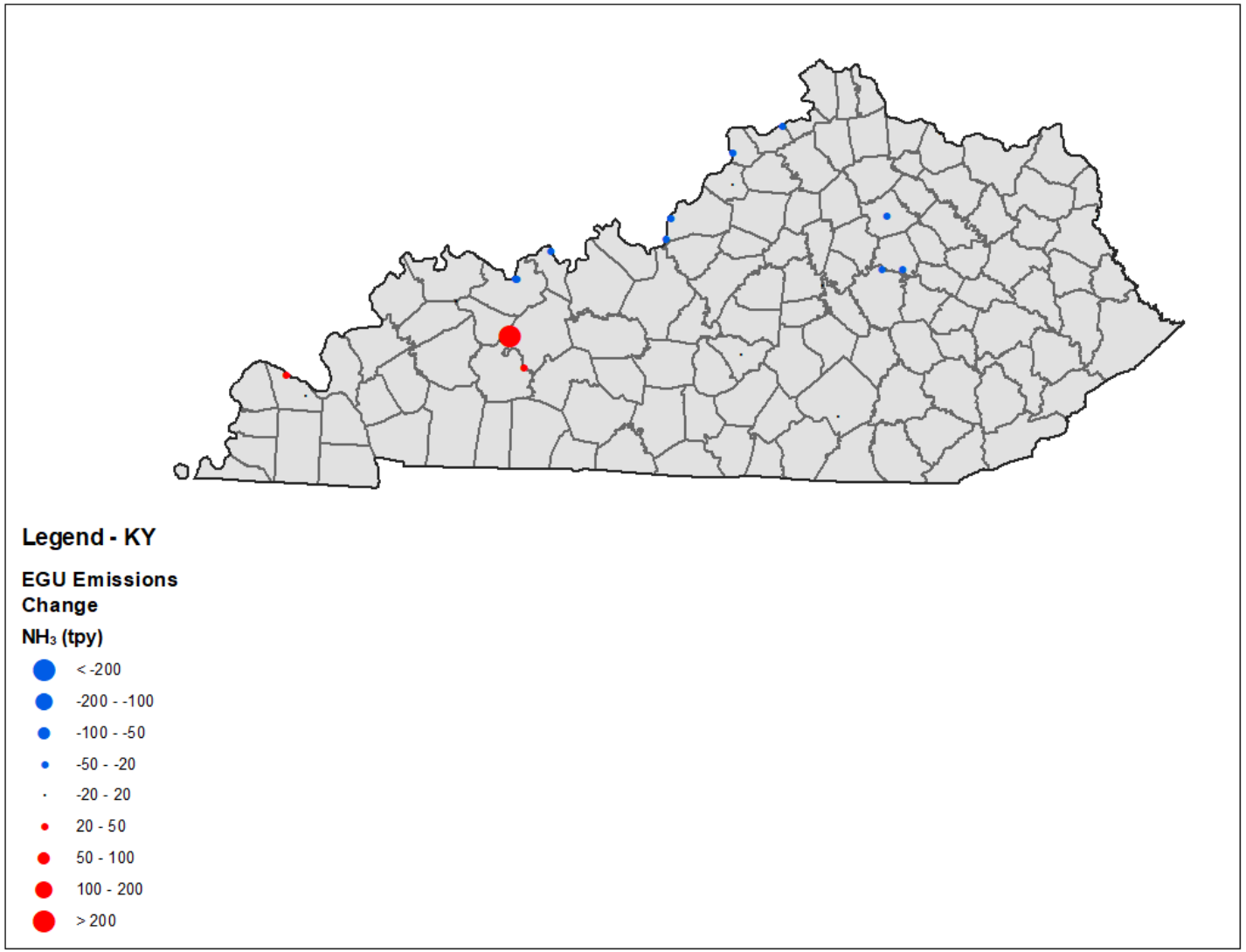

Figure B.4-3. Kentucky Point EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

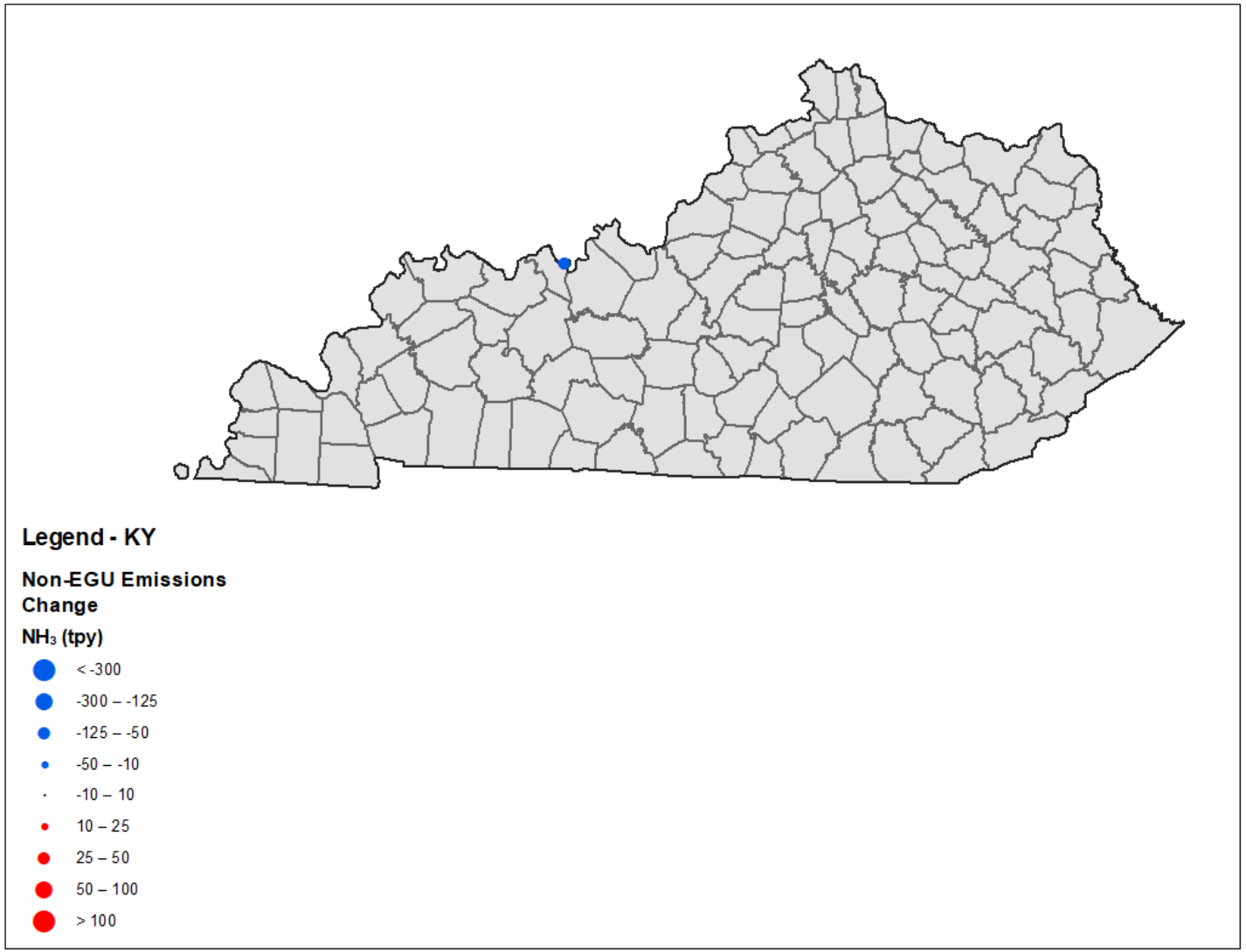

Figure B.4-4. Kentucky Point Non-EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

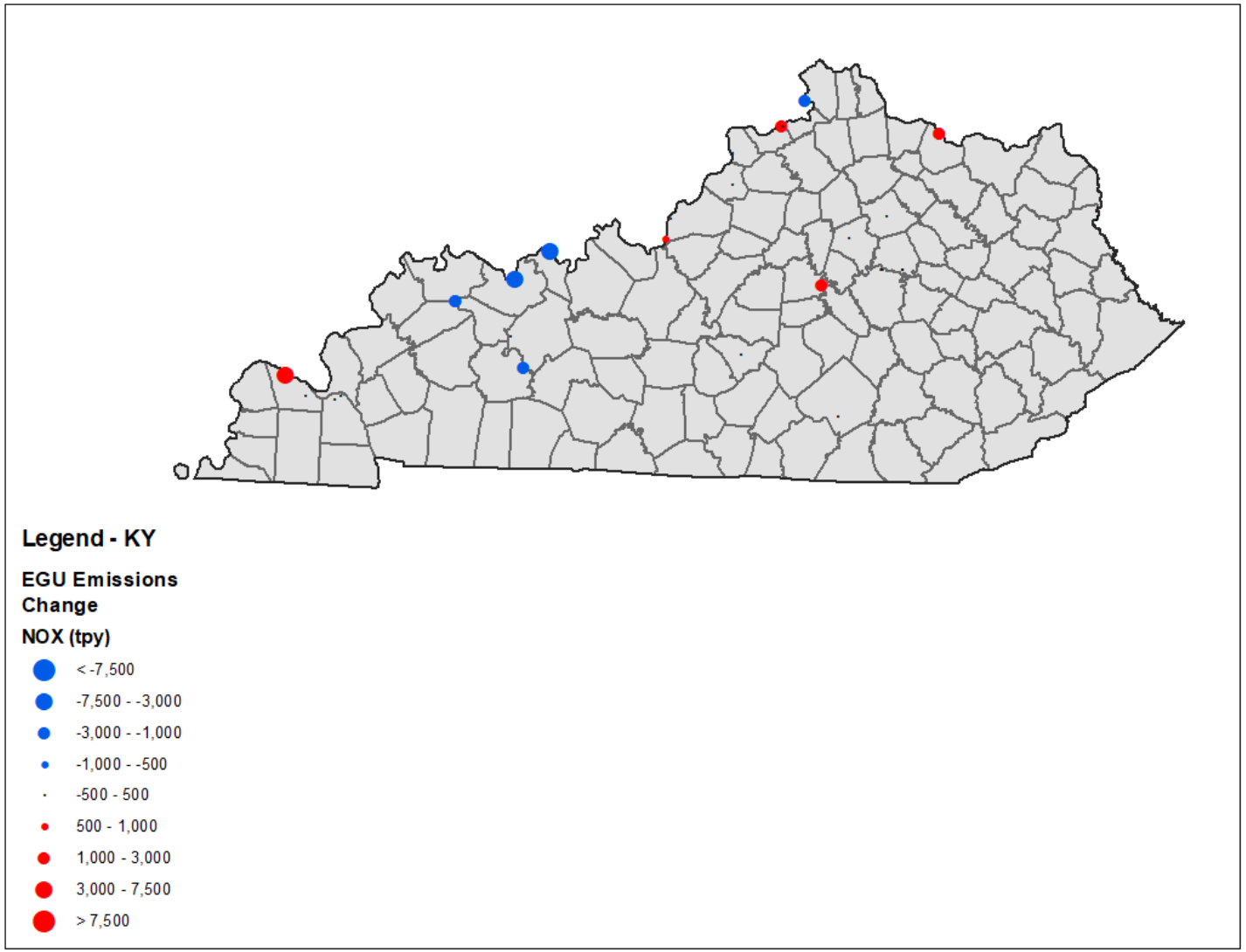

Figure B.4-5. Kentucky Point EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

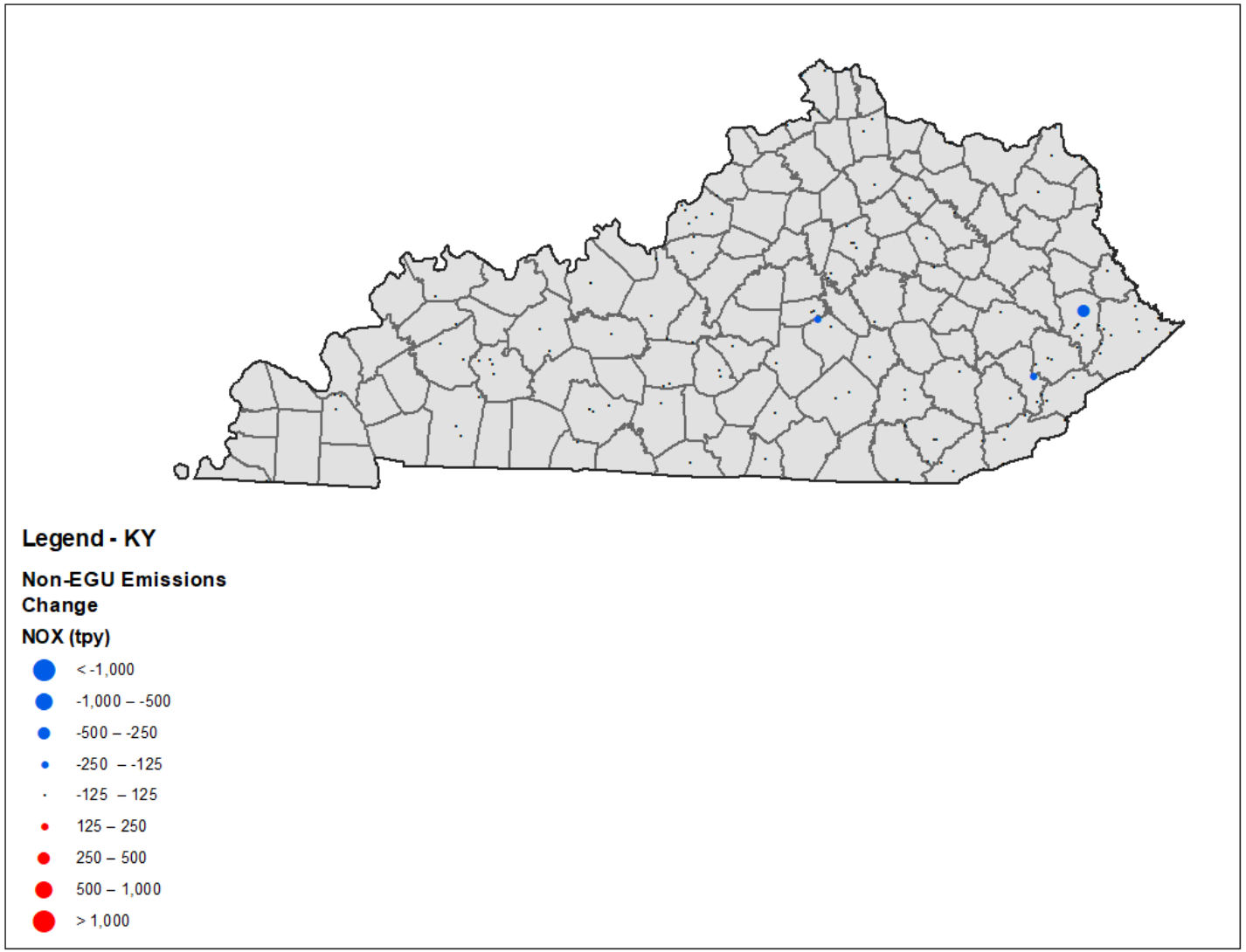

Figure B.4-6. Kentucky Point Non-EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

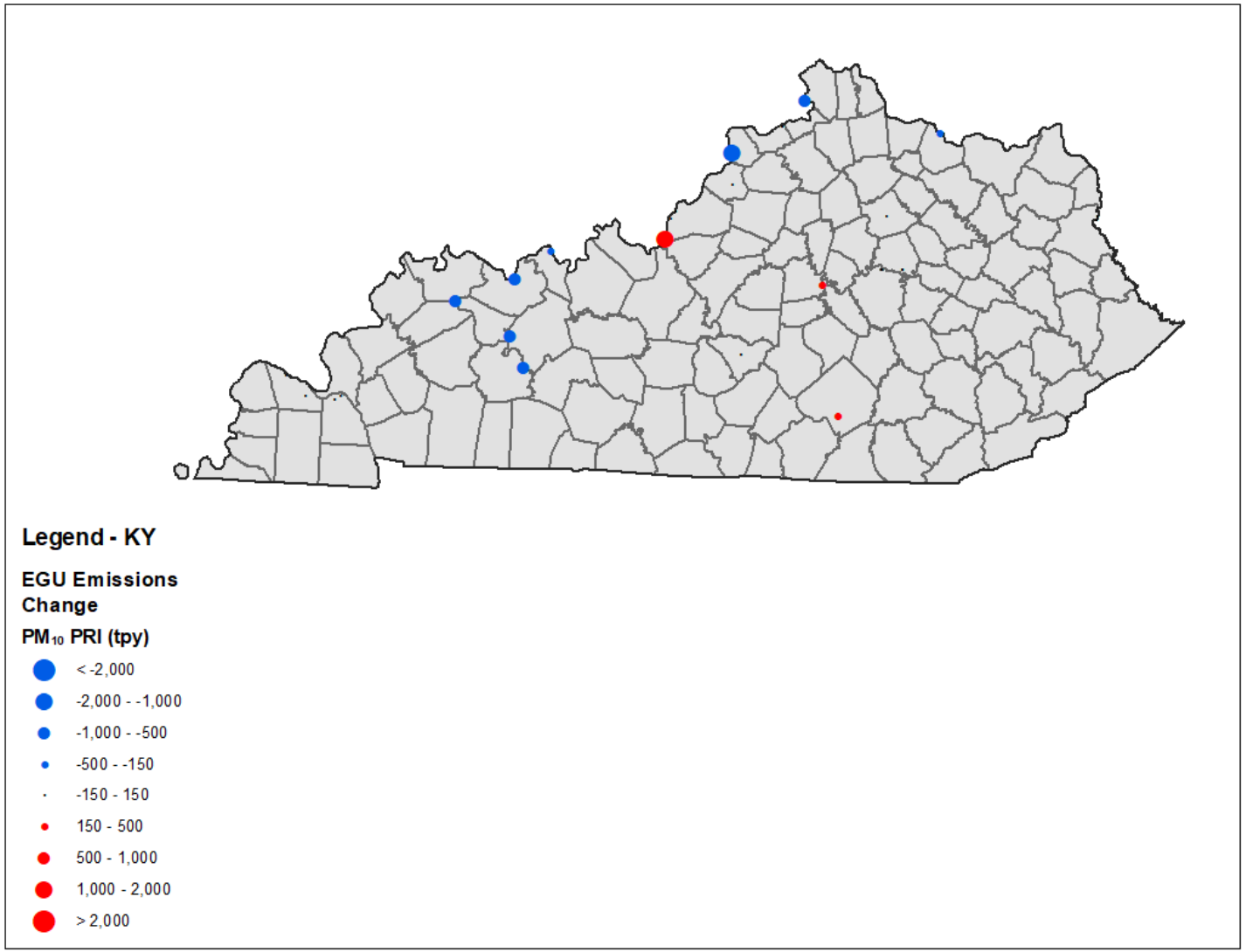

Figure B.4-7. Kentucky Point EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

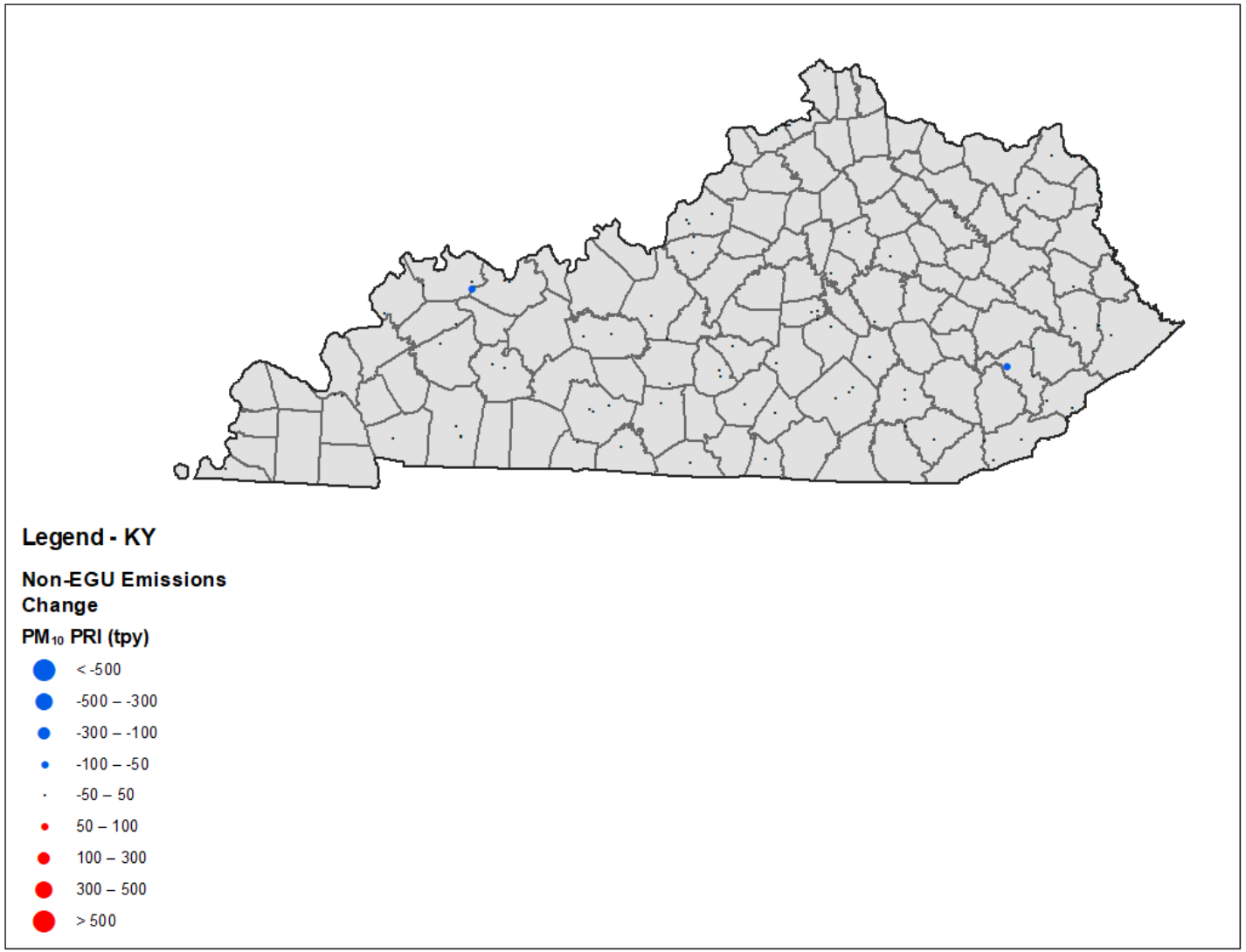

Figure B.4-8. Kentucky Point Non-EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

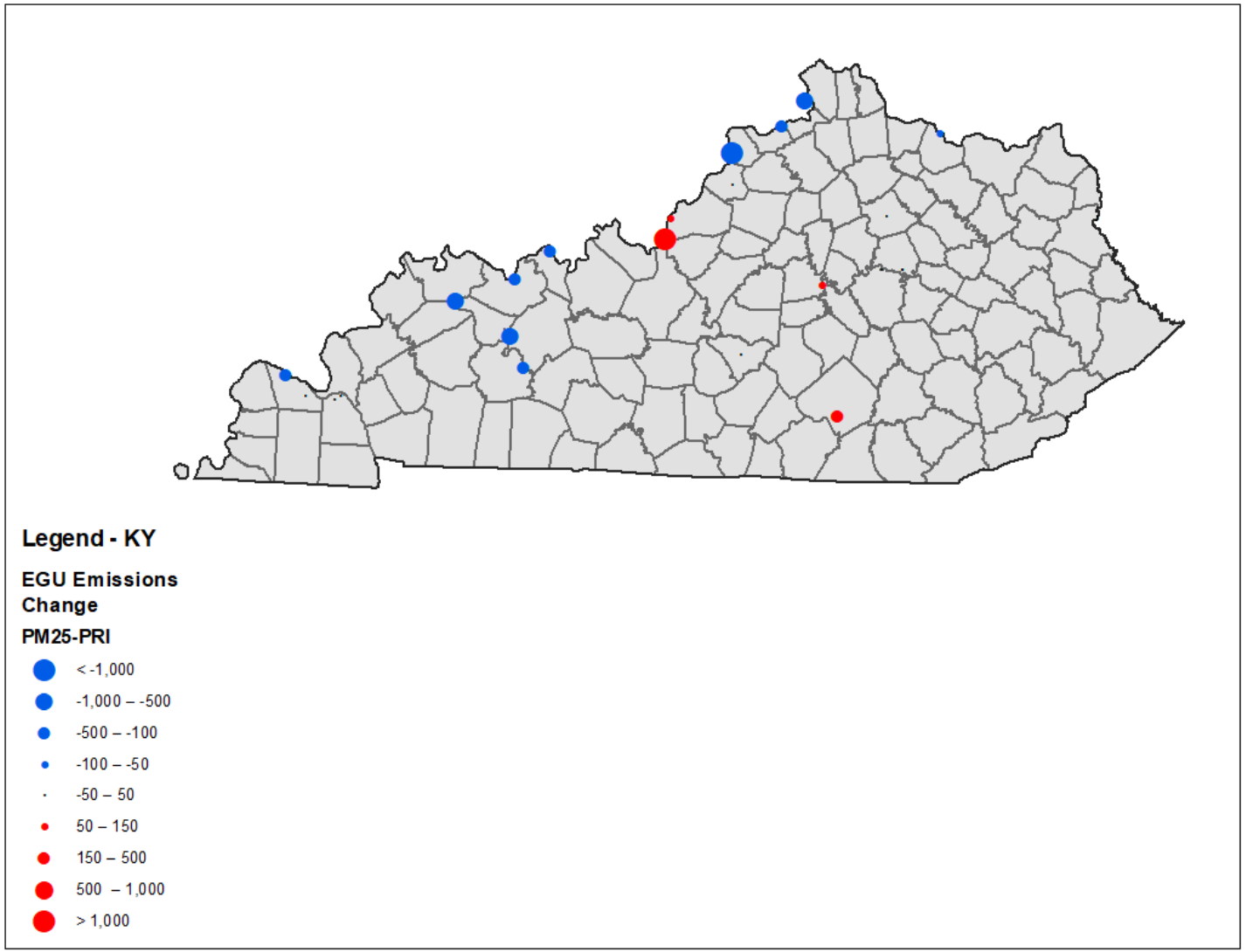

Figure B.4-9. Kentucky Point EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

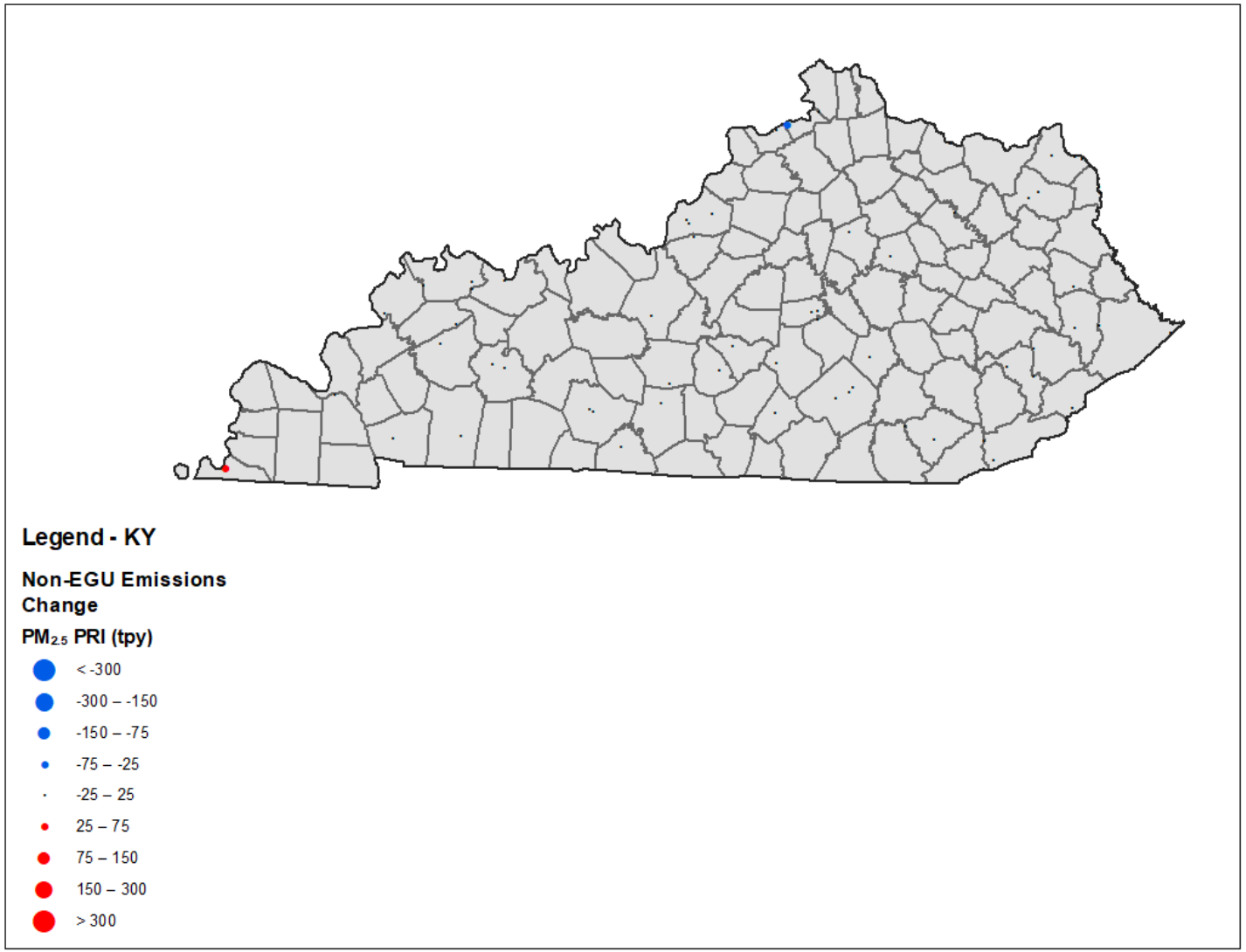

Figure B.4-10. Kentucky Point Non-EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

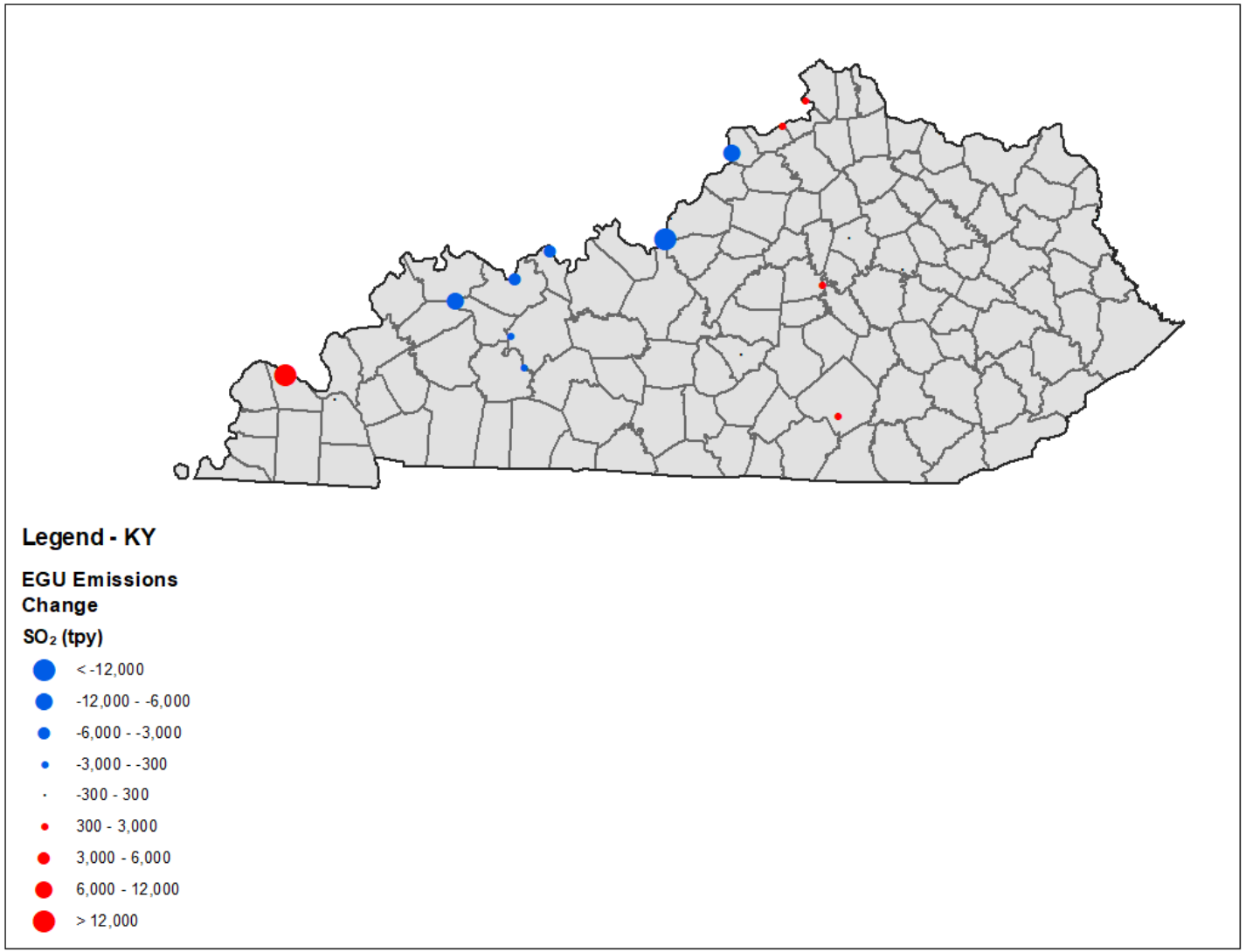

Figure B.4-11. Kentucky Point EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

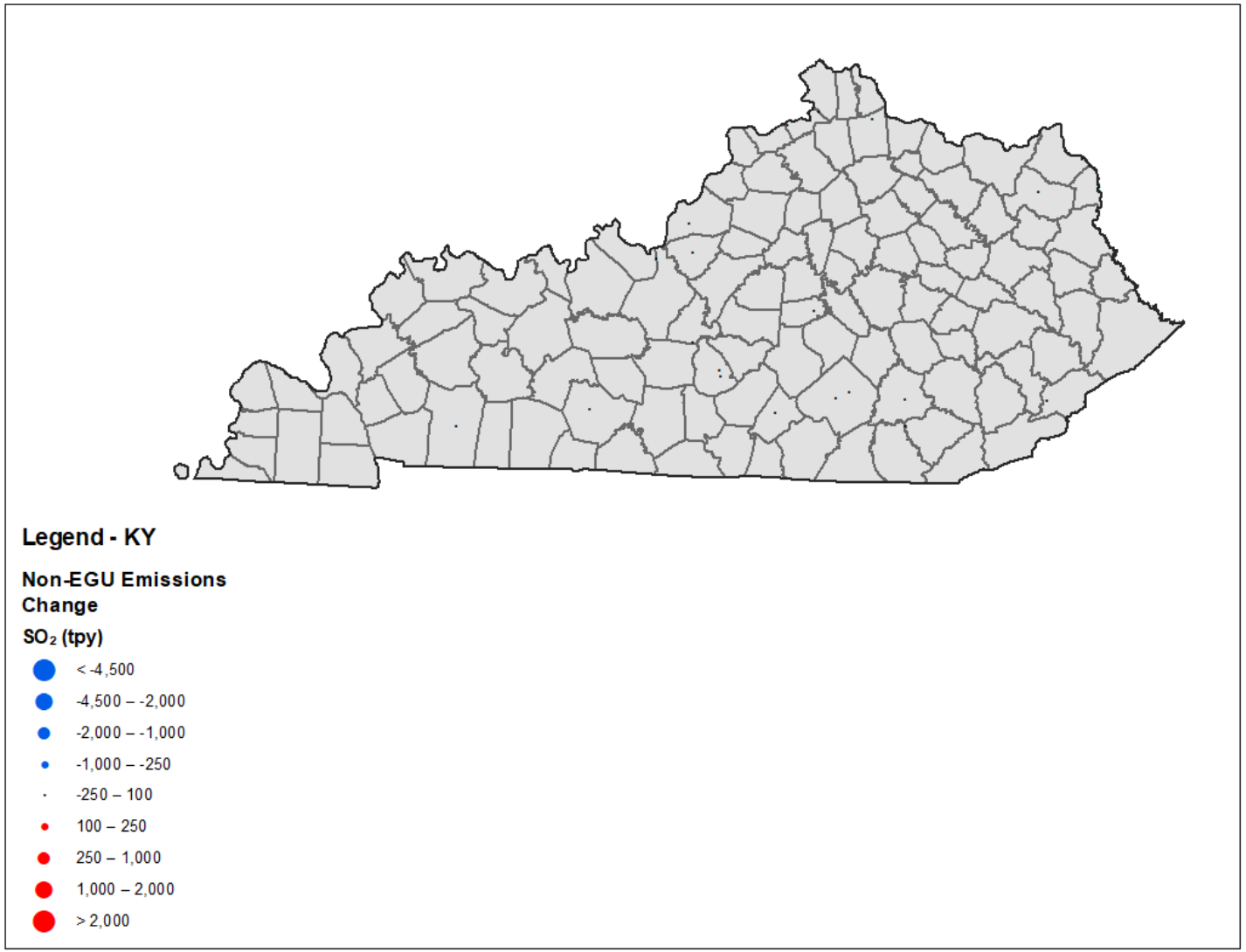

Figure B.4-12. Kentucky Point Non-EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

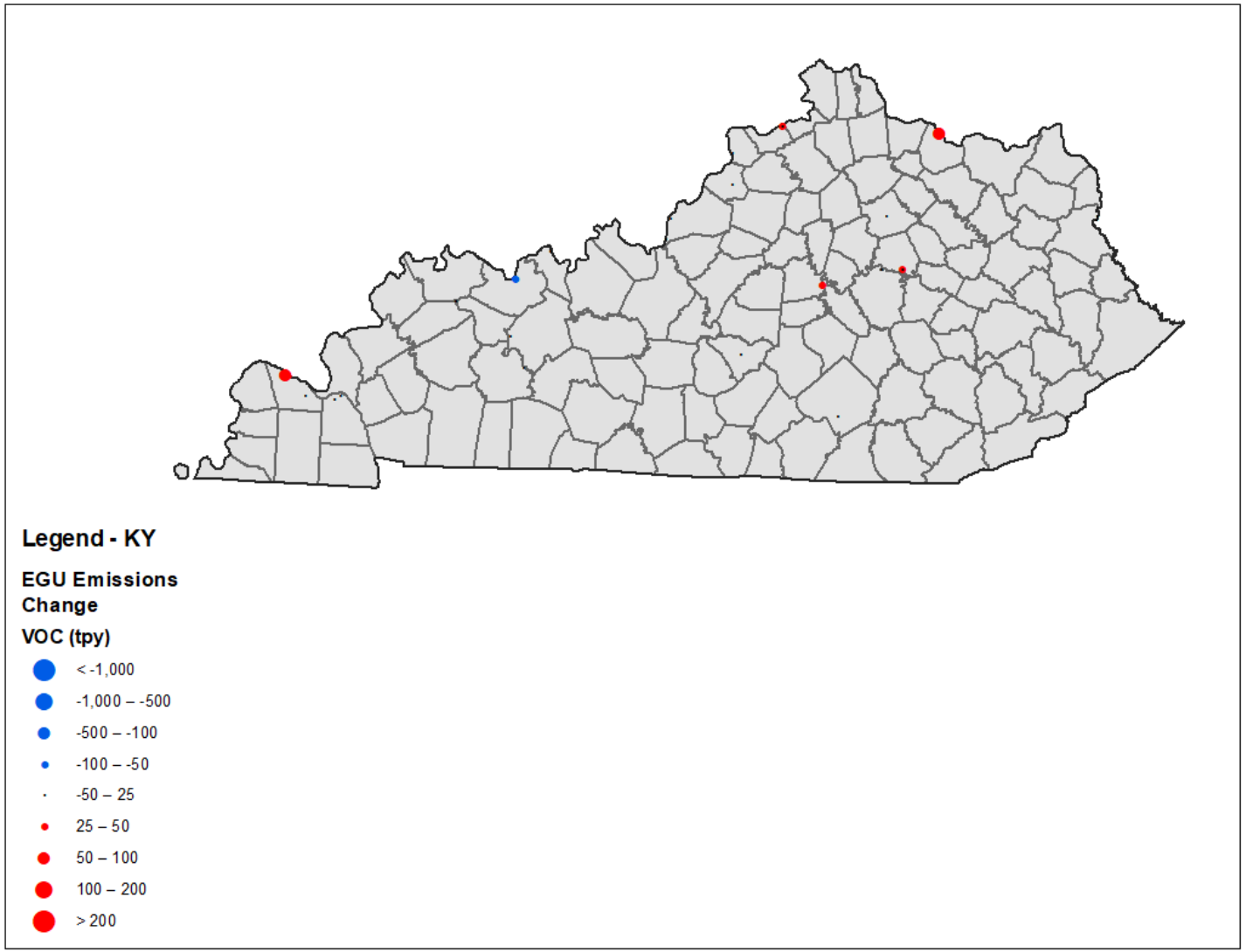

Figure B.4-13. Kentucky Point EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

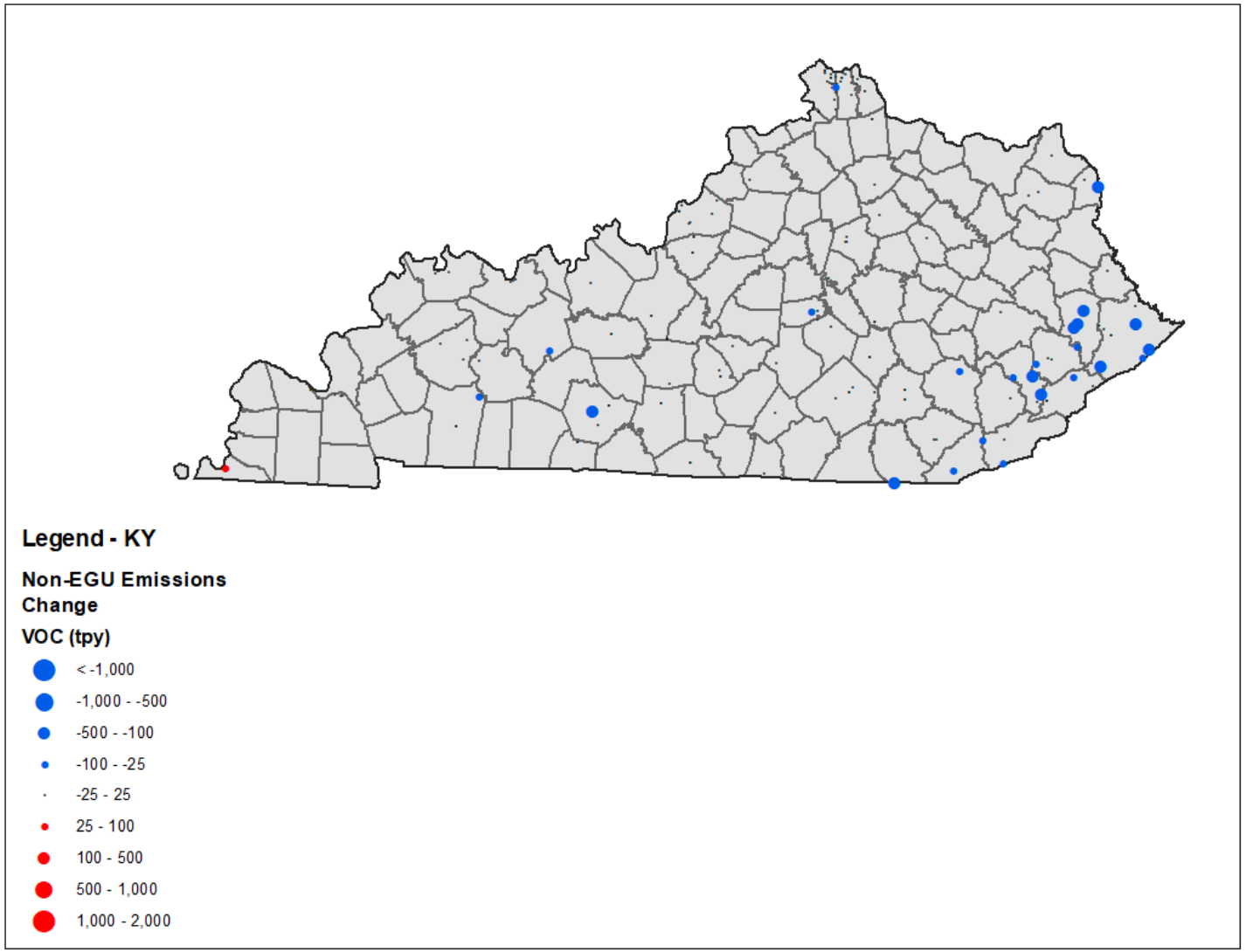

Figure B.4-14. Kentucky Point Non-EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

Appendix B-5. Mississippi 2028 Point EGU and Point Non-EGU Comparisons

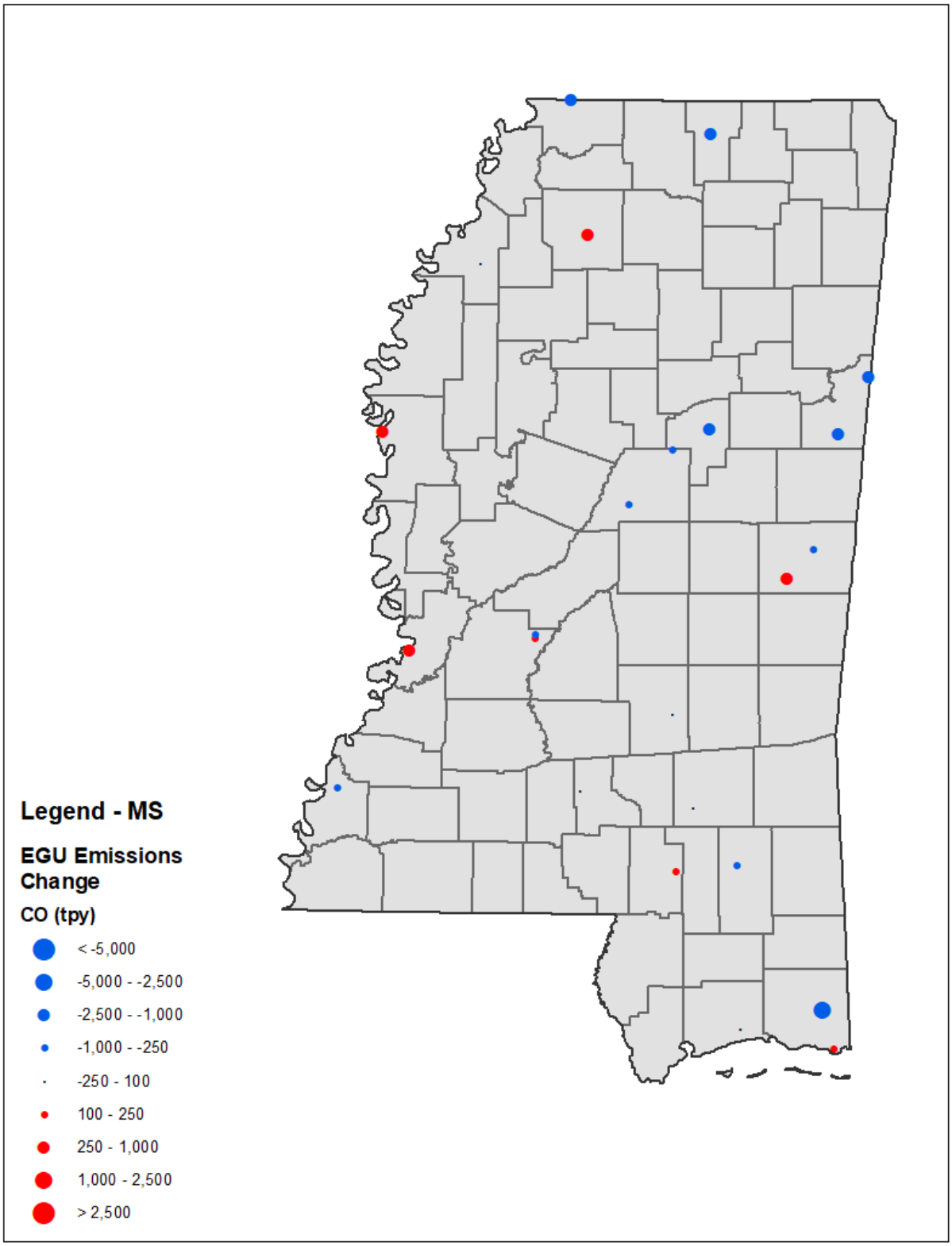

Figure B.5-1. Mississippi Point EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

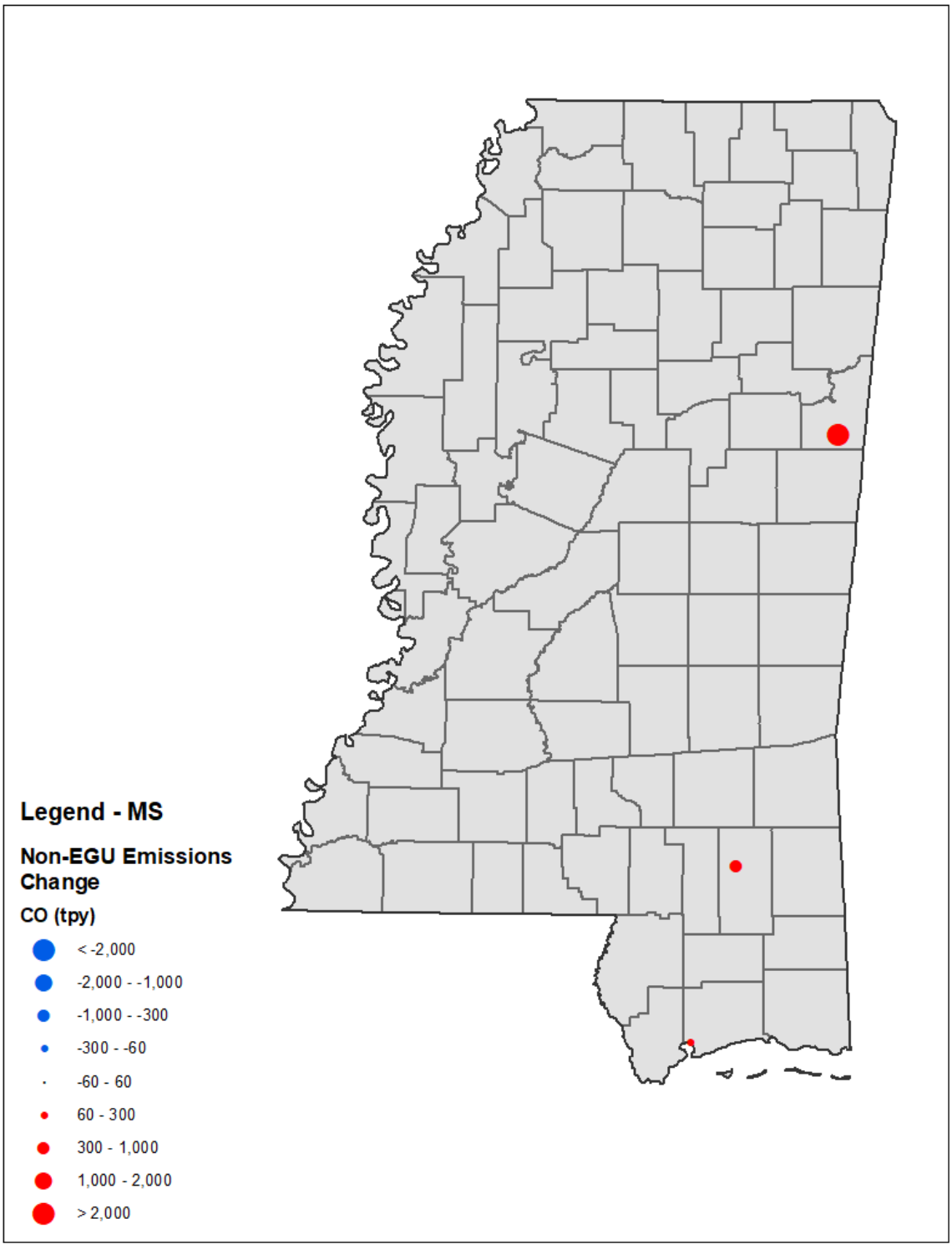

Figure B.5-2. Mississippi Point Non-EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

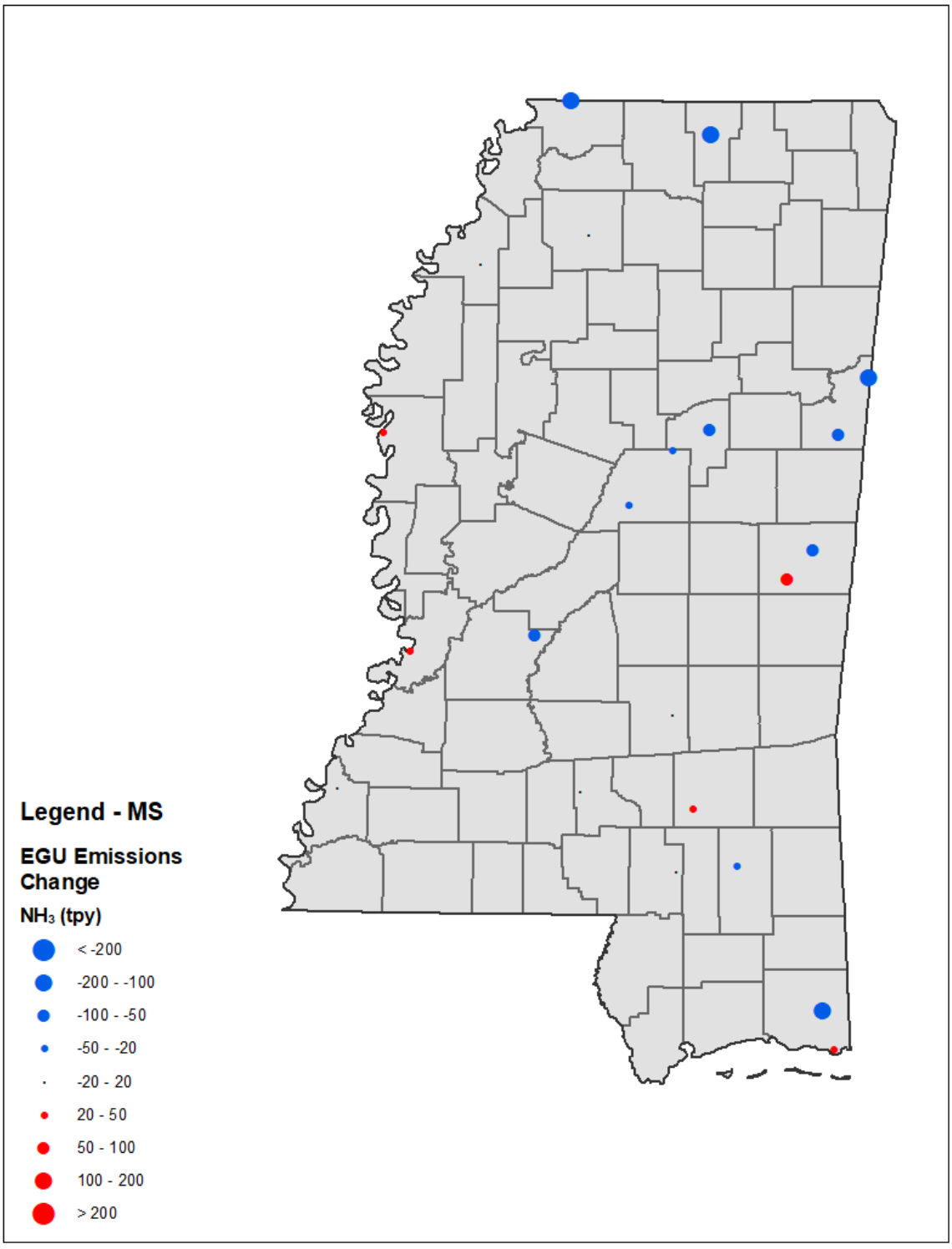

Figure B.5-3. Mississippi Point EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

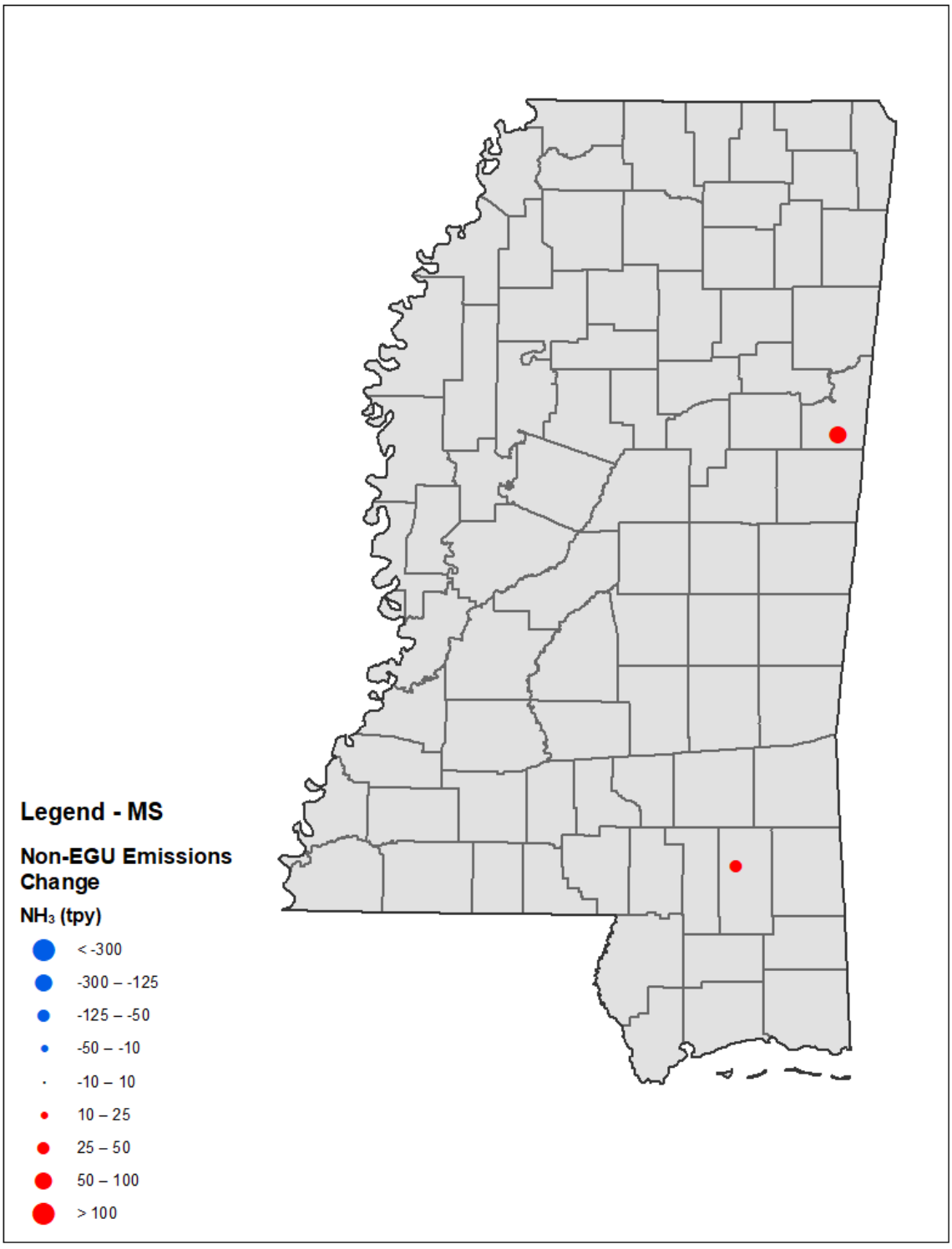

Figure B.5-4. Mississippi Point Non-EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

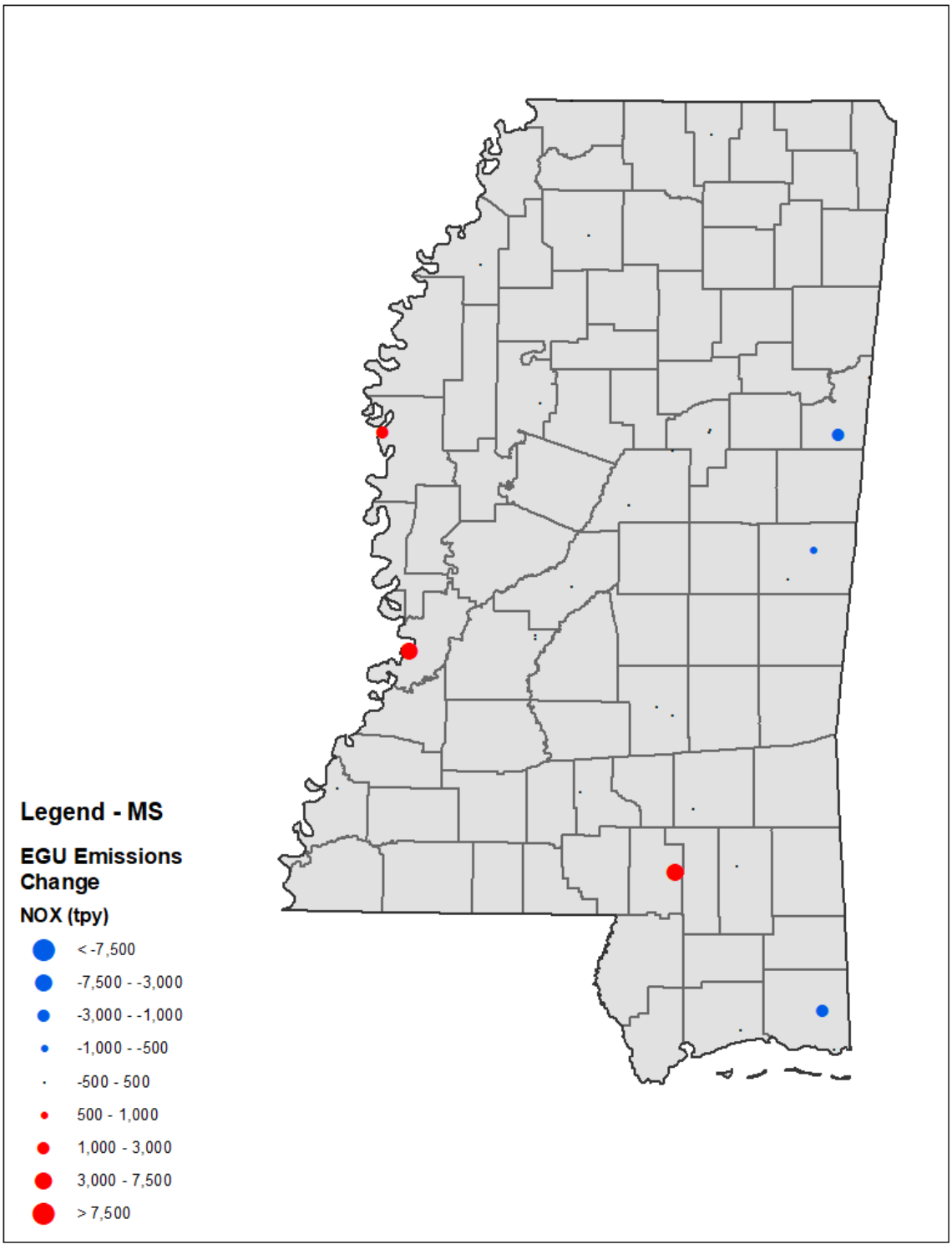

Figure B.5-5. Mississippi Point EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

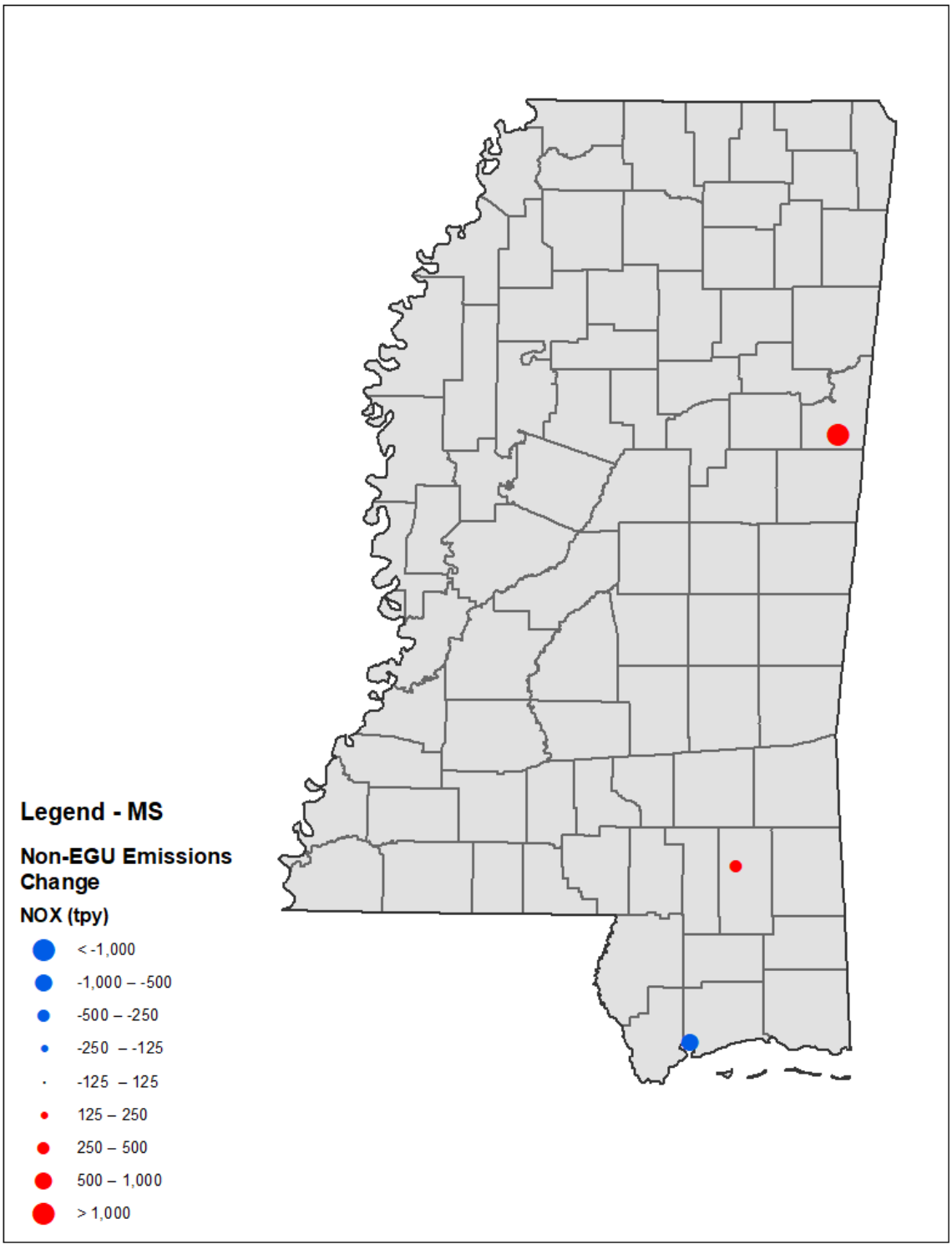

Figure B.5-6. Mississippi Point Non-EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

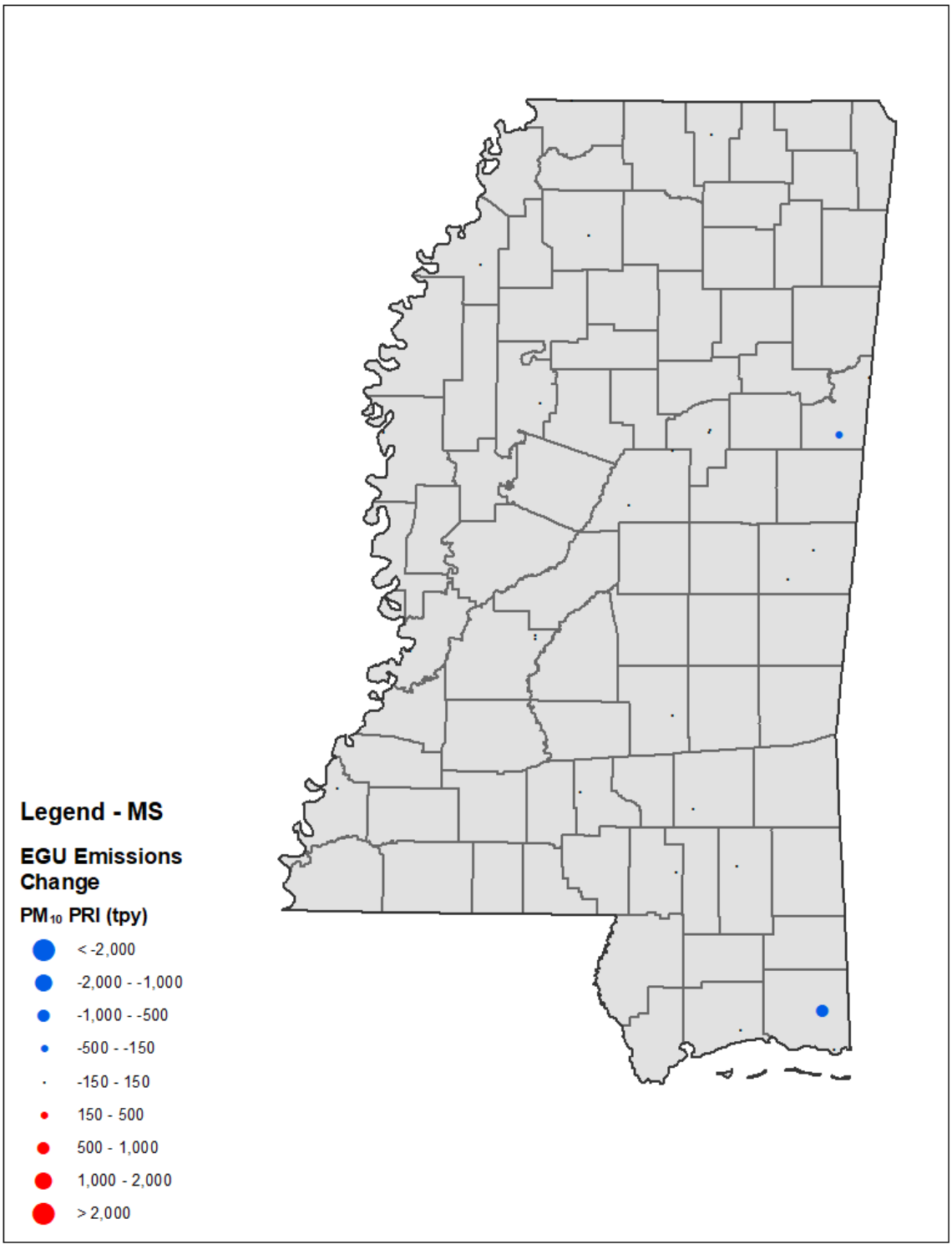

Figure B.5-7. Mississippi Point EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

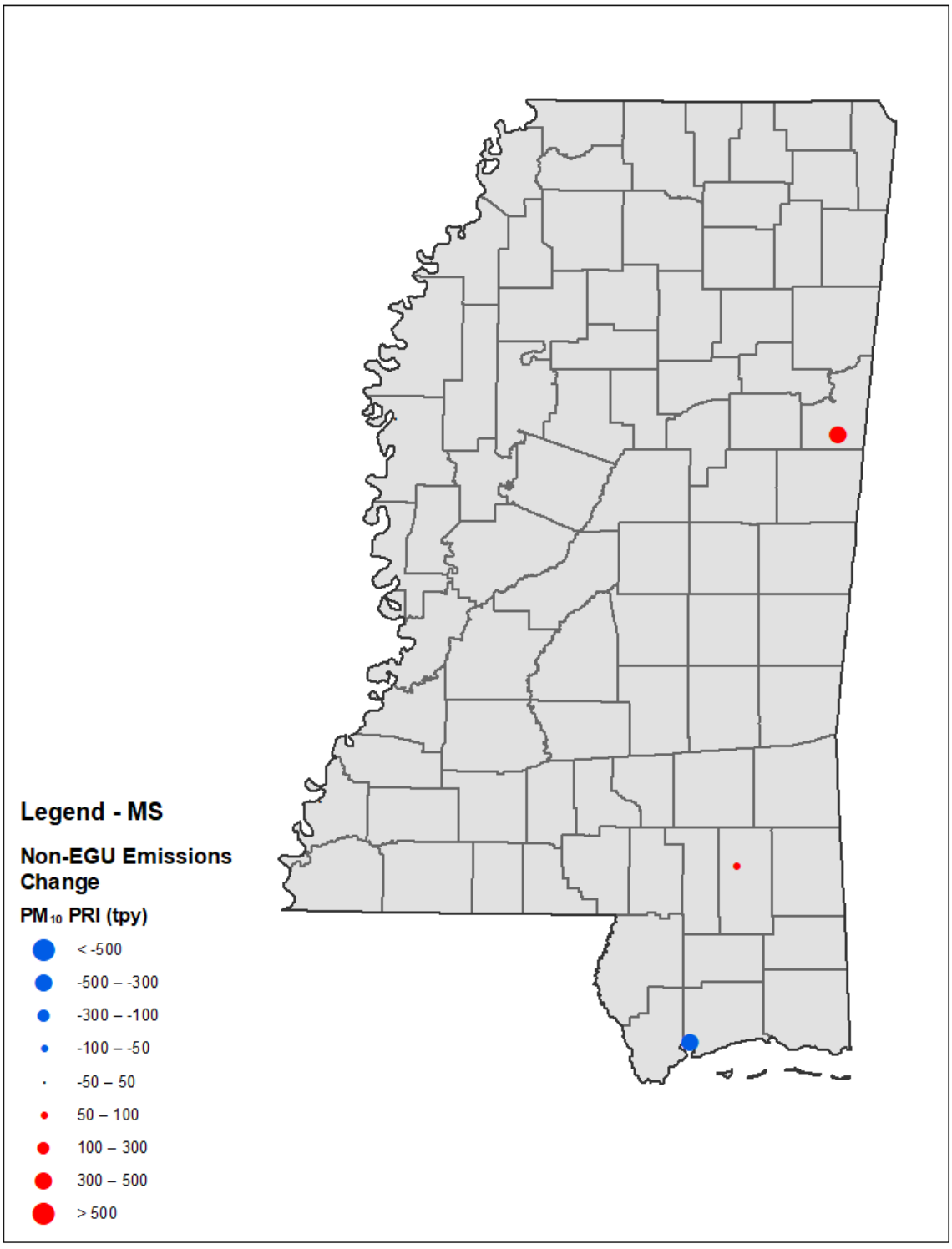

Figure B.5-8. Mississippi Point Non-EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

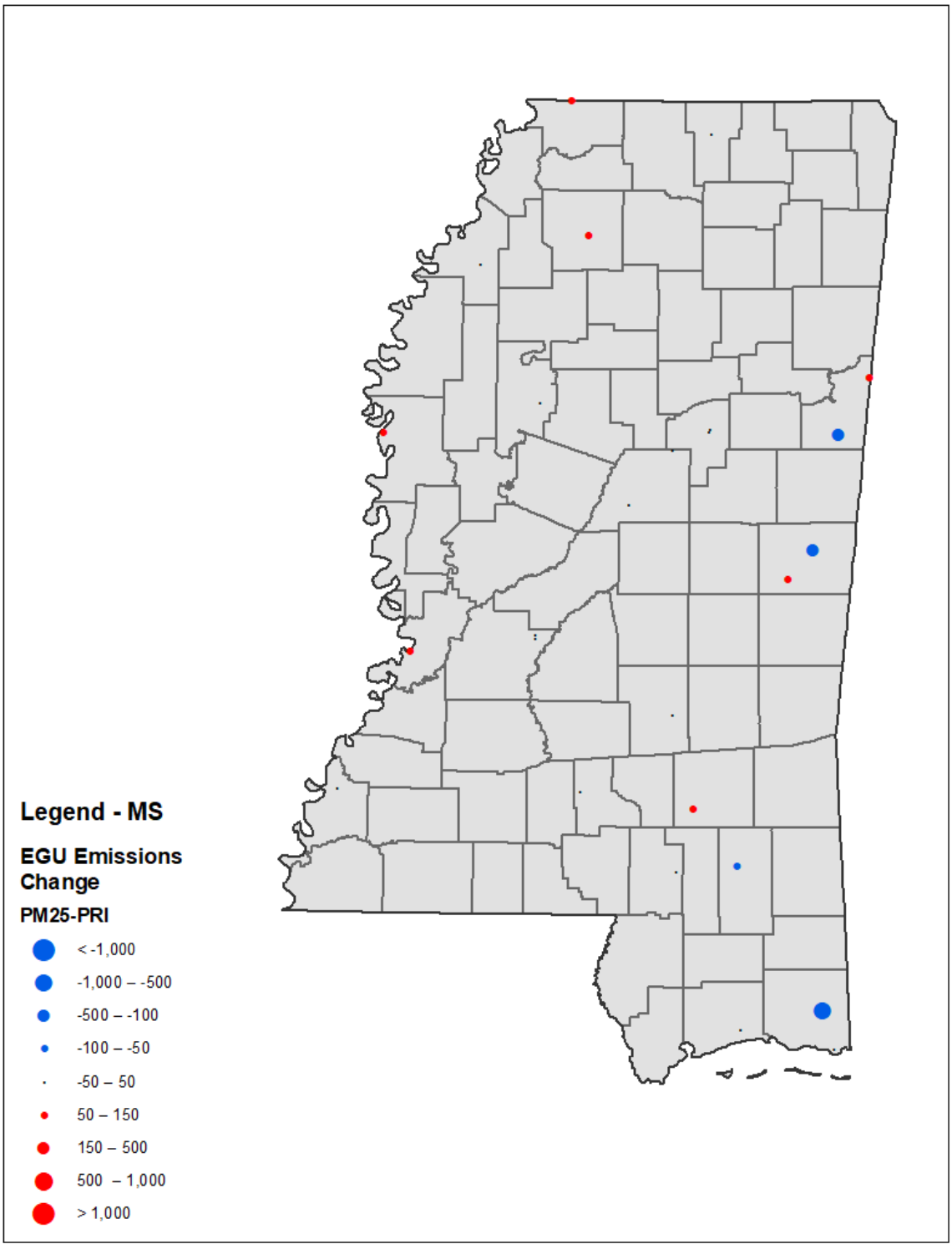

Figure B.5-9. Mississippi Point EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

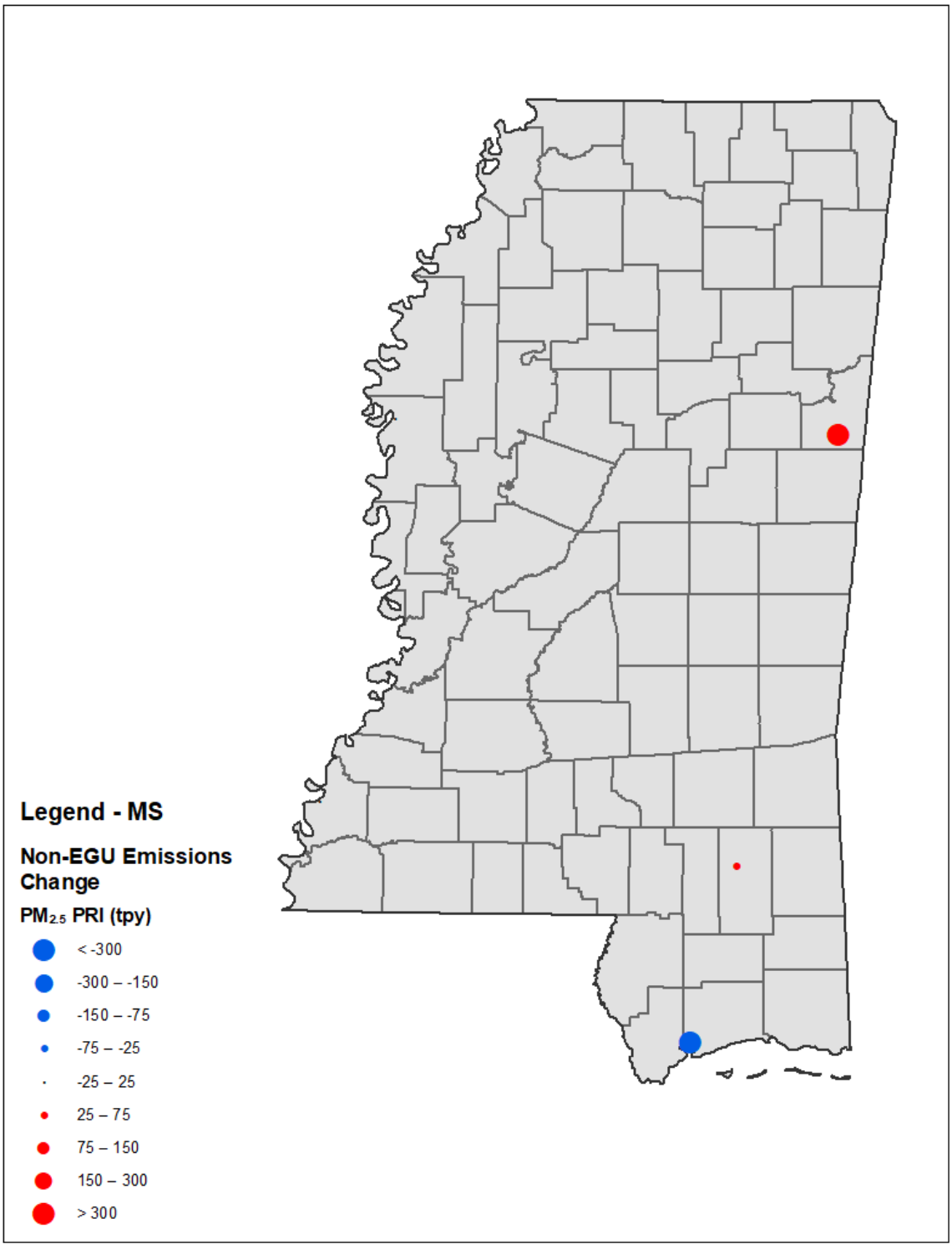

Figure B.5-10. Mississippi Point Non-EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

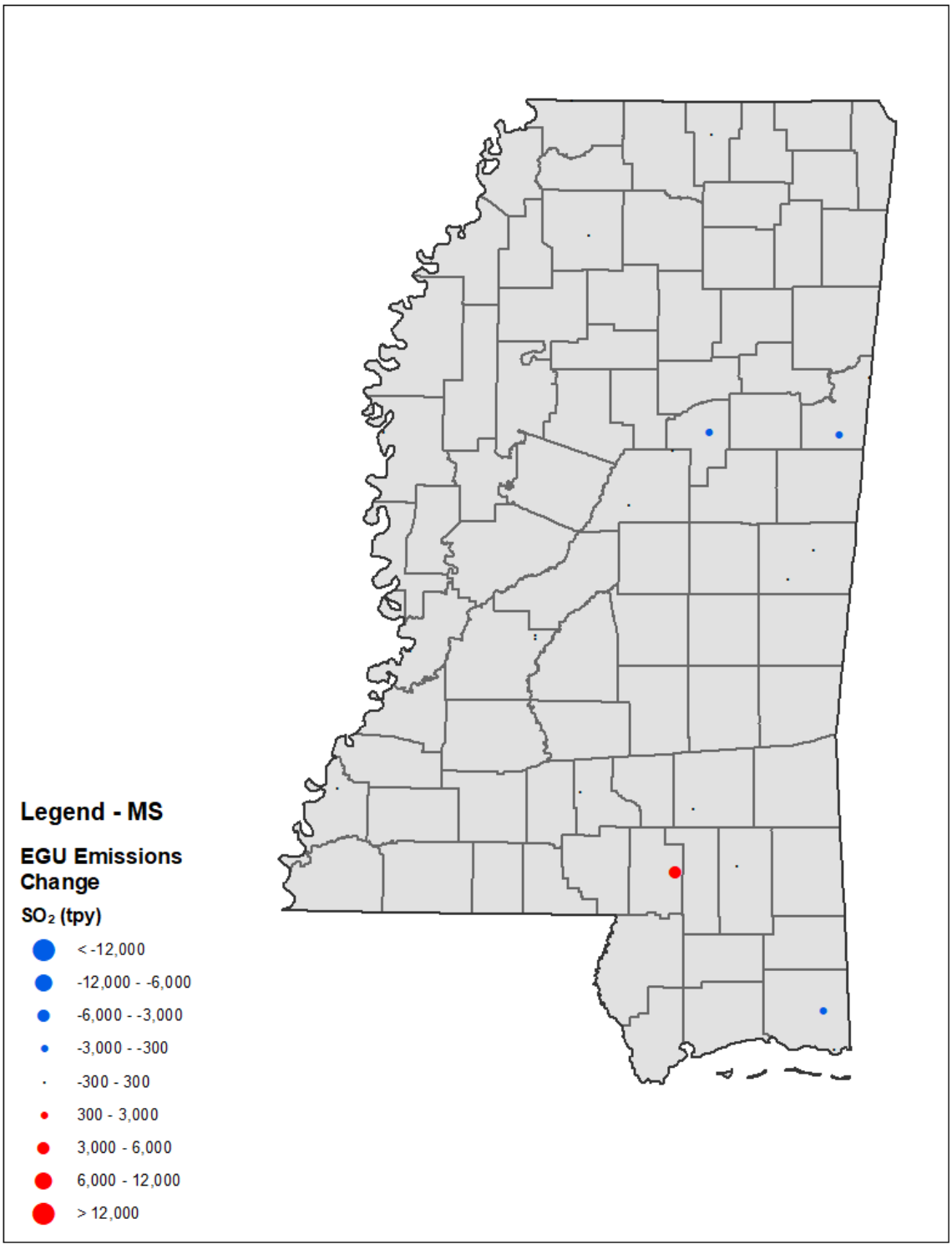

Figure B.5-11. Mississippi Point EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

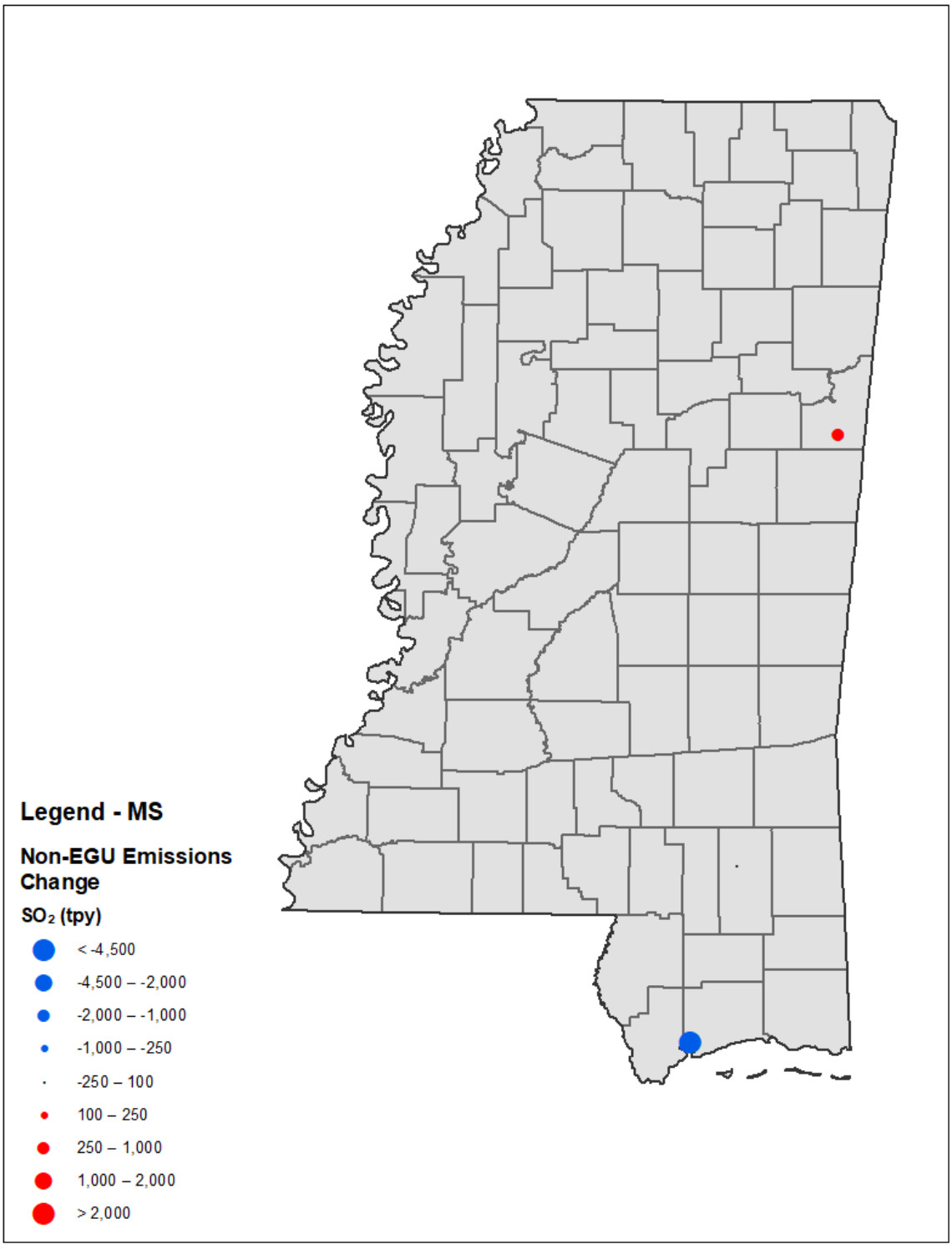

Figure B.5-12. Mississippi Point Non-EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

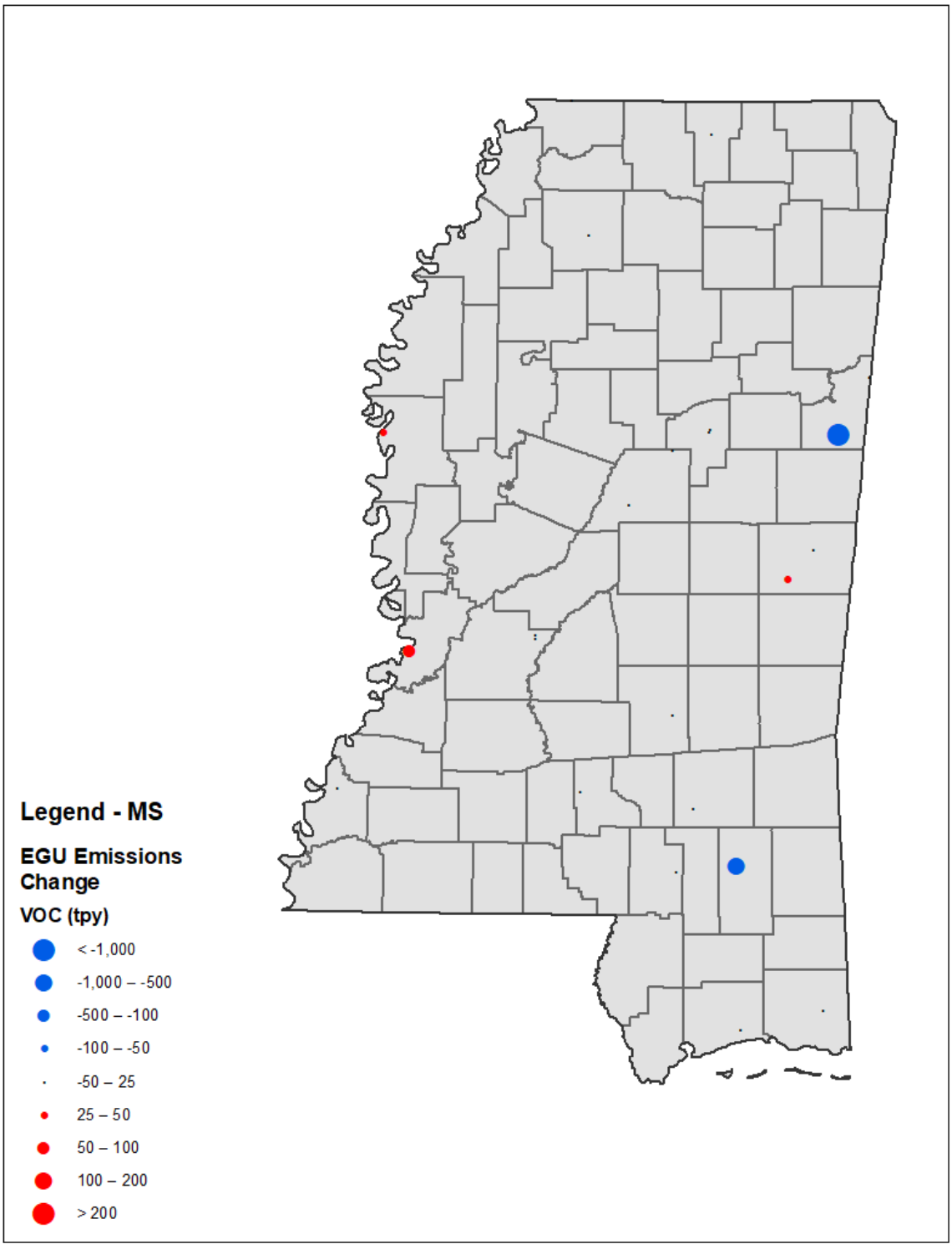

Figure B.5-13. Mississippi Point EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

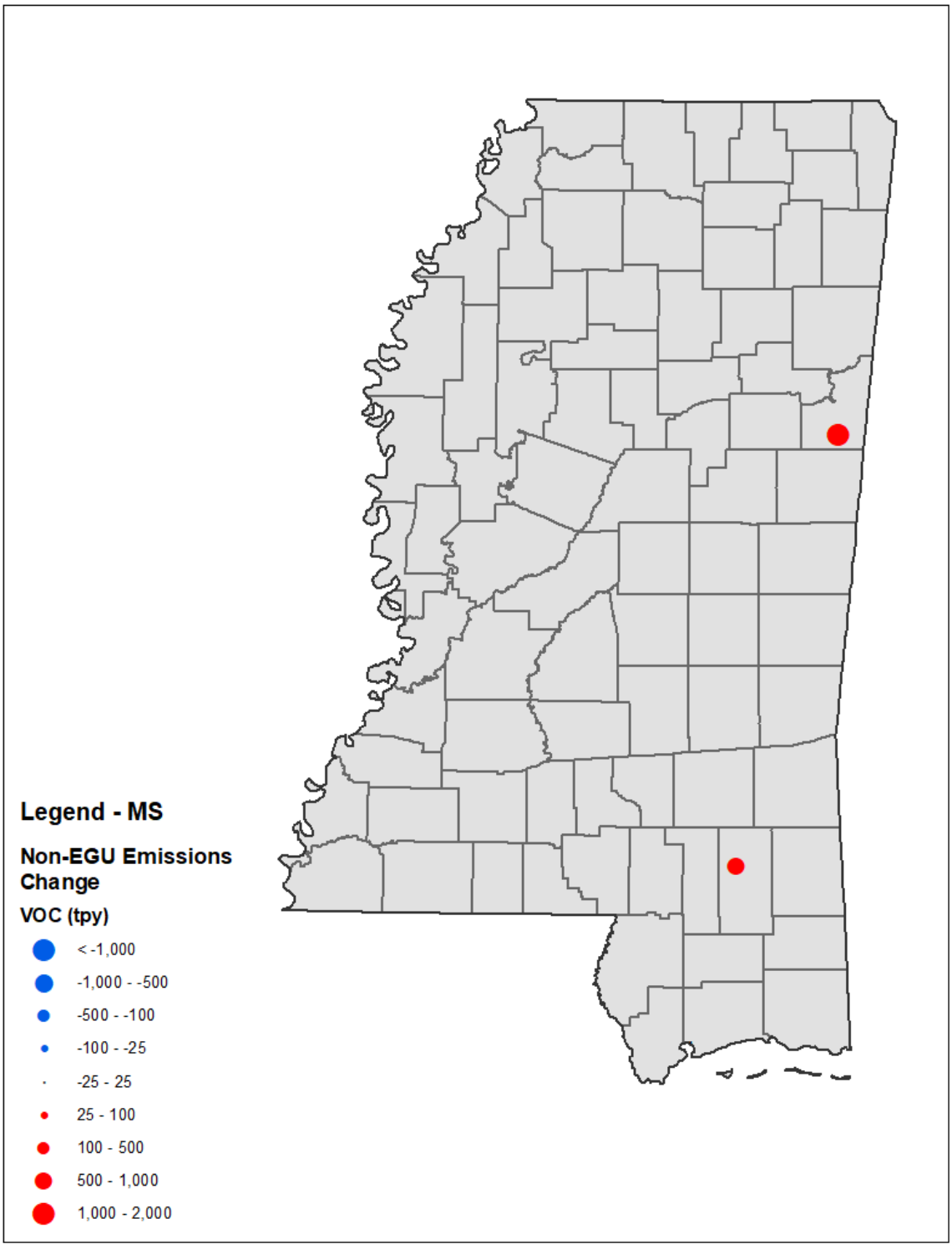

Figure B.5-14. Mississippi Point Non-EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

Appendix B-6. North Carolina 2028 Point EGU and Point Non-EGU Comparisons

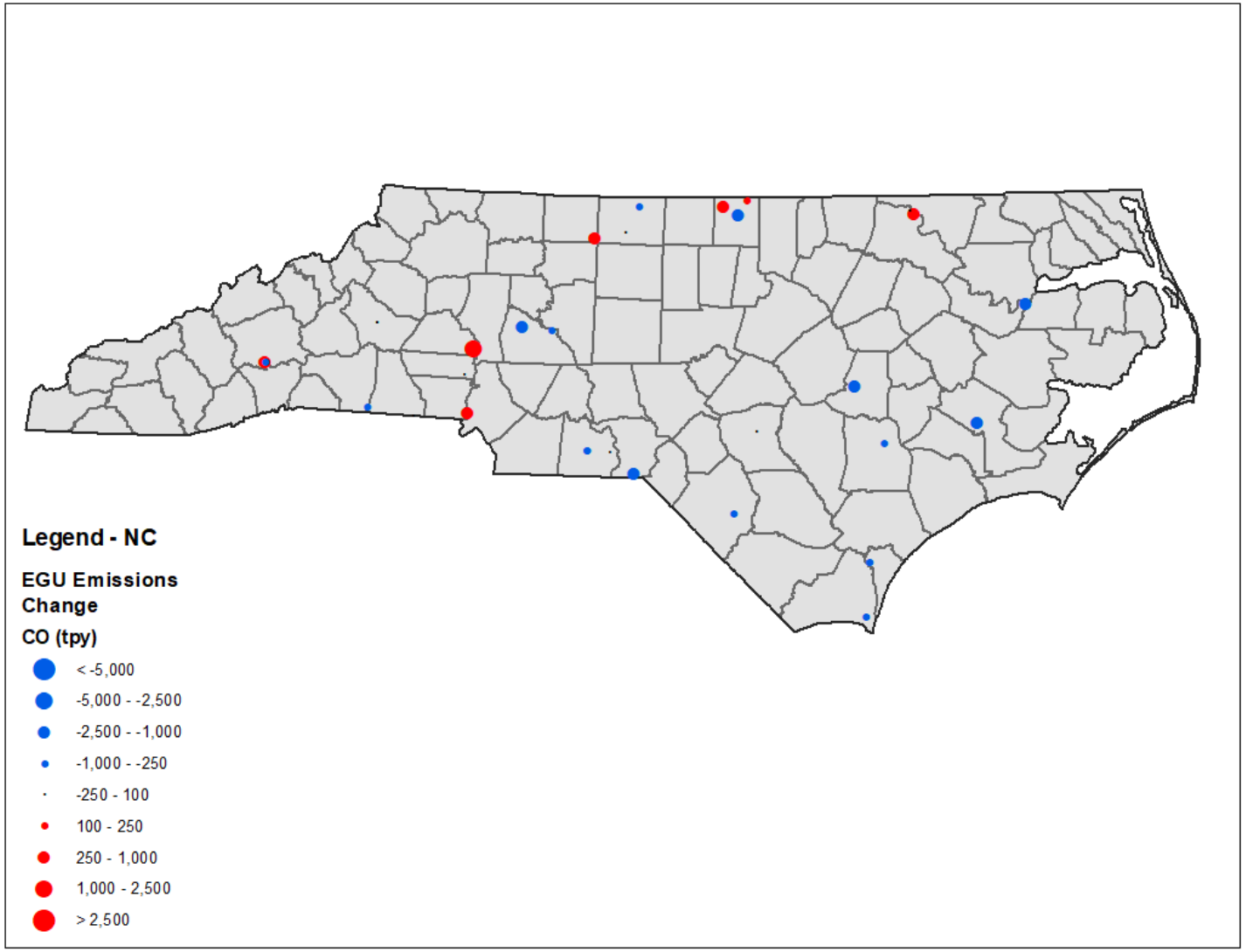

Figure B.6-1. North Carolina Point EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

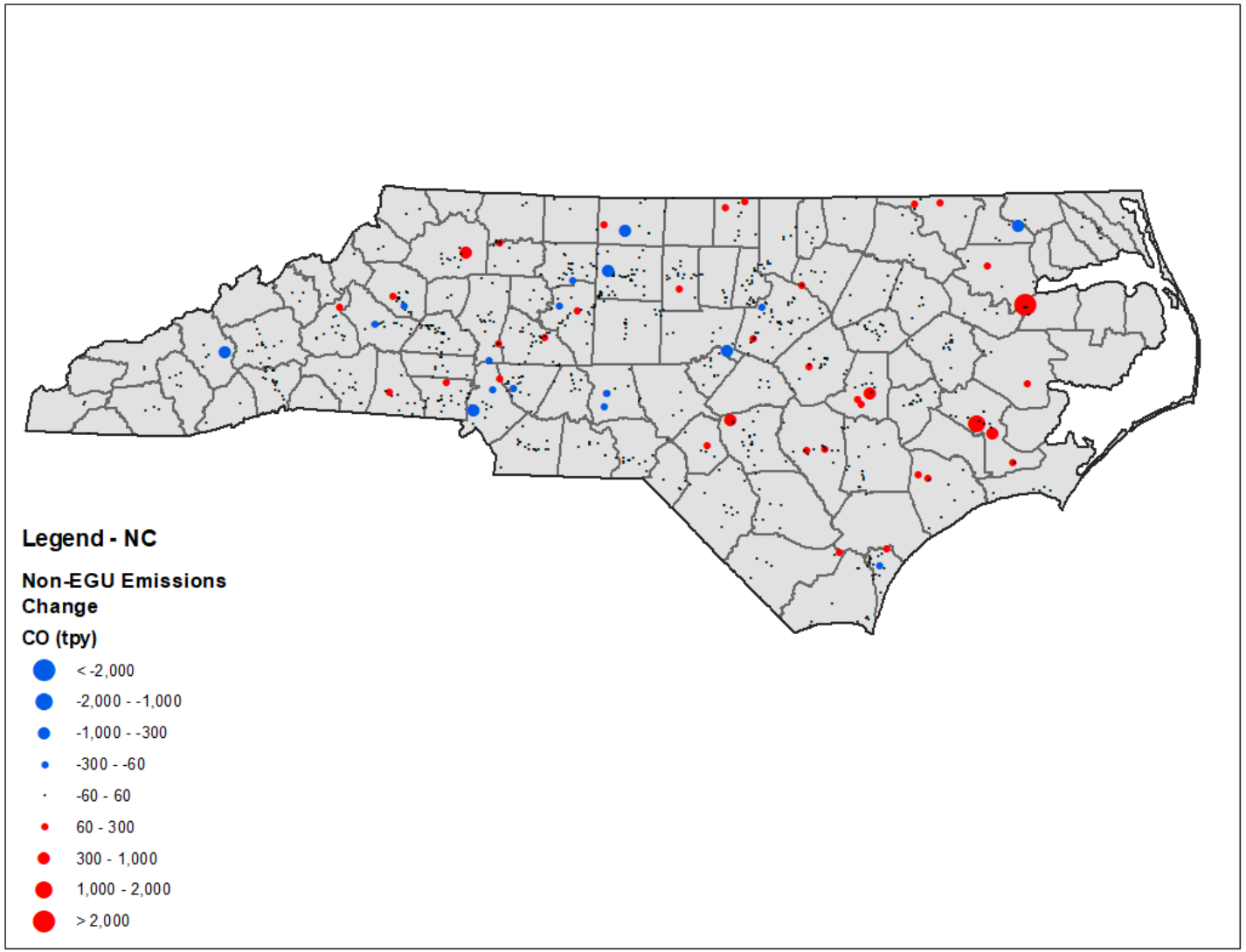

Figure B.6-2. North Carolina Point Non-EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

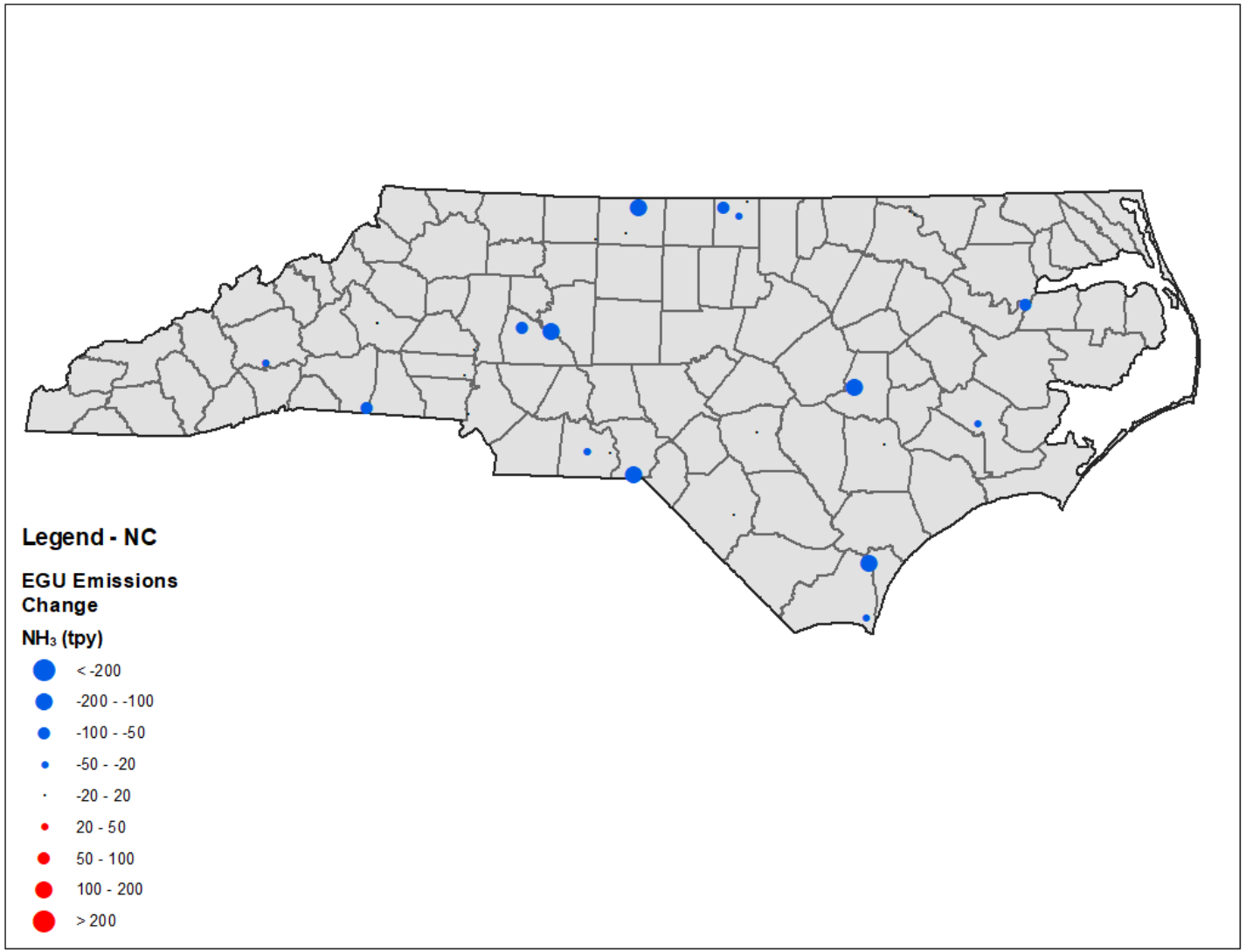

Figure B.6-3. North Carolina Point EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

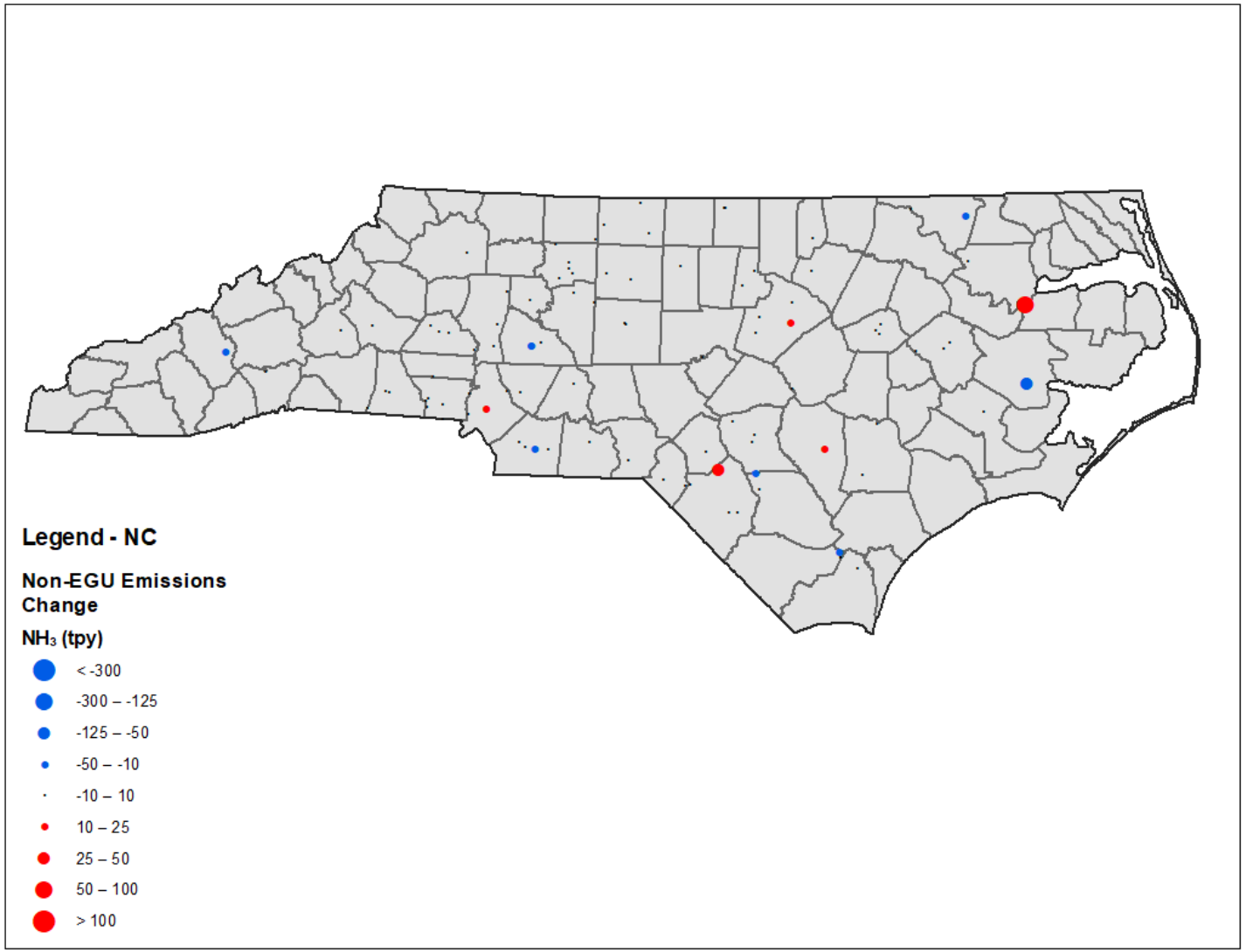

Figure B.6-4. North Carolina Point Non-EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

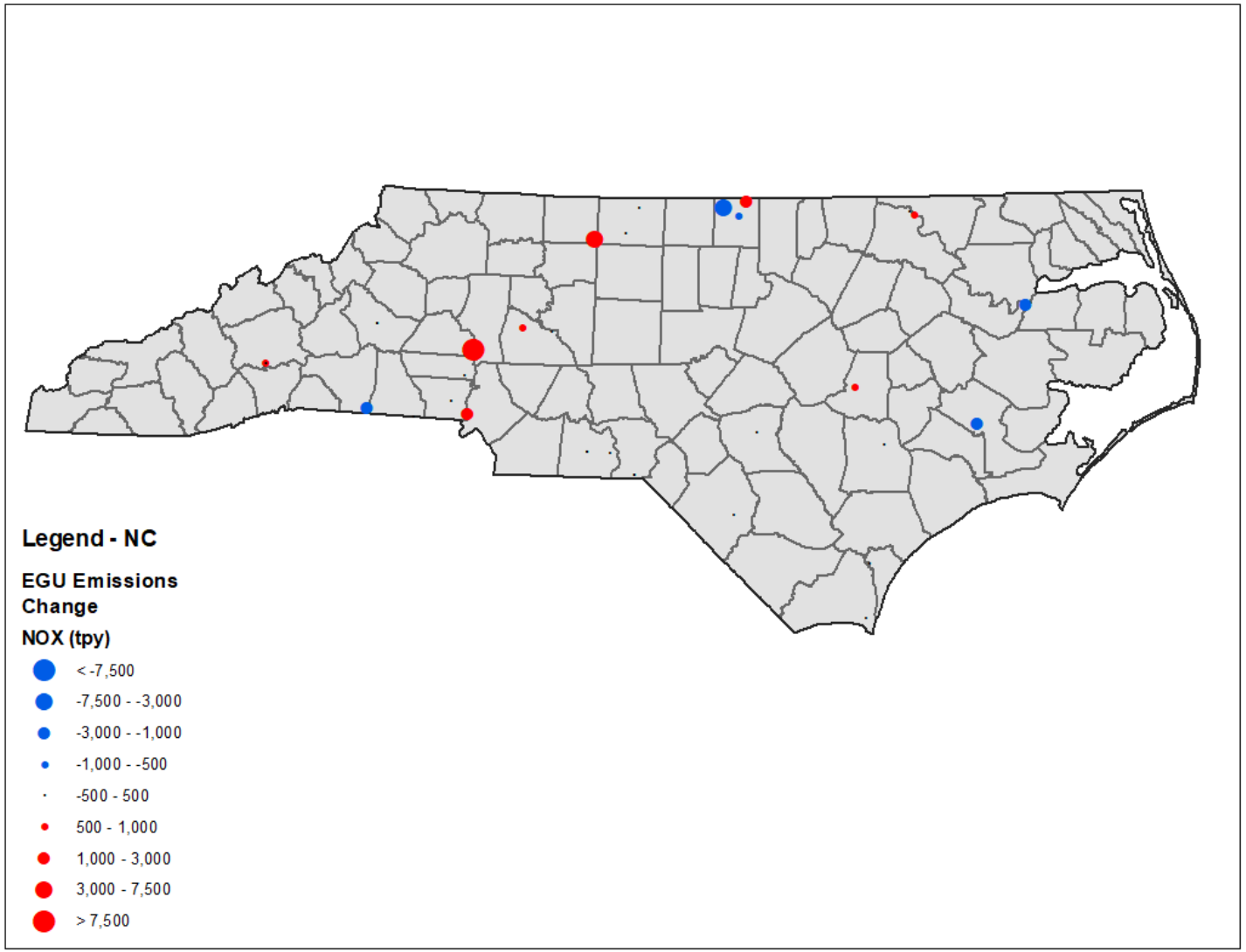

Figure B.6-5. North Carolina Point EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

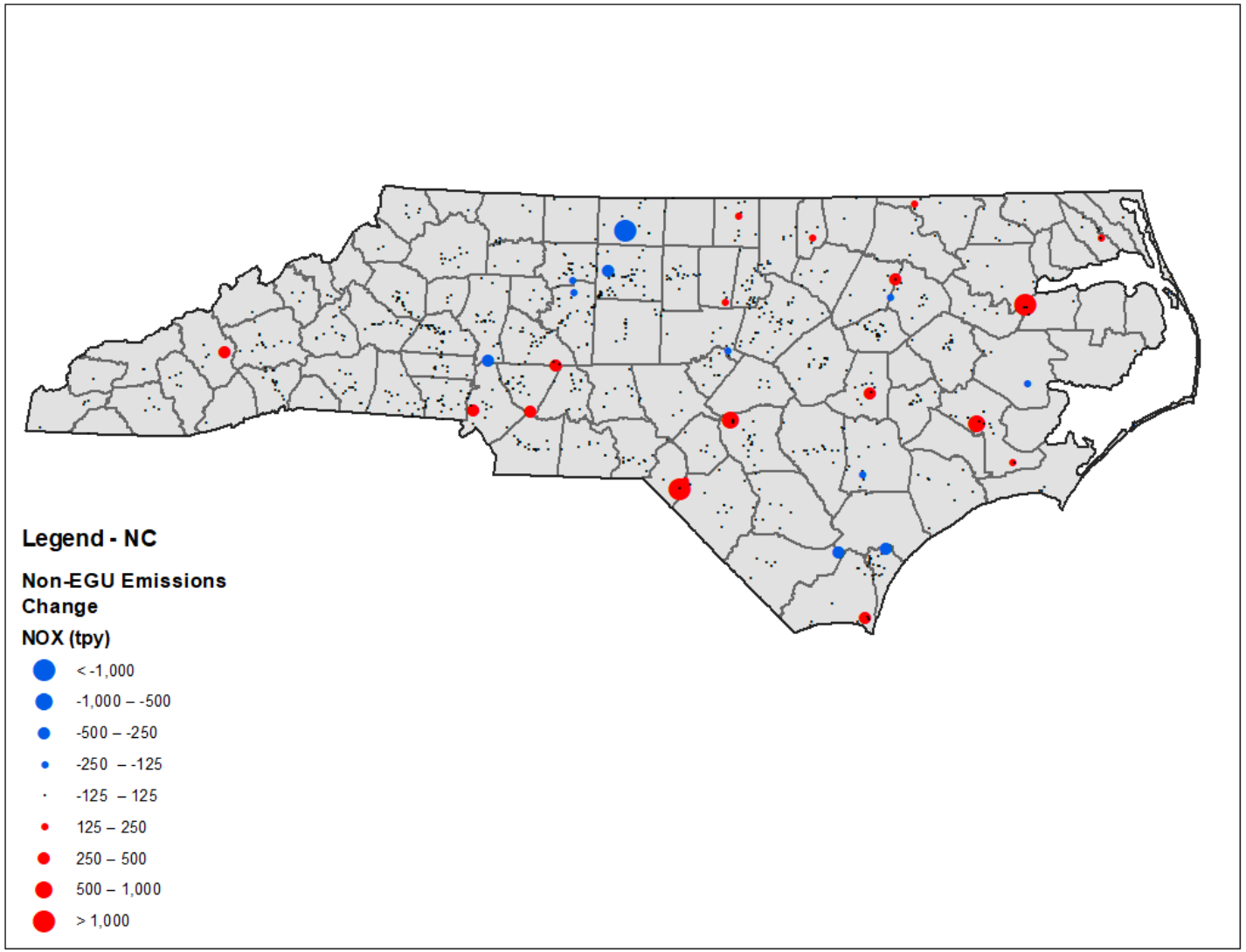

Figure B.6-6. North Carolina Point Non-EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

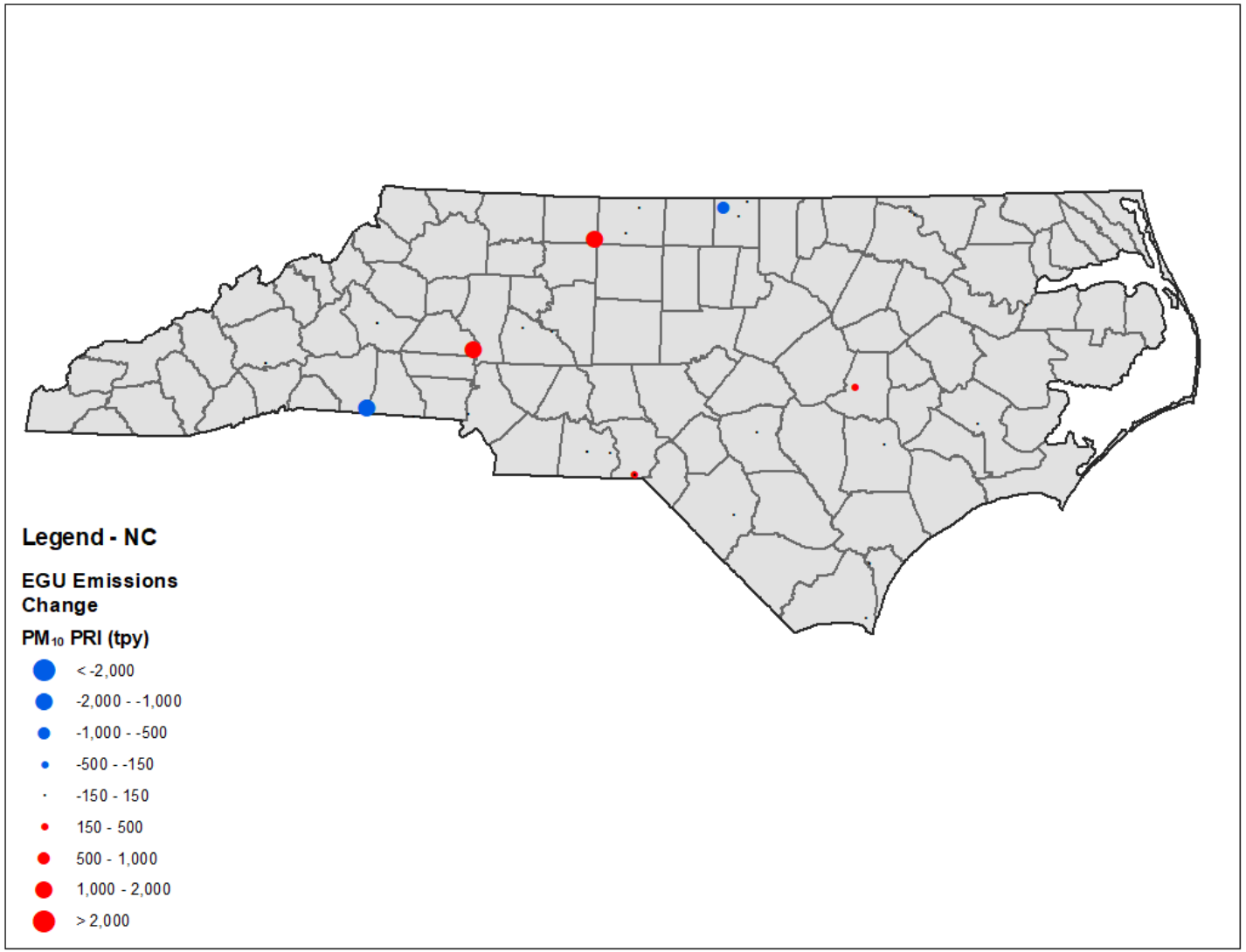

Figure B.6-7. North Carolina Point EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

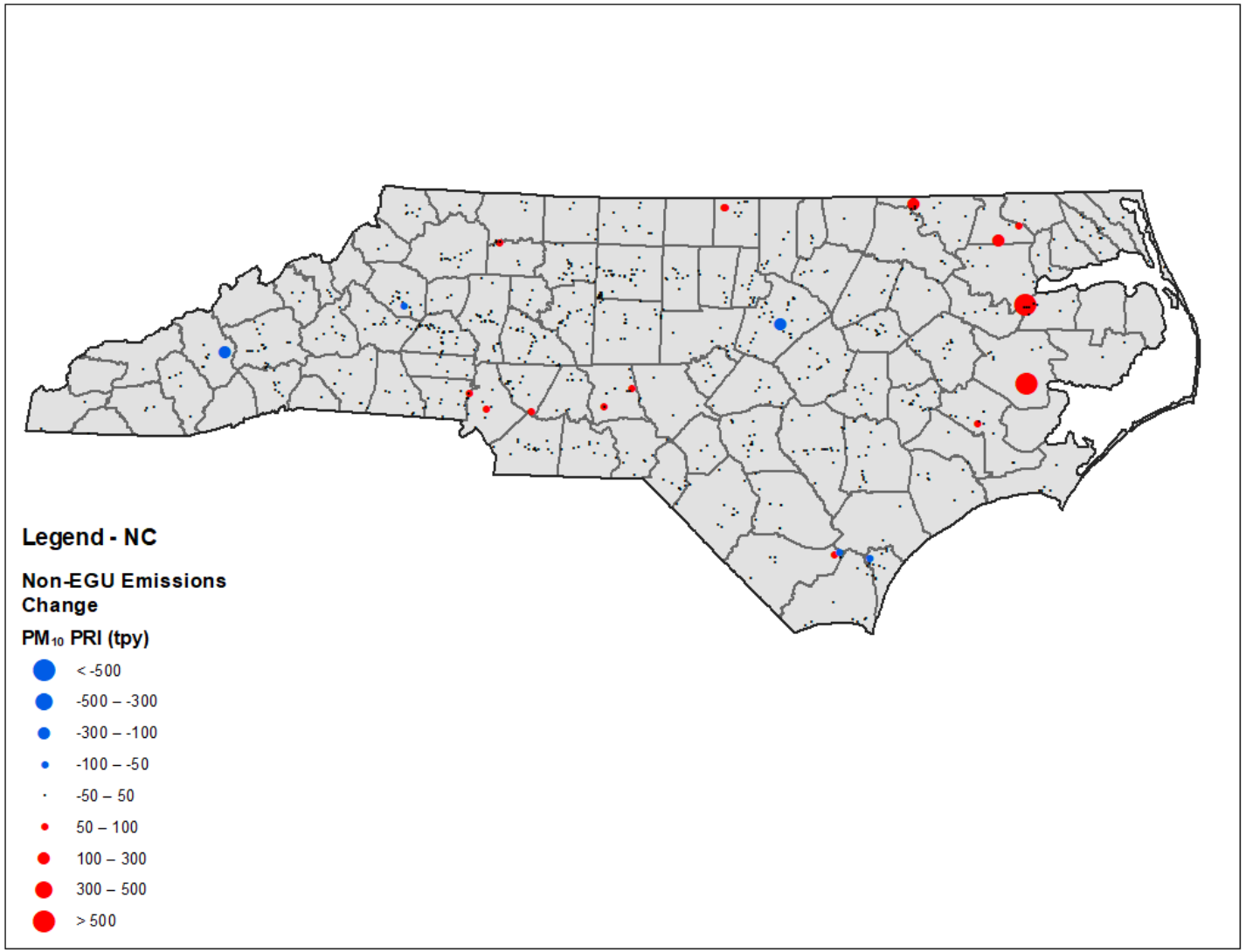

Figure B.6-8. North Carolina Point Non-EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

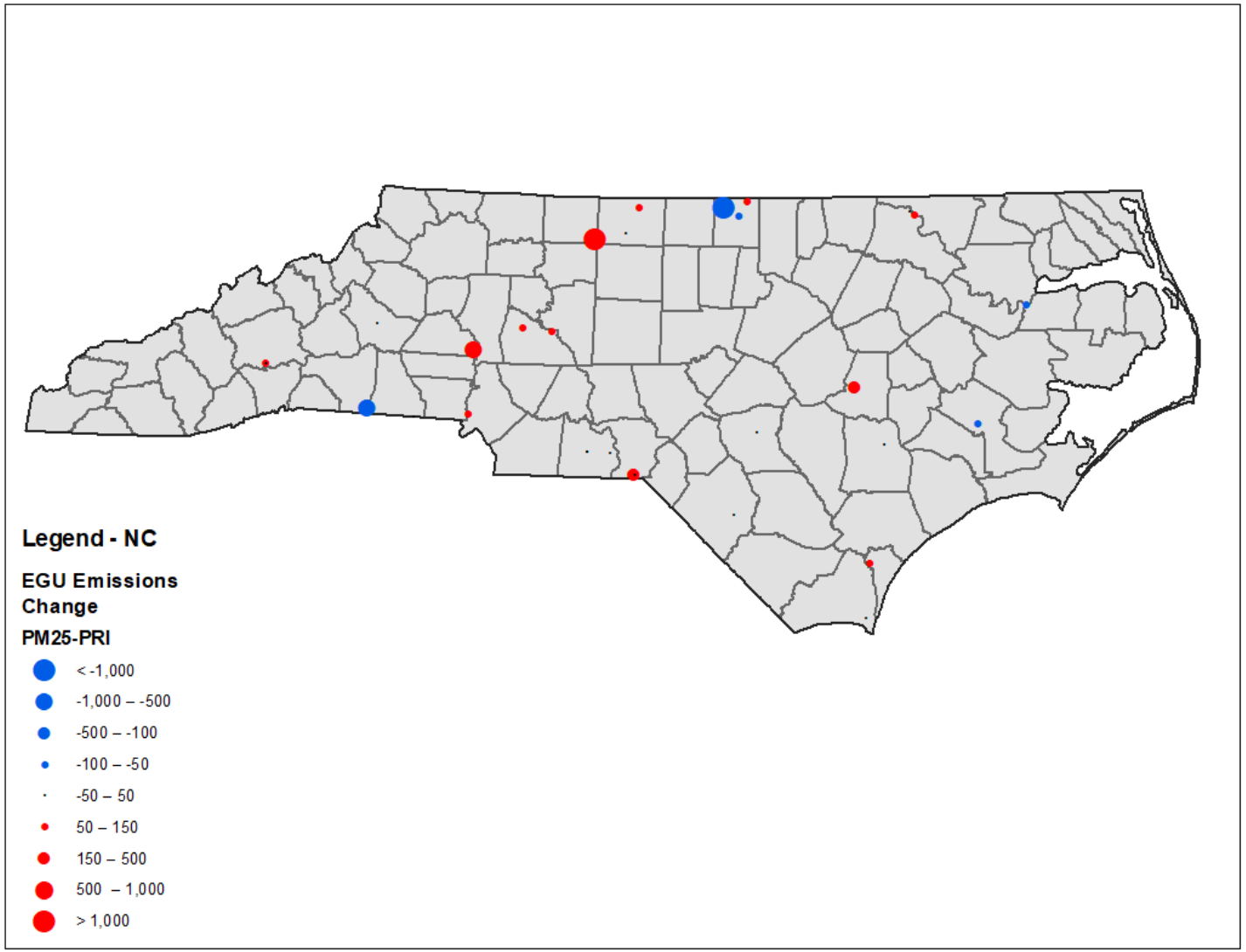

Figure B.6-9. North Carolina Point EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

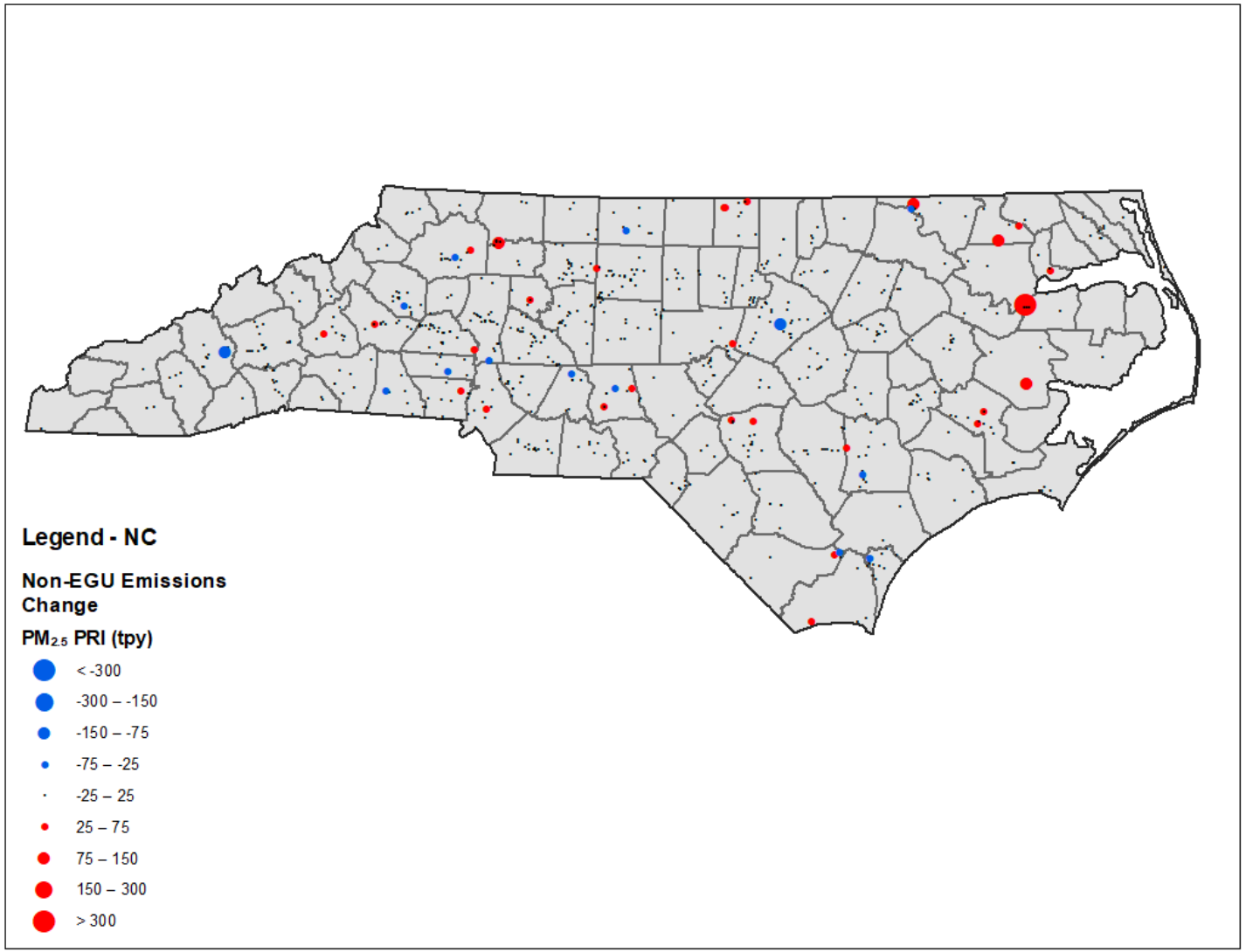

Figure B.6-10. North Carolina Point Non-EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

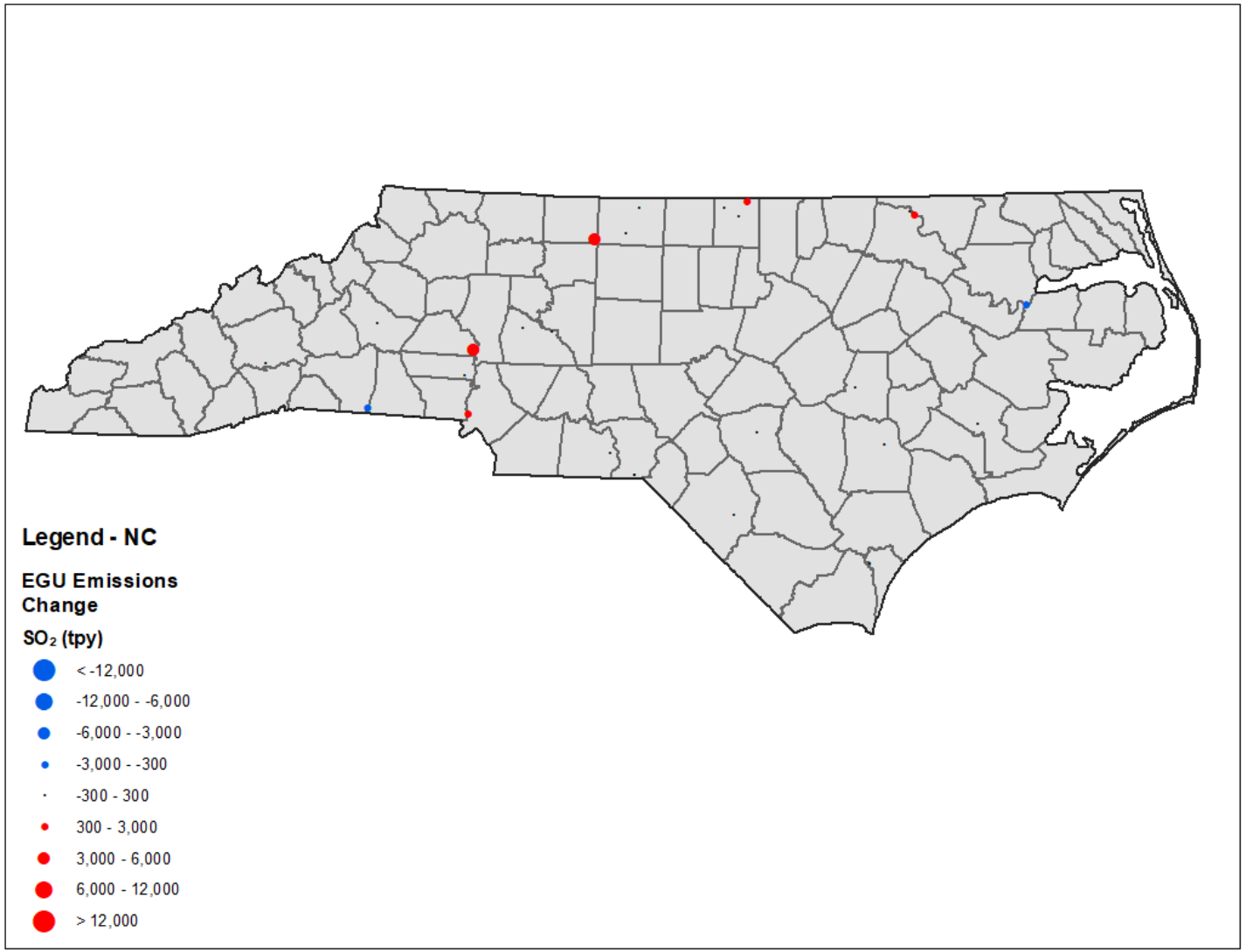

Figure B.6-11. North Carolina Point EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

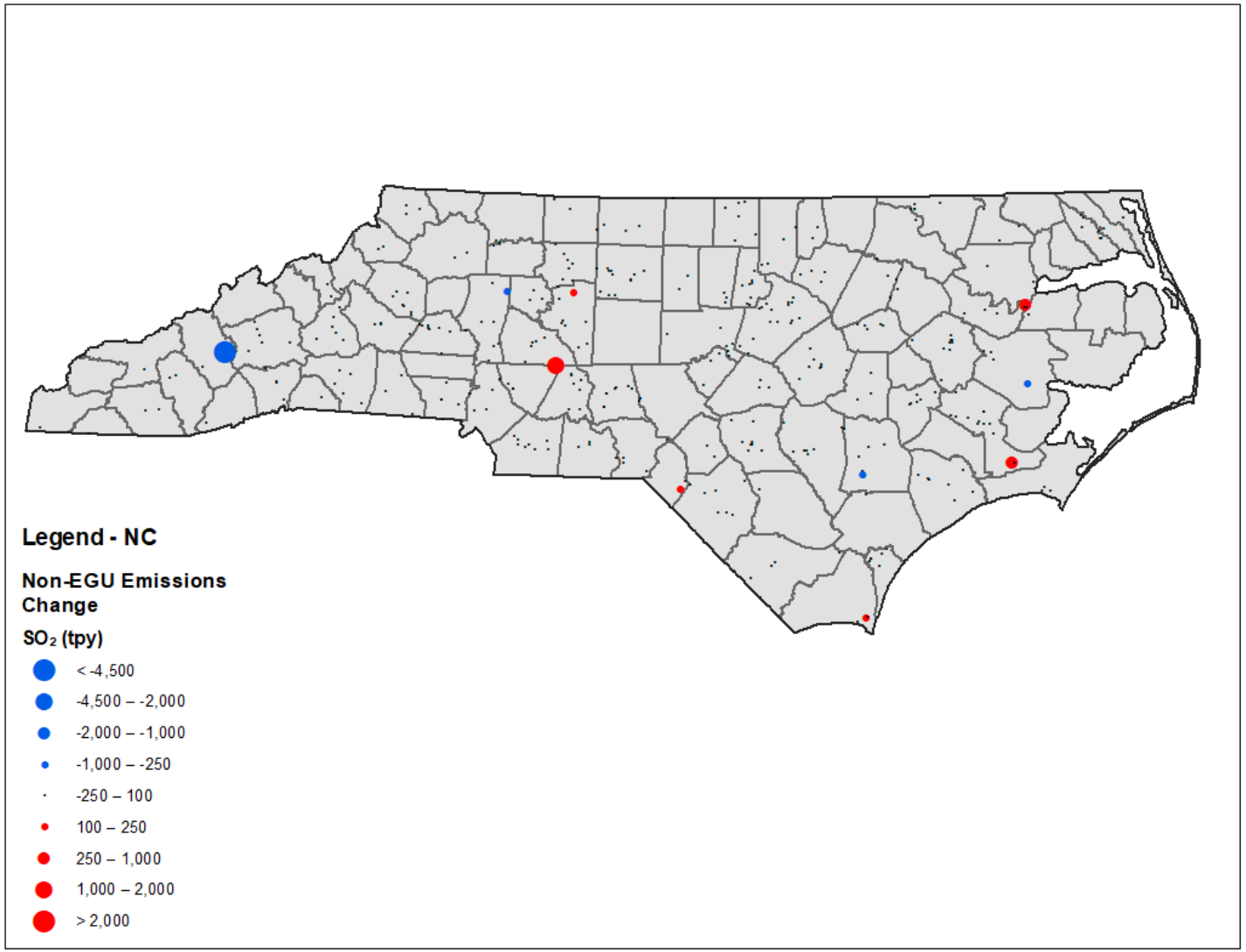

Figure B.6-12. North Carolina Point Non-EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

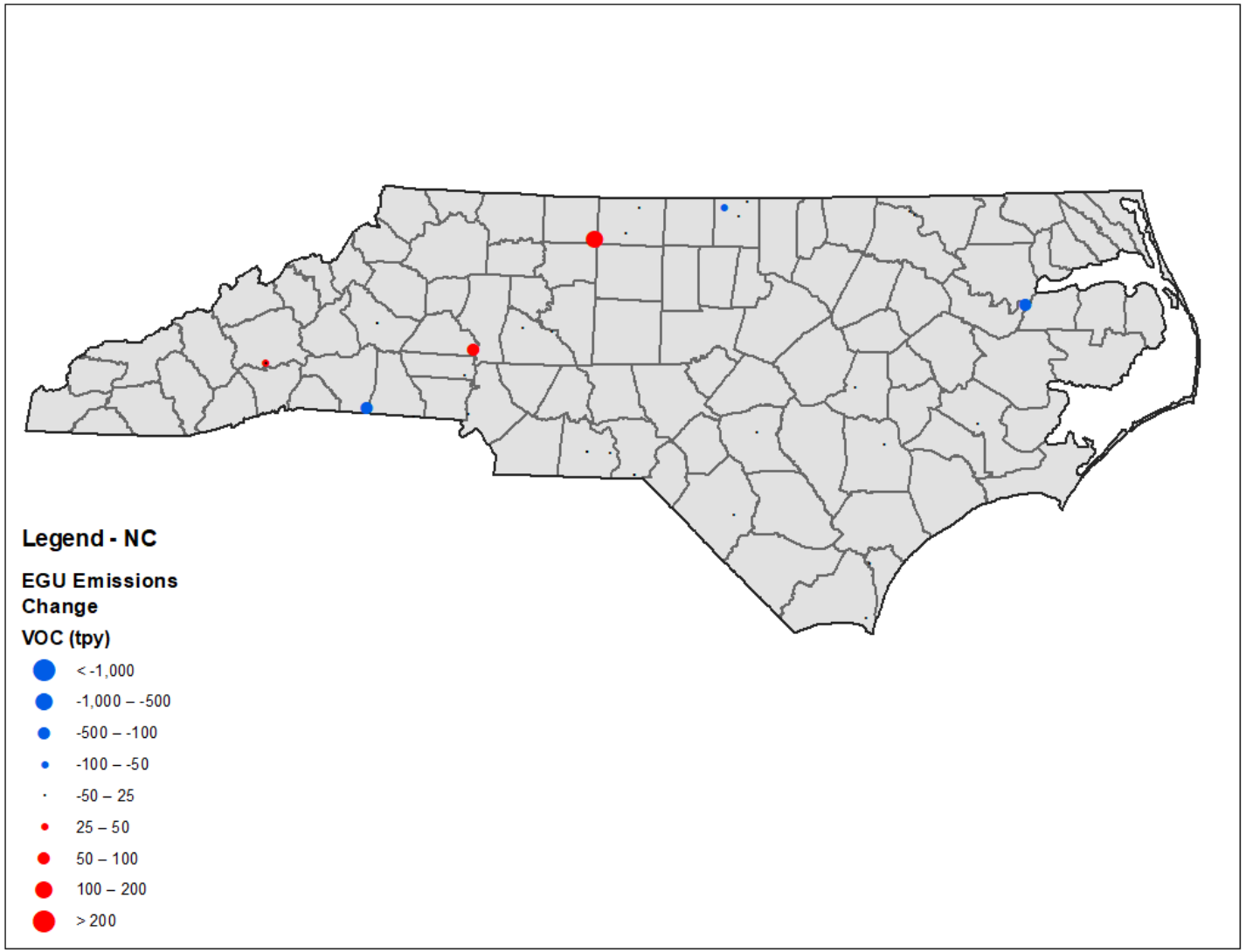

Figure B.6-13. North Carolina Point EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

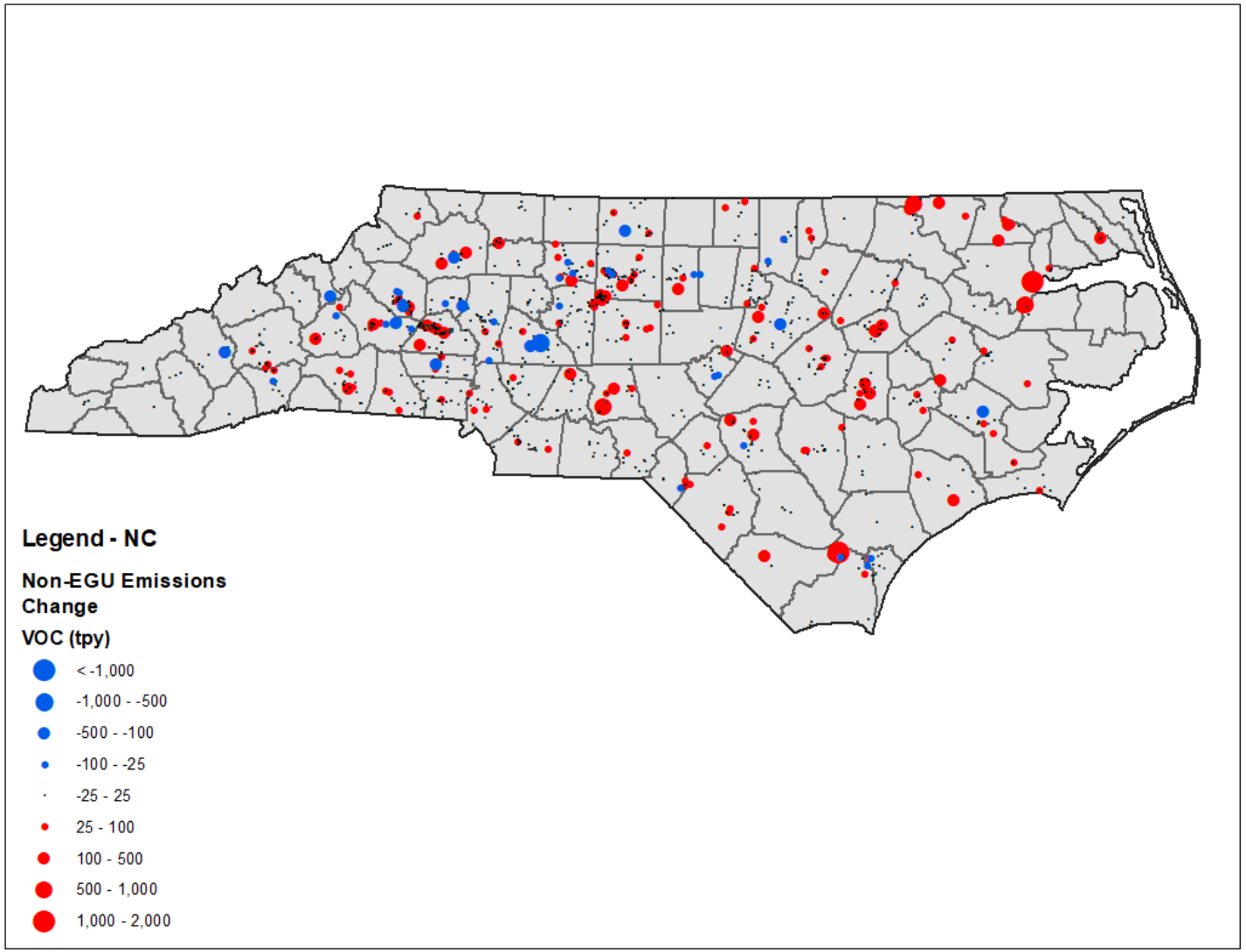

Figure B.6-14. North Carolina Point Non-EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

Appendix B-7. South Carolina 2028 Point EGU and Point Non-EGU Comparisons

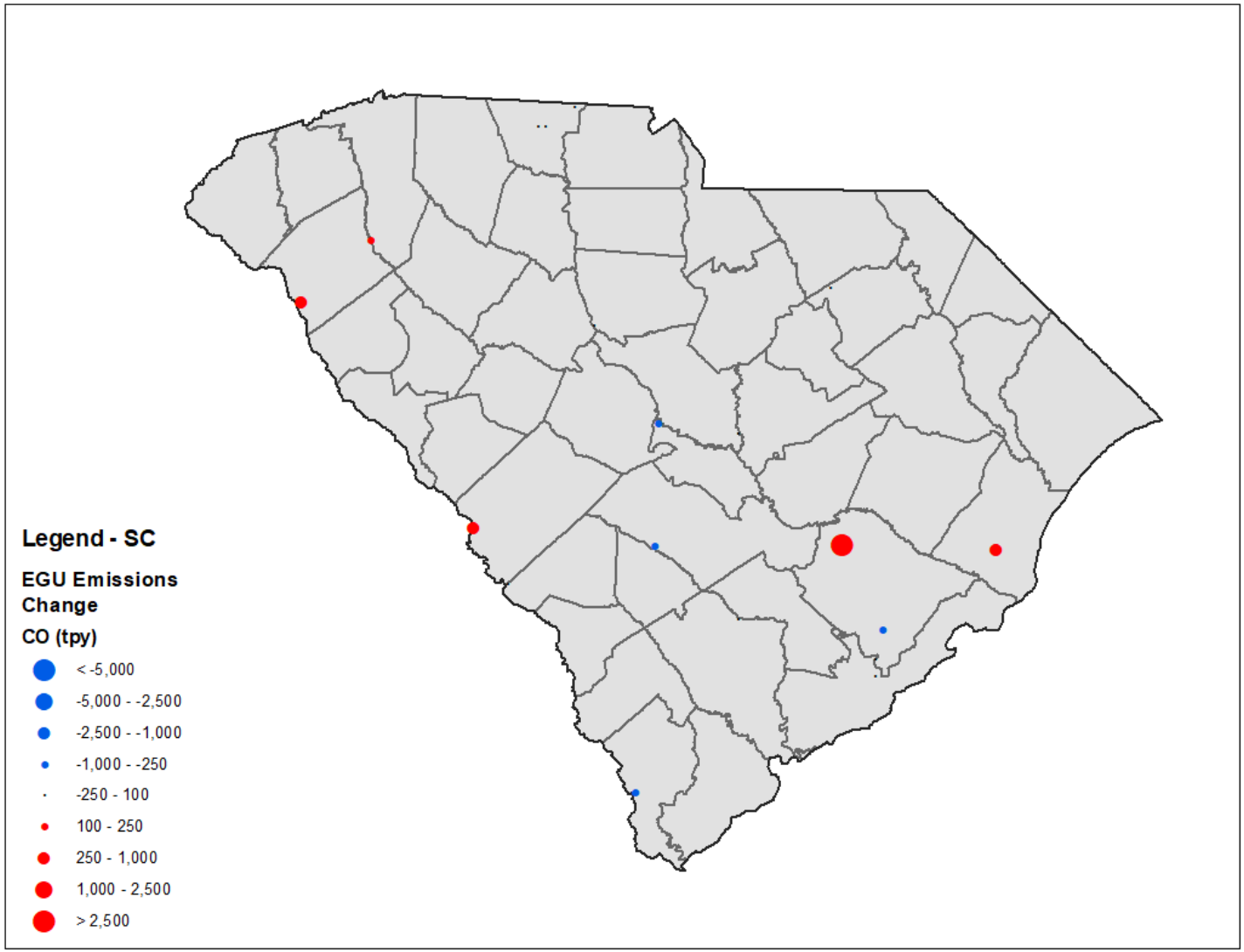

Figure B.7-1. South Carolina Point EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

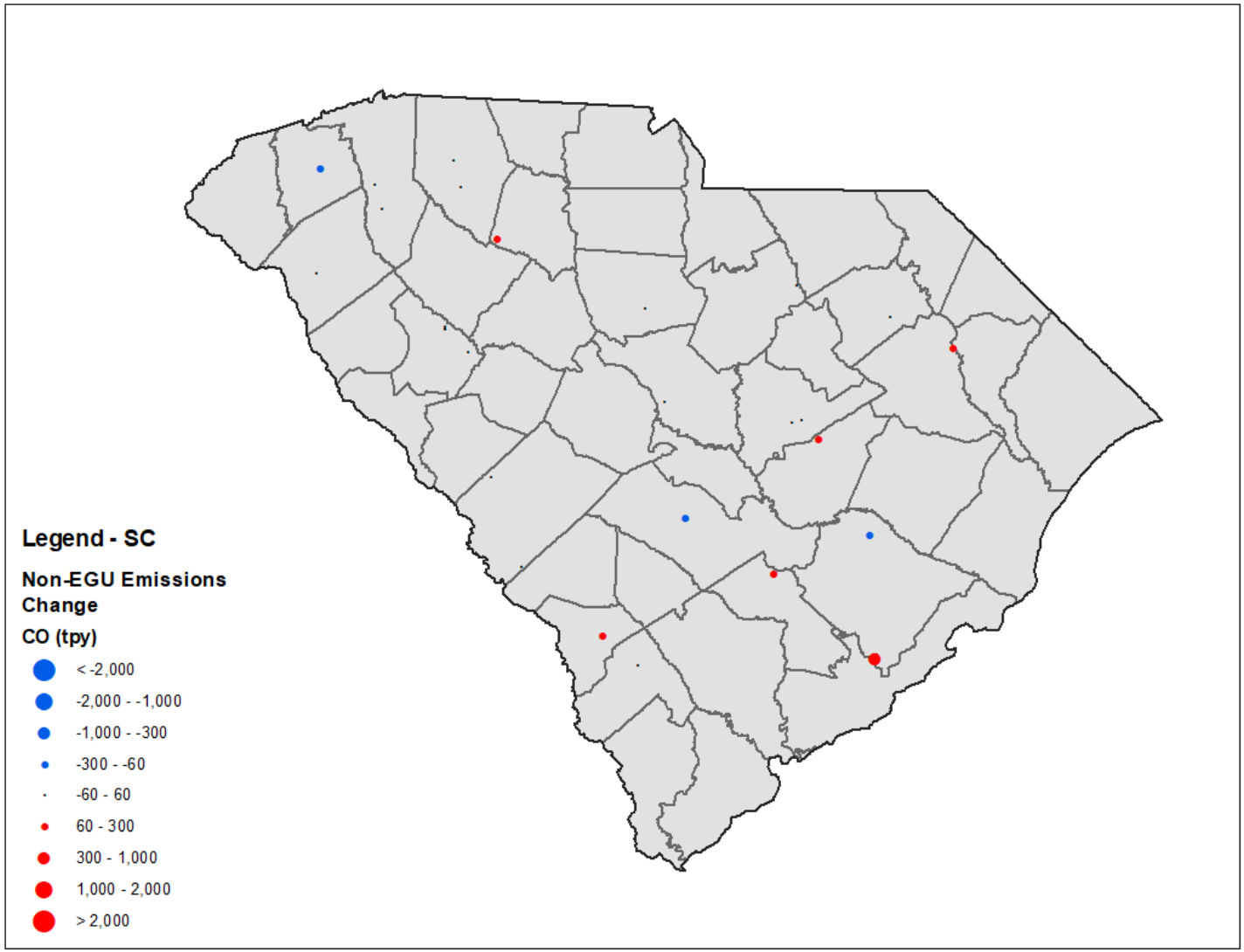

Figure B.7-2. South Carolina Point Non-EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

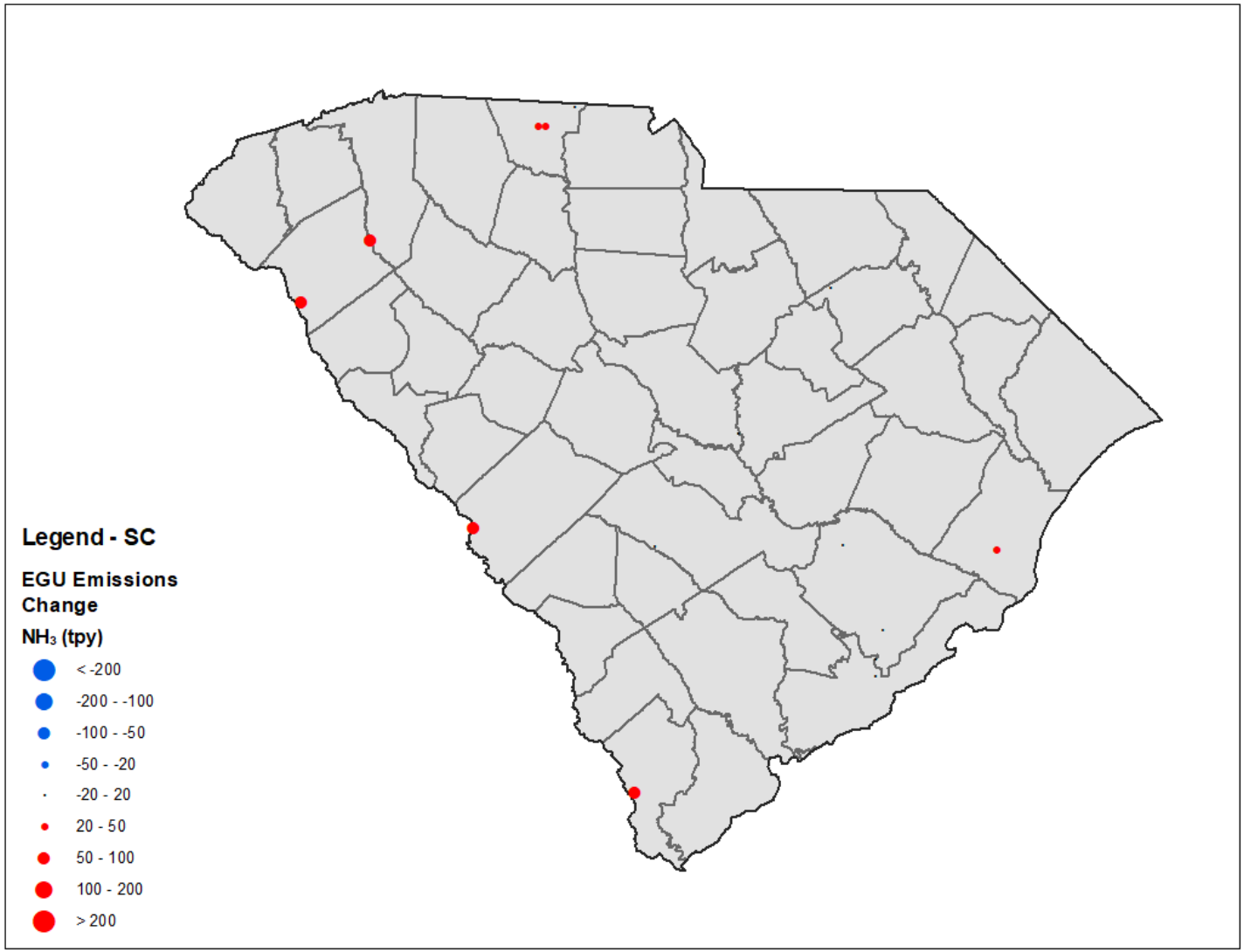

Figure B.7-3. South Carolina Point EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

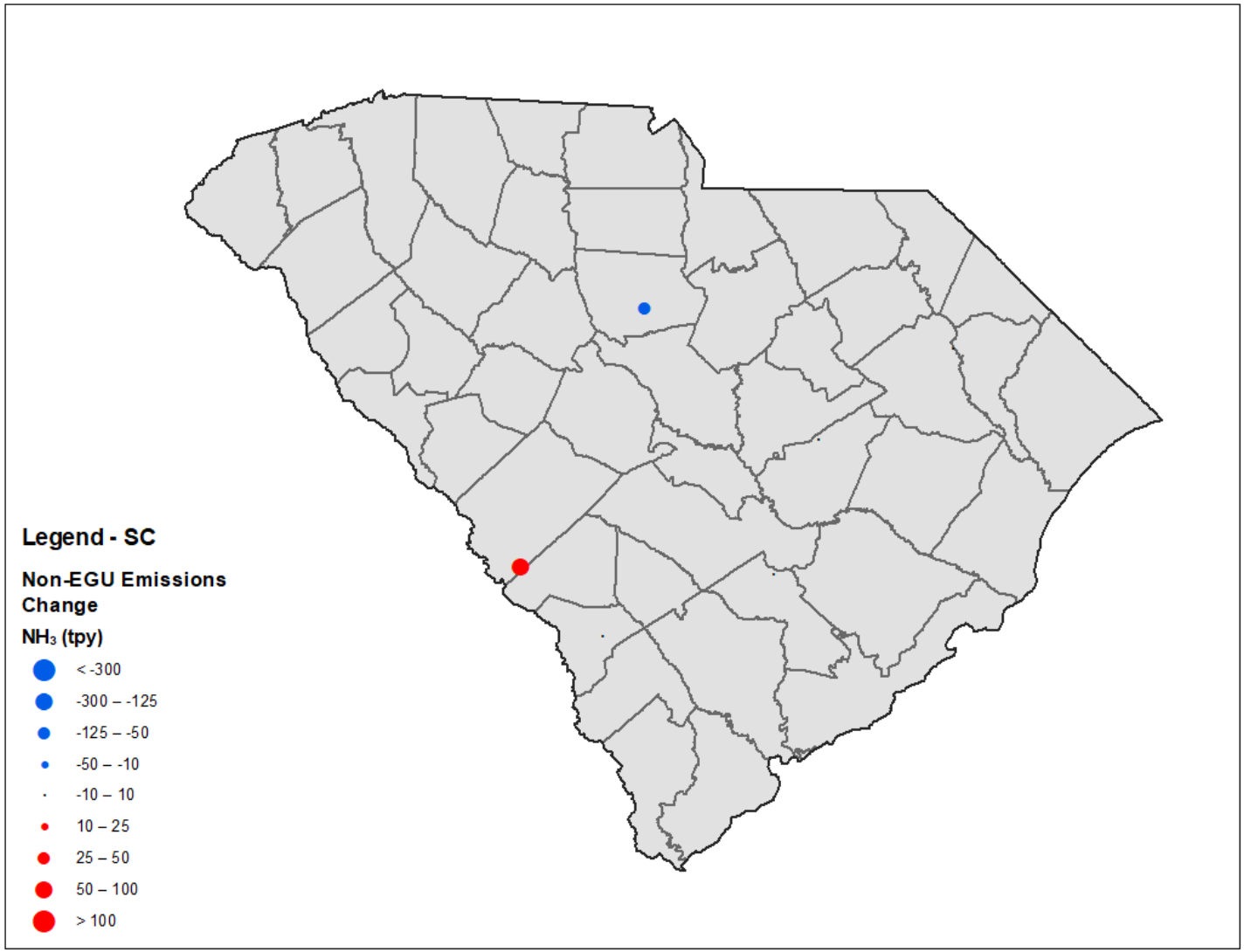

Figure B.7-4. South Carolina Point Non-EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

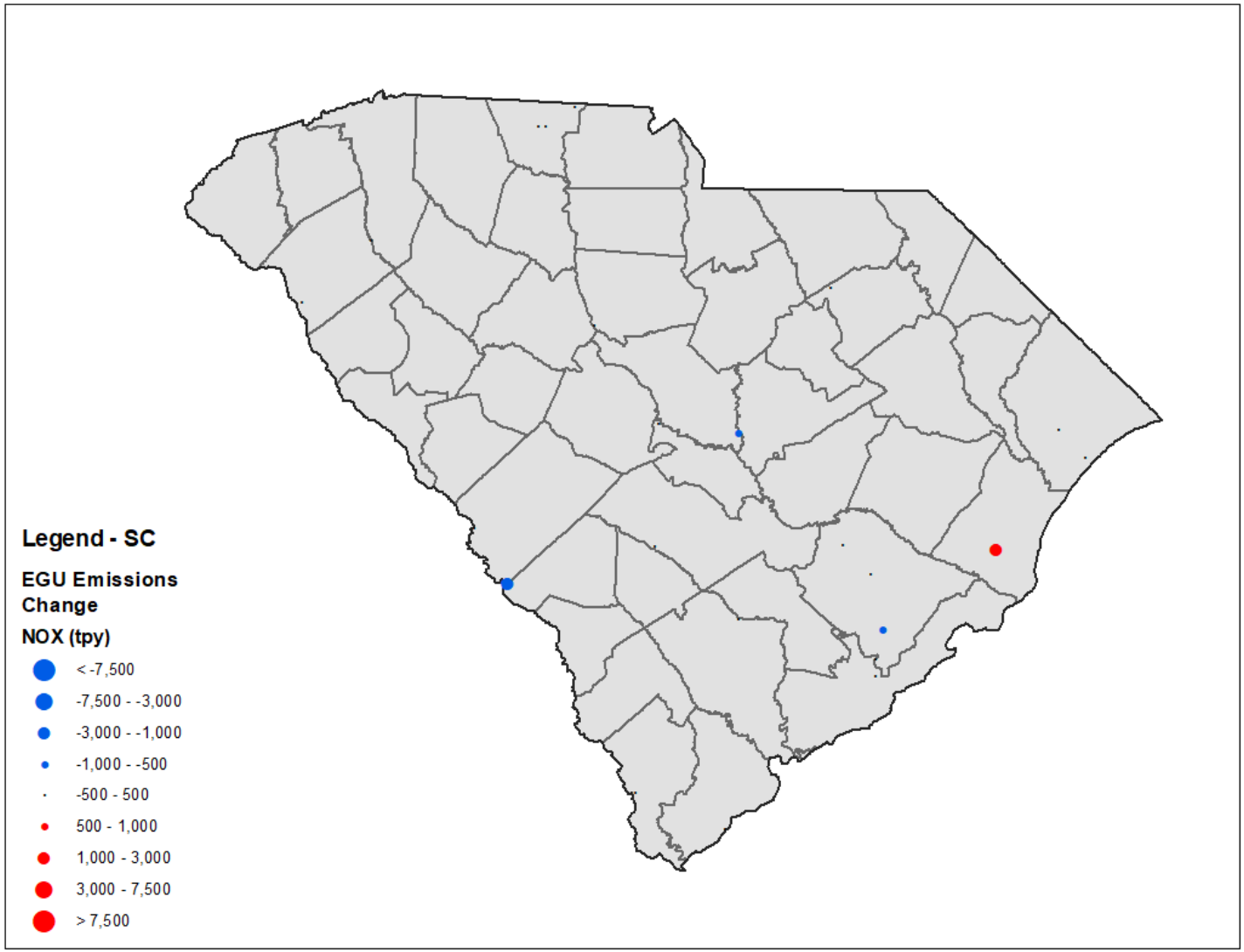

Figure B.7-5. South Carolina Point EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

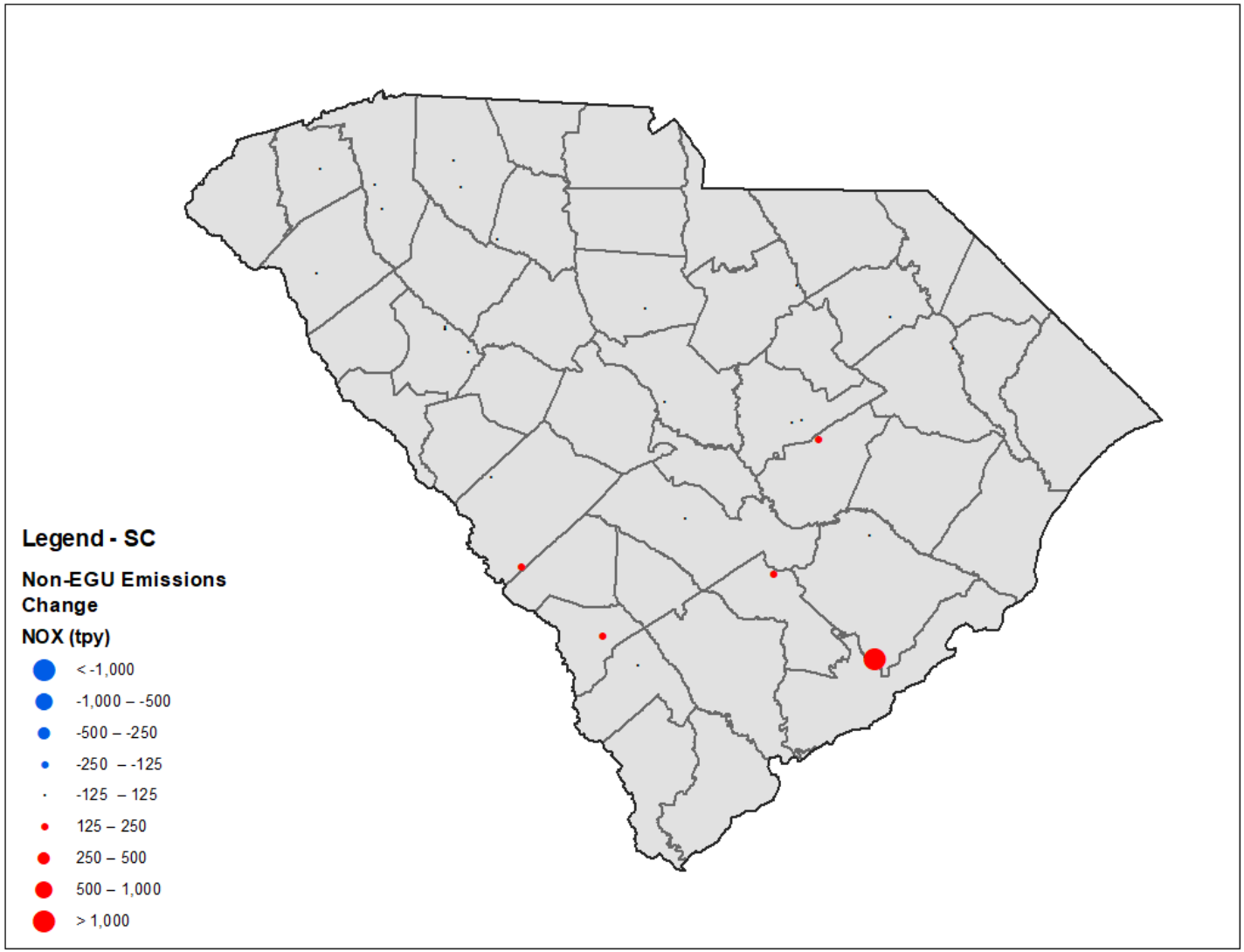

Figure B.7-6. South Carolina Point Non-EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

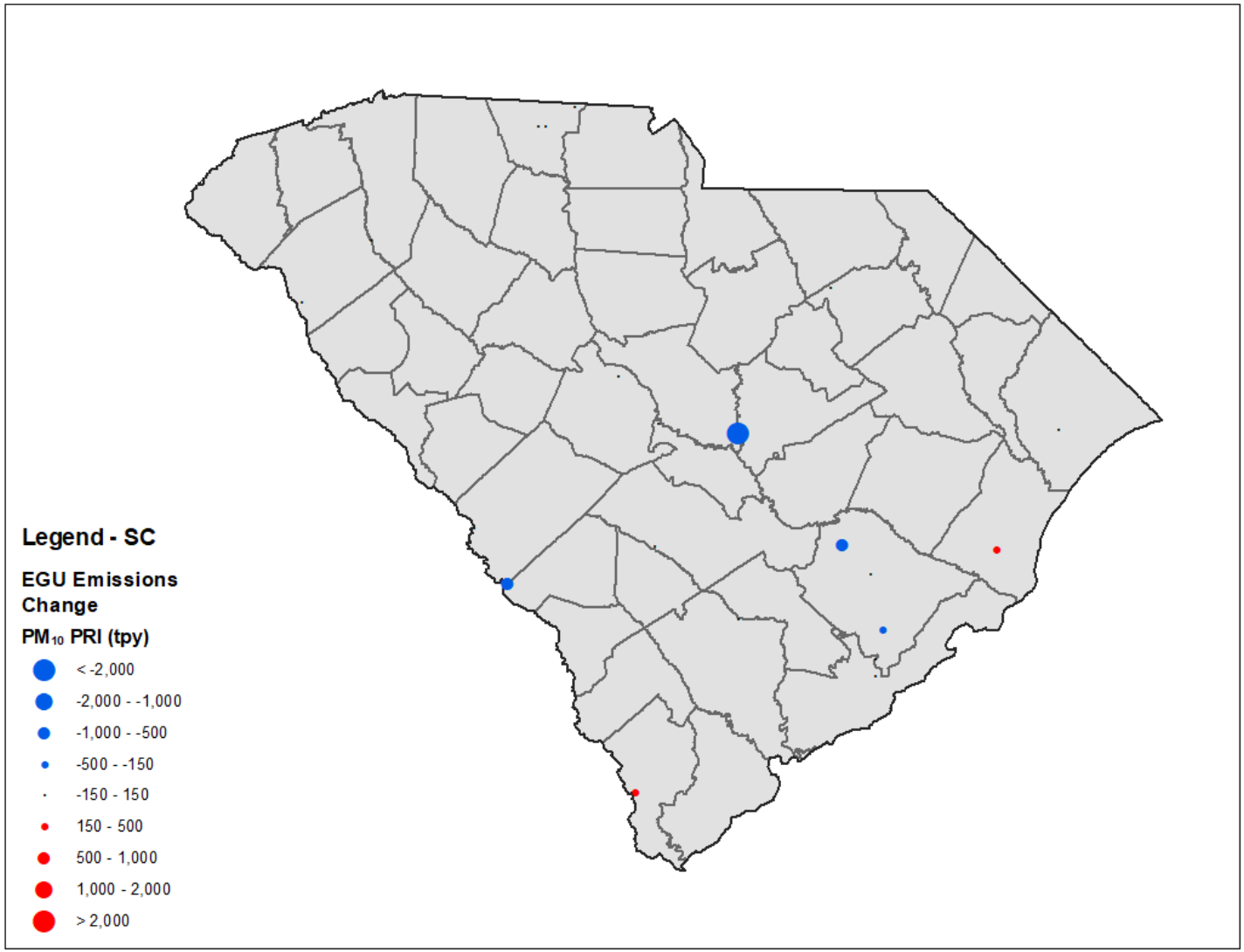

Figure B.7-7. South Carolina Point EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

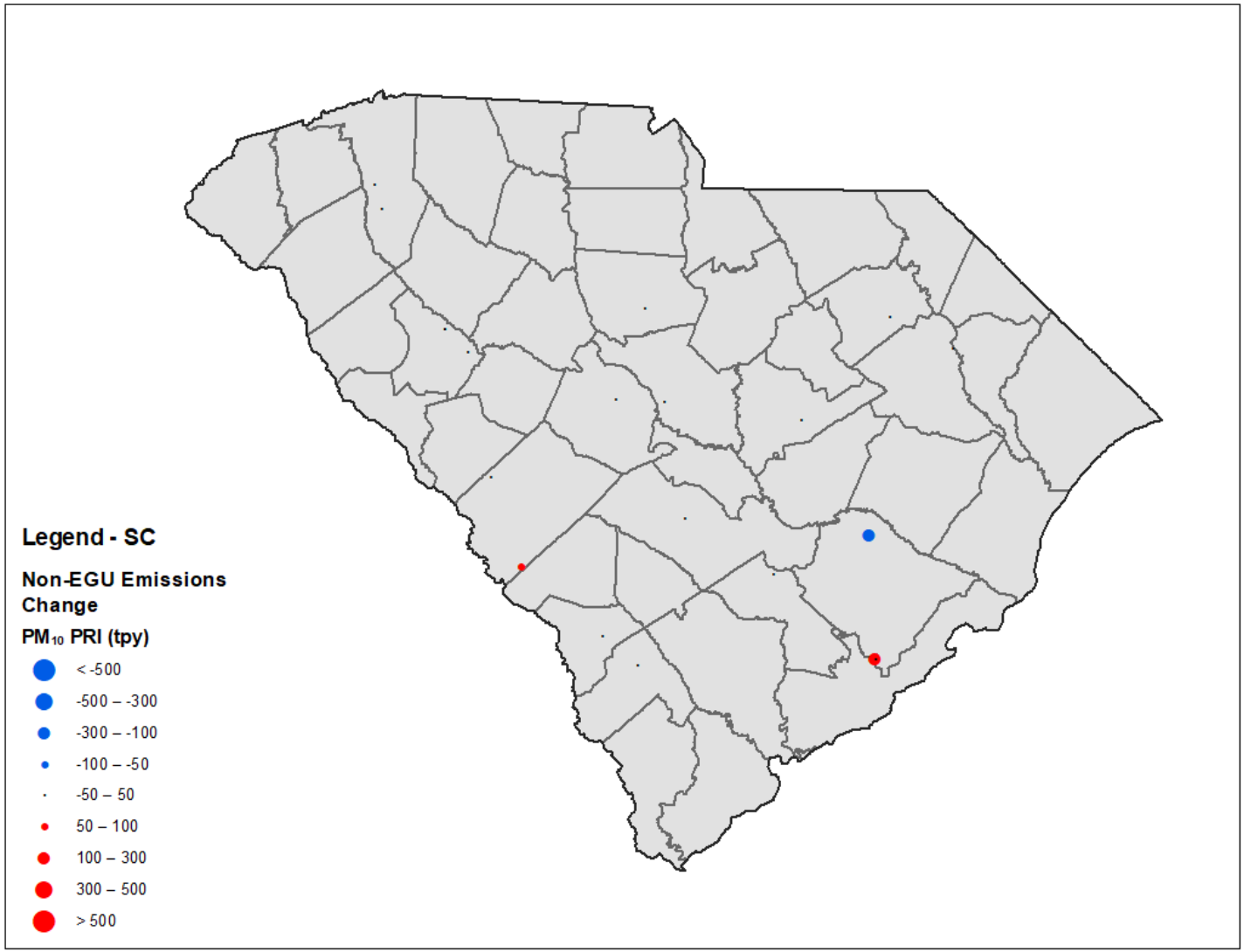

Figure B.7-8. South Carolina Point Non-EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

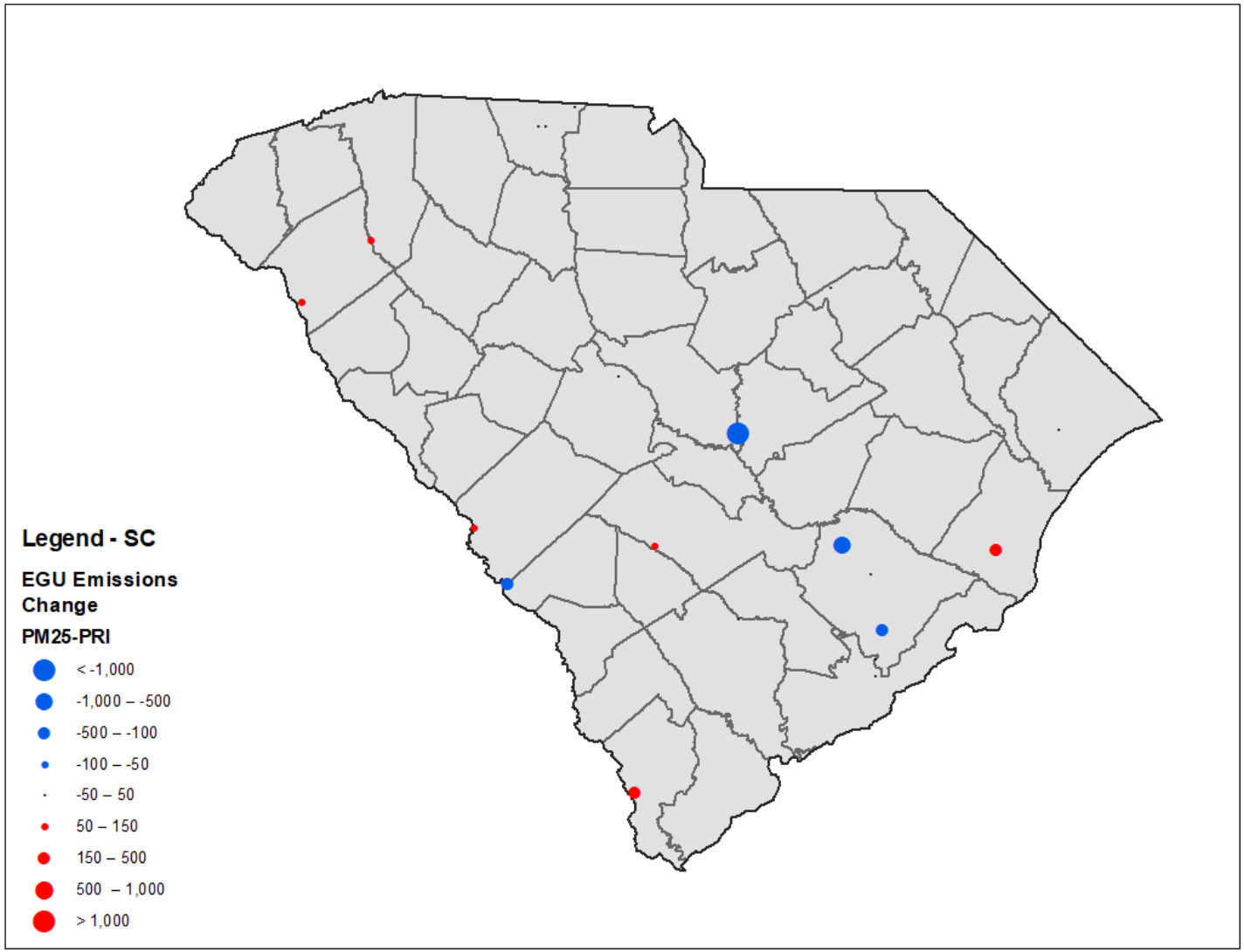

Figure B.7-9. South Carolina Point EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

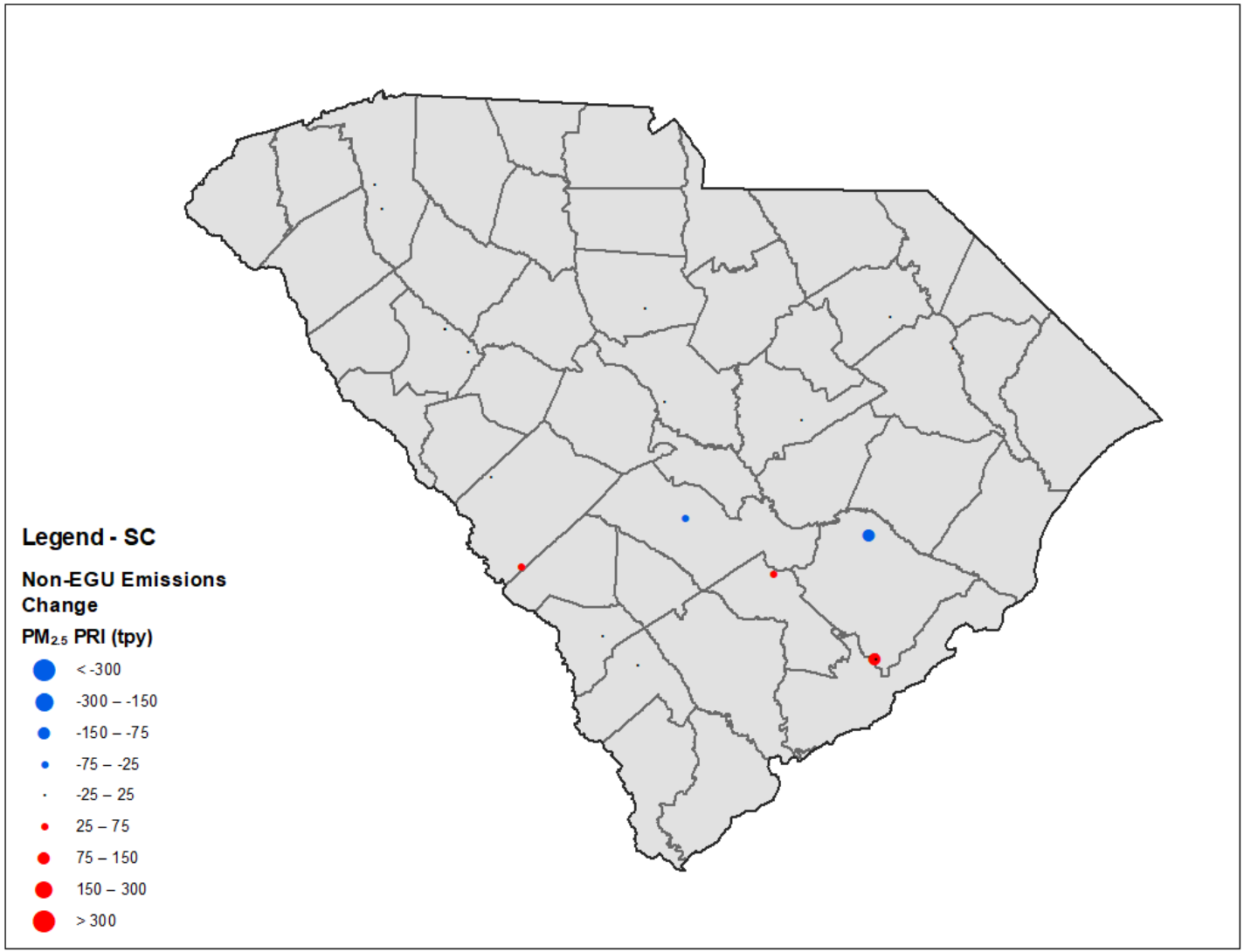

Figure B.7-10. South Carolina Point Non-EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

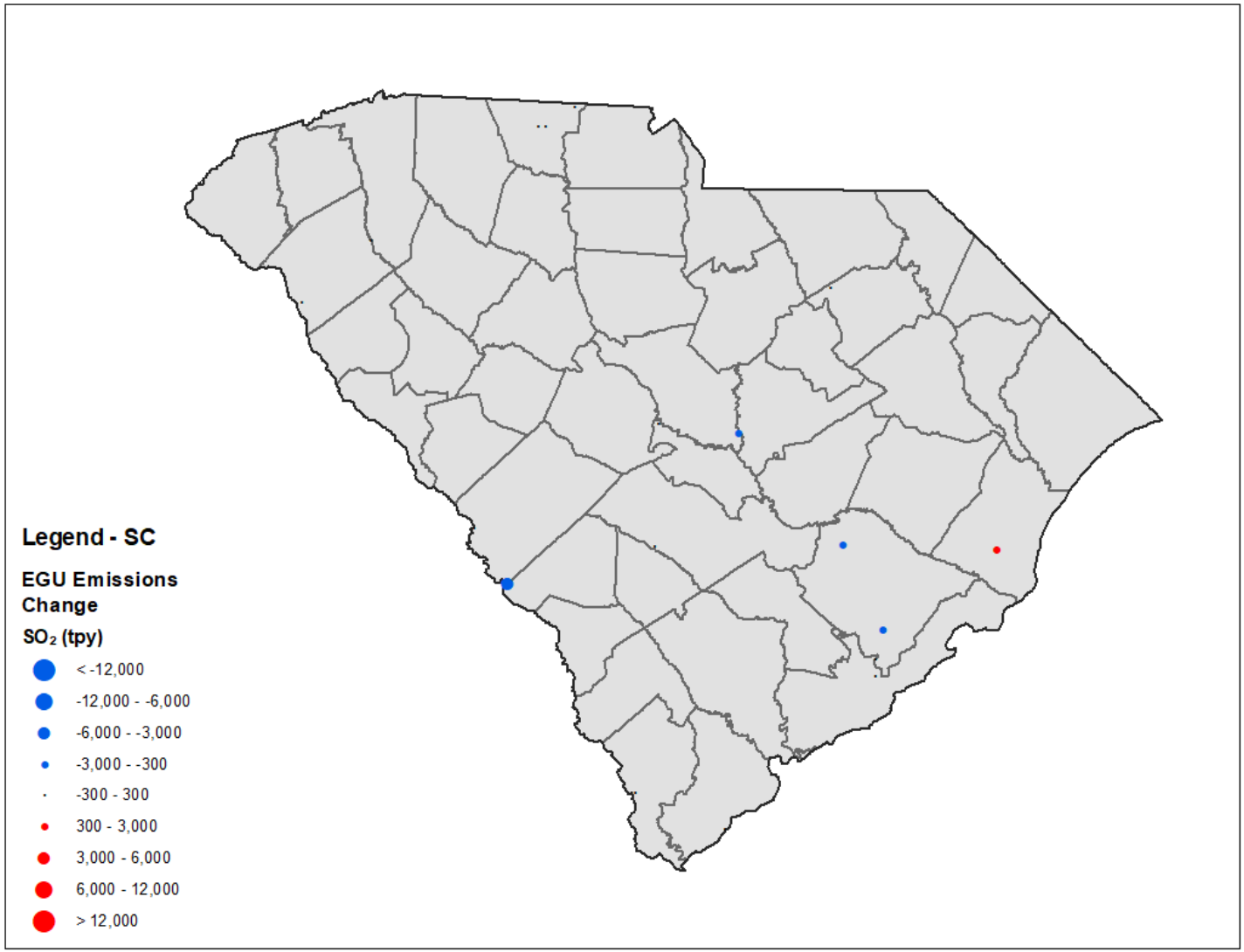

Figure B.7-11. South Carolina Point EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

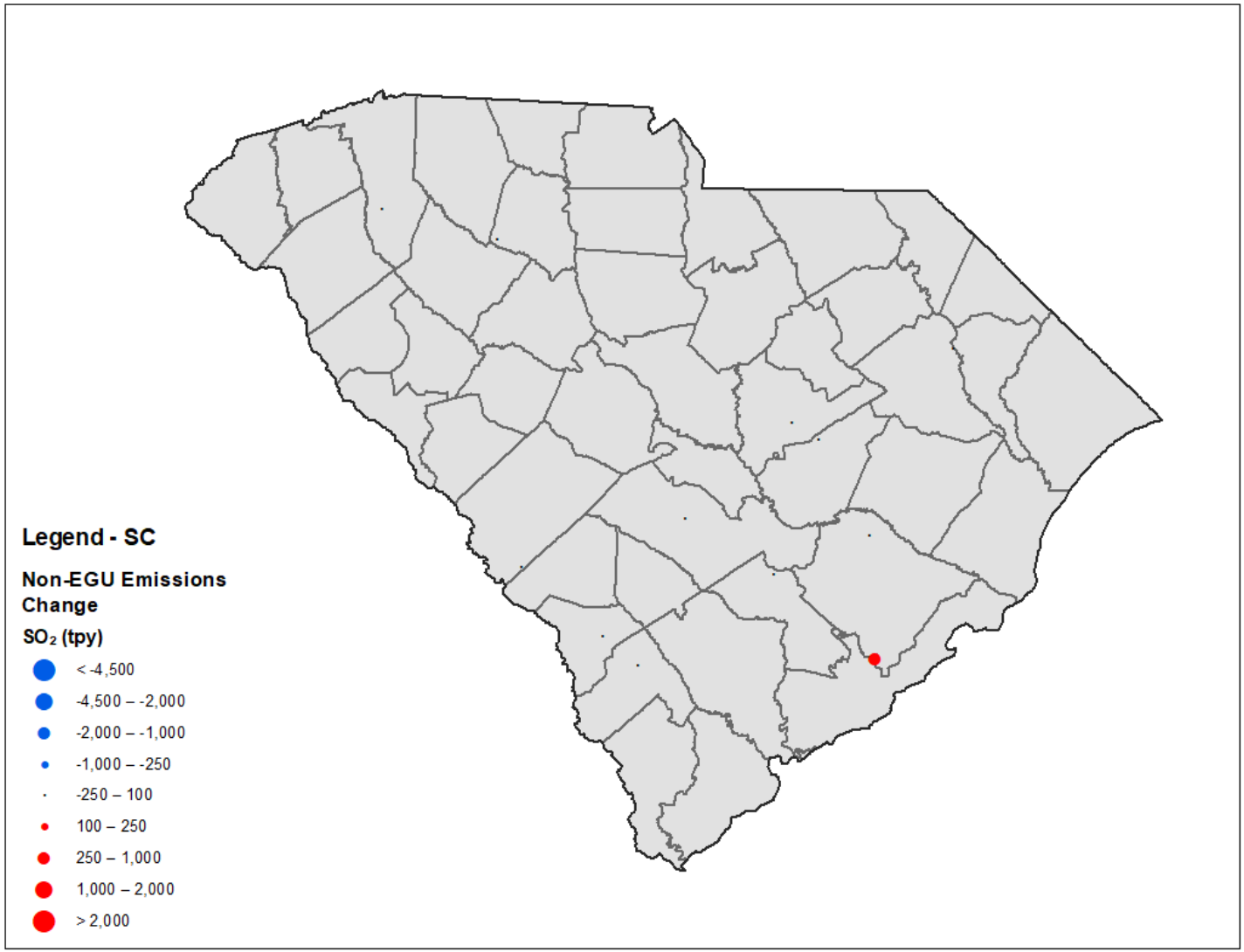

Figure B.7-12. South Carolina Point Non-EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

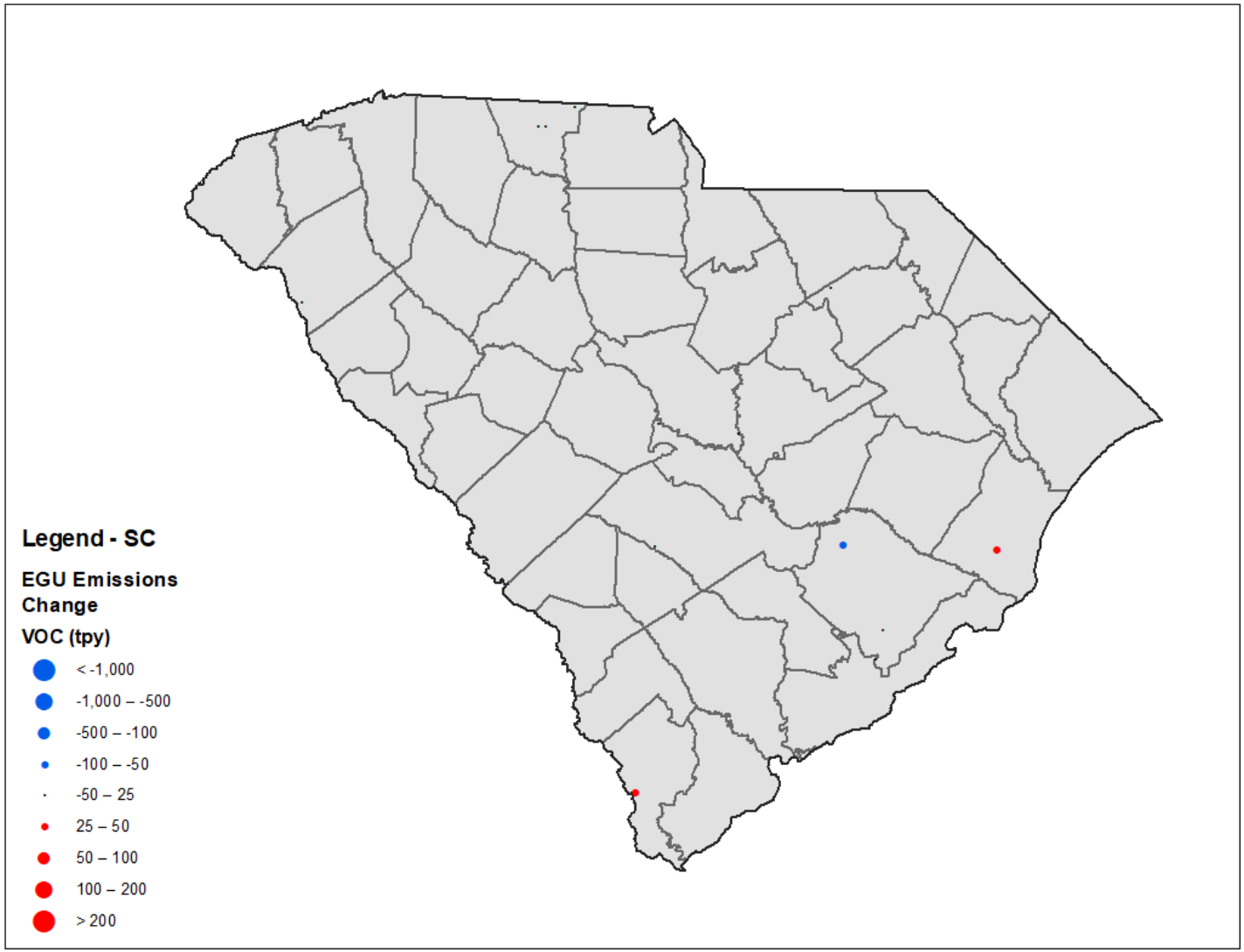

Figure B.7-13. South Carolina Point EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

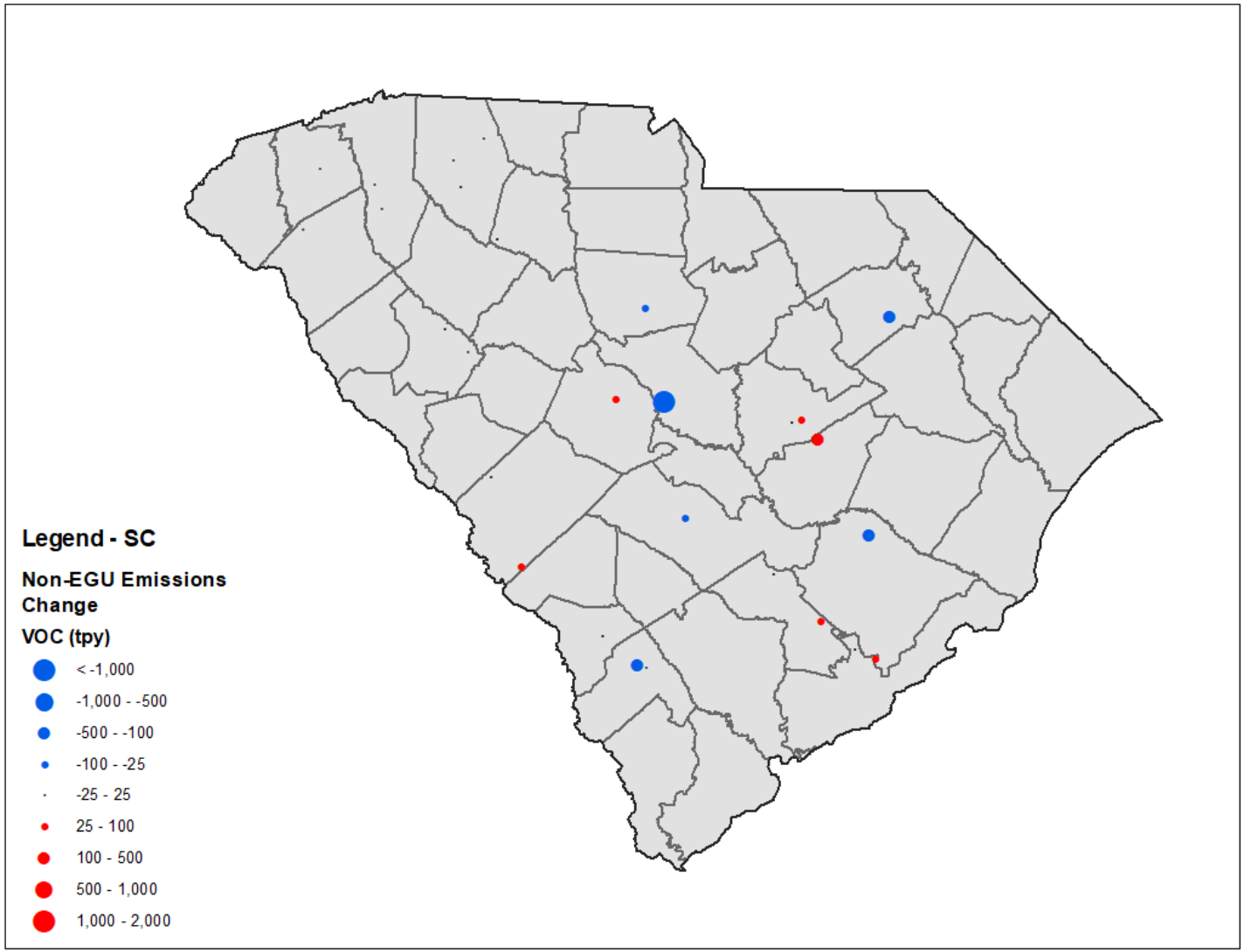

Figure B.7-14. South Carolina Point Non-EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

Appendix B-8. Tennessee 2028 Point EGU and Point Non-EGU Comparisons

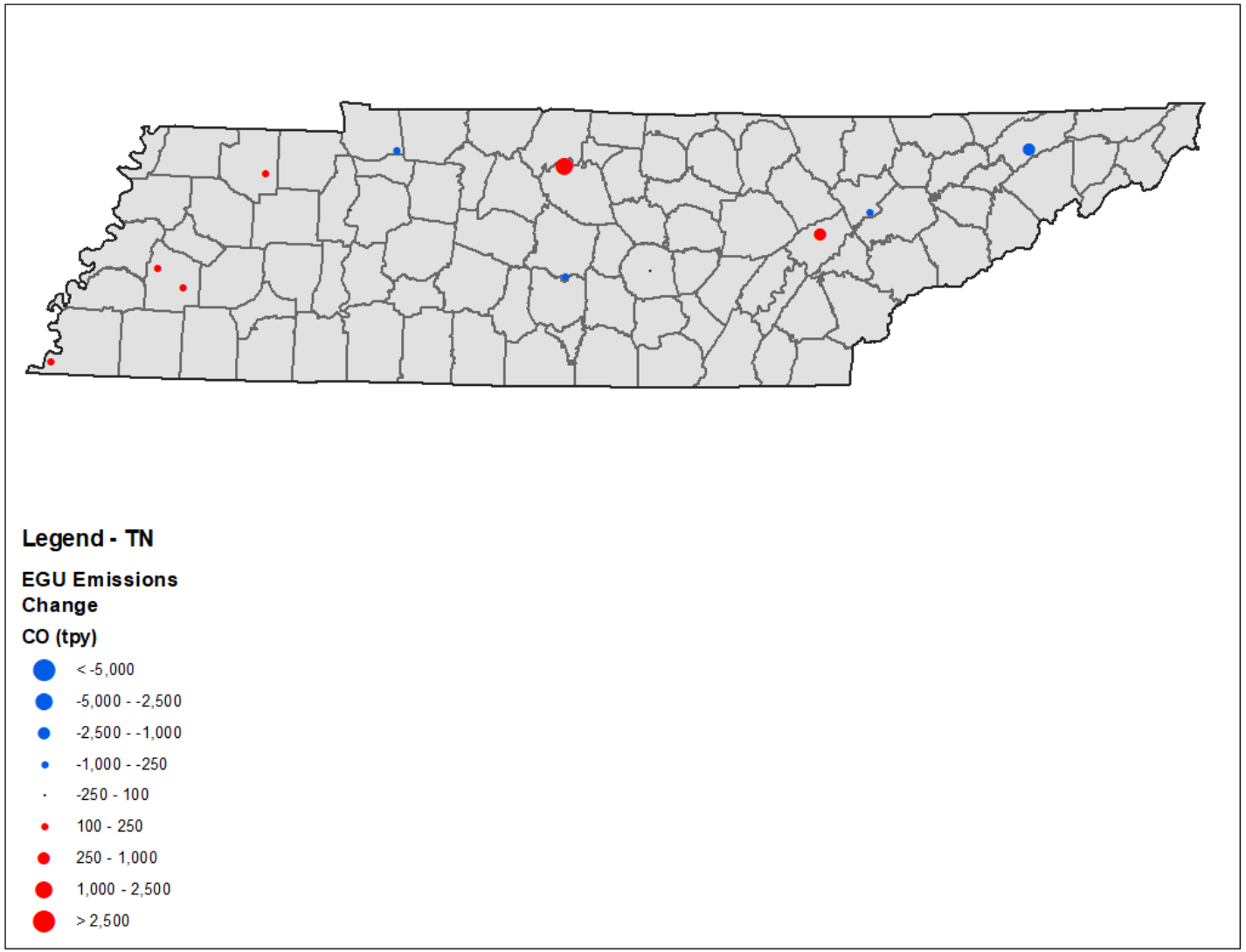

Figure B.8-1. Tennessee Point EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

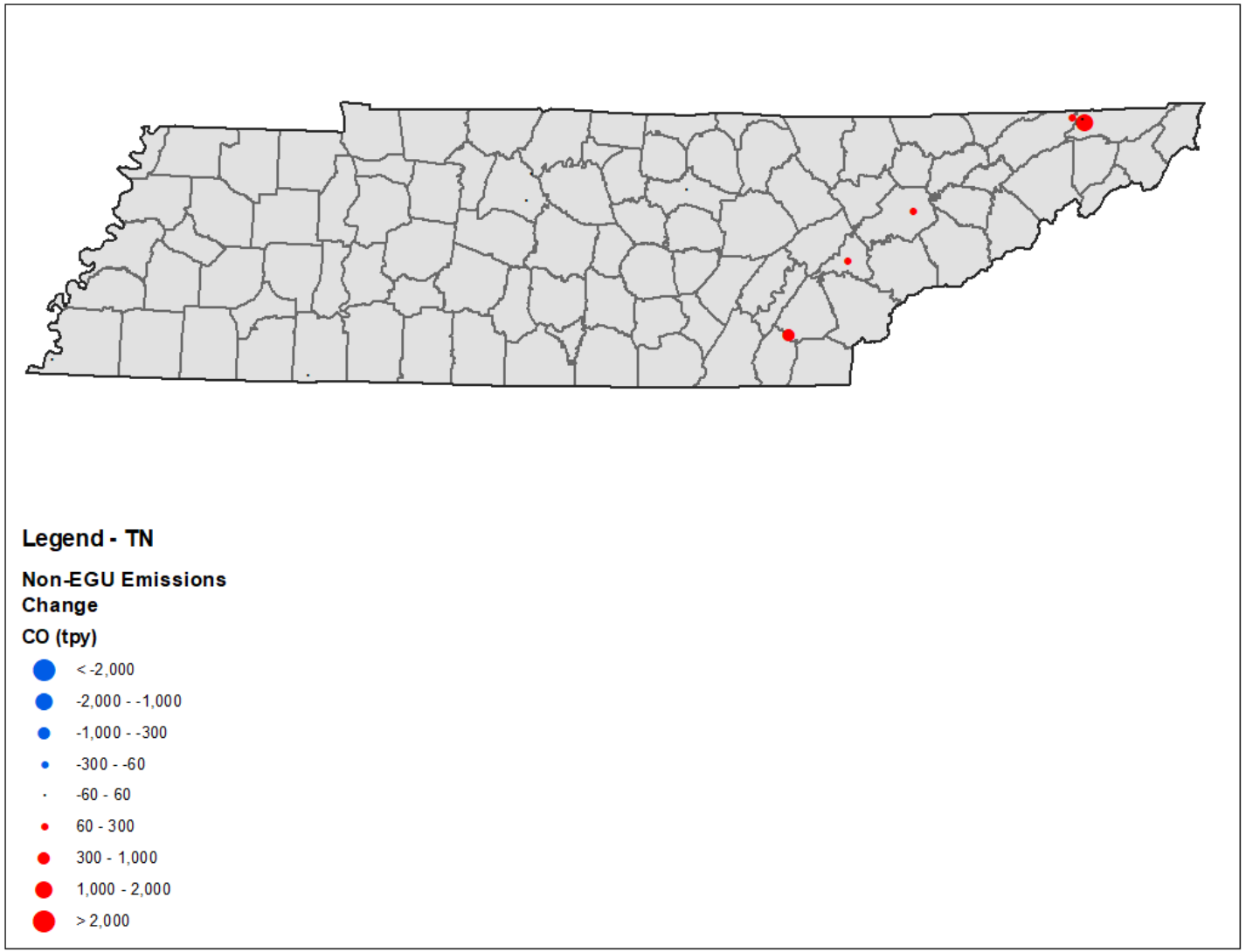

Figure B.8-2. Tennessee Point Non-EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

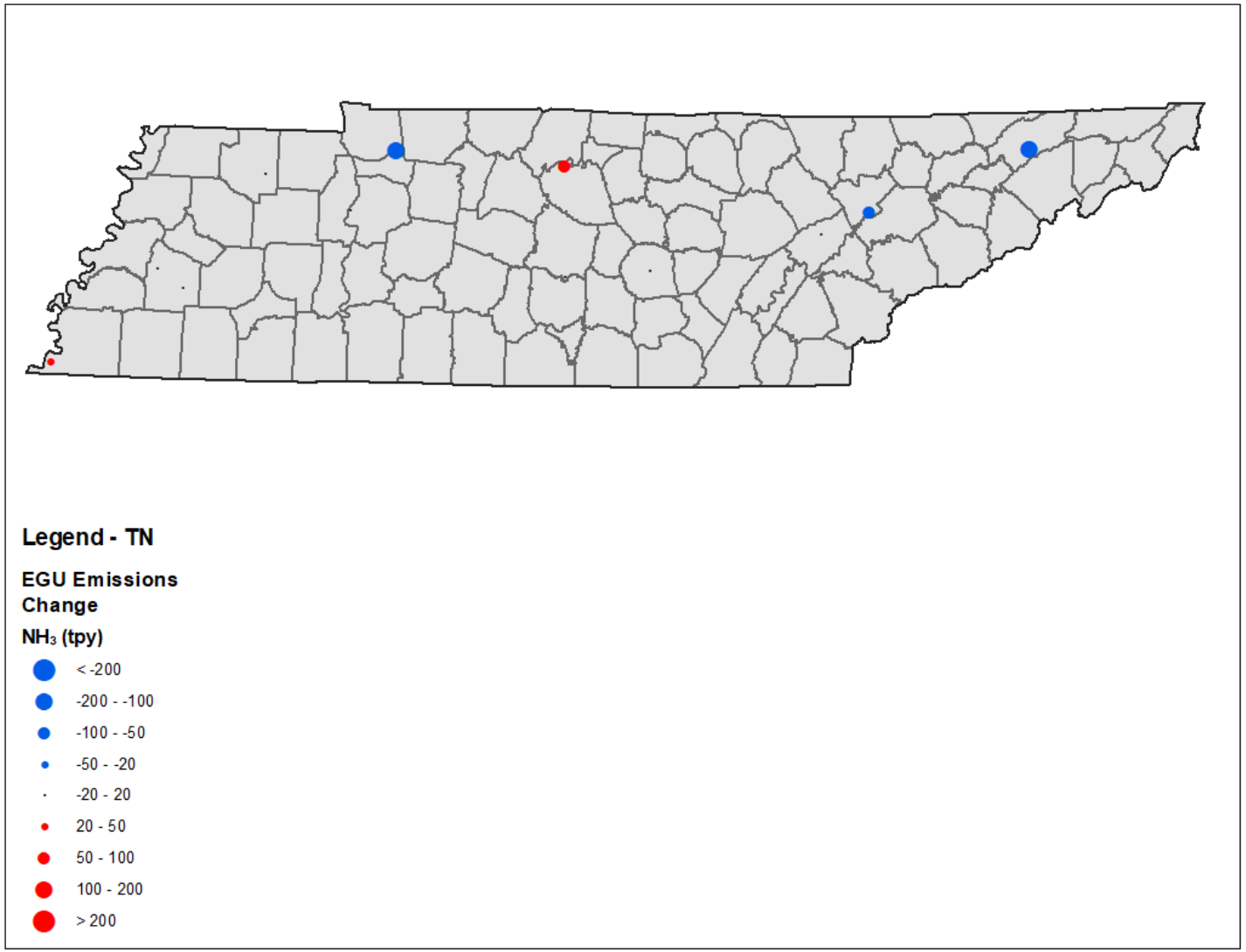

Figure B.8-3. Tennessee Point EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

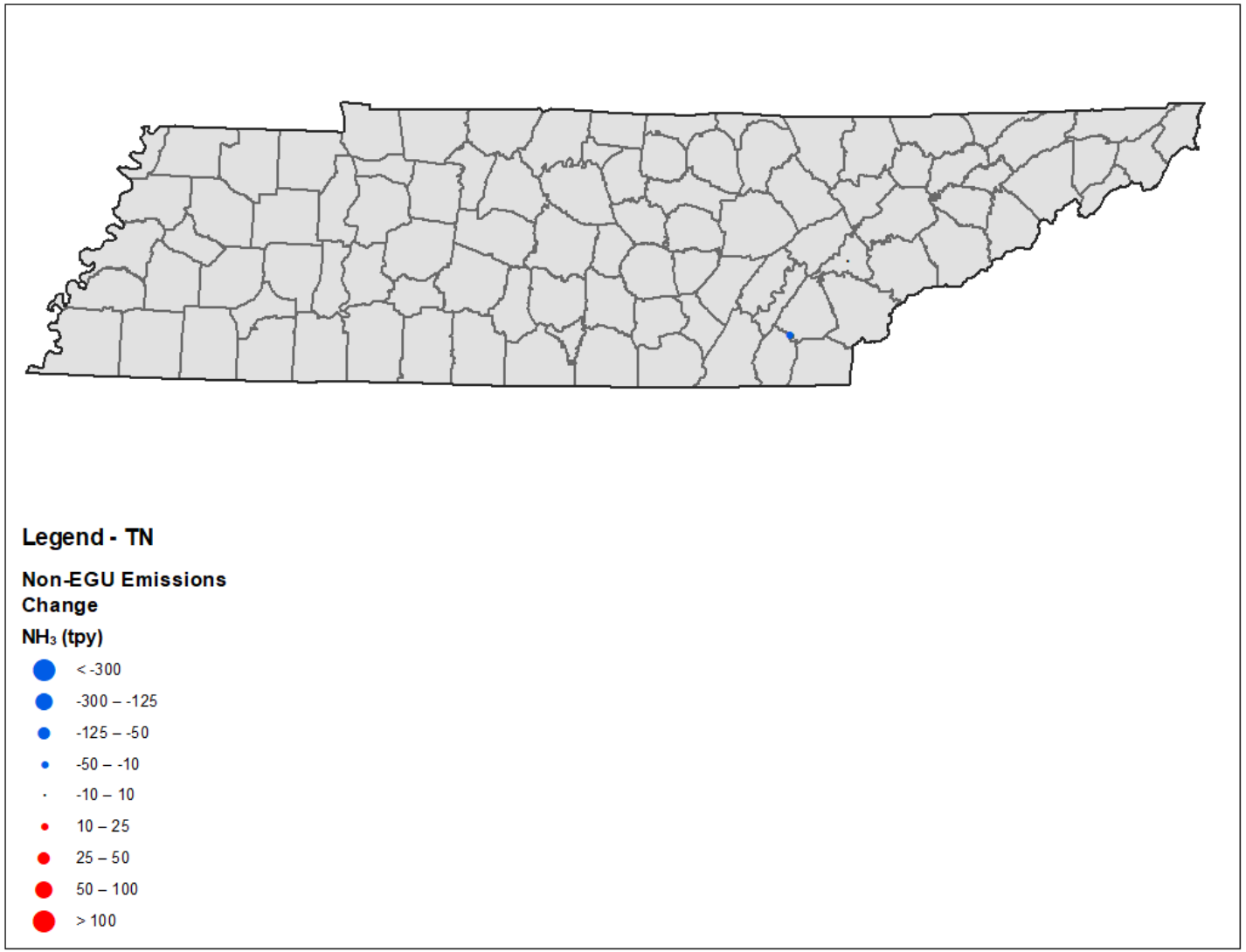

Figure B.8-4. Tennessee Point Non-EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

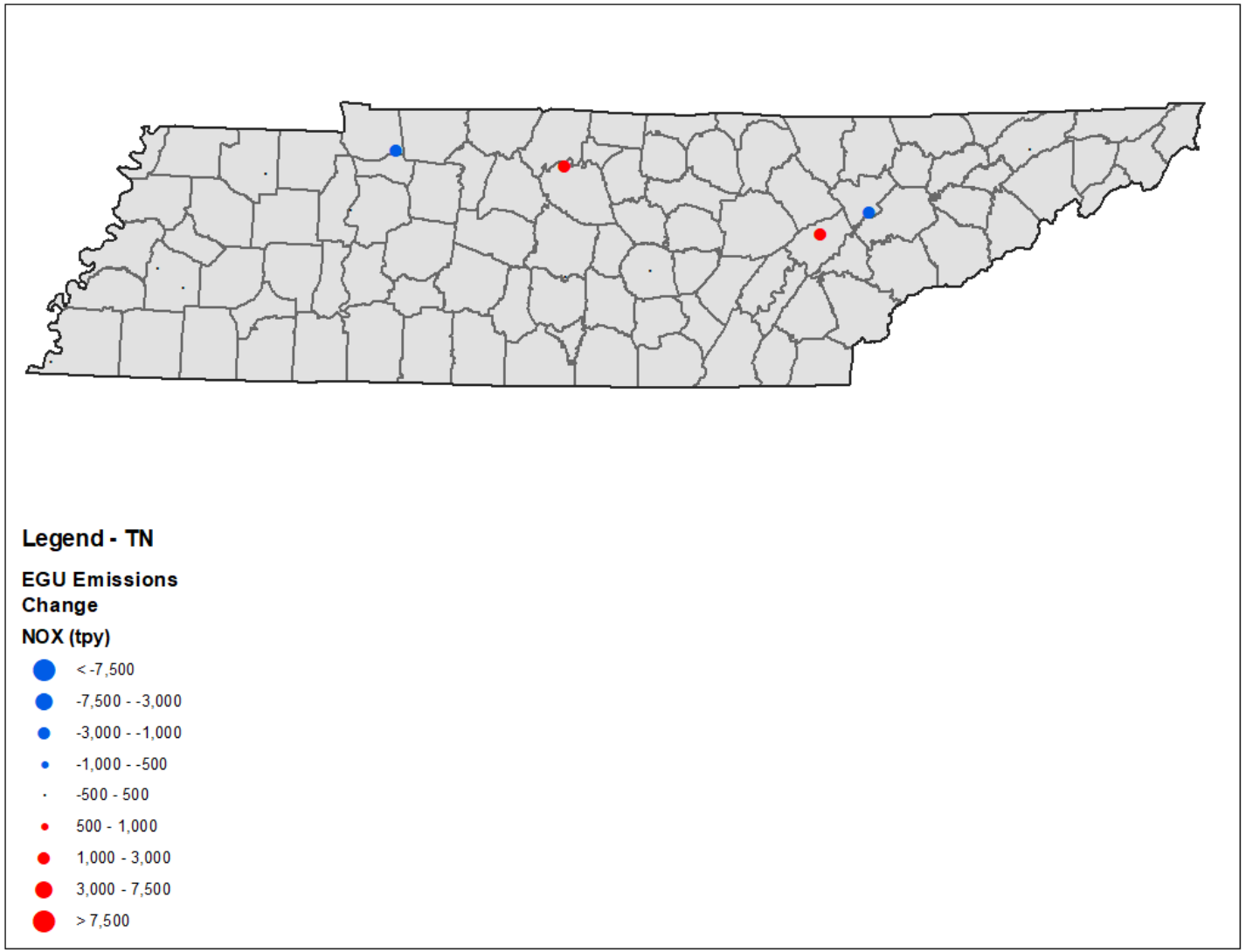

Figure B.8-5. Tennessee Point EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

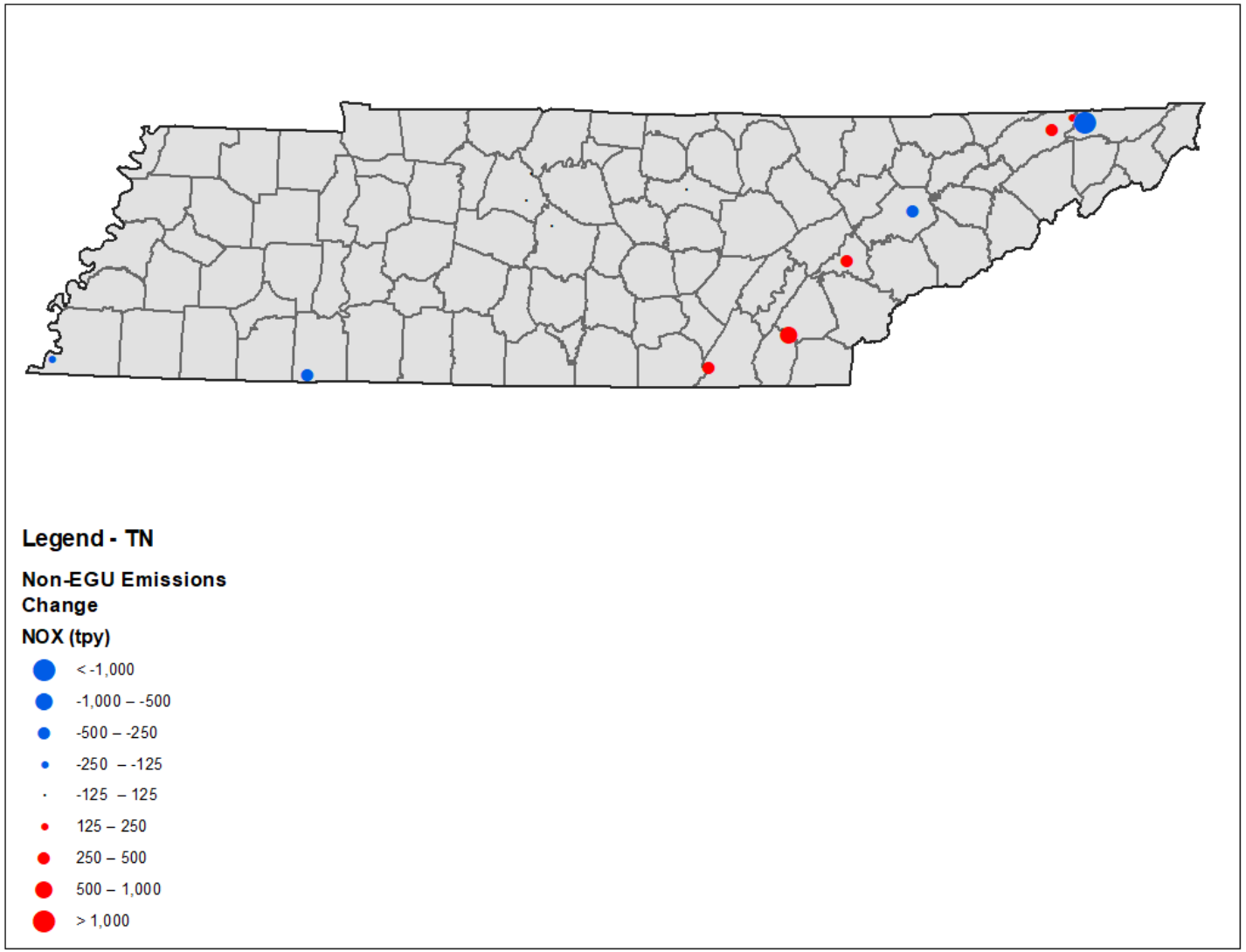

Figure B.8-6. Tennessee Point Non-EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

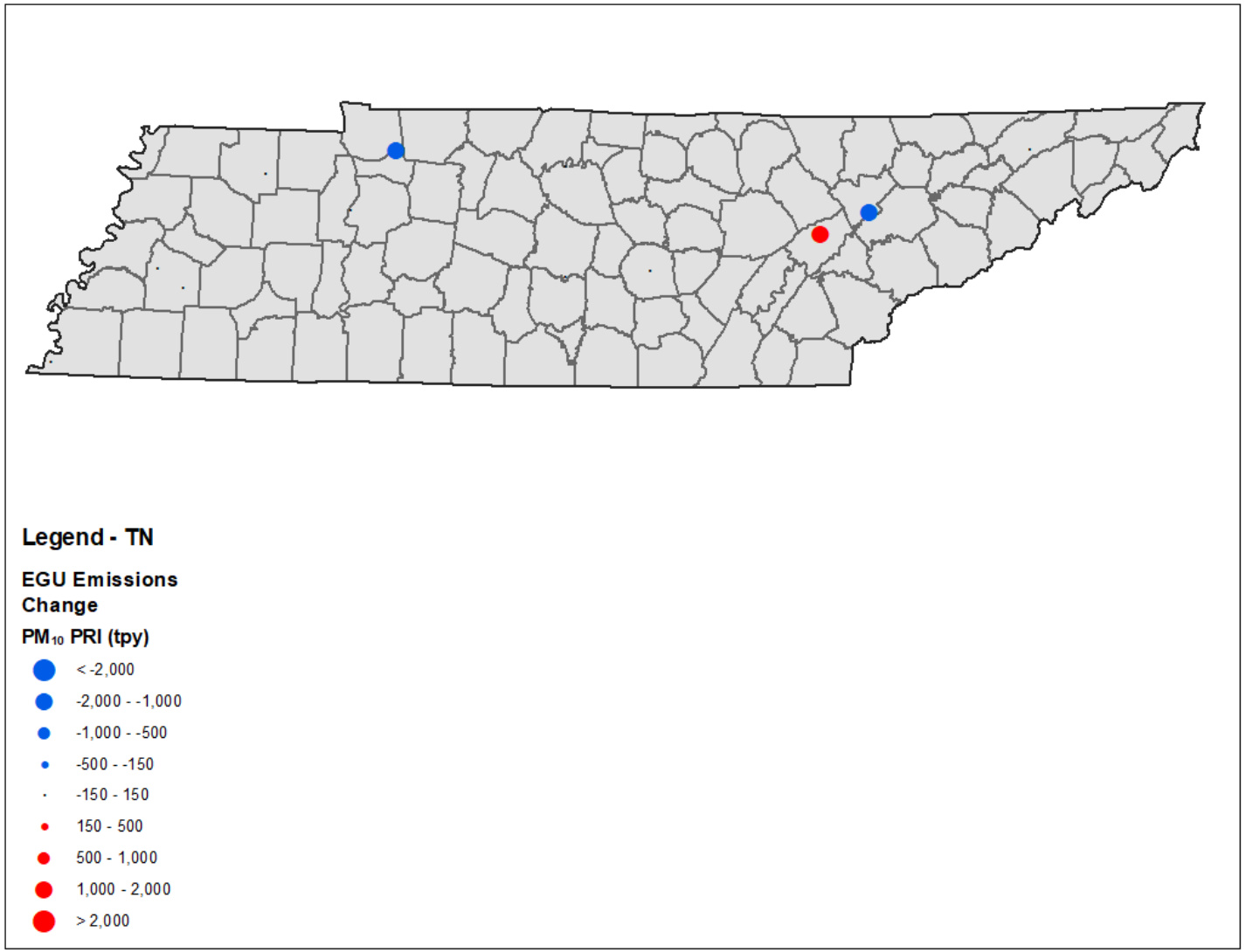

Figure B.8-7. Tennessee Point EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

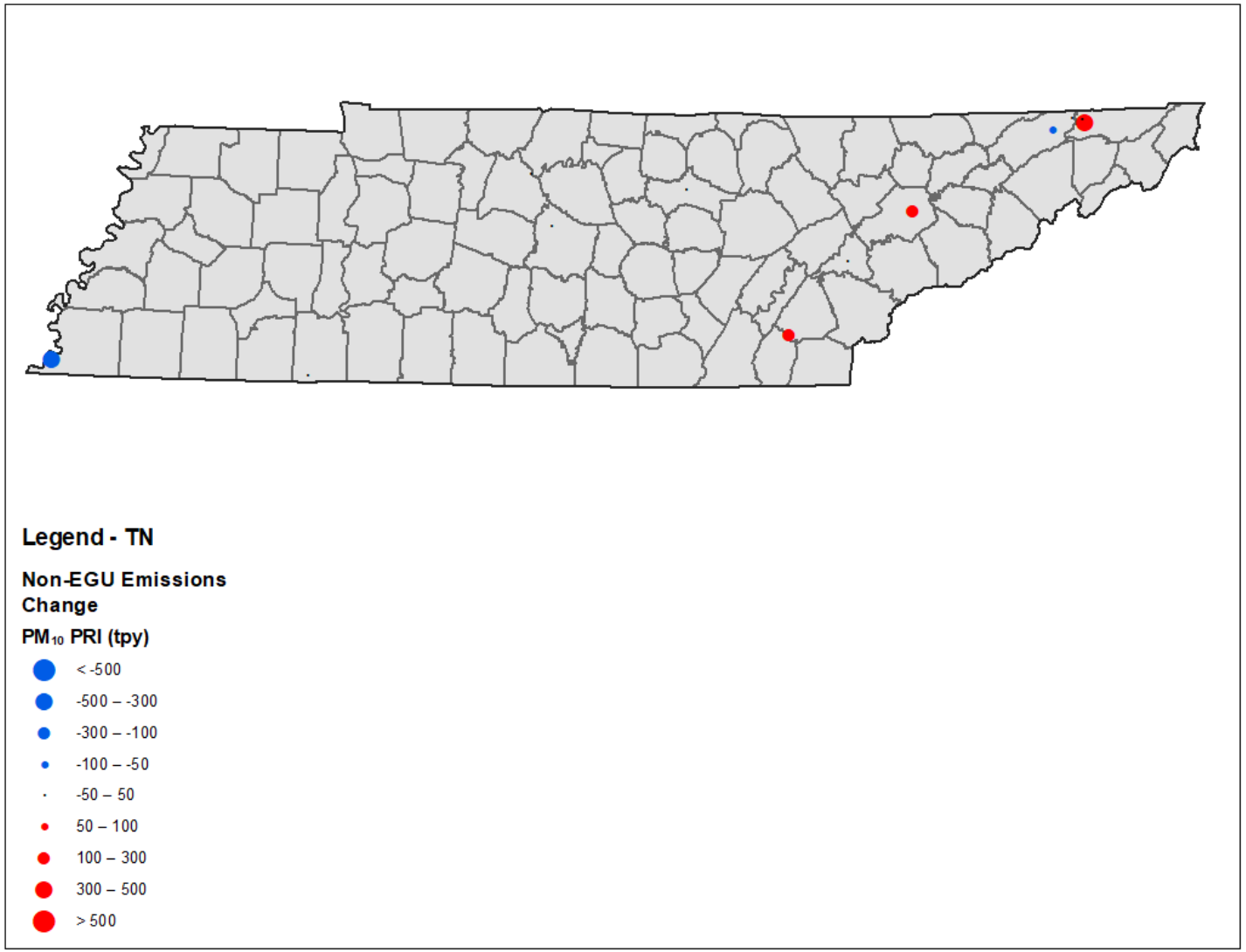

Figure B.8-8. Tennessee Point Non-EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

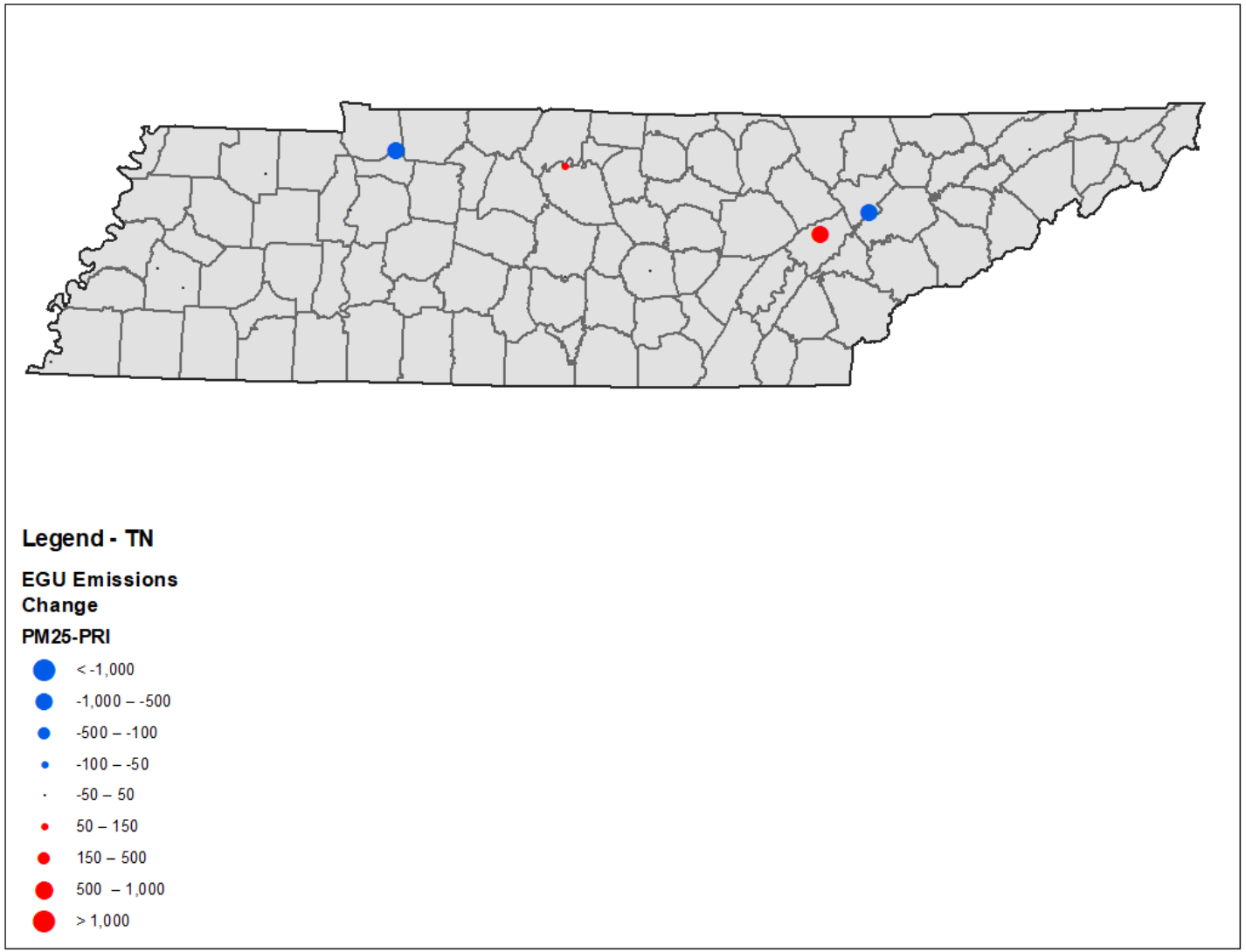

Figure B.8-9. Tennessee Point EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

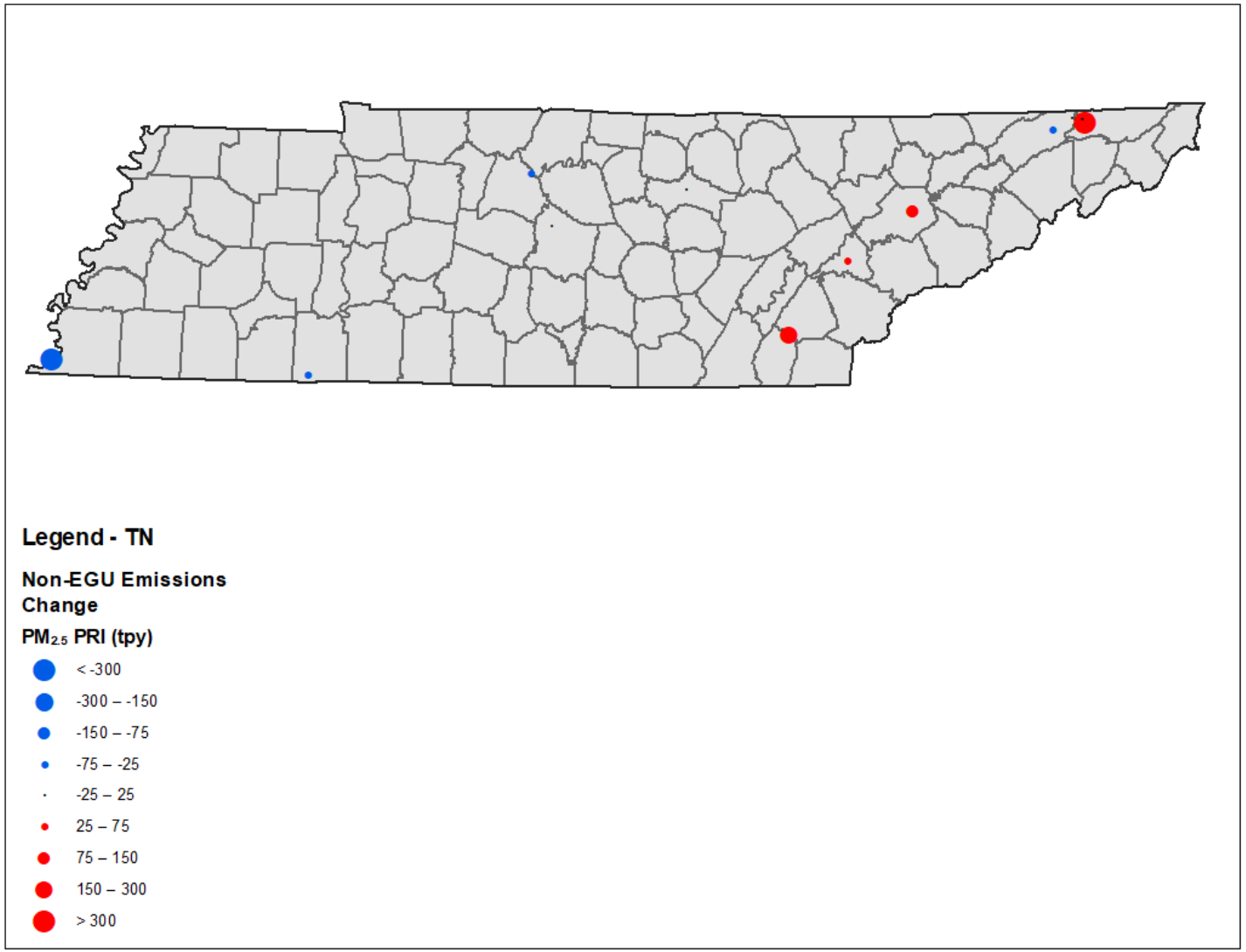

Figure B.8-10. Tennessee Point Non-EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

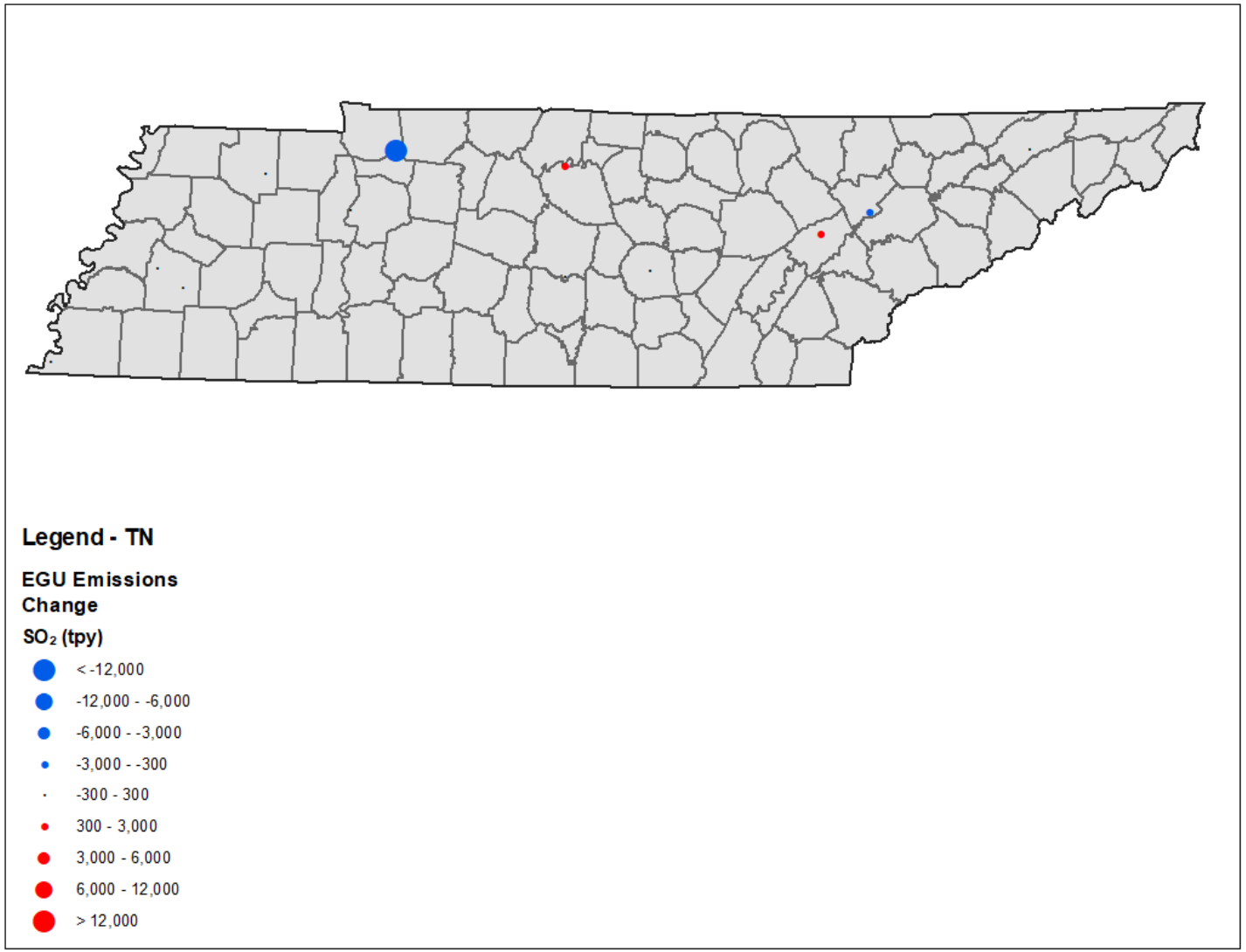

Figure B.8-11. Tennessee Point EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

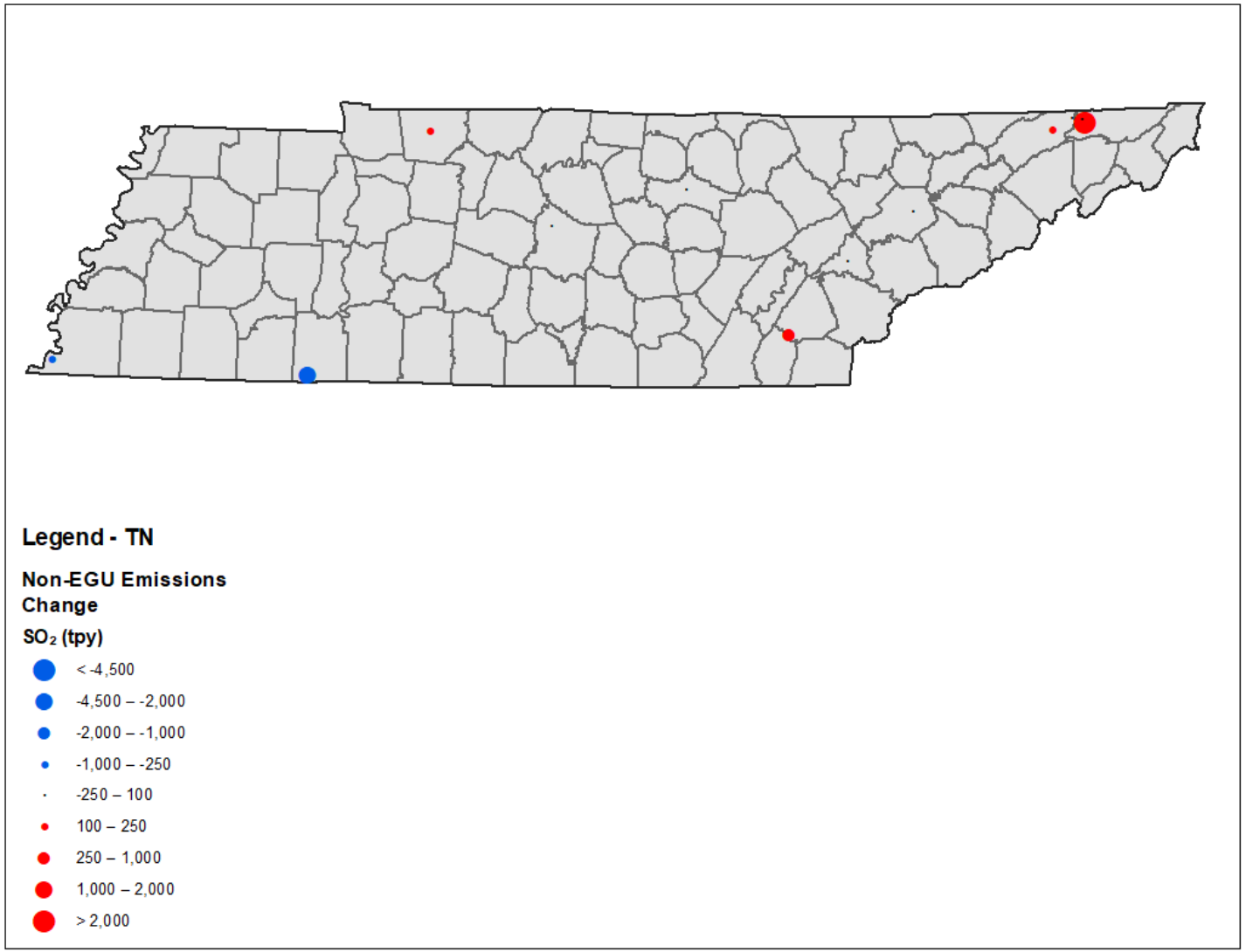

Figure B.8-12. Tennessee Point Non-EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

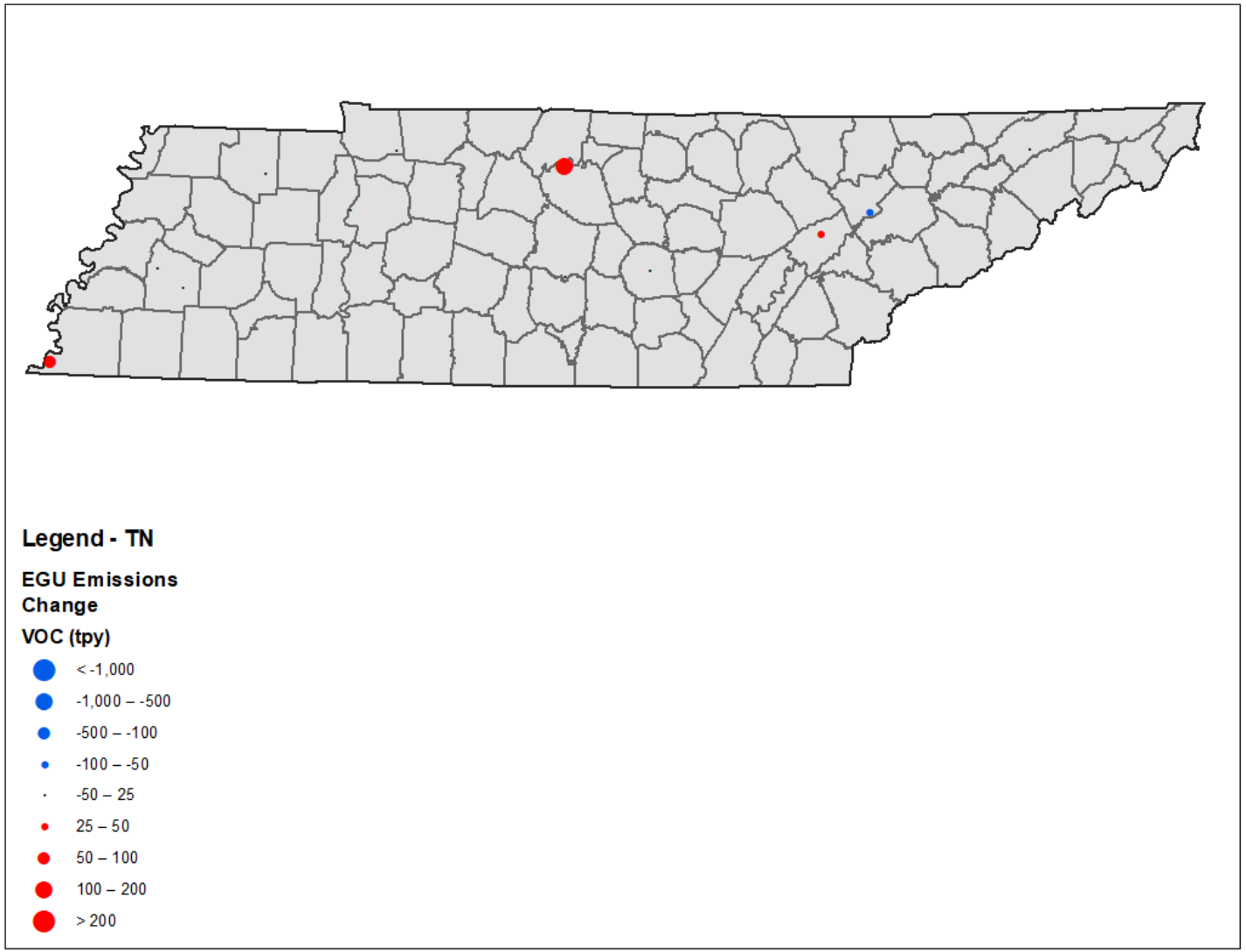

Figure B.8-13. Tennessee Point EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

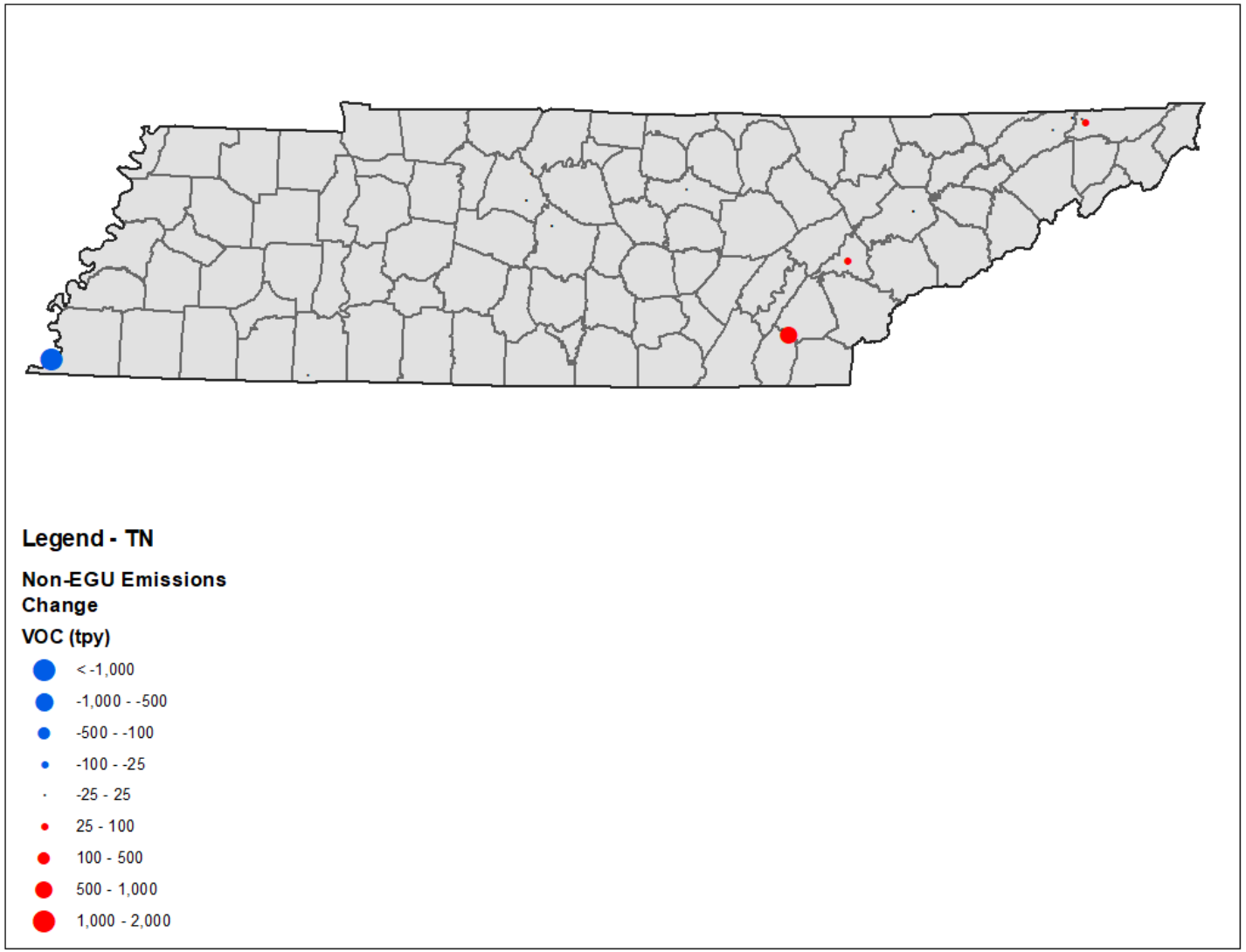

Figure B.8-14. Tennessee Point Non-EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

Appendix B-9. Virginia 2028 Point EGU and Point Non-EGU Comparisons

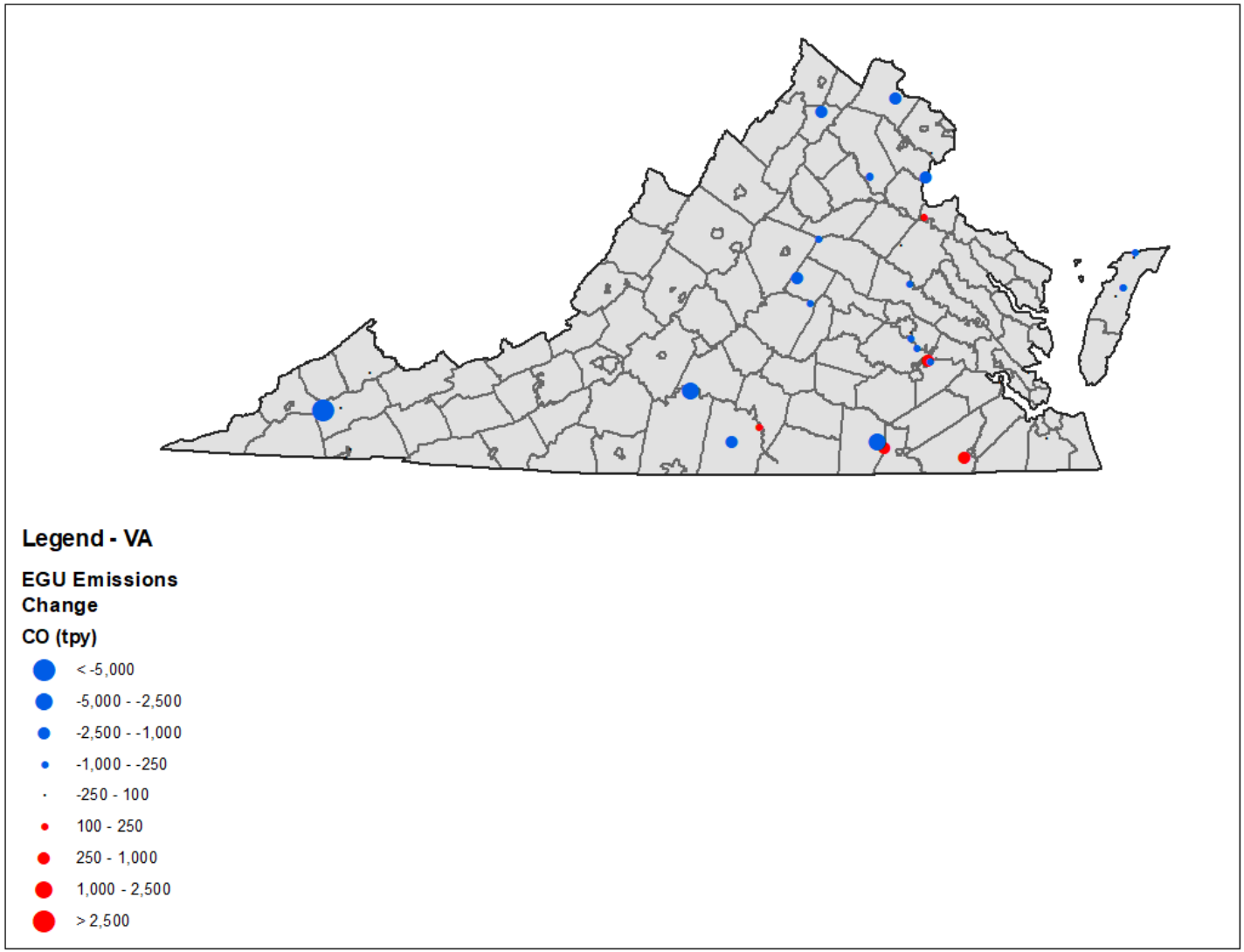

Figure B.9-1. Virginia Point EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

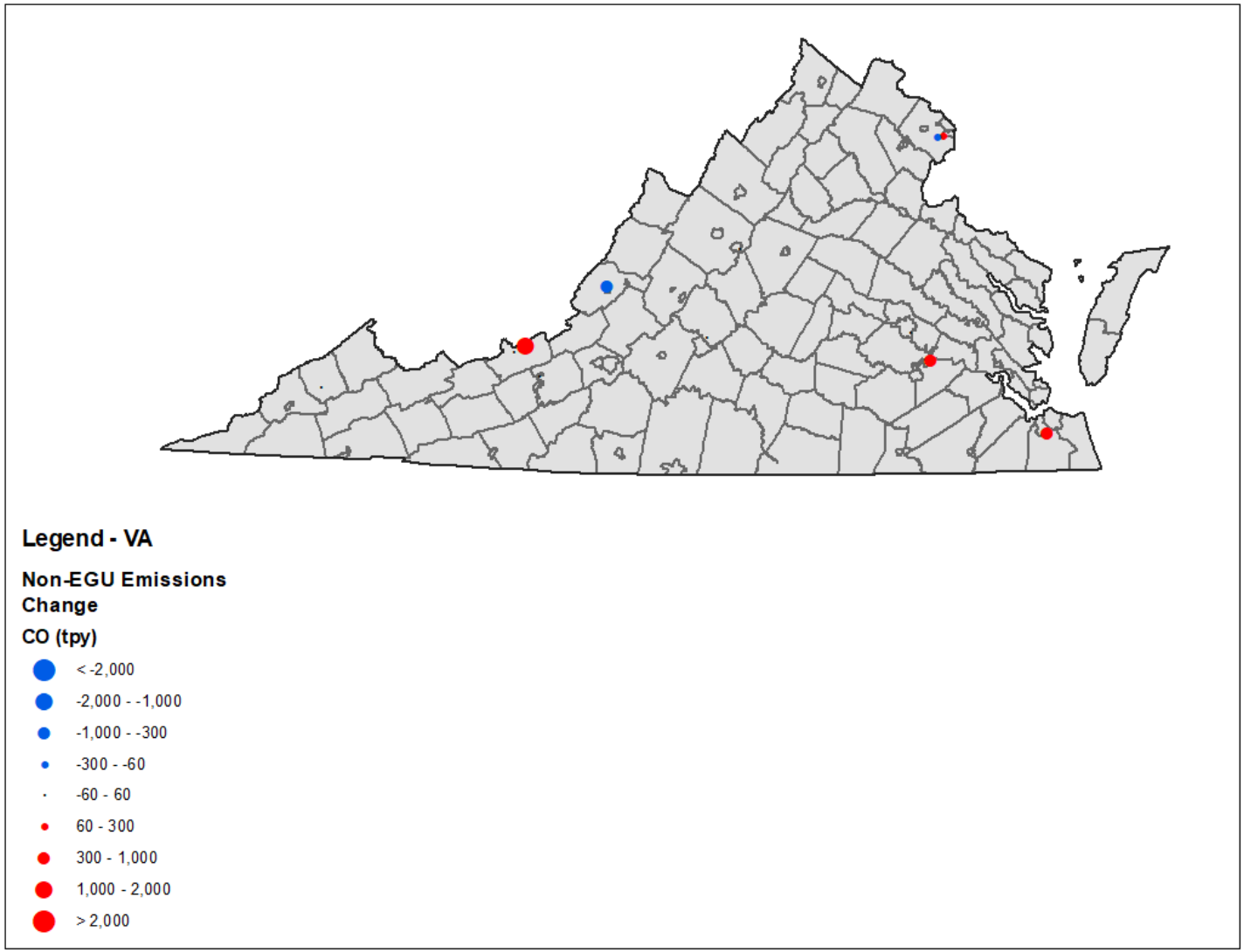

Figure B.9-2. Virginia Point Non-EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

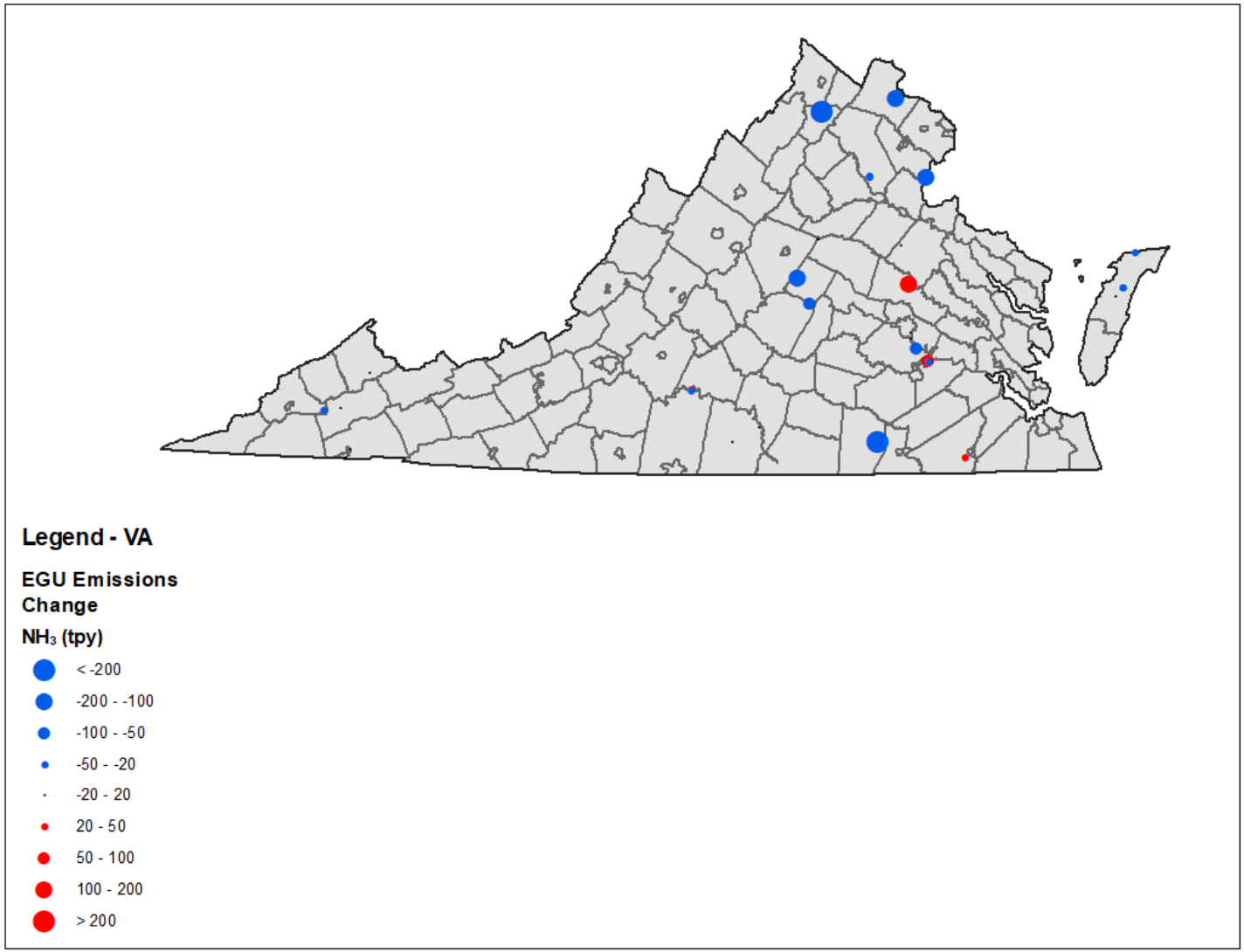

Figure B.9-3. Virginia Point EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

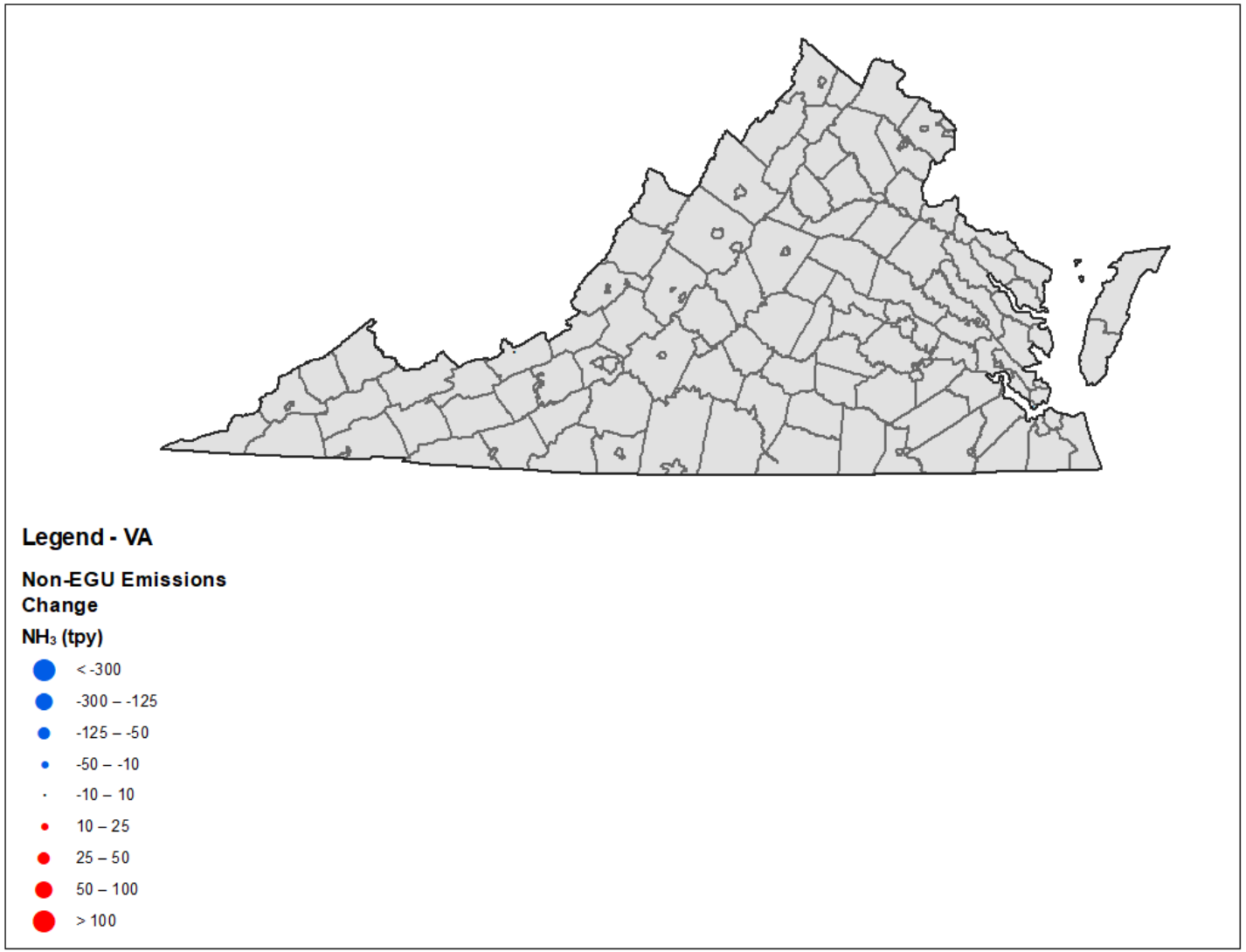

Figure B.9-4. Virginia Point Non-EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

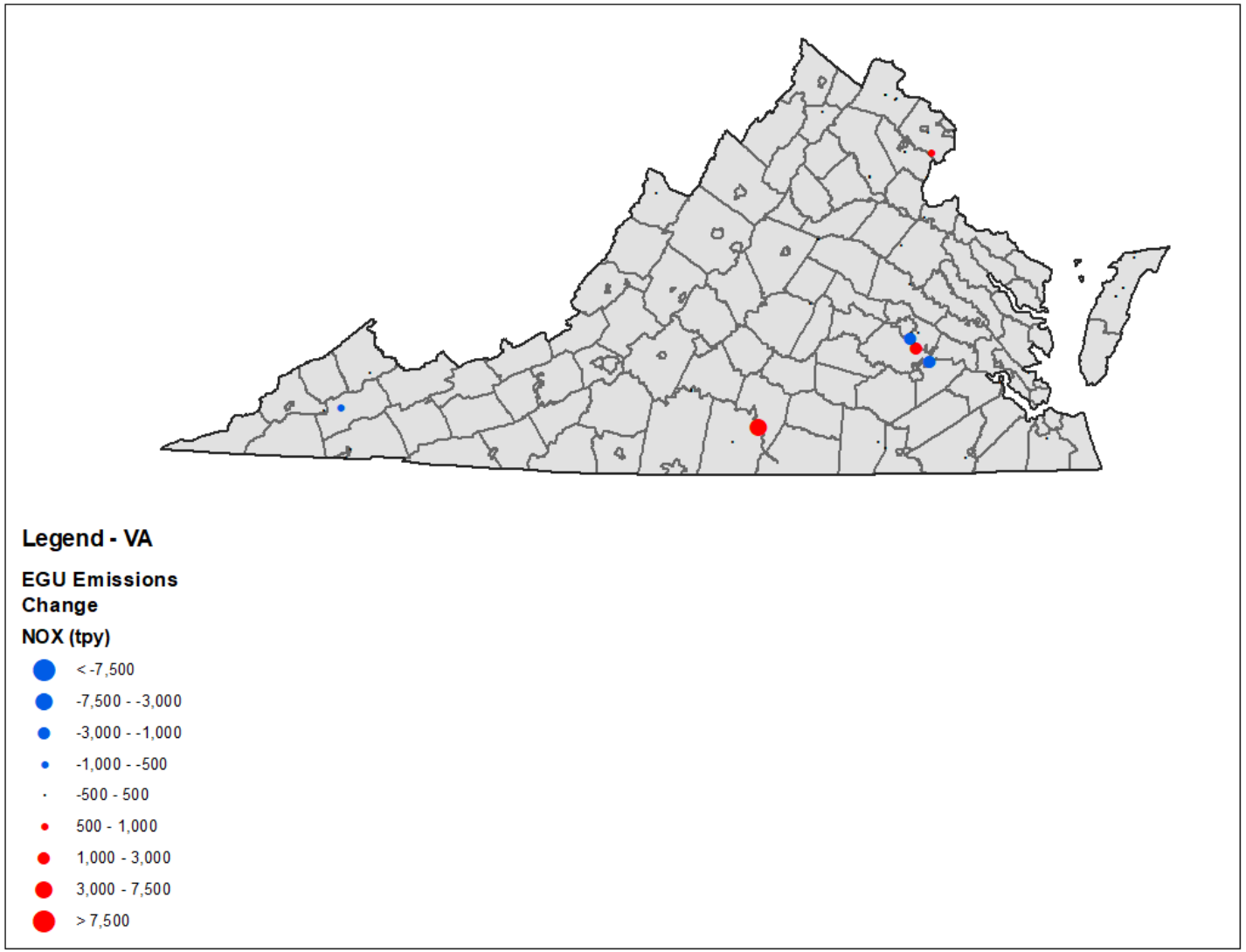

Figure B.9-5. Virginia Point EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

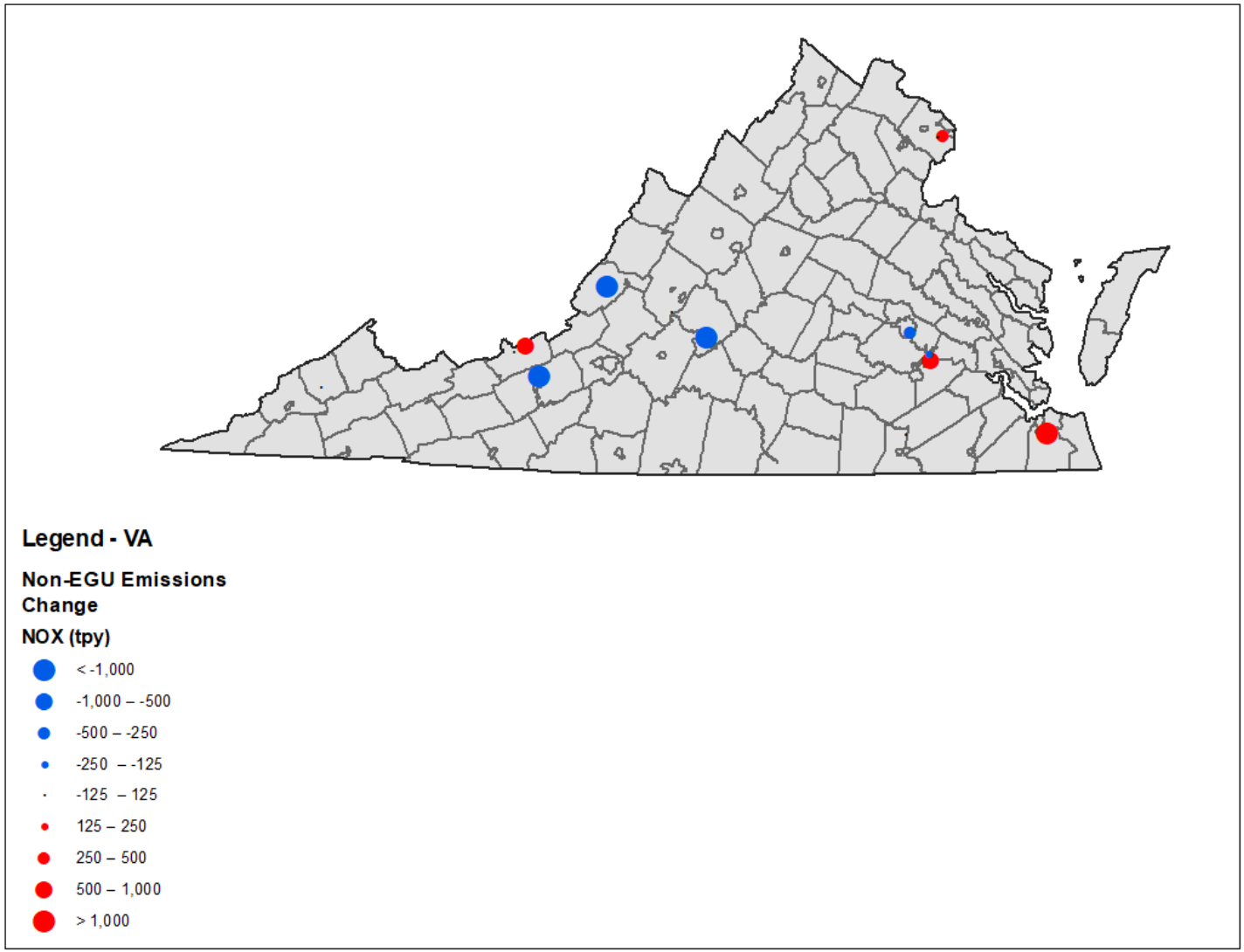

Figure B.9-6. Virginia Point Non-EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

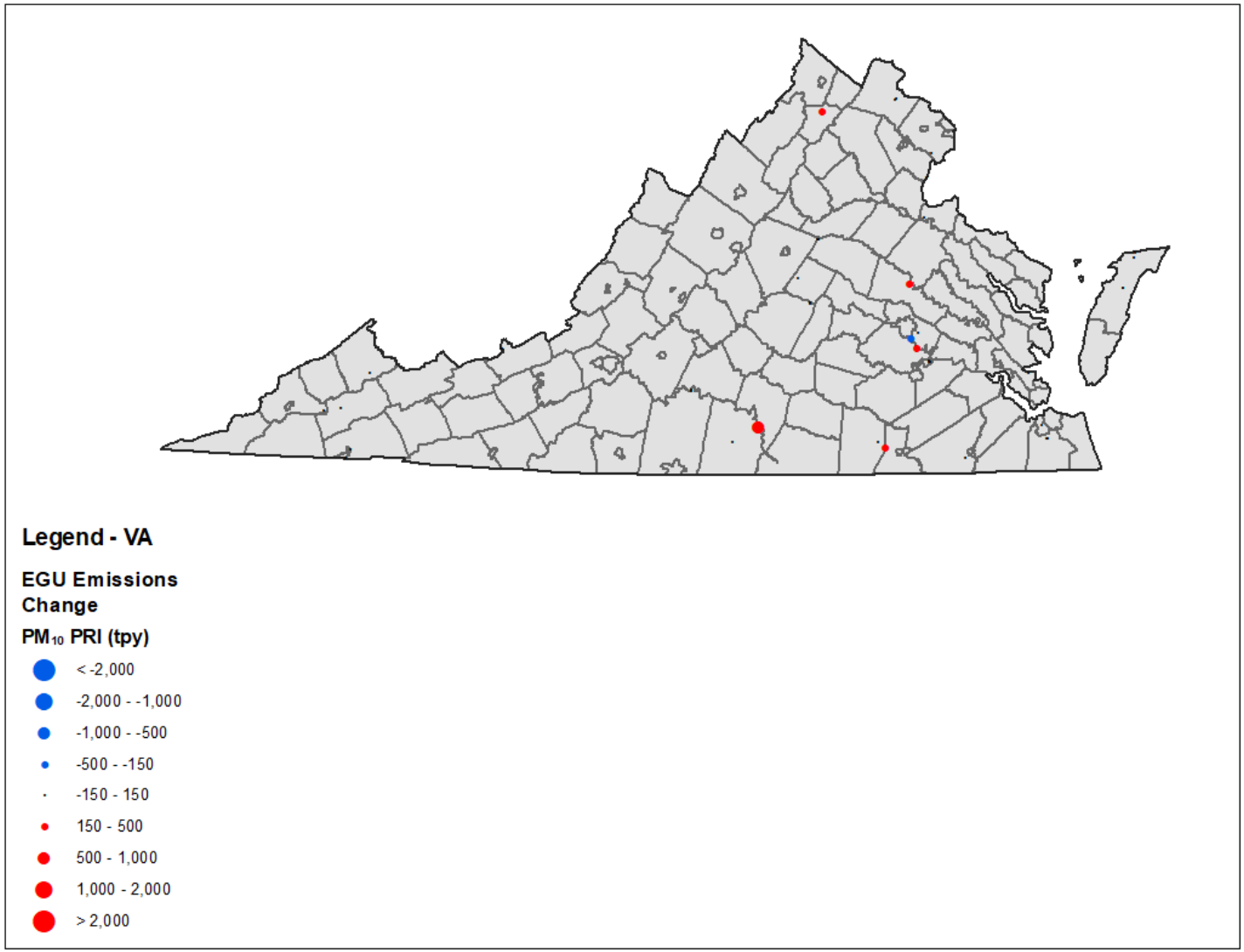

Figure B.9-7. Virginia Point EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

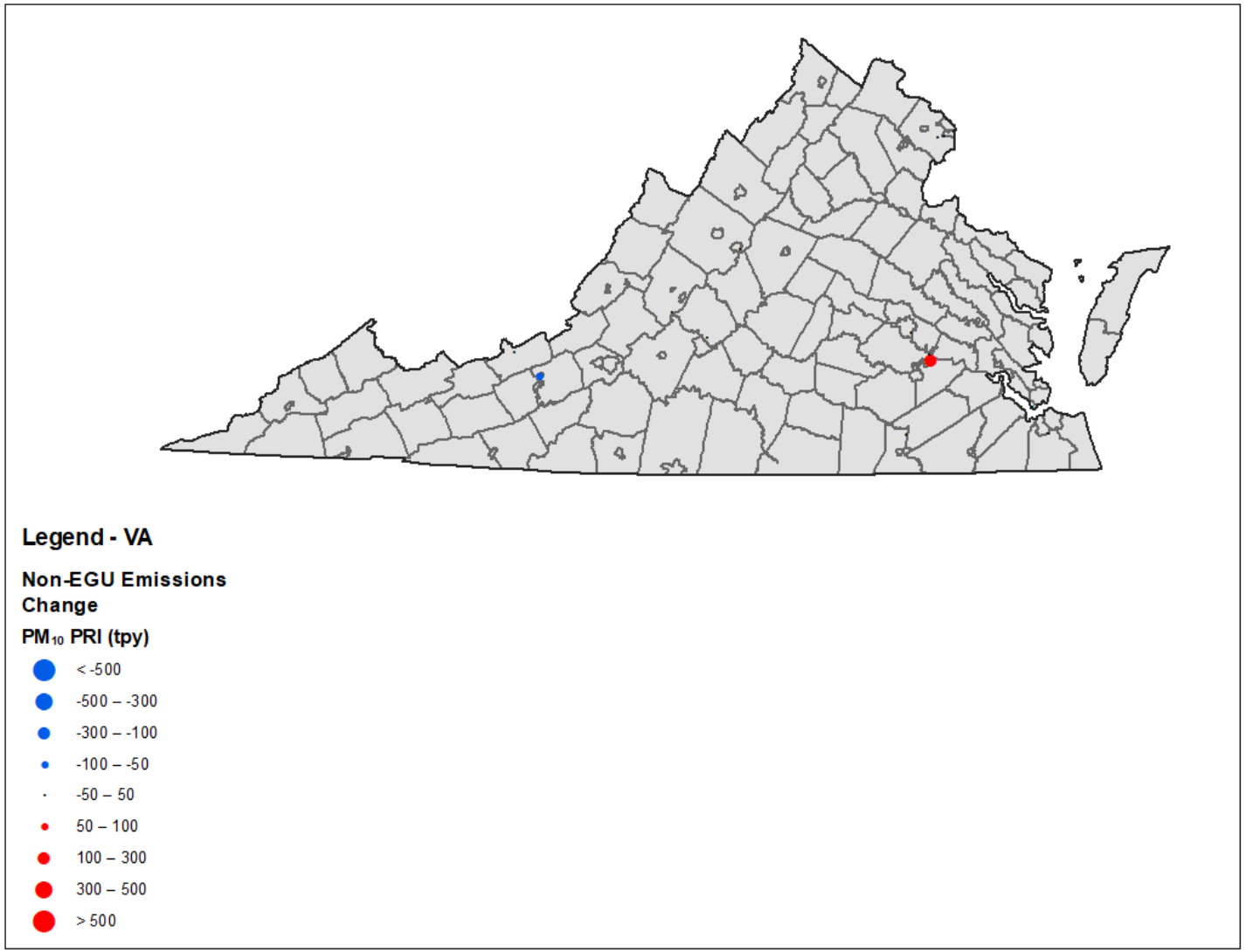

Figure B.9-8. Virginia Point Non-EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

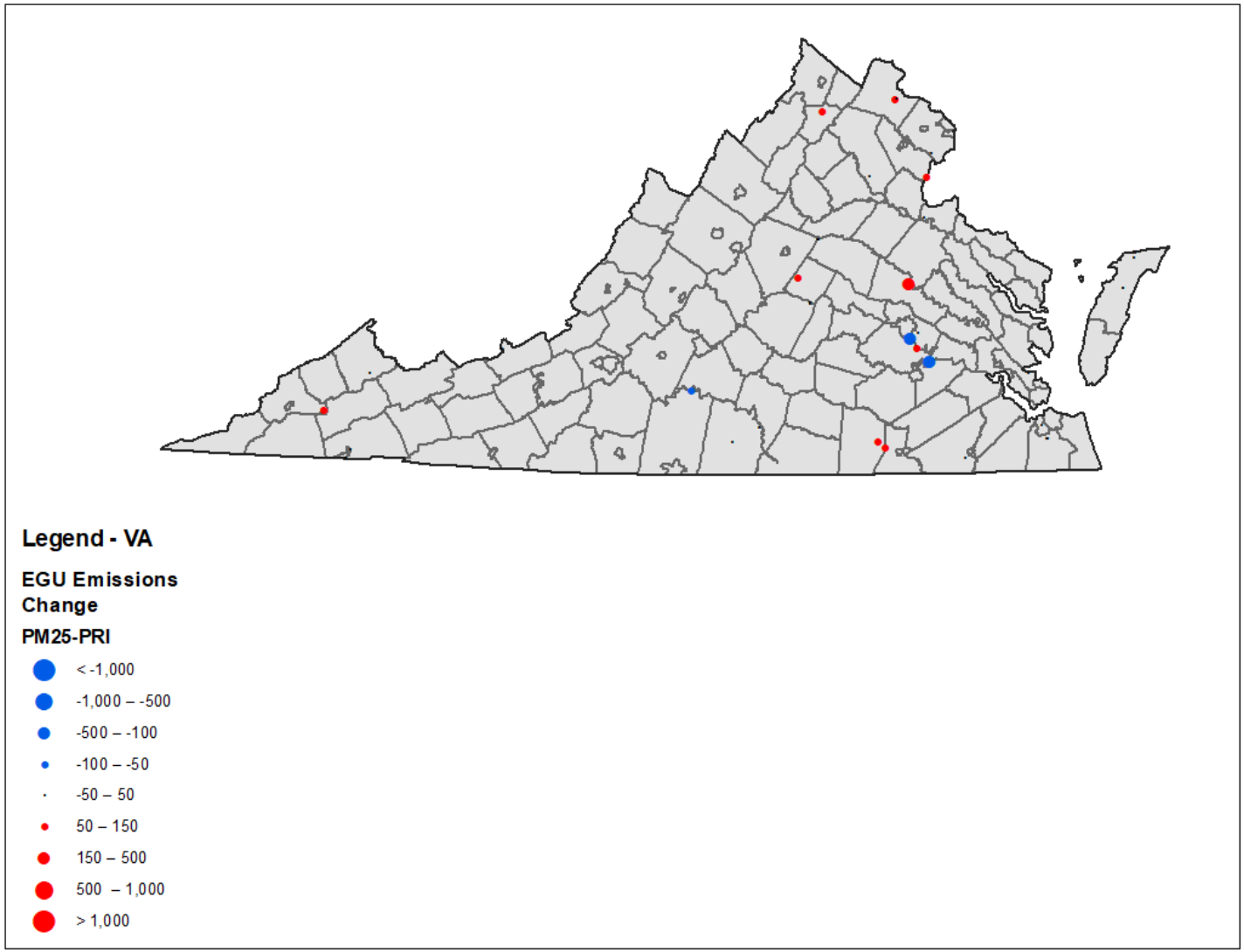

Figure B.9-9. Virginia Point EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

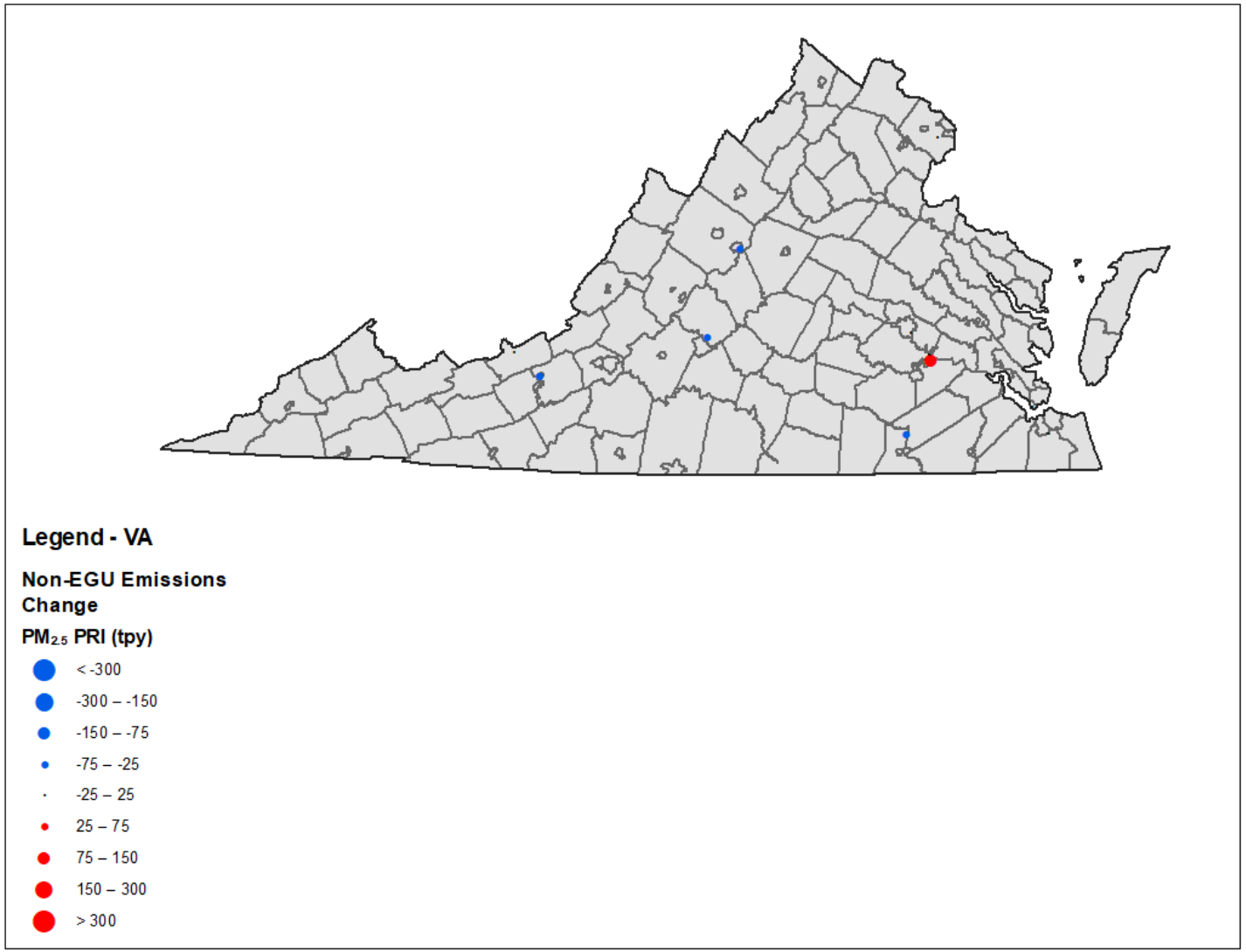

Figure B.9-10. Virginia Point Non-EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

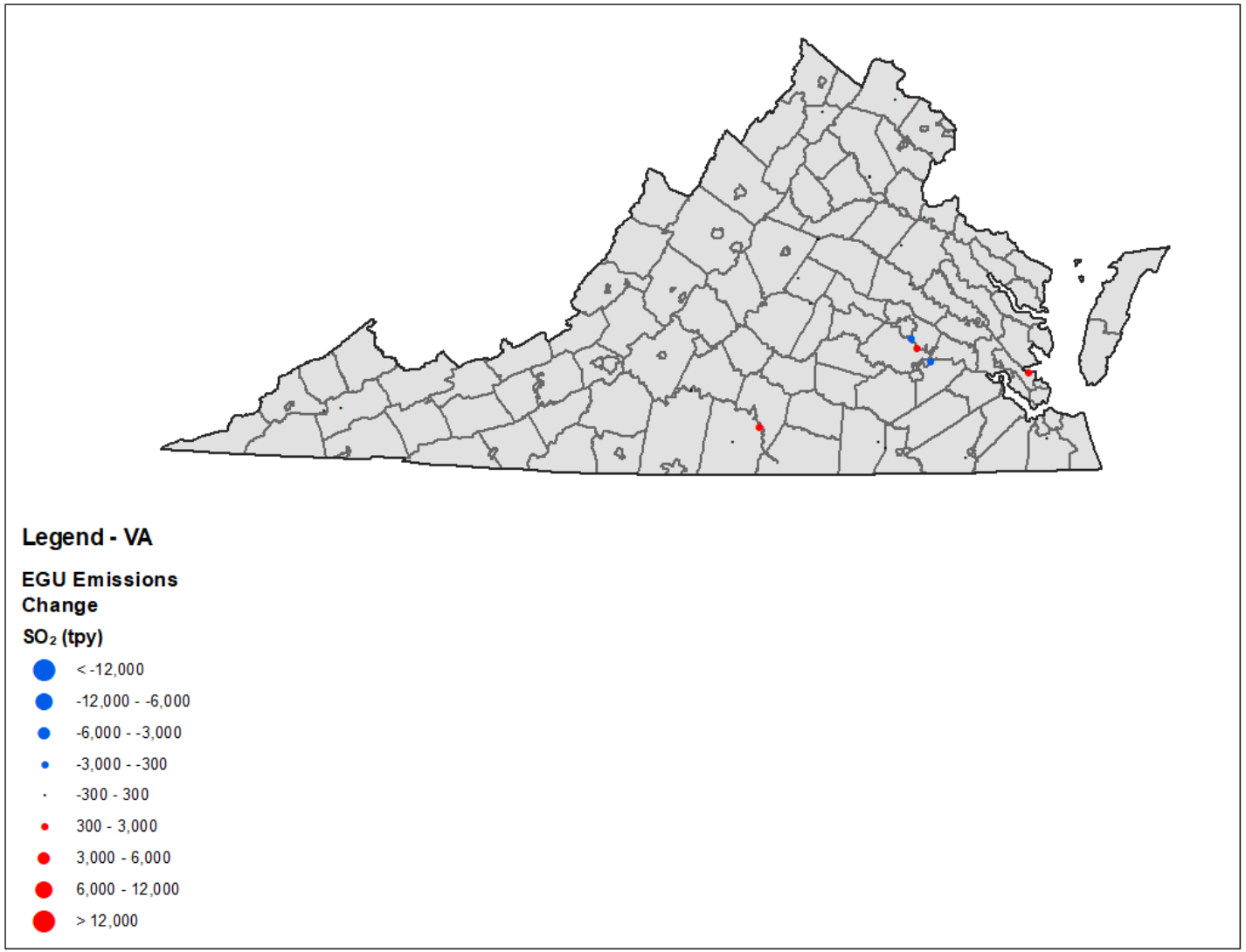

Figure B.9-11. Virginia Point EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

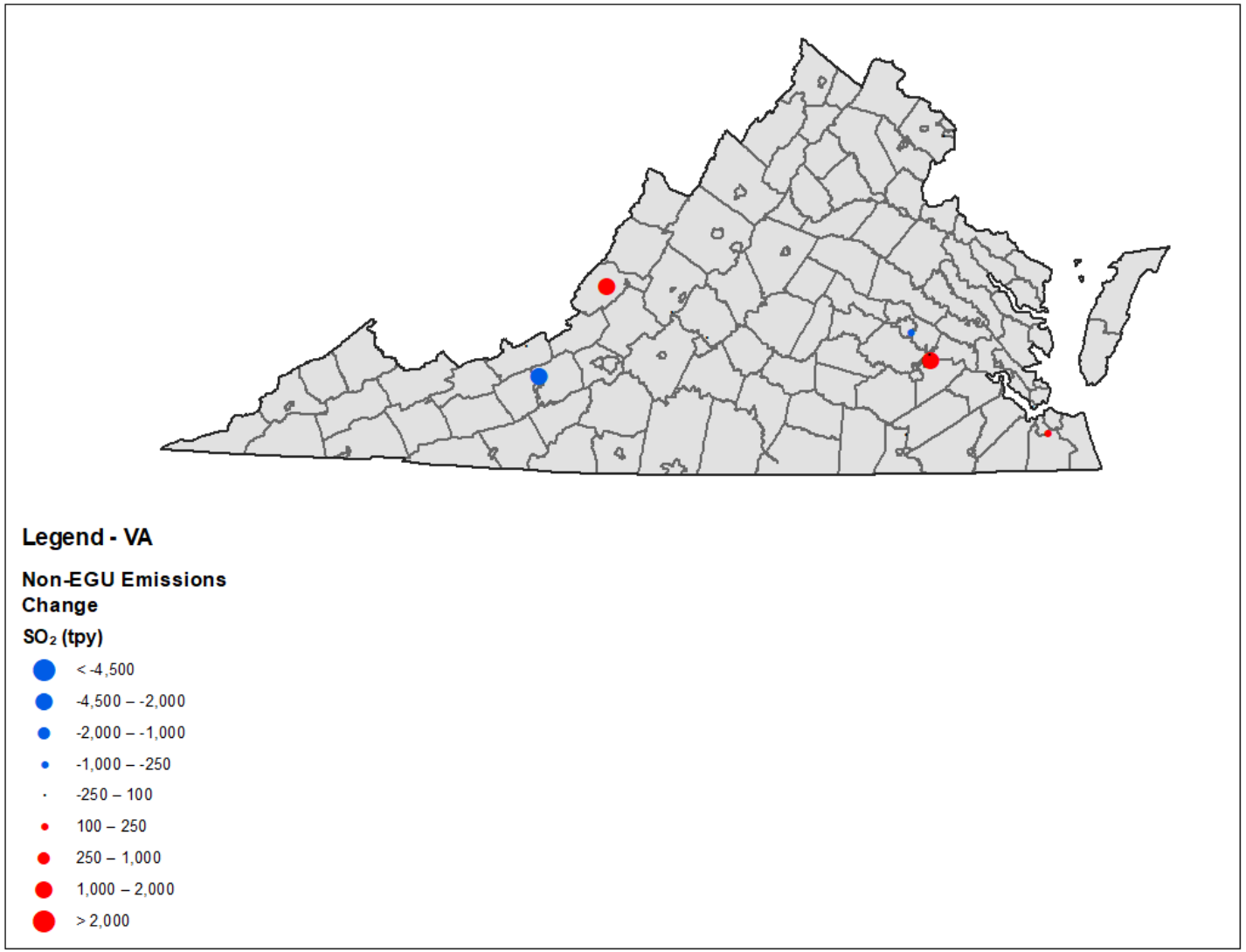

Figure B.9-12. Virginia Point Non-EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

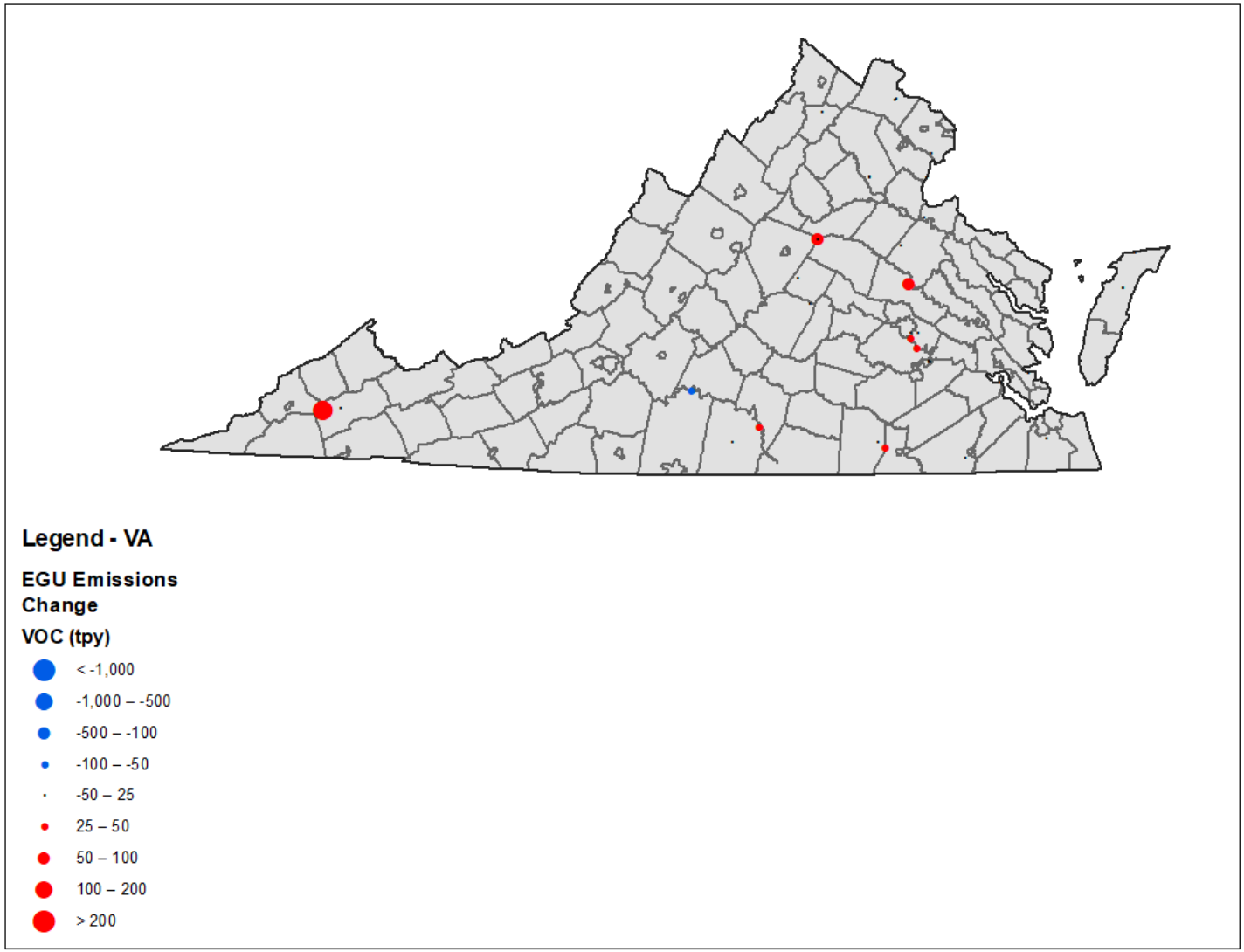

Figure B.9-13. Virginia Point EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

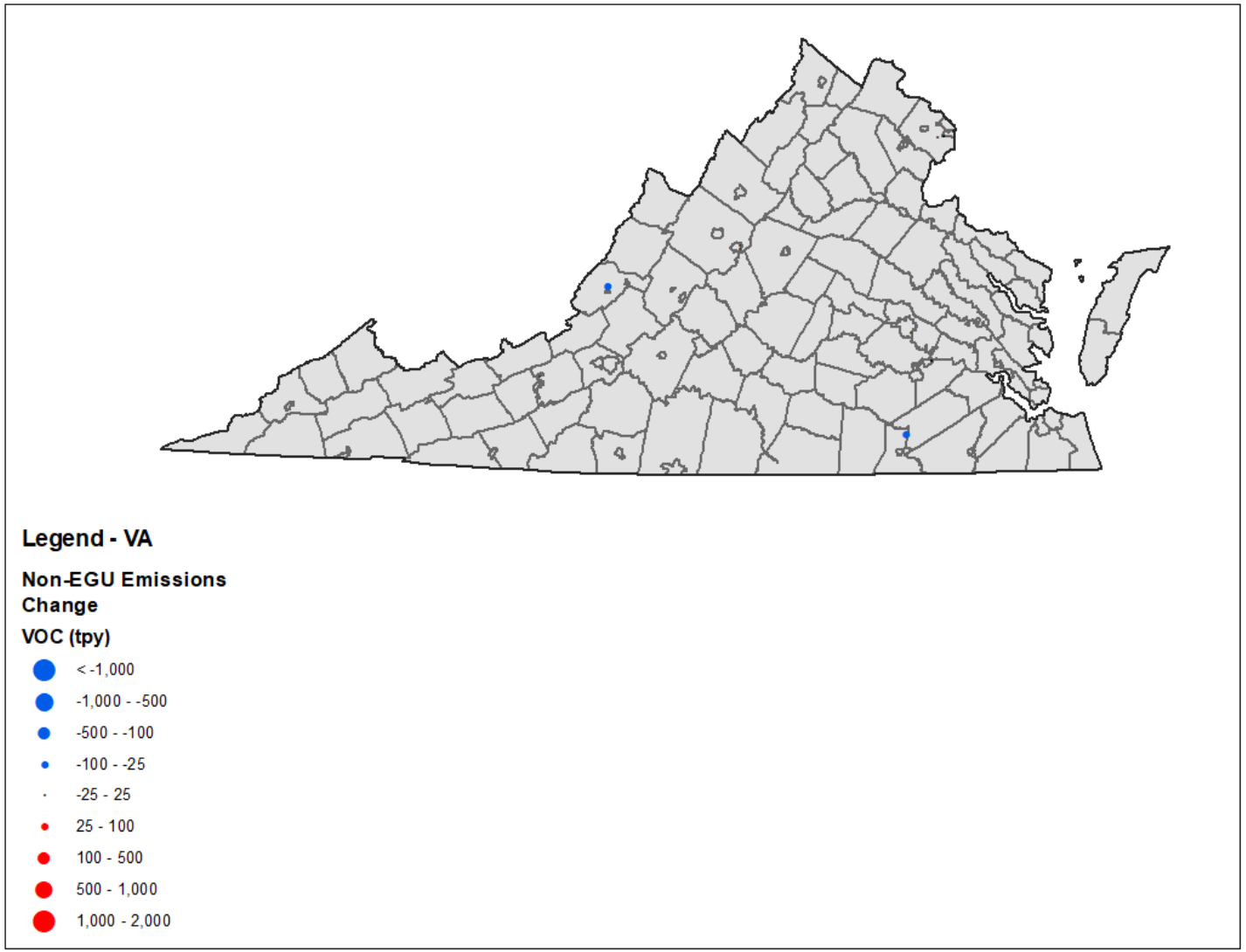

Figure B.9-14. Virginia Point Non-EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

Appendix B-10. West Virginia 2028 Point EGU and Point Non-EGU Comparisons

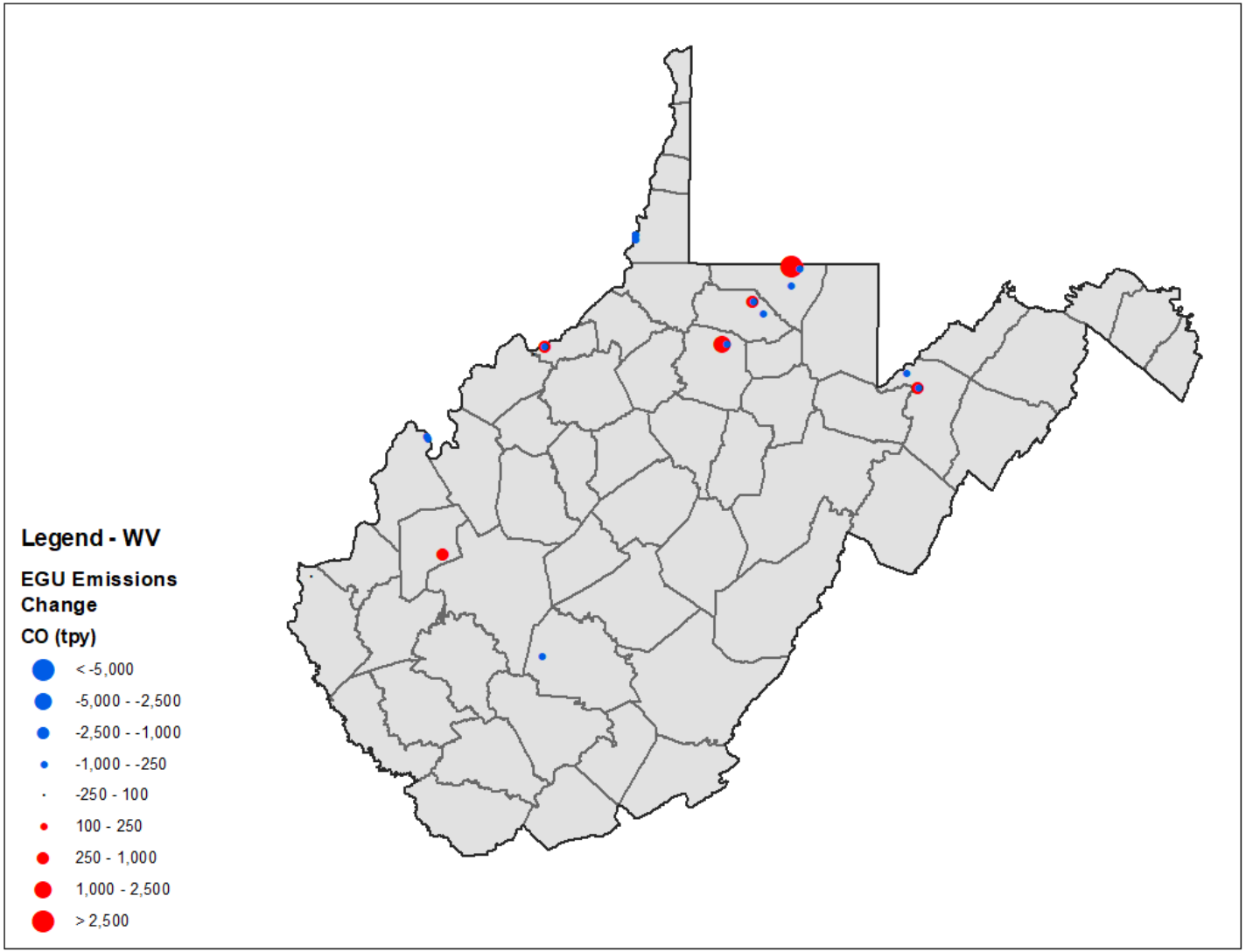

Figure B.10-1. West Virginia Point EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

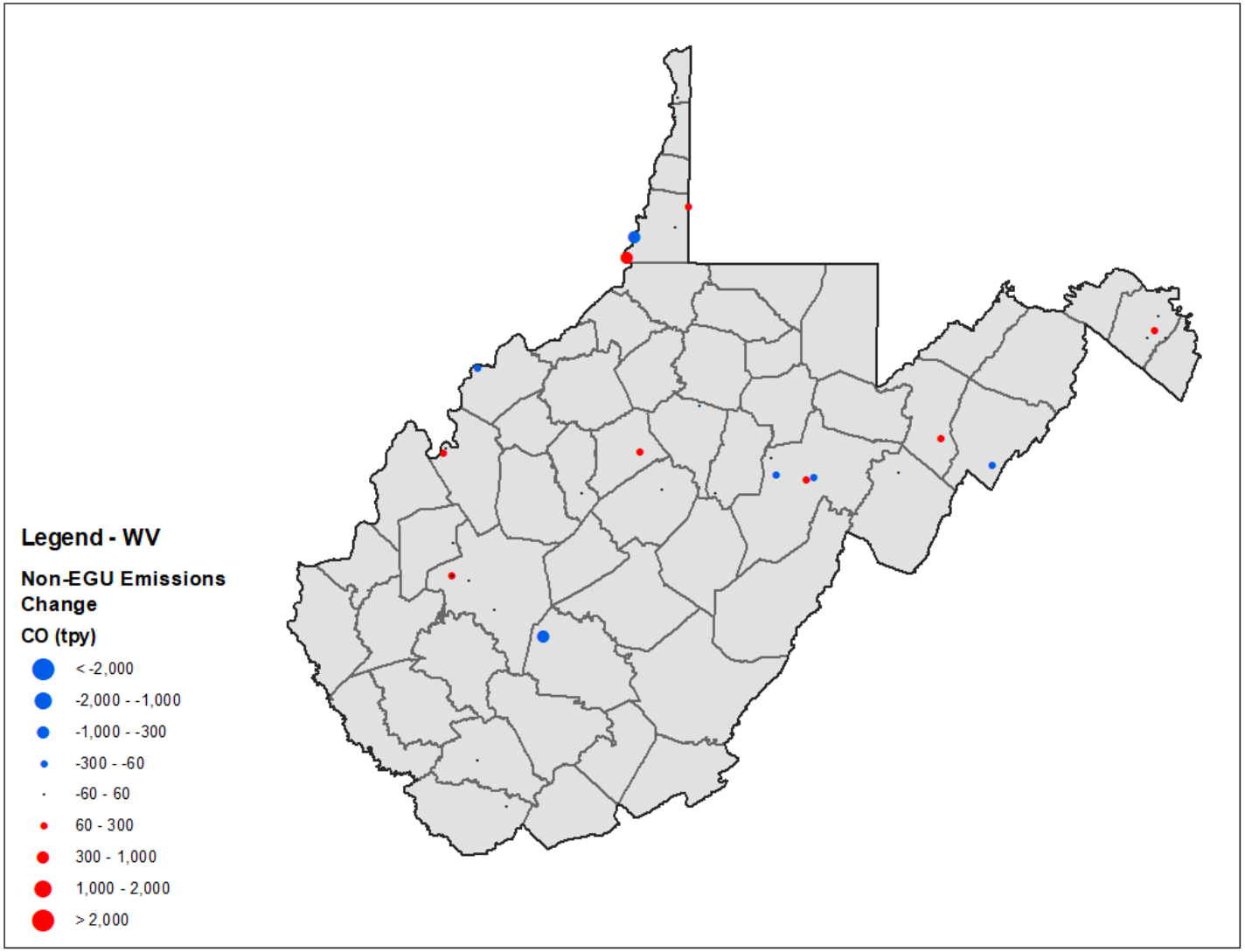

Figure B.10-2. West Virginia Point Non-EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

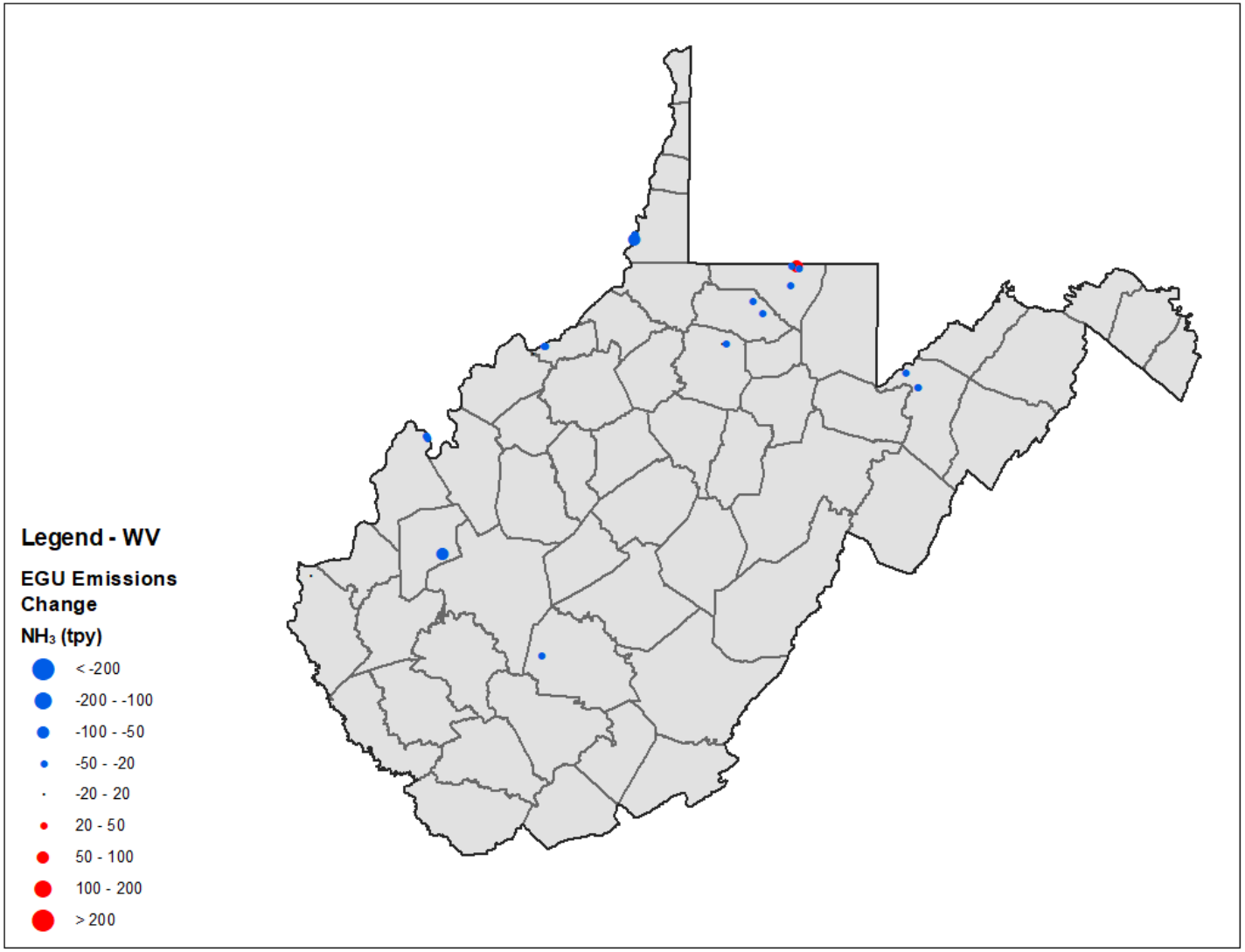

Figure B.10-3. West Virginia Point EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

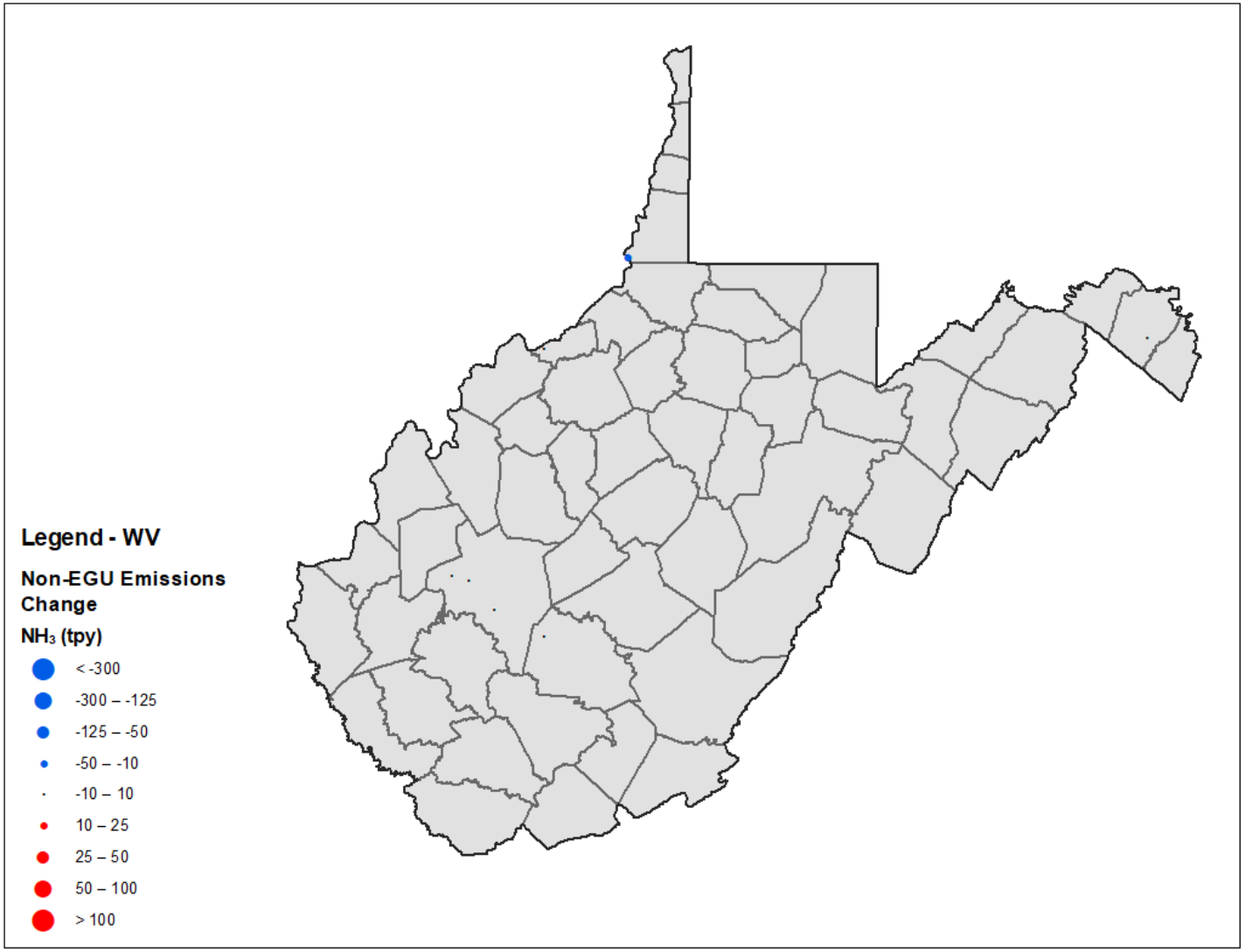

Figure B.10-4. West Virginia Point Non-EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

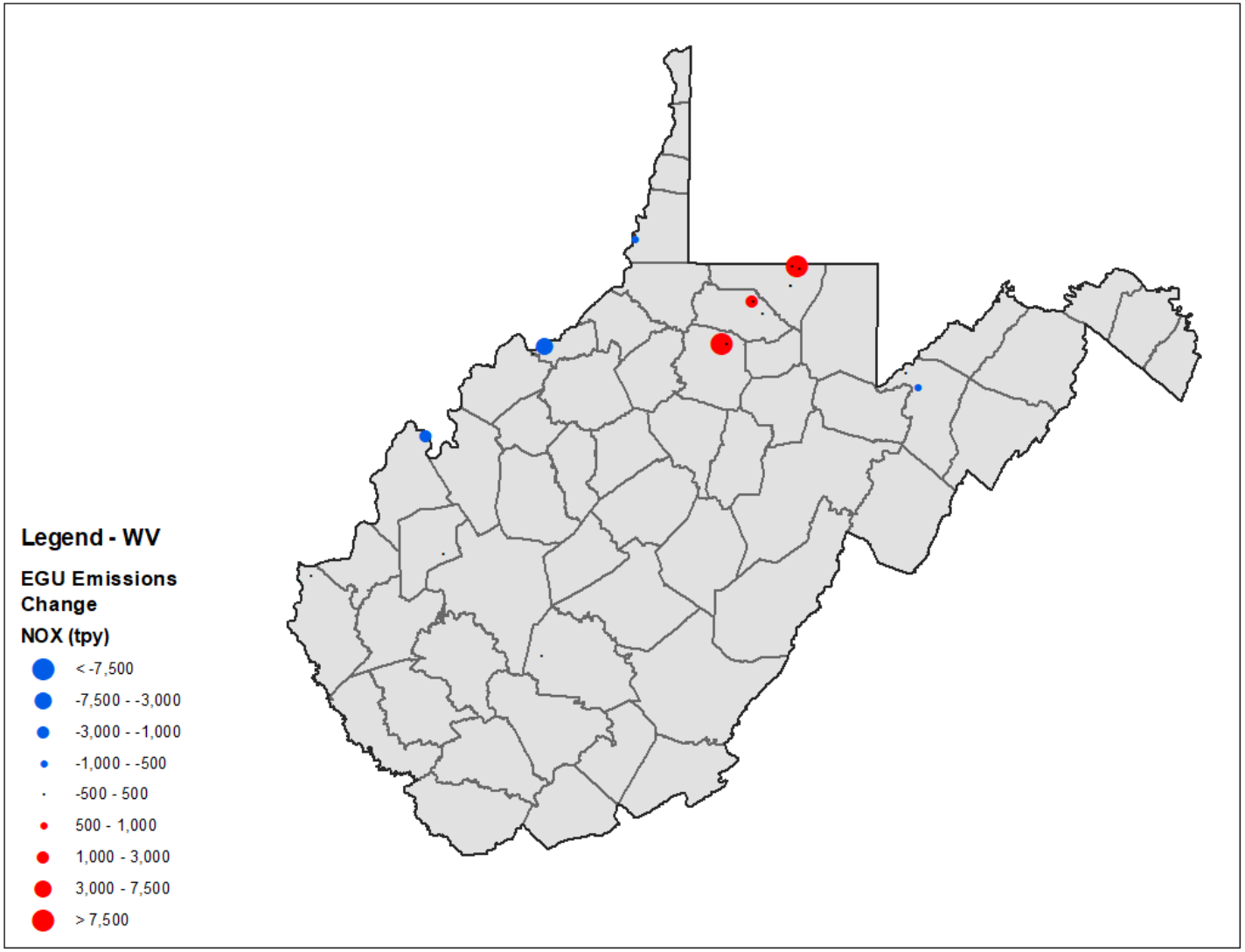

Figure B.10-5. West Virginia Point EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

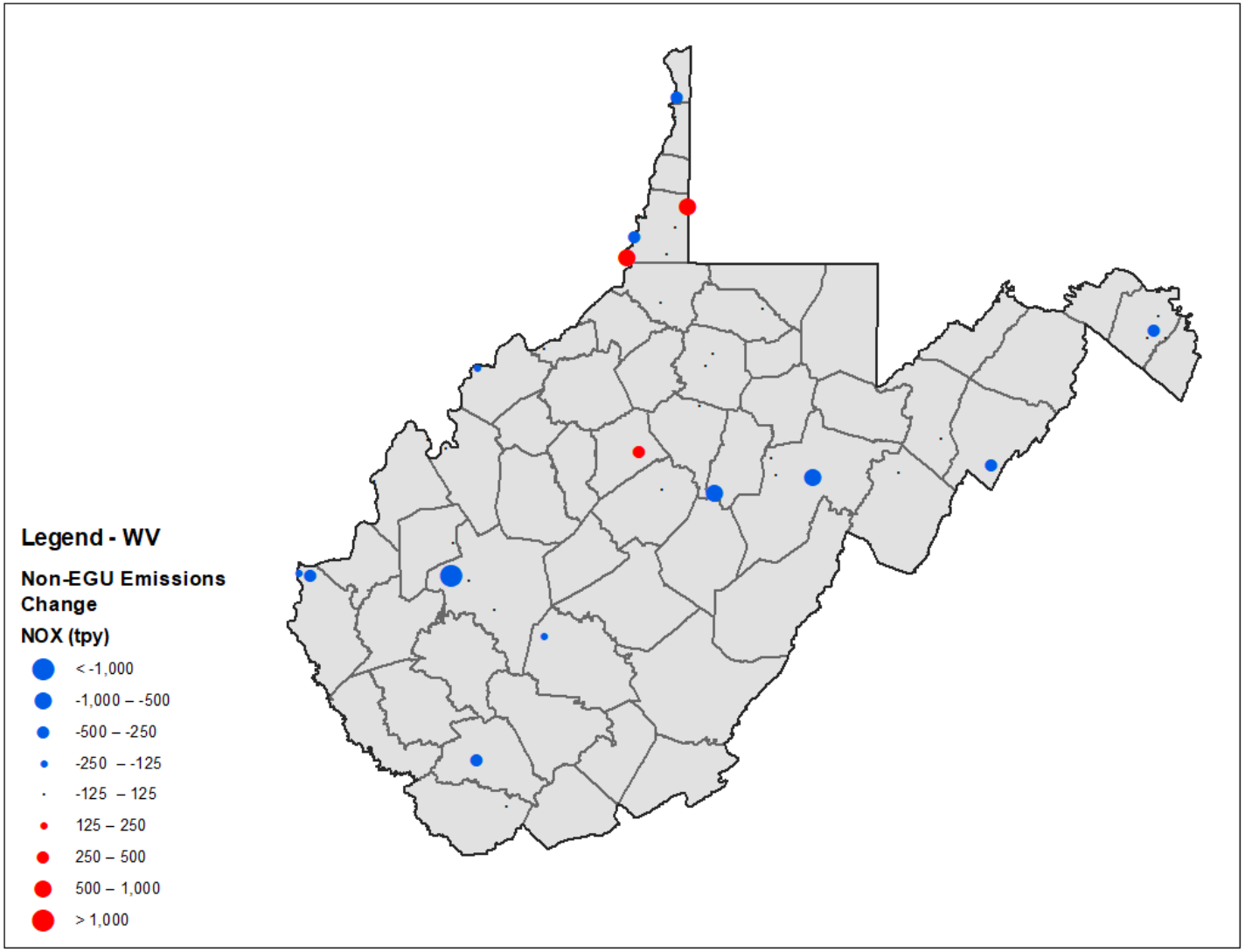

Figure B.10-6. West Virginia Point Non-EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

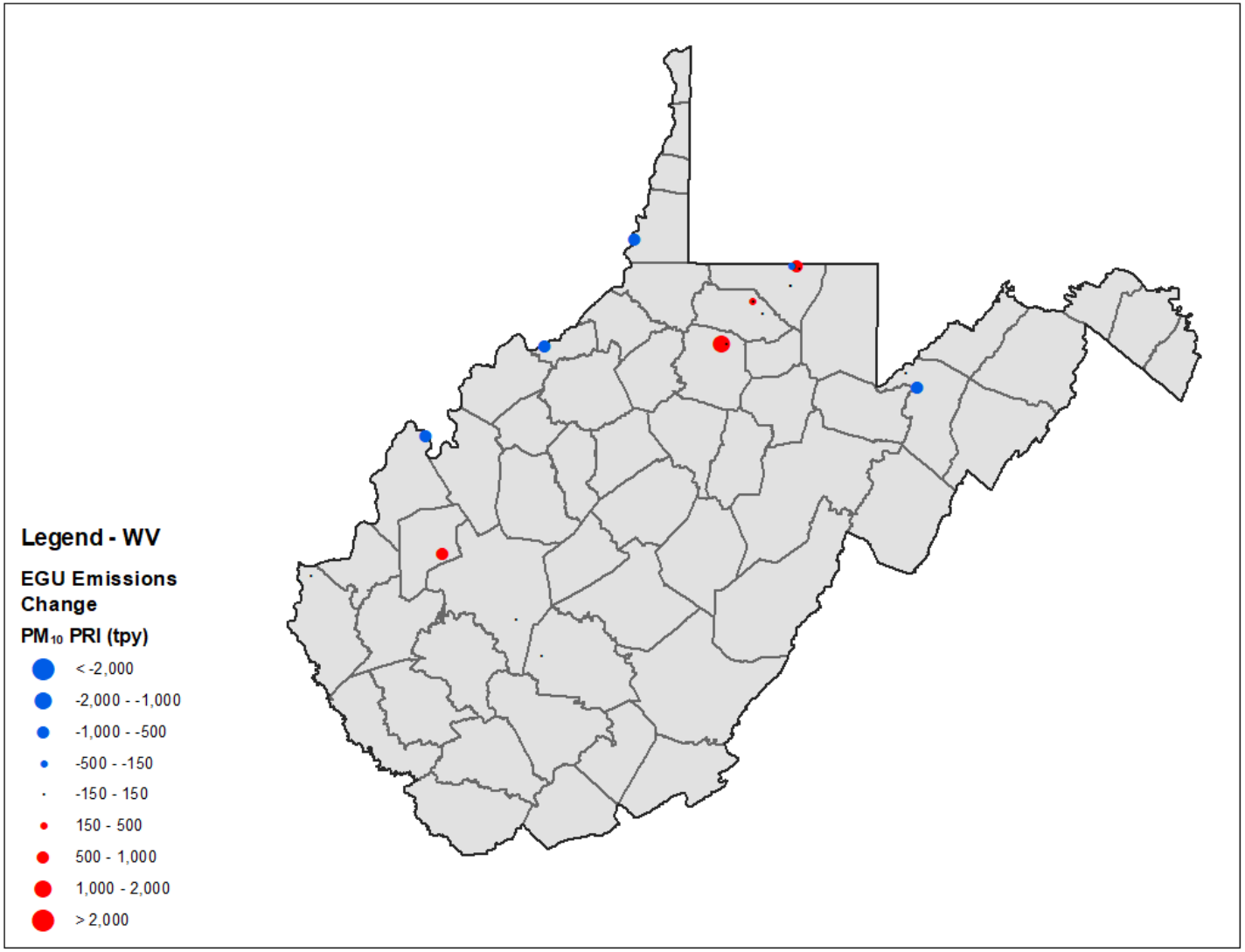

Figure B.10-7. West Virginia Point EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

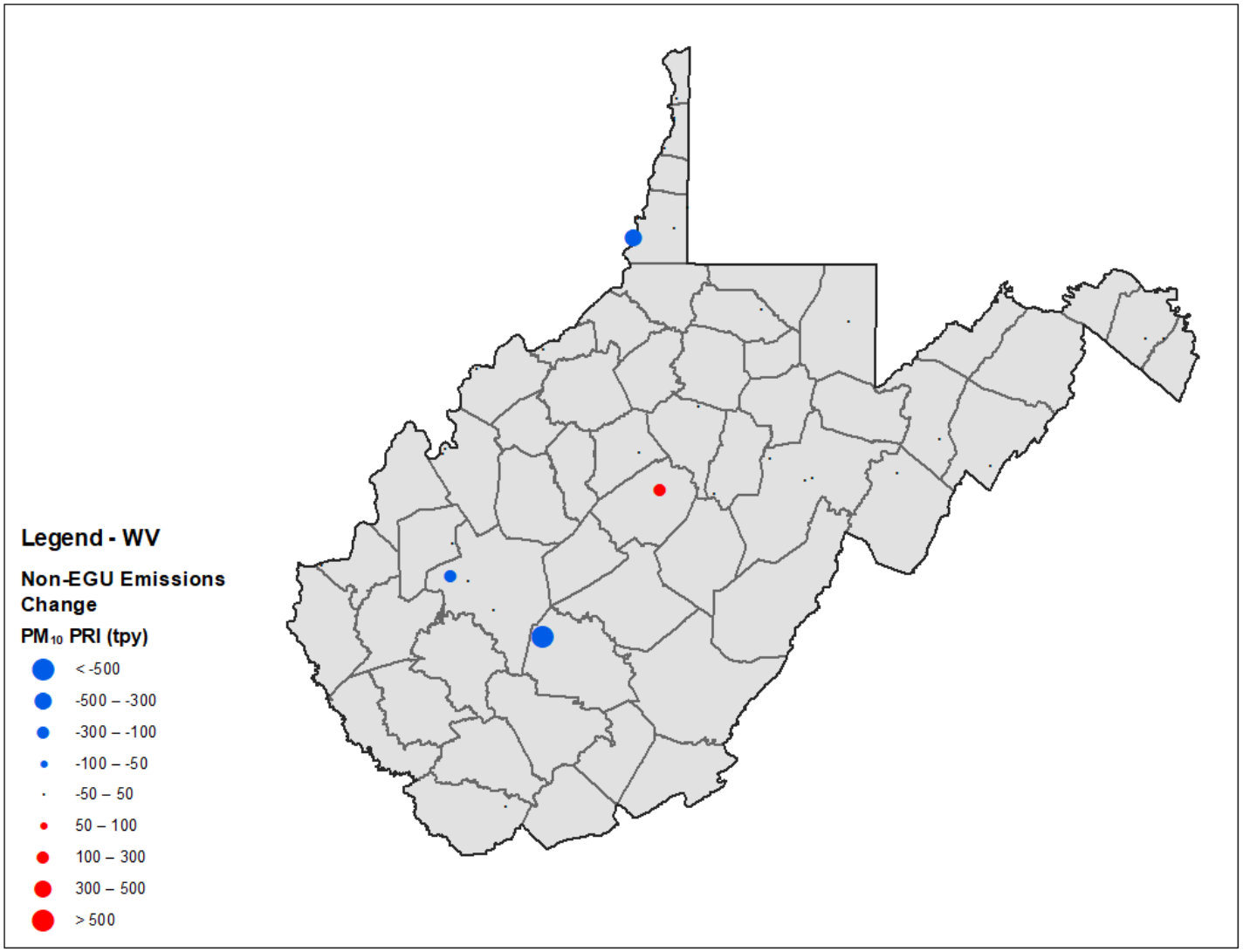

Figure B.10-8. West Virginia Point Non-EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

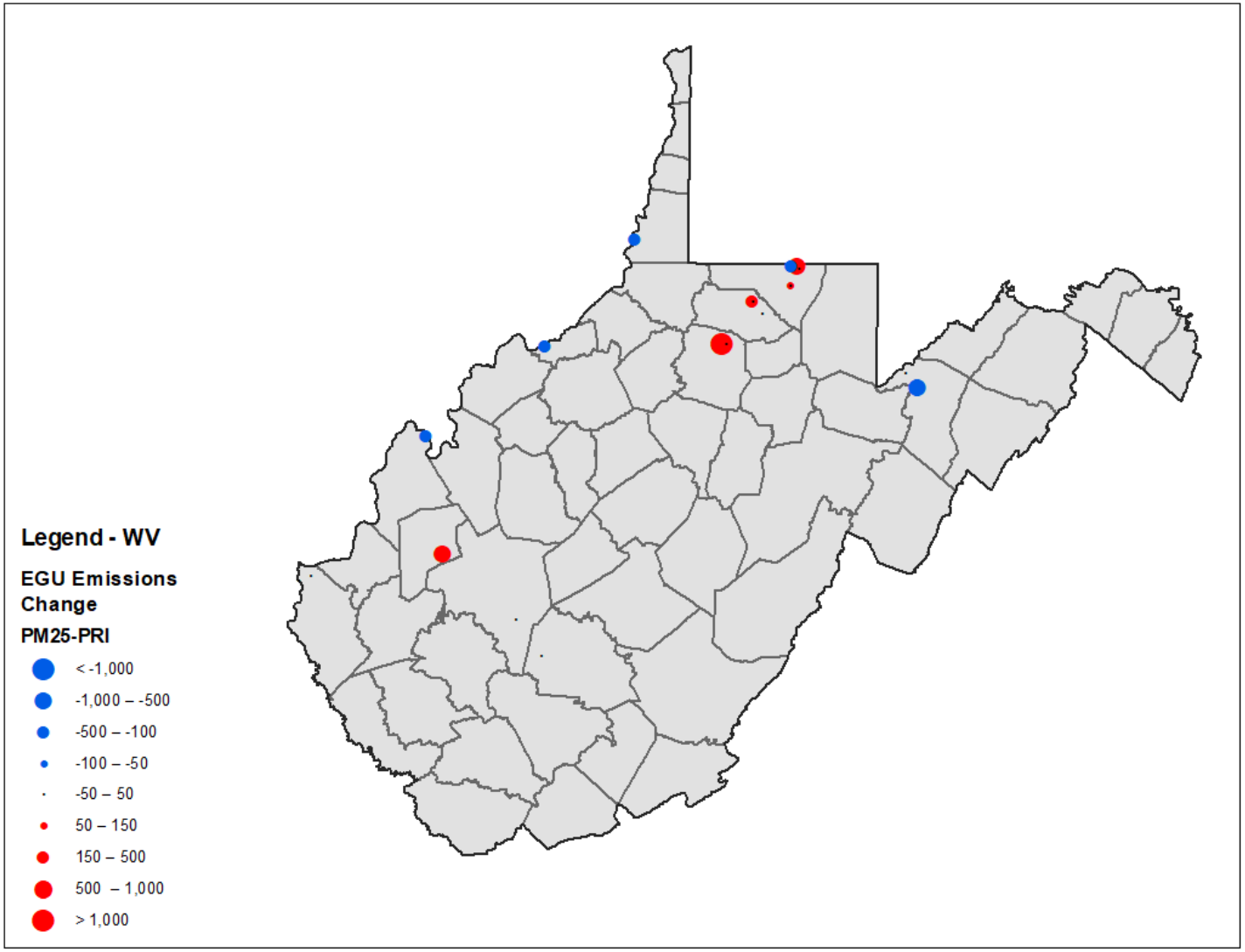

Figure B.10-9. West Virginia Point EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

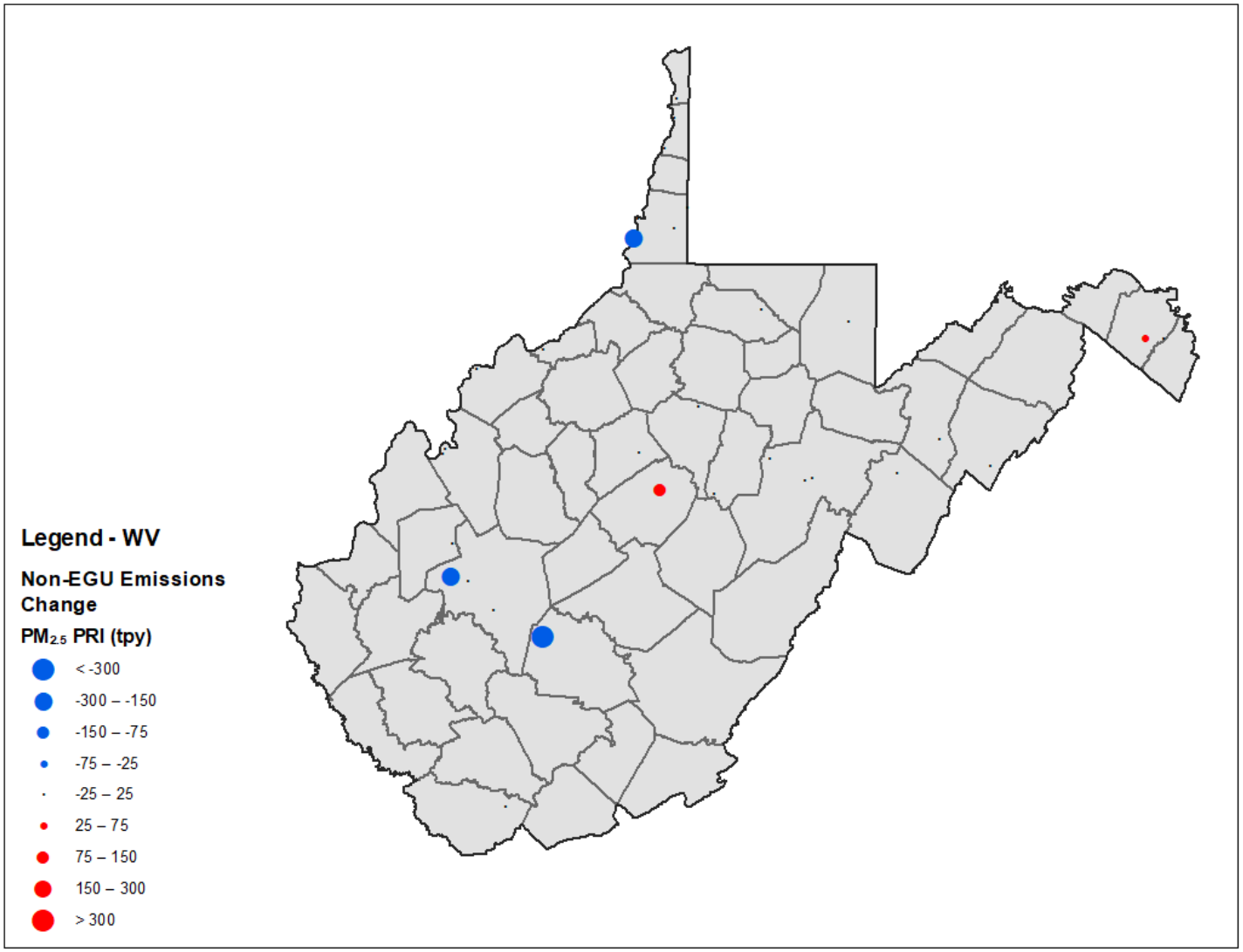

Figure B.10-10. West Virginia Point Non-EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

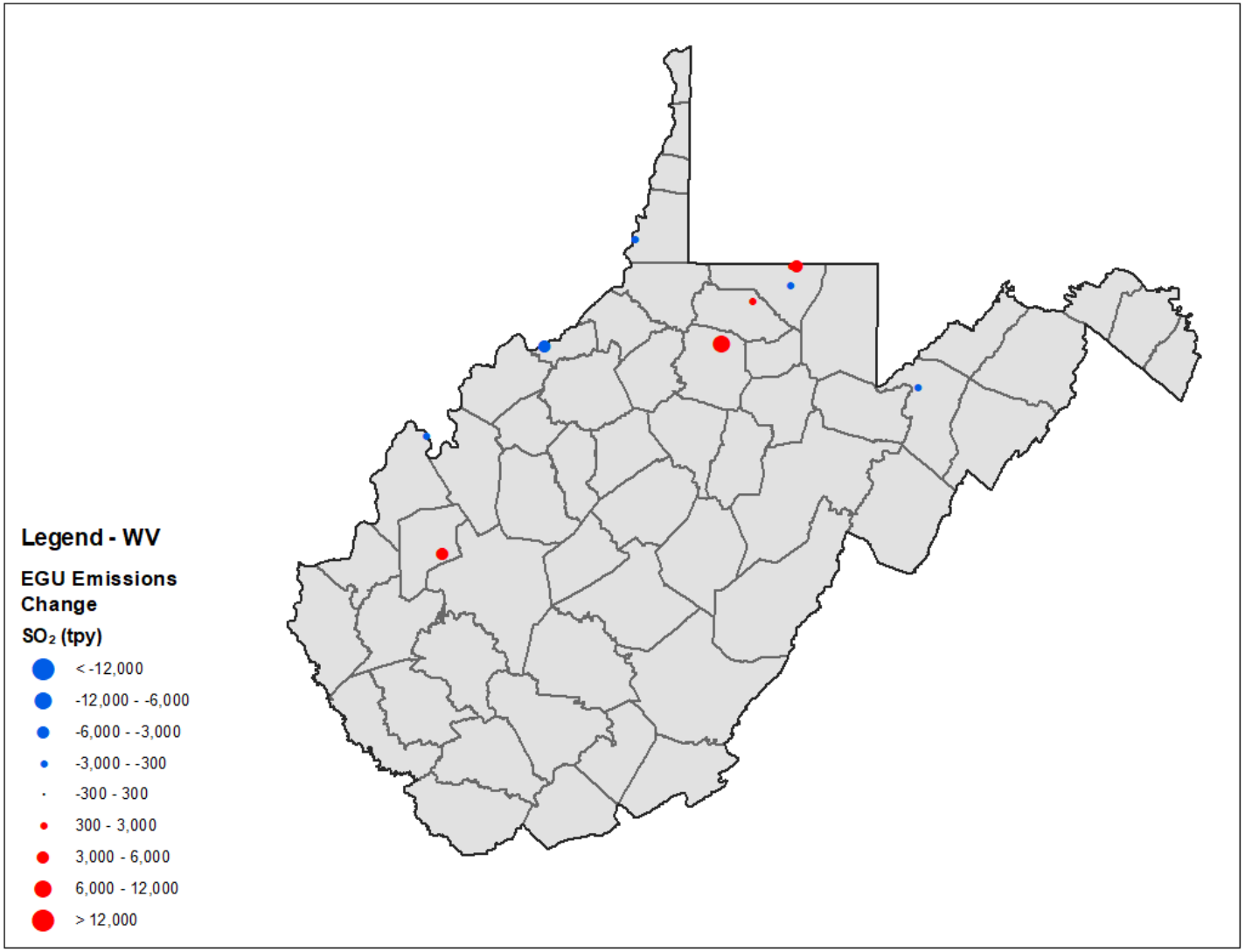

Figure B.10-11. West Virginia Point EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

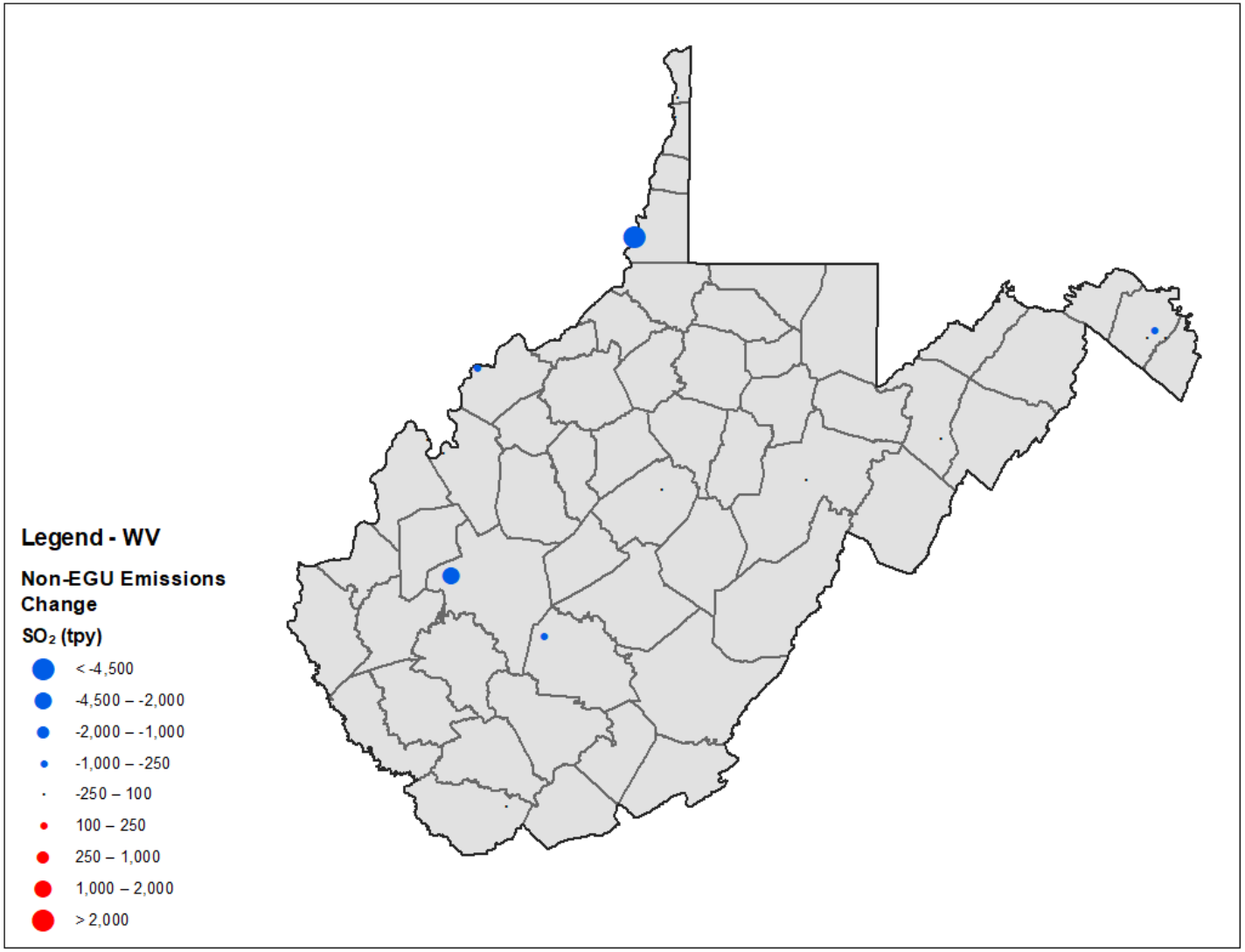

Figure B.10-12. West Virginia Point Non-EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

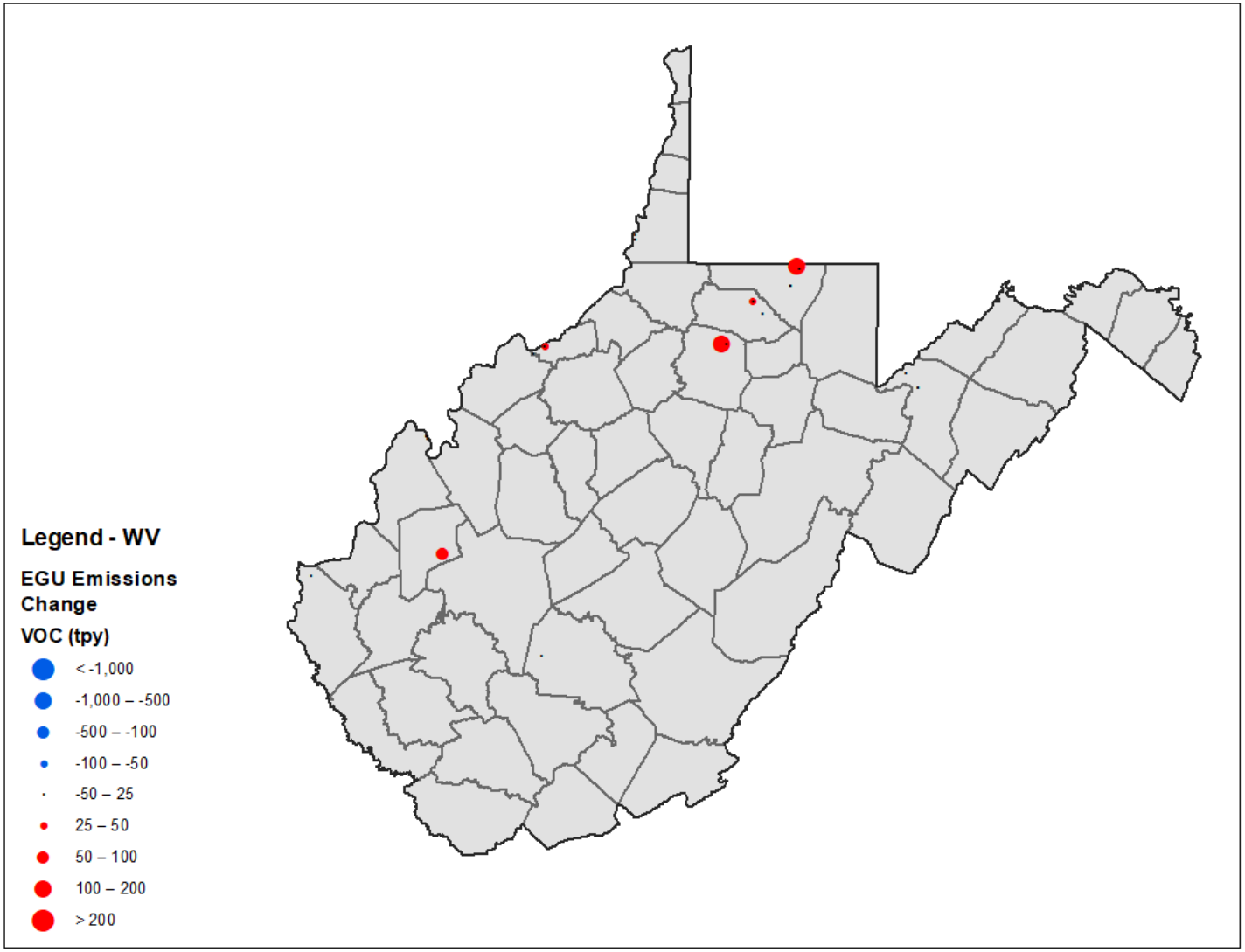

Figure B.10-13. West Virginia Point EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

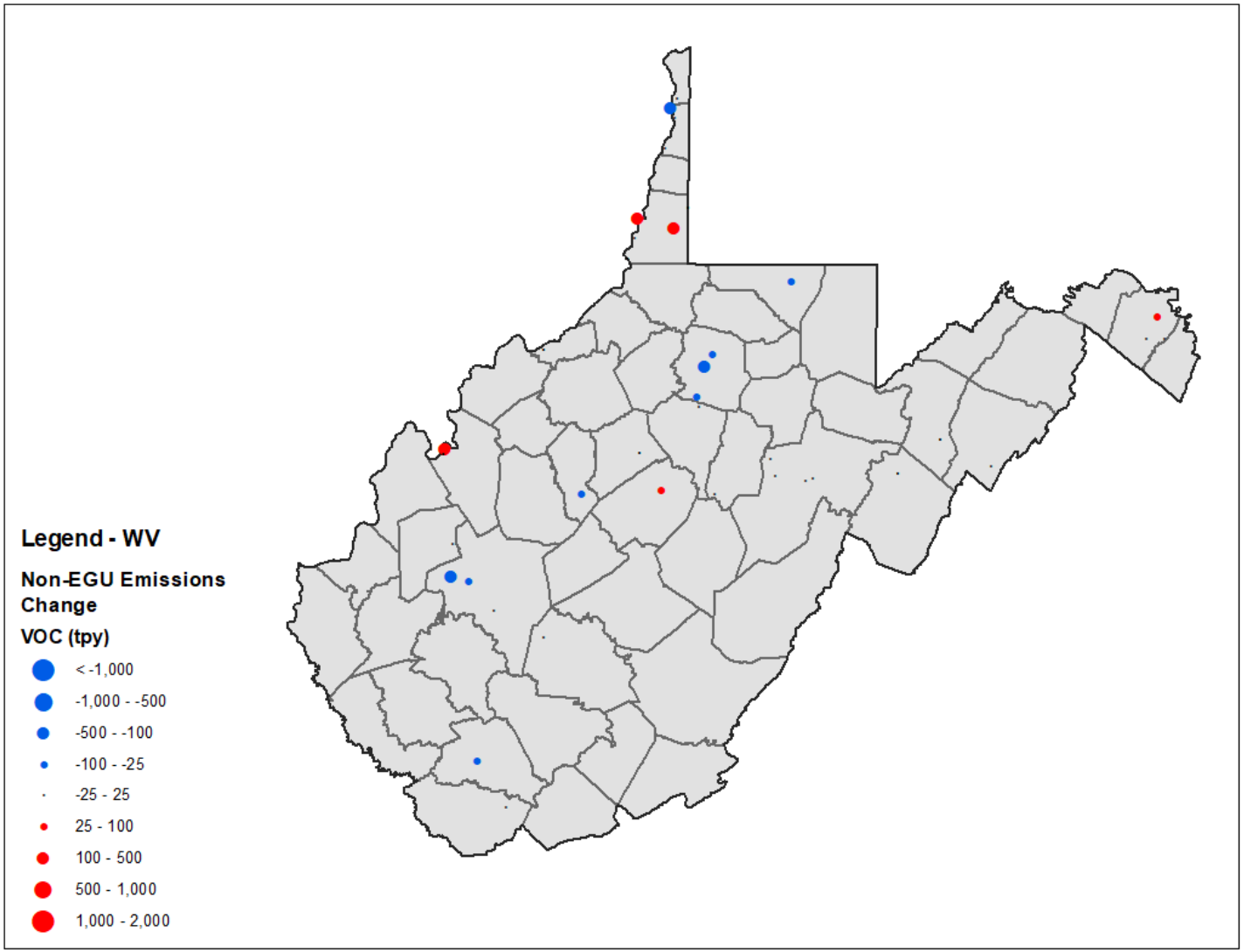

Figure B.10-14. West Virginia Point Non-EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

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Appendix C.

Afdust Sector Unadjusted and Adjusted PM_{10}-PRI and $PM_{2.5}$-PRI Emissions by State

Fugitive dust emissions from source categories are included in the "afdust" sector. In this report, the tables and charts that include PM_{10}-PRI and $PM_{2.5}$-PRI emissions from the "afdust" sector include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for those categories. For air quality modeling, the emissions for the "afdust" sector are adjusted downward to account for the effects of precipitation and the amount of emissions that are transported by physical forces (e.g., wind, vehicle traffic). Appendix C-1 presents SCCs are included in the "afdust" sector. Appendices C-2 and C-3 present the unadjusted and adjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions, respectively.

Appendix C-1. SCCs Included in the "Afdust" Nonpoint Sector File

SCC	SCC Description	Tier 1 Level Description
2275085000	Mobile Sources: Aircraft; Unpaved Air Strips; Total	Miscellaneous
2294000000	Mobile Sources: Paved Roads; All Paved Roads; Total Fugitives	Miscellaneous
2294000002	Mobile Sources: Paved Roads; All Paved Roads; Total Sanding/Salting – Fugitives	Miscellaneous
2296000000	Mobile Sources: Unpaved Roads; All Unpaved Roads; Total Fugitives	Miscellaneous
2296005000	Mobile Sources: Unpaved Roads; Public Unpaved Roads; Total Fugitives	Miscellaneous
2296010000	Mobile Sources: Unpaved Roads; Industrial Unpaved Roads; Total Fugitives	Miscellaneous
2311000000	Industrial Processes; Construction: SIC 15-17; All Processes; Total	Miscellaneous
2311010000	Industrial Processes; Construction: SIC 15-17; Residential; Total	Miscellaneous
2311020000	Industrial Processes; Construction: SIC 15-17; Industrial/Commercial/Institutional; Total	Miscellaneous
2311030000	Industrial Processes; Construction: SIC 15-17; Road Construction; Total	Miscellaneous
2311040000	Industrial Processes; Construction: SIC 15-17; Special Trade Construction; Total	Miscellaneous
2325000000	Industrial Processes; Mining and Quarrying: SIC 14; All Processes; Total	Other Industrial Processes
2325020000	Industrial Processes; Mining and Quarrying: SIC 14; Crushed and Broken Stone; Total	Other Industrial Processes
2325030000	Industrial Processes; Mining and Quarrying: SIC 14; Sand and Gravel; Total	Other Industrial Processes
2801000000	Misc. Area Sources; Agricultural Production – Crops; Agricultural Crops; Total	Other Industrial Processes
2801000002	Misc. Area Sources; Agricultural Production – Crops; Agricultural Crops; Planting	Other Industrial Processes
2801000003	Misc. Area Sources; Agricultural Production – Crops; Agricultural Crops; Tilling	Miscellaneous
2801000005	Misc. Area Sources; Agricultural Production – Crops; Agricultural Crops; Harvesting	Miscellaneous
2801000008	Misc. Area Sources; Agricultural Production – Crops; Agricultural Crops; Transport	Miscellaneous
2805001000	Misc. Area Sources; Agricultural Production – Livestock; Beef cattle – finishing operations on feedlots (drylots)	Miscellaneous

Appendix C-2. Unadjusted and Adjusted PM_{10}-PRI Emissions by State for the "Afdust" Sector

State	2011 Emissions[1]			2028 Emissions[2]		
	Unadjusted PM_{10} Emissions (tpy)	Adjusted PM_{10} Emissions (tpy)	% Difference	Unadjusted PM_{10} Emissions (tpy)	Adjusted PM_{10} Emissions (tpy)	% Difference
Alabama	380,229	68,124	-82%	430,733	76,874	-82%
Florida	293,589	111,780	-62%	380,488	145,257	-62%
Georgia	735,156	139,833	-81%	881,893	164,382	-81%
Kentucky	199,314	39,138	-80%	227,020	43,921	-81%
Mississippi	960,759	174,453	-82%	1,184,397	209,460	-82%
North Carolina	186,065	39,732	-79%	214,913	45,982	-79%
South Carolina	260,399	61,175	-77%	323,526	76,086	-76%
Tennessee	139,126	31,767	-77%	155,433	34,741	-78%
Virginia	131,973	23,097	-82%	146,912	25,859	-82%
West Virginia	85,879	6,211	-93%	85,917	6,215	-93%
Totals	**3,372,490**	**695,311**	**-79%**	**4,031,230**	**828,777**	**-79%**

[1] 2011 State-level unadjusted and adjusted PM_{10}-PRI emissions were obtained from the "afdust" tab in the following file: ftp://ftp.epa.gov/EmisInventory/2011v6/v3platform/reports/2011el_and_2023el/2011el_cb6v2_v6_11g_state_sector_totals.xlsx

[2] 2028 State-level unadjusted and adjusted PM_{10}-PRI emissions were obtained from the "afdust" tab in the following file: ftp://ftp.epa.gov/EmisInventory/2011v6/v3platform/reports/2028el/2028el_cb6v2_v6_11g_state_sector_totals.xlsx

Appendix C-3. Unadjusted and Adjusted $PM_{2.5}$-PRI Emissions by State for the "Afdust" Sector

State	2011 Emissions			2028 Emissions		
	Unadjusted $PM_{2.5}$ Emissions (tpy)	Adjusted $PM_{2.5}$ Emissions (tpy)	% Difference	Unadjusted $PM_{2.5}$ Emissions (tpy)	Adjusted $PM_{2.5}$ Emissions (tpy)	% Difference
Alabama	47,298	8,560	-82%	53,486	9,629	-82%
Florida	39,755	15,304	-62%	51,667	19,976	-61%
Georgia	90,130	18,014	-80%	106,273	20,730	-80%
Kentucky	29,413	5,992	-80%	33,207	6,651	-80%
Mississippi	108,287	21,280	-80%	131,498	24,923	-81%
North Carolina	33,330	7,225	-78%	38,620	8,387	-78%
South Carolina	31,594	7,492	-76%	38,858	9,204	-76%
Tennessee	25,263	5,843	-77%	28,530	6,443	-77%
Virginia	19,402	3,479	-82%	22,449	4,032	-82%
West Virginia	10,646	764	-93%	10,653	765	-93%
Totals	**435,119**	**93,952**	**-79%**	**515,240**	**110,740**	**-79%**

[1] 2011 State-level unadjusted and adjusted PM_{10}-PRI emissions were obtained from the "afdust" tab in the following file: ftp://ftp.epa.gov/EmisInventory/2011v6/v3platform/reports/2011el_and_2023el/2011el_cb6v2_v6_11g_state_sector_totals.xlsx

[2] 2028 State-level unadjusted and adjusted PM_{10}-PRI emissions were obtained from the "afdust" tab in the following file: ftp://ftp.epa.gov/EmisInventory/2011v6/v3platform/reports/2028el/2028el_cb6v2_v6_11g_state_sector_totals.xlsx

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Appendix D.

Tier-Level Emissions by State

Appendix D-1. 2011 Sector 1 Pollutant Emissions (except Biogenic) by State[33]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Alabama							
Chemical & Allied Product Mfg	3,123	183	2,411	704	650	6,559	1,629
Fuel Comb. Elec. Util.	9,958	489	61,687	7,323	4,866	179,323	1,152
Fuel Comb. Industrial	71,865	813	35,447	46,274	34,664	41,322	3,283
Fuel Comb. Other	12,104	466	4,229	1,689	1,654	417	2,038
Highway Vehicles	701,397	2,724	152,732	8,001	4,611	683	75,523
Metals Processing	10,991	76	5,947	5,359	4,647	13,298	1,843
Miscellaneous[33]	670,765	70,977	14,735	445,039	108,297	6,746	159,034
Off-Highway	261,788	44	47,801	3,584	3,369	1,074	43,396
Other Industrial Processes[33]	19,708	1,527	21,546	17,032	8,749	9,569	14,327
Petroleum & Related Industries	14,882	3	11,226	373	354	19,196	22,103
Solvent Utilization	124	2	135	83	61	1	46,790
Storage & Transport	65	<0.5	51	870	653	2	18,726
Waste Disposal & Recycling	45,712	105	1,876	7,885	6,531	175	3,620
Alabama 2011 Totals[a]	**1,822,482**	**77,408**	**359,822**	**544,218**	**179,105**	**278,364**	**393,465**

[a] Total emissions may not add up due to rounding

[33] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-1. 2011 Sector 1 Pollutant Emissions (except Biogenic) by State[34]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Florida							
Chemical & Allied Product Mfg	117	1,662	1,393	415	348	21,948	1,231
Fuel Comb. Elec. Util.	36,344	3,102	69,049	11,621	9,607	95,087	1,931
Fuel Comb. Industrial	72,200	710	31,291	33,061	28,979	15,715	4,576
Fuel Comb. Other	25,015	352	4,601	3,498	3,448	1,183	4,330
Highway Vehicles	1,784,678	7,465	308,752	21,329	9,377	2,104	183,609
Metals Processing	742	<0.5	80	199	165	337	62
Miscellaneous[34]	992,515	53,791	22,844	384,091	129,258	10,473	231,259
Off-Highway	1,120,490	172	159,796	14,009	13,181	20,051	166,582
Other Industrial Processes[34]	13,065	372	8,885	28,504	11,836	4,338	14,485
Petroleum & Related Industries	802	NR[a]	279	92	63	211	2,847
Solvent Utilization	3	NR[a]	2	34	30	<0.5	151,477
Storage & Transport	104	37	154	1,177	592	29	101,966
Waste Disposal & Recycling	27,944	394	1,240	4,151	3,492	1,224	2,707
Florida 2011 Totals[b]	**4,074,019**	**68,056**	**608,367**	**502,180**	**210,376**	**172,701**	**867,062**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[34] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-1. 2011 Sector 1 Pollutant Emissions (except Biogenic) by State[35]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Georgia							
Chemical & Allied Product Mfg	502	2,376	959	476	408	1,580	2,571
Fuel Comb. Elec. Util.	13,543	739	56,037	9,061	6,298	188,009	1,195
Fuel Comb. Industrial	21,837	256	22,274	3,198	2,752	21,358	1,737
Fuel Comb. Other	20,021	1,315	11,233	2,204	2,152	4,660	3,056
Highway Vehicles	1,018,645	4,492	223,223	12,518	6,829	1,088	109,005
Metals Processing	344	NR[a]	149	156	82	92	57
Miscellaneous[35]	1,022,524	99,060	40,646	858,861	220,258	11,424	78,048
Off-Highway	471,960	73	74,217	5,923	5,594	2,562	60,843
Other Industrial Processes[35]	24,548	3,306	15,893	47,506	17,925	3,705	22,763
Petroleum & Related Industries	6	NR[a]	NR[a]	23	11	NR[a]	132
Solvent Utilization	25	36	30	31	30	<0.5	84,352
Storage & Transport	49	1	21	1,015	511	NR[a]	33,985
Waste Disposal & Recycling	227,703	52	7,636	26,852	26,222	223	17,363
Georgia 2011 Totals[b]	**2,821,707**	**111,705**	**452,317**	**967,825**	**289,072**	**234,700**	**415,106**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[35] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-1. 2011 Sector 1 Pollutant Emissions (except Biogenic) by State[36]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Kentucky							
Chemical & Allied Product Mfg	62	28	241	817	708	1,663	2,202
Fuel Comb. Elec. Util.	15,547	757	92,756	13,874	9,495	247,556	1,749
Fuel Comb. Industrial	10,848	97	20,009	2,247	1,981	5,774	1,422
Fuel Comb. Other	48,175	908	5,765	6,891	6,781	1,868	8,390
Highway Vehicles	498,702	2,106	115,685	5,480	3,345	502	50,326
Metals Processing	61,446	1	1,611	4,151	3,402	6,021	2,081
Miscellaneous[36]	190,510	53,765	3,486	204,775	44,517	1,742	43,514
Off-Highway	201,625	46	56,646	3,573	3,392	641	31,999
Other Industrial Processes[36]	4,985	321	5,682	26,177	9,042	6,468	31,759
Petroleum & Related Industries	31,312	NR[a]	24,707	683	633	522	31,085
Solvent Utilization	3	<0.5	5	83	73	<0.5	44,118
Storage & Transport	23	85	6	2,005	484	3	22,606
Waste Disposal & Recycling	25,288	16	1,156	5,335	4,532	161	2,352
Kentucky 2011 Totals[b]	**1,088,525**	**58,131**	**327,756**	**276,088**	**88,386**	**272,922**	**273,603**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[36] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-1. 2011 Sector 1 Pollutant Emissions (except Biogenic) by State[37]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Mississippi							
Chemical & Allied Product Mfg	7,477	521	1,864	487	430	1,377	1,317
Fuel Comb. Elec. Util.	6,154	402	26,602	2,084	1,627	43,259	487
Fuel Comb. Industrial	14,794	1	32,381	3,448	2,935	6,397	3,428
Fuel Comb. Other	7,450	288	2,885	1,029	997	50	1,200
Highway Vehicles	433,332	1,794	91,026	4,491	2,538	405	46,084
Metals Processing	1,313	NR[a]	381	549	546	124	127
Miscellaneous[37]	372,960	61,162	9,080	996,316	142,022	4,248	81,272
Off-Highway	153,473	31	33,132	2,493	2,353	1,029	29,662
Other Industrial Processes[37]	5,127	560	3,204	8,129	5,372	678	10,915
Petroleum & Related Industries	4,592	36	3,641	257	200	6,240	28,840
Solvent Utilization	31	NR[a]	39	115	105	<0.5	38,358
Storage & Transport	368	NR[a]	71	109	70	42	29,068
Waste Disposal & Recycling	42,760	805	1,591	6,657	5,392	91	3,780
Mississippi 2011 Totals[b]	**1,049,833**	**65,600**	**205,895**	**1,026,163**	**164,587**	**63,940**	**274,537**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[37] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-1. 2011 Sector 1 Pollutant Emissions (except Biogenic) by State[38]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
North Carolina							
Chemical & Allied Product Mfg	7,188	658	1,286	738	472	5,507	2,756
Fuel Comb. Elec. Util.	32,828	205	43,911	8,790	6,921	83,925	934
Fuel Comb. Industrial	16,197	75	24,394	3,828	2,899	12,354	1,500
Fuel Comb. Other	29,163	878	9,652	4,724	4,323	7,757	4,611
Highway Vehicles	1,145,623	4,486	204,008	10,447	5,510	1,082	112,173
Metals Processing	2,675	27	324	355	308	556	1,493
Miscellaneous[38]	101,890	168,297	4,047	195,376	45,672	1,068	7,851
Off-Highway	479,335	71	68,433	5,742	5,435	2,472	63,283
Other Industrial Processes[38]	5,731	605	10,261	14,515	6,970	3,279	15,218
Petroleum & Related Industries	773	NR[a]	263	249	160	432	306
Solvent Utilization	53	74	72	145	121	31	95,419
Storage & Transport	2,174	57	125	590	306	7	24,731
Waste Disposal & Recycling	66,928	67	2,720	11,151	9,386	251	5,613
North Carolina 2011 Totals[b]	**1,890,559**	**175,499**	**369,497**	**256,650**	**88,483**	**118,721**	**335,887**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[38] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-1. 2011 Sector 1 Pollutant Emissions (except Biogenic) by State[39]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
South Carolina							
Chemical & Allied Product Mfg	1,217	145	165	132	77	9	2,110
Fuel Comb. Elec. Util.	16,809	268	26,752	10,851	8,604	71,899	607
Fuel Comb. Industrial	19,560	134	17,924	10,314	8,273	15,748	1,103
Fuel Comb. Other	12,508	367	3,283	1,701	1,660	339	2,128
Highway Vehicles	475,876	2,104	109,374	6,618	3,766	504	51,164
Metals Processing	53,733	2	780	572	480	5,139	457
Miscellaneous[39]	214,147	33,020	4,602	280,281	51,363	1,978	48,908
Off-Highway	240,507	37	35,569	3,036	2,856	2,268	35,104
Other Industrial Processes[39]	17,912	1,056	10,251	7,581	4,149	5,223	15,036
Petroleum & Related Industries	NR[a]	NR[a]	NR[a]	NR[a]	NR[a]	NR[a]	31
Solvent Utilization	7	<0.5	1	14	13	<0.5	41,039
Storage & Transport	39	3	26	346	139	1	30,397
Waste Disposal & Recycling	48,668	639	1,817	7,055	5,746	140	4,073
South Carolina 2011 Totals[b]	**1,100,985**	**37,776**	**210,544**	**328,503**	**87,125**	**103,247**	**232,159**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[39] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-1. 2011 Sector 1 Pollutant Emissions (except Biogenic) by State[40]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Tennessee							
Chemical & Allied Product Mfg	14,866	310	811	755	426	492	4,412
Fuel Comb. Elec. Util.	5,529	242	27,156	5,191	4,172	120,170	769
Fuel Comb. Industrial	18,910	347	27,988	10,632	9,018	27,778	1,129
Fuel Comb. Other	25,945	787	9,207	3,470	3,182	5,441	5,168
Highway Vehicles	739,041	3,017	182,796	9,927	5,778	769	80,463
Metals Processing	5,066	2	611	1,492	1,251	572	2,923
Miscellaneous[40]	133,301	36,940	2,840	150,164	36,986	1,347	31,052
Off-Highway	309,062	53	60,384	4,242	4,010	767	46,292
Other Industrial Processes[40]	5,668	488	7,449	11,527	6,034	2,550	15,672
Petroleum & Related Industries	2,706	5	1,812	189	160	243	3,559
Solvent Utilization	72	72	84	328	288	15	67,091
Storage & Transport	56	57	37	520	238	5	29,921
Waste Disposal & Recycling	26,959	28	1,392	5,710	4,813	174	2,549
Tennessee 2011 Totals[a]	**1,287,181**	**42,346**	**322,564**	**204,145**	**76,357**	**160,323**	**291,002**

[a] Total emissions may not add up due to rounding

[40] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-1. 2011 Sector 1 Pollutant Emissions (except Biogenic) by State[41]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Virginia							
Chemical & Allied Product Mfg	83	816	7,707	169	73	203	486
Fuel Comb. Elec. Util.	4,984	205	30,213	5,794	1,157	69,077	742
Fuel Comb. Industrial	13,713	226	22,048	5,883	4,817	14,349	950
Fuel Comb. Other	77,919	1,596	11,470	11,302	11,002	4,884	12,940
Highway Vehicles	566,315	3,341	145,507	7,106	4,368	711	63,152
Metals Processing	3,016	NR[a]	812	859	724	5,196	270
Miscellaneous[41]	167,730	45,744	3,186	141,777	33,384	1,487	39,308
Off-Highway	383,506	61	67,844	5,029	4,747	3,355	48,417
Other Industrial Processes[41]	5,644	399	12,766	12,394	5,001	7,028	6,937
Petroleum & Related Industries	12,445	76	9,618	406	284	59	8,525
Solvent Utilization	<0.5	5	0.1435	66	61	<0.5	85,760
Storage & Transport	5	44	2	351	286	<0.5	23,556
Waste Disposal & Recycling	33,103	63	2,283	5,745	4,925	1,469	4,317
Virginia 2011 Totals[b]	**1,268,463**	**52,578**	**313,457**	**196,881**	**70,829**	**107,819**	**295,360**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[41] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-1. 2011 Sector 1 Pollutant Emissions (except Biogenic) by State[42]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
West Virginia							
Chemical & Allied Product Mfg	247	64	402	330	246	145	2,000
Fuel Comb. Elec. Util.	10,106	63	54,289	11,066	9,100	93,080	1,011
Fuel Comb. Industrial	4,424	37	16,592	1,977	1,086	16,306	540
Fuel Comb. Other	19,471	433	8,661	2,893	2,803	760	4,059
Highway Vehicles	185,437	734	41,840	2,101	1,269	179	20,493
Metals Processing	24,179	14	1,806	1,468	1,046	2,069	520
Miscellaneous[42]	86,791	10,610	1,296	76,122	15,876	684	20,396
Off-Highway	89,194	18	22,397	1,428	1,341	204	15,934
Other Industrial Processes[42]	2,726	103	2,464	21,016	3,655	1,983	1,283
Petroleum & Related Industries	27,645	NR[a]	22,041	692	594	6,144	47,734
Solvent Utilization	<0.5	<0.5	<0.5	13	13	<0.5	14,315
Storage & Transport	2	1	4	465	182	<0.5	8,621
Waste Disposal & Recycling	31,785	8	1,152	4,840	3,981	63	2,622
West Virginia 2011 Totals[b]	**482,008**	**12,084**	**172,944**	**124,409**	**41,192**	**121,618**	**139,527**
SESARM 2011 Totals[b]	**16,885,761**	**701,183**	**3,343,164**	**4,427,062**	**1,295,512**	**1,634,354**	**3,517,706**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[42] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-2. 2028 Sector 1 Pollutant Emissions (except Biogenic) by State[43]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Alabama							
Chemical & Allied Product Mfg	3,122	183	2,409	704	650	6,559	1,576
Fuel Comb. Elec. Util.	8,013	458	25,166	2,938	1,930	15,770	974
Fuel Comb. Industrial	76,032	978	29,444	47,518	39,300	19,774	3,614
Fuel Comb. Other	11,352	462	4,100	1,584	1,549	193	1,796
Highway Vehicles	182,602	1,703	30,113	4,984	1,322	262	15,013
Metals Processing	10,989	76	5,943	5,356	4,643	13,298	1,817
Miscellaneous[43]	666,279	76,738	14,567	494,515	113,981	6,679	158,720
Off-Highway	253,400	52	25,355	1,781	1,653	193	22,709
Other Industrial Processes[43]	18,938	1,421	21,060	16,274	8,098	8,275	13,929
Petroleum & Related Industries	10,654	3	7,474	315	295	33,296	15,244
Solvent Utilization	119	2	120	74	54	1	46,658
Storage & Transport	65	0.2	51	870	653	2	12,341
Waste Disposal & Recycling	45,712	105	1,876	7,885	6,531	175	3,620
Alabama 2028 Totals[a]	**1,287,276**	**82,180**	**167,681**	**584,798**	**180,657**	**104,477**	**298,010**

[a] Total emissions may not add up due to rounding

[43] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-2. 2028 Sector 1 Pollutant Emissions (except Biogenic) by State[44]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Florida							
Chemical & Allied Product Mfg	117	376	1,288	357	303	20,254	1,230
Fuel Comb. Elec. Util.	27,930	3,501	28,690	8,321	7,516	29,230	1,460
Fuel Comb. Industrial	78,826	572	29,845	38,119	33,502	8,460	3,615
Fuel Comb. Other	23,849	348	4,588	3,278	3,248	303	3,860
Highway Vehicles	679,511	5,737	72,019	19,834	4,412	823	51,019
Metals Processing	480	0.247	80	192	159	31	49
Miscellaneous[44]	960,190	54,601	21,346	466,941	138,297	9,727	228,825
Off-Highway	1,125,776	213	94,782	6,737	6,231	2,973	88,560
Other Industrial Processes[44]	13,065	372	9,127	28,238	11,664	4,315	14,315
Petroleum & Related Industries	828	NR[a]	293	93	64	211	2,252
Solvent Utilization	3	NR[a]	2	33	30	<0.5	151,367
Storage & Transport	104	37	154	1,008	537	28	68,391
Waste Disposal & Recycling	27,924	339	1,233	4,148	3,489	1,143	2,707
Florida 2028 Totals[b]	**2,938,603**	**66,097**	**263,448**	**577,298**	**209,451**	**77,497**	**617,650**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[44] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-2. 2028 Sector 1 Pollutant Emissions (except Biogenic) by State[45]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Georgia							
Chemical & Allied Product Mfg	476	2,266	931	406	353	1,054	2,399
Fuel Comb. Elec. Util.	10,767	844	26,793	5,232	4,317	19,311	1,032
Fuel Comb. Industrial	19,771	435	17,788	2,672	2,311	9,769	1,618
Fuel Comb. Other	19,536	1,312	10,857	1,998	1,950	4,187	2,730
Highway Vehicles	305,264	2,983	48,973	8,914	2,289	443	25,629
Metals Processing	344	NR[a]	149	156	82	92	57
Miscellaneous[45]	984,133	107,020	39,003	998,804	232,719	10,688	75,220
Off-Highway	477,533	91	40,838	2,974	2,769	967	36,837
Other Industrial Processes[45]	17,280	3,202	13,130	45,021	15,808	2,268	20,583
Petroleum & Related Industries	6	NR[a]	NR[a]	22	13	NR[a]	131
Solvent Utilization	24	36	28	31	30	<0.5	83,997
Storage & Transport	49	1	21	1,014	502	NR[a]	23,439
Waste Disposal & Recycling	227,696	52	7,628	26,851	26,221	222	17,361
Georgia 2028 Totals[b]	**2,062,878**	**118,241**	**206,140**	**1,094,094**	**289,364**	**49,002**	**291,033**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[45] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-2. 2028 Sector 1 Pollutant Emissions (except Biogenic) by State[46]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Kentucky							
Chemical & Allied Product Mfg	62	25	241	816	708	393	2,189
Fuel Comb. Elec. Util.	12,308	678	37,366	6,120	4,809	56,410	1,236
Fuel Comb. Industrial	10,870	106	17,876	2,505	2,214	4,819	1,031
Fuel Comb. Other	43,582	881	5,477	6,158	6,072	1,166	7,183
Highway Vehicles	157,636	1,437	27,819	3,448	1,015	209	12,938
Metals Processing	61,446	1	1,611	4,111	3,383	6,021	2,081
Miscellaneous[46]	180,432	55,494	3,034	230,661	47,310	1,528	42,725
Off-Highway	193,150	55	29,793	1,557	1,464	402	17,094
Other Industrial Processes[46]	4,992	266	5,662	25,695	8,753	6,465	31,489
Petroleum & Related Industries	67,128	NR[a]	47,426	2,795	2,745	1,561	44,846
Solvent Utilization	3	<0.5	5	81	72	<0.5	44,031
Storage & Transport	23	85	6	1,820	431	3	16,169
Waste Disposal & Recycling	25,288	16	1,156	5,330	4,527	161	2,352
Kentucky 2028 Totals[a]	**756,920**	**59,045**	**177,472**	**291,097**	**83,504**	**79,141**	**225,363**

[a] Total emissions may not add up due to rounding

[46] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-2. 2028 Sector 1 Pollutant Emissions (except Biogenic) by State[47]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Mississippi							
Chemical & Allied Product Mfg	7,477	521	1,864	482	428	1,377	1,317
Fuel Comb. Elec. Util.	4,958	614	18,755	1,484	1,182	6,530	476
Fuel Comb. Industrial	16,127	11	27,658	3,464	2,826	1,631	3,253
Fuel Comb. Other	7,009	286	2,848	967	935	50	1,056
Highway Vehicles	117,589	1,115	17,788	3,100	814	165	9,317
Metals Processing	1,202	NR[a]	362	297	294	123	103
Miscellaneous[47]	325,044	66,069	6,803	1,211,587	160,523	3,165	77,346
Off-Highway	143,429	36	16,707	1,074	999	143	14,770
Other Industrial Processes[47]	5,047	561	2,592	7,613	4,909	654	10,632
Petroleum & Related Industries	5,412	38	4,105	322	270	10,400	24,313
Solvent Utilization	30	NR[a]	37	113	104	<0.5	37,486
Storage & Transport	368	NR[a]	71	96	64	42	20,947
Waste Disposal & Recycling	42,760	805	1,591	6,657	5,392	91	3,843
Mississippi 2028 Totals[b]	**676,453**	**70,055**	**101,181**	**1,237,255**	**178,739**	**24,373**	**204,858**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[47] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-2. 2028 Sector 1 Pollutant Emissions (except Biogenic) by State[48]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
North Carolina							
Chemical & Allied Product Mfg	693	471	879	1,184	462	5,056	3,712
Fuel Comb. Elec. Util.	14,420	107	28,463	3,953	3,456	18,869	936
Fuel Comb. Industrial	14,306	93	16,645	2,867	2,386	5,129	1,164
Fuel Comb. Other	28,845	880	9,790	4,604	4,246	5,970	4,302
Highway Vehicles	252,167	2,730	30,968	6,512	1,646	311	21,709
Metals Processing	2,122	49	454	547	471	433	1,005
Miscellaneous[48]	86,087	183,286	3,500	221,483	49,500	956	6,672
Off-Highway	471,127	89	39,379	2,994	2,798	1,055	37,520
Other Industrial Processes[48]	11,412	681	12,529	18,192	8,780	5,108	20,374
Petroleum & Related Industries	1,007	<0.5	305	295	263	412	354
Solvent Utilization	79	50	103	177	165	8	110,199
Storage & Transport	278	41	128	654	412	11	15,117
Waste Disposal & Recycling	67,028	53	2,772	11,153	9,420	213	5,800
North Carolina 2028 Totals[a]	**949,572**	**188,530**	**145,916**	**274,614**	**84,004**	**43,530**	**228,865**

[a] Total emissions may not add up due to rounding

[48] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-2. 2028 Sector 1 Pollutant Emissions (except Biogenic) by State[49]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
South Carolina							
Chemical & Allied Product Mfg	1,217	145	165	131	76	4	1,843
Fuel Comb. Elec. Util.	13,453	735	10,808	3,267	2,646	10,760	553
Fuel Comb. Industrial	21,206	259	17,560	11,291	9,502	9,387	1,143
Fuel Comb. Other	11,800	363	3,351	1,580	1,546	309	1,867
Highway Vehicles	155,913	1,410	23,263	4,504	1,152	215	12,546
Metals Processing	53,811	2	861	581	490	5,182	457
Miscellaneous[49]	200,969	34,470	4,033	341,123	56,686	1,902	47,771
Off-Highway	233,340	46	19,154	1,477	1,369	360	19,097
Other Industrial Processes[49]	17,827	1,004	11,697	7,313	3,898	5,724	14,800
Petroleum & Related Industries	NR[a]	NR[a]	NR[a]	NR[a]	NR[a]	NR[a]	29
Solvent Utilization	7	<0.5	1	14	12	<0.5	39,452
Storage & Transport	39	3	26	283	119	1	21,258
Waste Disposal & Recycling	48,668	639	1,817	7,055	5,745	140	4,073
South Carolina 2028 Totals[b]	**758,251**	**39,076**	**92,735**	**378,619**	**83,242**	**33,985**	**164,889**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[49] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-2. 2028 Sector 1 Pollutant Emissions (except Biogenic) by State[50]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Tennessee							
Chemical & Allied Product Mfg	14,862	310	804	755	426	489	4,397
Fuel Comb. Elec. Util.	4,560	181	10,278	3,848	3,412	12,143	679
Fuel Comb. Industrial	22,827	386	25,501	12,314	10,713	8,149	1,253
Fuel Comb. Other	23,479	779	8,441	3,044	2,928	779	4,906
Highway Vehicles	233,423	2,130	44,927	6,734	1,811	338	20,483
Metals Processing	5,066	2	611	1,492	1,251	681	2,923
Miscellaneous[50]	124,792	38,101	2,450	165,066	39,404	1,162	30,344
Off-Highway	298,569	64	33,596	2,032	1,898	625	25,501
Other Industrial Processes[50]	6,237	463	8,575	11,243	5,776	1,702	14,828
Petroleum & Related Industries	4,956	5	3,193	307	278	149	3,517
Solvent Utilization	72	72	84	328	288	15	67,091
Storage & Transport	56	9	29	406	187	4	19,812
Waste Disposal & Recycling	26,959	28	1,392	5,710	4,813	137	2,839
Tennessee 2028 Totals[a]	**765,859**	**42,528**	**139,878**	**213,278**	**73,186**	**26,374**	**198,572**

[a] Total emissions may not add up due to rounding

[50] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-2. 2028 Sector 1 Pollutant Emissions (except Biogenic) by State[51]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Virginia							
Chemical & Allied Product Mfg	83	657	1,734	169	73	203	486
Fuel Comb. Elec. Util.	6,247	420	11,654	2,962	1,555	2,854	987
Fuel Comb. Industrial	10,401	204	13,968	4,968	4,288	5,754	846
Fuel Comb. Other	74,900	1,581	11,035	10,748	10,507	3,264	11,877
Highway Vehicles	232,611	2,242	35,427	4,302	1,309	279	18,550
Metals Processing	3,016	NR[a]	812	859	723	5,196	270
Miscellaneous[51]	164,877	48,195	3,077	156,214	36,128	1,439	39,107
Off-Highway	391,290	75	37,836	2,576	2,398	892	30,266
Other Industrial Processes[51]	7,097	400	10,891	12,800	5,386	5,652	7,093
Petroleum & Related Industries	12,993	76	9,748	545	424	65	12,152
Solvent Utilization	<0.5	5	<0.5	68	63	<0.5	93,969
Storage & Transport	6	44	2	353	301	<0.5	16,225
Waste Disposal & Recycling	33,192	64	2,305	5,758	4,932	1,483	4,380
Virginia 2028 Totals[b]	**936,713**	**53,964**	**138,488**	**202,322**	**68,087**	**27,083**	**236,207**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[51] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-2. 2028 Sector 1 Pollutant Emissions (except Biogenic) by State[52]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
West Virginia							
Chemical & Allied Product Mfg	249	35	278	296	229	106	1,558
Fuel Comb. Elec. Util.	12,970	70	46,733	11,500	9,575	57,830	1,101
Fuel Comb. Industrial	4,242	31	11,134	1,337	538	6,241	590
Fuel Comb. Other	18,096	427	6,639	2,750	2,671	672	3,477
Highway Vehicles	55,258	489	10,124	1,273	375	72	5,208
Metals Processing	23,830	13	1,520	981	600	1,670	483
Miscellaneous[52]	86,171	11,240	1,277	76,051	15,810	677	20,356
Off-Highway	89,373	20	11,934	696	649	35	8,932
Other Industrial Processes[52]	2,510	107	2,012	20,347	3,594	1,244	1,446
Petroleum & Related Industries	42,004	NR[a]	29,237	1,514	1,511	191	130,182
Solvent Utilization	<0.5	NR[a]	NR[a]	2	2	NR[a]	13,613
Storage & Transport	2	<0.5	21	208	71	<0.5	5,687
Waste Disposal & Recycling	31,785	8	1,152	4,840	3,981	63	2,622
West Virginia 2028 Totals[b]	**366,490**	**12,439**	**122,060**	**121,793**	**39,605**	**68,802**	**195,256**
SESARM 2028 Totals[b]	**11,499,015**	**732,154**	**1,555,000**	**4,975,169**	**1,289,838**	**534,264**	**2,660,703**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[52] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-3. Percent Emissions Change from 2011 to 2028 by Tier 1 Level, Pollutant, and State[53]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	% Difference						
Alabama							
Chemical & Allied Product Mfg	<-1%	<-1%	<-1%	<-1%	<-1%	<-1%	-3%
Fuel Comb. Elec. Util.	-20%	-6%	-59%	-60%	-60%	-91%	-15%
Fuel Comb. Industrial	6%	20%	-17%	3%	13%	-52%	10%
Fuel Comb. Other	-6%	-1%	-3%	-6%	-6%	-54%	-12%
Highway Vehicles	-74%	-37%	-80%	-38%	-71%	-62%	-80%
Metals Processing	<-1%	<-1%	<-1%	<-1%	<-1%	<-1%	-11%
Miscellaneous[53]	-1%	8%	-1%	11%	5%	-1%	<-1%
Off-Highway	-3%	19%	-47%	-50%	-51%	-82%	-48%
Other Industrial Processes[53]	-4%	-7%	-2%	-4%	-7%	-14%	-3%
Petroleum & Related Industries	-28%	<1%	-33%	-16%	-17%	73%	-31%
Solvent Utilization	-5%	-7%	-11%	-11%	-12%	-39%	<-1%
Storage & Transport	<-1%	<1%	<1%	<1%	<1%	<1%	-34%
Waste Disposal & Recycling	<1%	<-1%	<1%	<-1%	<-1%	<-1%	<1%
Alabama % Difference	**-29%**	**6%**	**-53%**	**7%**	**<-1%**	**-63%**	**-24%**

[53] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-3. Percent Emissions Change from 2011 to 2028 by Tier 1 Level, Pollutant, and State[54]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	% Difference						
Florida							
Chemical & Allied Product Mfg	<-1%	-77%	-8%	-14%	-13%	-8%	<-1%
Fuel Comb. Elec. Util.	-23%	13%	-58%	-28%	-22%	-69%	-24%
Fuel Comb. Industrial	9%	-19%	-5%	15%	16%	-46%	-21%
Fuel Comb. Other	-5%	-1%	<-1%	-6%	-6%	-74%	-11%
Highway Vehicles	-62%	-23%	-77%	-7%	-53%	-61%	-72%
Metals Processing	-35%	<-1%	<-1%	-3%	-4%	-91%	-21%
Miscellaneous[54]	-3%	2%	-7%	22%	7%	-7%	-1%
Off-Highway	<1%	24%	-41%	-52%	-53%	-85%	-47%
Other Industrial Processes[54]	<-1%	<-1%	33%	-1%	1%	-1%	-1%
Petroleum & Related Industries	3%	NA[a]	5%	1%	2%	<-1%	-21%
Solvent Utilization	<1%	NA[a]	<1%	-3%	-3%	<1%	<-1%
Storage & Transport	<1%	<-1%	<1%	-14%	-10%	-5%	-33%
Waste Disposal & Recycling	<-1%	-14%	-1%	<-1%	<1%	-7%	<-1%
Florida % Difference	**-28%**	**-3%**	**-57%**	**15%**	**<-1%**	**-55%**	**-29%**

[a] NA: No calculation is possible

[54] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-3. Percent Emissions Change from 2011 to 2028 by Tier 1 Level, Pollutant, and State[55]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	% Difference						
Georgia							
Chemical & Allied Product Mfg	-5%	-5%	-3%	-15%	-13%	-33%	-7%
Fuel Comb. Elec. Util.	-21%	14%	-55%	-43%	-31%	-90%	-14%
Fuel Comb. Industrial	-9%	70%	-20%	-17%	-16%	-54%	-7%
Fuel Comb. Other	-2%	<-1%	-3%	-9%	-9%	-10%	-11%
Highway Vehicles	-70%	-34%	-78%	-29%	-66%	-59%	-76%
Metals Processing	<-1%	NA[1]	<-1%	<1%	<-1%	<1%	-1%
Miscellaneous[55]	-4%	8%	-4%	16%	6%	-6%	-4%
Off-Highway	1%	25%	-45%	-50%	-51%	-62%	-39%
Other Industrial Processes[55]	-30%	-3%	-17%	-5%	-12%	-39%	-10%
Petroleum & Related Industries	1%	NA[a]	NA[a]	-6%	22%	NA[a]	-1%
Solvent Utilization	-3%	<-1%	-6%	-1%	-1%	-4%	<-1%
Storage & Transport	<1%	1%	<-1%	<-1%	-2%	NA[a]	-31%
Waste Disposal & Recycling	<-1%	<-1%	<-1%	<-1%	<-1%	<-1%	<-1%
Georgia % Difference	**-27%**	**6%**	**-54%**	**13%**	**<1%**	**-79%**	**-30%**

[a] NA: No calculation is possible

[55] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-3. Percent Emissions Change from 2011 to 2028 by Tier 1 Level, Pollutant, and State[56]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	% Difference						
Kentucky							
Chemical & Allied Product Mfg	<1%	-13%	<-1%	<-1%	<-1%	-76%	-1%
Fuel Comb. Elec. Util.	-21%	-10%	-60%	-56%	-49%	-77%	-29%
Fuel Comb. Industrial	<1%	9%	-11%	12%	12%	-17%	-28%
Fuel Comb. Other	-10%	-3%	-5%	-11%	-10%	-38%	-14%
Highway Vehicles	-68%	-32%	-76%	-37%	-70%	-58%	-74%
Metals Processing	<-1%	<-1%	<-1%	-1%	-1%	<-1%	<-1%
Miscellaneous[56]	-5%	3%	-13%	13%	6%	-13%	-2%
Off-Highway	-4%	19%	-47%	-56%	-57%	-37%	-47%
Other Industrial Processes[56]	<1%	-17%	<-1%	-2%	-3%	<-1%	-1%
Petroleum & Related Industries	114%	NA[a]	92%	309%	334%	199%	44%
Solvent Utilization	<1%	<1%	<-1%	-3%	-2%	<1%	<-1%
Storage & Transport	<-1%	<-1%	<-1%	-9%	-11%	<-1%	-28%
Waste Disposal & Recycling	<-1%	<1%	<1%	<-1%	<-1%	<1%	<-1%
Kentucky % Difference	**-30%**	**2%**	**-46%**	**5%**	**-6%**	**-71%**	**-18%**

[a] NA: No calculation is possible

[56] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-3. Percent Emissions Change from 2011 to 2028 by Tier 1 Level, Pollutant, and State[57]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	% Difference						
Mississippi							
Chemical & Allied Product Mfg	<-1%	<1%	<1%	-1%	<-1%	<-1%	<1%
Fuel Comb. Elec. Util.	-20%	53%	-30%	-29%	-27%	-85%	-2%
Fuel Comb. Industrial	9%	1066%	-15%	<1%	-4%	-75%	-5%
Fuel Comb. Other	-6%	-1%	-1%	-6%	-6%	-1%	-12%
Highway Vehicles	-73%	-38%	-80%	-31%	-68%	-59%	-80%
Metals Processing	-8%	NA[a]	5%	-46%	-46%	-1%	-19%
Miscellaneous[57]	-13%	8%	-25%	22%	13%	-26%	-5%
Off-Highway	-7%	18%	-50%	-57%	-58%	-86%	-50%
Other Industrial Processes[57]	-2%	<1%	-19%	-6%	-9%	-3%	-3%
Petroleum & Related Industries	18%	5%	13%	25%	35%	-67%	-16%
Solvent Utilization	-3%	NA[a]	-5%	-2%	-1%	-5%	-2%
Storage & Transport	<1%	NA[a]	<-1%	-12%	-8%	<1%	-28%
Waste Disposal & Recycling	<1%	<1%	<-1%	<-1%	<-1%	<-1%	2%
Mississippi % Difference	**-36%**	**7%**	**-51%**	**21%**	**9%**	**-62%**	**-25%**

[1] NA: No calculation is possible

[57] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-3. Percent Emissions Change from 2011 to 2028 by Tier 1 Level, Pollutant, and State[58]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	% Difference						
North Carolina							
Chemical & Allied Product Mfg	-90%	-28%	-32%	60%	-2%	-8%	35%
Fuel Comb. Elec. Util.	-56%	-48%	-35%	-55%	-50%	-78%	<1%
Fuel Comb. Industrial	-12%	24%	-32%	-25%	-18%	-58%	-22%
Fuel Comb. Other	-1%	<1%	1%	-3%	-2%	-23%	-7%
Highway Vehicles	-78%	-39%	-85%	-38%	-70%	-71%	-81%
Metals Processing	-21%	78%	40%	54%	53%	-22%	-33%
Miscellaneous[58]	-16%	9%	-14%	13%	8%	-11%	-15%
Off-Highway	-2%	26%	-42%	-48%	-49%	-57%	-41%
Other Industrial Processes[58]	99%	13%	22%	25%	26%	56%	34%
Petroleum & Related Industries	30%	NA[a]	16%	18%	64%	-5%	16%
Solvent Utilization	50%	-32%	42%	22%	36%	-74%	15%
Storage & Transport	-87%	-28%	3%	11%	34%	49%	-39%
Waste Disposal & Recycling	<1%	-21%	2%	<1%	<1%	-15%	3%
North Carolina % Difference	**-50%**	**7%**	**-61%**	**7%**	**-5%**	**-63%**	**-32%**

[1] NA: No calculation is possible

[58] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-3. Percent Emissions Change from 2011 to 2028 by Tier 1 Level, Pollutant, and State[59]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	% Difference						
South Carolina							
Chemical & Allied Product Mfg	<-1%	<1%	<-1%	-1%	-1%	-50%	-13%
Fuel Comb. Elec. Util.	-20%	175%	-60%	-70%	-69%	-85%	-9%
Fuel Comb. Industrial	8%	93%	-2%	9%	15%	-40%	4%
Fuel Comb. Other	-6%	-1%	2%	-7%	-7%	-9%	-12%
Highway Vehicles	-67%	-33%	-79%	-32%	-69%	-57%	-75%
Metals Processing	<1%	<1%	10%	2%	2%	1%	<1%
Miscellaneous[59]	-6%	4%	-12%	22%	10%	-4%	-2%
Off-Highway	-3%	24%	-46%	-51%	-52%	-84%	-46%
Other Industrial Processes[59]	<-1%	-5%	14%	-4%	-6%	10%	-2%
Petroleum & Related Industries	NA[a]	NA[a]	NA[a]	NA[a]	NA[a]	NA[a]	-5%
Solvent Utilization	<-1%	<-1%	<1%	-1%	-2%	<1%	-4%
Storage & Transport	<-1%	0%	<-1%	-18%	-14%	<-1%	-30%
Waste Disposal & Recycling	<1%	<1%	<1%	<-1%	<-1%	<-1%	<-1%
South Carolina % Difference	**-31%**	**3%**	**-56%**	**15%**	**-4%**	**-67%**	**-29%**

[1] NA: No calculation is possible

[59] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-3. Percent Emissions Change from 2011 to 2028 by Tier 1 Level, Pollutant, and State[60]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	% Difference						
Tennessee							
Chemical & Allied Product Mfg	<-1%	<1%	-1%	<1%	<1%	-1%	<-1%
Fuel Comb. Elec. Util.	-18%	-25%	-62%	-26%	-18%	-90%	-12%
Fuel Comb. Industrial	21%	11%	-9%	16%	19%	-71%	11%
Fuel Comb. Other	-10%	-1%	-8%	-12%	-8%	-86%	-5%
Highway Vehicles	-68%	-29%	-75%	-32%	-69%	-56%	-75%
Metals Processing	<-1%	<-1%	<1%	<1%	<-1%	19%	<1%
Miscellaneous[60]	-6%	3%	-14%	10%	7%	-14%	-2%
Off-Highway	-3%	22%	-44%	-52%	-53%	-18%	-45%
Other Industrial Processes[60]	10%	-5%	15%	-2%	-4%	-33%	-5%
Petroleum & Related Industries	83%	<1%	76%	63%	74%	-39%	-1%
Solvent Utilization	<-1%	<-1%	<-1%	<-1%	<-1%	<1%	<-1%
Storage & Transport	<1%	-85%	-23%	-22%	-22%	-9%	-34%
Waste Disposal & Recycling	<-1%	<1%	<-1%	<-1%	<-1%	-21%	11%
Tennessee % Difference	**-41%**	**<1%**	**-57%**	**4%**	**-4%**	**-84%**	**-32%**

[60] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-3. Percent Emissions Change from 2011 to 2028 by Tier 1 Level, Pollutant, and State[61]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	% Difference						
Virginia							
Chemical & Allied Product Mfg	<1%	-19%	-78%	<1%	<1%	<1%	<-1%
Fuel Comb. Elec. Util.	25%	105%	-61%	-49%	34%	-96%	33%
Fuel Comb. Industrial	-24%	-10%	-37%	-16%	-11%	-60%	-11%
Fuel Comb. Other	-4%	-1%	-4%	-5%	-5%	-33%	-8%
Highway Vehicles	-59%	-33%	-76%	-39%	-70%	-61%	-71%
Metals Processing	<1%	NA[a]	<1%	<-1%	<-1%	<1%	<1%
Miscellaneous[61]	-2%	5%	-3%	10%	8%	-3%	-1%
Off-Highway	2%	24%	-44%	-49%	-49%	-73%	-37%
Other Industrial Processes[61]	26%	<1%	-15%	3%	8%	-20%	2%
Petroleum & Related Industries	4%	<1%	1%	34%	49%	11%	43%
Solvent Utilization	<1%	1%	<1%	4%	4%	<1%	10%
Storage & Transport	10%	<-1%	8%	1%	5%	9%	-31%
Waste Disposal & Recycling	<1%	1%	1%	<1%	<1%	1%	1%
Virginia % Difference	**-26%**	**3%**	**-56%**	**3%**	**-4%**	**-75%**	**-20%**

[1] NA: No calculation is possible

[61] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-3. Percent Emissions Change from 2011 to 2028 by Tier 1 Level, Pollutant, and State[62]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	% Difference						
West Virginia							
Chemical & Allied Product Mfg	1%	-46%	-31%	-10%	-7%	-27%	-22%
Fuel Comb. Elec. Util.	28%	12%	-14%	4%	5%	-38%	9%
Fuel Comb. Industrial	-4%	-16%	-33%	-32%	-50%	-62%	9%
Fuel Comb. Other	-7%	-1%	-23%	-5%	-5%	-12%	-14%
Highway Vehicles	-70%	-33%	-76%	-39%	-70%	-60%	-75%
Metals Processing	-1%	-9%	-16%	-33%	-43%	-19%	-7%
Miscellaneous[62]	-1%	6%	-1%	<-1%	<-1%	-1%	<-1%
Off-Highway	<1%	14%	-47%	-51%	-52%	-83%	-44%
Other Industrial Processes[62]	-8%	4%	-18%	-3%	-2%	-37%	13%
Petroleum & Related Industries	52%	NA[a]	33%	119%	154%	-97%	173%
Solvent Utilization	-28%	-100%	-100%	-87%	-87%	-100%	-5%
Storage & Transport	<-1%	-100%	485%	-55%	-61%	<1%	-34%
Waste Disposal & Recycling	<-1%	<-1%	<-1%	<-1%	<-1%	<-1%	<-1%
West Virginia % Difference	**-24%**	**3%**	**-29%**	**-2%**	**-4%**	**-43%**	**40%**
SESARM % Difference	**-32%**	**4%**	**-53%**	**12%**	**<-1%**	**-67%**	**-24%**

[1] NA: No calculation is possible

[62] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

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Appendix E.

County Summary Emission Change Maps from 2011 to 2028 for Each State

In the following figures, the color blue denotes reductions in 2028 from 2011 values while the color red denotes increases in emissions expected in 2028 from 2011 value. The color green denotes little or no change in emissions.

Appendix E-1. Alabama County-Level Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory

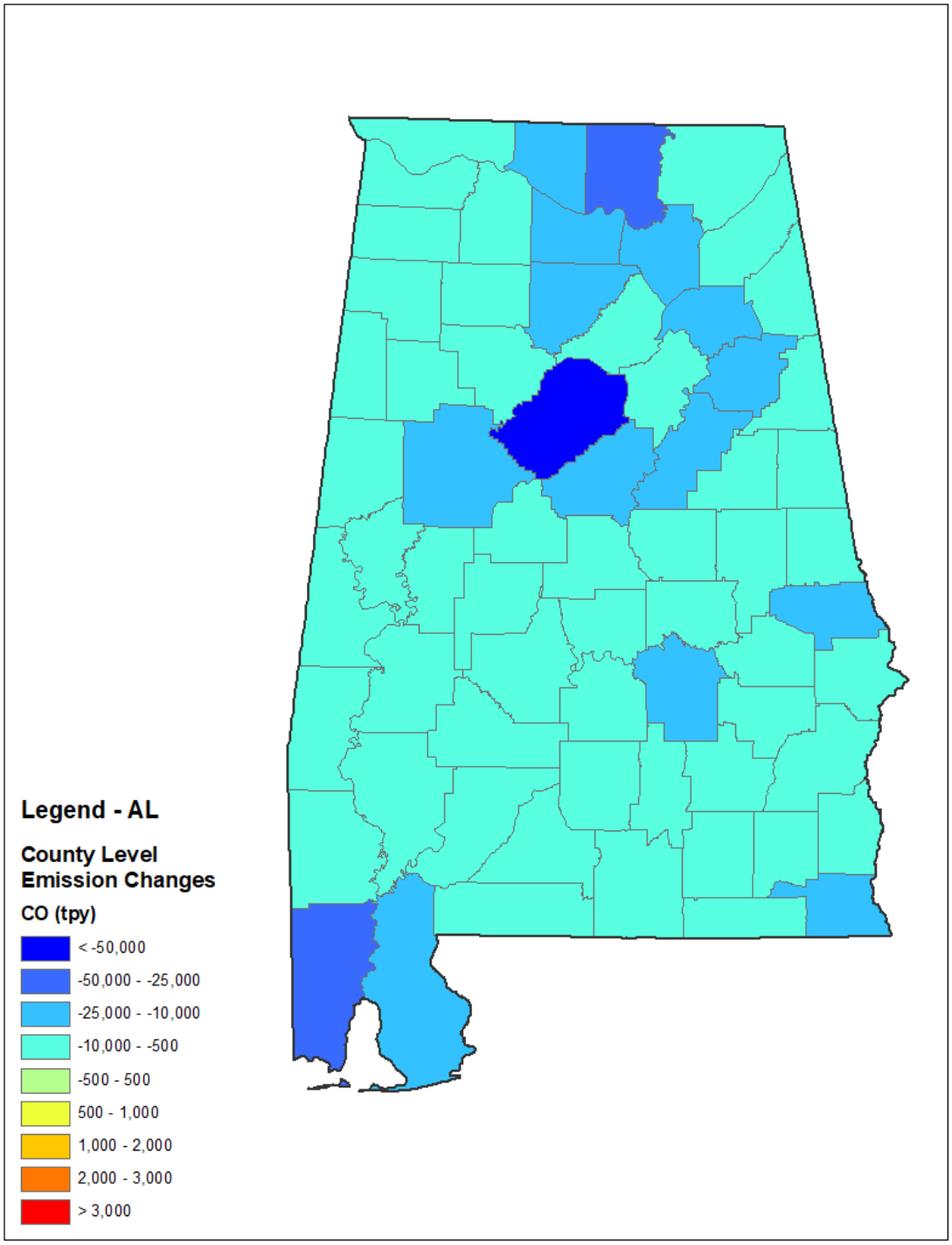

Figure E.1-1. Alabama County Level CO Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

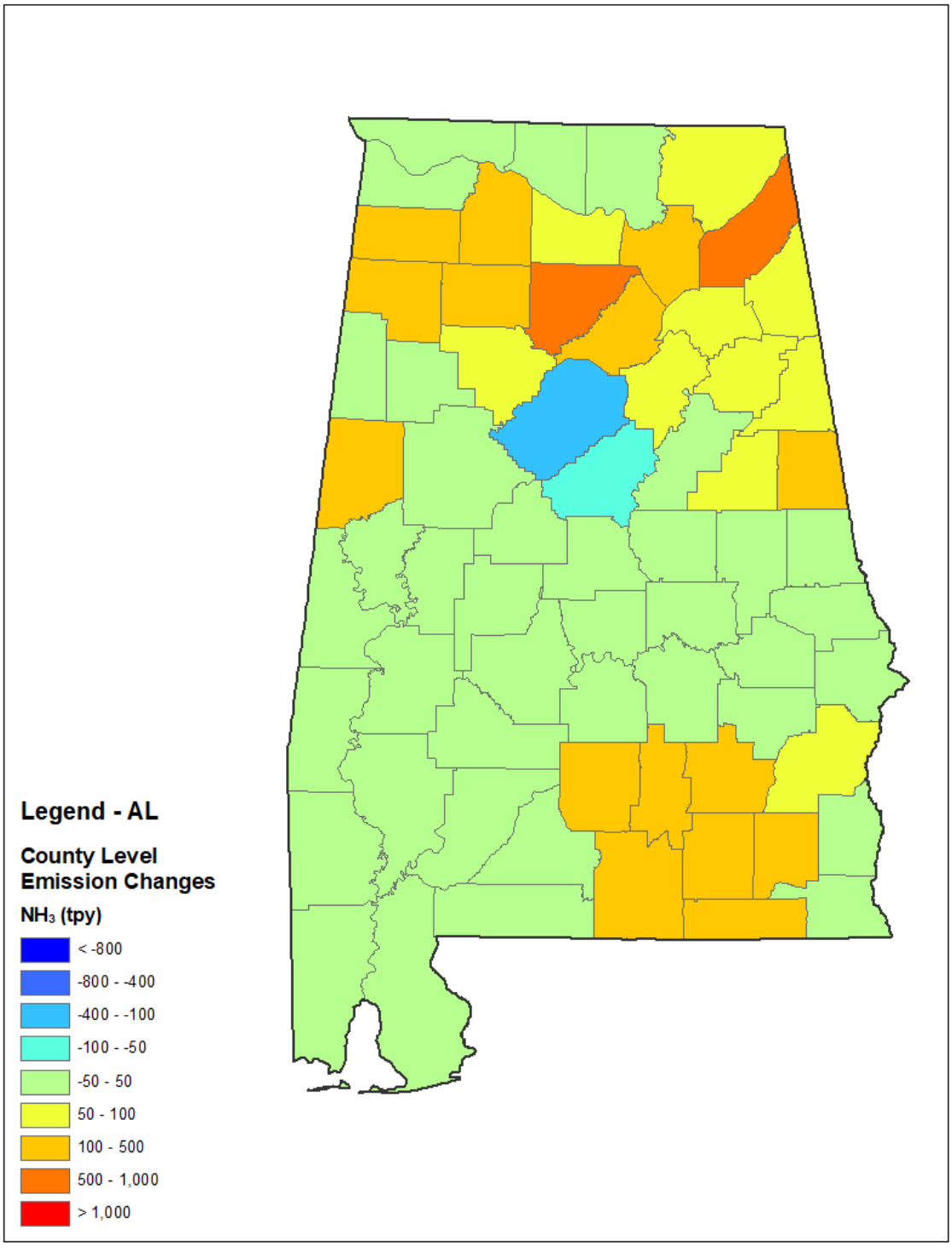

Figure E.1-2. Alabama County Level NH_3 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

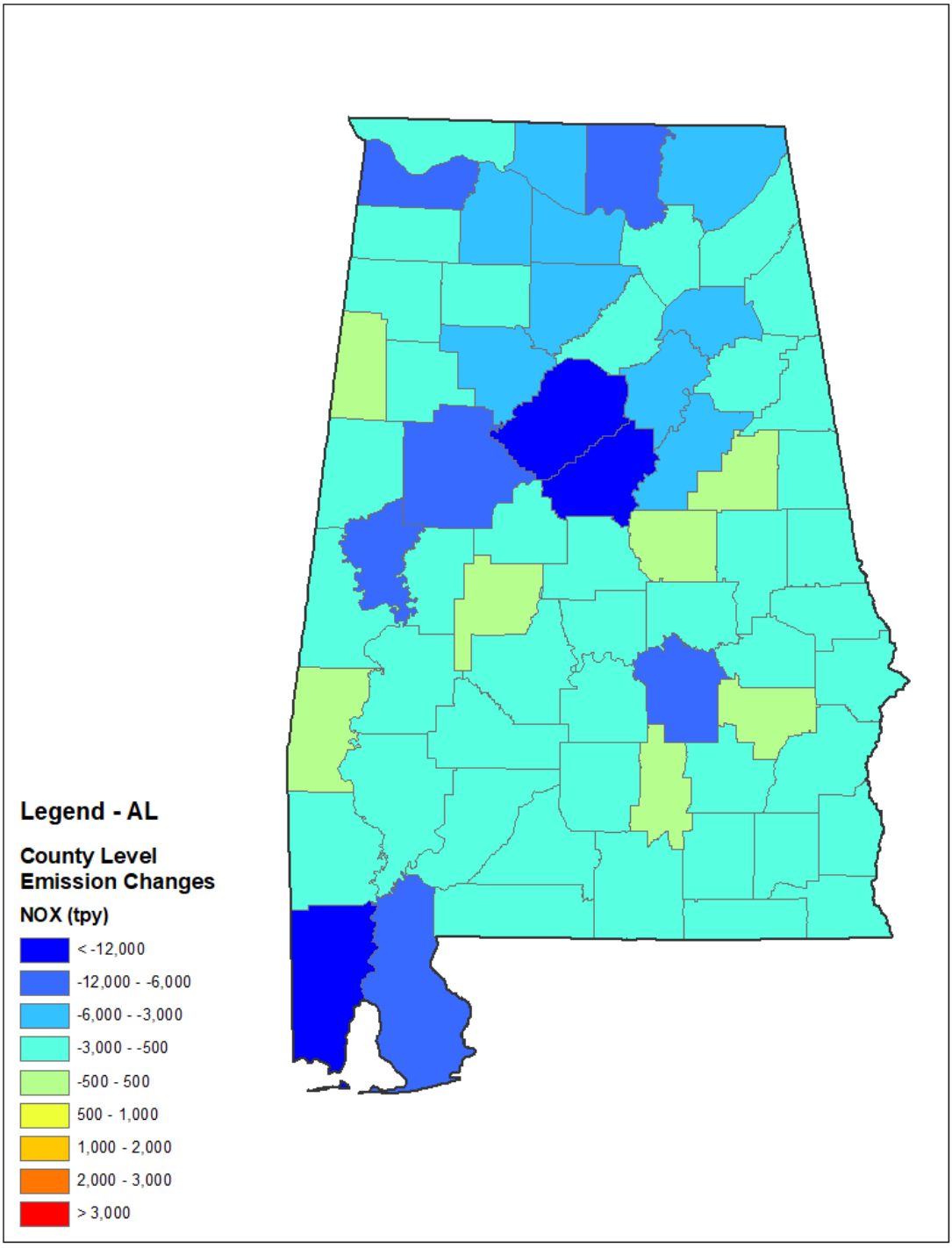

Figure E.1-3. Alabama County Level NO_x Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

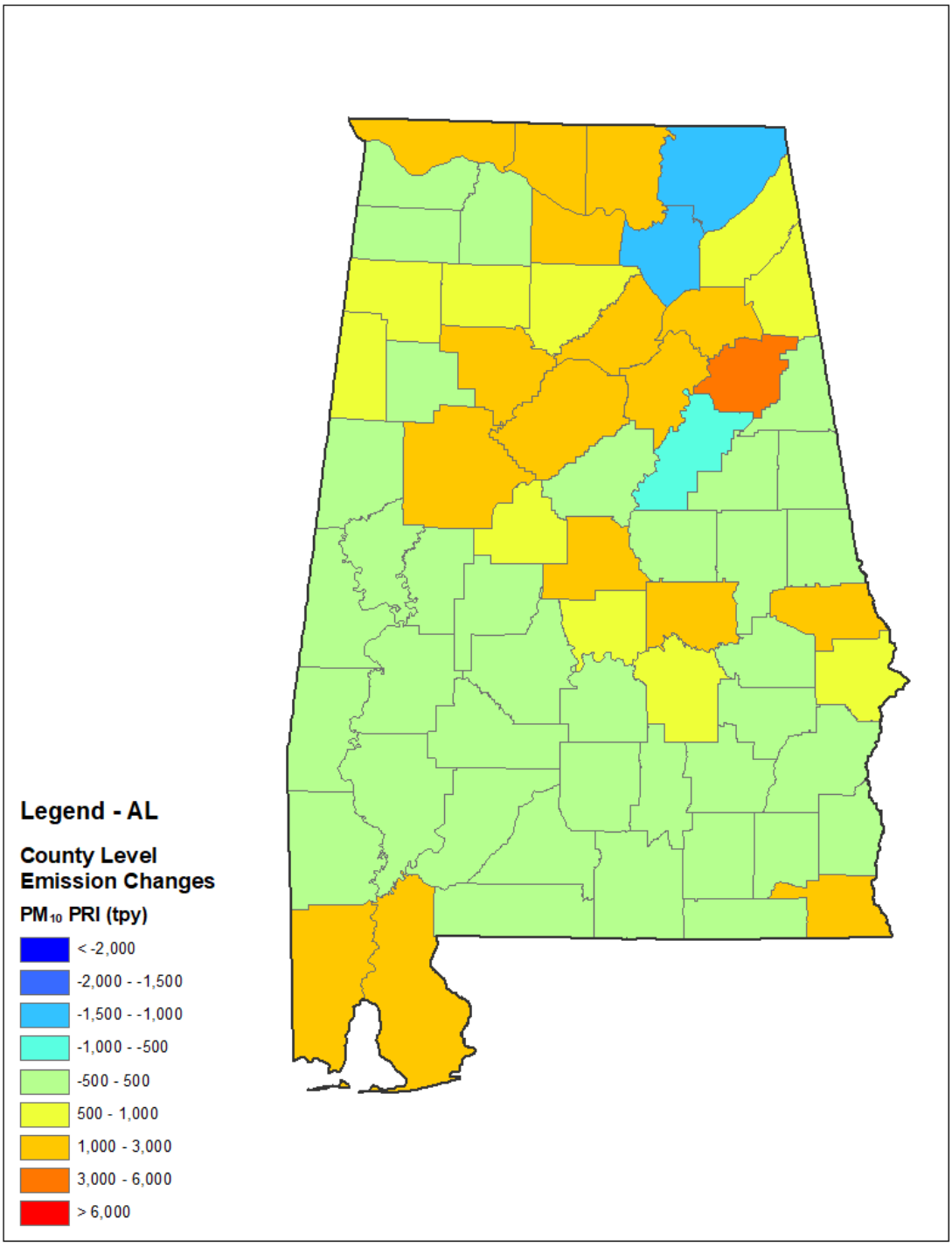

Figure E.1-4. Alabama County Level PM_{10}-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[63]

[63] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

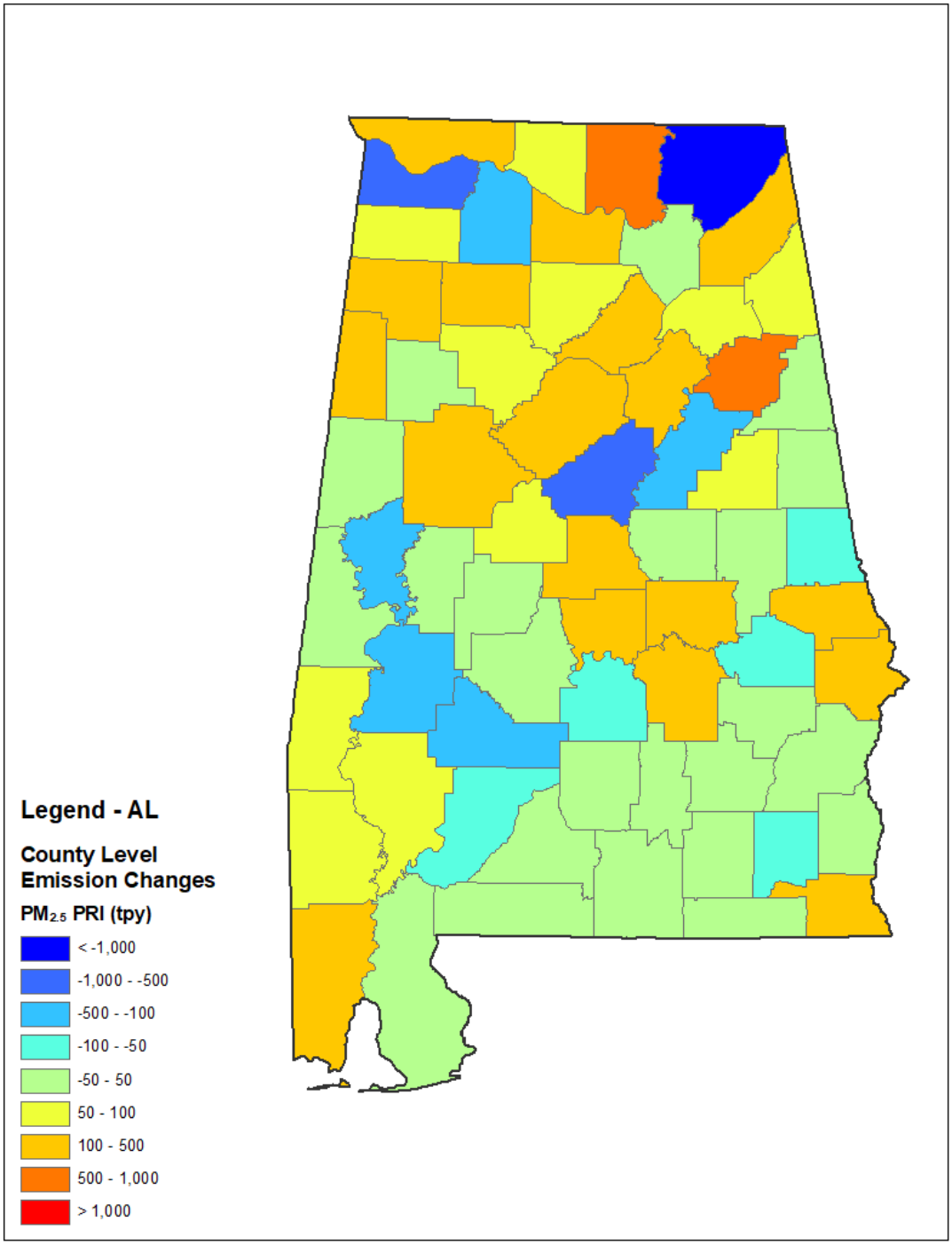

Figure E.1-5. Alabama County Level $PM_{2.5}$-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[64]

[64] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

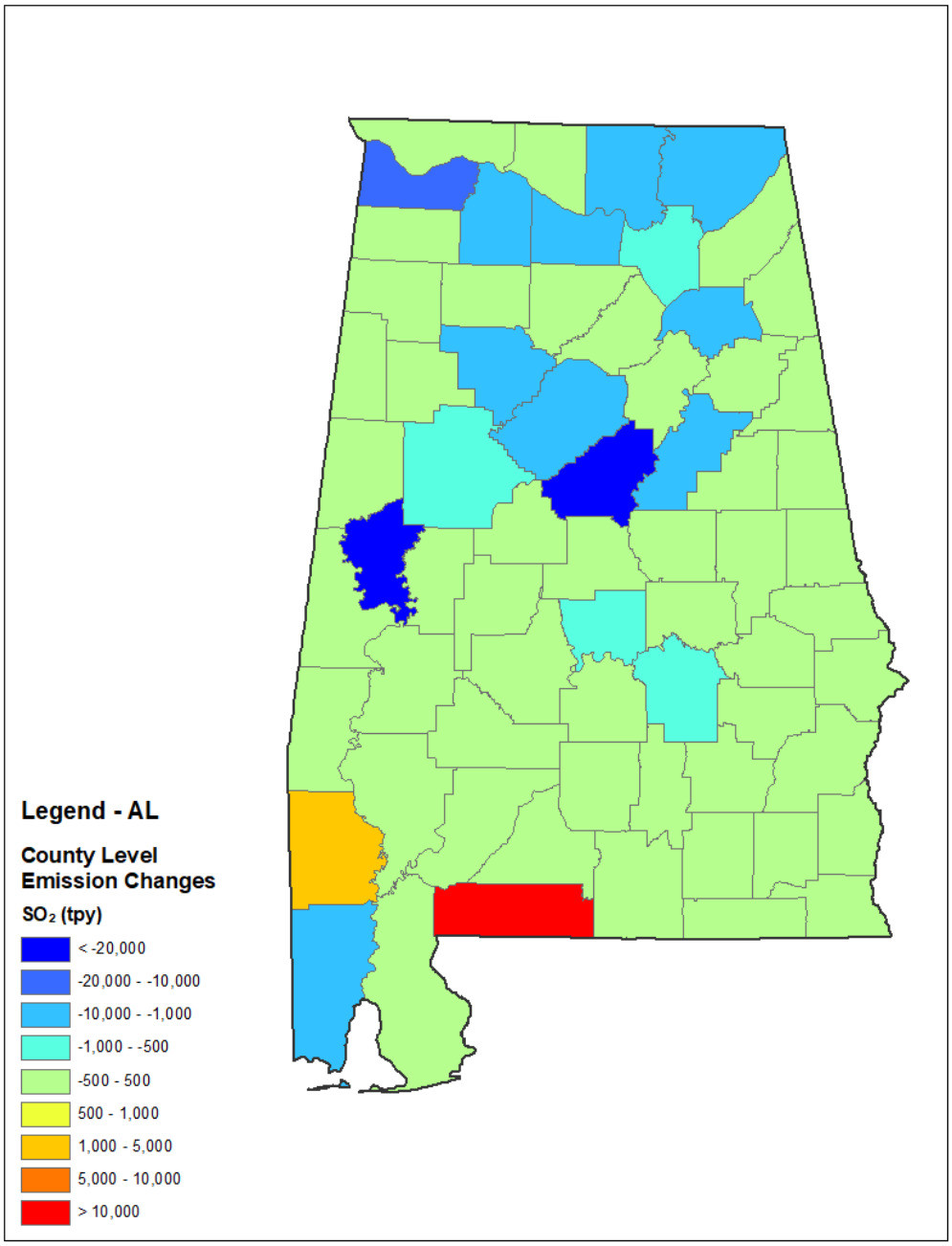

Figure E.1-6. Alabama County Level SO_2 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

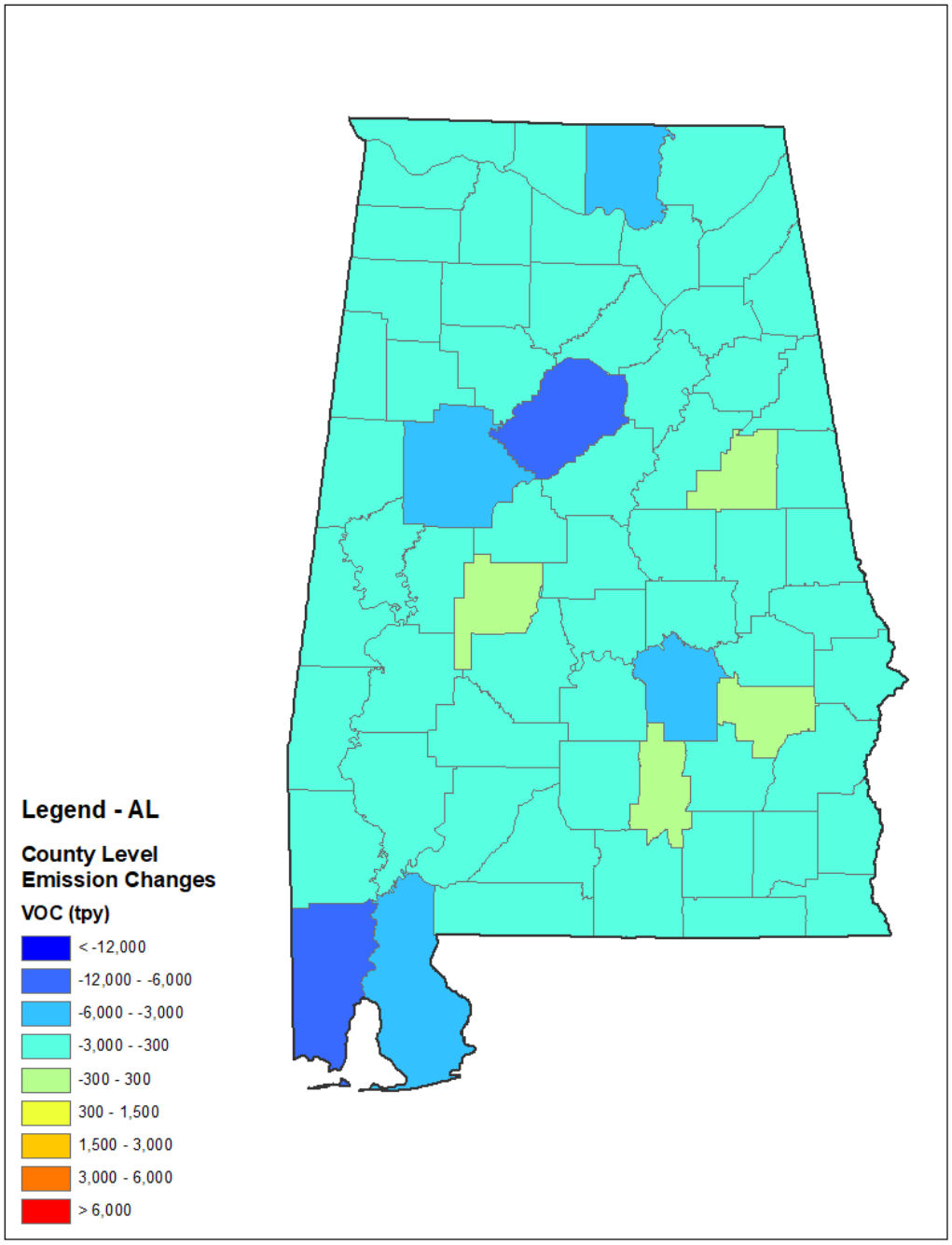

Figure E.1-7. Alabama County Level VOC Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

Appendix E-2. Florida County-Level Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory

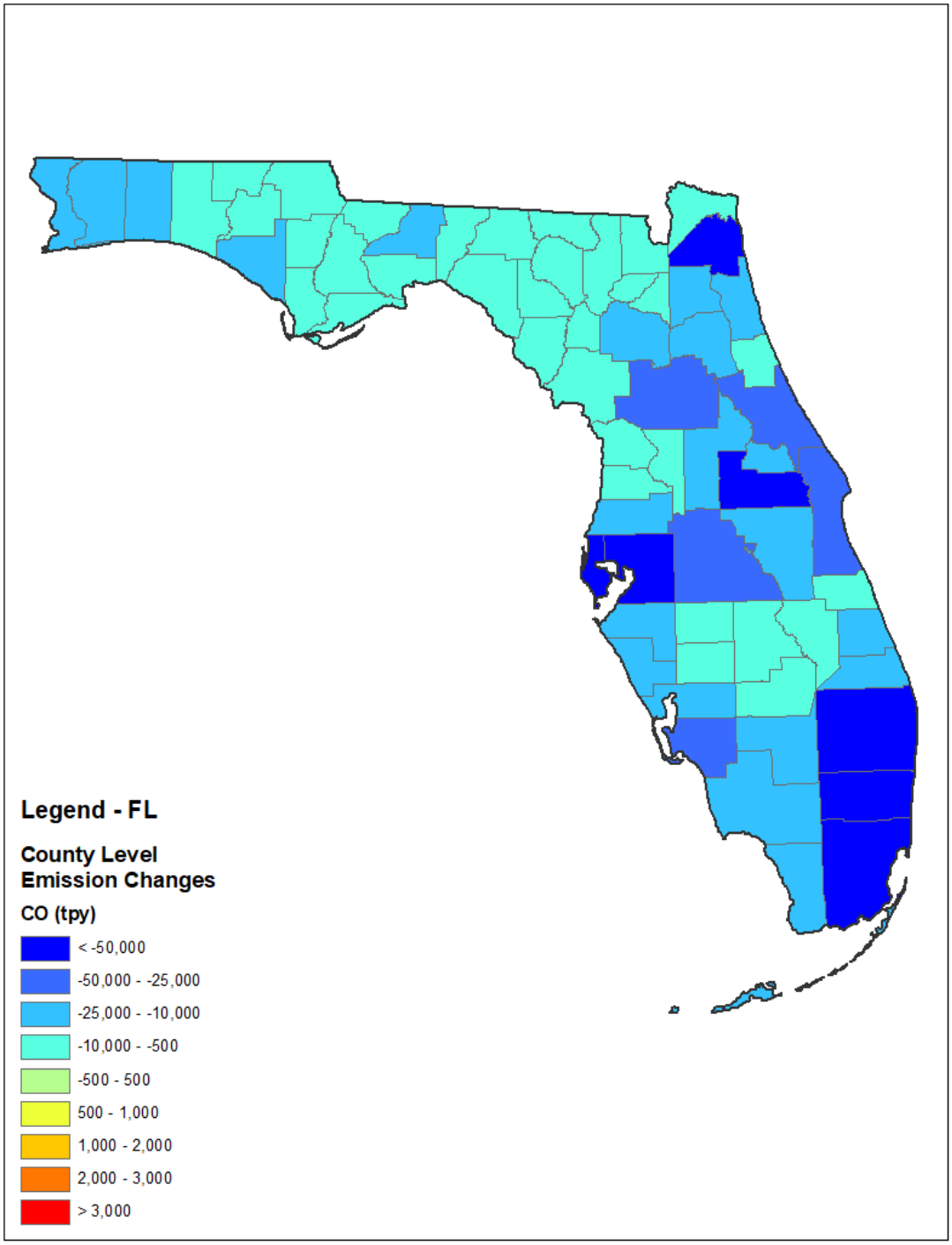

Figure E.2-1. Florida County Level CO Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

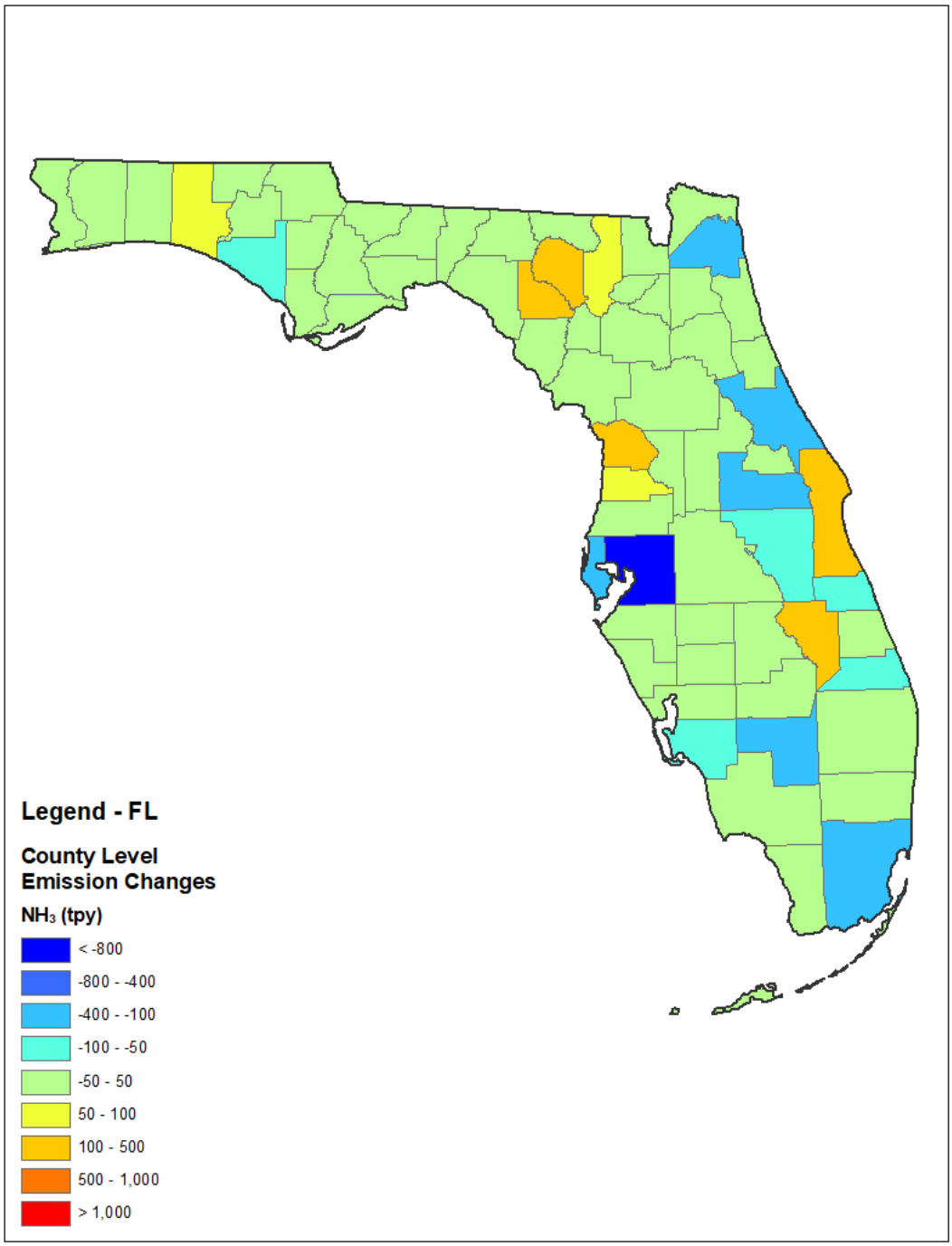

Figure E.2-2. Florida County Level NH_3 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

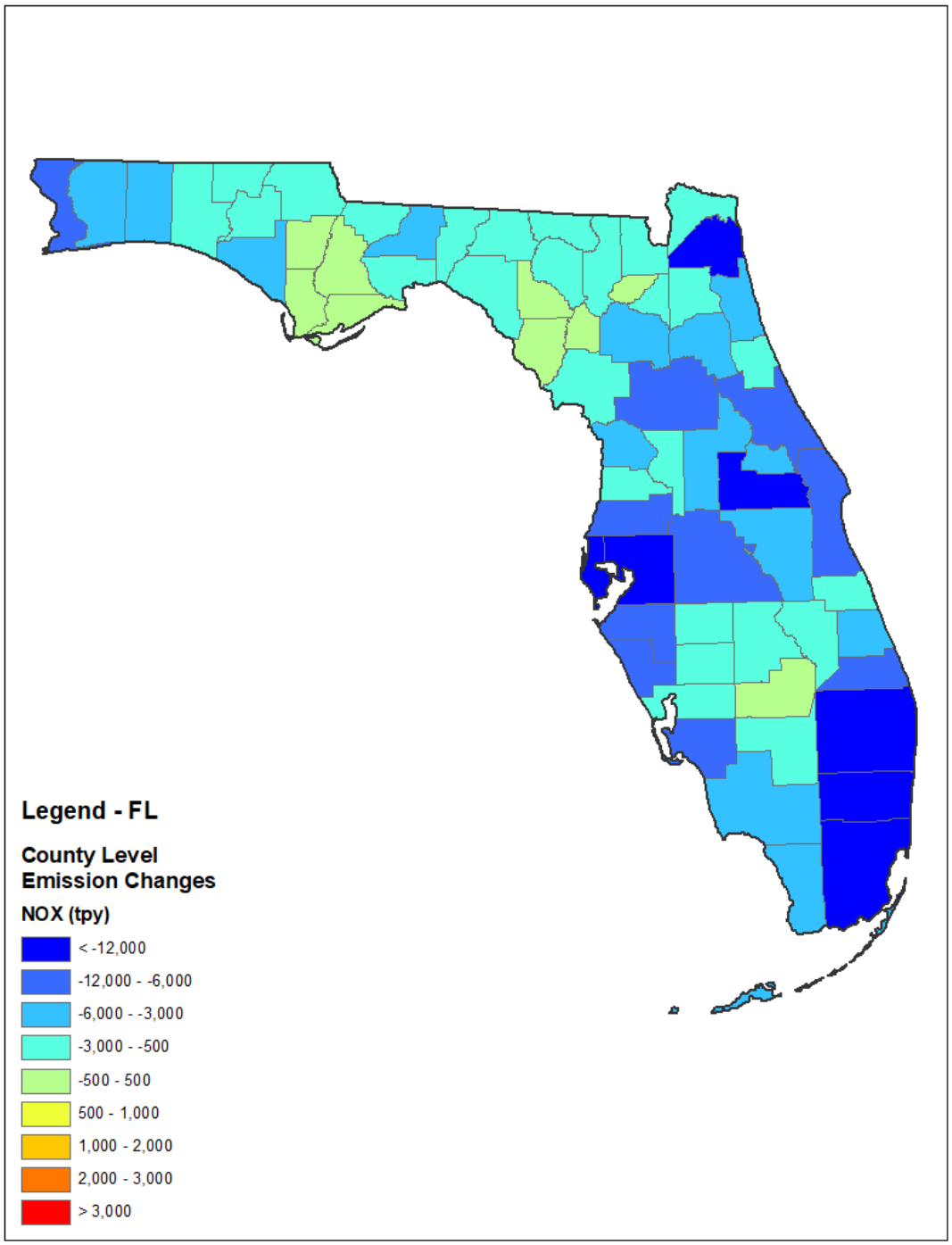

Figure E.2-3. Florida County Level NO_x Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

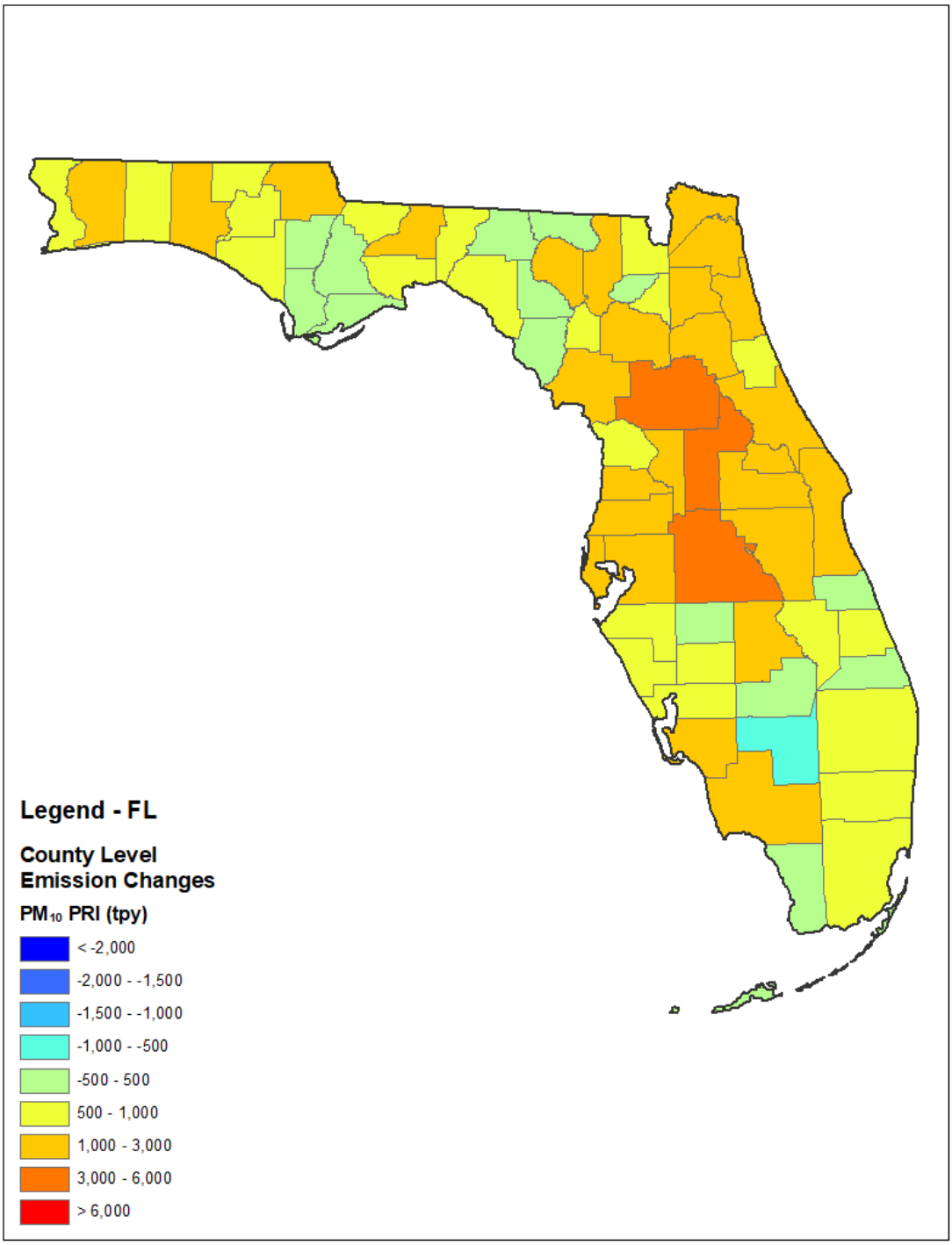

Figure E.2-4. Florida County Level PM_{10}-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[65]

[65] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

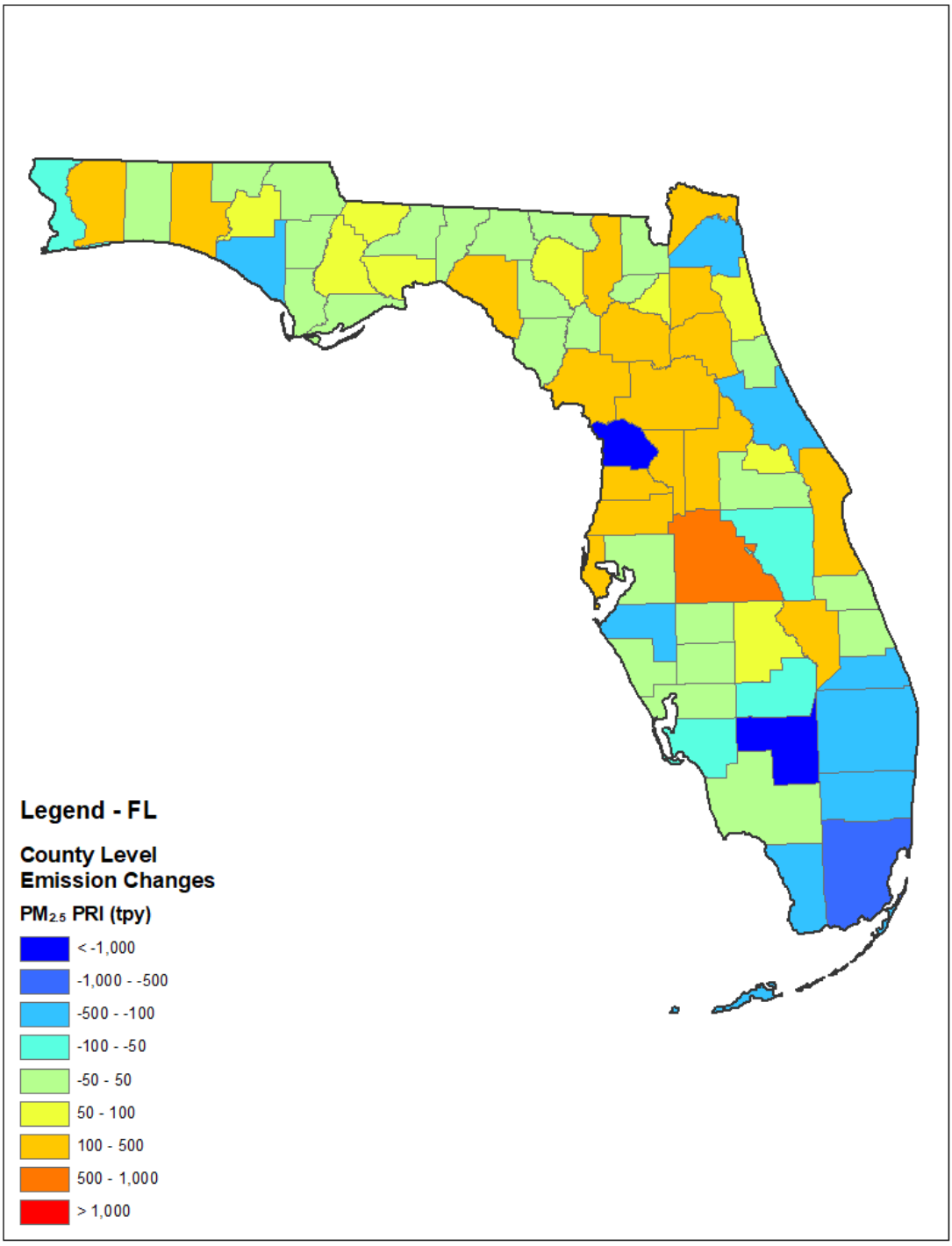

Figure E.2-5. Florida County Level $PM_{2.5}$-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[66]

[66] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

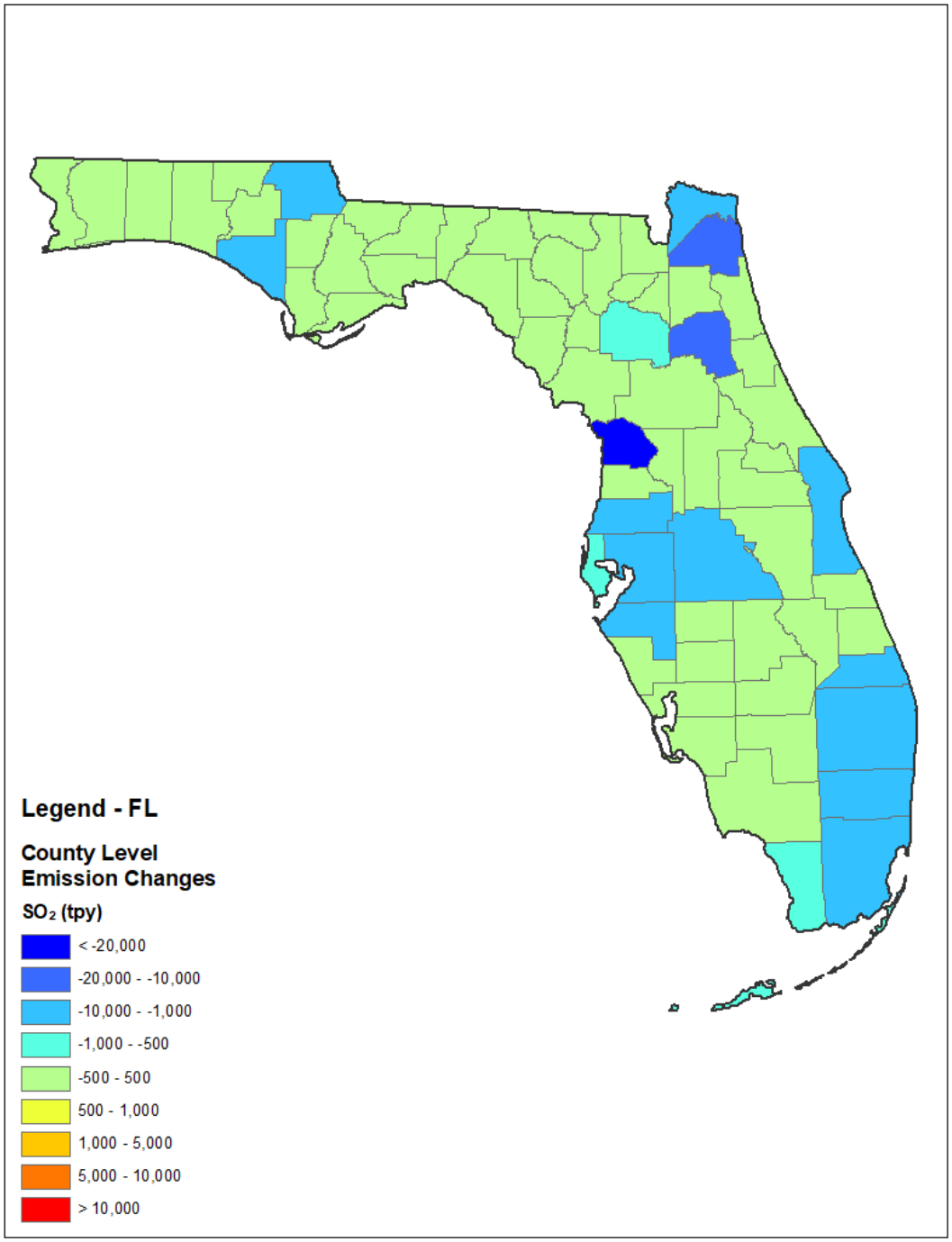

Figure E.2-6. Florida County Level SO_2 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

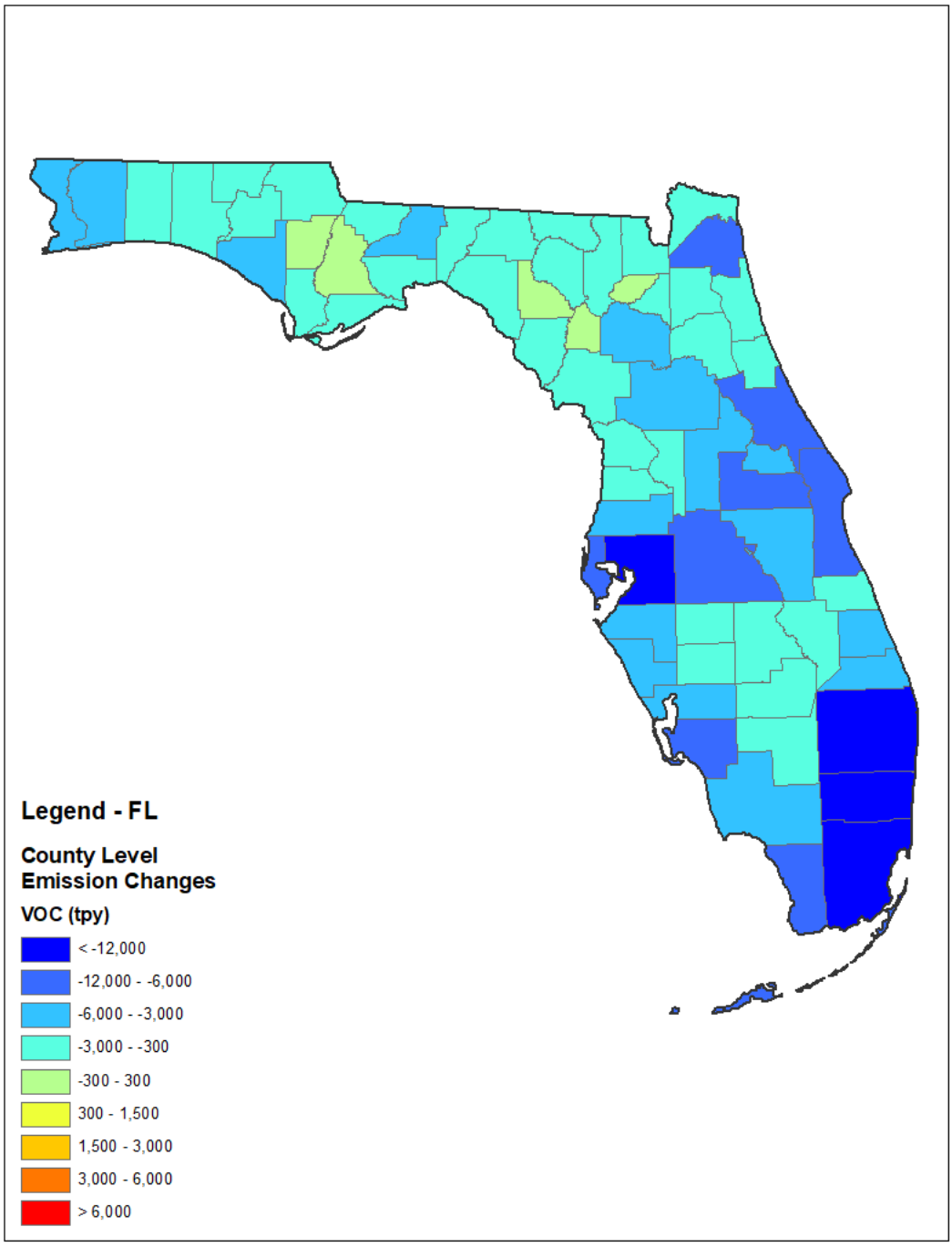

Figure E.2-7. Florida County Level VOC Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

Appendix E-3. Georgia County-Level Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory

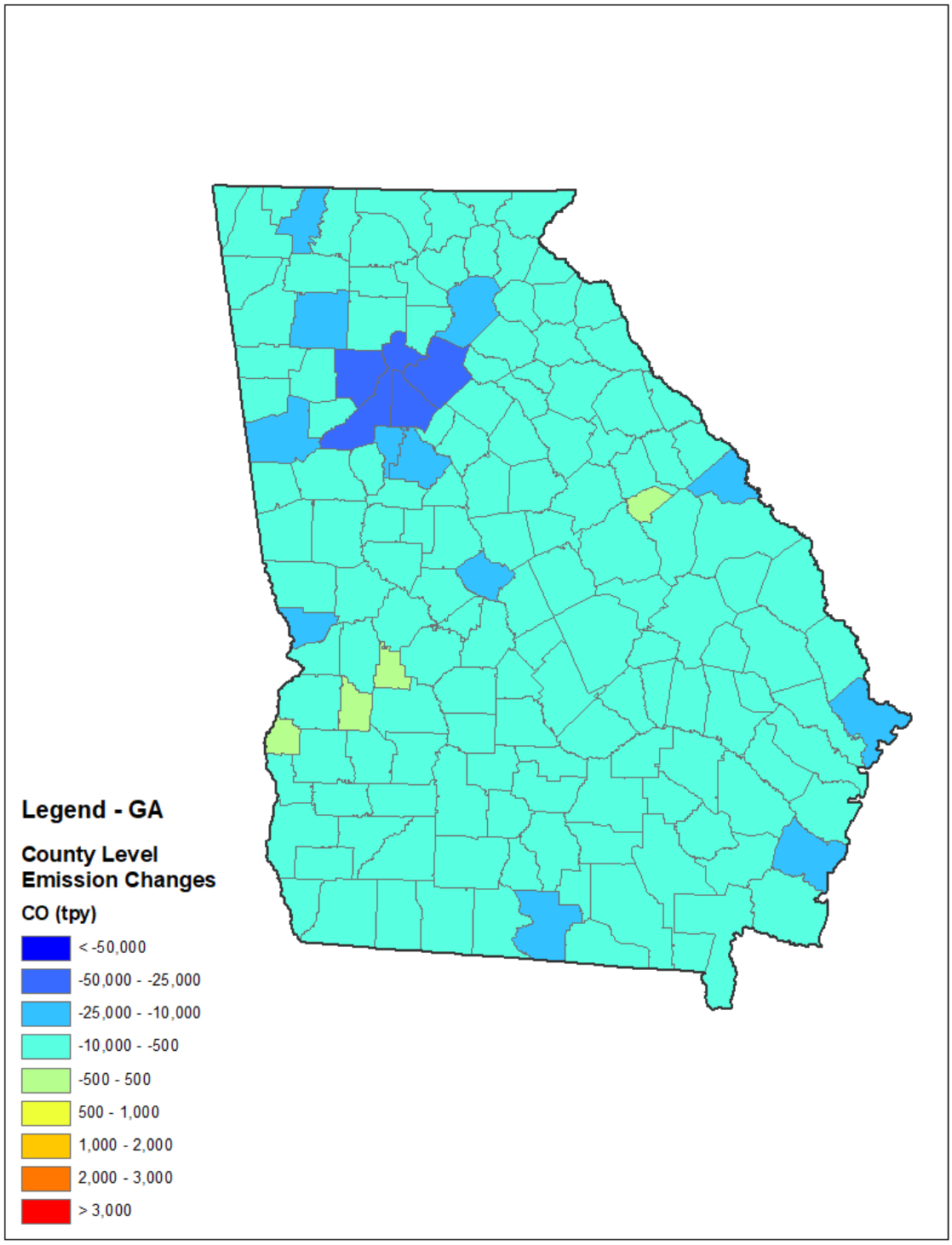

Figure E.3-1. Georgia County Level CO Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

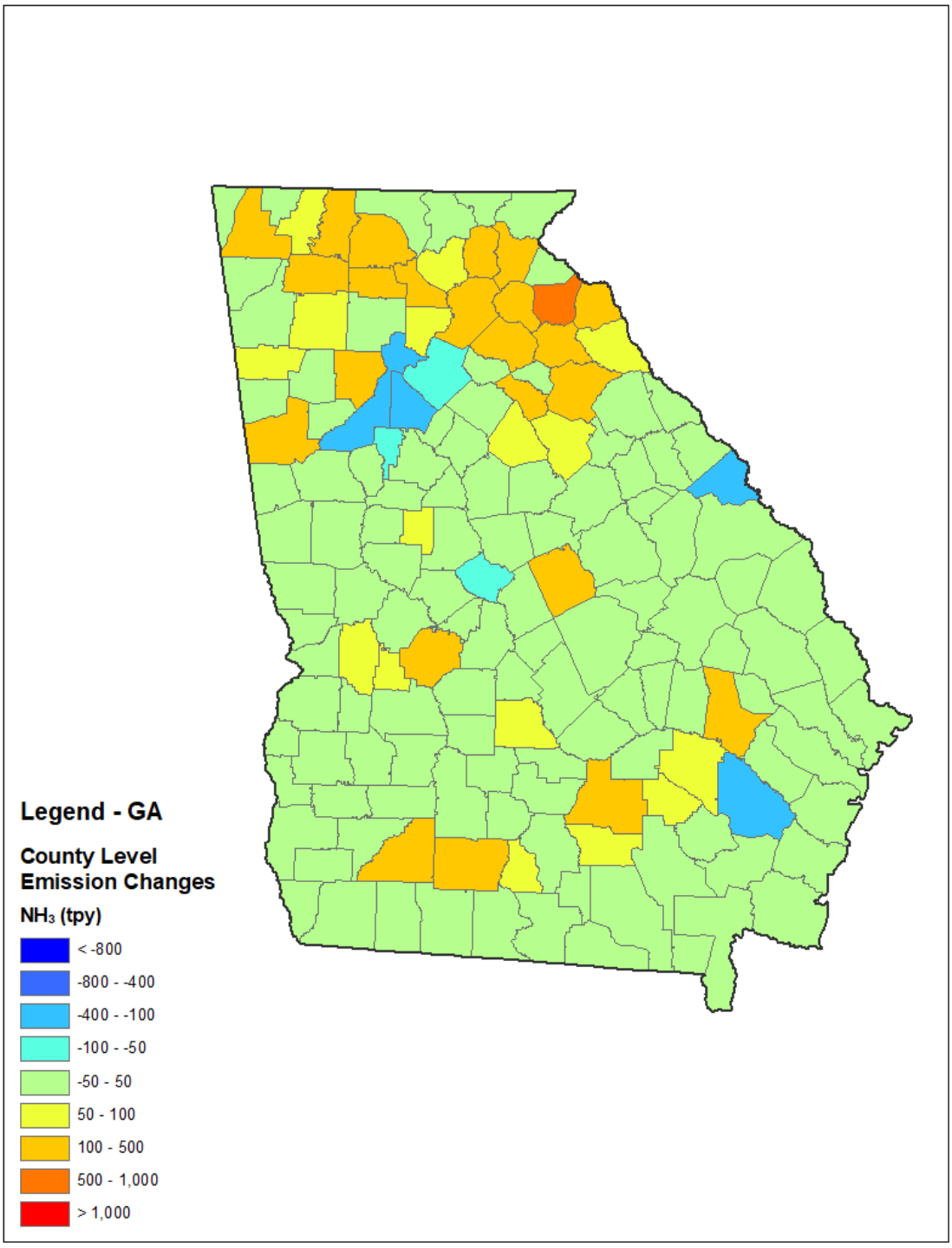

Figure E.3-2. Georgia County Level NH_3 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

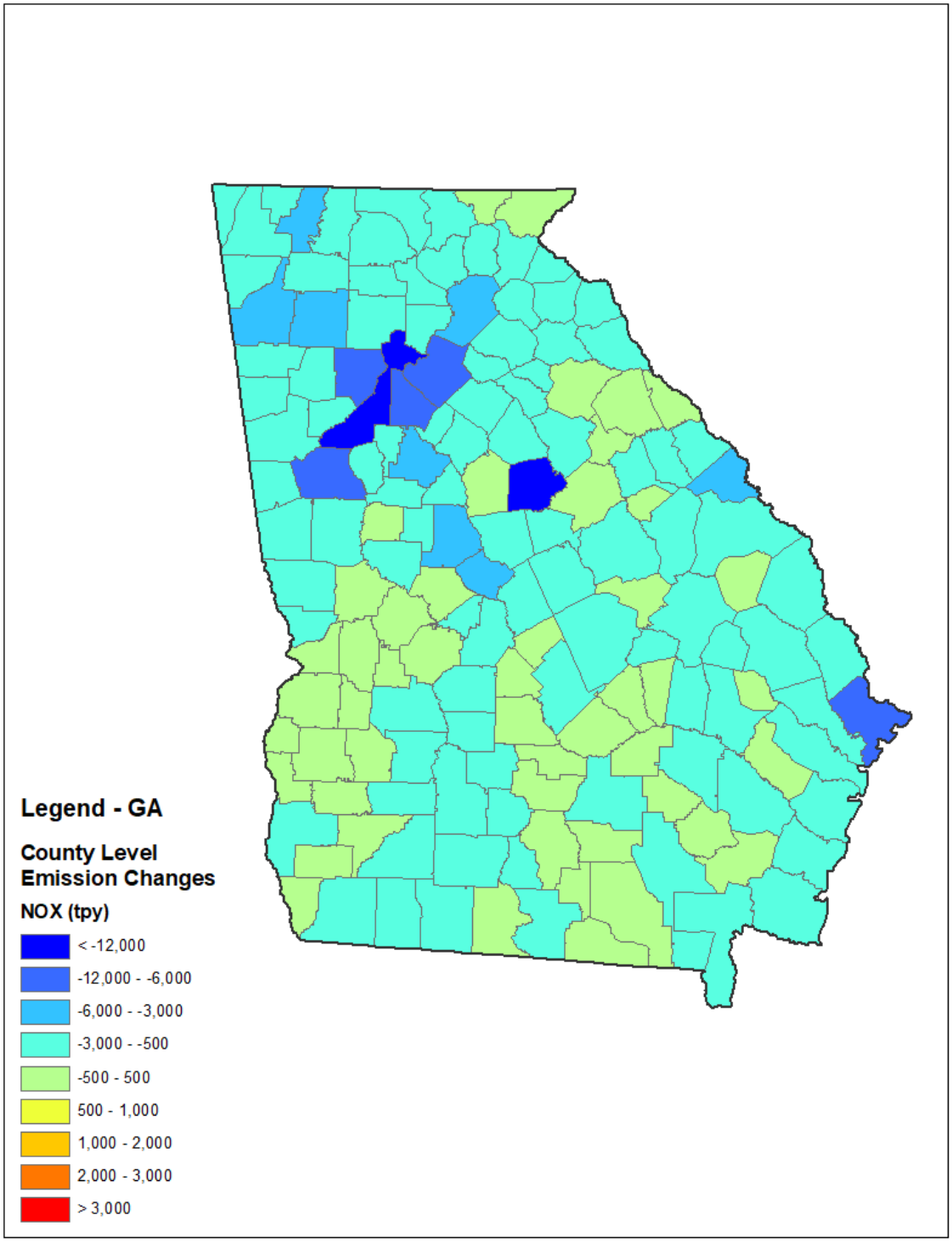

Figure E.3-3. Georgia County Level NO_x Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

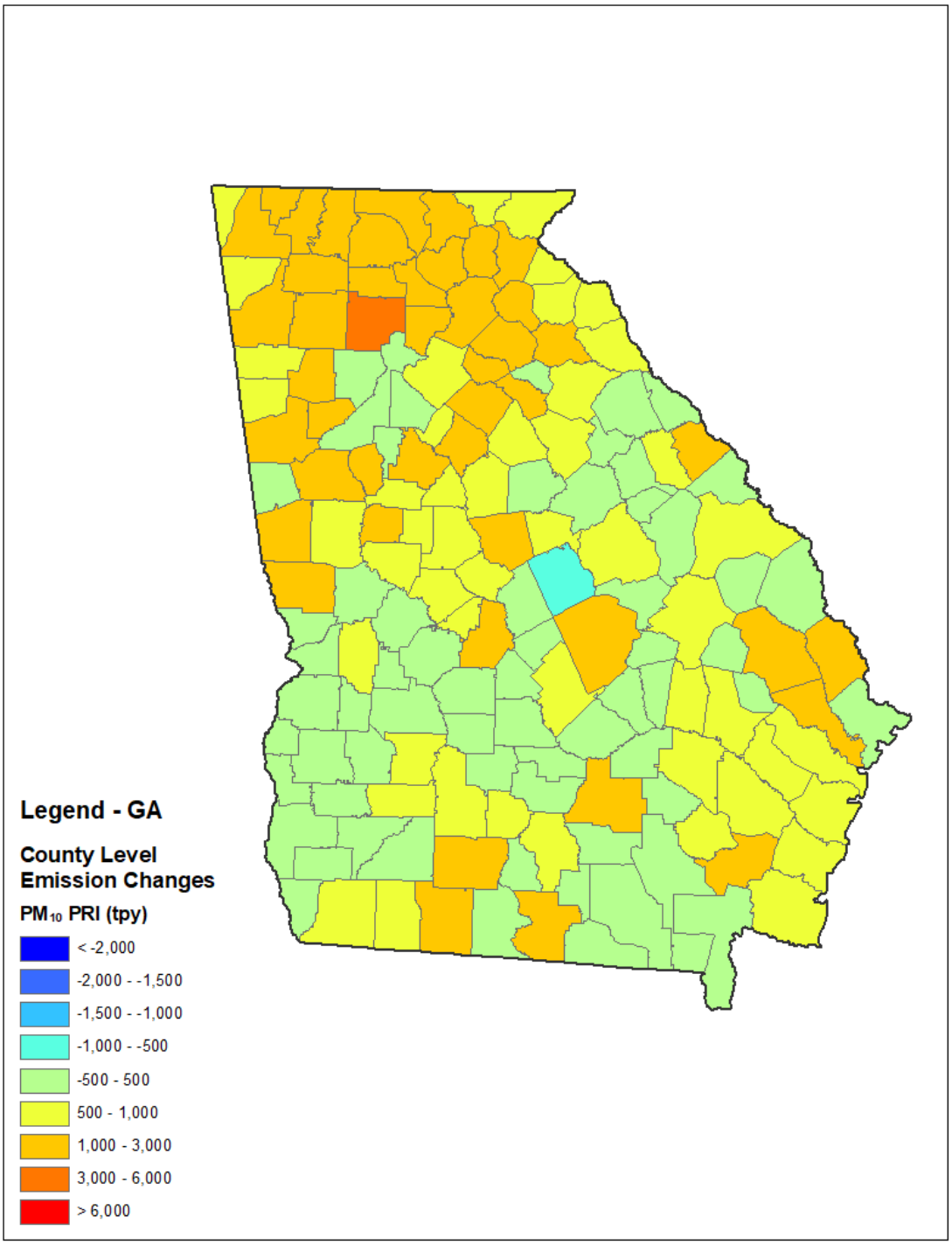

Figure E.3-4. Georgia County Level PM_{10}-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[67]

[67] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

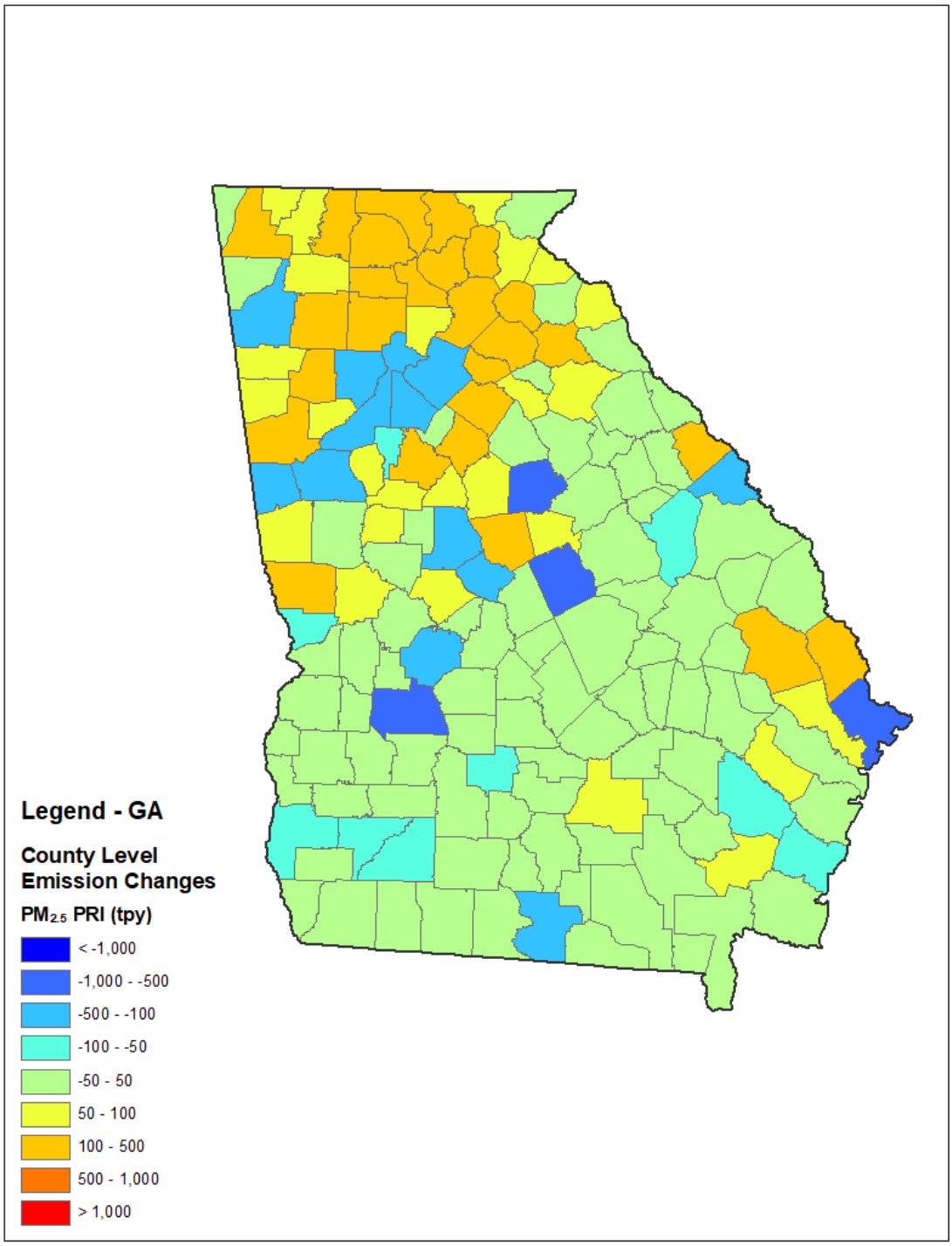

Figure E.3-5. Georgia County Level $PM_{2.5}$-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[68]

[68] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

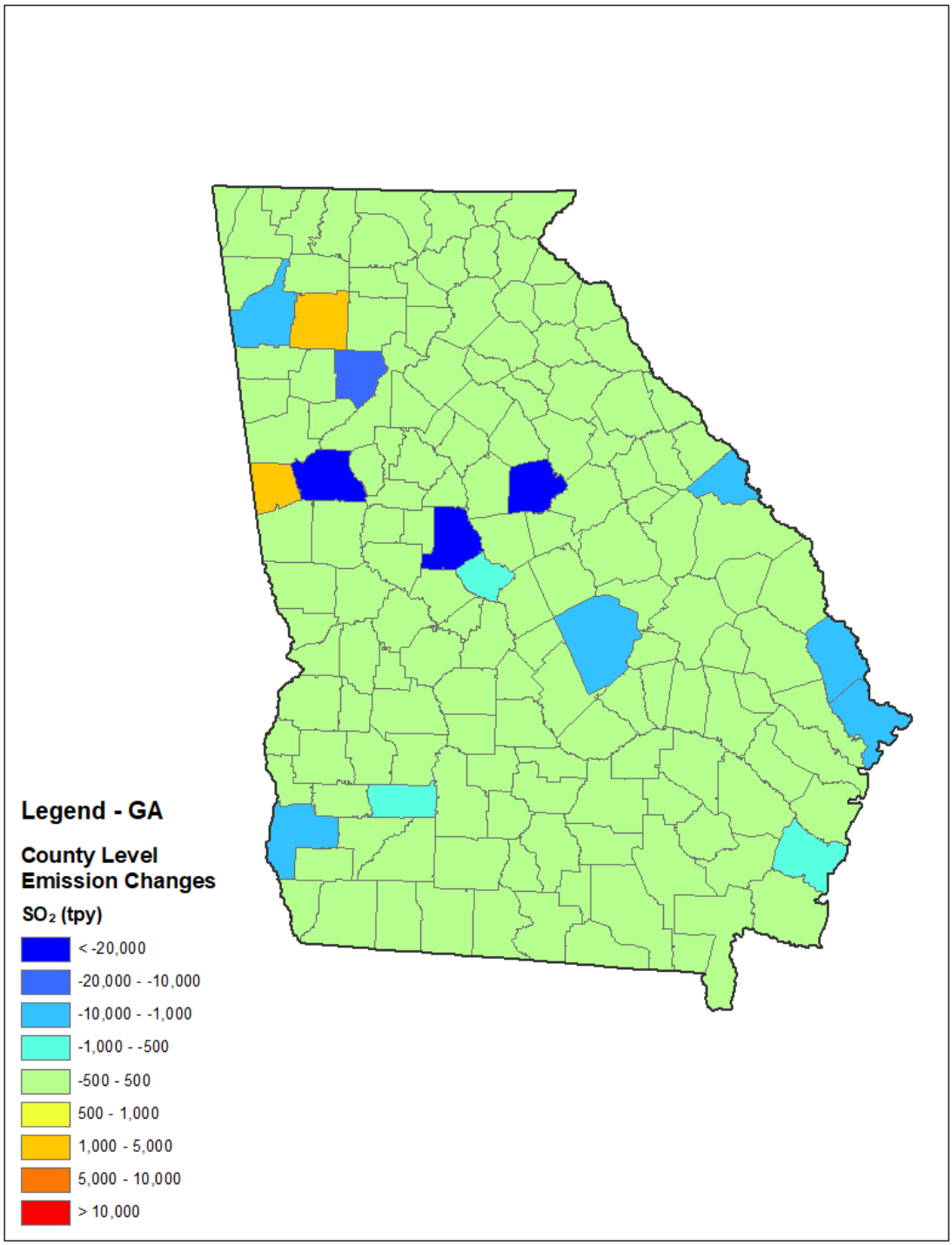

Figure E.3-6. Georgia County Level SO_2 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

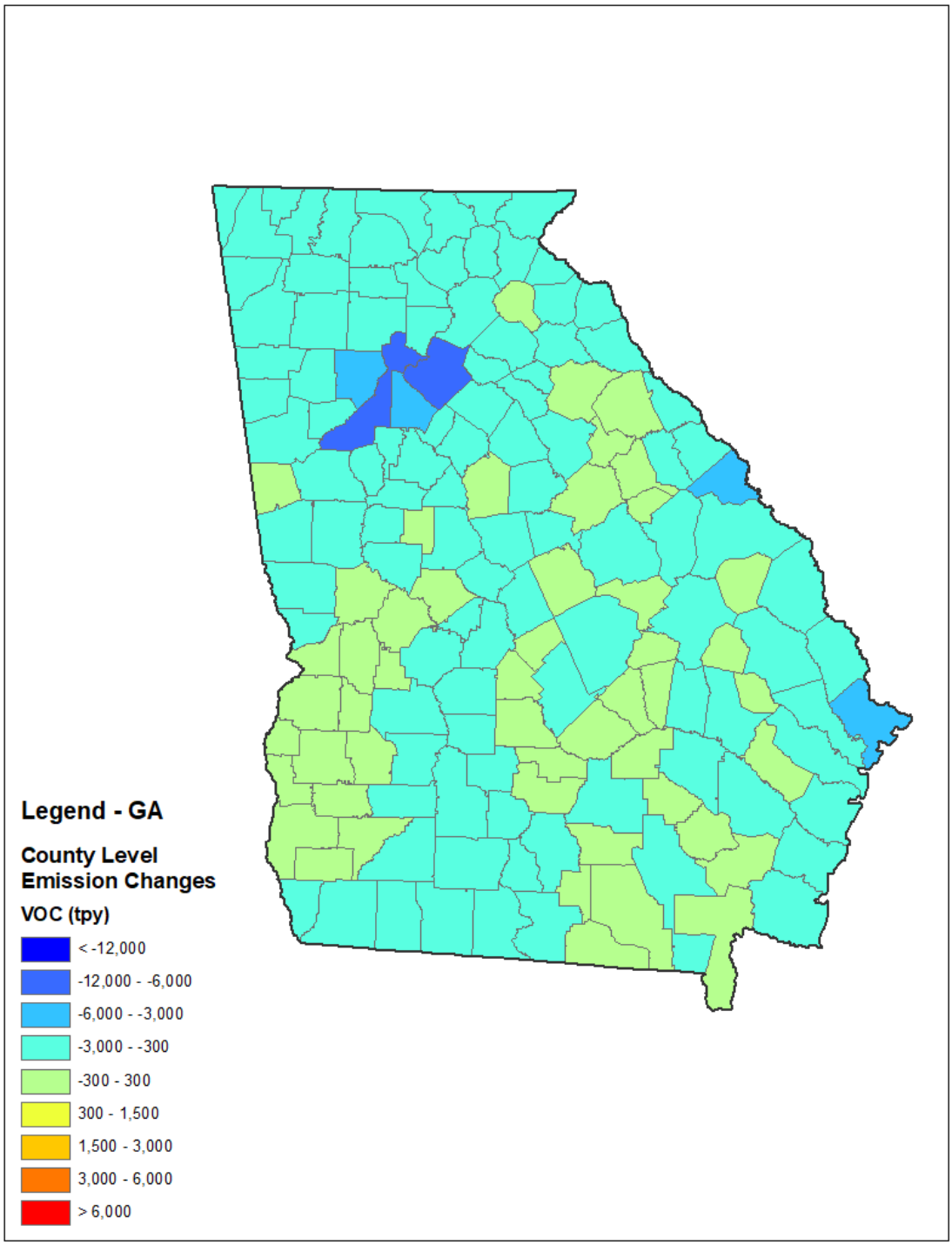

Figure E.3-7. Georgia County Level VOC Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

Appendix E-4. Kentucky County-Level Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory

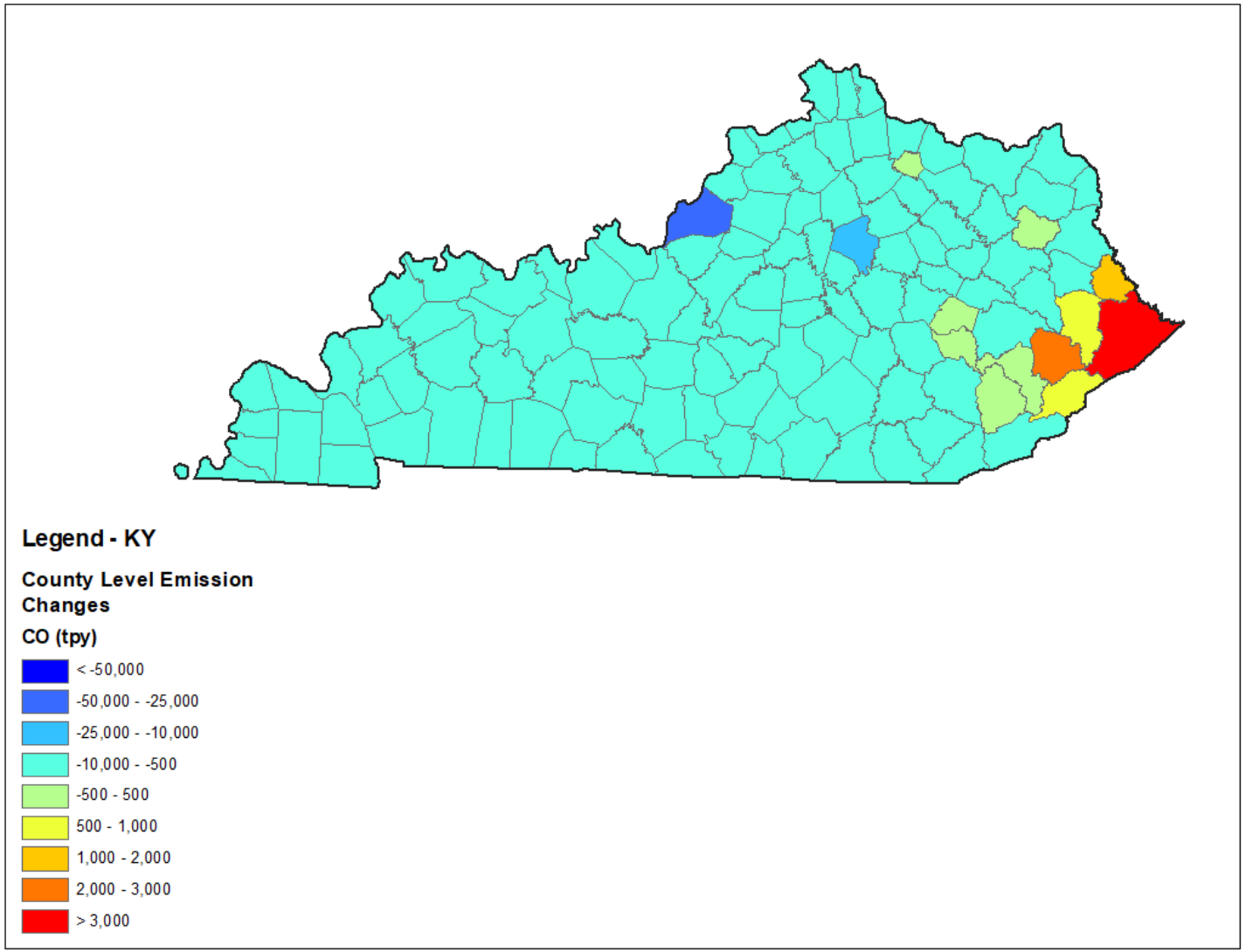

Figure E.4-1. Kentucky County Level CO Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

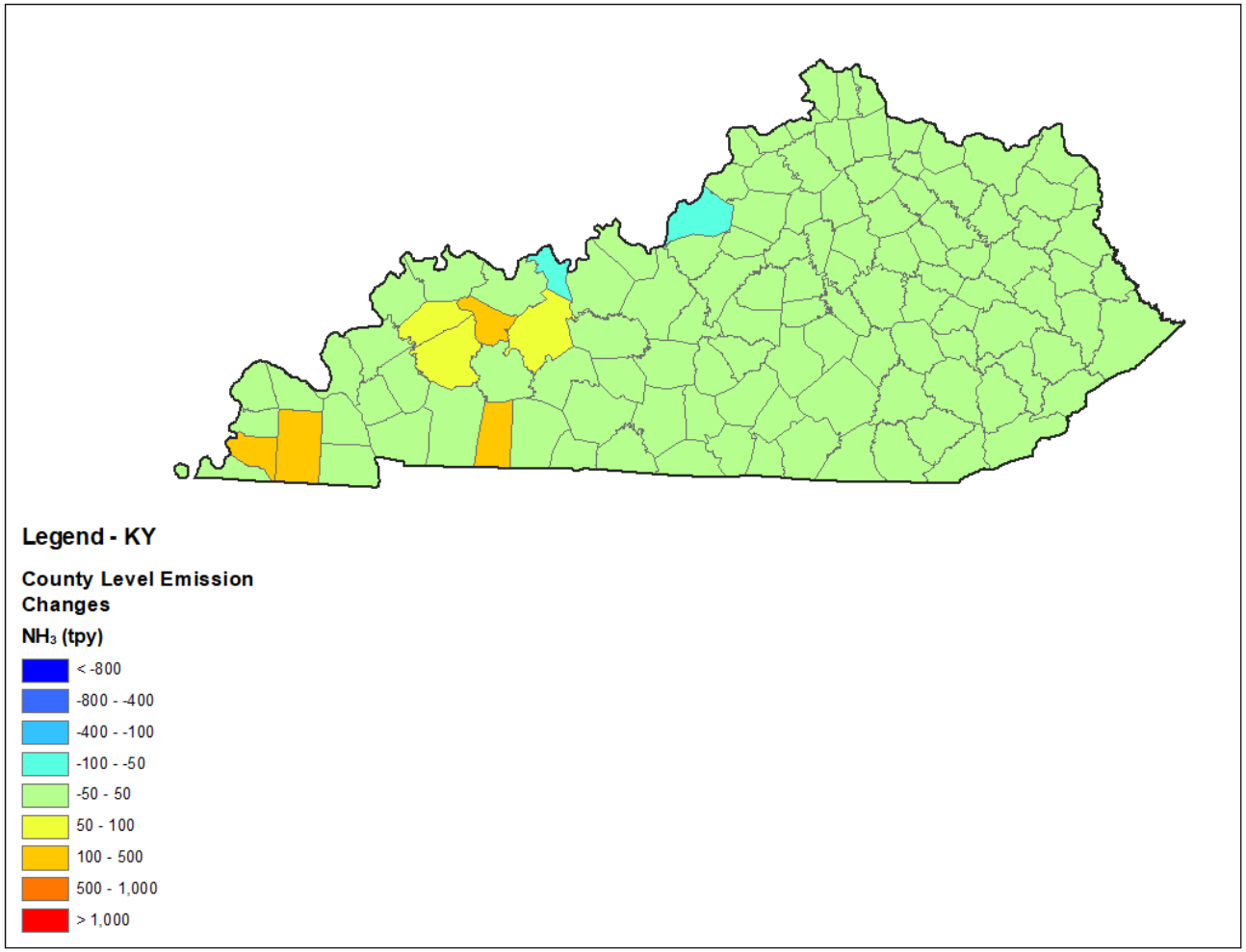

Figure E.4-2. Kentucky County Level NH_3 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

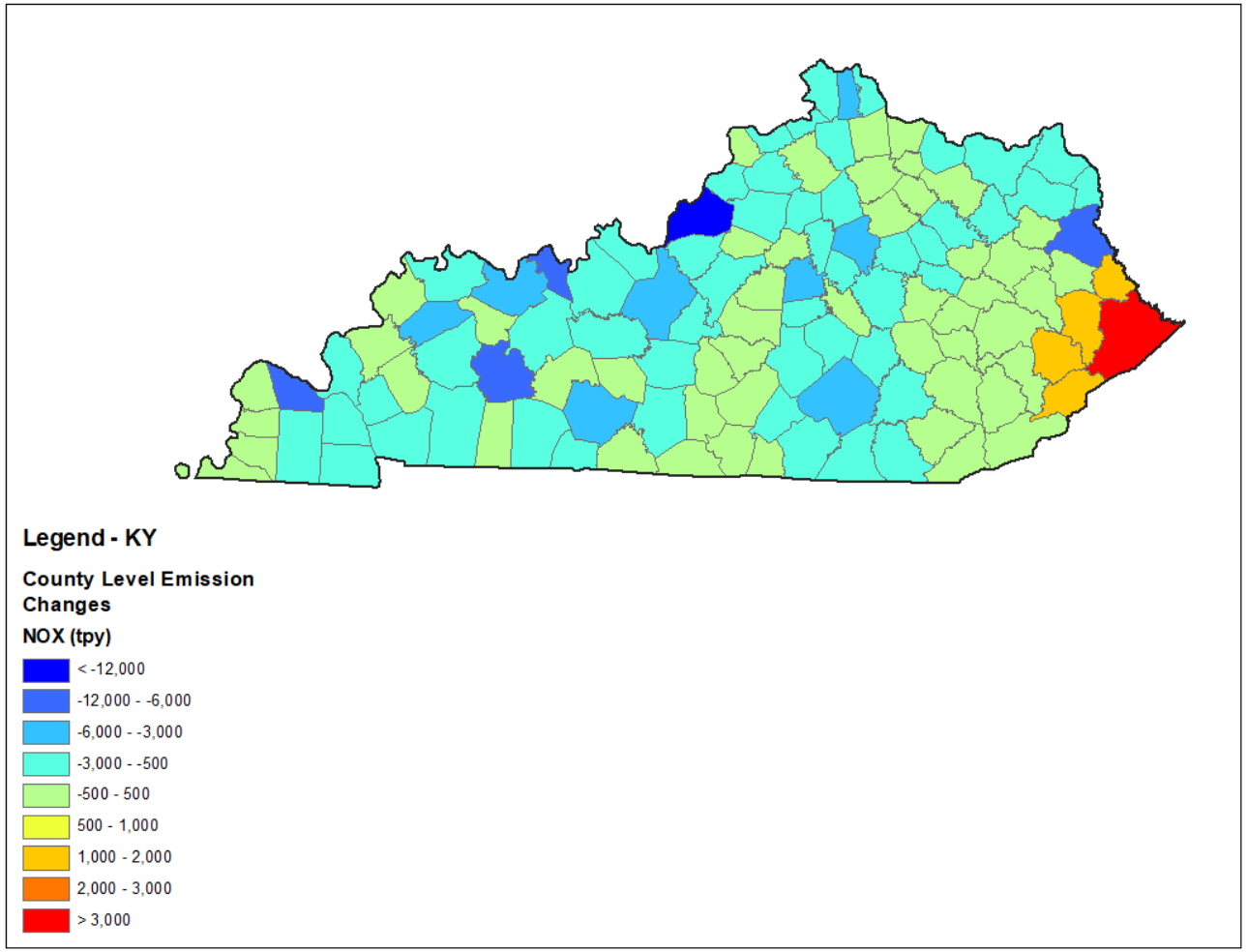

Figure E.4-3. Kentucky County Level NO_x Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

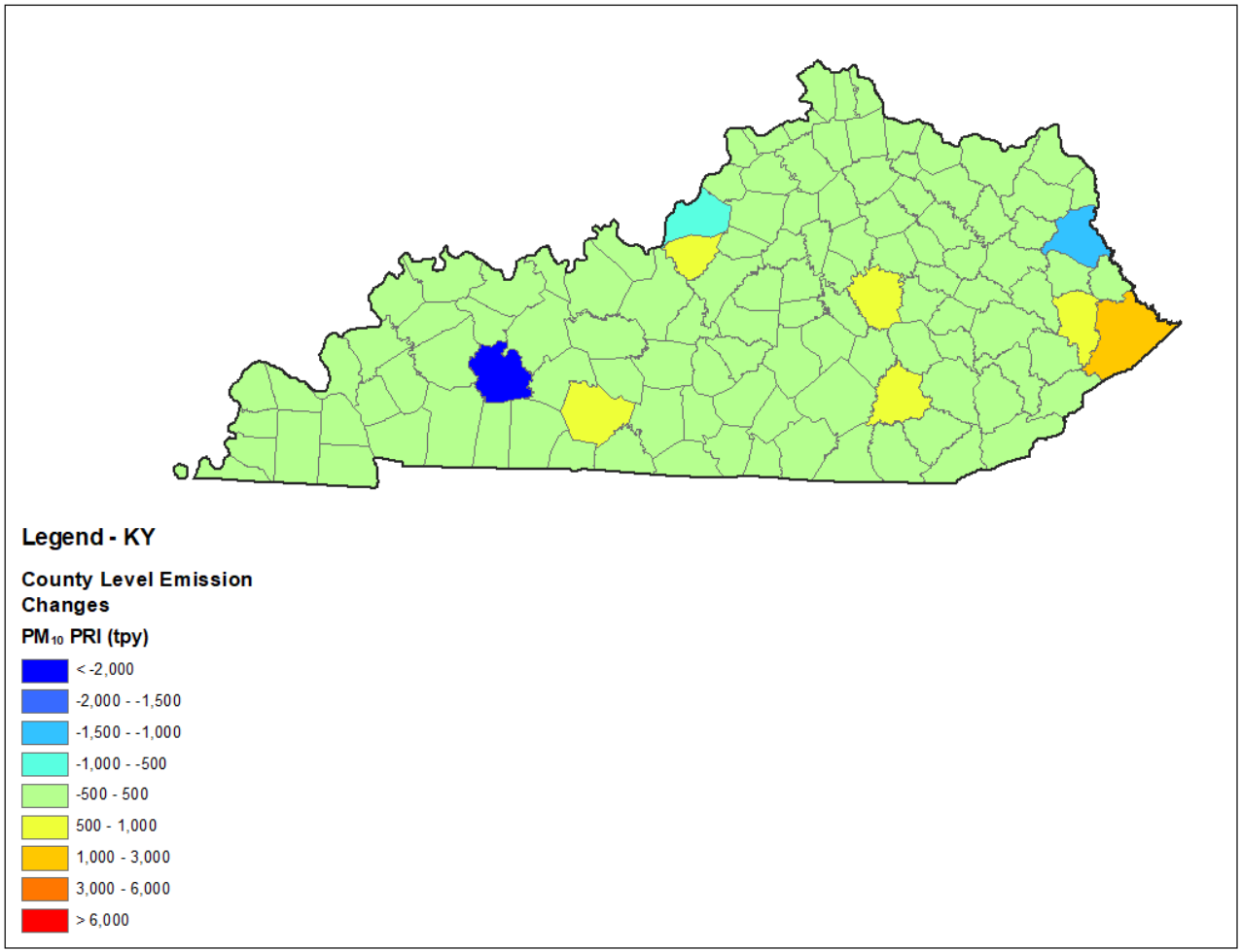

Figure E.4-4. Kentucky County Level PM_{10}-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[69]

[69] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

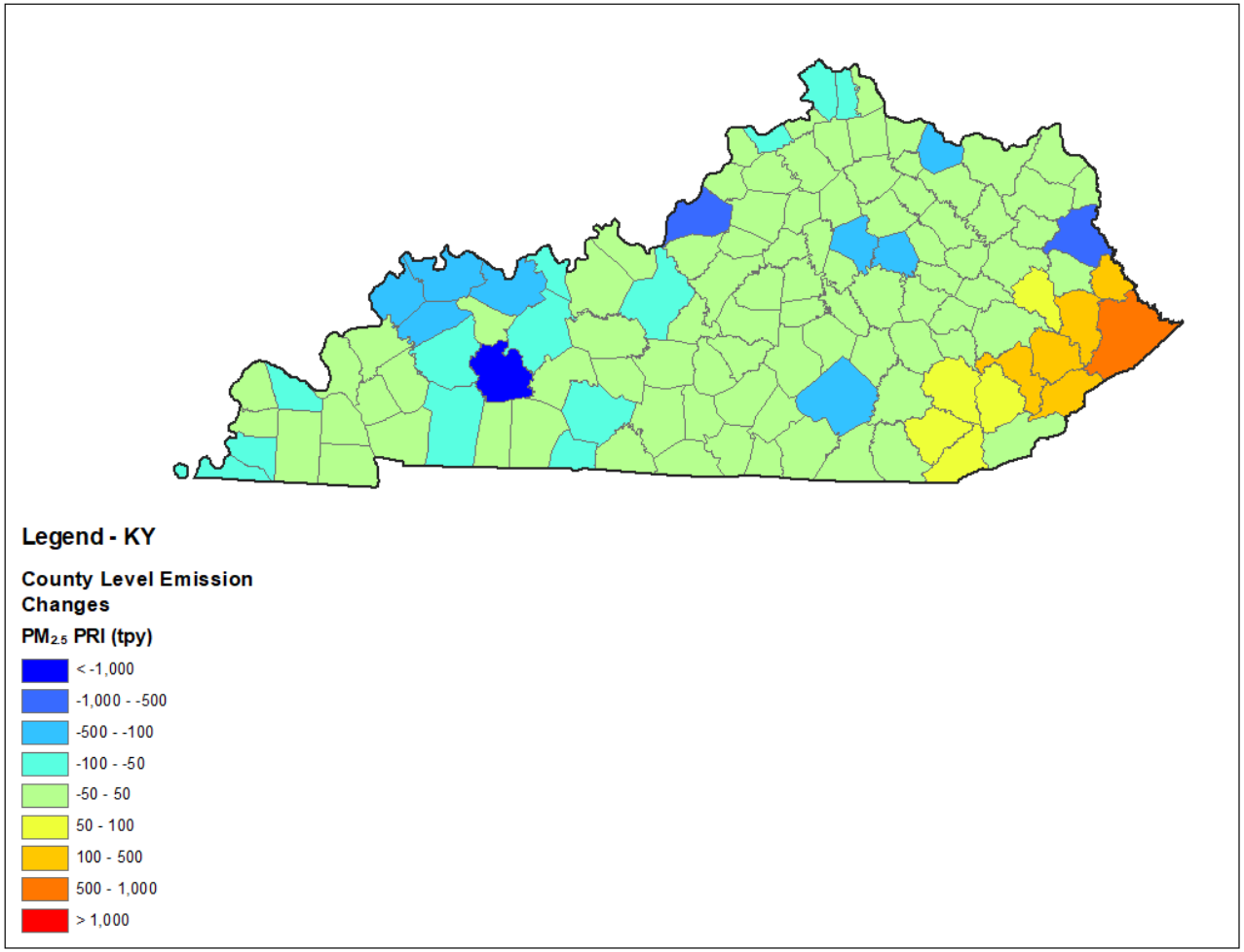

Figure E.4-5. Kentucky County Level $PM_{2.5}$-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[70]

[70] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

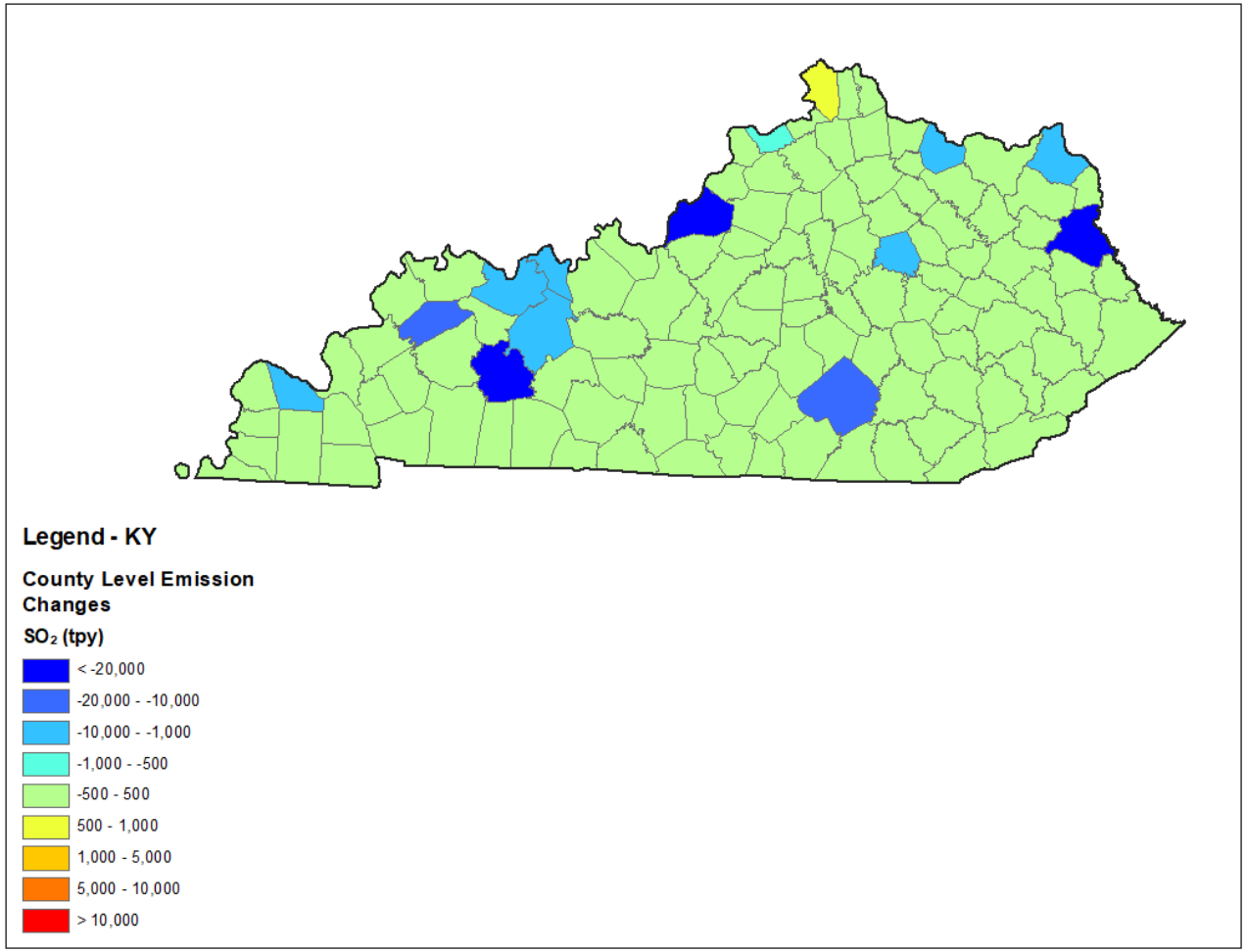

Figure E.4-6. Kentucky County Level SO_2 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

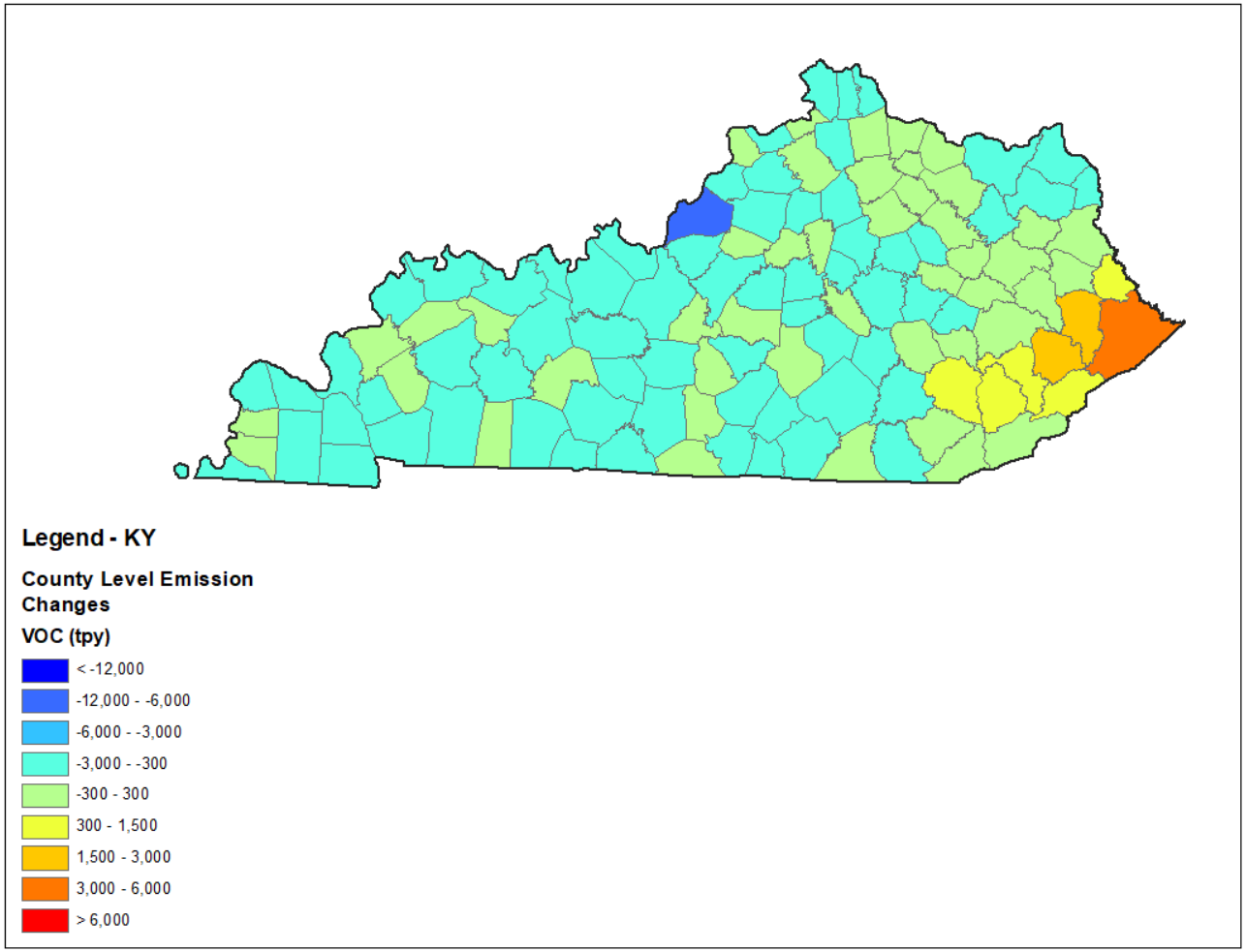

Figure E.4-7. Kentucky County Level VOC Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

Appendix E-5. Mississippi County-Level Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory

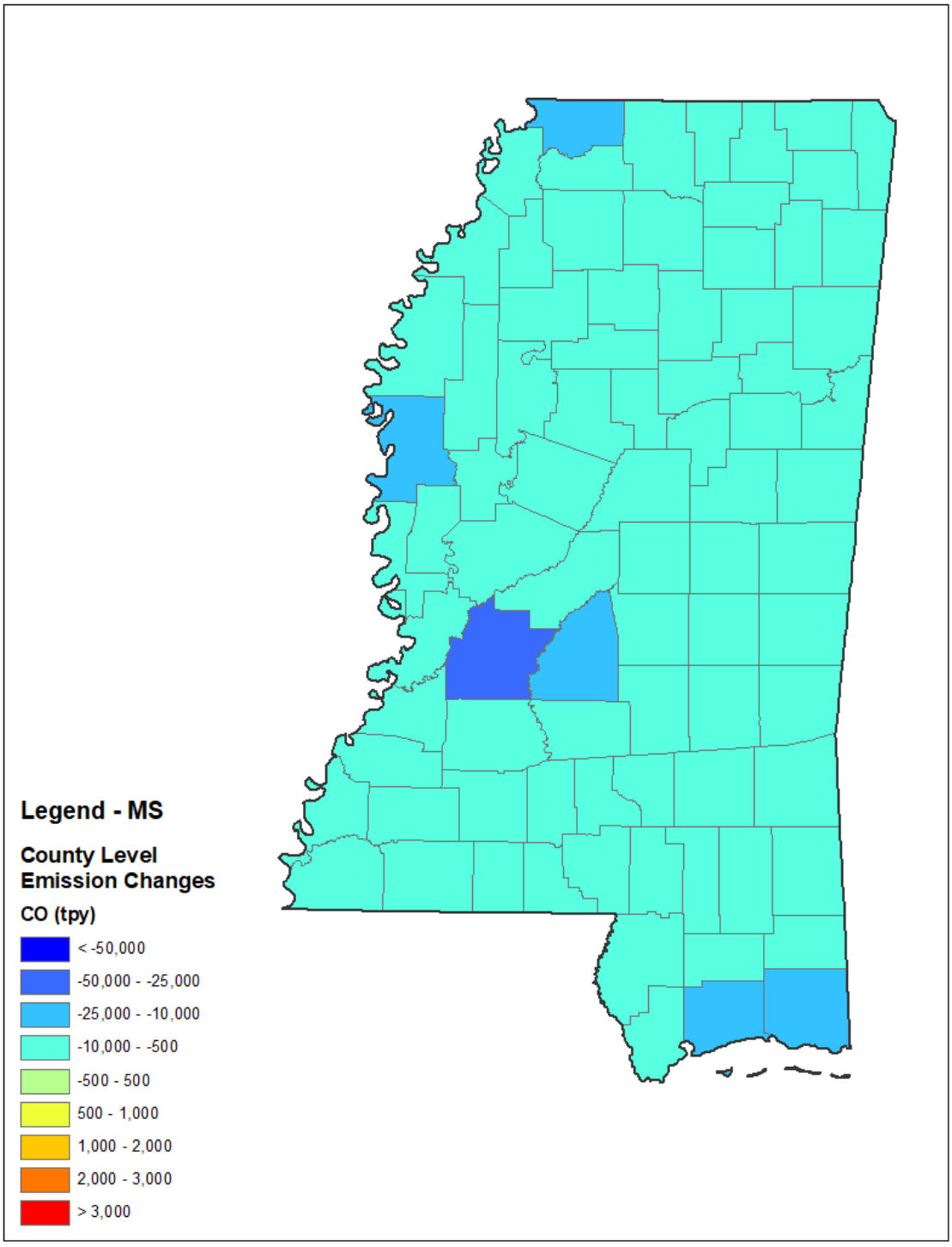

Figure E.5-1. Mississippi County Level CO Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

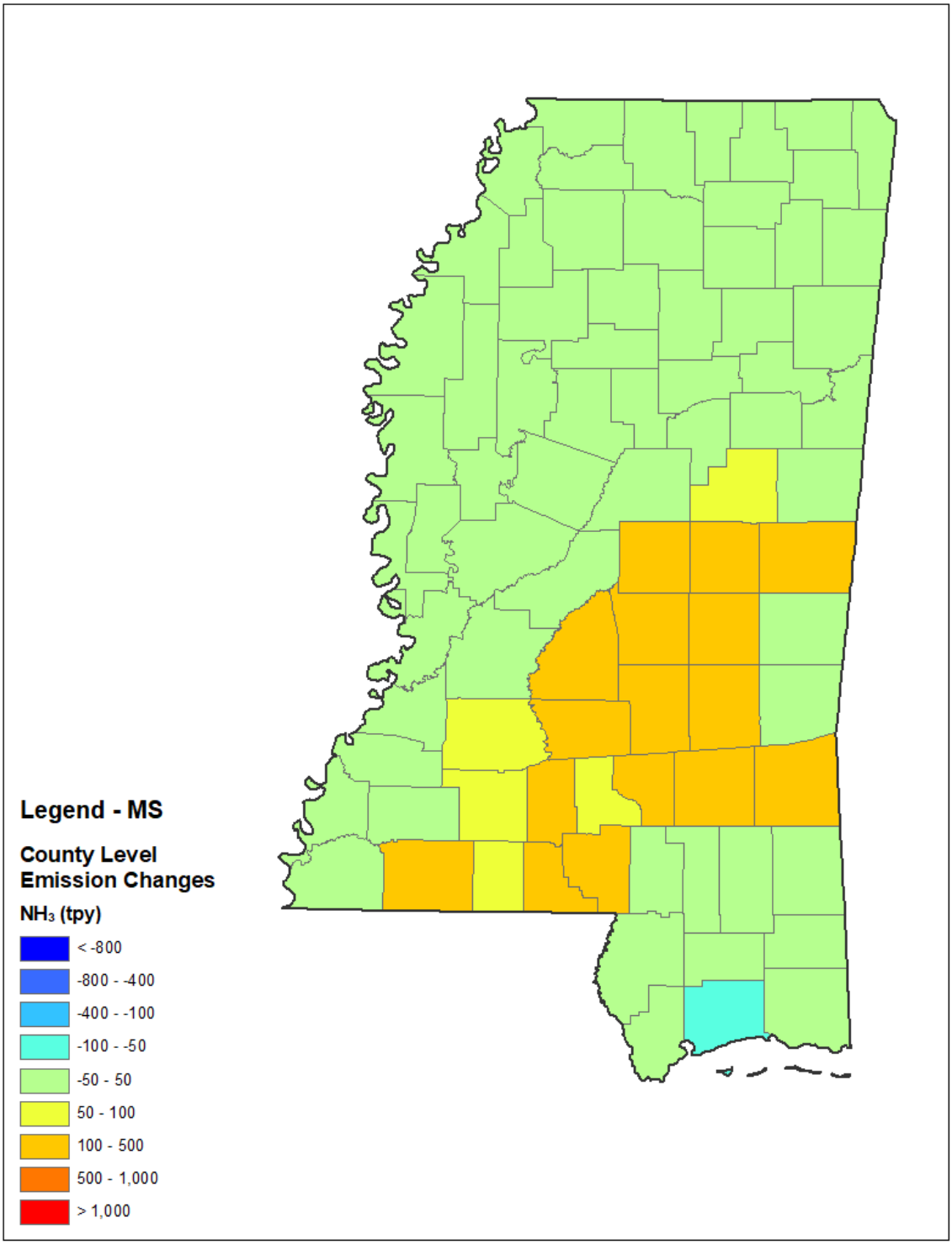

Figure E.5-2. Mississippi County Level NH_3 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

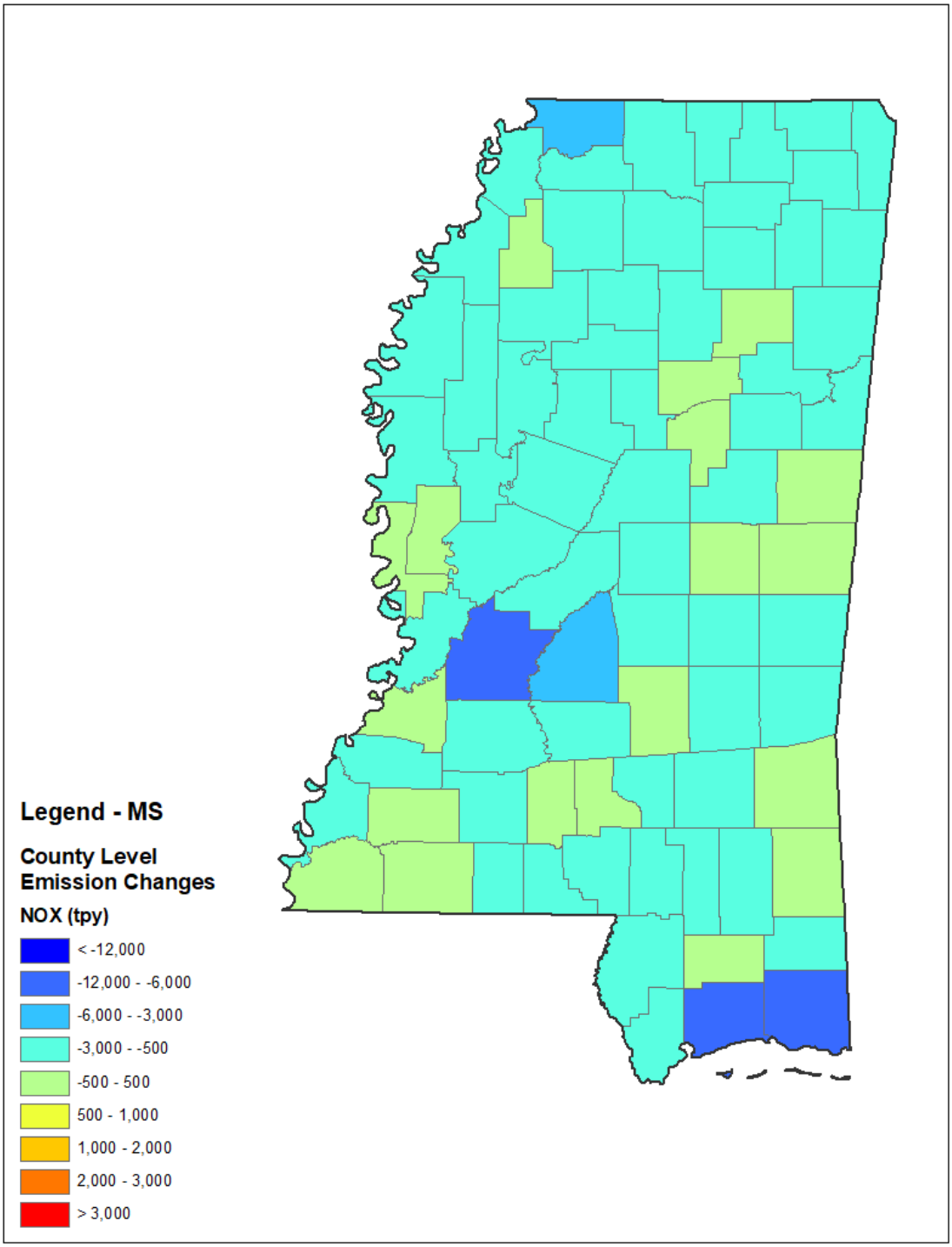

Figure E.5-3. Mississippi County Level NO_x Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

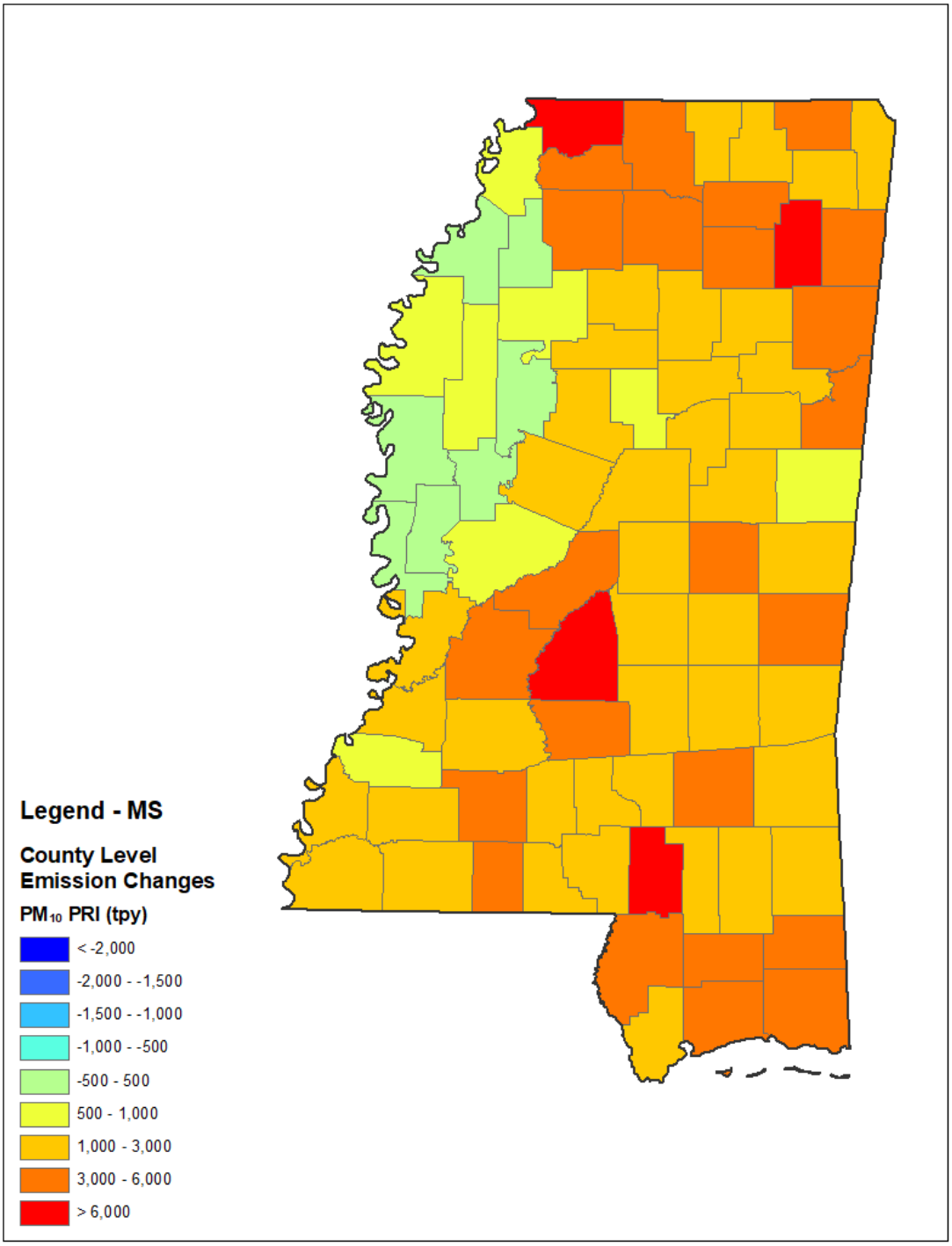

Figure E.5-4. Mississippi County Level PM_{10}-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[71]

[71] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

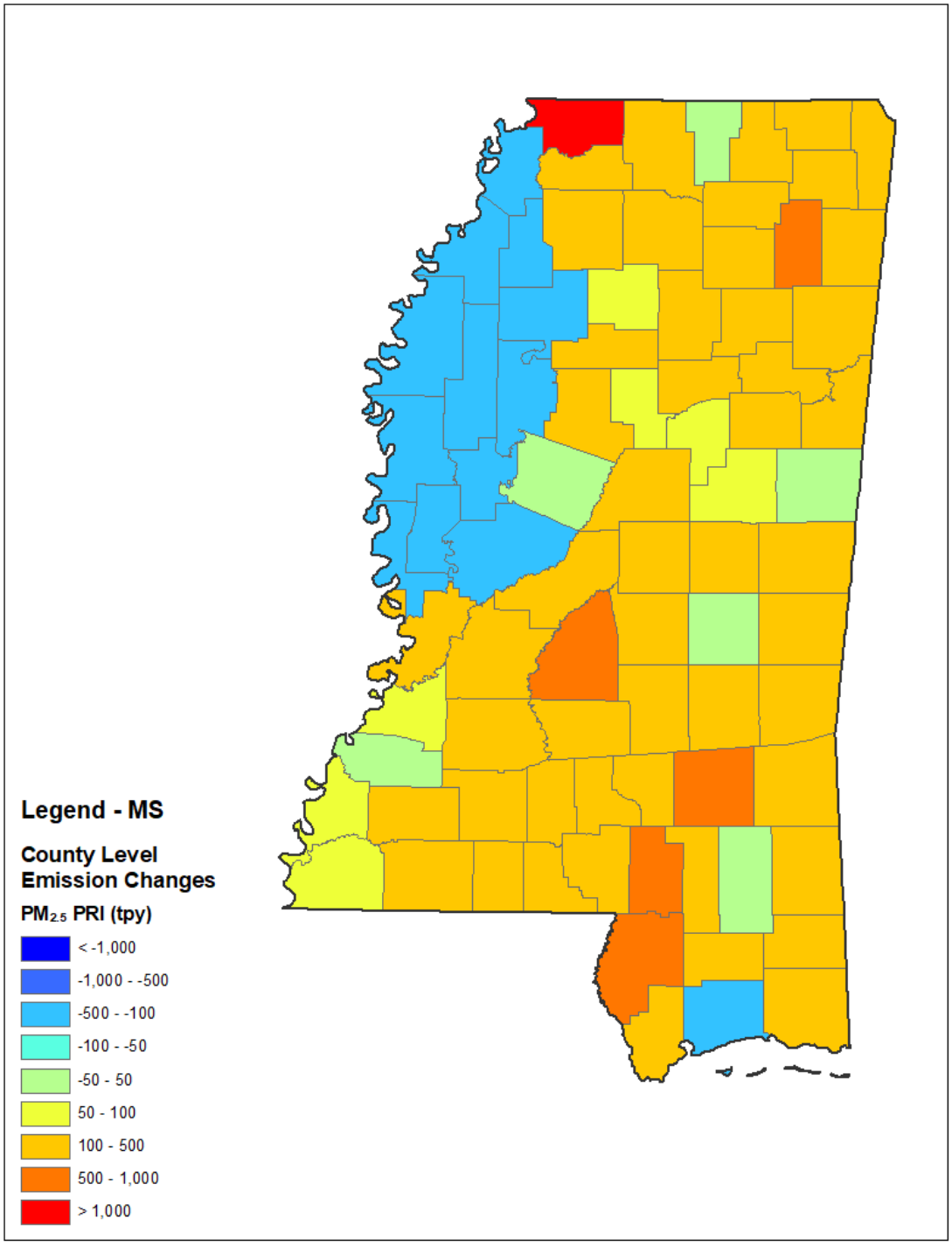

Figure E.5-5. Mississippi County Level $PM_{2.5}$-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[72]

[72] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

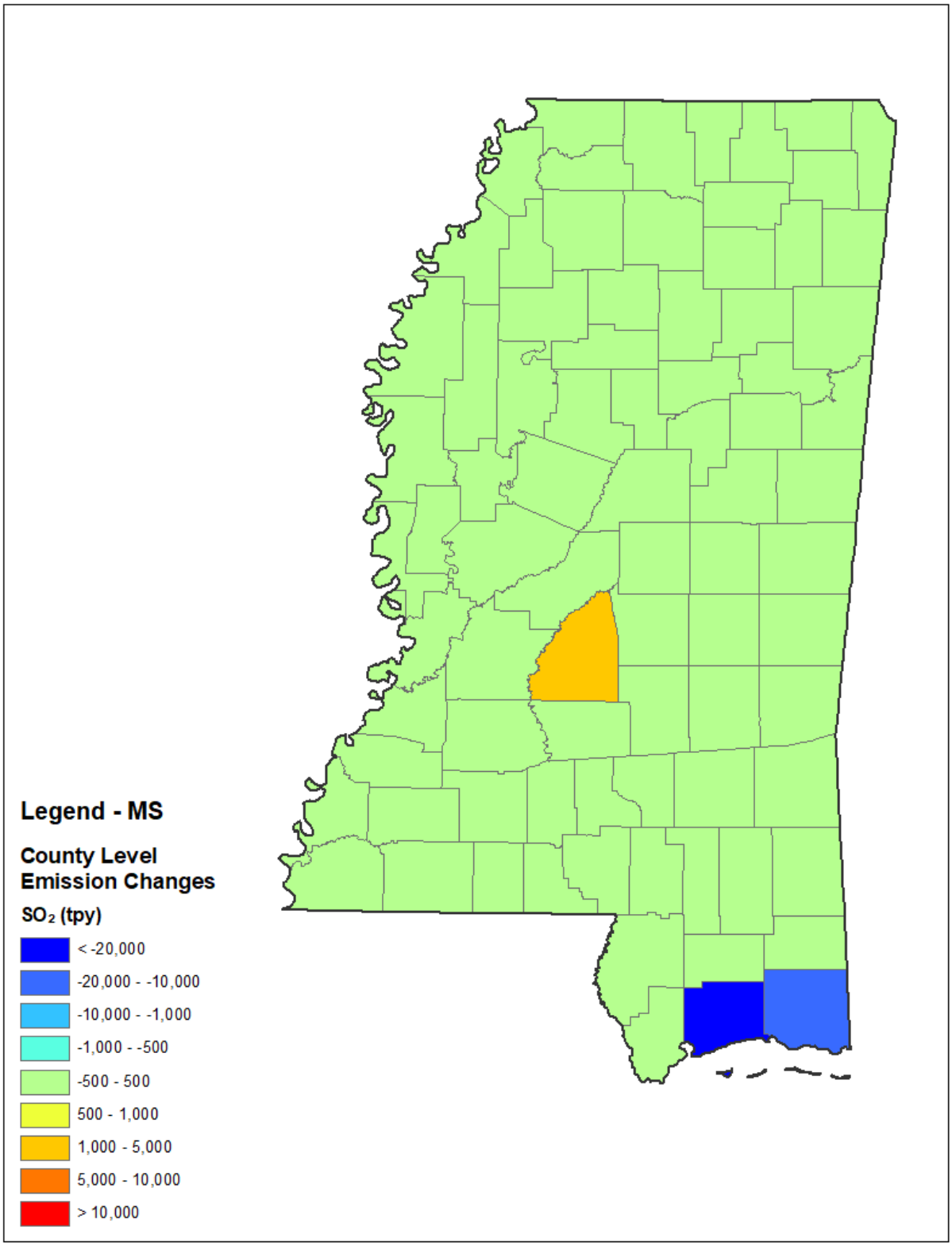

Figure E.5-6. Mississippi County Level SO_2 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

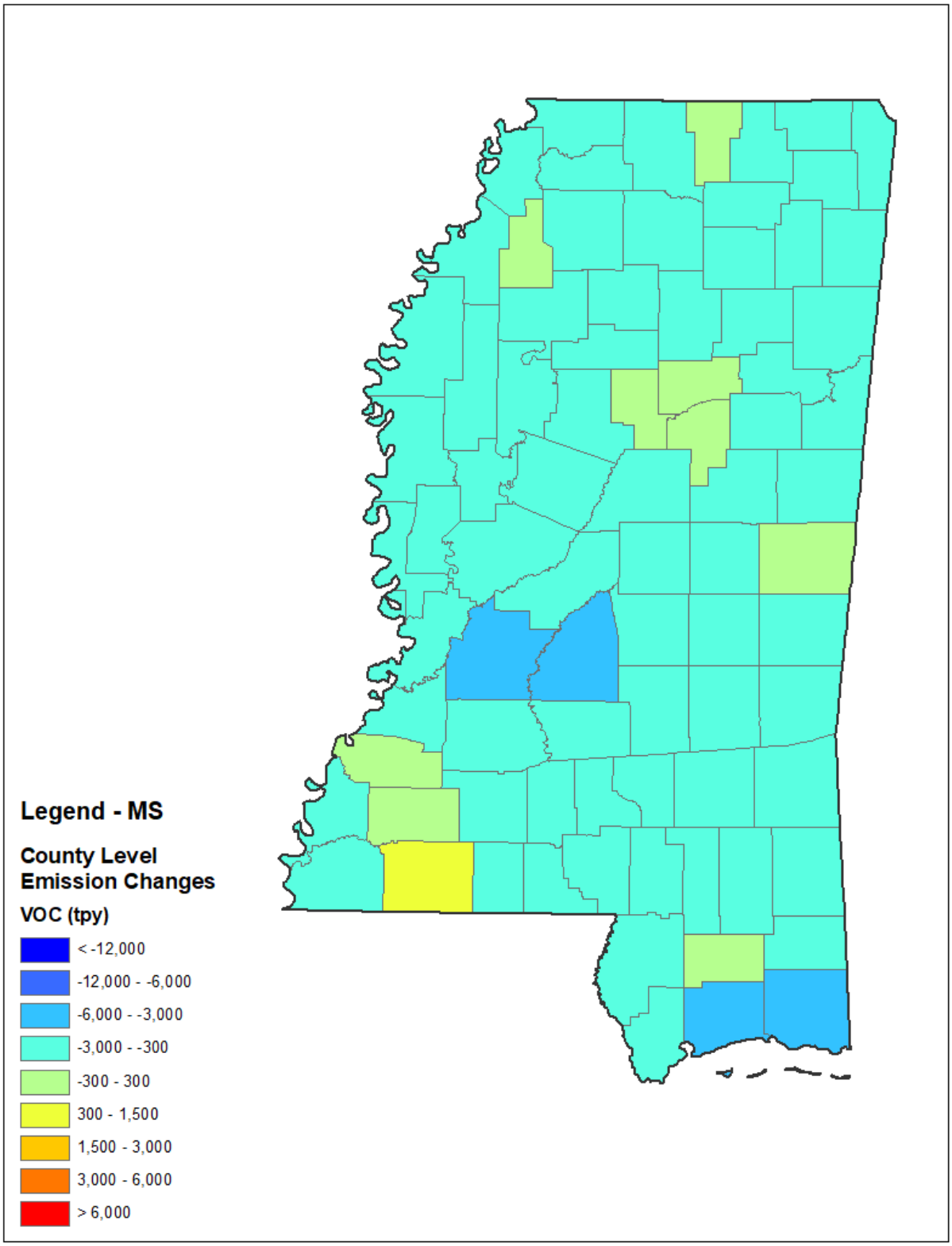

Figure E.5-7. Mississippi County Level VOC Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

Appendix E-6. North Carolina County-Level Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory

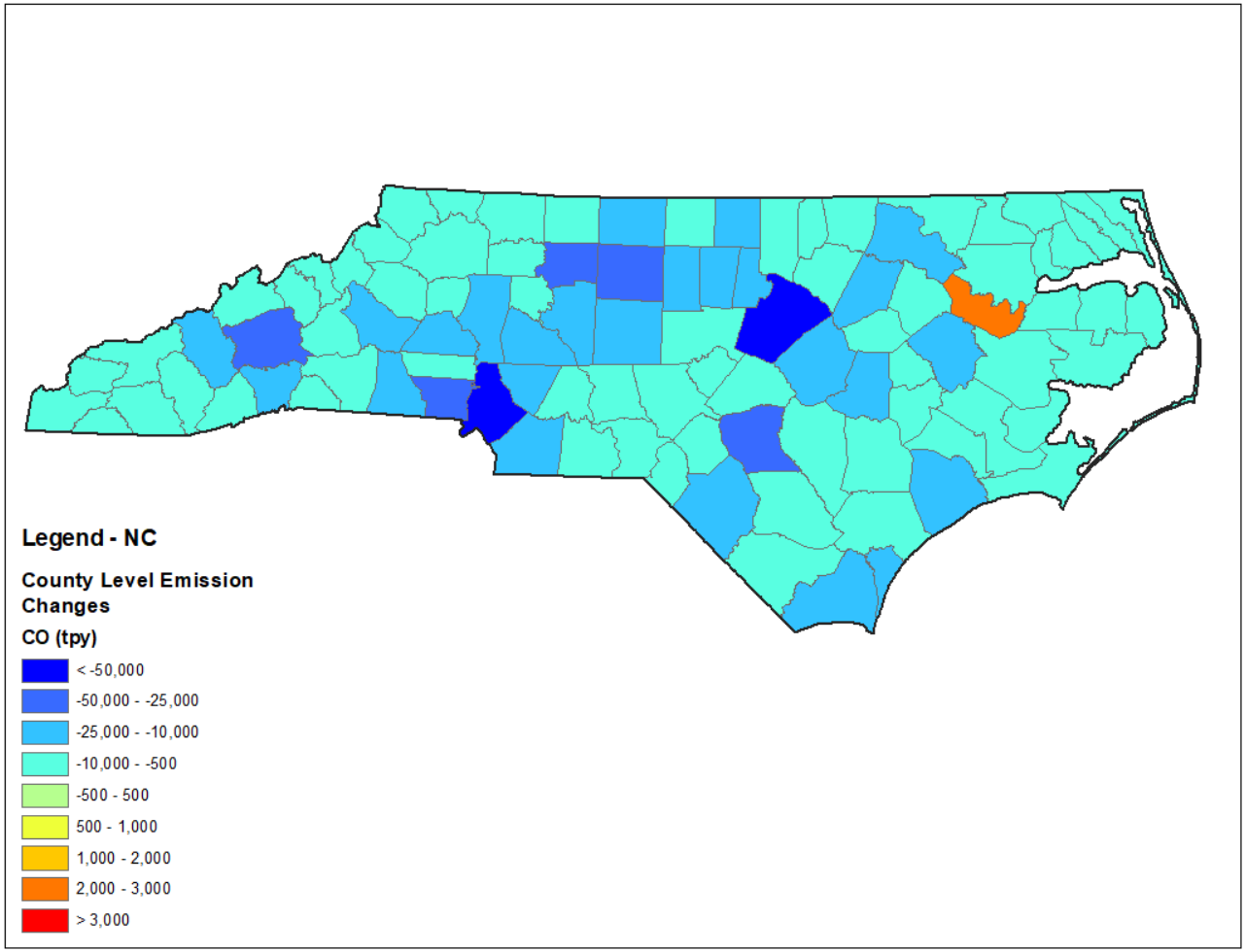

Figure E.6-1. North Carolina County Level CO Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

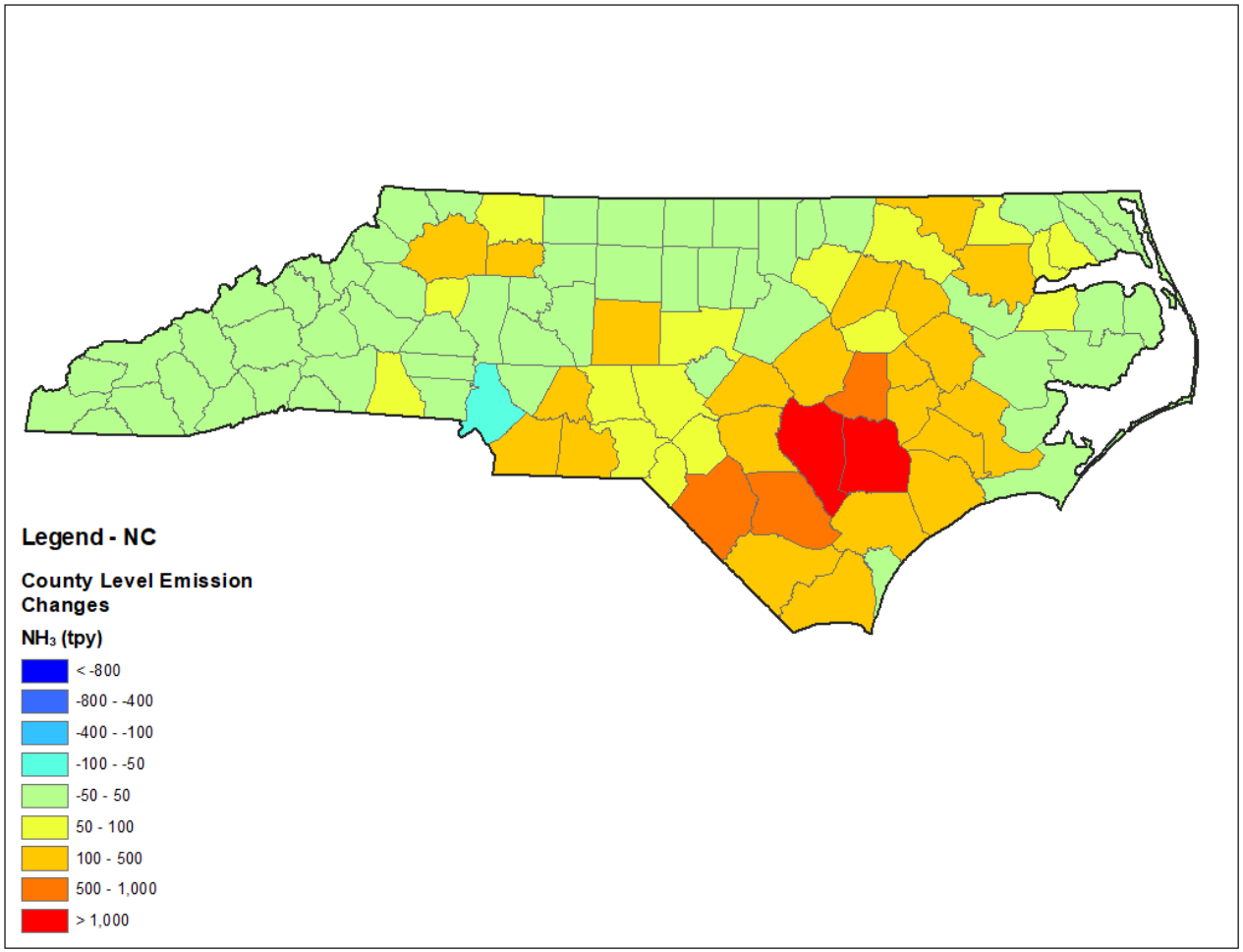

Figure E.6-2. North Carolina County Level NH_3 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

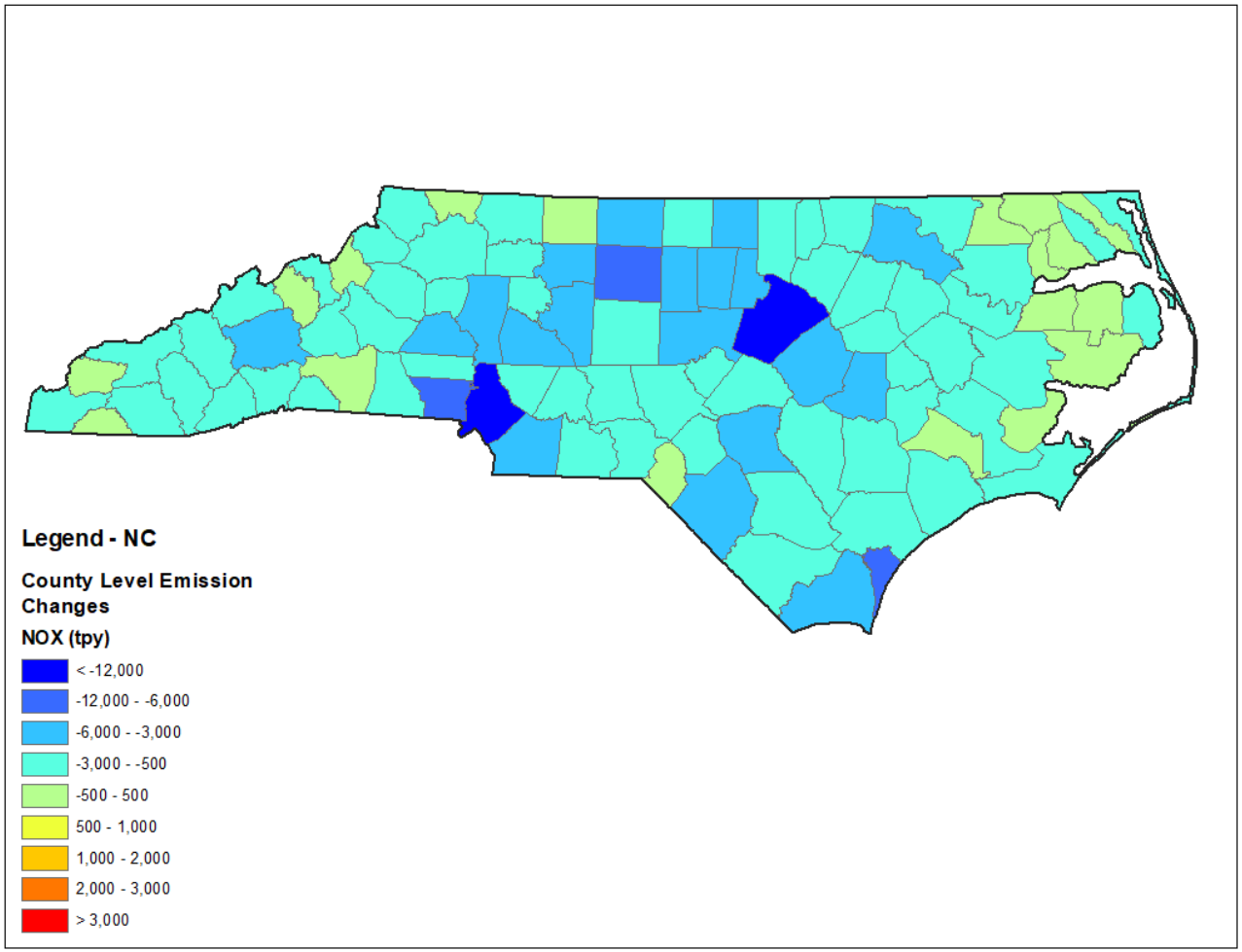

Figure E.6-3. North Carolina County Level NO_x Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

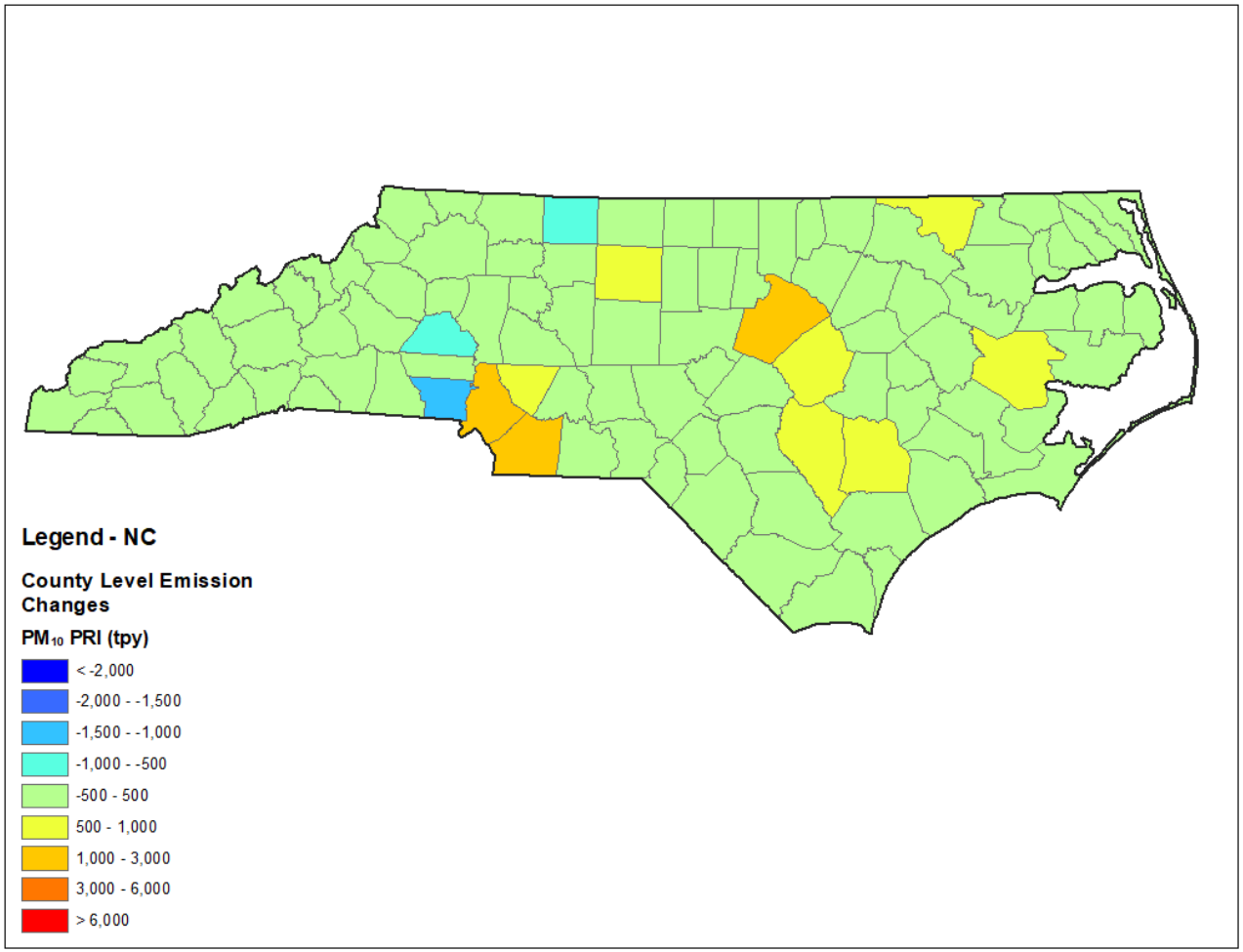

Figure E.6-4. North Carolina County Level PM_{10}-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[73]

[73] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

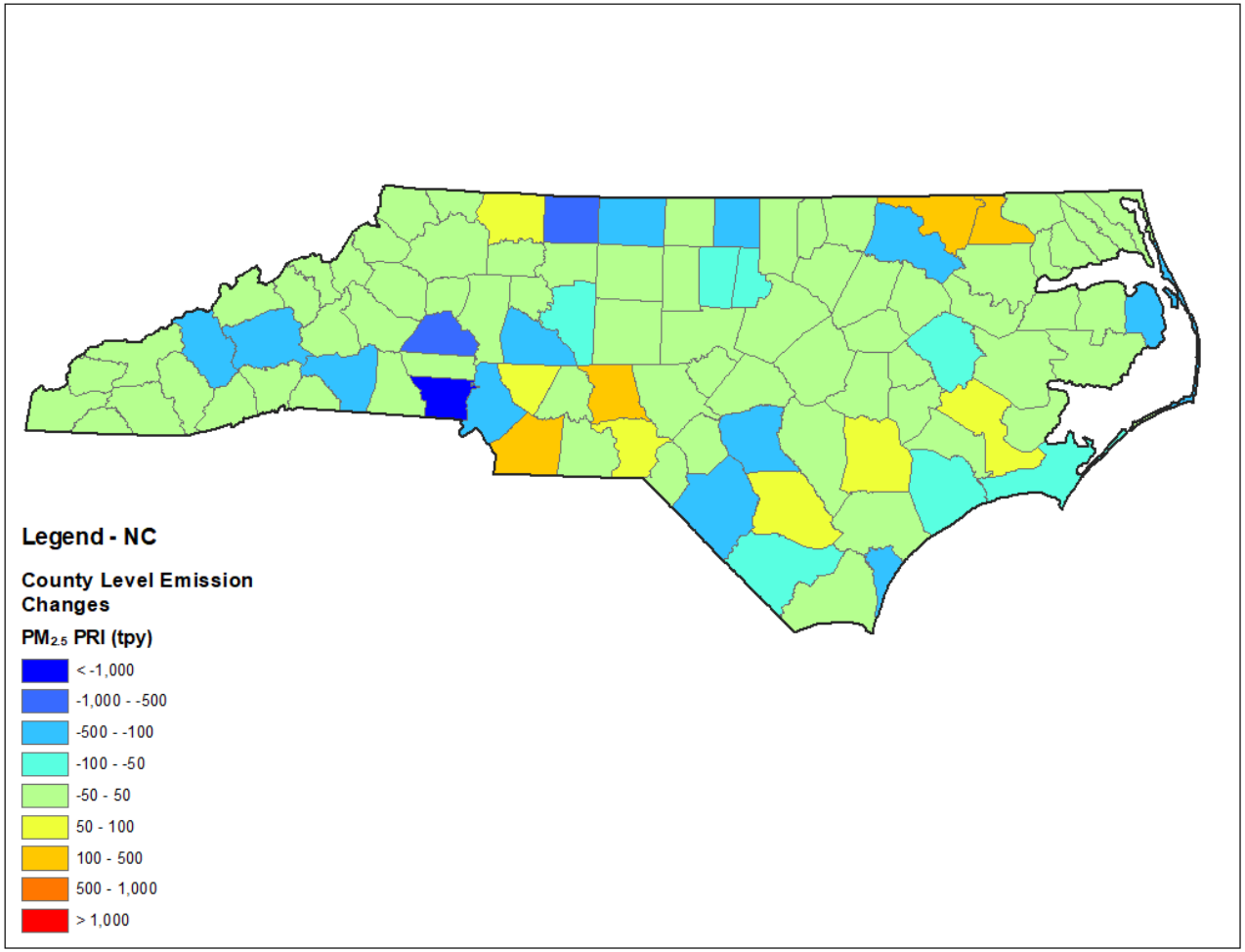

Figure E.6-5. North Carolina County Level $PM_{2.5}$-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[74]

[74] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

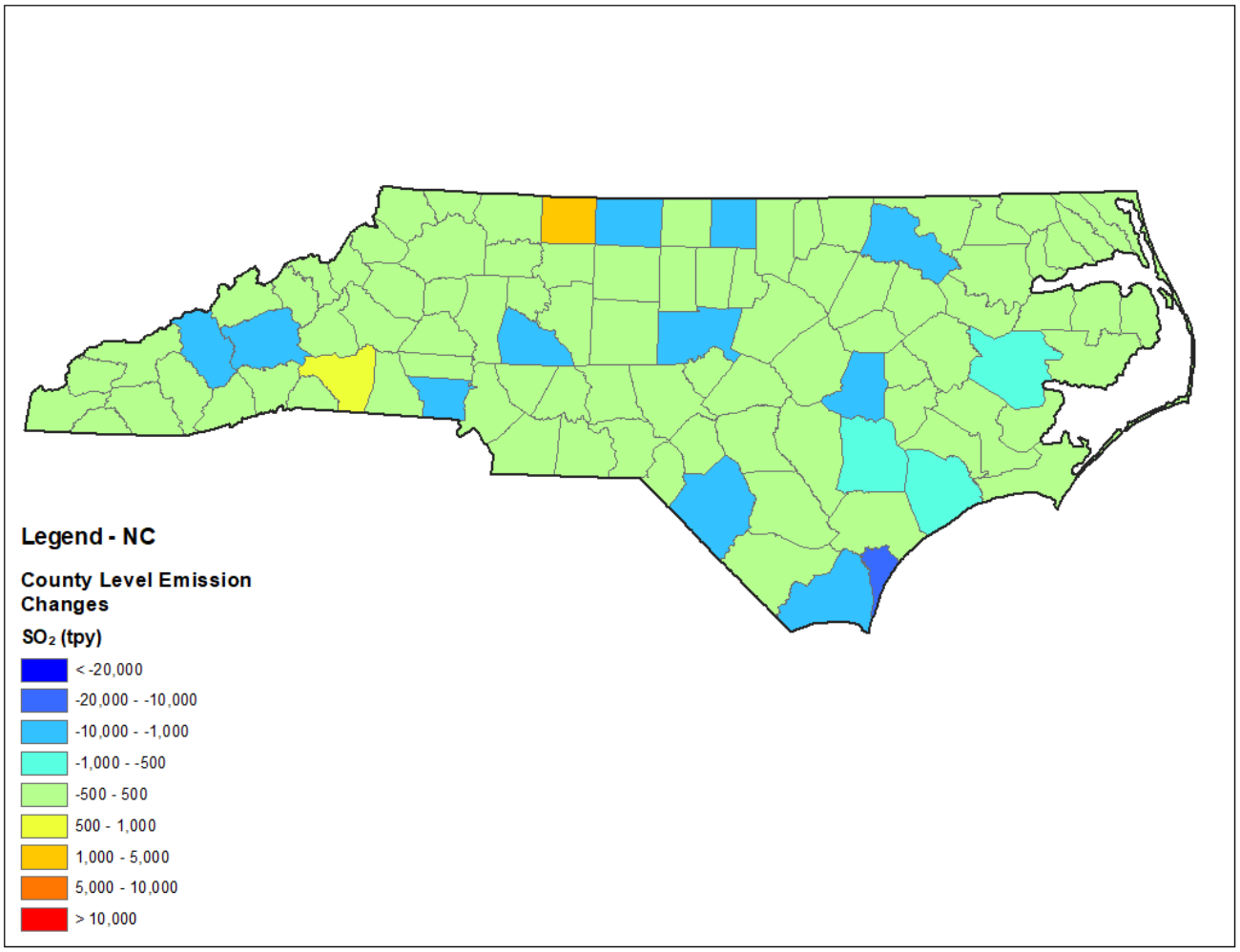

Figure E.6-6. North Carolina County Level SO_2 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

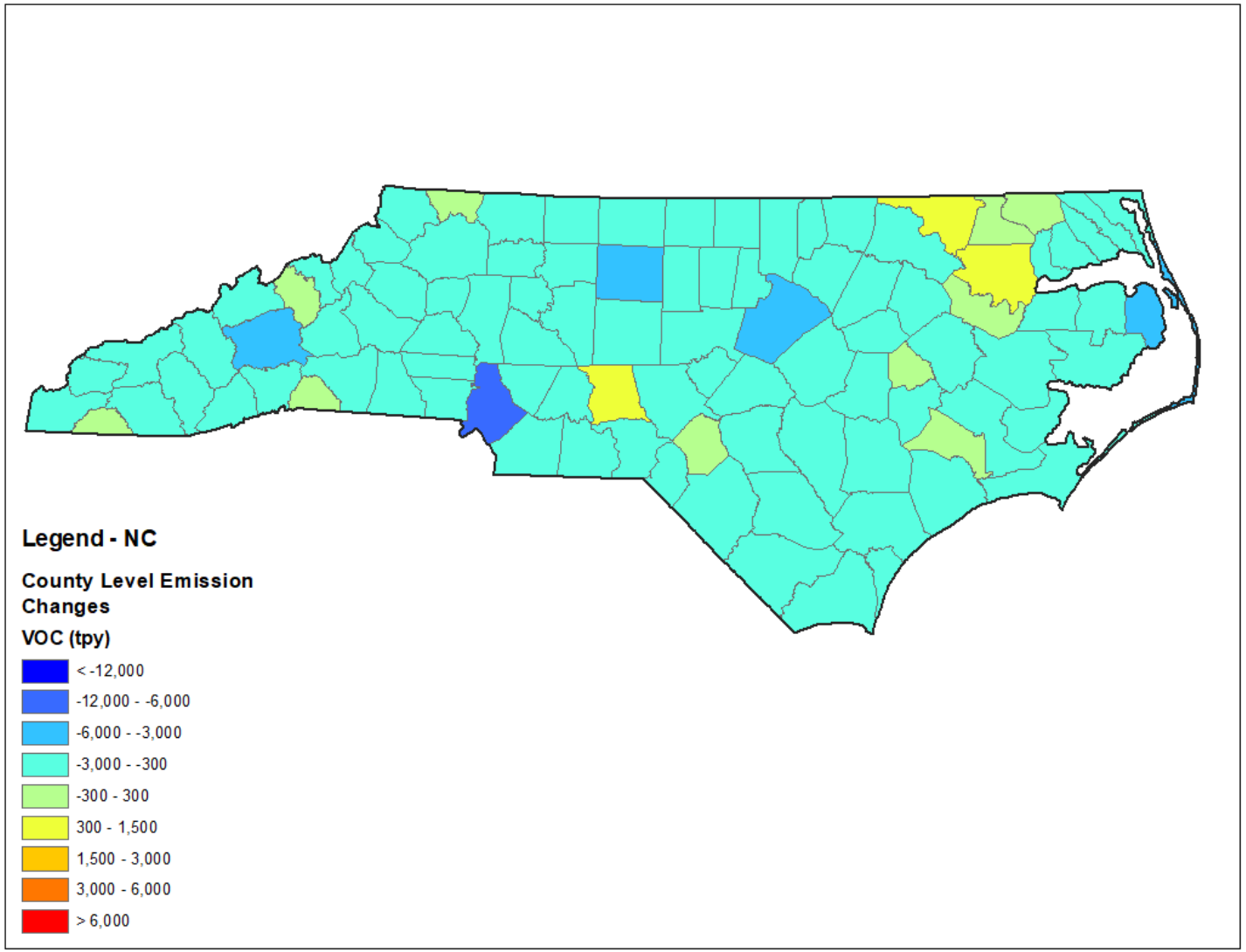

Figure E.6-7. North Carolina County Level VOC Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

Appendix E-7. South Carolina County-Level Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory

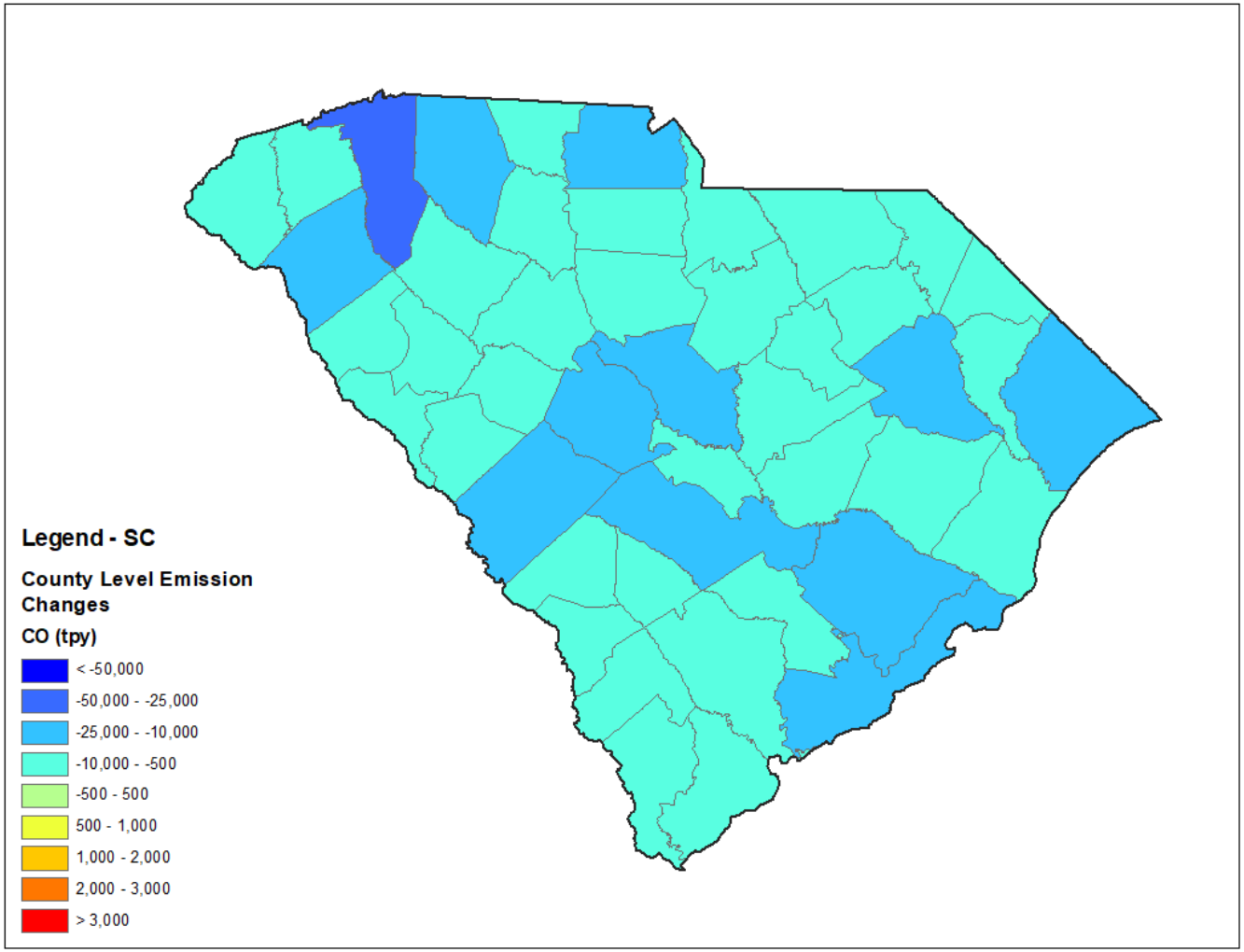

Figure E.7-1. South Carolina County Level CO Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

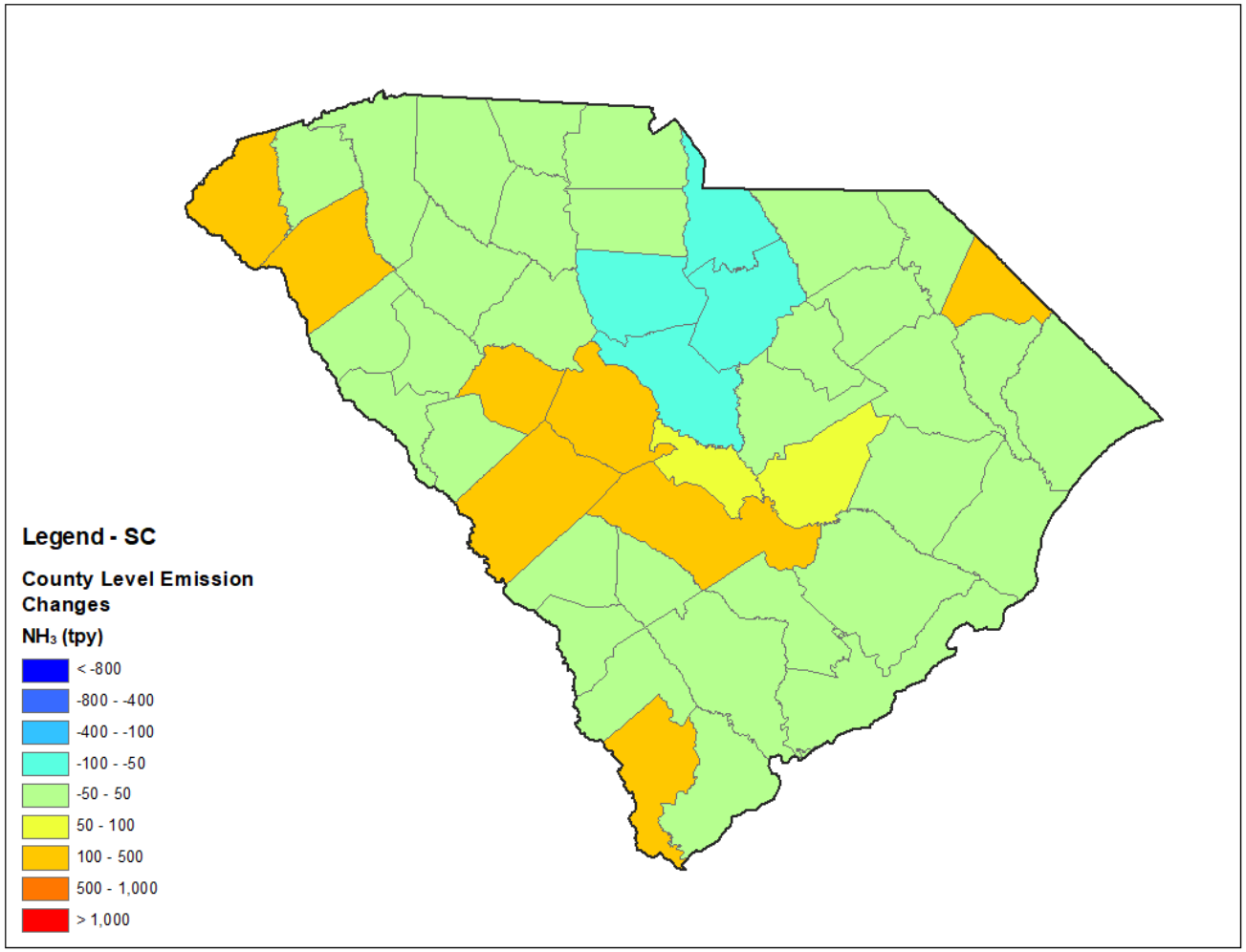

Figure E.7-2. South Carolina County Level NH_3 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

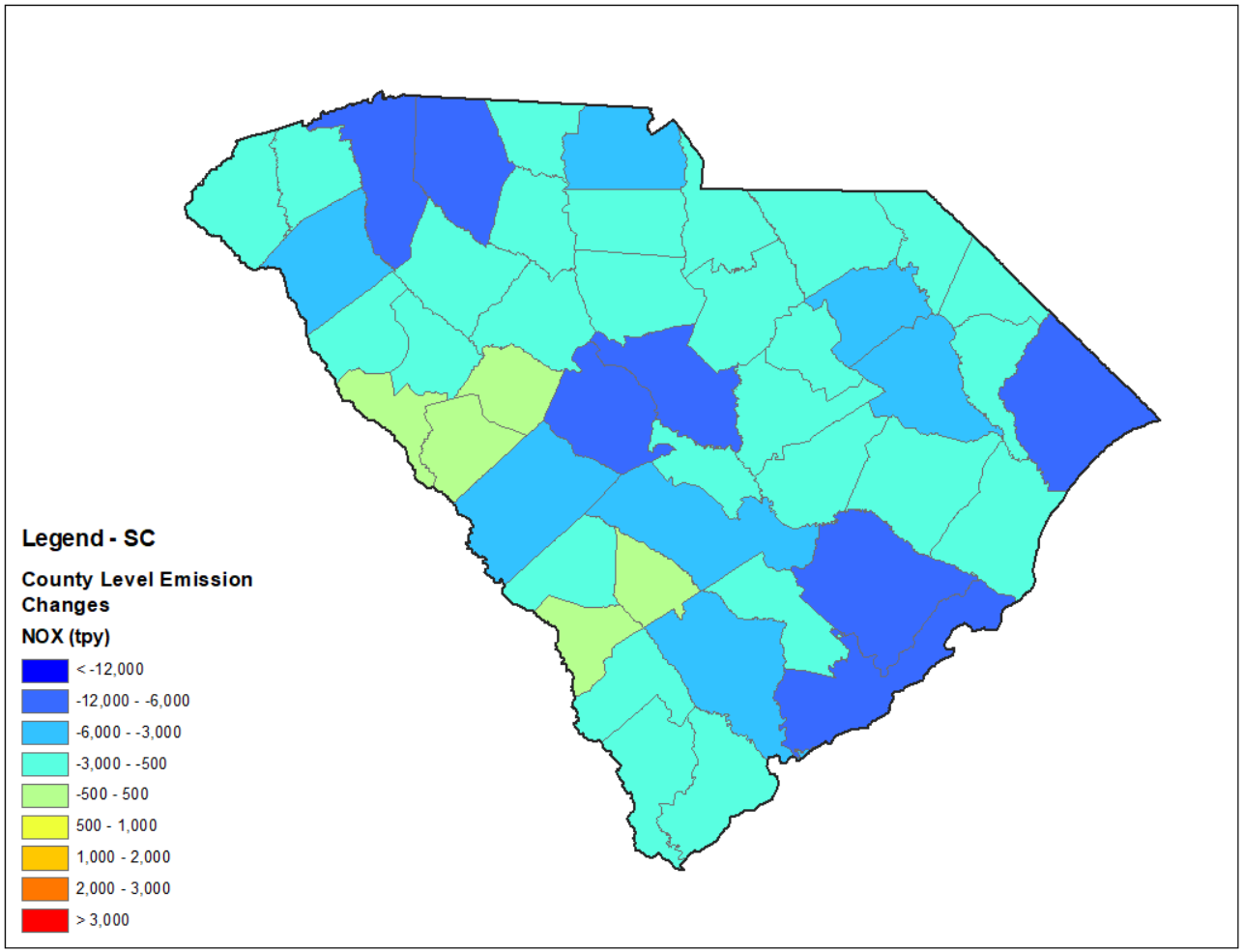

Figure E.7-3. South Carolina County Level NO_x Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

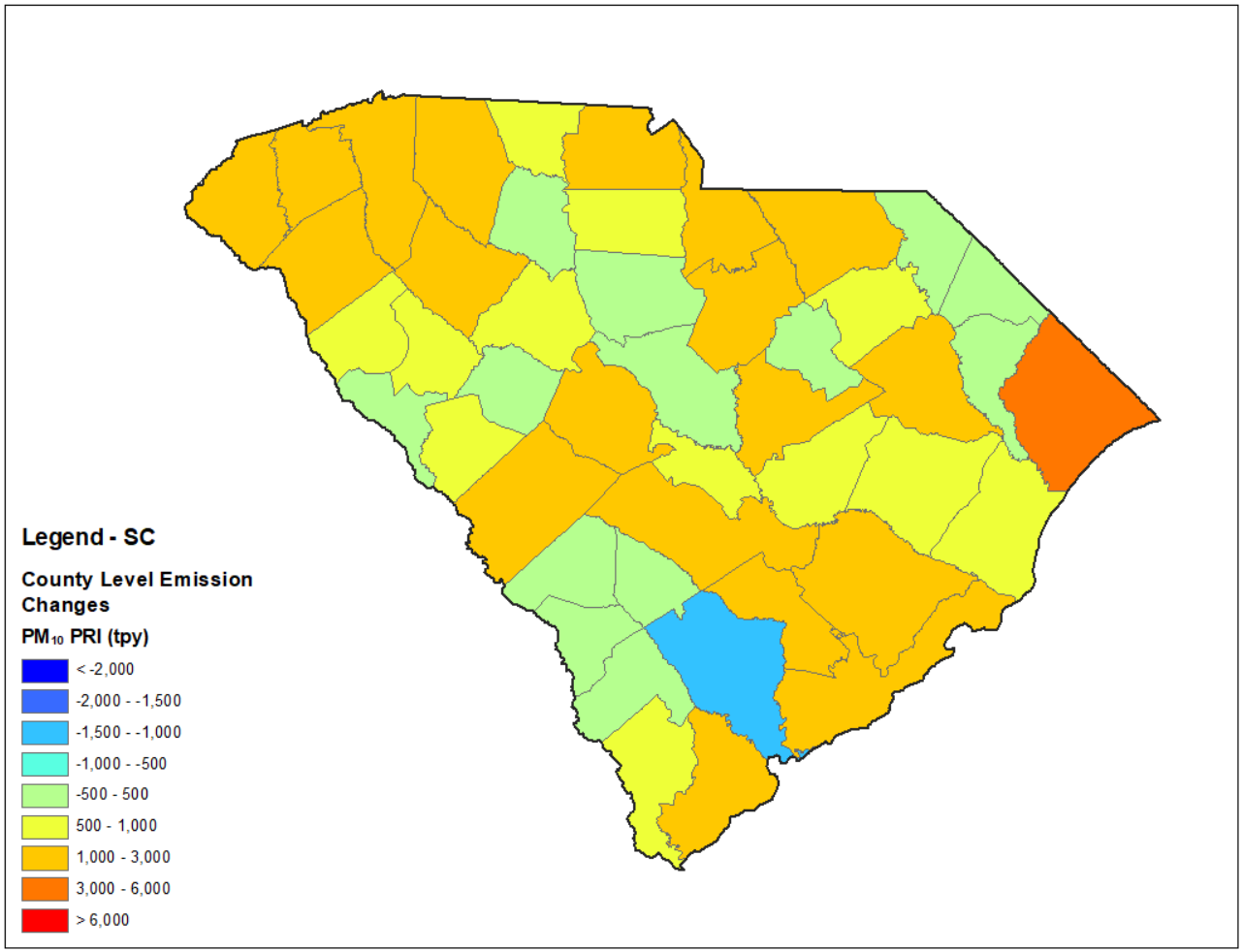

Figure E.7-4. South Carolina County Level PM_{10}-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[75]

[75] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

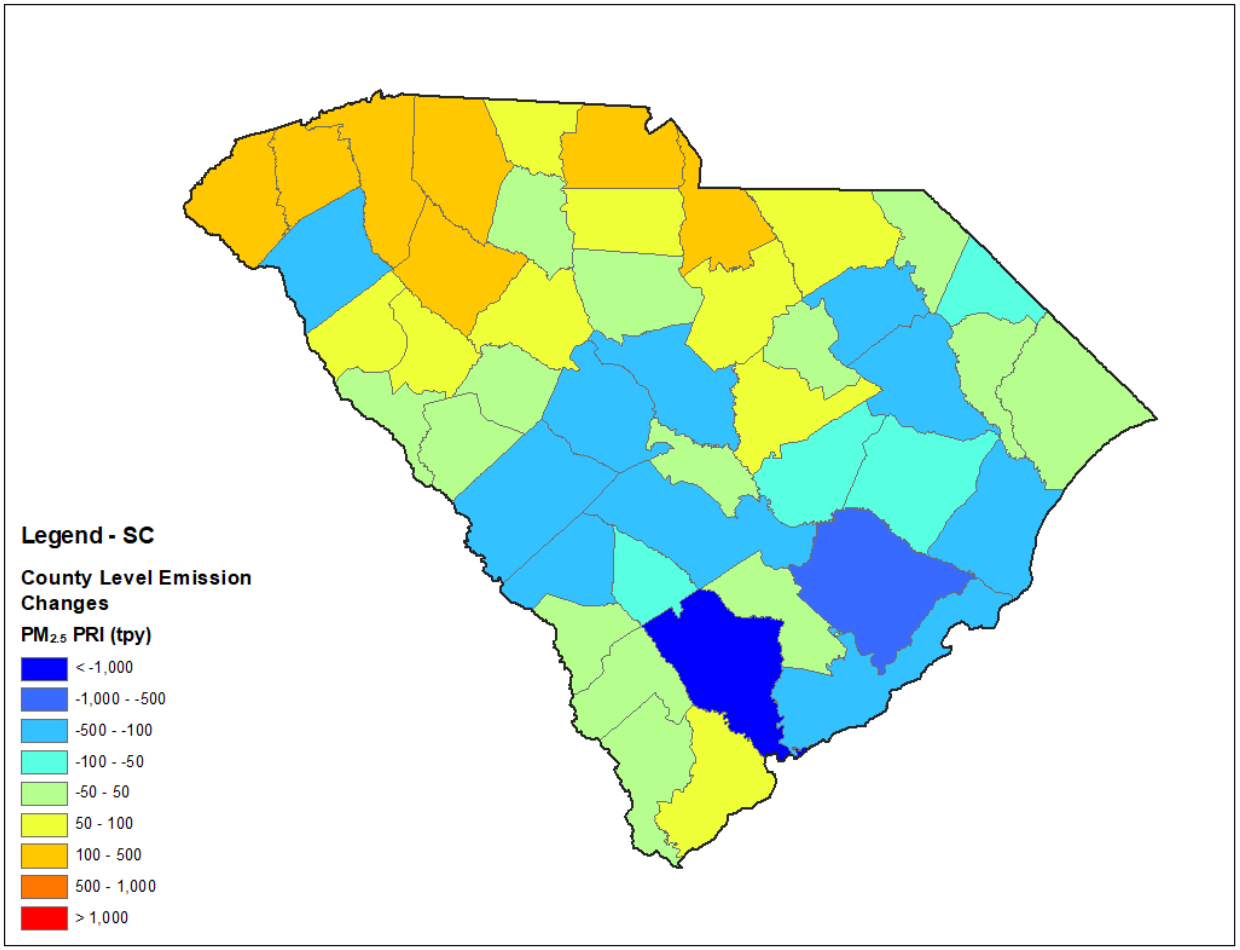

Figure E.7-5. South Carolina County Level $PM_{2.5}$-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[76]

[76] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

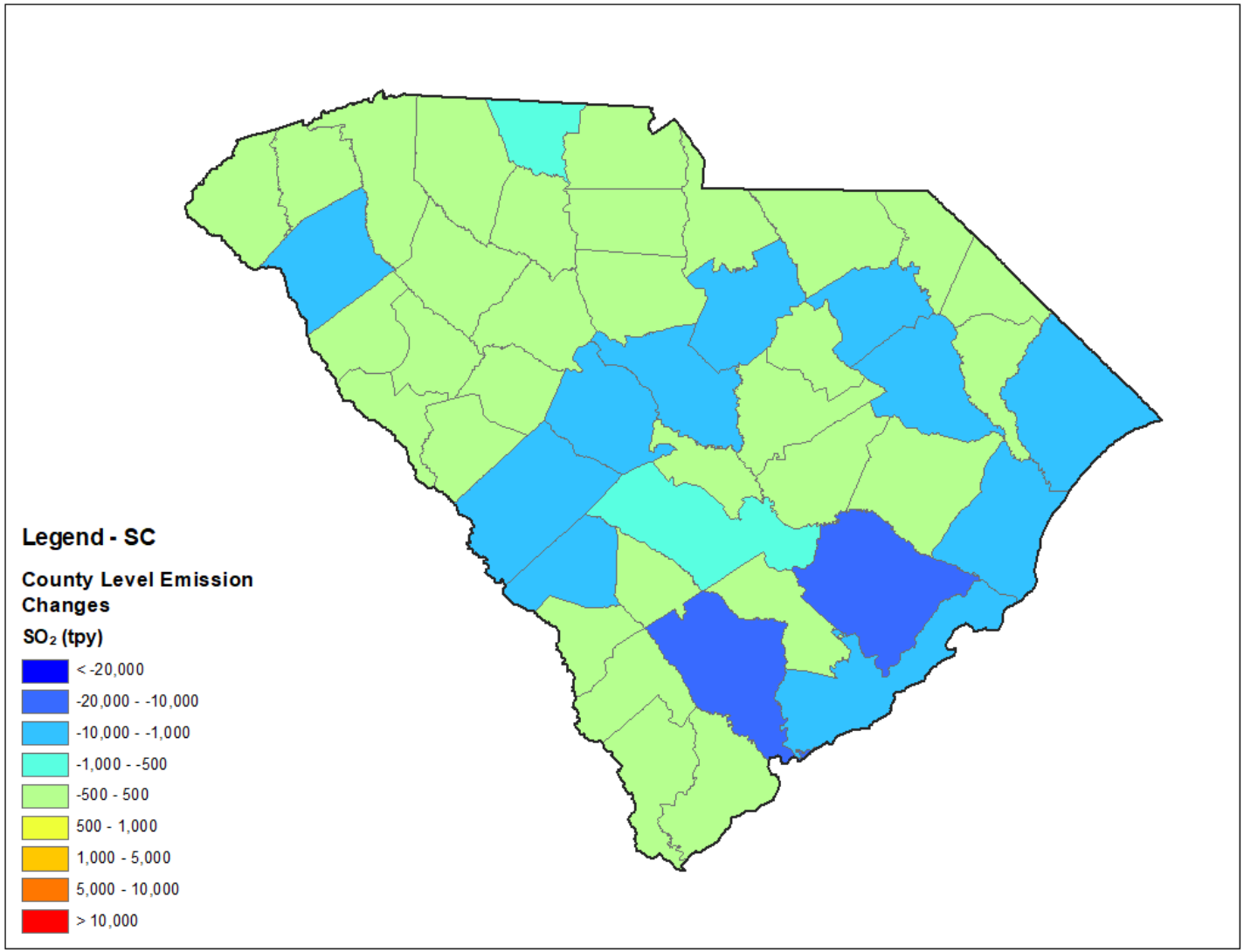

Figure E.7-6. South Carolina County Level SO_2 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

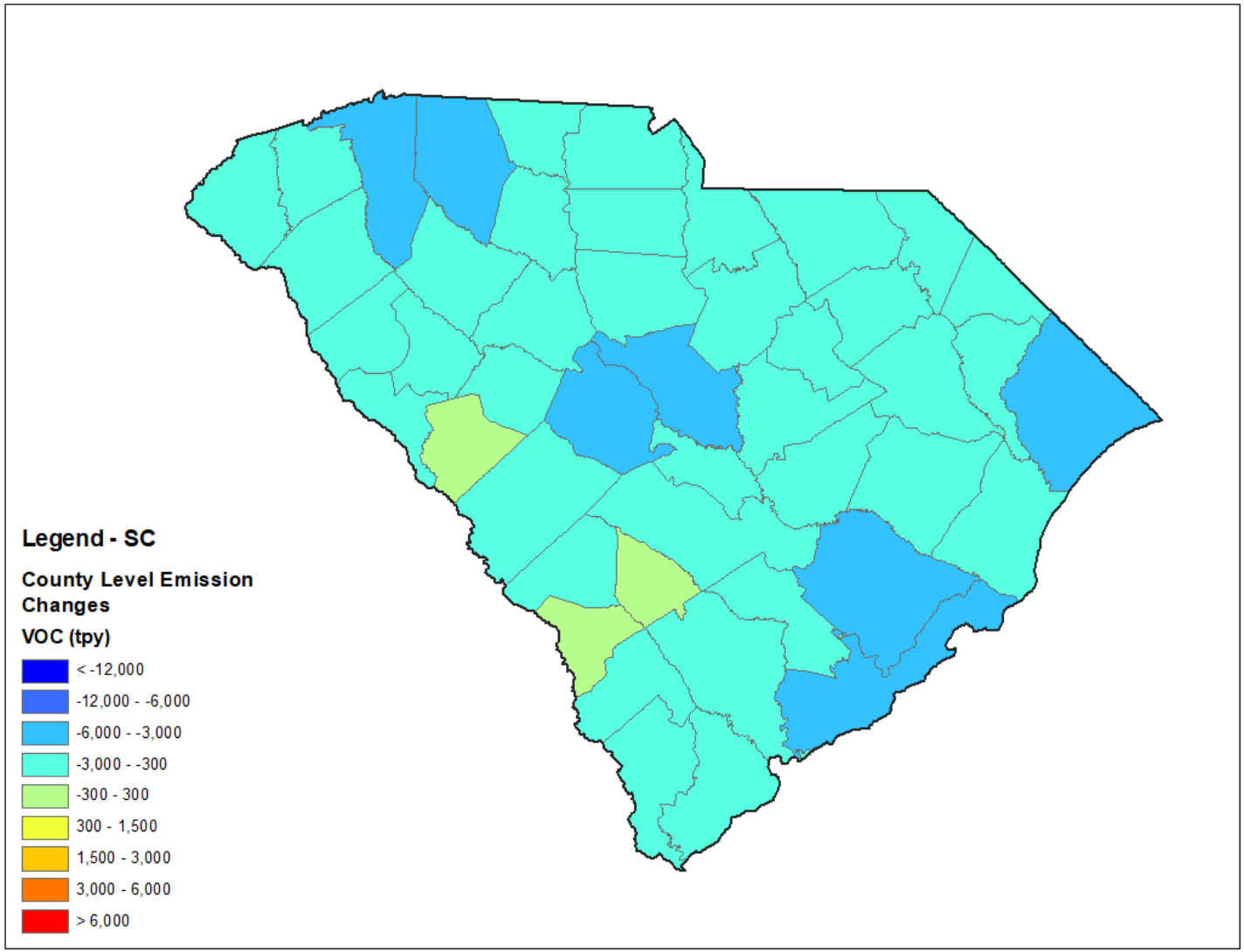

Figure E.7-7. South Carolina County Level VOC Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

Appendix E-8. Tennessee County-Level Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory

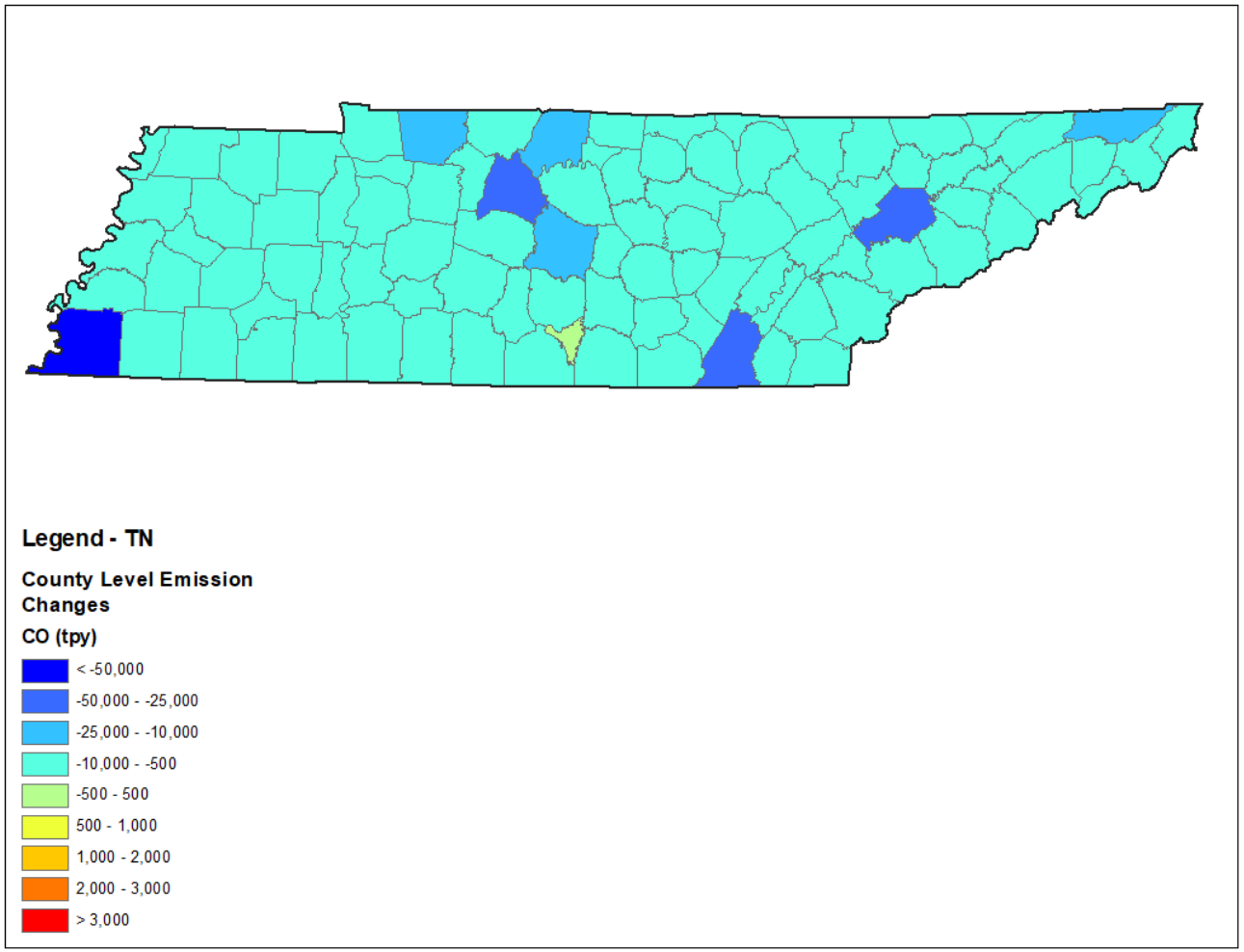

Figure E.8-1. Tennessee County Level CO Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

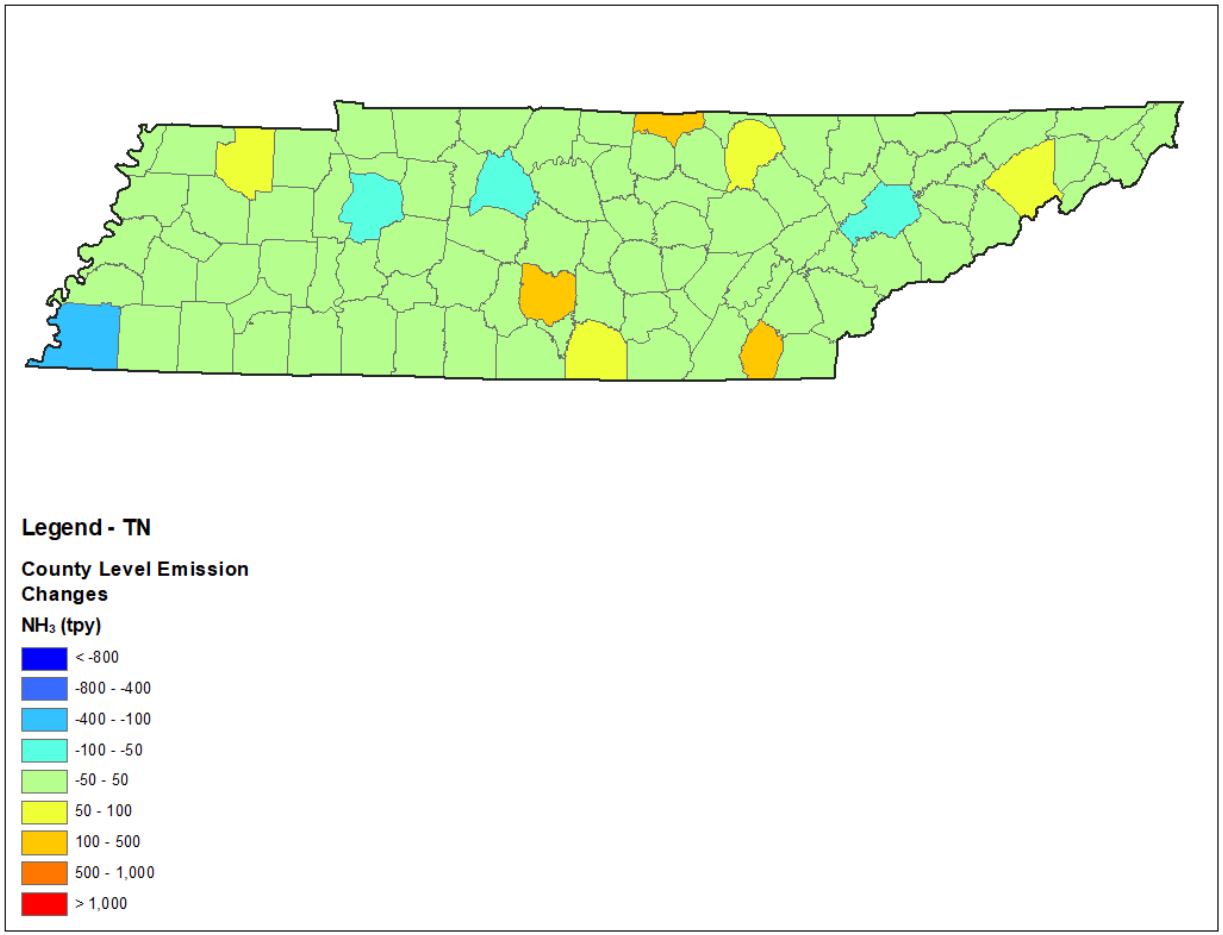

Figure E.8-2. Tennessee County Level NH_3 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

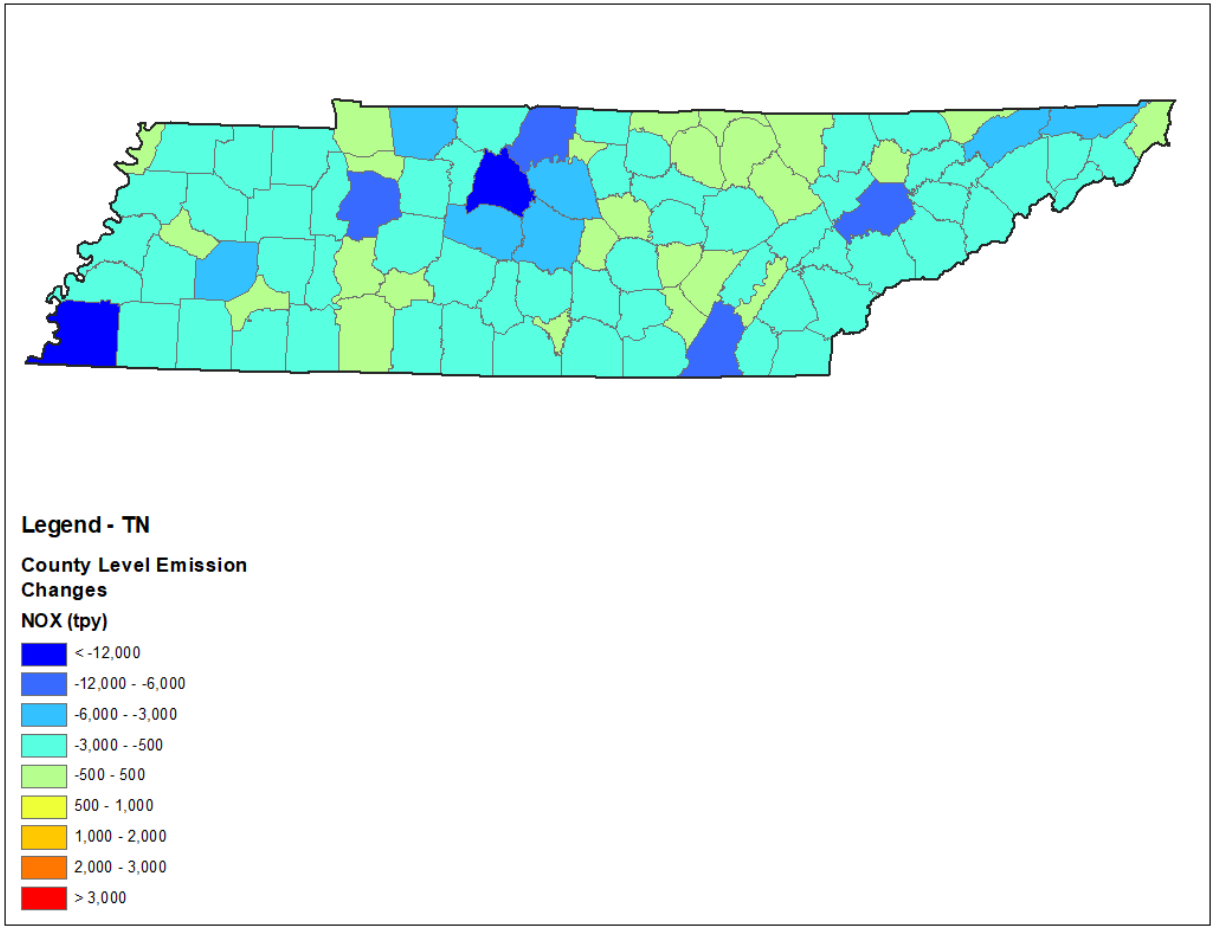

Figure E.8-3. Tennessee County Level NO_x Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

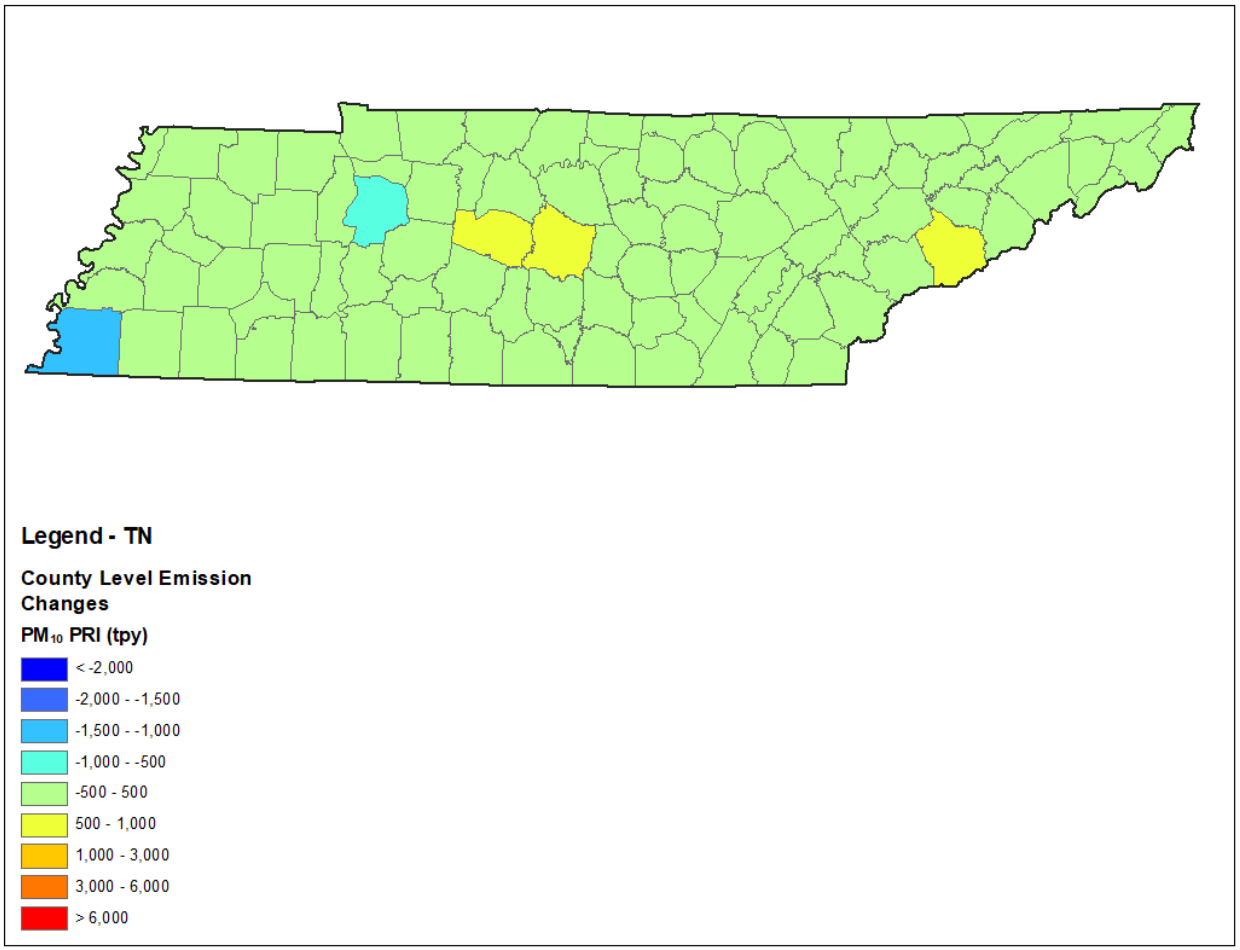

Figure E.8-4. Tennessee County Level PM_{10}-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[77]

[77] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

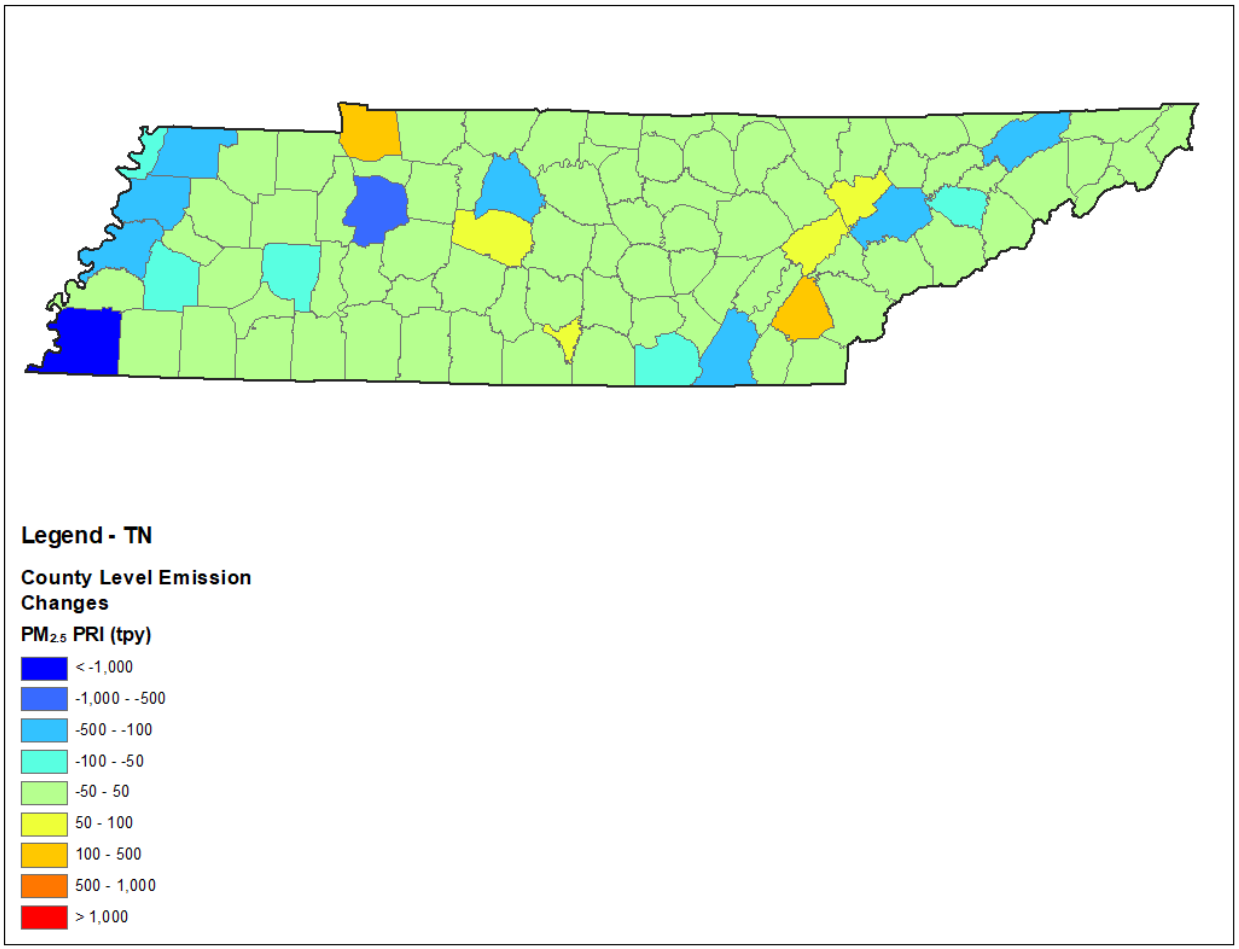

Figure E.8-5. Tennessee County Level $PM_{2.5}$-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[78]

[78] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

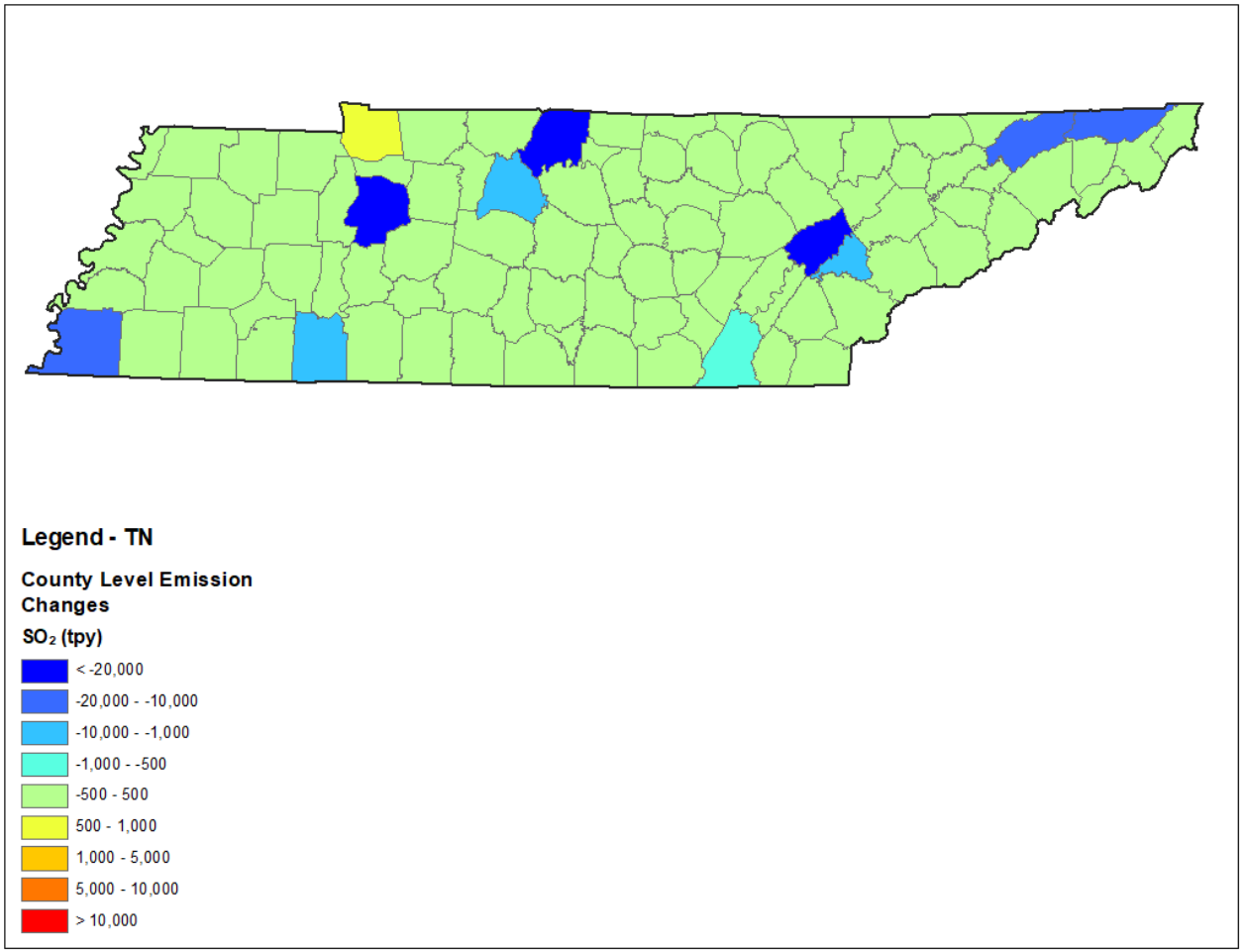

Figure E.8-6. Tennessee County Level SO_2 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

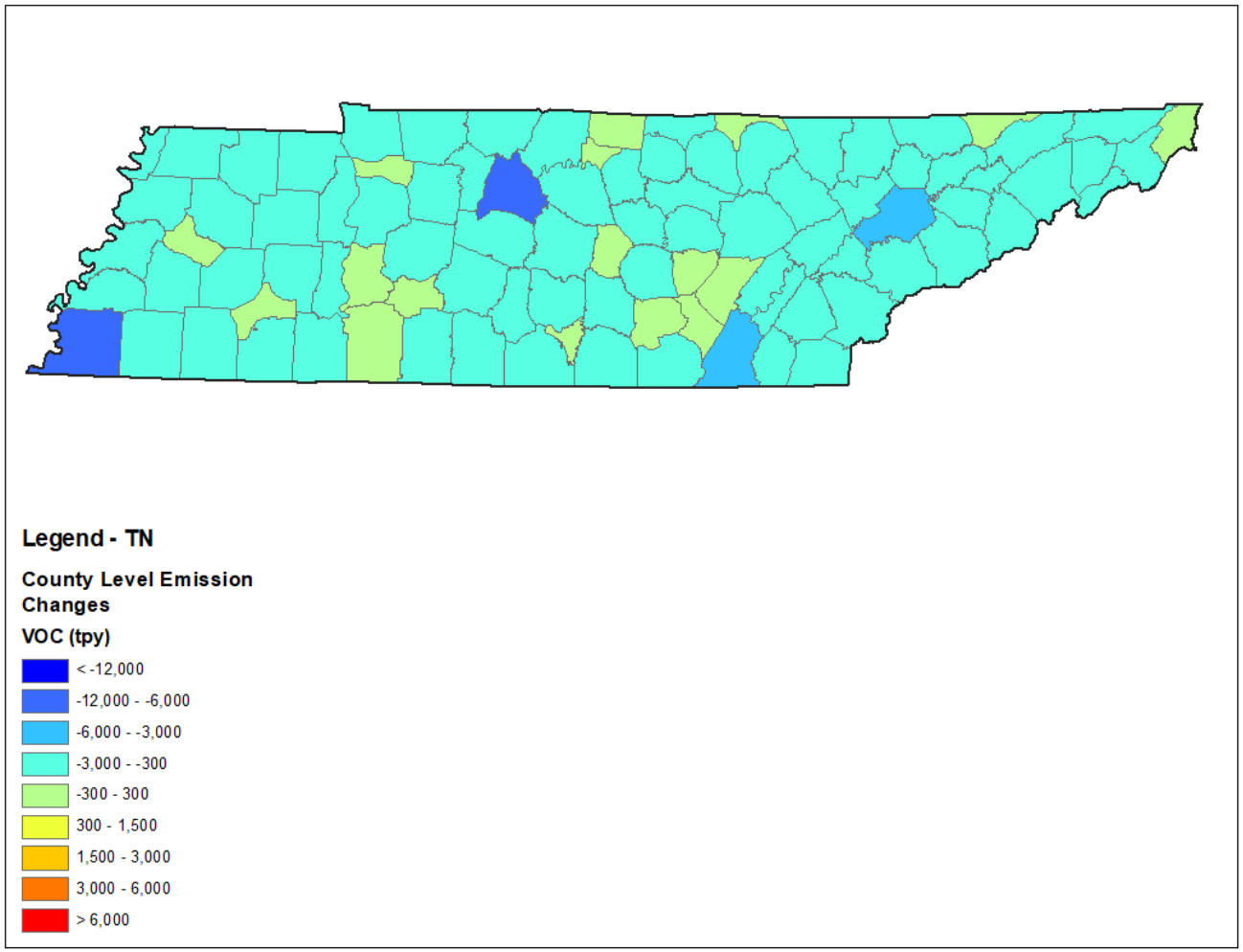

Figure E.8-7. Tennessee County Level VOC Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

Appendix E-9. Virginia County-Level Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory

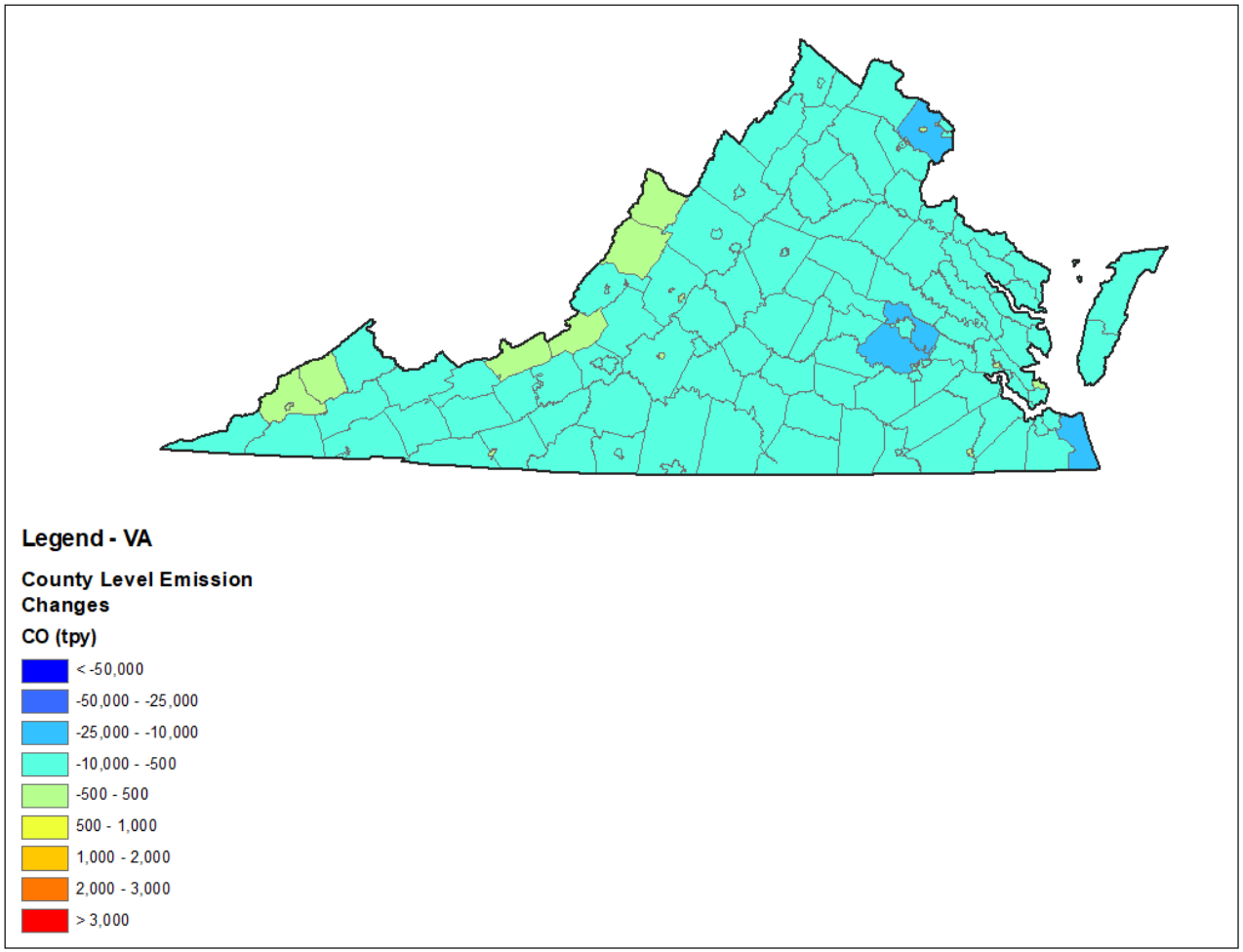

Figure E.9-1. Virginia County Level CO Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

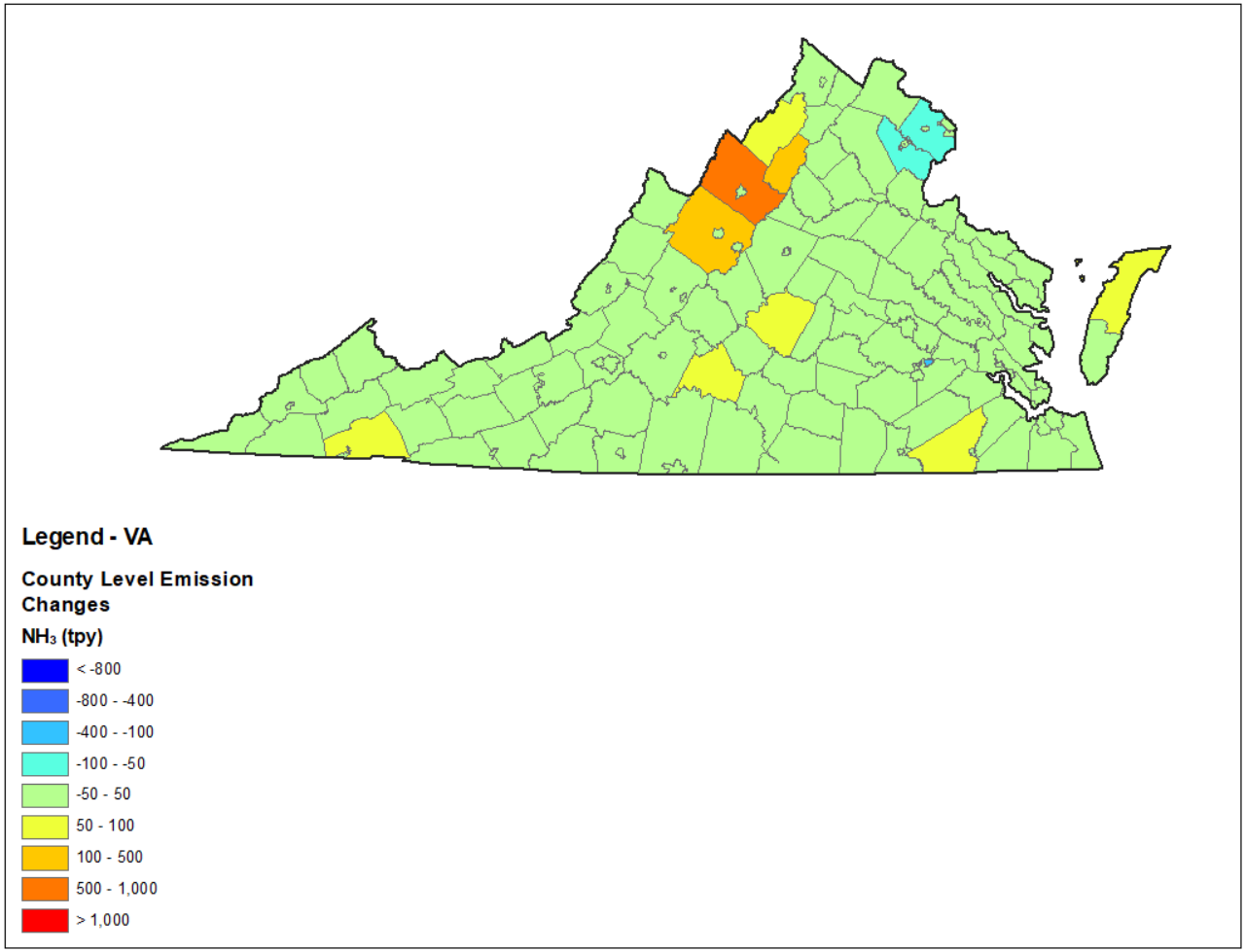

Figure E.9-2. Virginia County Level NH_3 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

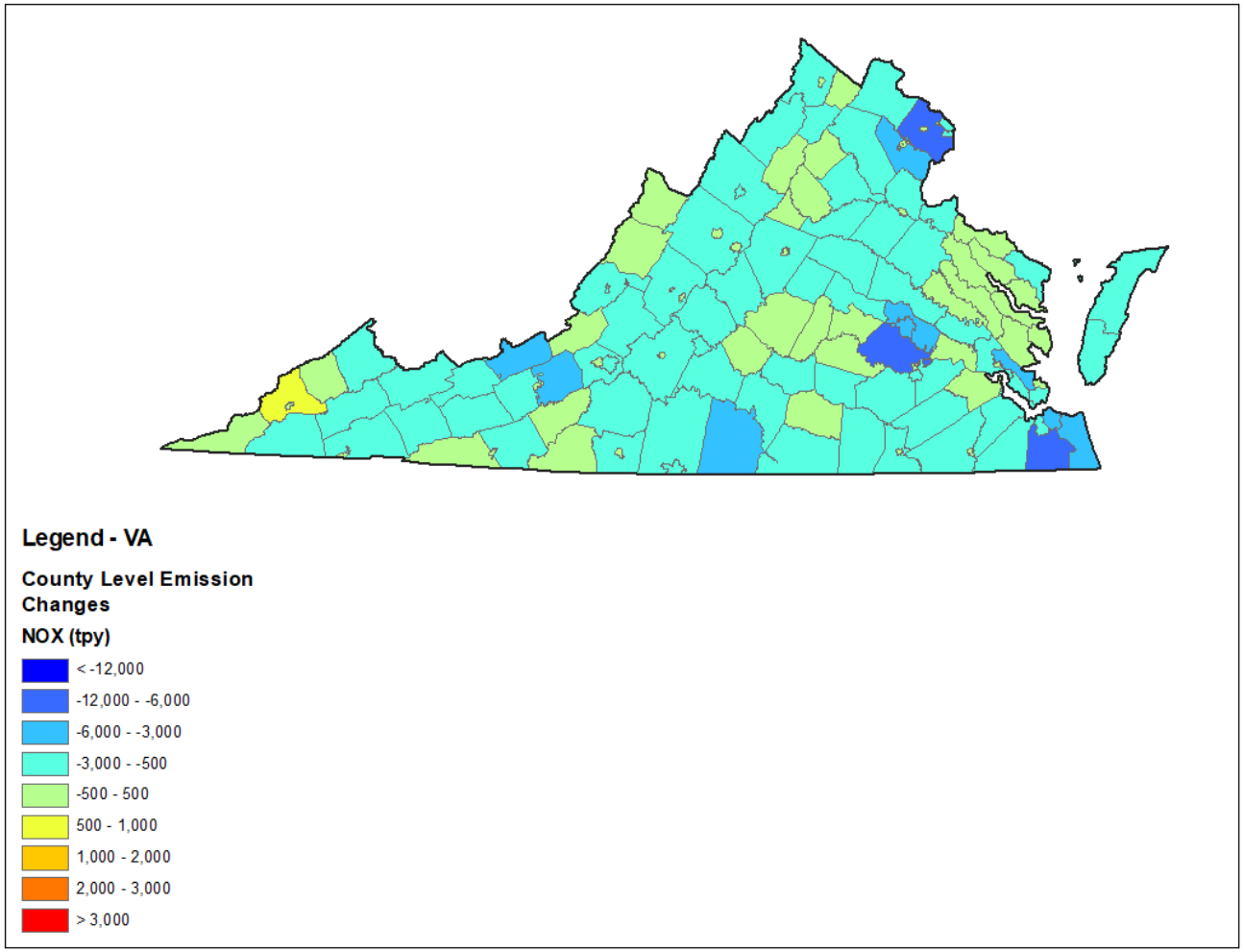

Figure E.9-3. Virginia County Level NO_x Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

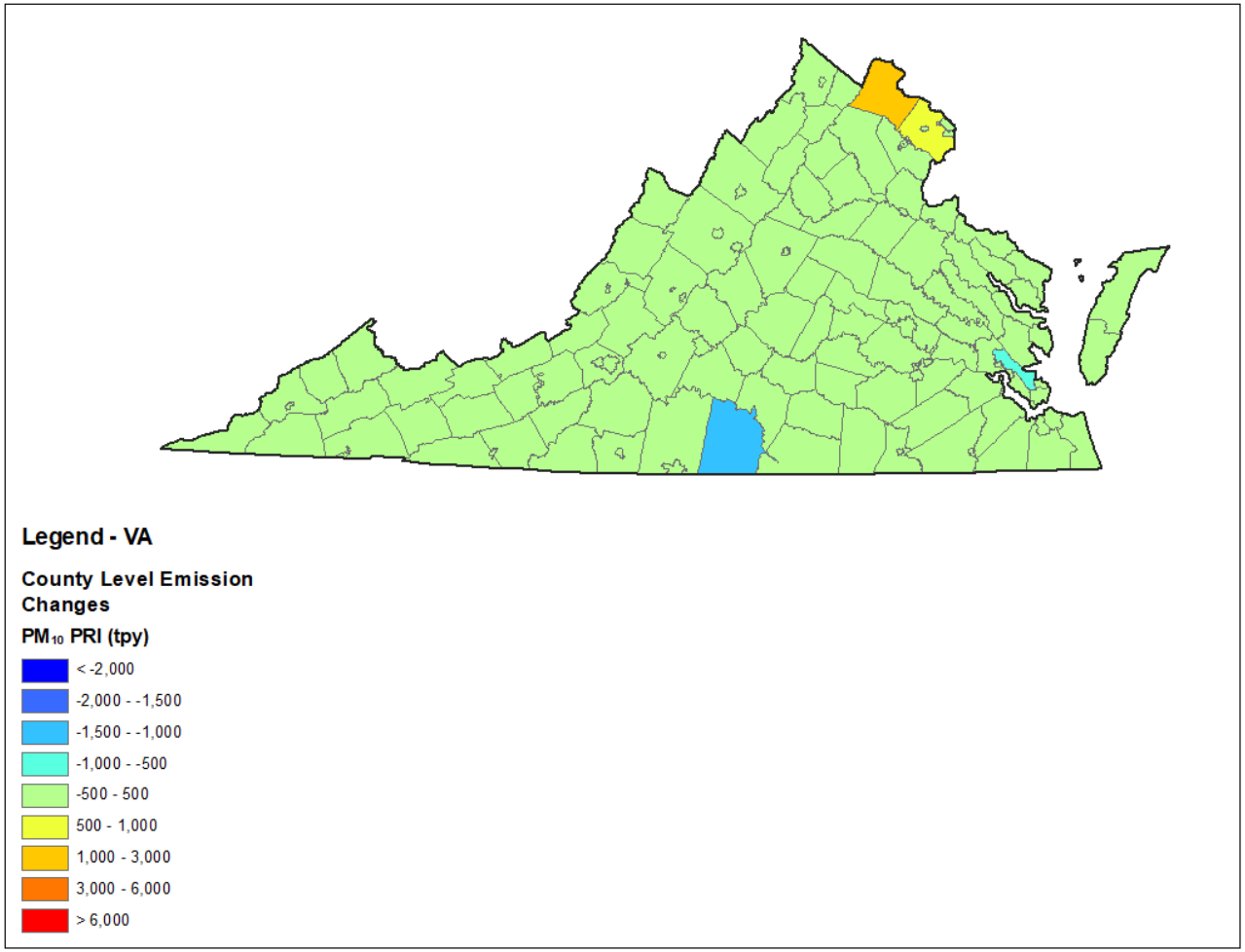

Figure E.9-4. Virginia County Level PM_{10}-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[79]

[79] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

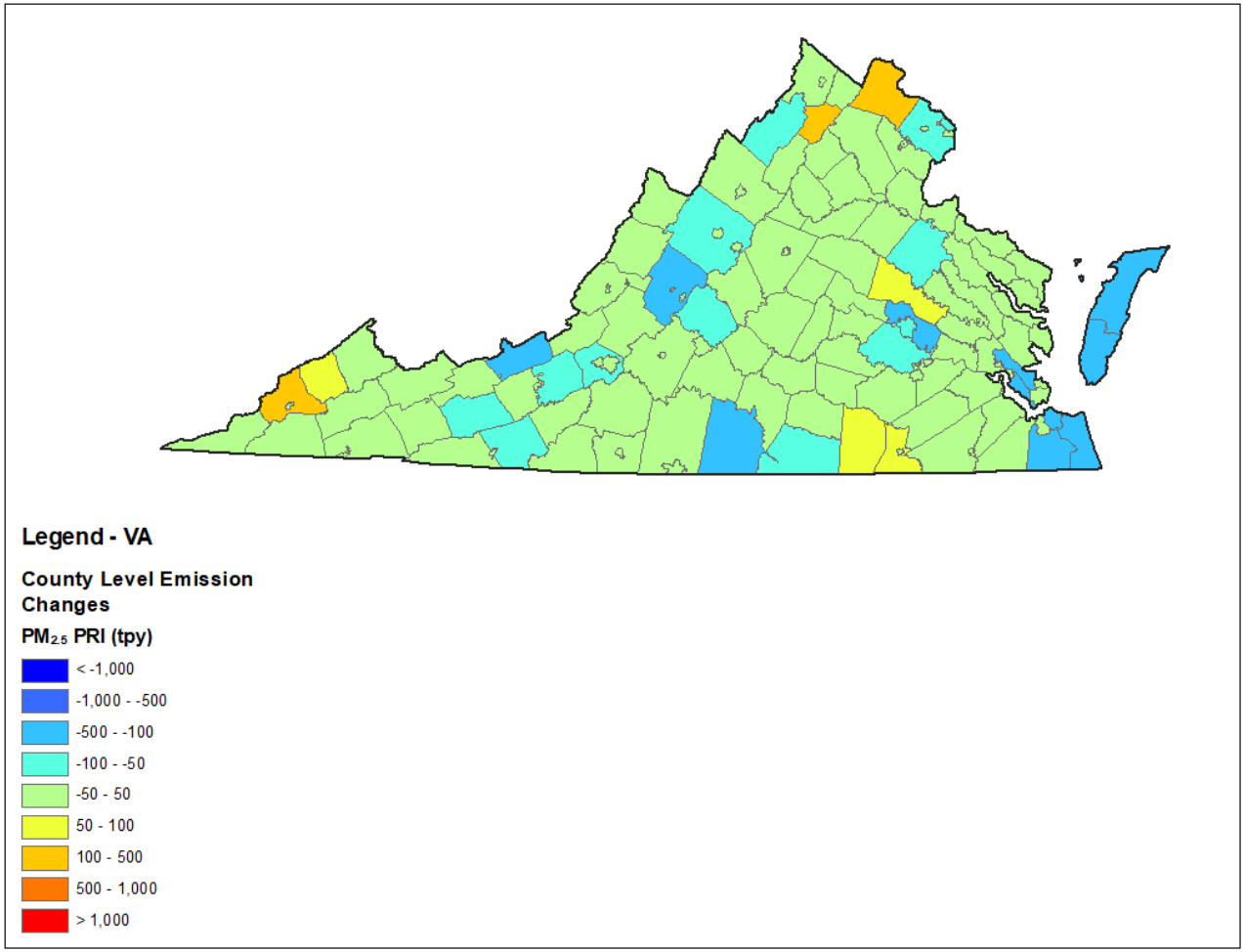

Figure E.9-5. Virginia County Level $PM_{2.5}$-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[80]

[80] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

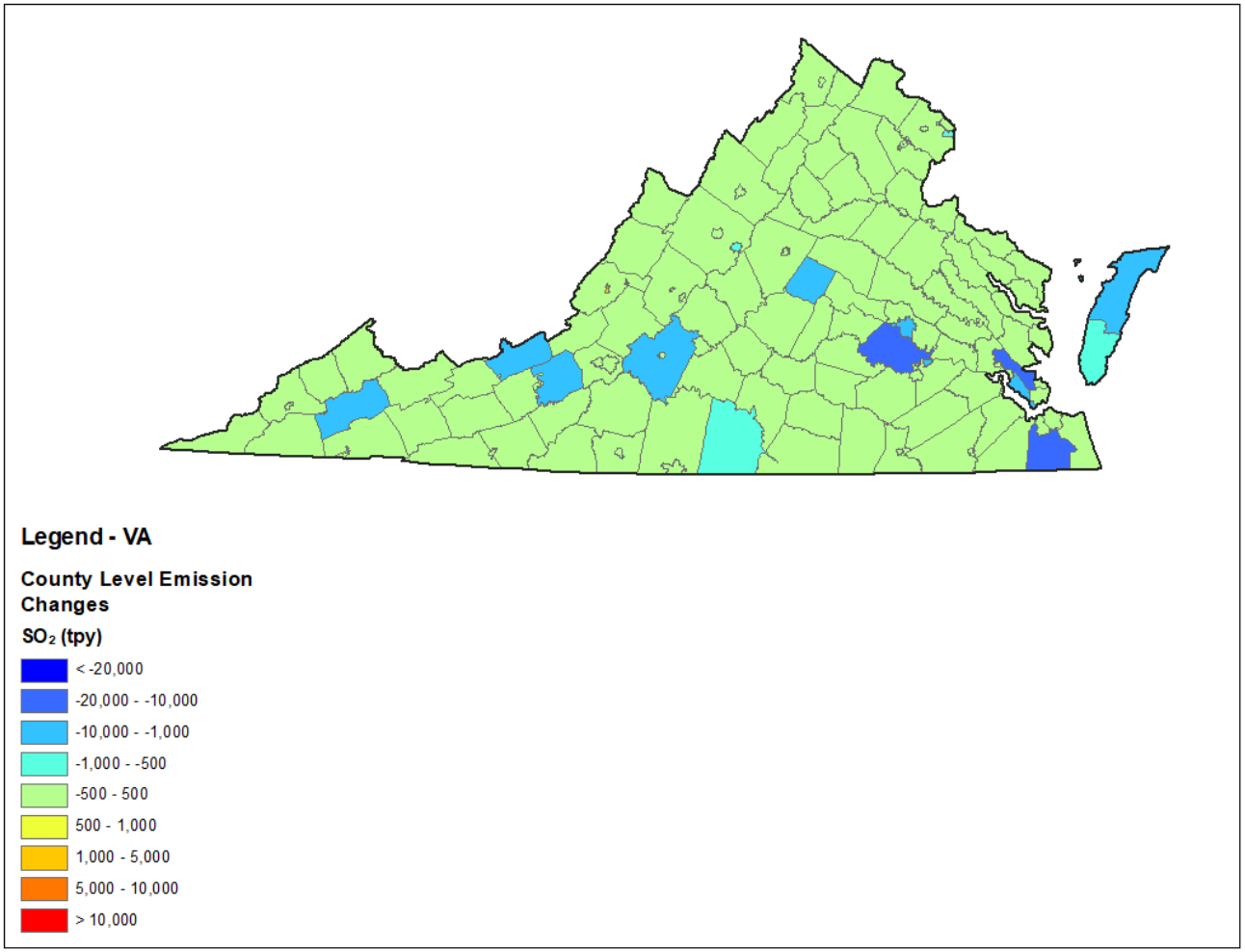

Figure E.9-6. Virginia County Level SO_2 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

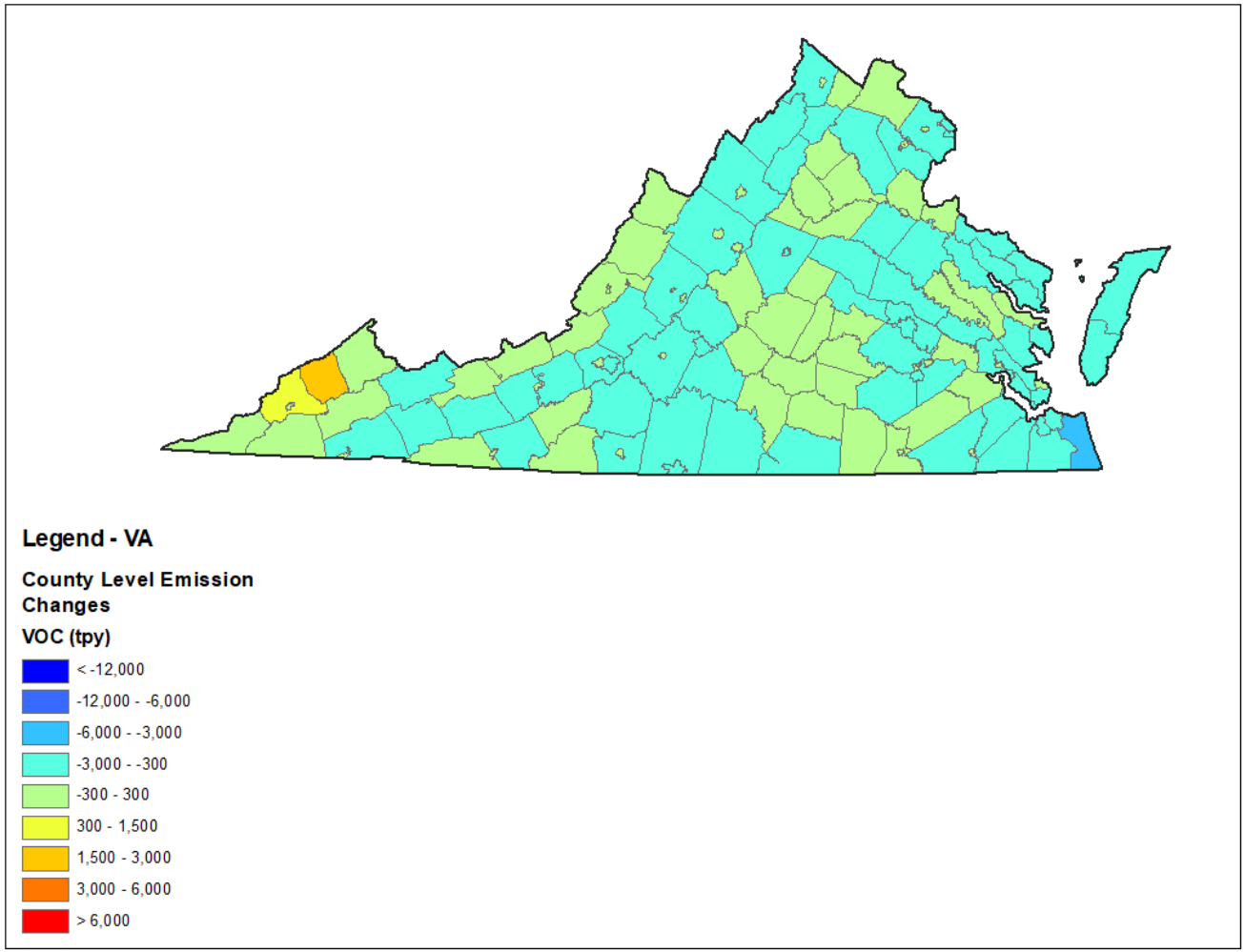

Figure E.9-7. Virginia County Level VOC Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

Appendix E-10. West Virginia County-Level Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory

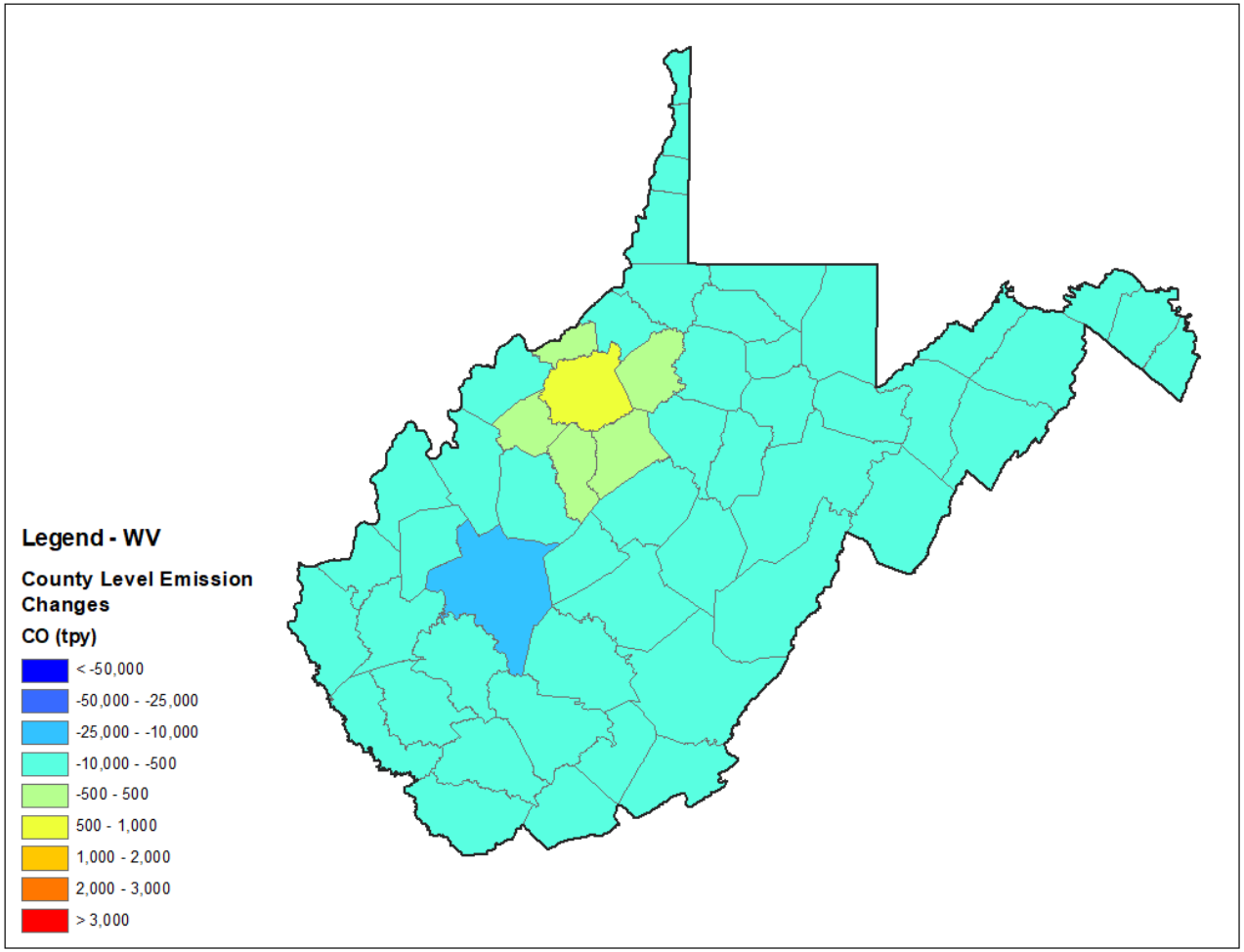

Figure E.10-1. West Virginia County Level CO Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

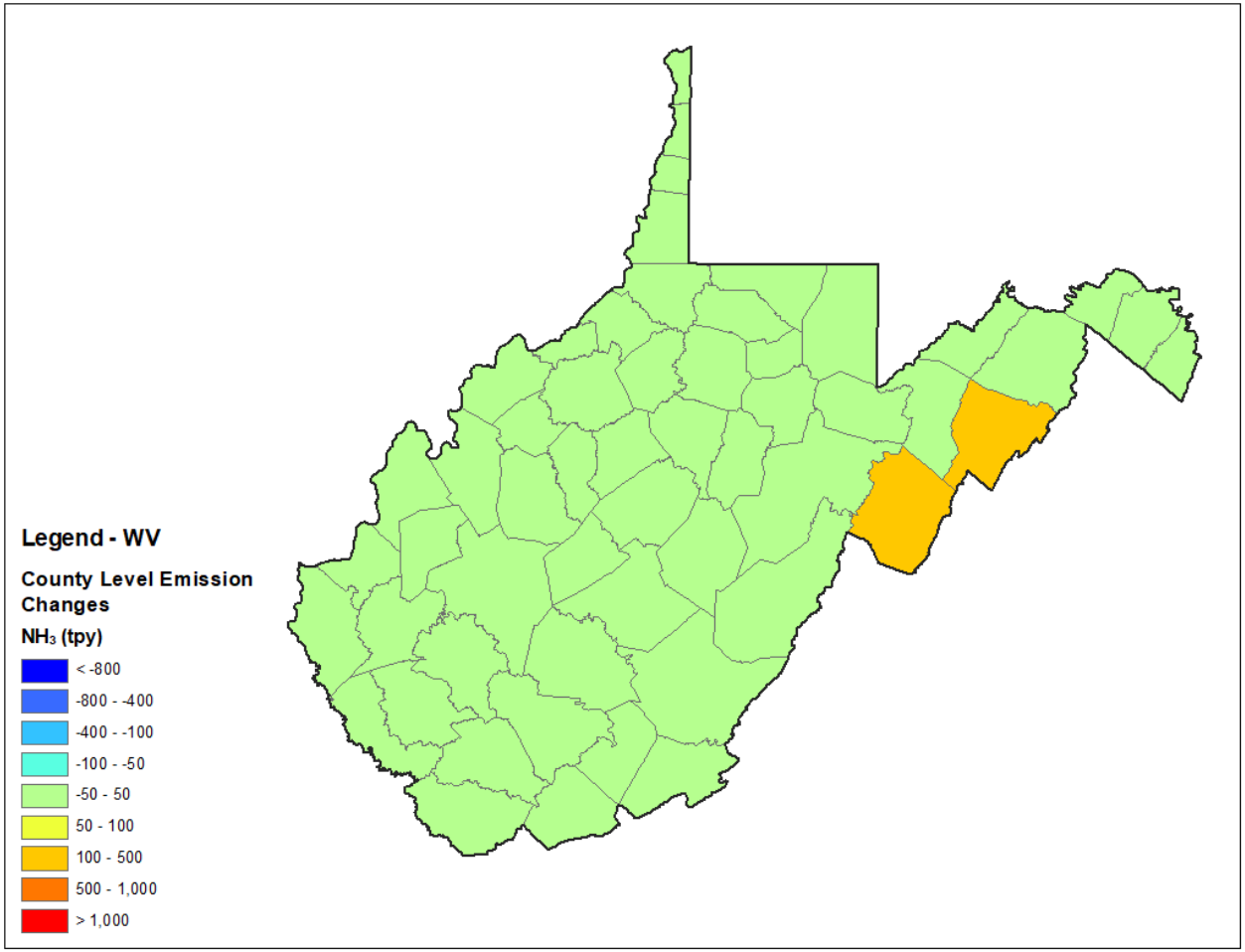

Figure E.10-2. West Virginia County Level NH_3 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

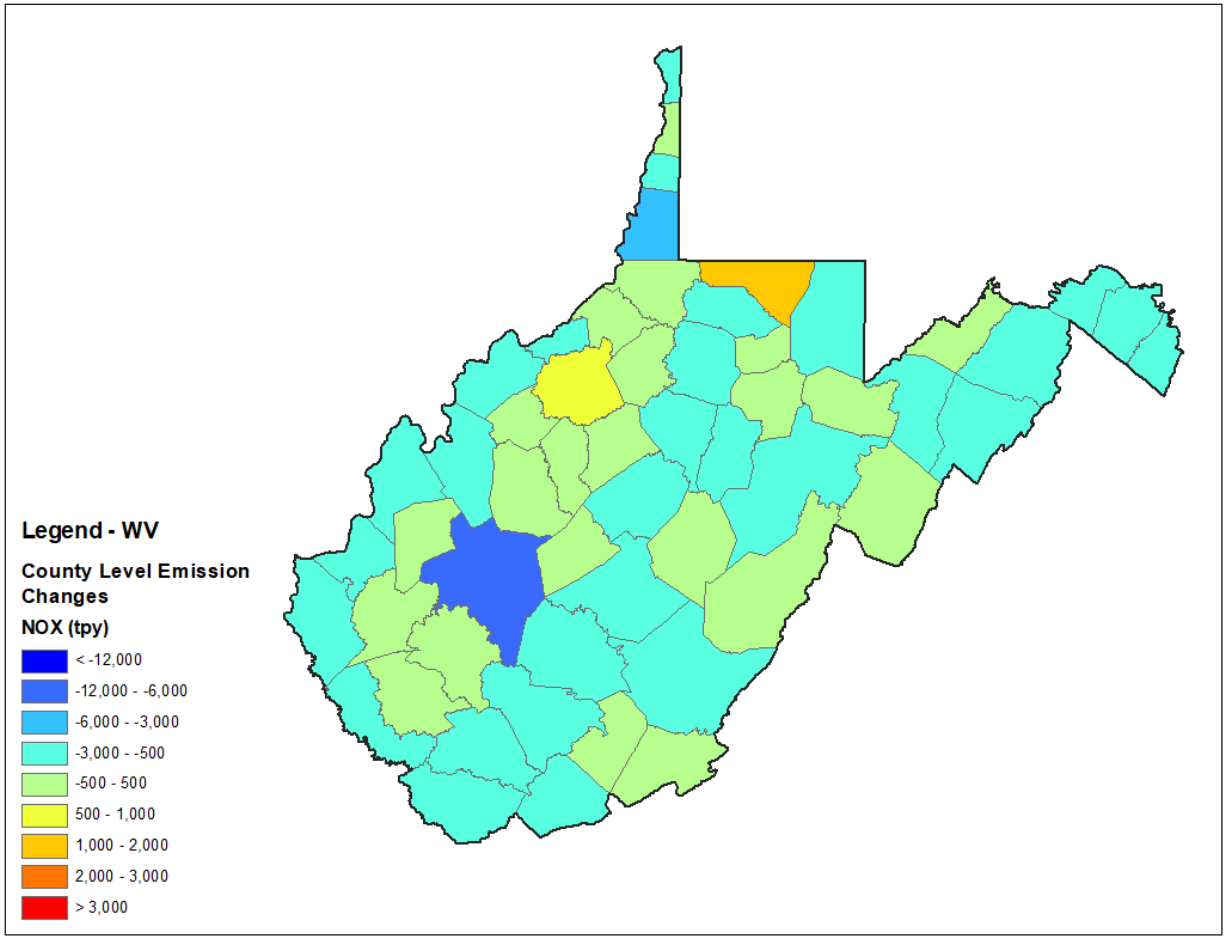

Figure E.10-3. West Virginia County Level NO_x Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

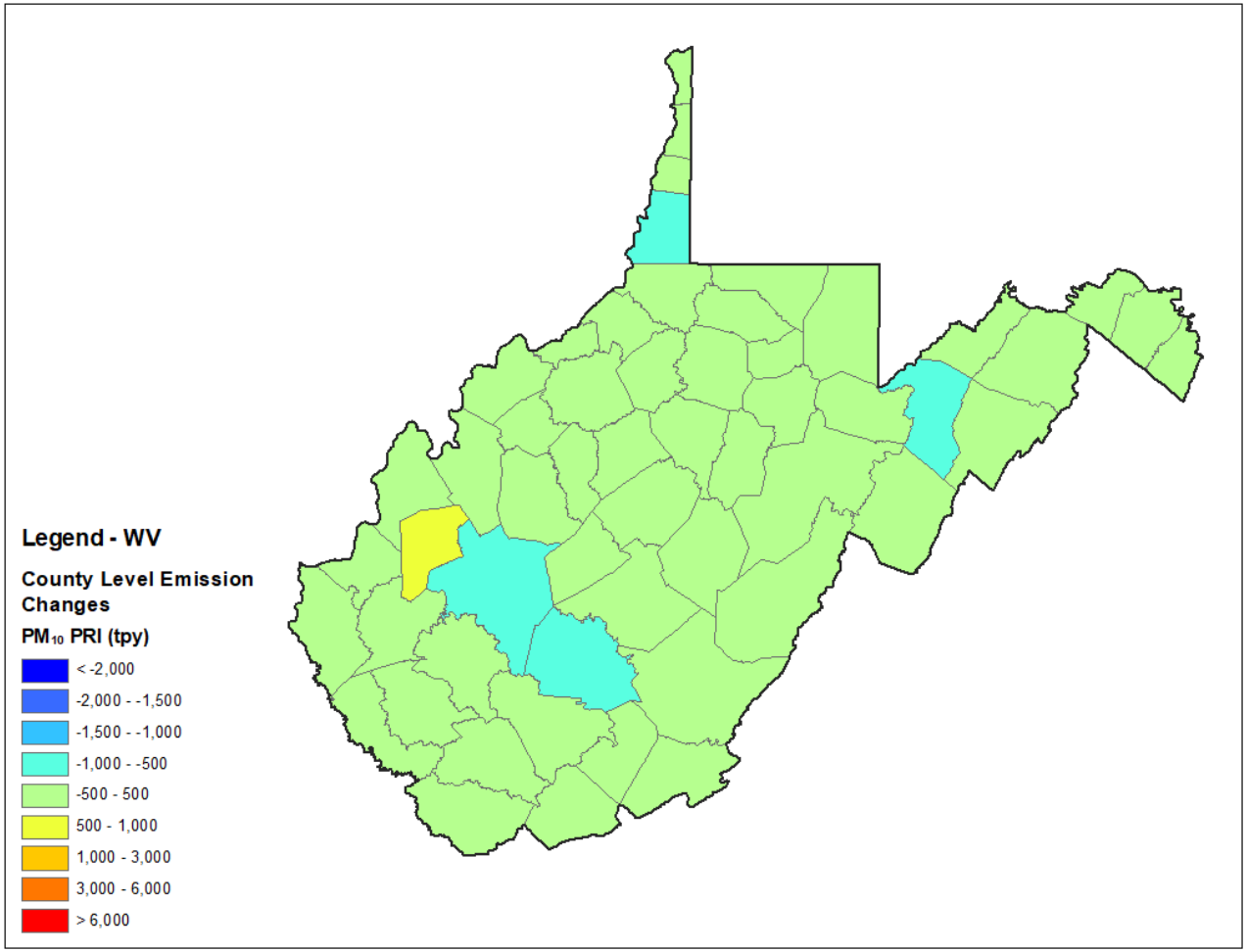

Figure E.10-4. West Virginia County Level PM_{10}-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[81]

[81] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

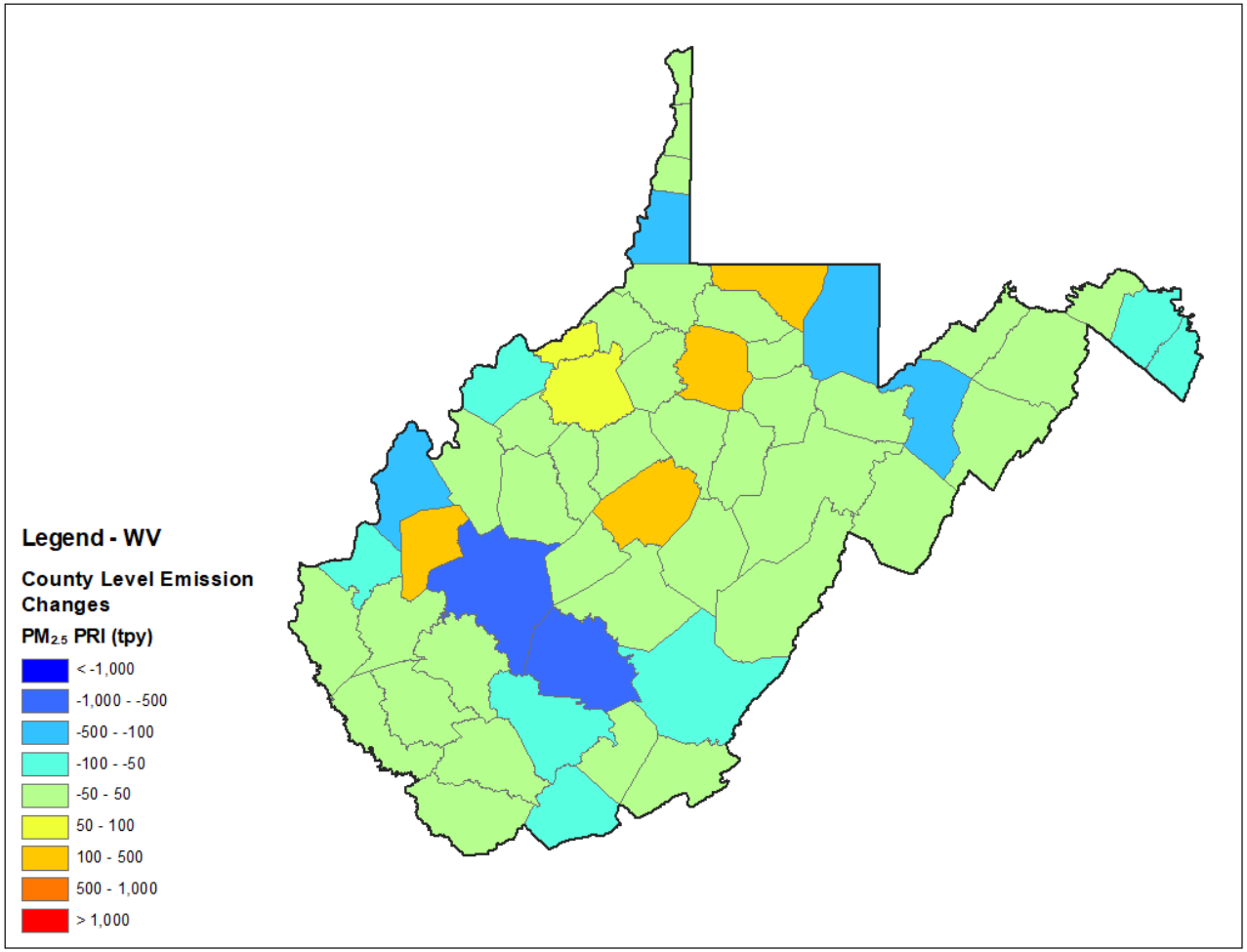

Figure E.10-5. West Virginia County Level $PM_{2.5}$-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[82]

[82] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

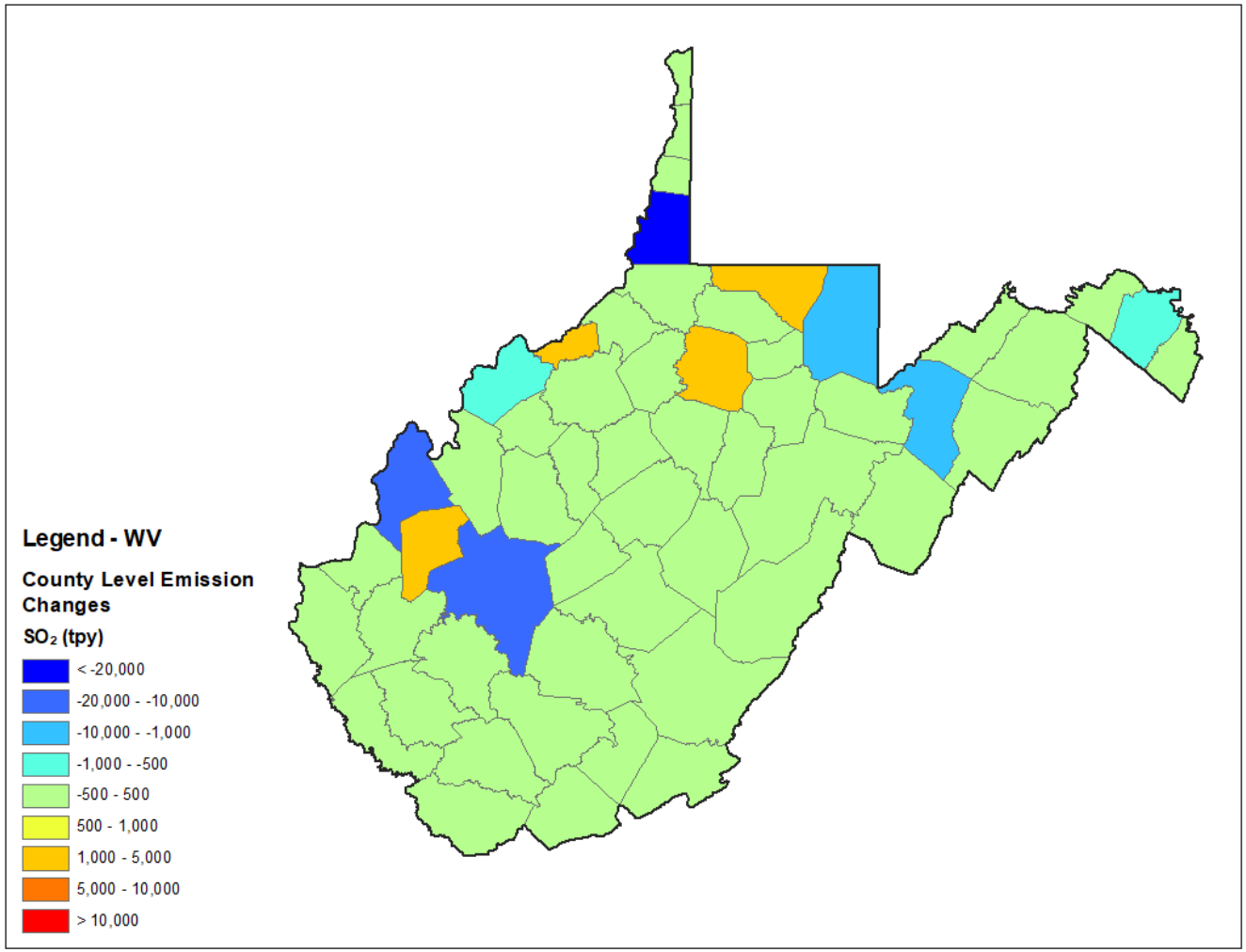

Figure E.10-6. West Virginia County Level SO_2 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

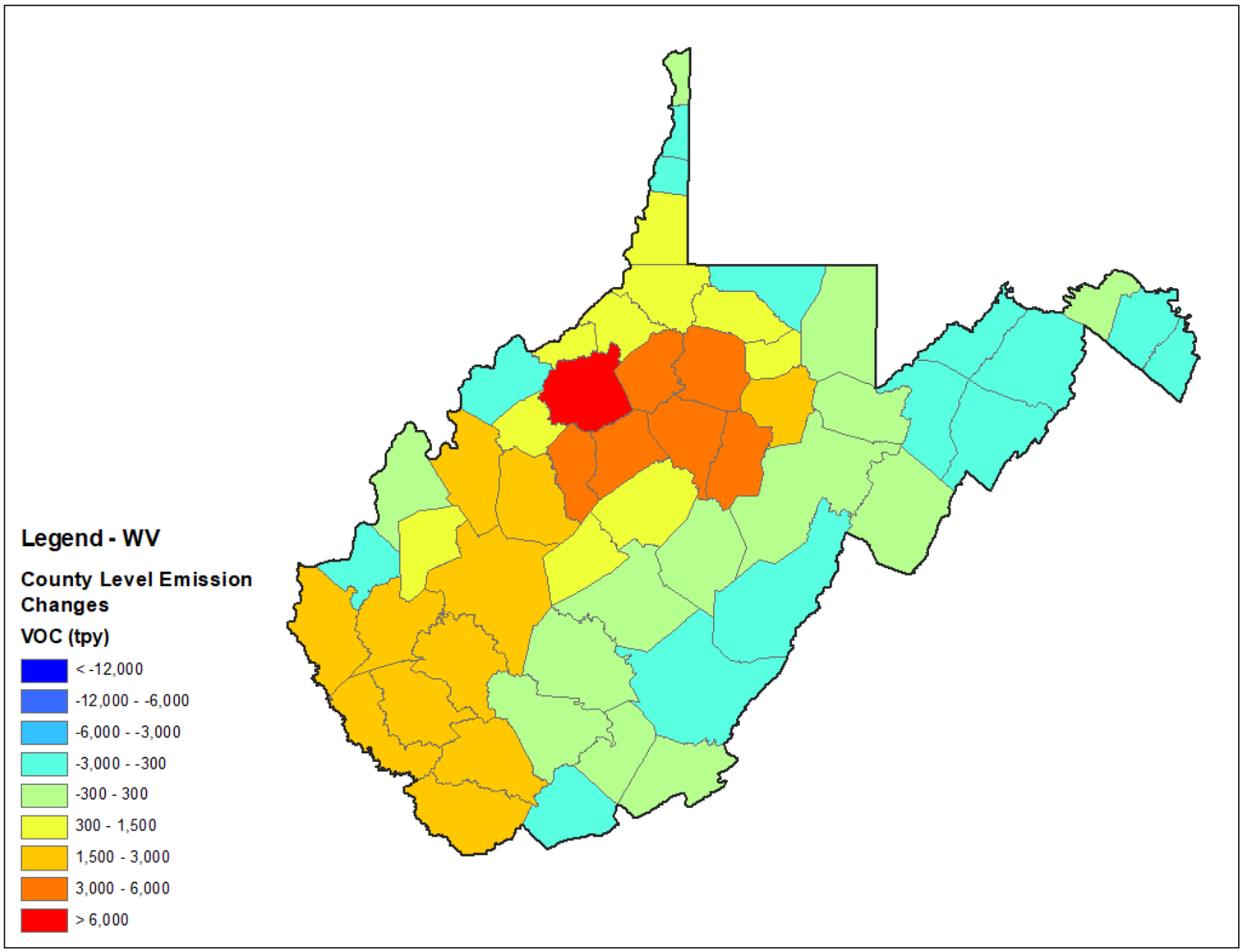

Figure E.10-7. West Virginia County Level VOC Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

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Appendix B-1b

VISTAS II Task 3A - Conversion of the Task 2A 2028 Point Source Files for Emissions Processing with SMOKE

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Conversion of Task 2A 2028 Point Source Modeling Files for Emissions Processing with SMOKE (Task 3A)

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Abbreviations/Acronym List

Alpine	Alpine Geophysics, LLC
CEM	Continuous Emissions Monitoring
CenRAP	Central Regional Air Partnership
EGU	Electricity Generating Unit
EPA	United States Environmental Protection Agency
ERG	Eastern Research Group, Inc.
ERTAC	Eastern Regional Technical Advisory Committee
FF10	Flat File 2010
FIPS	Federal Information Processing System
FTP	File Transfer Protocol
GA	Georgia
GADNR	Georgia Department of Natural Resources
IPM	Integrated Planning Model
LADCO	Lake Michigan Air Directors Consortium (LADCO)
MANE-VU	Mid-Atlantic and Northeast Visibility Union
MARAMA	Mid-Atlantic Regional Air Management Association, Inc.
MMBTU/hr	Million British thermal units per hour
MW	Megawatts
NCDAQ	North Carolina Division of Air Quality
NO_x	Oxides of nitrogen
ORIS	Plant identifier issued by U.S. Department of Energy
PSAT	Particulate Source Apportionment Technology
QA/QC	Quality Assurance/Quality Control
RHR	Regional Haze Rule
SCC	Source Classification Code
SCR	Selective catalytic reduction
SESARM	Southeastern States Air Resource Managers, Inc.
SIPS	State Implementation Plans
SMOKE	Sparse Matrix Operator Kernel Emissions
SO_2	Sulfur dioxide
tpy	Tons per year
VISTAS	Visibility Improvement – State and Tribal Association of the Southeast
WRAP	Western Regional Air Partnership (WRAP)

1.0 INTRODUCTION

Southeastern States Air Resource Managers, Inc. (SESARM) has been designated by the United States Environmental Protection Agency (EPA) as the entity responsible for coordinating regional haze evaluations for the ten Southeastern states of Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia. The Eastern Band of Cherokee Indians and the Knox County, Tennessee local air pollution control agency are also participating agencies. These parties are collaborating through the Regional Planning Organization known as Visibility Improvement - State and Tribal Association of the Southeast (VISTAS) in the technical analyses and planning activities associated with visibility and related regional air quality issues. VISTAS' analyses support the VISTAS states in their responsibility to develop, adopt, and implement their State Implementation Plans (SIPs) for regional haze.

The state and local air pollution control agencies in the Southeast are mandated to protect human health and the environment from the impacts of air pollutants. They are responsible for air quality planning and management efforts including the evaluation, development, adoption, and implementation of strategies controlling and managing all criteria air pollutants including fine particles and ozone as well as regional haze. This project focused on regional haze and regional haze precursor emissions. Control of regional haze precursor emissions will have the additional benefit of reducing criteria pollutants as well.

The 1999 Regional Haze Rule (RHR) identified 18 Class I Federal areas (national parks greater than 6,000 acres and wilderness areas greater than 5,000 acres) in the VISTAS region. The 1999 RHR required states to define long-term strategies to improve visibility in Federal Class I national parks and wilderness areas. States were required to establish baseline visibility conditions for the period 2000-2004, natural visibility conditions in the absence of anthropogenic influences, and an expected rate of progress to reduce emissions and incrementally improve visibility to natural conditions by 2064. The original RHR required states to improve visibility on the 20% most impaired days and protect visibility on the 20% least impaired days.[1] The RHR

[1] RHR summary data is available at: http://vista.cira.colostate.edu/Improve/rhr-summary-data/

requires states to evaluate progress toward visibility improvement goals every five years and submit revised SIPs every ten years.

This report documents the processing of 2028 mass emissions inventory data for input to photochemical grid modeling that were used to support Particulate Source Apportionment Technology (PSAT) modeling, as well as initial modeling of 2028 visibility impacts (elv3) for each Class I Federal area. The 2028 projection data used in the PSAT modeling were based on 2028 emissions in the "el" platform projected from a 2011 base year that VISTAS states updated based on best available knowledge of in-state Electricity Generating Unit (EGU) and non-EGU point facilities.

After completion of this analytical work, additional updates to the 2028 inventory were needed to include more recent 2028 emissions data, newer Eastern Regional Technical Advisor Committee (ERTAC) EGU projections using 2016 continuous emissions monitoring (CEM) data as the base year input, and other significant point source inventory changes. These subsequent changes to mass emissions were included in updated 2028 emissions projections (elv5) and documented in the Task 2B report for the SESARM states. Revisions to the 2028 mass emissions for the non-SESARM states and processing of the 2028 mass emissions inventory data for both the SESARM and non-SESARM states to support the elv5 modeling is documented in the Task 3B report.

This report documents the steps taken by Alpine Geophysics, LLC (Alpine) in preparing Sparse Matrix Operator Kernel Emissions (SMOKE)-ready point source input files from the SESARM adjusted 2028 EGU and non-EGU point source emissions data provided to Alpine by Eastern Research Group, Inc. (ERG). ERG completed the point EGU and point non-EGU emissions data under Task 2 of VISTAS Contract No. V-2018-03-01, entitled “Southeast VISTAS II Regional Haze Analysis Project”. Alpine prepared these datasets under ERG subcontract 4133.00.001/01.

2.0 EMISSIONS DATA

Under Task 3 of the VISTAS Contract, specifically Subtasks 3.1 (Create Photochemical Model Ready EGU Emission Files for 2028), 3.1.2 (Scale Hourly SMOKE Emissions for EGUs), and 3.2 (Create Photochemical Model Ready Non-EGU Point Source Emission Files for 2028), ERG tasked Alpine with preparing SMOKE-ready input files for processing point source emissions to support the 2028 regional haze base case. For these tasks, Alpine created SESARM state inputs (based on ERG provided data), as well as non-SESARM state files to generate national modeling inventories for these categories consistent with the 2011 meteorology associated with the base year modeling platform.

On June 30, 2018, ERG provided Alpine, via project File Transfer Protocol (FTP), with two emissions inventory files for use in this task:

- VISTAS_2028_FF10_EGU.zip – EGU emissions estimates for the 2028 regional base case.
- VISTAS_2028_FF10_NON_EGU.zip – Non-EGU emissions estimates for the 2028 regional base case.

These files represent the SESARM state EGU and non-EGU point source emissions, respectively, and replace the EGU and non-EGU source files for the SESARM states from the EPA 2028el modeling platform. No 2028 adjustments were made to the other sector files (e.g., nonpoint, nonroad, onroad, biogenic, etc.) used in modeling the future year.

Upon receipt of these files, Alpine first confirmed that the files were in the documented Flat File 2010 (FF10) format and that all states in the SESARM region were represented in each file. As a second step, Alpine compared the emission files with the summary files by Federal Information Processing System (FIPS) code, source classification code (SCC), and pollutant that were provided by ERG and confirmed that the annual emission totals of both files matched the summary file totals. A final pre-use quality assurance/quality control (QA/QC) step was to confirm that all required fields for modeling were populated and that all sources had latitude and longitude data within the boundaries of the SESARM state domain.

Additionally, Alpine obtained the Eastern Regional Technical Advisory Committee (ERTAC) EGU forecast tool, version 2.7, emission projections to 2028 that were prepared by the ERTAC EGU workgroup[2] and made available through a FTP transfer to Alpine from ERG on May 1, 2018. These EGU projections were used for non-SESARM states.

[2] SESARM received permission from J. McDill of Mid-Atlantic Regional Air Management Association, Inc. (MARAMA) on April 27, 2018 to allow SESARM to use the ERTAC EGU forecast tool, version 2.7 emission projections for year 2028 for this project. As such, ERG downloaded this data from a North Carolina Division of Air Quality (NCDAQ) secure FTP site (ftp.daq.ncdenr.org) for Task 2 activities and provided the data to Alpine for Task 3 activities.

3.0 ANNUAL FILE PREPARATION

After the above noted initial QA/QC steps were conducted, Alpine prepared annual emissions inventory data for emissions modeling.

3.1 Non-EGU Point Sources

Since no issues were identified in Alpine's cursory QA/QC review of the "VISTAS_2028_FF10_NON_EGU" file provided by ERG, Alpine prepared a new FF10-formatted file with new header information indicating what emissions were included in the file and that it was to be used in the SESARM 2028 regional haze modeling analysis. The resulting file was prepared and is named "ff10_point_nonegu_sesarm_2028.csv". Alpine confirmed that emissions totals matched the provided emissions totals.

As a second step, Alpine developed non-SESARM state non-EGU point source emissions files to compliment the SESARM-only file prepared by ERG. For this purpose, Alpine reviewed the EPA list of non-EGU point source emissions for SMOKE processing[3] to determine which files were necessary for us to review and extract non-SESARM state data. From these files, Alpine determined that the following files were needed to extract non-SESARM state data to fully represent non-EGU point sources consistent with EPA's 2028el modeling platform:

- 2023el_from_refueling_2011NEIv2_POINT_20140913_20sep2016_v1.csv
- 2023_MARAMA_Point_Offsets_2016_08_24_04oct2016_v1.csv
- Biodiesel_Plants_2018_ff10_11apr2013_v0.csv
- 2023el_from_ethanol_plants_2011NEIv2_POINT_20141123_20sep2016_v0.csv
- Illinois_WV_new_sources_NODA_29aug2016_v2.csv
- MARAMA_2028_ptnonipm_2011NEIv2_POINT_20140913_revised_20150115_mar_18nov2016_v3.csv
- MARAMA_2028el_refueling_2011NEIv2_POINT_20140913_18nov2016_v1.csv
- MARAMA_2028el_pt_oilgas_2011NEIv2_POINT_20140913_mar_21nov2016_v1.csv

[3] The "ptinv_ptnonipm_2028el_cb6v2_v6_11g.lst" and "ptinv_pt_oilgas_2028el_cb6v2_v6_11g.lst" were extracted from: ftp://ftp.epa.gov/EmisInventory/2011v6/v3platform/2028emissions/ 2028el_cb6v2_v6_11g_inputs_point.zip

- 2028el_pt_oilgas_2011NEIv2_POINT_20140913_02dec2016_v1.csv

These files were concatenated to develop a single non-EGU point source file of national coverage and to be consistent with the ERG-provided SESARM-only non-EGU point source files. From this single file, Alpine removed all records associated with SESARM state sources. The remaining file was reconfigured as a new FF10 formatted input file and is named "ff10_point_nonegu_nonsesarm_2028el.csv". Since these emissions inventory files were confirmed for use by EPA in their modeling platform, no additional QA/QC beyond removal of SESARM state records was conducted by Alpine.

Both non-EGU point source files were prepared with annual emissions and no additional temporal file preparation (daily or hourly input format) was conducted consistent with EPA's 2011el modeling configuration.

3.2 EGU Point Sources

Alpine obtained the ERTAC EGU forecast tool, version 2.7, emission projections to 2028 that were prepared by the ERTAC EGU workgroup[4] and made available through an FTP transfer to Alpine from ERG on May 1, 2018. As a first step, Alpine concatenated the individual region input files and created a single, national file of EGU emissions as included in each of the following ERTAC v.2.7 files:

- FsS_WESTAR_WAORWYIDMTNDSDCANVAZUTNMCO_ff10_future.csv
- FsS_CENSARA_ARIAKSLAMOOKNETX_ff10_future.csv
- FsS_SESARM_ALFLGAKYMSNCSCTNWV_ff10_future.csv
- FsS_LADCO_INILMIMNOHWI_ff10_future.csv
- FsS_MANE-VUVA_CTDEDCMEMDMANHNJNYPARIVTVA_ff10_future.csv

From this single file, Alpine removed all records associated with SESARM state sources (no matching to EPA's Integrated Planning Model (IPM) data for the same 2023 scenario was

[4] SESARM received permission from J. McDill of MARAMA on April 27, 2018 to allow SESARM to use the ERTAC EGU forecast tool, version 2.7 emission projections for year 2028 for this project. As such, ERG downloaded this data from a NCDAQ secure FTP site (ftp.daq.ncdenr.org) for Task 2 activities and provided the data to Alpine for Task 3 activities.

conducted on these files to determine if there were units missing in the non-SESARM states).[5] The remaining file was reconfigured as a new FF10 formatted input file and used as a working file for non-SESARM state EGU file development. Similar to the non-EGU cursory QA/QC, Alpine confirmed that all required fields for modeling were populated and that all sources had latitude and longitude data within the boundaries of the modeling domain and outside of SESARM states.

For ease of data management, processing, and resulting QA/QC, Alpine then concatenated the SESARM-only EGU file provided by ERG to the working file to create a single, national, annual emissions file for all EGU emission sources (both SESARM and non-SESARM states). The file is called "ptegu_2028_12july2018.csv".

This file was then configured with new header information to indicate the national coverage of the inputs and documented to note the file's use in SESARM's 2028 regional haze modeling.

[5] Since we did not prepare the original ERTAC files, we included all obtained files in the case that the ERTAC group may have included/excluded SESARM sources in any one of the other files.

4.0 HOURLY SCALING – EGU POINT SOURCES ONLY

As outlined in subtask 3.1.2 of the work plan, the next step was to create hourly emission files consistent with the temporal distribution of EPA's 2011el modeling platform for EGUs that report continuous emissions monitoring (CEM) data to EPA. The main purpose of this step was to ensure that emissions simulated in 2028 occur in the same timelines as the emissions were simulated in the 2011 modeling, preventing fabricated emissions increases or decreases between the two years simply as a result of the temporal profile. For example, Alpine wanted to ensure that a unit operating during hour 14 of June 12th in the 2011 simulation is also operating at a comparable level on hour 14 of June 12th in the 2028 simulation with the only difference being in the absolute level of emissions between the two years.

In order to accomplish this step, Alpine first obtained EPA's hourly distribution files of CEM-based EGU emissions from the 2011/2028el modeling platforms. These files present hourly emissions of oxides of nitrogen (NO_x) and sulfur dioxide (SO_2) emissions, as well as provide an hourly distribution of heat input for the annual episode simulated (e.g., the 2011 calendar year).

Using these files, Alpine generated an hourly-to-annual ratio of NO_x, SO_2, and heat input for each unit identified by EPA within the VISTAS_12 domain. Alpine used ratio preparation methods originally identified and applied for VISTAS in past regional haze studies.[6] These ratios were then matched to the new annual EGU file "ptegu_2028_12july2018.csv" where the NO_x ratios were used to scale annual NO_x emissions, the SO_2 ratios were used to scale SO_2 emissions, and heat input was used to scale all other pollutant emissions from annual to hourly distribution. When the "EPA HOUR" files did not have associated NO_x or SO_2 ratios (because of missing or incomplete data), Alpine used heat input as the scalar for all pollutants.

For cases where ORIS facility and unit ID were not provided in either the SESARM EGU file or the non-SESARM ERTAC EGU file, no hourly emission distribution was calculated, and default temporal profiles were used in the emissions processing of these sources.

[6] ftp://ftp.epa.gov/EmisInventory/ei_conference/EI14/session11/stella.pdf

The sole exception to this procedure was the Scherer facility located in Georgia (GA). In 2011-2014, Plant Scherer installed selective catalytic reduction (SCR) NO_x controls on Units 1-4. These SCR controls are only required to be run from May 1 to September 30. GA Department of Natural Resources (GA DNR) provided episodic (January-March, April-September, and October-December) emission aggregates for each of four boilers at this facility, as presented in Table 4-1.

Table 4-1. Plant Scherer 2028 Seasonal NO_x Emissions at Units 1-4.

UNIT	Jan-April	May-Sept	Oct-Dec	TOTAL
1	1,529.6	640.0	1,654.4	3,824.0
2	1,161.5	765.2	585.9	2,512.6
3	1,542.9	753.1	1,046.0	3,342.0
4	945.1	781.0	1,342.6	3,068.7

Alpine used the following steps to integrate this profile data:

1. Step 1 – Alpine allocated the episodic emissions to months using a day in month per season ratio (e.g., 31 days in January per 90 days in Jan-Mar period or 31/90*episodic emissions) for each unit and pollutant provided.
2. Step 2 – Alpine prepared ratios of hourly distribution per month using EPA's CEM data profiles. These new hour-to-month ratios were then applied to the Scherer unit's monthly emissions to create month-specific hourly distribution of emissions. Since Units 1 and 2 demonstrated sporadic operations during certain months in meteorological year 2011, the hour-to-month ratios for Unit 3 were used to distribute emissions at these two units.
3. Step 3 – Alpine confirmed that the sum of the month-specific hourly distribution of emissions matched the annual emissions.
4. Step 4 – The file was then appended to the remaining hourly distribution files and monthly, hour specific inputs were prepared for the SMOKE processing step for all four units.

Figure 4-1 presents the original 2011 (blue), 2028 emissions with 2011 distribution (red), and resulting 2028 monthly distributions with the modified approach (green) detailed above.

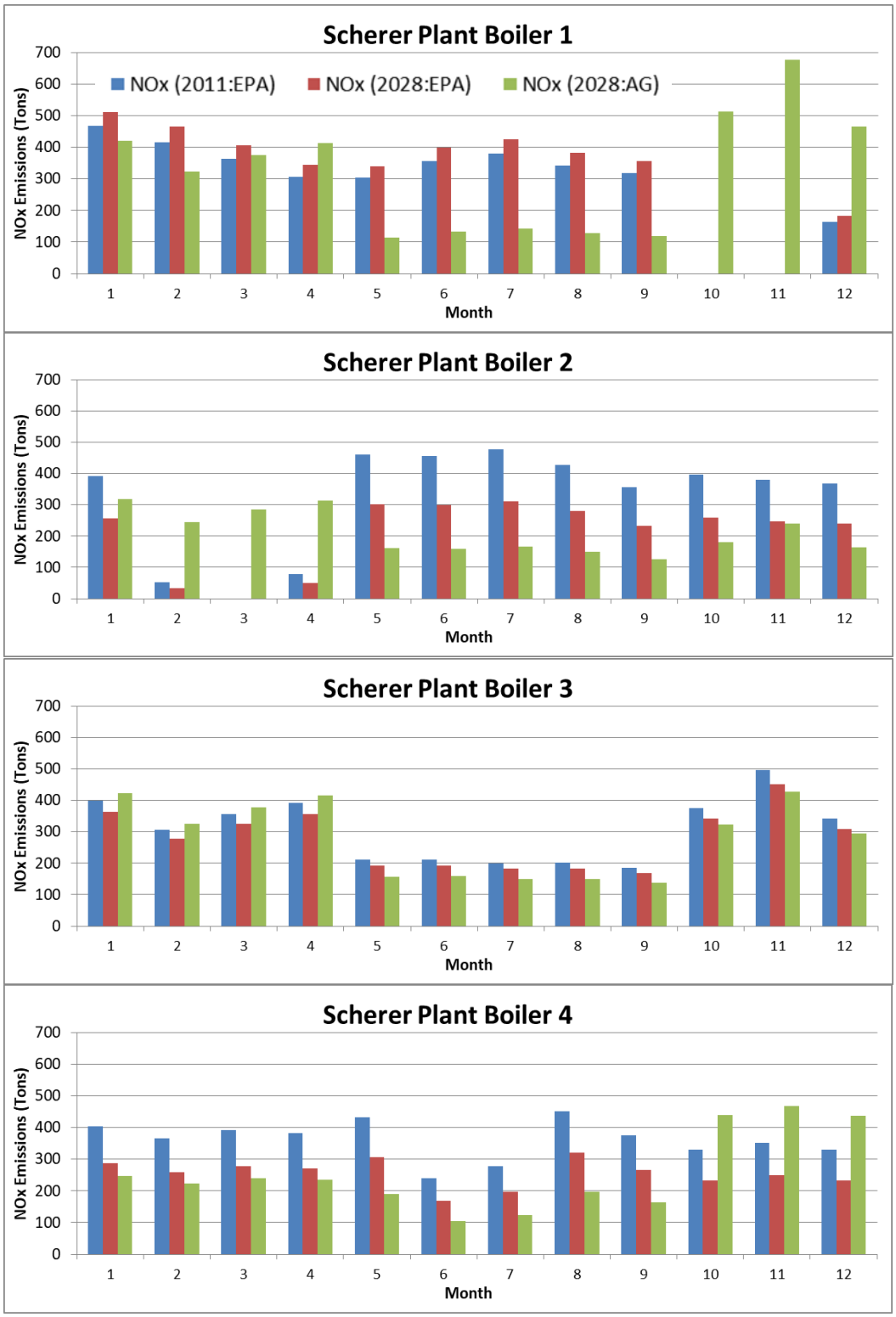

Figure 4-1. Scherer Unit-Level, Monthly NO_x Emissions Distribution by Month.

5.0 ADDITIONAL DATA FOR SMALL EGUS

The ERTAC tool includes EGUs that burn fossil fuel with ≥25 megawatts (MW) of generation capacity or ≥250 million British thermal units per hour (MMBtu/hr) of heat input and generate electricity for the power grid. EPA's Integrated Planning Model (IPM) forecast includes the same fossil fuel units as those included in ERTAC, plus small EGUs with <25 MW of generation capacity or <250 MMBtu/hr of heat input and may or may not produce electricity for the power grid. Therefore, it was necessary to develop a 2028 projection year inventory for the small EGUs that are included in IPM but not in ERTAC to include in the VISTAS II modeling platform to ensure complete accounting of emissions from small EGUs. Appendix A is the documentation for developing the small EGU inventory and the QA/QC steps conducted to develop the small EGU inventory.[7]

The small EGU FF10 files were finalized in early-November 2018,[8] and sent to ALPINE for emissions processing. Processing concluded on December 9, 2018.

[7] Memorandum: "Southeastern VISTAS II Regional Haze Project: Documentation of 2028 Mass Emissions Inventory for Small Electricity Generating Units (EGUs) for States not included in the VISTAS II Region." Prepared by the North Carolina Division of Air Quality (NCDAQ). December 7, 2018.

[8] Final data files submitted to SESARM by NCDAQ on November 12, 2018.

6.0 QUALITY ASSURANCE OF PTHOUR FILES

As a final step, Alpine prepared summaries of the hourly files, by unit, month, and pollutant, and aggregated the twelve monthly emission files to generate a reconstituted annual emission summary by unit. These summaries were then compared back to the annual emission file and confirmation was made of the tonnage conversions from annual to hourly distribution. The resulting national, month-specific hourly files are called:

- pthour_2028_12july2018_01.csv – January 2028 hourly emissions;
- pthour_2028_12july2018_02.csv – February 2028 hourly emissions;
- pthour_2028_12july2018_03.csv – March 2028 hourly emissions;
- pthour_2028_12july2018_04.csv – April 2028 hourly emissions;
- pthour_2028_12july2018_05.csv – May 2028 hourly emissions;
- pthour_2028_12july2018_06.csv – June 2028 hourly emissions;
- pthour_2028_12july2018_07.csv – July 2028 hourly emissions;
- pthour_2028_12july2018_08.csv – August 2028 hourly emissions;
- pthour_2028_12july2018_09.csv – September 2028 hourly emissions;
- pthour_2028_12july2018_10.csv – October 2028 hourly emissions;
- pthour_2028_12july2018_11.csv – November 2028 hourly emissions; and
- pthour_2028_12july2018_12.csv – December 2028 hourly emissions

The hourly emissions were the basis for the elv3 emissions modeling occurring in subsequent tasks.

Addendum to the elv3 Emissions Processing

Since the completion of the elv3 emissions processing and subsequent modeling efforts (October 2019), SESARM concluded that the 2028 point EGU and non-EGU emissions needed to be reviewed and updated for selected sources. These include data review from:

- Point source emissions updates identified in the Area of Influence report;
- Updated EGU emissions developed by ERTAC;
- EPA's 2028 point source emissions based on the 2016 modeling platform; and
- Additional facility emission updates after Particulate Source Apportionment Technology (PSAT) analysis from other regional planning organizations with states in the VISTAS modeling domain, such as the Central Regional Air Partnership (CenRAP); the Lake Michigan Air Directors Consortium (LADCO); the Mid-Atlantic and Northeast Visibility Union (MANE-VU); and the Western Regional Air Partnership (WRAP).

Specific revisions related to development of the 2028 emissions inventory updates for re-modeling are documented in the Task 2B report for the SESARM states and Task 3B for non-SESARM states.

When comparing emissions processing results from the elv3 modeling and the subsequent modeling (elv4), several problems were identified within the elv3 modeling framework, including differences in modeled emissions being higher than expected emissions (i.e., the mass emissions ERG provided to Alpine for processing through the SMOKE emissions processor vs. after processing). Table 6-1 presents these differences for states in the VISTAS domain.

Table 6-1. Comparison of Modeled Emissions vs. Expected Emissions.

State	Modeled NOx Emissions (tpy)	Modeled SO_2 Emissions (tpy)	Expected NOx Emissions (tpy)	Expected SO_2 Emissions (tpy)	Percent Difference, NOx (%)	Percent Difference, SO_2 (%)
SESARM States						
Alabama	84,809	89,233	80,528	87,896	4%	2%
Florida	71,763	63,344	68,110	63,596	5%	1%
Georgia	84,069	89,233	80,528	87,896	1%	<1%
Kentucky	71,763	64,344	68,110	63,596	1%	<1%
Mississippi	67,854	37,270	67,309	37,121	1%	<1%
North Carolina	67,070	75,281	66,321	75,197	7%	3%
South Carolina	52,978	20,831	52,709	20,815	5%	2%
Tennessee	70,746	36,441	65,949	35,270	1%	<1%
Virginia	37,834	30,119	36,117	29,652	8%	2%
West Virginia	46,470	23,524	45,976	23,480	<1%	<1%
SESARM Totals	**46,940**	**20,260**	**43,283**	**19,883**	**3%**	**1%**
Non-SESARM States						
Arkansas	75,165	89,284	74,454	87,557	1%	2%
Colorado	87,539	17,040	88,107	17,742	-1%	-4%
Connecticut	4,337	463	5,032	504	-14%	-8%
Delaware	4,787	4,757	4,152	3,531	15%	35%
District of Columbia	556	21	556	21	0%	0%
Illinois	112,950	169,260	106,617	144,967	6%	17%
Indiana	151,208	195,574	138,970	188,159	9%	4%
Iowa	44,962	54,514	43,846	51,396	3%	6%
Kansas	43,991	30,445	43,299	30,429	2%	<1%
Louisiana	167,539	137,710	160,058	141,305	5%	-3%
Maine	14,000	2,845	11,711	2,504	20%	14%

Table 6-1. Comparison of Modeled Emissions vs. Expected Emissions.

State	Modeled NOx Emissions (tpy)	Modeled SO_2 Emissions (tpy)	Expected NOx Emissions (tpy)	Expected SO_2 Emissions (tpy)	Percent Difference, NOx (%)	Percent Difference, SO_2 (%)
Maryland	27,710	44,692	27,481	44,667	1%	<1%
Massachusetts	18,213	2,706	13,421	1,930	36%	40%
Michigan	99,760	86,580	93,486	80,950	7%	7%
Minnesota	64,221	32,872	55,909	28,319	15%	16%
Missouri	67,880	180,622	65,162	171,837	4%	5%
Montana	22,796	17,468	23,639	19,588	-4%	-11%
Nebraska	46,813	76,573	46,829	76,569	<-1%	<1%
New Hampshire	3,876	2,402	3,693	2,383	5%	1%
New Jersey	17,688	4,305	17,081	4,131	4%	4%
New Mexico	70,497	26,630	70,476	26,628	<1%	<1%
New York	60,432	39,786	52,641	32,272	15%	23%
North Dakota	51,689	55,279	51,268	55,007	1%	<1%
Ohio	110,479	189,262	107,788	172,265	2%	10%
Oklahoma	120,411	53,571	116,468	49,591	3%	8%
Pennsylvania	124,445	190,614	111,502	180,793	12%	5%
Rhode Island	1,667	895	1,666	895	<1%	0%
South Dakota	13,462	1,199	13,426	1,195	<1%	<1%
Texas	364,551	413,170	359,997	411,482	1%	<1%
Vermont	1,079	130	731	128	48%	2%
Wisconsin	48,486	47,217	47,295	46,153	3%	2%
Wyoming	118,851	60,990	115,810	60,985	3%	<1%
Non-SESARM Totals	**2,159,040**	**2,228,876**	**2,072,571**	**2,135,883**	**4%**	**4%**
Totals	**2,769,877**	**2,689,607**	**2,663,981**	**2,592,218**	**4%**	**4%**

Appendix B (APP_B_ELV3_REASSESSMENT.zip) contains a memorandum and supporting attachments summarizing the problems with the elv3 modeling, which include:

- Differences in model spin-up days;
- Molecular weight differences in CAMx Reporting;
- Stack characteristic changes (presented in Attachment A of Appendix B);
- Temporal variability configuration and processing of small boiler files (presented in Attachment B-1 of Appendix B); and
- EGU boiler unit double count in 2028 elv3 (presented in Attachments B-2 and B-3 of Appendix B).

It is important to note that these issues only occurred with the elv3 modeling and were corrected in the final elv5 modeling.

Appendix A

Southeastern VISTAS II Regional Haze Project: Documentation of 2028 Mass Emissions Inventory for Small Electricity Generating Units (EGUs) for States not included in the VISTAS II Region

(see APP_A_Small_EGU_Emissions_Inventory_Documentation_120718.pdf)

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To: Visibility Improvement - State and Tribal Association of the Southeast (VISTAS) Region Team

From: North Carolina Division of Air Quality (NCDAQ)

Date: December 7, 2018

Subject: Southeastern VISTAS II Regional Haze Project:
Documentation of 2028 Mass Emissions Inventory for Small Electricity Generating Units (EGUs) for States not included in the VISTAS II Region

Introduction

The VISTAS II regional haze modeling platform for 2028 started with U.S. Environmental Protection Agency's (EPA) 2028v6.3el modeling platform.[1] For EGUs, the 2028 emissions were projected from the base year 2011 using the Integrated Planning Model (IPM) that included the Clean Power Plan (CPP); however, EPA did not implement the CPP. Therefore, for the VISTAS II project, the Coordinating Committee (CC) and Technical Analysis Work Group (TAWG) agreed to replace the IPM forecast for 2028 with the 2028 emissions forecast produced by the Eastern Regional Technical Advisory Committee (ERTAC) EGU forecast tool (referred to as the 2028 ERTACv2.7 EGU inventory). The 2028 ERTACv2.7 EGU inventory was projected from a 2011 base year, geographically covers the continental United States, and excludes the CPP.

The ERTAC tool includes EGUs that burn fossil fuel with ≥25 megawatts (MW) of generation capacity or ≥250 million British thermal units per hour (MMBtu/hr) of heat input, and generate electricity for the power grid. IPM includes the same fossil fuel units as those included in ERTAC, plus small EGUs with <25 MW of generation capacity or <250 MMBtu/hr of heat input and may or may not produce electricity for the power grid. Therefore, it was necessary to develop a 2028 projection year inventory for the small EGUs that are included in IPM but not in ERTAC to include in the VISTAS II modeling platform to ensure complete accounting of emissions from small EGUs. See the attachment to this memorandum for additional information comparing EGU coverage by IPM versus the ERTAC forecast tool.

For the VISTAS II 2028 inventory, the following five files were developed for small EGUs:

- Revised Ozone Transport Commission (OTC)/Mid-Atlantic Regional Air Management Association, Inc. (MARAMA) file: The small EGU file developed by OTC/MARAMA for the OTC modeling platform was modified to remove the VISTAS states and double counting of some emissions sources included in the 2028 ERTACv2.7 inventory.[2]

[1] Technical Support Document (TSD), Updates to Emissions Inventories for the Version 6.3, 2011 Emissions Modeling Platform for the Year 2028, EPA, Office of Air and Radiation, Office of Air Quality Planning and Standards, Air Quality Assessment Division, October 2017, https://www.epa.gov/air-emissions-modeling/updates-2011-and-2028-emissions-version-63-technical-support-document.

[2] Obtained from Eric Zalewsky, New York State Department of Environmental Conservation (NYSDEC), and Susan McCusker, MARAMA via a MARAMA's Sharefile FTP site on September 13, 2018. File name = 2023_POINT_PTNONERTAC_IPM_29may2017_02jun2017_v0.csv.

- Small EGU Inventory for 14 Western States: Two files (one for summer and the other for winter emissions) that cover small EGUs in 14 western states not included in the OTC/MARAMA small EGU inventory file. The data in these files originate from EPA's 2023v6.3en modeling platform.
- Small EGUs in the Eastern and Mid-Western U.S. not included in the ERTACv2.7 and the OTC/MARAMA Small EGU Inventories: Two files (one for summer and the other for winter emissions) that cover units in the eastern and mid-western U.S. that appear in the EPA 2023v6.3en modeling platform and are anticipated to be operating in 2028, but are missing from 2028 ERTACv2.7 and the OTC/MARAMA small EGU files.

Note that for the 2023v6.3en EGU inventory, EPA applied an engineering analysis to develop future year 2023 emissions for EGUs that reported NOx and/or SO_2 continuous emissions monitoring (CEM) data to EPA. For EGUs not reporting CEM data to EPA, EPA relied on its IPM forecast projected from 2011. The small EGUs included in these files most likely represent a mixture of EGUs to which EPA applied its engineering analysis versus relying on its IPM forecast to prepare the 2023 inventory. See EPA's technical support document for "Additional Updates to Emissions Inventories for the Version 6.3, 2011 Emissions Modeling Platform for the Year 2023" for details.[3]

Table 1 identifies the small EGU emissions data files developed for the VISTAS II 2028 regional haze modeling platform and identifies the states covered by the files. The data for all 5 files originate from EPA's IPM forecast for 2023 that EPA used in its 2011/2023v6.3en modeling platform, which excludes the CPP. For the VISTAS II project, small EGU emissions were not projected from 2023 to 2028 because, in general, emissions associated with small EGUs are not expected to change significantly by 2028. In addition, time and resource constraints prohibited developing growth factors for these small EGUs. Therefore, 2023 emissions were assumed to be representative of 2028 emissions.

The remainder of this memorandum documents how the 2028 small EGU inventory was prepared for the three sets of files for the non-VISTAS states, including quality assurance (QA) review of the inventory. Note that for the VISTAS states, each state reviewed its EGU inventory and provided the contractor with direction on how to update its 2028 EGU inventory to exclude the CPP. The methodologies for the VISTAS states are documented in the Task 2 report from the VISTAS contractor.[4] The focus of this inventory effort is on the following pollutants: sulfur dioxide (SO_2), oxides of nitrogen (NOx), volatile organic compounds (VOC), primary particulate matter with an aerodynamic diameter $\leq$10 and $\leq$2.5 micrometers (PM10-PRI and PM2.5-PRI), ammonia (NH_3), and carbon monoxide (CO).

[3] Technical Support Document (TSD), Additional Updates to Emissions Inventories for the Version 6.3, 2011 Emissions Modeling Platform for the Year 2023, U.S. Environmental Protection Agency, Office of Air and Radiation, Office of Air Quality Planning and Standards, Air Quality Assessment Division, October 2017., https://www.epa.gov/sites/production/files/2017-11/documents/2011v6.3_2023en_update_emismod_tsd_oct2017.pdf

[4] Southeastern VISTAS II Regional Haze Analysis Project –Task 2 Emission Inventory Updates Report, Prepared for Southeastern States Air Resource Managers, Inc., 205 Corporate Center Drive, Suite D, Stockbridge, GA 30281-7383 under SESARM Contract No. V-2018-03-01, prepared by Eastern Research Group, Inc., 1600 Perimeter Park Drive, Suite 200, Morrisville, NC 27560, REVISED FINAL – August 28, 2018. The VISTAS states include AL, FL, GA, KY, MS, NC, SC, TN, VA, and WV. The Eastern Band of Cherokee Indians and the Knox County, Tennessee local air pollution control agency are also participating agencies in VISTAS.

Table 1. Small EGU Emissions Data Files Developed for the VISTAS II 2028 Regional Haze Modeling Platform

File Name	Description	Nature of Revisions
Revised OTC/MARAMA Small EGU Inventory		
nonERTAC_sources_outsideVISTAS _outsideWEST_20181008_ff10.csv	Contains small EGUs for the following 25 eastern and mid-western states: AR, CT, DE, IL, IN, IA, KS, LA, ME, MD, MA, MI, MN, MO, NE, NH, NJ, NY, OH, OK, PA, RI, TX, VT, and WI	Removed facilities and emission units that were identified in the 2028 ERTACv2.7 inventory. Removed data for VISTAS States (AL, FL, GA, KY, MS, NC, SC, TN, VA, and WV). Note that Florida was not included in the original file obtained from OTC/MARAMA.
Small EGU Inventory for Western States		
West_nonERTAC_egu_summer_ff10.csv[1]	Contains small EGUs for the following 14 western states: AZ, CA, CO, ID, KS, MT, NE, NV, NM, OR, SD, UT, WA, and WY. Note that ND did not contain any small EGUs.	These are new files created for the VISTAS II regional haze modeling platform.
West_nonERTAC_egu_winter_ff10.csv[2]		
Additional Small EGU Facilities Missing from the ERTACv2.7 and the OTC/MARAMA Small EGU Files		
Additional_2023en_sources_nonERTAC _egu_EASTUS_summer.csv[1]	Contains small EGUs for the following 19 states: AR, CT, IL, IN, IA, LA, ME, MD, MA, MI, MN, MO, NH, NJ, NY, OH, OK, PA, and TX.	These are new files created for the VISTAS II regional haze modeling platform.
Additional_2023en_sources_nonERTAC _egu_EASTUS_winter.csv[2]		

[1] The annual emissions column in this "summer" file reflects the sum of monthly emissions in the file for May through September.

[2] The annual emissions column in this "winter" file reflects the sum of monthly emissions in the file for January through April plus October through December.

Small EGU Inventory Developed for the Eastern U.S.

OTC/MARAMA jointly prepared a 2028 projection year inventory to support regional haze modeling.[5] For EGUs, OTC/MARAMA used the 2028 ERTACv2.7 forecast and developed an inventory for the small EGUs included in the IPM but not the ERTAC forecast. This inventory included small EGUs in the states covered by the OTC modeling domain and the states bordering the western and southern boundary (excluding FL) of the OTC modeling domain.

The NCDAQ revised the OTC/MARAMA small EGU file by first removing facilities located within VISTAS states (AL, GA, KY, MS, NC, SC, TN, VA, and WV) because the VISTAS states provided updated emissions to the contractor.[6]

[5] Ozone Transport Commission/Mid-Atlantic Northeastern Visibility Union 2011 Based Modeling Platform Support Document – October 2018, Project Manager: Joseph Jakuta, Contributors: Michael Ku, Joseph Jakuta, David Healy, Michael Woodman, Kurt Kebschull, Update, October 18, 2018. See page B-176 for identification of small EGU file names. https://otcair.org/MANEVU/Upload/Publication/Reports/OTC%20MANE-VU%202011%20Based%20Modeling%20Platform%20Support%20Document%20October%202018%20-%20Final.pdf.

[6] Note that Florida was not included in the original small EGU file obtained from OTC/MARAMA because FL is outside of the OTC modeling domain.

The NCDAQ then compared the location of facilities in the OTC/MARAMA small EGU file and the ERTACv2.7 file. The comparison involved a two-step process. First, facilities were mapped in ArcGIS to identify facilities with coordinates in the two files that were less than 2 miles apart. Then, facilities outside of this geographic overlap were checked via the facility_id, unit_id, rel_point_id, and process_id to identify any duplicate sources between the two files. This QA check identified two large-emitting facilities in TX, two in MI, and one in OH, plus several small-emitting facilities in other states that were duplicates and removed from the OTC/MARAMA small EGU file. Table 2 lists the facilities located in non-VISTAS states that were removed from the file OTC/MARAMA small EGU file. Table 3 provides a summary of annual emissions by non-VISTAS state contained in the revised OTC/MARAMA small EGU inventory for 2028.

Table 2. Facilities and Emissions Removed from the OTC/MARAMA Small EGU file in for Non-VISTAS States

Facility	State	Facility ID	SO_2	NOx	VOC	PM10-PRI	PM2.5-PRI	NH_3	CO
Associated Electric COOP Inc-Dell Pwr Pl	AR	10642211	0	3	0	0	0	0	5
Central Iowa Power COOP - Summit Lake	IA	3731711	0	43	0	1	1	1	10
Western Minnesota Municipal Power Agency	IA	9661311	0	4	0	0	0	0	2
Ameren Energy Generating Co	IL	2622911	0	12	1	2	2	0	9
Ameren Services	IL	9686711	0	21	5	5	5	0	44
Ameren UE	IL	1945711	0	5	2	2	2	0	19
City Water Light & Power	IL	4541611	0	0	0	0	0	0	0
Crete Energy Park	IL	4106911	0	2	0	1	1	0	3
Exelon Generation Co LLC	IL	9725911	0	3	0	1	1	0	1
Holland Energy LLC	IL	9698311	1	29	0	13	13	0	2
Lee Energy Facility	IL	5483011	0	1	0	0	0	0	1
NRG Rockford Energy Center	IL	9698111	0	10	0	1	1	0	2
Southern Illinois Power Coop	IL	8164511	0	4	0	0	0	0	0
CLECO Power LLC - Teche Power Station	LA	7204011	0	14	7	18	18	0	6
Louisiana Generating LLC - Big Cajun 1 Power Plant (Steam)	LA	5931611	0	1	0	0	0	0	0
Cadillac Renewable Energy Facility	MI	6180011	93	273	10	39	34	15	467
DTE - Electric Company Delray Power Plant	MI	7306011	0	5	0	1	1	0	1
Grayling Generating Station LTD PTNR	MI	4187811	19	308	6	16	16	0	566
Great River Energy - Cambridge	MN	6167711	0	23	1	0	0	0	11
Hutchinson Utilities Commission -Plant 2	MN	7626711	0	0	0	0	0	0	0

Facility	State	Facility ID	SO_2	NOx	VOC	PM10-PRI	PM2.5-PRI	NH_3	CO
LSP Cottage Grove Cogeneration Facility	MN	6785711	1	11	0	0	0	0	41
Xcel Energy - Riverside Generating Plant	MN	6393811	2	68	1	1	1	21	112
City Utilities of Springfield Missouri-John Twitty Energy Center	MO	7496411	0	2	0	0	0	0	1
City Utilities Of Springfield-N L McCartney Dist Generation	MO	7498011	0	8	0	0	0	0	7
Lon D Wright Power Plant	NE	7766111	0	0	0	0	0	0	0
Holtsville Gt Facility	NY	8452411	0	14	0	1	1	0	0
Ogdensburg Energy Facility	NY	7968011	0	10	1	1	1	0	8
Buckeye Power Greenville Station (0819070237)	OH	8257111	0	12	0	0	0	0	17
Smart Papers - Hamilton Mill	OH	7920911	558	108	1	16	10	0	43
Allen Fossil Plant	TN	5720111	0	7	0	0	0	0	0
E I. Dupont De Nemours & Co Inc	TN	6516311	0	52	2	3	3	0	8
Powell Valley Electric Cooperative, Inc.	TN	3787211	0	0	0	0	0	0	0
TVA Bull Run Fossil Plant	TN	6196011	0	0	0	9	3	0	0
TVA Cumberland Fossil Plant	TN	4979311	0	0	0	19	10	0	0
TVA Gleason Combustion Turbine Plant	TN	3428511	0	0	0	0	0	0	0
TVA Johnsonville Fossil Plant	TN	5720911	0	65	2	5	5	0	13
Bastrop Energy Center	TX	3981411	0	0	0	0	0	0	0
Channelview Cogeneration Facility	TX	4057511	18	314	27	146	146	88	167
Fayette Power Project	TX	4144811	2,196	396	4	70	38	43	125
Graham Steam Electric Station	TX	8532511	0	91	2	3	3	2	31
Handley Steam Electric Station	TX	4916711	0	12	2	3	3	0	2
Harrington Station Power Plant	TX	5745311	16,196	5,152	109	1,342	172	55	3,079
Jones Station Power Plant	TX	4030611	0	10	1	2	2	0	6
Laredo Power Station	TX	5023911	0	6	1	2	2	1	3
Leon Creek Plant	TX	3000111	0	12	0	4	4	0	15
Mountain Creek Steam Electric Station	TX	5729911	0	42	2	2	2	2	8
Mustang Electric Station	TX	5129311	0	3	1	1	1	0	2
Plant X Power Plant	TX	4946011	1	130	7	9	9	4	30
Sabine Plant	TX	5730811	4	998	33	46	46	0	145
Sand Hill Energy Center	TX	9071611	0	6	2	2	2	0	29
Silas Ray Power Plant	TX	6493311	0	8	0	0	0	0	1
South Texas Electric Coop	TX	5863011	1	19	3	9	9	5	22
SR Bertron Station	TX	4941311	1	126	5	7	7	3	11
Stryker Creek Electric Station	TX	5729511	1	110	6	8	8	5	34

Facility	State	Facility ID	SO_2	NOx	VOC	PM10-PRI	PM2.5-PRI	NH_3	CO
VH Braunig Plant	TX	5616511	0	15	2	4	4	9	7
WA Parish Electric Generating Station	TX	3968411	1	272	7	10	10	6	50
WI Public Service Corp - JP Pulliam Plant	WI	5295111	1	11	2	2	2	0	1
Wisconsin Public Service Corp - De Pere Energy Center	WI	7642611	0	15	0	0	0	0	1
Totals			**19,094**	**8,866**	**255**	**1,827**	**599**	**260**	**5,168**

Table 3. Revised OTC/MARAMA Small EGU Inventory: Summary of Annual Emissions by Non-VISTAS State

State	No. Facilities	SO_2	NOx	VOC	PM10-PRI	PM2.5-PRI	NH_3	CO
AR	10	0	118	1	3	3	0	31
CT	8	65	96	7	22	21	18	96
DE	2	1,317	411	5	94	89	1	18
IA	47	2,941	1,066	53	104	74	25	205
IL	23	20,892	4,480	59	696	409	1	1,015
IN	20	5,534	10,893	48	1,305	1,163	1	649
KS	5	6	39	0	1	1	0	10
LA	22	148	7,841	218	920	912	36	2,453
MA	21	765	4,473	78	93	83	135	928
MD	3	4	29	0	0	0	0	0
ME	21	677	2,777	91	87	83	20	3,810
MI	62	5,532	5,874	65	282	180	9	2,496
MN	43	4,565	8,433	222	756	481	398	2,758
MO	45	8,872	2,779	25	552	485	10	226
NE	10	1	4	10	1	0	0	1
NH	7	41	614	24	62	56	16	728
NJ	11	19	358	19	29	29	2	38
NY	59	731	5,542	92	198	136	64	1,351
OH	21	17,770	3,047	50	994	975	5	491
OK	8	0	4	0	7	7	0	1
PA	67	9,319	8,987	153	649	485	61	2,072
RI	1	0	1	0	0	0	0	0
TX	95	127	2,959	344	842	833	130	1,189
VT	2	3	332	21	3	2	16	1,376
WI	14	1,071	1,200	62	200	183	7	614
Totals	**627**	**80,400**	**72,357**	**1,647**	**7,900**	**6,690**	**955**	**22,556**

Small EGU Inventory for Western States in the Continental United States

For the non-VISTAS states, the OTC/MARAMA inventory excluded small EGUs in 14 western states (i.e., AZ, CA, CO, ID, KS, MT, NE, NM, NV, OR, SD, UT, WA, and WY). The OTC/MARAMA file included small EGUs; however, the NCDAQ identified a few small EGUs in NE and KS that were missing from the OTC/MARAMA small EGU file. The OTC/MARAMA did not include small EGUs in ND, and the NCDAQ confirmed that there were no small EGUs in ND.

To generate the small EGU files for the western states, first the NCDAQ generated a list of facilities from EPA's 2023v6.3en "ptegu" file that did not overlap within 2 miles with facilities in the 2028 ERTACv2.7 file.[7] Then these western state facilities/units were compared to facilities/units found in the revised OTC/MARAMA file and in the ERTACv2.7 file to check for duplicate sources with a matching facility_id, unit_id, rel_point_id, and process_id. Any duplicates were removed from the western small EGU files. Finally, a check for facility and unit closures was made for SO_2 sources with ≥100 tons per year. Any facilities or emission units that would be closed by 2028 were removed from the file. Table 4 provides a summary of annual emissions by non-VISTAS state contained in the western states small EGU inventory for 2028.

Table 4. Small EGU Inventory for Western States File: Summary of Annual Emissions by Non-VISTAS State

State	No. Facilities	SO_2	NOx	VOC	PM10-PRI	PM2.5-PRI	NH_3	CO
AZ	4	67	256	3	83	83	0	330
CA	78	2,198	5,795	433	948	816	770	13,558
CO	12	2,086	1,608	96	104	103	0	273
ID	4	93	1,299	185	134	118	0	4,139
KS	19	2	397	24	7	7	0	144
MT	3	3,129	1,360	16	84	75	0	34
NE	41	6	83	4	119	47	0	16
NM	4	0	1	0	1	1	0	2
NV	1	5	272	23	41	22	48	69
OR	9	606	2,177	111	508	421	46	2,280
SD	2	3	19	0	4	3	0	2
UT	10	1,559	876	22	54	45	11	155
WA	8	355	1,654	79	76	62	47	2,264
WY	1	0	6	1	4	4	2	10
Totals	**196**	**10,109**	**15,803**	**997**	**2,167**	**1,807**	**924**	**23,276**

Small EGUs in the Eastern and Mid-Western U.S. Missing from the ERTACv2.7 and the OTC/MARAMA Small EGU Inventory Files

For the non-VISTAS states, using ArcGIS, the NCDAQ identified sources in the IPM 2023en "ptegu" files that were not within 2 miles of any sources found in the 2028 ERTACv2.7 inventory file, revised OTC/MARAMA small EGU file, the western states small EGU file, or the non-EGU point source inventory. Sources with SO_2 emissions greater than 100 tons were checked to see if they would be shut down by 2028. This check identified one facility in IN (Duke Energy Gallagher) and one facility in MI (DTE Trenton Channel Power) that would be shut down by 2028. Therefore, these two facilities were removed from the small EGU inventory files. Table 5 provides a summary of annual emissions by non-VISTAS state contained in the additional sources small EGU inventory for 2028.

[7] The NCDAQ discovered a few facilities that had different names and/or facility IDs in EPA's 2023v6.3en "ptegu" file versus the ERTAC 2028 EGU file. As a result, the NCDAQ chose geographic screening within 2 miles as the primary step in creating the western non-ERTAC small EGU files.

Table 5. Small EGUs in the Eastern and Mid-Western U.S. not in ERTACv2.7 and OTC/MARAMA Small EGU Inventories: Summary of Annual Emissions by Non-VISTAS State

State	No. Facilities	SO_2	NOx	VOC	PM10-PRI	PM2.5-PRI	NH_3	CO
AR	1	87	315	1	48	27	0	6
CT	5	119	939	13	5	2	6	151
IA	5	1	91	1	2	2	2	10
IL	3	127	321	8	23	22	17	70
IN	6	30	248	36	76	71	80	333
LA	2	3,841	72	1	56	33	2	7
MA	3	0	0	0	0	0	0	0
MD	3	6	68	0	0	0	0	8
ME	1	353	507	65	13	6	3	985
MI	5	0	12	0	0	0	0	1
MN	5	0	41	0	1	1	1	4
MO	1	0	1	0	0	0	0	0
NH	5	23	476	58	95	73	86	1,777
NJ	8	41	866	6	30	24	5	104
NY	3	0	1	0	0	0	0	0
OH	5	23	207	31	64	60	68	281
OK	2	0	767	29	156	81	10	1,590
PA	7	3	54	0	1	1	0	2
TX	8	12	941	39	81	43	43	368
Totals	**78**	**4,666**	**5,927**	**288**	**651**	**446**	**323**	**5,697**

Quality Assurance

Each of the output files was compared to each other, and each file was also compared to the 2028 ERTACv2.7 file and the 2028v6.3el "ptnonipm" file. The comparison checked for any geographic overlap of less than 2 miles, and check for duplicate Facility ID and Unit ID entries. Any units that overlap or were duplicates were checked and removed. The following is a list of file comparisons:

- West_nonERTAC_egu_[summer/winter]_ff10.csv vs. ERTAC 2028, version 2.7
- West_nonERTAC_egu_[summer/winter]_ff10.csv vs. nonERTAC_sources_outsideVISTAS_outsideWEST_20181008_ff10.csv
- West_nonERTAC_egu_[summer/winter]_ff10.csv vs. 2023el_from_ptnonipm_2011NEIv2_POINT_20140913_revised_20150115_20sep2016_v2.csv
- nonERTAC_sources_outsideVISTAS_outsideWEST_20181008_ff10.csv vs. ERTAC 2028, version 2.7
- nonERTAC_sources_outsideVISTAS_outsideWEST_20181008_ff10.csv vs. 2023el_from_ptnonipm_2011NEIv2_POINT_20140913_revised_20150115_20sep2016_v2.csv
- West_nonERTAC_egu_[summer/winter]_ff10.csv vs. Additional_nonERTAC_EASTUS_[summer/winter]_ff10.csv

- Additional_nonERTAC_EASTUS_[summer/winter]_ff10.csv vs. nonERTAC_sources_outsideVISTAS_outsideWEST_20181008_ff10.csv
- Additional_nonERTAC_EASTUS_[summer/winter]_ff10.csv vs. ERTAC 2028, version 2.7
- Additional_nonERTAC_EASTUS_winter_ff10.csv vs. 2023el_from_ptnonipm_2011NEIv2_POINT_20140913_revised_20150115_20sep2016_v2.csv

Summary

Table 6 shows total annual emissions by non-VISTAS state for the small EGUs added to the VISTAS II inventory for 2028. In total, emissions were added for 37 states amounting to a total of 95,175 tons of SO_2; 94,087 tons of NOx; 51,529 tons of CO; 10,718 tons of PM10-PRI; 8,943 tons of PM2.5-PRI; 2,932 tons of VOC; and 2,202 tons of NH_3 annual emissions in 2028. Figure 1 provides a plot of the facilities added to the VISTAS II inventory for 2028.

Table 6. Small EGUs Emissions in the 5 Files: Total Annual Emissions by Non-VISTAS State for 2028

State	SO_2	NOx	VOC	PM10-PRI	PM2.5-PRI	NH_3	CO	No. Facilities		
								Table 3[1]	Table 4[1]	Table 5[1]
AR	87	433	2	51	30	0	37	10		1
AZ	67	256	3	83	83	0	330		4	
CA	2,198	5,795	433	948	816	770	13,558		78	
CO	2,086	1,608	96	104	103	0	273		12	
CT	184	1035	20	27	23	24	247	8		5
DE	1,317	411	5	94	89	1	18	2		
IA	2,942	1,157	54	106	76	27	215	47		5
ID	93	1,299	185	134	118	0	4,139		4	
IL	21,019	4,801	67	719	431	18	1,085	23		3
IN	5,564	11,141	84	1,381	1,234	81	982	20		6
KS	8	436	24	8	8	0	154	5	19	
LA	3,989	7,913	219	976	945	38	2,460	22		2
MA	765	4,473	78	93	83	135	928	21		3
MD	10	97	0	0	0	0	8	3		3
ME	1,030	3,284	156	100	89	23	4,795	21		1
MI	5,532	5,886	65	282	180	9	2,497	62		5
MN	4,565	8,474	222	757	482	399	2,762	43		5
MO	8,872	2,780	25	552	485	10	226	45		1
MT	3,129	1,360	16	84	75	0	34		3	
ND	0	0	0	0	0	0	0			
NE	7	87	14	120	47	0	17	10	41	
NH	64	1,090	82	157	129	102	2,505	7		5
NJ	60	1,224	25	59	53	7	142	11		8
NM	0	1	0	1	1	0	2		4	
NV	5	272	23	41	22	48	69		1	
NY	731	5,543	92	198	136	64	1,351	59		3
OH	17,793	3,254	81	1,058	1,035	73	772	21		5
OK	0	771	29	163	88	10	1,591	8		2
OR	606	2,177	111	508	421	46	2,280		9	
PA	9,322	9,041	153	650	486	61	2,074	67		7

State	SO_2	NOx	VOC	PM10-PRI	PM2.5-PRI	NH_3	CO	No. Facilities		
								Table 3[1]	Table 4[1]	Table 5[1]
RI	0	1	0	0	0	0	0	1		
SD	3	19	0	4	3	0	2		2	
TX	139	3,900	383	923	876	173	1,557	95		8
UT	1,559	876	22	54	45	11	155		10	
VT	3	332	21	3	2	16	1,376	2		
WA	355	1,654	79	76	62	47	2,264		8	
WI	1,071	1,200	62	200	183	7	614	14		
WY	0	6	1	4	4	2	10		1	
Totals	**95,175**	**94,087**	**2,932**	**10,718**	**8,943**	**2,202**	**51,529**	627	196	78

[1] These columns identify the number of the table in the memorandum from which emissions were summed in Table 5.

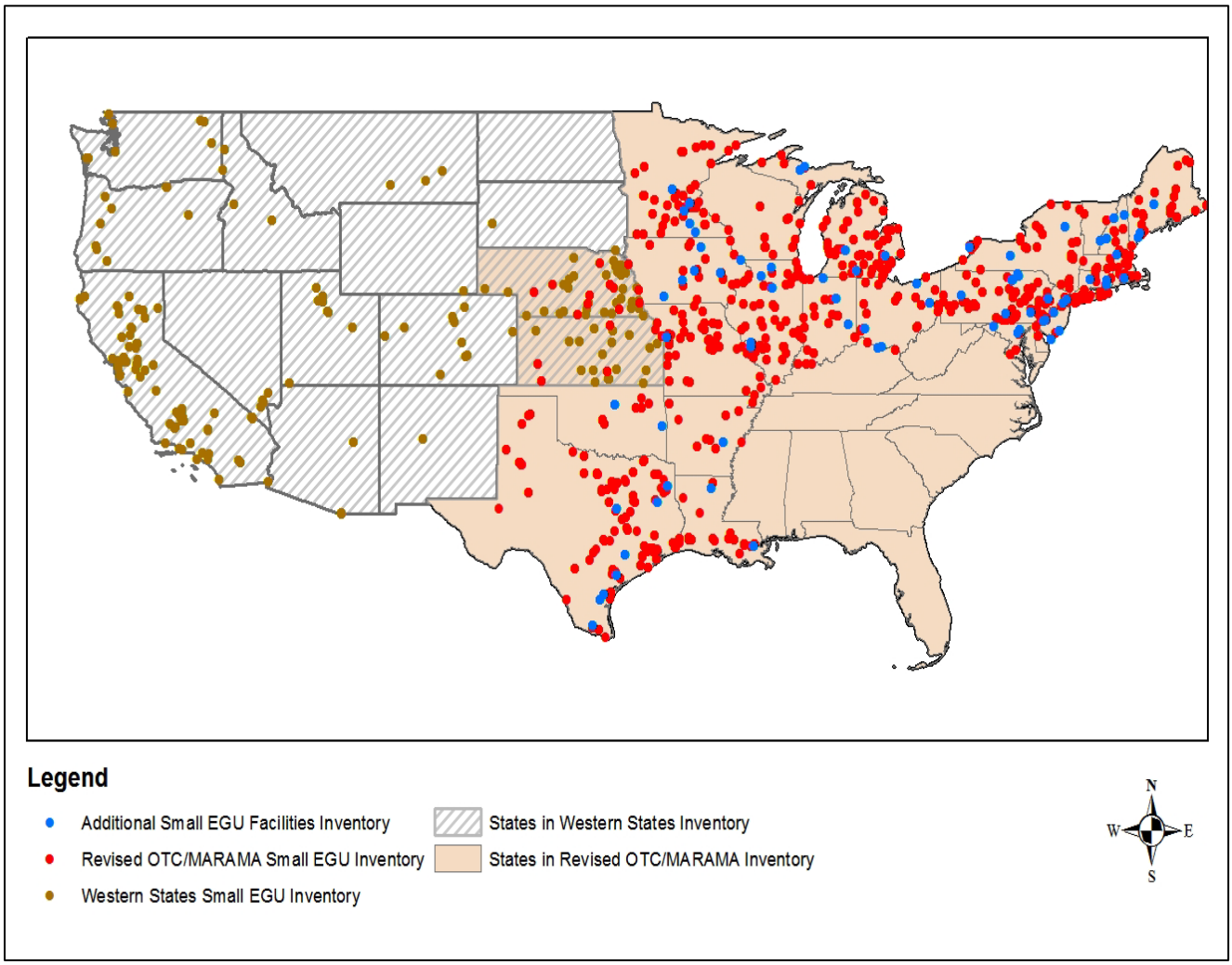


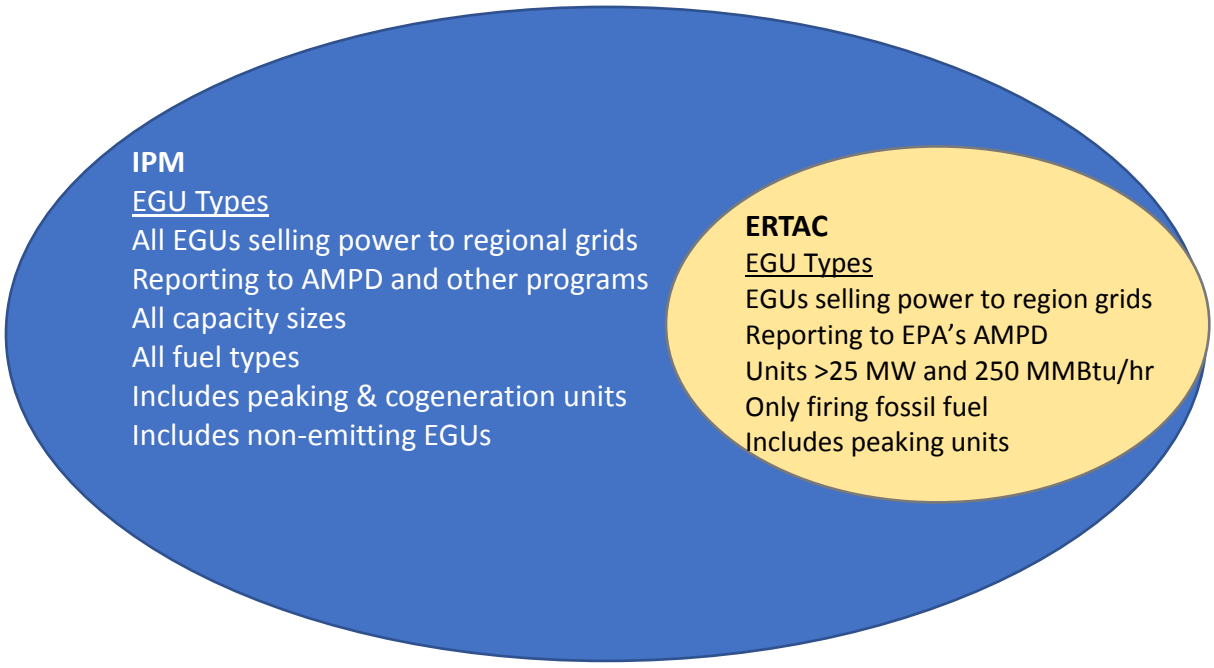
Figure 1. Plot of Small EGU Facilities Added to the VISTAS II Inventory for 2028

Attachment

Electricity Generating Unit (EGU) Coverage by the Integrated Planning Model (IPM) vs. the Eastern Regional Technical Advisory Committee (ERTAC) Forecast Tool

ERTAC developed a model to forecast air emissions from EGUs in the continental United States. The model utilizes hourly emissions monitoring data for EGUs subject to the reporting requirements of Volume 40 Part 75 of the Code of Federal Regulations (CFR) and that report to EPA's Air Markets Program Data (AMPD). The forecast tool only includes the AMPD units that 1) fire fossil fuels and 2) generate electricity for sale on regional power grids. The EGUs reporting to EPA's AMPD generally have capacities of ≥25 MW or heat inputs of ≥250 MMBtu/hr. It does not include units that generate both steam and electricity (cogeneration).

EPA's IPM is a least-cost model used to forecast electricity generation and the resulting air emissions for the United States. Both units reporting emissions to EPA's AMPD and those reporting emissions under different regulations are included. It includes all EGUs selling electricity to regional power grids, including small peaking power units <25 MW and cogeneration units. It also models generation from all source types, including fossil fuel and biomass EGUs, as well as non-emitting EGUs such as nuclear, hydropower, solar, wind and fuel cells. The ERTAC EGUs are a subset of the units contained in IPM.



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Appendix B

Task 6 – Benchmark Run #7 Report Review and 2028 elv3 Reassessment

(see APP_B_ELV3_REASSESSMENT.zip)

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Appendix B-2a

VISTAS II Task 2B - Emission Inventory Updates Report (2028 Visibility Estimates)

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Southeastern VISTAS II Regional Haze Analysis Project –Task 2B Emission Inventory Updates Report (2028 Visibility Estimates)

Prepared for:

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FINAL – September 22, 2020

SESARM Contract No. V-2018-03-01

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Abbreviations/Acronym List

AL	Alabama
AoI	Area of Influence
BEIS	Biogenic Emissions Inventory System
CAMx	Comprehensive Air Quality Model with Extension
CMV	Commercial Marine Vessel
CO	Carbon Monoxide
CONUS	Continental U.S.
CPP	Clean Power Plan
CSAPR	Cross-State Air Pollution Rule
EIS	Emission Inventory System
EPA	U.S. Environmental Protection Agency
ERG	Eastern Research Group, Inc.
ERTAC	Eastern Regional Technical Advisory Committee
EGU	Electricity Generating Unit
FF	Flat File
FL	Florida
FLM	Federal Land Manager
FR	Federal Register
FTP	File Transfer Protocol
GA	Georgia
GA DNR	Georgia Department of Natural Resources
IPM	Integrated Planning Model
KY	Kentucky
MARAMA	Mid-Atlantic Regional Air Management Association
MOVES	Motor Vehicles Emissions Simulator
MS	Mississippi
NAAQS	National Ambient Air Quality Standard
NC	North Carolina
NC DAQ	North Carolina Division of Air Quality
NC DEQ	North Carolina Department of Environmental Quality
NEI	National Emissions Inventory
NH_3	Ammonia
NODA	Notice of Data Availability
NO_x	Oxides of Nitrogen
PM	Particulate Matter
PM_{10}-PRI	Primary particulate matter ≤ 10 microns in aerodynamic diameter
$PM_{2.5}$-PRI	Primary particulate matter ≤2.5 microns in aerodynamic diameter
PSAT	Particulate Source Apportionment Tool
QA/QC	Quality Assurance/Quality Control
RHR	Regional Haze Rule
RTR	Risk and Technology Review
SC	South Carolina
SC DHEC	South Carolina Department of Health and Environmental Control
SCC	Source Classification Code

Abbreviations/Acronym List (cont.)

SESARM	Southeastern States Air Resource Managers, Inc.
SIP	State Implementation Plan
SMOKE	Sparse Matrix Operator Kernel Emissions
SO_2	Sulfur Dioxide
SQL	Structured Query Language
TDEC	Tennessee Department of Environment and Conservation
TN	Tennessee
tpy	Tons per year
TSD	Technical Support Document
U.S.	United States
VA	Virginia
VADEQ	Virginia Department of Environmental Quality
VISTAS	Visibility Improvement - State and Tribal Association of the Southeast
VOC	Volatile Organic Compound
WV	West Virginia

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1. INTRODUCTION

Southeastern States Air Resource Managers, Inc. (SESARM) has been designated by the United States Environmental Protection Agency (EPA) as the entity responsible for coordinating regional haze evaluations for the ten Southeastern states of Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia. The Eastern Band of Cherokee Indians and the Knox County, Tennessee local air pollution control agency are also participating agencies. These parties are collaborating through the Regional Planning Organization known as Visibility Improvement - State and Tribal Association of the Southeast (VISTAS) in the technical analyses and planning activities associated with visibility and related regional air quality issues. VISTAS analyses will support the VISTAS states in their responsibility to develop, adopt, and implement their State Implementation Plans (SIPs) for regional haze.

The state and local air pollution control agencies in the Southeast are mandated to protect human health and the environment from the impacts of air pollutants. They are responsible for air quality planning and management efforts including the evaluation, development, adoption, and implementation of strategies controlling and managing all criteria air pollutants (including fine particles and ozone) as well as regional haze. This project will focus on regional haze and regional haze precursor emissions. Control of regional haze precursor emissions will have the additional benefit of reducing certain criteria pollutants as well.

The 1999 Regional Haze Rule (RHR) identified 18 Class I Federal areas (national parks greater than 6,000 acres and wilderness areas greater than 5,000 acres) in the VISTAS region and required states to define long-term strategies to improve visibility in these Federal Class I national areas. States were required to establish baseline visibility conditions for the period 2000-2004, natural visibility conditions in the absence of anthropogenic influences, and an expected rate of progress to reduce emissions and incrementally improve visibility to natural conditions by 2064. The original RHR required states to improve visibility on the 20% most impaired days and

protect visibility on the 20% least impaired days.[1] The RHR requires states to evaluate progress toward visibility improvement goals every five years and submit revised SIPs every ten years.

EPA finalized revisions to various requirements of the RHR in January 2017 (82 FR 3078) that were designed to strengthen, streamline, and clarify certain aspects of the agency's regional haze program including:

A. Strengthening the Federal Land Manager (FLM) consultation requirements to ensure that issues and concerns are brought forward early in the planning process.

B. Updating the SIP submittal deadlines for the second planning period from July 31, 2018 to July 31, 2021 to ensure that they align where applicable with other state obligations under the Clean Air Act. The end date for the second planning period remains 2028; that is, the focus of state planning will be to establish reasonable progress goals for each Class I area against which progress will be measured during the second planning period. This extension will allow states to incorporate planning for other federal programs while conducting their regional haze planning. These other programs include: the Mercury and Air Toxics Standards, the 2010 1-hour sulfur dioxide (SO_2) National Ambient Air Quality Standard (NAAQS); the 2012 annual fine particle ($PM_{2.5}$) NAAQS; and the 2008 and 2015 ozone NAAQS.

C. Adjusting interim progress report submission deadlines so that second and subsequent progress reports will be due by: January 31, 2025; July 31, 2033; and every ten years thereafter. This means that one progress report will be required midway through each planning period.

D. Removing the requirement for progress reports to take the form of SIP revisions. States will be required to consult with FLMs and obtain public comment on their progress reports before submission to the EPA. EPA will be reviewing but not formally approving or disapproving these progress reports.

The RHR defines "clearest days" as the 20% of monitored days in a calendar year with the lowest deciview index values. "Most impaired days" are defined as the 20% of monitored

[1] RHR summary data is available at: http://vista.cira.colostate.edu/Improve/rhr-summary-data/

days in a calendar year with the highest amounts of anthropogenic visibility impairment. The long-term strategy and the reasonable progress goals must provide for an improvement in visibility for the most impaired days and ensure no degradation in visibility for the clearest days since the baseline period.

Under SESARM Contract No. V-2018-03-01 to support the "Regional Haze Analysis Project," Eastern Research Group, Inc. (ERG) completed Task 2, "Emissions Inventory Development." For this task, ERG compiled, reviewed, updated, and prepared emissions inventory data to be used for emissions modeling.

This report is divided into five sections and six appendices:

- Section 1 provides an introduction and background for this report;
- Section 2 defines the study parameters;
- Section 3 describes the data sources used for this task and merging of the datasets;
- Section 4 summarizes the state review, revisions to 2028 emissions, and steps to finalize the emissions;
- Section 5 presents summary emissions;
- Appendix A-1 supports Section 3 by listing the base year 2011 emission inventory datasets used for 2011 modeling;
- Appendix A-2 supports Section 3 by listing the future year 2028 emission inventory datasets reviewed;
- Appendix B supports Section 4 by providing point electricity generating unit (EGU) and non-EGU emission updates for 2028;
- Appendix C supports Section 4 by providing point EGU and non-EGU emission change maps from the original EPA 2028 emissions inventory and the revised emissions inventory;
- Appendix D supports Section 5 by comparing PM_{10}-PRI and $PM_{2.5}$-PRI unadjusted emissions to precipitation- and transport-adjusted emissions for paved and unpaved roads. Unadjusted emissions are presented in the emissions summary totals, while adjusted emissions are calculated for emissions modeling;
- Appendix E supports Section 5 by presenting Tier 1-level emissions for 2011 and 2028 for each VISTAS state; and
- Appendix F supports Section 5 with county summary emission changes maps for 2011 to 2028 for each VISTAS state.

The emissions inventory report for Task 2A (September 2020) documents revisions to the 2028 emissions inventory used to support the Area of Influence (AoI) analysis, Particulate Source Apportionment Technology (PSAT) modeling, and initial modeling of regional progress

goals (elv3) for each Class I Federal area. The 2028 emissions in the "el" platform were projected from a 2011 base year. Subsequently, EPA released a 2028 emissions inventory projected from its 2016 modeling platform for all source sectors. In addition, for EGUs, the Eastern Regional Technical Advisory Committee (ERTAC) prepared a 2028 emissions inventory projected from the 2016 base year.

Under Task 11.3, ERG prepared emissions summary tables for Electric Generating Unit (EGU) and non-EGU point sources for all states in the VISTAS domain to initially ascertain the emissions reductions. VISTAS compared SO_2 and NO_x emissions in the 2028 inventory projected from a 2011 base year to the 2028 emissions projected from the 2016 base year and observed significant reductions in both pollutants.

Based on consultation with EPA, it was determined that VISTAS needed to update 2028 SO_2 and NO_x emissions for point sources to reflect the significantly lower emissions observed in the EPA 2016/2028 modeling platform and the ERTAC projections. At that time, there were insufficient resources and time to revise the AOI and PSAT modeling activities. Therefore, the VISTAS states updated 2028 criteria pollutant emissions for point sources to support re-modeling of reasonable progress goals (elv5) for each Class I Federal area. The remainder of this report documents all the revisions to the 2028 SO_2 and NO_x emissions supporting modeling of reasonable progress goals (elv5). The reader is referred to the previous Task 2A emissions inventory report for documentation and summaries of the 2028 emissions used for the AoI analysis and PSAT modeling (elv3).

1.1 Emissions Update

Also under Task 11.3, ERG prepared EGU and non-EGU emissions summary comparison tables for each VISTAS state. These tables compared the 2028 emissions used for the original modeling (elv3) to the following data sources:

- Point source emissions updates identified after completing the AoI and PSAT modeling analyses;
- Updated EGU emissions for 2028 projected from 2016 base year emissions developed by the ERTAC; and
- EPA's 2028 point source emissions projected from EPA's 2016 base year modeling platform.

Each VISTAS state reviewed the following data sets for their state and identified revisions to 2028 EGU and non-EGU emissions needed to reflect more accurate emissions for modeling reasonable progress goals for each Class I Federal area.

In addition, for point sources in non-VISTAS states with a PSAT contribution of ≥1.00% for sulfate or ≥1.00% for nitrate, VISTAS consulted with the non-VISTAS states to review 2028 emissions. The 2028 emissions for some of these point sources were revised based on comments provided by the non-VISTAS states. Specific updates related to development of the 2028 emissions inventory updates are presented throughout the remainder of this report and in Appendix B.

2. STUDY PARAMETERS

ERG was directed by SESARM to use EPA's 2011el-based air quality modeling platform which includes emissions, meteorology, and other inputs for 2011 as the base year for the modeling described in EPA's technical support document (TSD) entitled "Documentation for the EPA's Preliminary 2028 Regional Haze Modeling".[2] EPA has projected the 2011 base year emissions[3] to a 2028 future year base case scenario. The 2011 modeling platform and projected 2028 emissions were used to drive the 2011 base year and 2028 base case air quality model simulations. As noted in EPA's TSD, the 2011 base year emissions and methods for projecting these emissions to 2028 are in large part similar to the data and methods used by EPA in the final Cross-State Air Pollution Rule (CSAPR) Update[4] and the subsequent notice of data availability (NODA)[5] to support ozone transport for the 2015 ozone NAAQS. The EPA also used this platform to support preliminary modeling for the assessment of reasonable progress for regional haze with cases 2011el and 2028el. The VISTAS states reviewed and revised the 2028 emissions to improve the estimates based on more recent data than was available to EPA at the time it prepared the 2028 future year emissions for its modelling platform.

2.1 Study Area of Interest

The area of interest for this study is the VISTAS_12 domain. As presented in Figure 2-1, the U.S. EPA continental U.S. (CONUS) modeling domain is divided into three sections:

- VISTAS_12 Domain, VISTAS states: Alabama (AL), Florida (FL), Georgia (GA), Kentucky (KY), Mississippi (MS), North Carolina (NC), South Carolina (SC), Tennessee (TN), Virginia (VA), and West Virginia (WV).
- Non-VISTAS States/Areas in VISTAS_12 Domain:
  - States – Arkansas, Colorado (partial), Connecticut, Delaware, Illinois, Indiana, Iowa, Kansas, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Montana (partial), Nebraska, New Hampshire, New Jersey, New Mexico (partial), New York, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Dakota, Texas, Vermont, Wisconsin, Wyoming (partial).

[2] https://www3.epa.gov/ttn/scram/reports/2028_Regional_Haze_Modeling-TSD.pdf

[3] https://www.epa.gov/air-emissions-modeling/2011-version-63-technical-support-document

[4] https://www.epa.gov/airmarkets/final-cross-state-air-pollution-rule-update

[5] https://www.epa.gov/airmarkets/notice-data-availability-preliminary-interstate-ozone-transport-modeling-data-2015-ozone

- Areas – District of Columbia, Gulf of Mexico (U.S.), Northeastern Mexico, Southern Canada (Manitoba province through New Brunswick), and International offshore areas off the Atlantic Ocean.

- States/Areas Outside of VISTAS_12 Domain:
  - States – Arizona, California, Colorado (partial), Idaho, Montana (partial), Nevada, New Mexico (partial), Oregon, Utah, Washington, and Wyoming.
  - Areas – Northwestern and Southern Mexico, Southwestern Canada (Alberta through Saskatchewan), and International offshore areas off the Pacific Ocean.

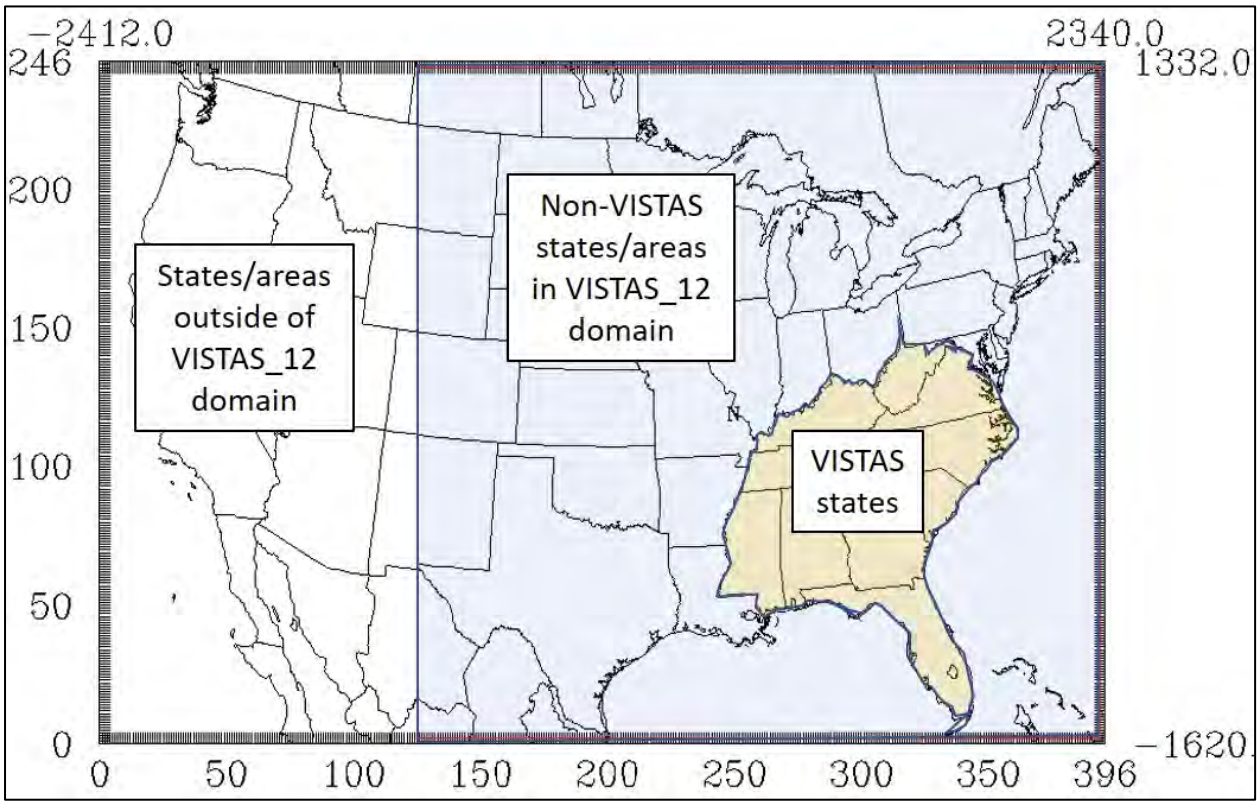

Figure 2-1. Geographic Areas for the VISTAS II Regional Haze Analysis Project

2.2 Pollutants of Interest

The pollutants of interest are the following criteria pollutants: carbon monoxide (CO); oxides of nitrogen (NO_x); particulate matter (PM) less than 10 microns (PM_{10}-PRI); PM less than 2.5 microns ($PM_{2.5}$-PRI); sulfur dioxide (SO_2); and volatile organic compounds (VOCs). Additionally, ammonia (NH_3) was also of interest as a precursor pollutant for PM.

2.3 Sectors and Years of Interest

For emissions modeling, all sectors were compiled for base year 2011 and projected year 2028. These include:

- Point Sources: Electric-generating units (EGU), non-EGU sources, railyards, and aircrafts activities (e.g., landing/takeoffs; ground-support equipment, and idling);
- Point-Fires: Fires data with emission release point locations;
- Nonpoint Sources: Nonpoint area sources, locomotives (outside the railyards), and commercial marine vessels (CMVs);
- Onroad Sources: Cars, trucks, buses, motorcycles, and Stage 2 refueling;
- Nonroad Sources: Off-road engines, such as for construction, lawn and garden, and recreational marine vessels; and
- Biogenics: Biogenic emissions from vegetation and soils using EPA's Biogenic Emissions Inventory System (BEIS) software.

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3. DATA SOURCES

The 2011 and 2028 emissions used for EPA's regional haze modeling are described in the documents:

- "Preparation of Emissions Inventories for the Version 6.3, 2011 Emissions Modeling Platform", August 2016[6]
- "Technical Support Document (TSD) Updates to Emissions Inventories for the Version 6.3, 2011 Emissions Modeling Platform for the Year 2028," October 2017[7] and
- "EPA Base Case v.5.16 for 2023 Ozone NAAQS Transport NODA Using IPM Incremental Documentation," December 2016.[8]

Appendix A-1 summarizes the 2011 "el" emissions inventory datasets (includes some "ek" files) retrieved from EPA's FTP site: ftp://ftp.epa.gov/EmisInventory/2011v6/v3platform/2011emissions/.

Appendix A-2 summarizes the 2028 "el" emissions inventory datasets retrieved from EPA's FTP site: ftp://ftp.epa.gov/EmisInventory/2011v6/v3platform/2028emissions/.

Additionally, ERG obtained the 2023 "el" emissions inventory datasets from EPA's FTP site: ftp://ftp.epa.gov/EmisInventory/2011v6/v3platform/2023emissions/.

Finally, ERG obtained from the Mid-Atlantic Regional Air Management Association (MARAMA) a 2028 emissions inventory for EGUs developed by the Eastern Regional Technical Advisory Committee (ERTAC). The emissions were generated by the ERTAC EGU projection tool[9] from the most recent CONUS 2.7 run.

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6 https://www.epa.gov/air-emissions-modeling/2011-version-63-technical-support-document

7 https://www.epa.gov/air-emissions-modeling/2011-version-63-platform

8 https://www.epa.gov/airmarkets/epa-base-case-v516-2015-ozone-naaqs-transport-noda-using-ipm-incremental-documentation

9 http://www.marama.org/2013-ertac-egu-forecasting-tool-documentation

March 2020 Emissions Update

As part of the emissions inventory update, states also reviewed version 16.0 of the ERTAC EGU emissions,[10] select facility updates from the AoI analysis and the PSAT modeling, and the projected 2028 emissions based on EPA's 2016 modeling platform.[11]

3.1 Data Processing

All 2011, 2023, and 2028 emissions data were uploaded into Microsoft SQL Server and Microsoft Access. The data were then extracted for the ten VISTAS states for the pollutants of interest. ERG reviewed the data fields for completeness. The datasets were then merged together to provide side-by-side analysis of emissions. ERG matched the emissions summaries published by EPA[12] to the extracted emissions for the ten VISTAS states.

3.2 2011 Base Year Emissions

The emissions data in the 2011 platform are primarily based on the 2011NEIv2 for point sources, nonpoint sources, CMVs, nonroad mobile sources, and fires. The onroad mobile source emissions are similar to those in the 2011NEIv2, but were generated using the released 2014a version of the Motor Vehicle Emissions Simulator (MOVES2014a). Fugitive dust emissions from anthropogenic sources (i.e., agricultural tilling and unpaved roads) are included in the nonpoint sector of the inventory, but wind-blown dust from natural sources is not accounted for in the inventory.

CAMx-ready emission inputs for 2011 were generated by EPA mainly by the SMOKE and BEIS emissions models. CAMx requires two emission input files for each day: (1) low level gridded emissions that are emitted directly into the first layer of the model from sources at the surface with little or no plume rise; and (2) elevated point sources (stacks) containing stack parameters from which the model can calculate plume rise.

EPA's 2011el emission platform in CAMx-ready format will be used without exception.

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[10] Point source emission from Version 16 of the 2028 ERTAC Projection Tool were provided to R. Oommen/ERG from D. McLeod/VDEQ on March 11, 2028.

[11] ftp://newftp.epa.gov/Air/emismod/2016/v1/2028emissions/2028fh_inventory_point_27sep2019.zip

[12] State-level pollutant emissions by SCC were retrieved from: ftp://newftp.epa.gov/air/emismod/2011/v3platform/reports/2011el_and_2023el/2011el_2011ek_2017ek_2023el_state_fullSCC_summary.xlsx

3.3 2028 Projection Year Emissions

Certain 2011 emission sectors were also projected by EPA to 2028 using various sector dependent methodologies. Onroad and nonroad mobile source emissions were created for 2028 using the MOVES and NONROAD models, respectively. Nonpoint area source emissions were prepared using growth and control factors simulating changes in economic conditions and environmental regulations anticipated to be fully implemented by calendar year 2028.

For projected year 2028 EGU point sources, states considered the EPA 2028el, the EPA 2023en, or 2028 emissions from the ERTAC EGU projection tool from the most recent CONUS 2.7 run. The EPA 2028el emissions inventory for EGUs considered the impacts of the Clean Power Plan (CPP), which was later vacated. Impacts of the CPP assumed that coal-fired EGUs would be shutdown and replaced by natural gas-fired EGUs. Thus, the EPA 2028el projected emissions for EGU emissions are not reflective of probable emissions for 2028. The ERTAC EGU emissions did not consider the impacts of the CPP.

For projected year 2028 non-EGU point sources, most states considered the EPA 2023en and EPA 2028el emissions, as well as providing their own emissions. For example, NC developed their own 2028 non-EGU point source emissions inventory by applying growth and control factors and facility closures to the data in EPA's 2016 modeling platform. Georgia used 2016 emissions (or 2014 emissions if 2016 was not available) to represent 2028 emissions for the 33 non-EGU facilities with over 100 tons per year (tpy) of SO_2 in 2011 (does not include Hartsfield-Jackson Atlanta International Airport).

As described earlier, state agencies also reviewed 2028 emissions projected from a 2016 base year from version 16.0 of the ERTAC EGU emissions, select facility updates from the AoI analysis, the PSAT modeling, and the projected 2028 emissions based on EPA's 2016 modeling platform.

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4. STATE EMISSIONS REVIEW[13]

ERG worked with SESARM on the final format of the comparison tables, including additional fields useful for review of the 2011, 2023, and 2028 emissions. For point sources, additional information included: facility information; source classification code (SCC) descriptions; Tier descriptions; unit, process, and release point descriptions; ORIS boiler identifiers; control information; and absolute and percentage differences between each selected pair of different vintage emissions inventories. The point sources were split between EGUs and non-EGUs. The "Point EGU" file included all EGU emission process records plus all non-EGU emission process records occurring at EGUs (e.g., commercial-sized boilers operating at the EGU). The "Point Non-EGU" file included industrial/commercial/institutional emission sources plus point source location emissions from aircrafts (e.g., landing/takeoffs) and railyards.

For all other sectors, county-level emissions summaries included SCC and Tier level descriptions to go along with absolute and percentage differences between each selected pair of emissions inventories.

4.1 Incorporation of Reviewer Comments

States were given three weeks to review the emissions summaries. After review of the emissions summary tables, states were asked to:

- Provide updated emissions, add new emission records, and to mark emission records for deletion;[14]

[13] Original and remodeled emissions for the non-SESARM states in the VISTAS domain are documented in the Task 3A and 3B Reports (September 2020).

[14] VA Department of Environmental Quality (VADEQ) noted via e-mail and attachments to ERG on 6/7/2018 that four sources in the 2011 NEI did not match their internal emissions inventory:
1) Meadwestvaco Covington (EIS Facility ID = 5798711): EPA's 2011 NEI facility summary spreadsheet shows 356.2 tons of SO_2 from this facility in 2011. Emissions reported to VA DEQ for 2011 are 7,850 tons of SO_2.
2) Chemical Lime Company (EIS Facility ID 4184511): The 2011 NEI data reflect values submitted by the facility (514.9 tons NO_X, 896.8 tons SO_2). The facility has since submitted updated emissions factors such that 2011 emissions for this facility are estimated to be 1,395 tons NO_X and 5,710 tons SO_2.
3) Old Virginia Brick Company (EIS Facility ID = 8517811): EPA's 2011 NEI facility data show 1,178 tons of NO_X emitted from this facility. Virginia's internal database shows 5.8 tons of NO_X in 2011 from this facility. The facility has since permanently shut down.
4) Celanese (EIS Facility ID = 4004311)/Duke Energy of Narrows (EIS Facility ID 10698711): VADEQ noted that SO_2 and NO_X emissions from the steam plant at Celanese Acetate (EIS Facility ID = 4004311) were not included in the EPA 2011 modeling inventory. These emissions are included in the 2011 NEI under EIS Facility ID = 10698711 since at that time the steam plant was under separate ownership and therefore was considered a separate, support facility. In 2012 ownership of the steam plant reverted to Celanese, and from 2012 on, emissions from the steam plant were included with Celanese's emissions. The 2011 modeling inventory for VA does not appear to account for 3,540 tons of NO_X and 6,540 tons of SO_2 from EIS facility # 10698711.

- Provide updated or new stack parameters; and
- Comment on whether updates to nonpoint, onroad, nonroad, and point-fires will be provided.

ERG worked with the states to review the emissions adjustments and ensure that the revised values are reasonable. All states provided at least one update to the EGU and non-EGU emissions inventory.

Table 4-1 presents a summary of action items provided by each VISTAS state in preparing the 2028 EGU emissions inventory prior to revising 2028 emissions to support re-modeling. An action item is generally applied to all pollutants for the emission process records provided for state review, unless otherwise noted.

Table 4-1. Summary of Point EGU Action Items for the Revised 2028 Projections Year (prior to March 2020 Emissions Update)

Action Item	AL	FL	GA	KY	MS	NC	SC	TN	VA	WV
EGU Retired for 2028; set EPA 2028 pollutant emissions to 0.	15	185	2	122	86	66	181	0	172	6
Do not use 2028 pollutant emission records; not likely to exist.	43	255	0	18	151	574	14	154	100	256
Use EPA 2011 emissions for all pollutants.	0	0	0	23	0	0	16	28	4	0
Use EPA 2023 emissions for all pollutants.	0	68	362	626	0	0	18	10	39	0
Use EPA 2023 emissions for all pollutants except NO_x. For NO_x, use state-provided emissions.	0	0	0	0	0	0	0	0	4	0
Use EPA 2028 emissions for all pollutants.	325	344	0	1	0	0	406	73	160	0
Use ERTAC 2028 emissions for all pollutants.	75	254	0	2	72	222	155	359	167	64
Use ERTAC 2028 emissions for all pollutants except NH_3. For NH_3, use state-provided emissions.	0	0	0	0	0	0	1	0	0	0
Use ERTAC 2028 emissions for all pollutants except PM_{10}-PRI and $PM_{2.5}$-PRI. For those, use state-provided emissions.	0	0	0	0	0	0	0	0	2	0
Use state-provided 2028 emissions for all pollutants	0	11	0	0	4	8	29	0	59	0
Totals	**458**	**1,117**	**364**	**792**	**313**	**870**	**820**	**624**	**707**	**326**

Table 4-2 presents a summary of action items provided by each VISTAS state in preparing the 2028 non-EGU emissions inventory prior to revising 2028 emissions to support re-modeling. An action item is generally applied to all pollutants for the emission process records provided for state review, unless otherwise noted.

March 2020 Emissions Update

For the re-modeling effort, states provided similar comments, as in Tables 4-1 and 4-2, including: deletion of process-specific emission records; inclusion of new facilities and units; adjustments to emissions; and, direction by states to replace emissions with updated emissions estimates, such as using ERTAC 16.0 emissions to replace ERTAC 2.7 emissions. These are presented in Tables 4-3 and 4-4.

Table 4-2. Summary of Point Non-EGU Action Items for the Revised 2028 Projections Year (prior to March 2020 Emissions Update)

Action Item	AL	FL	GA	KY	MS	NC	SC	TN	VA	WV
Adjust state-provided facility-level 2028 emissions for all pollutants to the process-level using process-level emission proportions from EPA 2023.	0	0	950	0	0	0	0	0	0	0
Do not use 2028 pollutant emission records; not likely to exist.	104	244	0	16	437	4,816	132	57	0	404
Unit Retired for 2028; set EPA 2028 pollutant emissions to 0.	75	21	0	1,212	0	0	316	6	54	149
Use EPA 2011 emissions for all pollutants.	0	0	0	979	0	0	30	1	22	0
Use EPA 2014 NEI data for all pollutants.	0	0	0	0	0	0	0	165	0	0
Use EPA 2023 emissions for all pollutants.	0	0	5,784	31,171	0	0	0	0	1	0
Use EPA 2023 emissions for all pollutants except NO_x. For NO_x, use state-provided emissions.	0	0	0	0	0	0	0	0	3	0
Use EPA 2028 emissions for all pollutants.	6,575	7,464	0	21	5,565	0	8,379	6,818	4,314	3,999
Use EPA 2028 emissions for all pollutants except CO. For CO, use state-provided emissions.	0	0	0	0	0	0	0	0	0	1
Use EPA 2028 emissions for all pollutants except CO, NO_x, and SO_2. For the pollutants, use state-provided emissions.	0	0	0	0	0	0	0	0	0	1
Use EPA 2028 emissions for all pollutants except CO, NO_x, and VOC. For the pollutants, use state-provided emissions.	0	0	0	0	0	0	0	0	0	7
Use EPA 2028 emissions for all pollutants except NO_x. For NO_x, use state-provided emissions.	0	0	0	0	0	0	0	1	0	27

Table 4-2. Summary of Point Non-EGU Action Items for the Revised 2028 Projections Year (prior to March 2020 Emissions Update)

Action Item	AL	FL	GA	KY	MS	NC	SC	TN	VA	WV
Use EPA 2028 emissions for all pollutants except NO_x, NH_3, and VOC. For these pollutants, use state-provided emissions.	0	0	0	0	0	0	0	0	0	1
Use EPA 2028 emissions for all pollutants except SO_2. For SO_2, use state-provided emissions.	0	0	0	0	0	0	0	0	0	1
Use EPA 2028 emissions for all pollutants except VOC. For VOC, use state-provided emissions.	0	0	0	0	0	0	0	0	0	1
Use state-provided 2028 emissions for all pollutants.	0	0	0	0	0	16,914	0	0	0	1
Use state-provided 2028 emissions for all pollutants except NH_3. For NH_3, use EPA 2028.	0	0	2	0	2	0	214	181	15	93
Use state-provided 2028 emissions for all pollutants except NH_3, PM_{10}-PRI and $PM_{2.5}$-PRI. For these pollutants, use EPA 2028.	0	0	0	0	0	0	0	0	0	3
Use state-provided 2028 emissions for all pollutants except PM_{10}-PRI and $PM_{2.5}$-PRI. For these pollutants, use EPA 2028.	0	0	0	0	0	0	0	0	0	1
Use state-provided 2028 emissions for all pollutants except SO_2. For SO_2, use EPA 2028.	0	0	0	0	0	0	0	0	0	1
Use state-provided 2028 emissions for all pollutants except VOC. For VOC, use EPA 2028.	0	0	0	0	0	0	0	0	0	1
Totals	**6,754**	**7,729**	**6,736**	**33,399**	**6,004**	**21,730**	**9,071**	**7,229**	**4,409**	**4,691**

Table 4-3. Summary of Point EGU Action Items for the Revised 2028 Projections Year (March 2020 Emissions Update)

Action Item	AL	FL	GA	KY	MS	NC	SC	TN	VA	WV
Update v3 emissions based on Area of Influence Analysis	63	0	89	203	0	0	0	28	0	0
Update v3 emissions based on EPA 2028 emissions from the 2016 Platform	0	21	0	7	0	0	0	0	0	123
Update v3 emissions based on ERTAC Version 16.0 update	0	112	0	100	14	4,388	14	0	920	353
Update v3 emissions based on PSAT review	8	99	0	28	0	54	0	595	0	119
Update v3 emissions based on state updates	20	0	0	47	21	0	14	0	0	66
Stack parameters for new emission unit.	1	0	0	0	0	0	0	0	0	0
Totals	**92**	**232**	**89**	**385**	**35**	**4,442**	**28**	**623**	**920**	**661**

Table 4-4. Summary of Point Non-EGU Action Items for the Revised 2028 Projections Year (March 2020 Emissions Update)

Action Item	AL	FL	GA	KY	MS	NC	SC	TN	VA	WV
Update v3 emissions based on Area of Influence Analysis	0	0	0	0	18	0	0	0	0	0
Update v3 emissions based on EPA 2028 emissions from the 2016 Platform	0	16	0	0	0	0	0	0	0	48
Update v3 emissions based on PSAT review	221	148	0	19	0	0	0	47	0	0
Update v3 emissions based on state updates	227	0	0	0	0	50	188	0	0	173
Stack parameters for new emission unit.	2	0	0	0	22	2	0	0	0	0
Locational coordinates for new emission unit.	0	0	0	0	22	2	0	0	0	0
Totals	**450**	**164**	**0**	**19**	**18**	**50**	**188**	**47**	**0**	**221**

Once updates were made, ERG provided revised files for states to approve. Where updates to emissions and/or stack parameters were made, ERG documented these changes in the

final Excel worksheets. In some situations, ERG was directed by the state agency to make additional updates not provided in the Excel worksheets.[15,16]

The following states provided stack parameter information on new and modified sources:

- GA Department of Natural Resources (GA DNR): One facility
  - GA Power Company - Plant Scherer (Facility ID = 8354711) – thirteen emission release points.
- NC Department of Environmental Quality (NC DEQ): Eight facilities
  - Asheville EGU (Facility ID = NEW_2706) – two emission release points;
  - Cleveland County Generation (Facility ID = 16600211) – four emission release points;
  - Duke Energy Carolinas, LLC - Buck Steam Station (Facility ID = 8506911) – one emission release point;
  - Duke Energy Carolinas, LLC - Cliffside Steam Station (Facility ID = 8300611) – one emission release point;
  - Duke Energy Carolinas, LLC - Dan River Combined Cycle Facility (Facility ID = 8009611) – one emission release point;
  - Duke Energy Progress - H.F. Lee Steam Electric Plant (Facility ID = 7265811) – one emission release point;
  - Duke Energy Progress, L.V. Sutton Electric Plant (Facility ID = 8547211) – two emission release points; and
  - NCEMC - Hamlet Plant (Facility ID = 10631811) – two emission release points.
- TN Department of Environment and Conservation (TDEC): Four facilities
  - Eastman Chemical Company (Facility ID = 3982311) – one emission release point;
  - Holston Army Ammunition Plant (HSAAP) (Facility ID = 5018911) – four emission release points;
  - Tate & Lyle, Loudon (Facility ID = 4129211) – two emission release points; and
  - TVA Gallatin Fossil Plant (Facility ID = 5610411) – two emission release points.

4.2 QA/QC of Stack Parameters

For the final 2028 EGU and non-EGU emissions, stack parameters were checked for completeness of six data fields: 1) stack height; 2) stack diameter; 3) exit gas temperature; 4) exit

[15] In an e-mail dated June 12, 2018, the Tennessee Department of Environment and Conservation (TDEC) directed ERG to use the 2014 NEI Version 2 emissions data for Bowater (EIS Facility ID = 6444111) for 2028 projected emissions. These emissions were not in the 2011el or 2028el emission inventories.

[16] In an e-mail dated June 13, 2018, the Georgia Department of Natural Resources (GA DNR) provided facility-level emissions updates for the 2028 projected emissions. GA DNR directed ERG to scale the 2028 facility-level emissions in proportion to EPA's 2023en process-level emissions.

gas velocity; 5) exit gas flowrate; and 6) emission release type. EPA's Emission Inventory System (EIS) does allow for two of the following three parameters to be updated: stack diameter, exit gas velocity, and exit gas flowrate. As such, if two of the three parameters are populated, then the third can be calculated. If stack height and/or exit gas temperature were missing, then ERG used defaults by SCC to gap-fill. These stack parameter defaults were generated for EPA's Risk and Technology Review (RTR) program. If emission release point type was not populated, then the SCC and/or associated stack parameters (e.g., exit gas velocity) were reviewed to determine if the process emits through a stack or is fugitive. If all six stack parameter fields were missing, then ERG populated missing stack parameters with the RTR stack parameter defaults by SCC.

The following facilities had stack parameters not populated, and were thus populated with SCC defaults:

- GA: One facility
  - Albany Green Energy (Facility ID = ORIS60340) – one emission release point.
- KY: One facility
  - PJM_West_KY_Combustion Turbine (Facility ID = ORIS84024) – one emission release point.
- NC: One facility
  - Cleveland County Generation (Facility ID = 16600211) – four emission release points.
- SC: Six facilities[17]
  - Dominion Carolina Gas Trans, LLC Moore (Facility ID = 2060-0528) – eleven emission release points;
  - Georgia Pacific Wood Products (Facility ID = 16860811) – twenty-four emission release points;
  - Michelin North America Inc. US10 (Facility ID = 16862511) – four emission release points;
  - S_VACA_SC_O/G Steam (Facility ID = ORIS84032) – one emission release point;
  - Sumter Heat and Power LLC (Facility ID = 17630111) – one emission release point; and

[17] SC DHEC notes that stack parameter data were available for these facilities, but due to time constraints, the information was not obtained by ERG.

  - Union Renewable Energy (Facility ID = 17630411) – two emission release points.

- VA: Nine facilities
  - AOL (Facility ID = ORIS83003) – one emission release point;
  - AOL (Facility ID = ORIS83004) – one emission release point;
  - AOL (Facility ID = ORIS83006) – one emission release point;
  - Bristol Plant (Facility ID = ORIS60222) – twelve emission release points;
  - DuPont Fabros (Facility ID = ORIS83007) – one emission release point;
  - MCI (Facility ID = ORIS83005) – one emission release point;
  - Micron Technology Incorporated (Facility ID = ORIS59614) – one emission release point;
  - Monterey Diesel Generation Facility (Facility ID = ORIS83002) – ten emission release points; and
  - Quest Diagnostics (Facility ID = ORIS83001) – one emission release point.

- WV: Four facilities
  - Marathon Petroleum Butane Cavern (Facility ID = 16886511) – one emission release point;
  - Marathon Petroleum Neal Propane Cavern (Facility ID = 16886611) – one emission release point;
  - Williams Ohio Valley Midstream Fort Beeler Station (Facility ID = 16886211) – seven emission release points; and
  - Williams Ohio Valley Midstream Moundsville (Facility ID = 16886311) – two emission release points.

4.3 QA/QC of Emissions

For the nonpoint, onroad, nonroad, and point-fires categories, no state agencies provided formal updates.[18] For the point EGU and point non-EGU source categories, emission estimates for 2028 were prepare in Flat File 2010 (FF10) format. ERG compared emission estimates to ensure that all data were accounted for:

- Emissions from the revised spreadsheets for point EGU and point non-EGU matched the master ERG database;
- Emissions from the master ERG database matched the FF10 files for point EGU and point non-EGU sources.

[18] SC DHEC noted in an e-mail to ERG on 6/11/2018 that new cement manufacturing emissions in the EPA 2028el nonpoint inventory were inserted for Dorchester County, SC. SC DHEC does not believe that this new facility/process will exist in 2028. The NO_x emissions for 2028 are 1,139 tpy and the SO_2 emissions for 2028 are 527 tpy. However, SC DHEC agreed to retain the new cement emissions for modeling purposes.

Additionally, all key data fields necessary for emissions modeling were populated for completeness.

4.4 March 2020 Emissions Update

In March 2020, SESARM, its member states, and surrounding states in the VISTAS domain reviewed updated 2028 emissions for select point sources. Table 4-5 provides a summary of emission changes by SESARM state.

Table 4-5. SESARM Point Source Adjustments for the Remodel

State	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Alabama	-4,967	-77	-9,565	-2,525	-1,805	-28,644	-708
Florida	-2,504	-243	2,004	810	866	-10,519	67
Georgia	-157	-2	-1,312	-82	-74	-900	-16
Kentucky	-56	-7	-4,109	1,062	952	-9,503	-169
Mississippi	18	-266	-5,761	41	-2	-12,374	-8
North Carolina	-3,827	695	-6,899	-498	-337	-10,885	172
South Carolina	58	8	120	<-1	11	<1	-178
Tennessee	-938	-5	-2,925	-1,284	-989	-2,390	-108
Virginia	1,037	2,016	-1,538	1,033	3	-1,288	-502
West Virginia	-4,267	-20	3,147	-4,237	-3,711	-9,688	-540
Totals	**-15,604**	**2,098**	**-26,839**	**-5,681**	**-5,088**	**-86,192**	**-1,991**

Table 4-6 provides a summary of emission changes by Data Source/Reason.

Table 4-6. SESARM Point Source Adjustments by Data Source/Reason

Data Source	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
AoI Analysis	-330	-267	-7,458	-1,251	-758	-15,793	-25
EPA 2016 Platform	572	-15	725	1,481	1,216	-264	71
ERTAC 16.0	-2,331	2,612	-7,211	1,388	219	-9,088	-259
PSAT inquiry	-12,105	-175	-8,055	-5,913	-4,636	-67,432	-549
State Update	-1,410	-58	-4,841	-1,386	-1,128	6,386	-1,228
Totals	**-15,604**	**2,098**	**-26,839**	**-5,681**	**-5,088**	**-86,192**	**-1,991**

Appendix B presents point source-specific emissions updates for 2028 and the source for the updated emissions. Additionally, stack parameter updates for new sources were provided for Mississippi Silicon (EIS Facility ID = 17942211) and new units for Ascend Performance Materials (assigned as EIS Unit ID = 83267013b for EIS Facility ID = 985511), Georgia Pacific

(assigned as EIS Unit ID = 83317013b for EIS Facility ID = 7442111), and National Cement of Alabama (assigned as EIS Unit ID = 103297113b for EIS Facility ID = 949611).

4.5 Point EGU and Non-EGU Emissions Comparison by State[19]

Table 4-7 summarizes the revised 2028 point EGU and non-EGU emissions for Alabama.

Table 4-7. Alabama 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Revised 2028 EGU Emissions (tpy)	EPA 2028el EGU Emissions (tpy)	% Diff for EGU	Revised 2028 Non-EGU Emissions (tpy)	EPA 2028el Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	10,747	27,988	-61.6%	61,719	63,285	-2.5%
NH_3	685	2,007	-65.8%	1,622	1,399	16.0%
NO_x	20,008	23,699	-15.6%	50,817	53,438	-4.9%
PM_{10}-PRI	2,742	6,495	-57.8%	17,065	18,336	-6.9%
$PM_{2.5}$-PRI	2,063	4,999	-58.7%	14,057	15,104	-6.9%
SO_2	8,366	28,892	-71.0%	50,691	72,276	-29.9%
VOC	1,787	2,422	-26.2%	23,747	23,958	-0.9%

Table 4-8 summarizes the revised 2028 point EGU and non-EGU emissions for Florida.

Table 4-8. Florida 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Revised 2028 EGU Emissions (tpy)	EPA 2028el EGU Emissions (tpy)	% Diff for EGU	Revised 2028 Non-EGU Emissions (tpy)	EPA 2028el Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	18,224	65,259	-72.1%	106,181	94,837	12.0%
NH_3	3,150	4,129	-23.7%	1,303	2,440	-46.6%
NO_x	25,050	44,775	-44.1%	44,960	38,233	17.6%
PM_{10}-PRI	10,303	10,231	0.7%	13,869	12,585	10.2%
$PM_{2.5}$-PRI	9,145	7,917	15.5%	12,001	10,777	11.4%
SO_2	24,005	54,015	-55.6%	28,978	35,648	-18.7%
VOC	1,298	2,811	-53.8%	26,711	25,669	4.1%

[19] The revised 2028 emissions and differences presented in Tables 4-5 through 4-14, Figures 4-1 through 4-14, and Appendix C are reflective of the emissions update finalized on 3/31/2020 that was used for the elv5 modeling. It is important to note that several EGU facilities that were in the May 2018 version of the 2028 SESARM emissions inventory (elv3) were reclassified as non-EGUs in the March 2020 version of the 2028 SESARM emissions inventory (elv5) based on updated emissions inventory information from EPA. As such, emissions and differences presented in these tables would also capture emissions changes due to these reclassifications, even if a state did not provide updated emission changes for elv5. This was observed for both Georgia and Virginia, who did not provide elv5 non-EGU sector emissions updates, yet the emissions and differences did not match the values for non-EGU presented in the Task 2A Report due to reclassifications.

Table 4-9 summarizes the revised 2028 point EGU and non-EGU emissions for Georgia.

Table 4-9. Georgia 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Revised 2028 EGU Emissions (tpy)	EPA 2028el EGU Emissions (tpy)	% Diff for EGU	Revised 2028 Non-EGU Emissions (tpy)	EPA 2028el Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	9,751	25,058	-61.1%	57,324	67,860	-15.5%
NH_3	1,176	1,508	-22.0%	5,595	5,678	-1.5%
NO_x	24,588	13,163	86.8%	41,298	45,540	-9.3%
PM_{10}-PRI	5,140	3,876	32.6%	12,387	15,695	-21.1%
$PM_{2.5}$-PRI	4,263	3,374	26.4%	9,655	12,502	-22.8%
SO_2	17,574	27,533	-36.2%	18,593	23,519	-20.9%
VOC	1,042	885	17.7%	24,528	27,198	-9.8%

Table 4-10 summarizes the revised 2028 point EGU and non-EGU emissions for Kentucky.

Table 4-10. Kentucky 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Revised 2028 EGU Emissions (tpy)	EPA 2028el EGU Emissions (tpy)	% Diff for EGU	Revised 2028 Non-EGU Emissions (tpy)	EPA 2028el Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	11,462	24,801	-53.8%	86,053	86,082	-0.03%
NH_3	669	705	-5.1%	454	508	-10.5%
NO_x	32,696	43,411	-24.7%	29,435	31,048	-5.2%
PM_{10}-PRI	9,326	12,180	-23.4%	15,931	16,253	-2.0%
$PM_{2.5}$-PRI	7,402	9,409	-21.3%	10,483	10,619	-1.3%
SO_2	49,586	81,304	-39.0%	16,051	19,083	-15.9%
VOC	887	1,212	-26.8%	43,588	46,814	-6.9%

Table 4-11 summarizes the revised 2028 point EGU and non-EGU emissions for Mississippi.

Table 4-11. Mississippi 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Revised 2028 EGU Emissions (tpy)	EPA 2028el EGU Emissions (tpy)	% Diff for EGU	Revised 2028 Non-EGU Emissions (tpy)	EPA 2028el Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	4,153	18,160	-77.1%	37,591	34,061	10.4%
NH_3	579	1,288	-55.0%	1,693	1,784	-5.1%
NO_x	12,209	11,210	8.9%	34,645	32,503	6.6%
PM_{10}-PRI	1,456	1,923	-24.3%	9,236	9,184	0.6%
$PM_{2.5}$-PRI	1,119	1,777	-37.0%	7,809	7,765	0.6%
SO_2	3,236	6,253	-48.2%	5,169	19,255	-73.2%
VOC	413	2,183	-81.1%	27,155	25,389	7.0%

Table 4-12 summarizes the revised 2028 point EGU and non-EGU emissions for North Carolina.

Table 4-12. North Carolina 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Revised 2028 EGU Emissions (tpy)	EPA 2028el EGU Emissions (tpy)	% Diff for EGU	Revised 2028 Non-EGU Emissions (tpy)	EPA 2028el Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	8,239	22,086	-62.7%	46,329	33,823	37.0%
NH_3	806	1,284	-37.2%	1,348	1,271	6.0%
NO_x	20,978	18,528	13.2%	37,956	30,418	24.8%
PM_{10}-PRI	3,644	3,203	13.8%	12,602	8,590	46.7%
$PM_{2.5}$-PRI	3,244	2,763	17.4%	8,653	5,866	47.5%
SO_2	9,571	11,548	-17.1%	14,776	21,407	-31.0%
VOC	812	1,075	-24.4%	47,061	29,129	61.6%

Table 4-13 summarizes the revised 2028 point EGU and non-EGU emissions for South Carolina.

Table 4-13. South Carolina 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Revised 2028 EGU Emissions (tpy)	EPA 2028el EGU Emissions (tpy)	% Diff for EGU	Revised 2028 Non-EGU Emissions (tpy)	EPA 2028el Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	12,711	11,181	13.7%	91,019	89,363	1.9%
NH_3	863	657	31.3%	1,762	1,657	6.3%
NO_x	10,707	12,303	-13.0%	25,463	22,613	12.6%
PM_{10}-PRI	3,432	6,611	-48.1%	6,495	6,322	2.7%
$PM_{2.5}$-PRI	2,730	4,159	-34.4%	4,670	4,530	3.1%
SO_2	10,695	18,231	-41.3%	18,906	17,885	5.7%
VOC	476	1,847	-74.2%	21,974	22,387	-1.8%

Table 4-14 summarizes the revised 2028 point EGU and non-EGU emissions for Tennessee.

Table 4-14. Tennessee 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Revised 2028 EGU Emissions (tpy)	EPA 2028el EGU Emissions (tpy)	% Diff for EGU	Revised 2028 Non-EGU Emissions (tpy)	EPA 2028el Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	3,614	5,837	-38.1%	48,801	45,967	6.2%
NH_3	174	419	-58.4%	1,001	1,019	-1.7%
NO_x	7,814	10,025	-22.1%	35,140	36,007	-2.4%
PM_{10}-PRI	2,629	5,608	-53.1%	11,020	10,755	2.5%
$PM_{2.5}$-PRI	2,430	3,919	-38.0%	8,150	7,892	3.3%
SO_2	10,030	28,429	-64.7%	11,027	8,781	25.6%
VOC	541	416	30.0%	33,224	33,717	-1.5%

Table 4-15 summarizes the revised 2028 point EGU and non-EGU emissions for Virginia.

Table 4-15. Virginia 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Revised 2028 EGU Emissions (tpy)	EPA 2028el EGU Emissions (tpy)	% Diff for EGU	Revised 2028 Non-EGU Emissions (tpy)	EPA 2028el Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	5,811	31,807	-81.7%	35,075	32,019	9.5%
NH_3	2,365	1,379	71.5%	1,490	1,400	6.5%
NO_x	10,436	10,207	2.2%	31,236	31,321	-0.3%
PM_{10}-PRI	3,942	853	362.0%	5,834	5,849	-0.2%
$PM_{2.5}$-PRI	1,509	747	101.9%	4,633	4,607	0.6%
SO_2	1,976	2,335	-15.4%	16,575	16,967	-2.3%
VOC	455	650	-30.0%	17,457	17,498	-0.2%

Table 4-16 summarizes the revised 2028 point EGU and non-EGU emissions for West Virginia.

Table 4-16. West Virginia 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Revised 2028 EGU Emissions (tpy)	EPA 2028el EGU Emissions (tpy)	% Diff for EGU	Revised 2028 Non-EGU Emissions (tpy)	EPA 2028el Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	8,661	11,894	-27.2%	33,439	33,581	-0.4%
NH_3	50	840	-94.1%	187	215	-12.8%
NO_x	49,874	27,315	82.6%	18,327	22,530	-18.7%
PM_{10}-PRI	6,877	11,311	-39.2%	3,600	4,292	-16.1%
$PM_{2.5}$-PRI	5,480	7,604	-27.9%	2,599	2,963	-12.3%
SO_2	47,744	46,075	3.6%	5,971	15,151	-60.6%
VOC	1,162	779	49.2%	6,994	8,046	-13.1%

Figures 4-1 through 4-7 present pollutant emission bubble maps highlighting emission changes for the point EGU sector from the EPA 2028el inventory to the revised VISTAS 2028 inventory.[20] Similarly, Figures 4-8 through 4-14 present pollutant emission bubble maps highlighting emission changes for the point non-EGU sector from the EPA 2028el inventory to the revised VISTAS 2028 inventory.[19] Appendix C presents these maps at the state-pollutant level. Decreasing emissions are presented in shades of blue (i.e., where the EPA2028el emissions were higher than the revised VISTAS 2028 emissions), while increasing emissions are presented in shades of red (i.e., where the EPA2028el emissions were lower than the revised VISTAS 2028 emissions).

[20] The revised 2028 emissions and differences presented in Tables 4-5 through 4-14, Figures 4-1 through 4-14, and Appendix C are reflective of the emissions update finalized on 3/31/2020 that was used for the elv5 modeling. It is important to note that several EGU facilities that were in the May 2018 version of the 2028 SESARM emissions inventory (elv3) were reclassified as non-EGUs in the March 2020 version of the 2028 SESARM emissions inventory (elv5) based on updated emissions inventory information from EPA. As such, emissions and differences presented in these tables would also capture emissions changes due to these reclassifications, even if a state did not provide updated emission changes for elv5. This was observed for both Georgia and Virginia, who did not provide elv5 non-EGU sector emissions updates, yet the emissions and differences did not match the values for non-EGU presented in the Task 2A Report due to reclassifications.

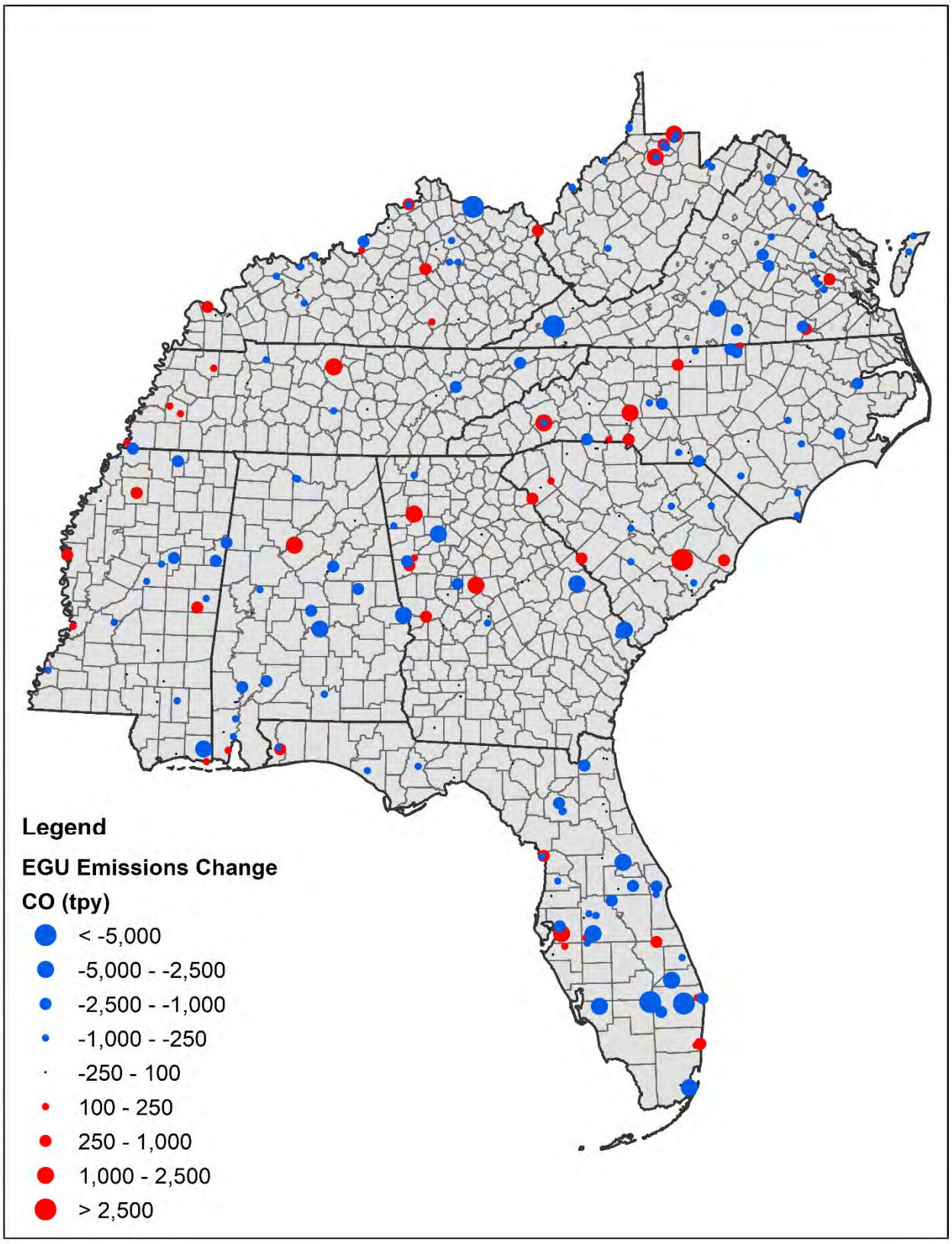

Figure 4-1. Point EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

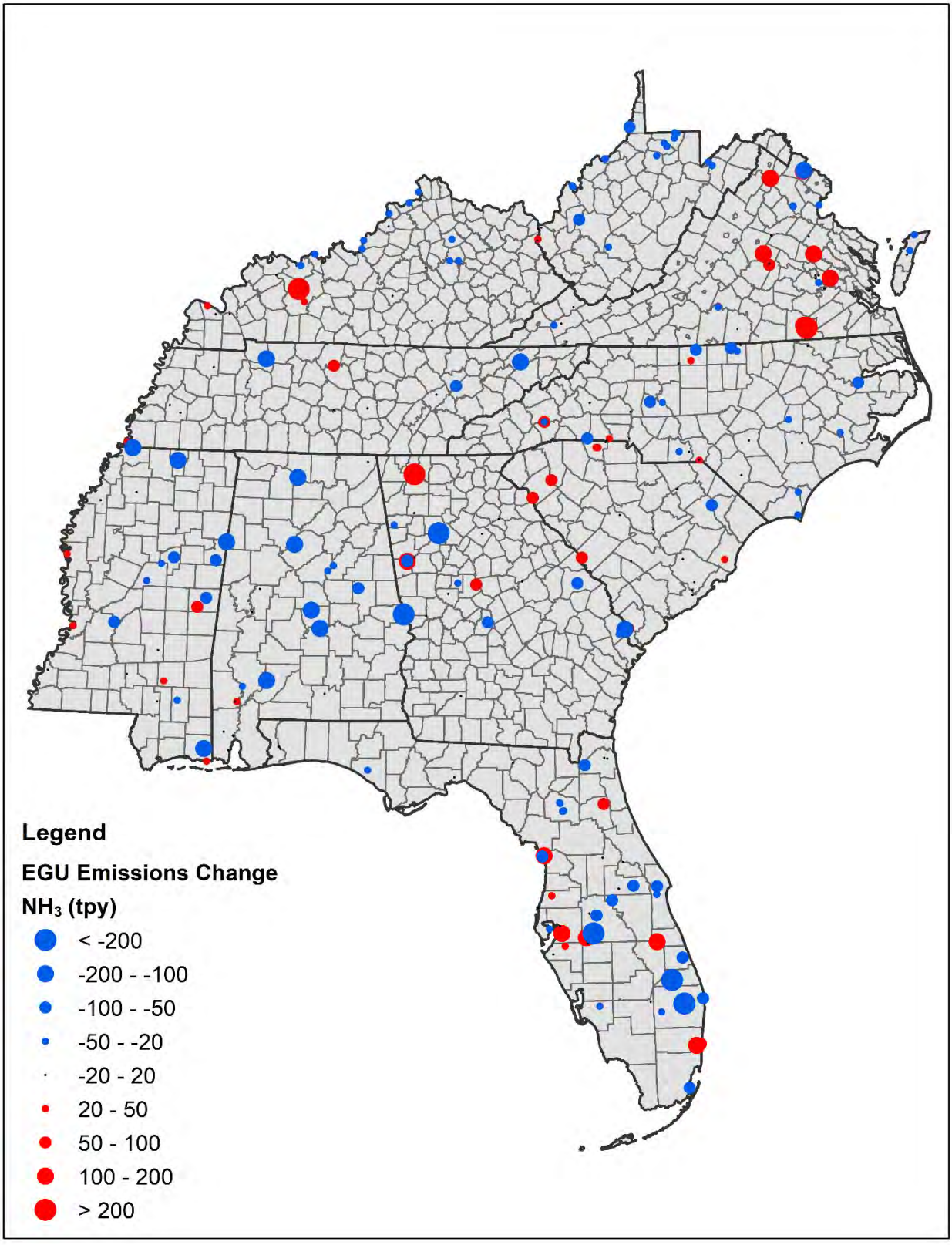

Figure 4-2. Point EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

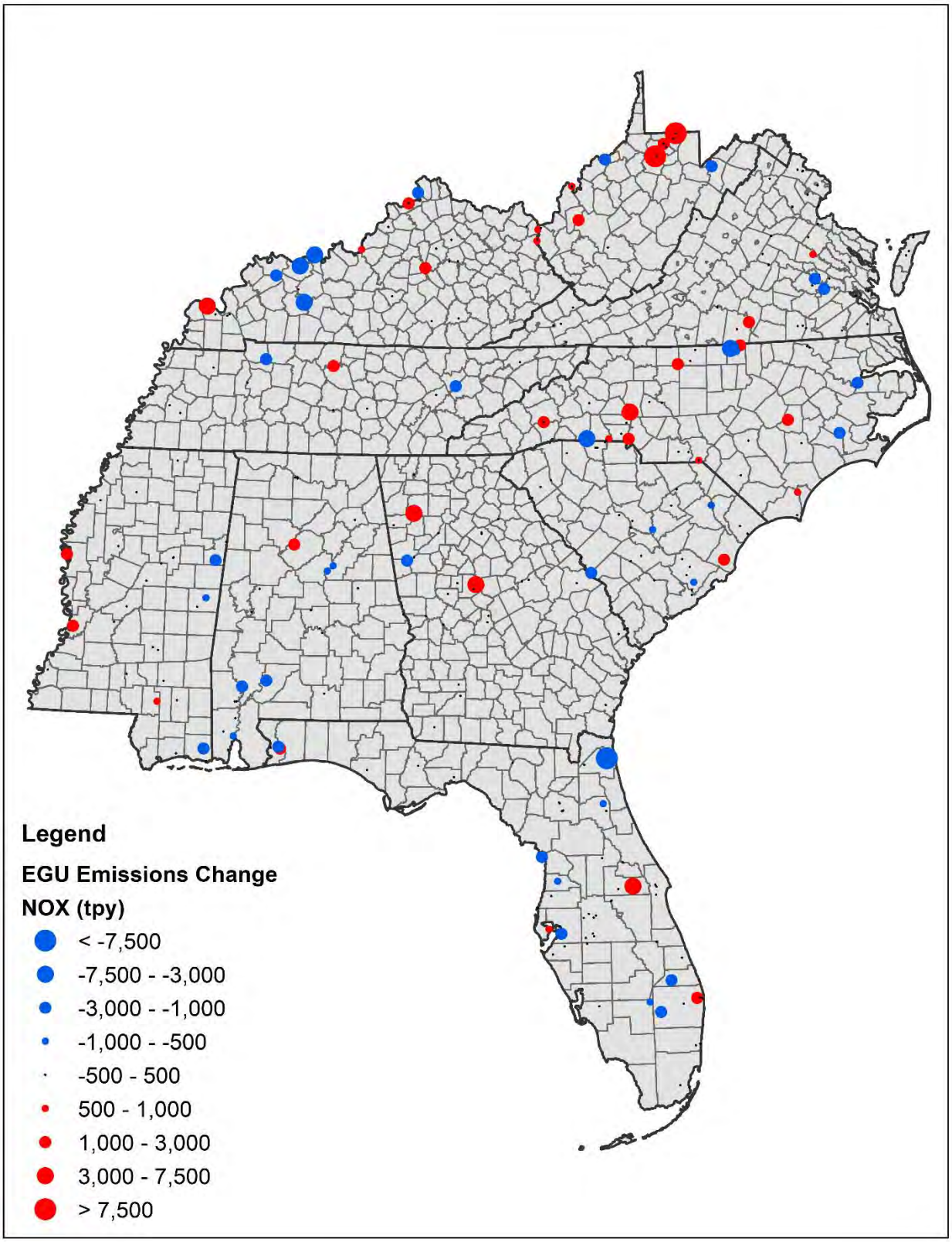

Figure 4-3. Point EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

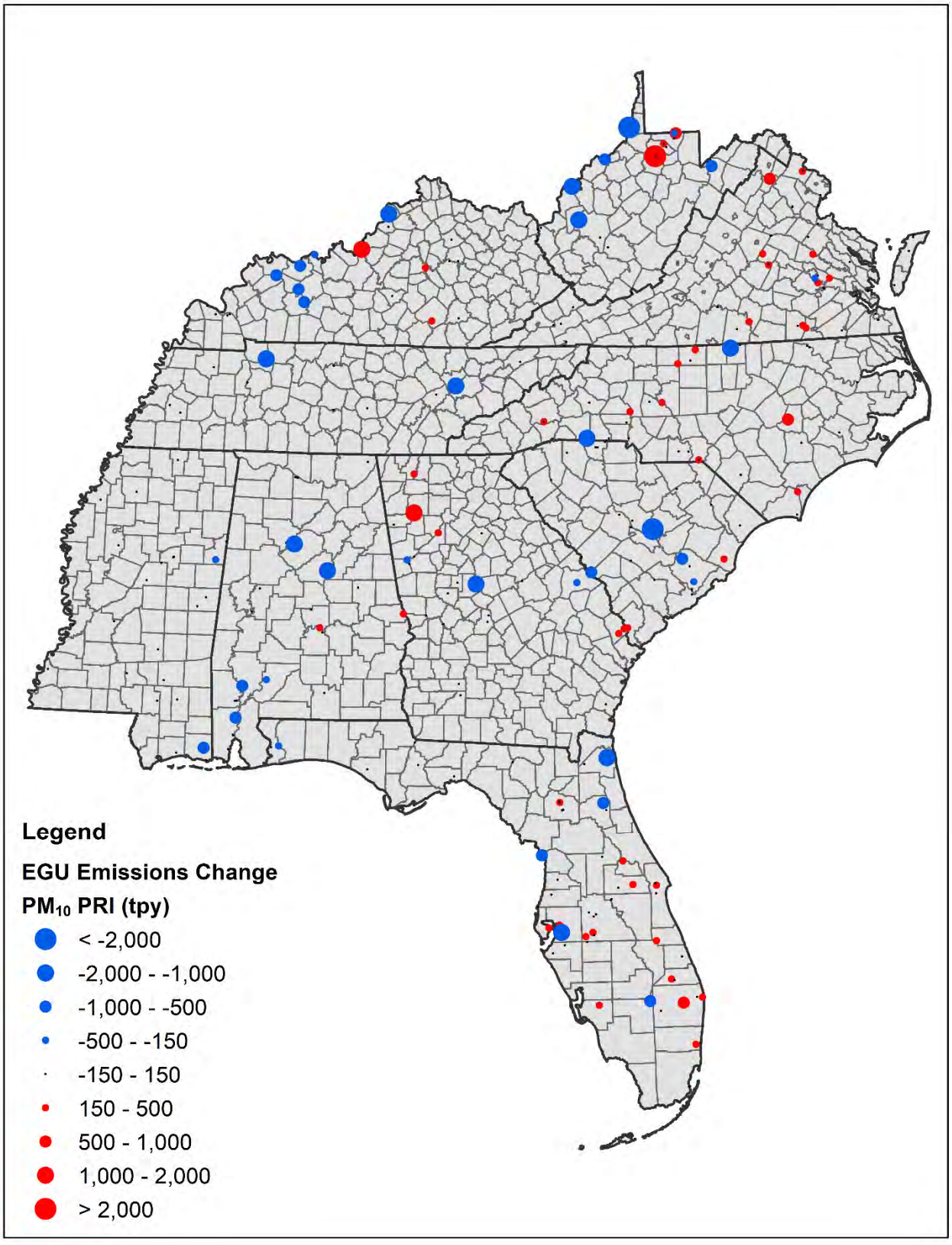

Figure 4-4. Point EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

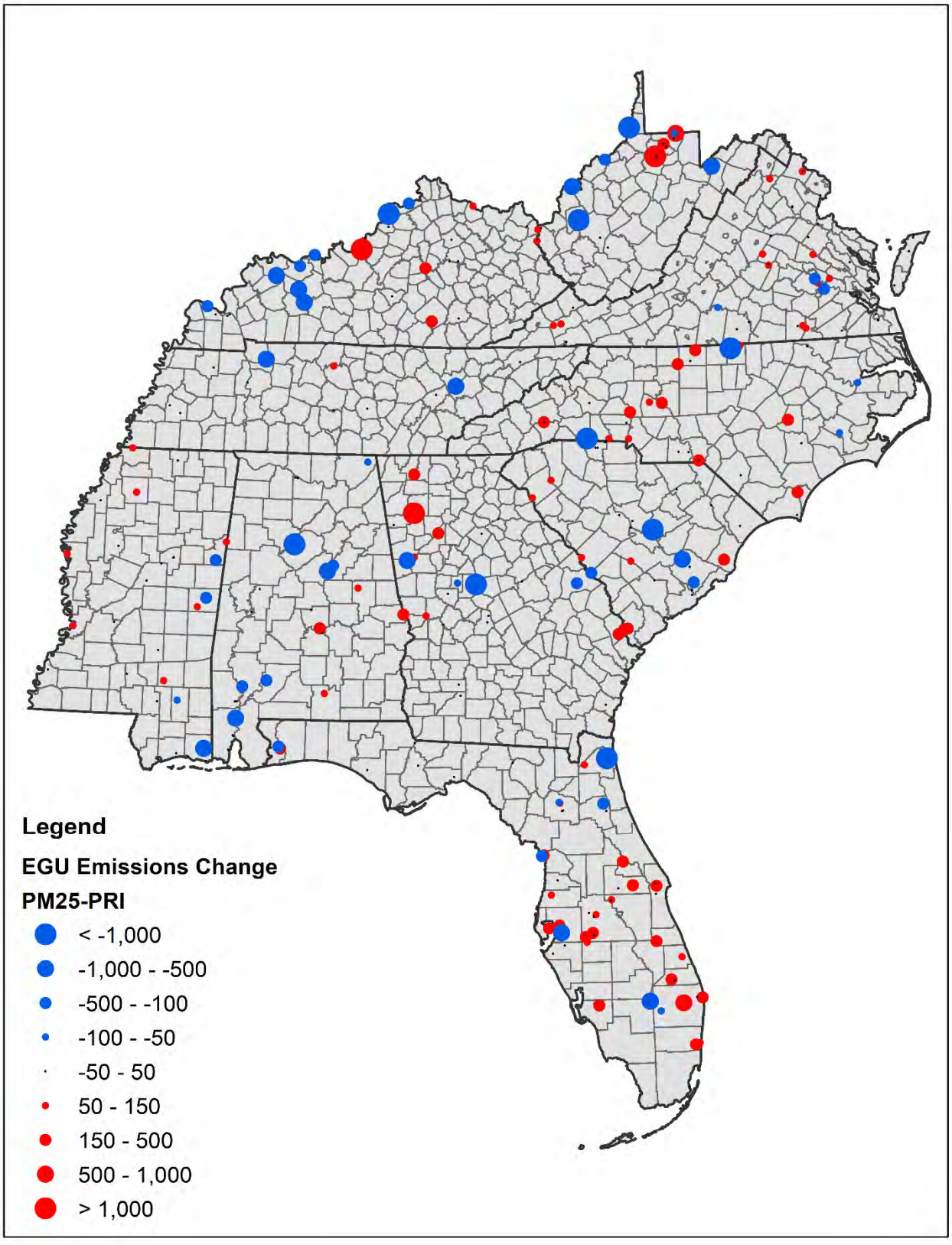

Figure 4-5. Point EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

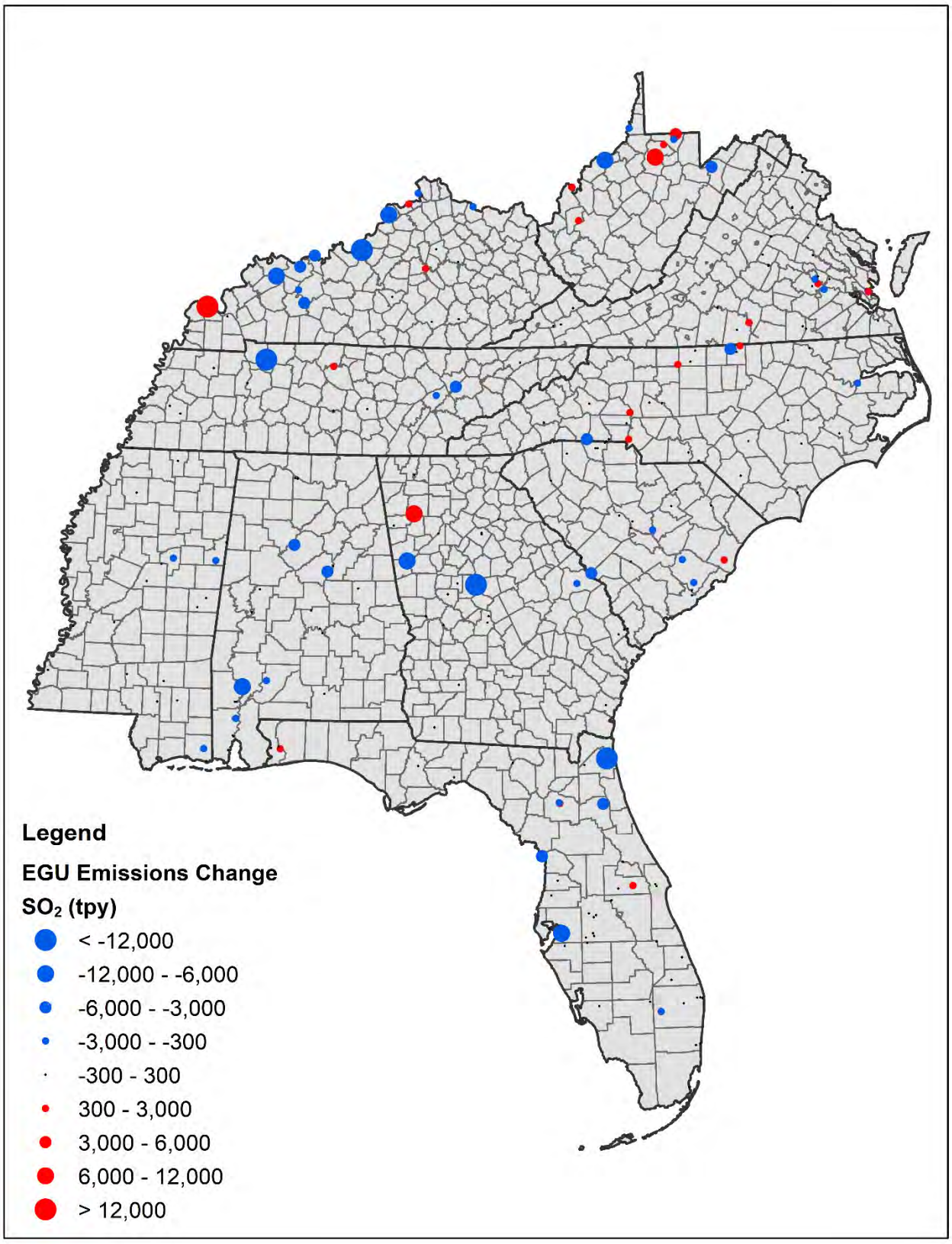

Figure 4-6. Point EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

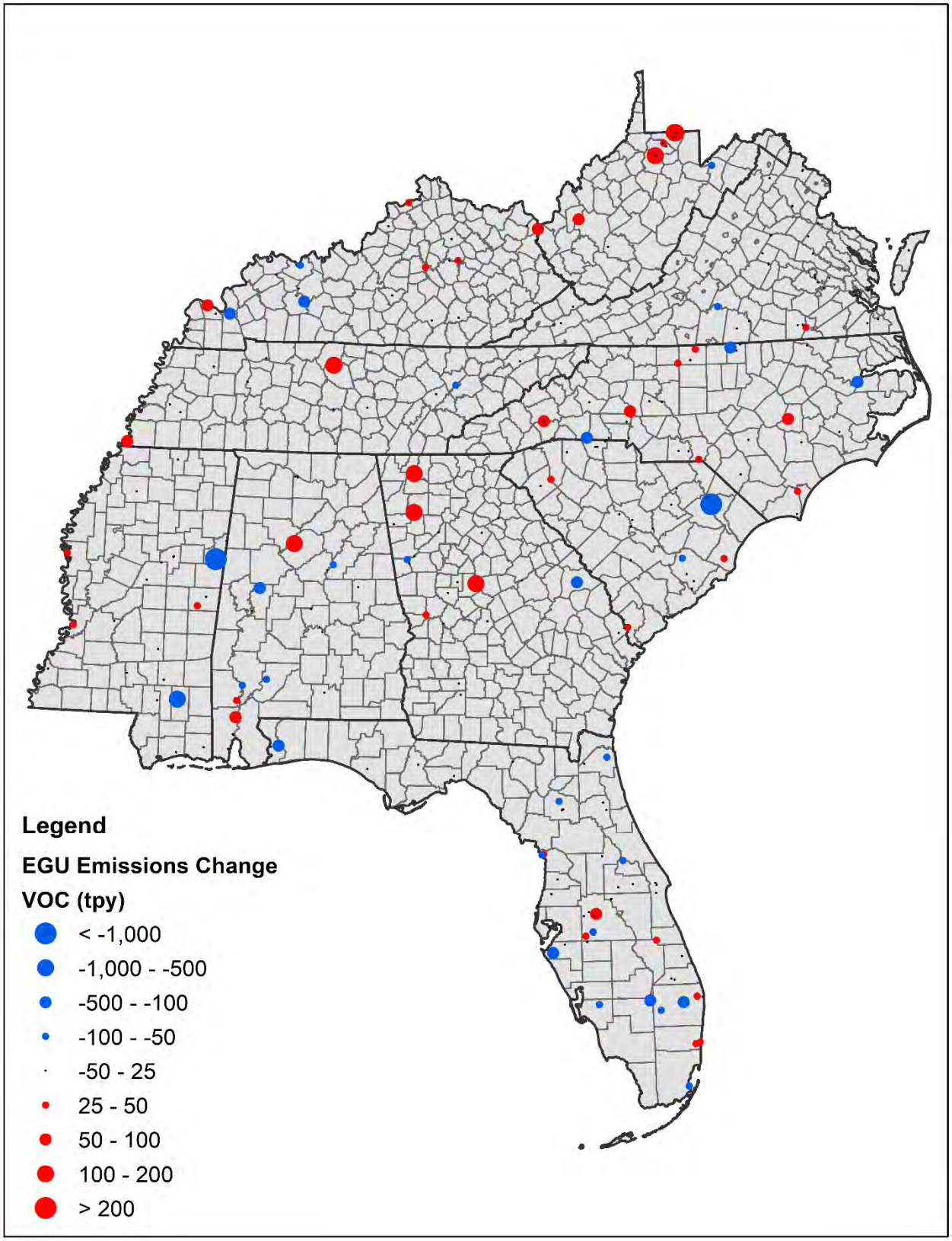

Figure 4-7. Point EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

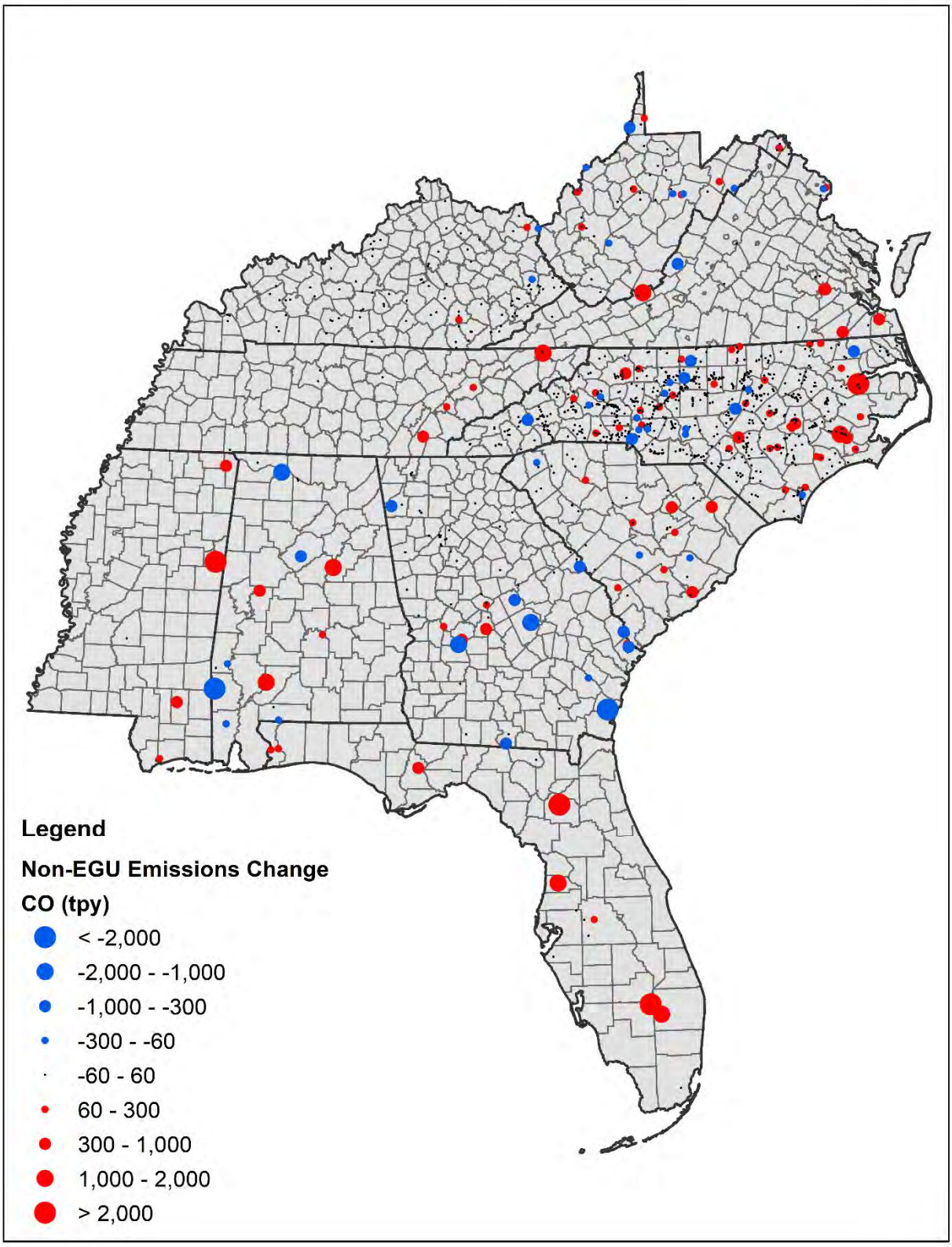

Figure 4-8. Point Non-EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

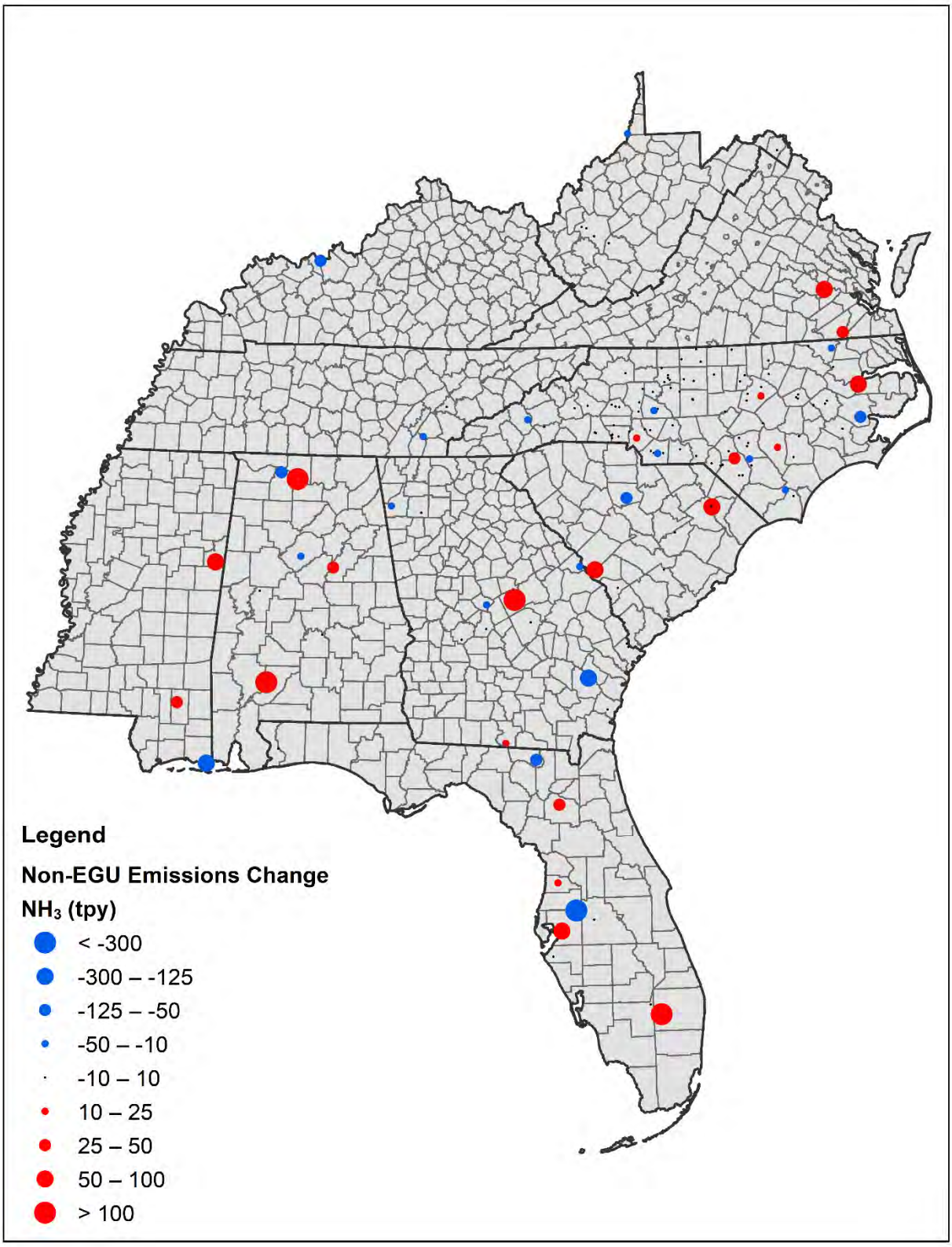

Figure 4-9. Point Non-EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

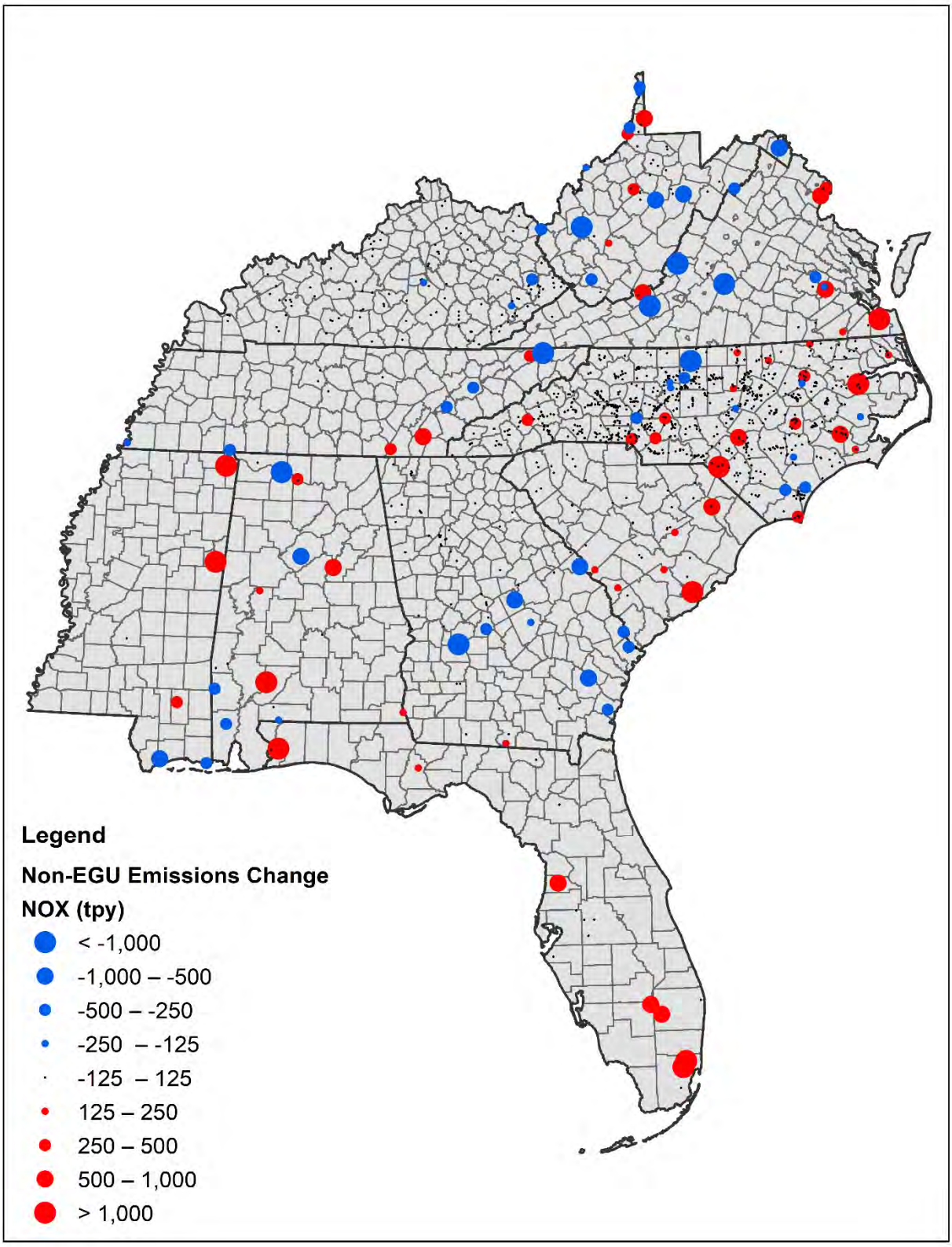

Figure 4-10. Point Non-EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

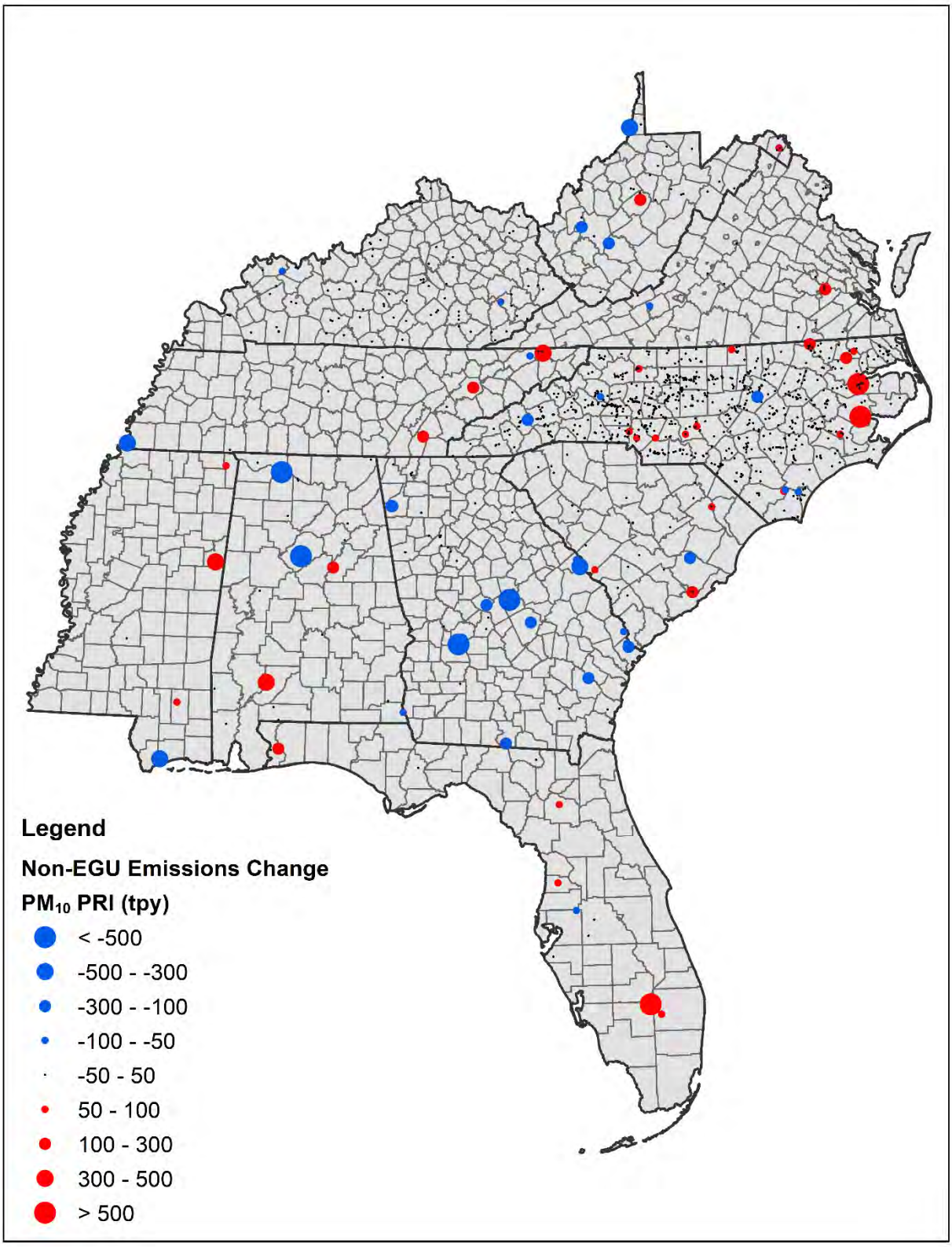

Figure 4-11. Point Non-EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

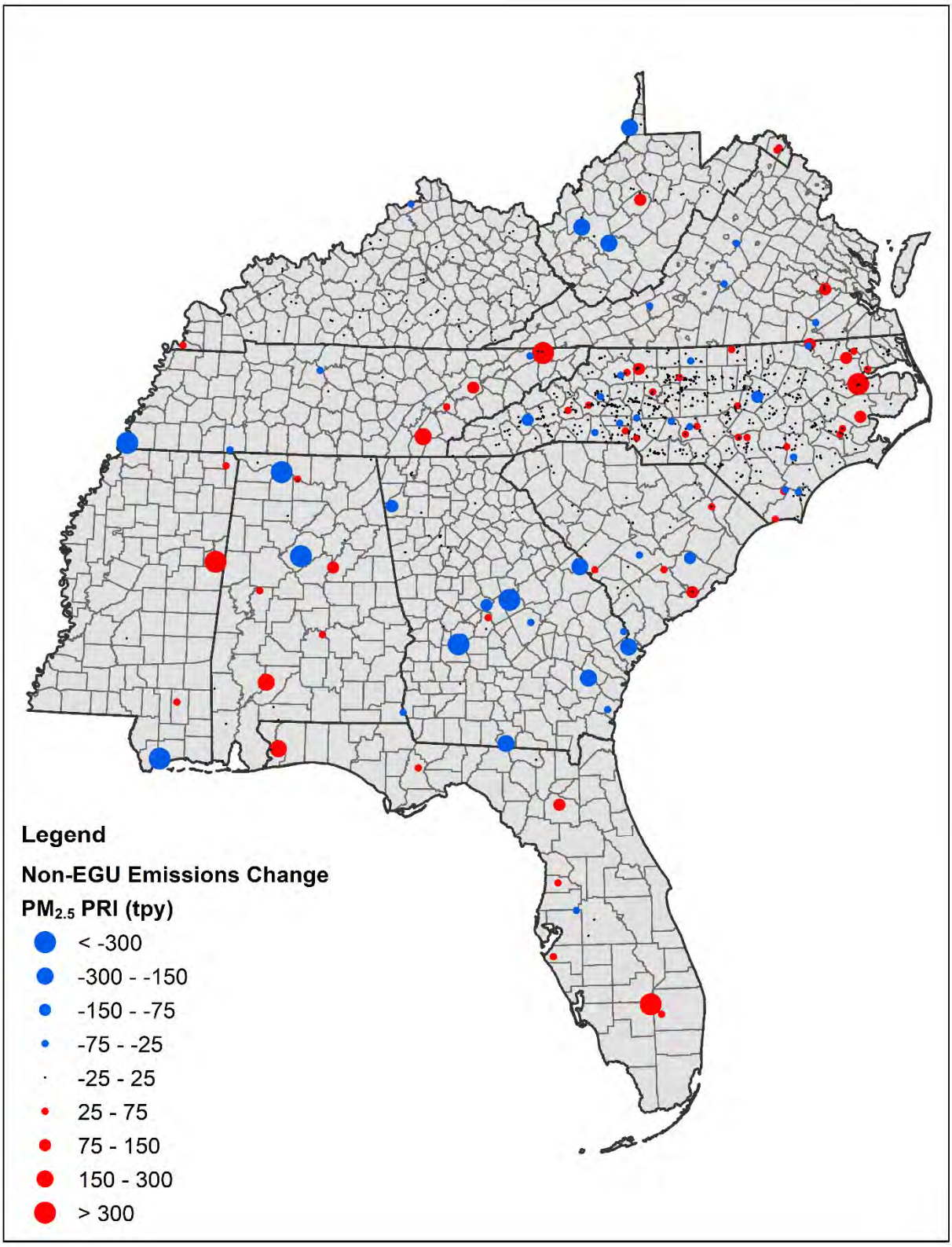

Figure 4-12. Point Non-EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

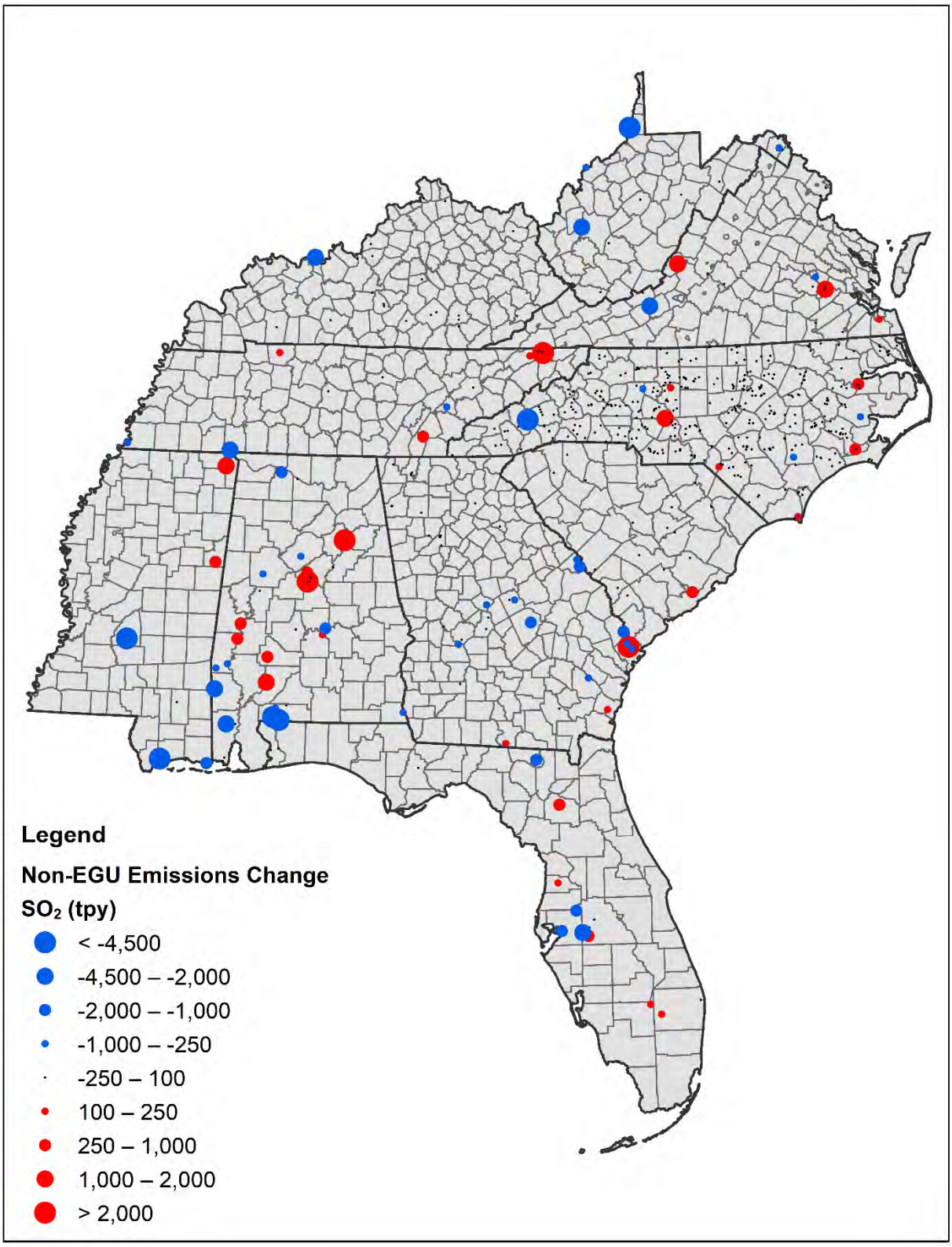

Figure 4-13. Point Non-EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

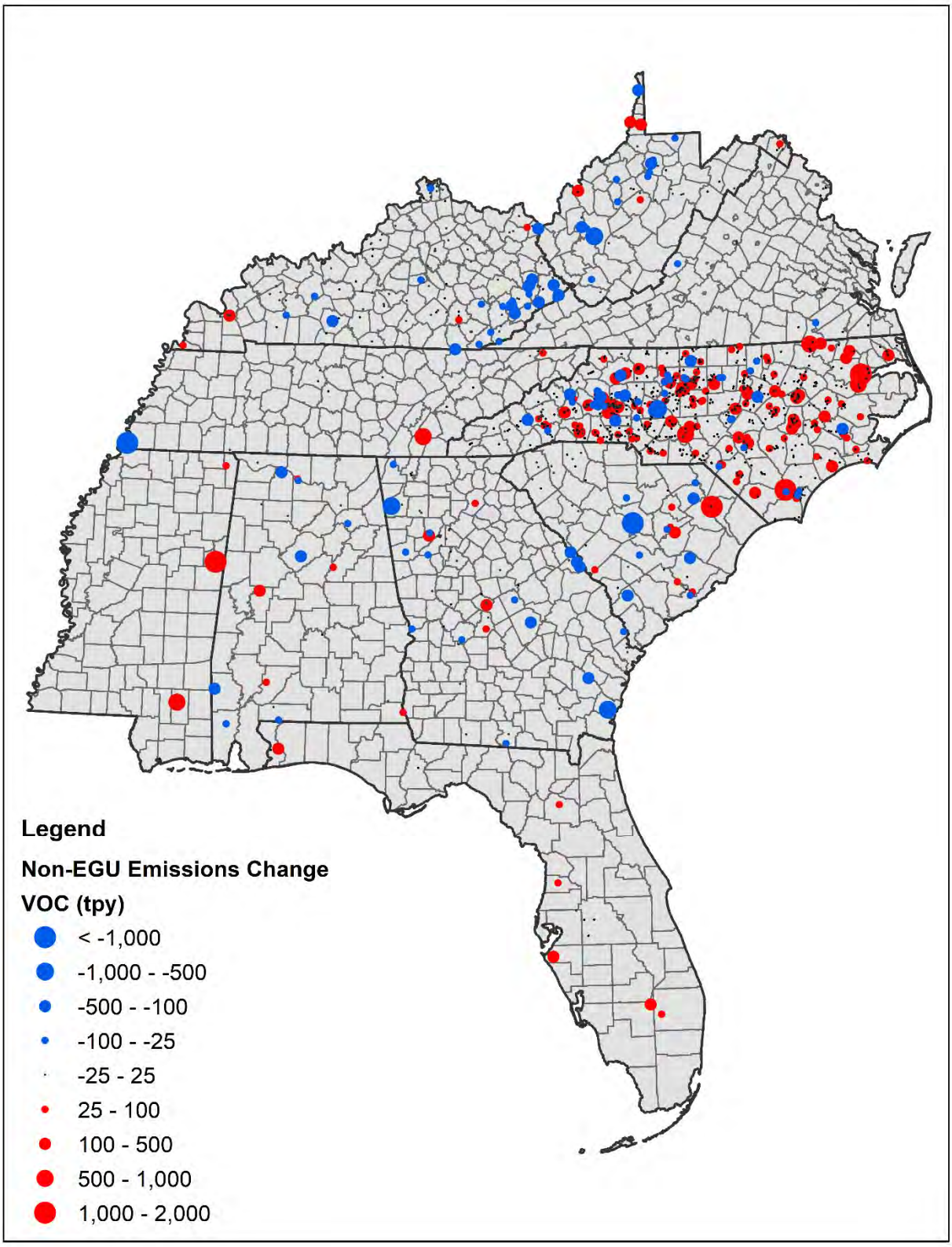

Figure 4-14. Point Non-EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

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5. EMISSION SUMMARIES

State-level emission summaries for the Base Year 2011 and revised 2028 projection year are presented in this section.[21] Fugitive dust emissions from source categories are included in the "afdust" sector. In this report, the tables and charts that include PM_{10}-PRI and $PM_{2.5}$-PRI emissions from the "afdust" sector include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for those categories. For air quality modeling, the emissions for the "afdust" sector are adjusted downward to account for the effects of precipitation and the amount of emissions that are transported by physical forces (e.g., wind, vehicle traffic). Appendix D identifies the source categories included in the "afdust" sector and provides a state-level summary of the unadjusted and adjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for those categories.

5.1 VISTAS State-Level Emissions

Table 5-1 summarizes 2011 state-level emissions by pollutant.[22]

Table 5-1. 2011 Pollutant Emissions by State, All Sectors Combined (except Biogenic)

State	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Alabama	1,822,482	77,408	359,822	544,218	179,105	278,364	393,465
Florida	4,074,019	68,056	608,367	502,180	210,376	172,701	867,062
Georgia	2,821,707	111,705	452,317	967,825	289,072	234,700	415,106
Kentucky	1,088,525	58,131	327,756	276,088	88,386	272,922	273,603
Mississippi	1,049,833	65,600	205,895	1,026,163	164,587	63,940	274,537
North Carolina	1,890,559	175,499	369,497	256,650	88,483	118,721	335,887
South Carolina	1,100,985	37,776	210,544	328,503	87,125	103,247	232,159
Tennessee	1,287,181	42,346	322,564	204,145	76,357	160,323	291,002
Virginia	1,268,463	52,578	313,457	196,881	70,829	107,819	295,360
West Virginia	482,008	12,084	172,944	124,409	41,192	121,618	139,527
Totals[a]	**16,885,761**	**701,183**	**3,343,164**	**4,427,062**	**1,295,512**	**1,634,354**	**3,517,706**

[a] Total emissions may not add up due to rounding

[21] The revised 2028 emissions presented in Tables 5-7 through 5-16 are reflective of the emissions update finalized on 3/31/2020.

[22] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Table 5-2 summarizes 2028 state-level emissions by pollutant.[23,24]

Table 5-2. 2028 Pollutant Emissions by State, All Sectors Combined (except Biogenic)

State	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Alabama	1,282,309	82,103	158,115	582,273	178,852	75,833	297,302
Florida	2,936,098	65,854	265,453	578,108	210,317	66,979	617,717
Georgia	2,062,722	118,240	204,828	1,094,012	289,290	48,102	291,017
Kentucky	756,864	59,038	173,363	292,159	84,455	69,637	225,195
Mississippi	676,471	69,788	95,420	1,237,295	178,737	11,999	204,851
North Carolina	945,729	189,222	138,986	273,895	83,458	32,644	229,032
South Carolina	758,308	39,084	92,855	378,619	83,253	33,985	164,711
Tennessee	764,921	42,522	136,954	211,994	72,196	23,983	198,464
Virginia	937,750	55,979	136,950	203,356	68,090	25,795	235,704
West Virginia	362,223	12,419	125,206	117,556	35,894	59,114	194,715
Totals[a]	**11,483,395**	**734,250**	**1,528,129**	**4,969,267**	**1,284,542**	**448,072**	**2,658,708**

[a] Total emissions may not add up due to rounding

Table 5-3 presents the percent change by pollutant from the 2011 state-level emissions to the revised 2028 state-level emissions.[23]

Table 5-3. Percent Change in Emissions by State, All Sectors Combined (except Biogenic)

State	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	% Difference						
Alabama	-30%	6%	-56%	7%	<-1%	-73%	-24%
Florida	-28%	-3%	-56%	15%	<-1%	-61%	-29%
Georgia	-27%	6%	-55%	13%	<1%	-80%	-30%
Kentucky	-30%	2%	-47%	6%	-4%	-74%	-18%
Mississippi	-36%	6%	-54%	21%	9%	-81%	-25%
North Carolina	-50%	8%	-62%	7%	-6%	-73%	-32%
South Carolina	-31%	3%	-56%	15%	-4%	-67%	-29%
Tennessee	-41%	<1%	-58%	4%	-5%	-85%	-32%
Virginia	-26%	6%	-56%	3%	-4%	-76%	-20%
West Virginia	-25%	3%	-28%	-6%	-13%	-51%	40%
Total	**-32%**	**5%**	**-54%**	**12%**	**-1%**	**-73%**	**-24%**

[23] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

[24] The revised 2028 emissions presented in Table 5-2 are reflective of the emissions update finalized on 3/31/2020.

5.2 VISTAS States: Tier 1 Pollutant Emissions

Table 5-4 summarizes the Base Year 2011 Tier 1 emissions by pollutant for the ten VISTAS states, while Table 5-5 summarizes the revised 2028 Tier 1 emissions by pollutant.[25] Table 5-6 presents the percent change by pollutant from the 2011 Tier 1 emissions to the revised 2028 Tier 1 emissions. Appendix E presents these data at the state-level.

[25] The revised 2028 emissions presented in Table 5-5 are reflective of the emissions update finalized on 3/31/2020.

Table 5-4. 2011 Tier 1 Pollutant Emissions (except Biogenic) for the Ten VISTAS States[26]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Chemical & Allied Product Mfg	34,883	6,762	17,238	5,022	3,837	39,482	20,714
Fuel Comb. Elec. Util.	151,802	6,471	488,453	85,656	61,846	1,191,386	10,576
Fuel Comb. Industrial	264,348	2,696	250,349	120,862	97,403	177,103	19,668
Fuel Comb. Other	277,771	7,390	70,985	39,401	38,003	27,359	47,920
Highway Vehicles	7,549,047	32,263	1,574,943	88,017	47,390	8,027	791,993
Metals Processing	163,506	123	12,501	15,160	12,650	33,405	9,833
Miscellaneous[26]	3,953,133	633,365	106,762	3,732,801	827,631	41,197	740,642
Off-Highway	3,710,940	604	626,217	49,059	46,279	34,422	541,514
Other Industrial Processes[26]	105,113	8,737	98,400	194,381	78,734	44,820	148,394
Petroleum & Related Industries	95,162	120	73,588	2,963	2,459	33,046	145,163
Solvent Utilization	318	190	367	910	796	48	668,718
Storage & Transport	2,886	284	497	7,448	3,462	89	323,577
Waste Disposal & Recycling	576,851	2,177	22,864	85,381	75,021	3,971	48,995
Totals	**16,885,761**	**701,183**	**3,343,164**	**4,427,062**	**1,295,512**	**1,634,354**	**3,517,706**

[26] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Table 5-5. 2028 Tier 1 Pollutant Emissions (except Biogenic) for the Ten VISTAS States[27,28]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Chemical & Allied Product Mfg	28,334	4,930	10,561	5,279	3,700	28,198	20,184
Fuel Comb. Elec. Util.	101,793	9,941	216,451	44,188	35,209	183,351	8,770
Fuel Comb. Industrial	272,849	3,088	205,032	126,911	107,424	78,121	17,911
Fuel Comb. Other	262,468	7,319	67,184	36,711	35,652	16,898	43,049
Highway Vehicles	2,371,974	21,976	341,421	63,604	16,147	3,117	192,413
Metals Processing	163,152	144	13,297	13,997	11,740	31,211	9,046
Miscellaneous[27]	3,778,975	675,213	99,091	4,362,444	890,359	37,923	727,086
Off-Highway	3,676,987	742	349,374	23,899	22,227	7,646	301,285
Other Industrial Processes[27]	104,648	8,273	99,121	193,076	77,102	47,414	149,452
Petroleum & Related Industries	143,691	122	101,729	6,199	5,861	7,361	232,823
Solvent Utilization	337	165	379	919	819	25	687,749
Storage & Transport	990	219	509	6,616	3,215	2,857	219,347
Waste Disposal & Recycling	577,197	2,117	23,980	85,423	75,087	3,950	49,593
Totals	**11,483,395**	**734,250**	**1,528,129**	**4,969,267**	**1,284,542**	**448,072**	**2,658,708**

[27] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

[28] The revised 2028 emissions presented in Table 5-5 are reflective of the emissions update finalized on 3/31/2020.

Table 5-6. Percent Change in Emissions by Tier 1 Level, All Sectors Combined (except Biogenic)[29]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	% Difference						
Chemical & Allied Product Mfg	-19%	-27%	-39%	5%	-4%	-29%	-3%
Fuel Comb. Elec. Util.	-33%	54%	-56%	-48%	-43%	-85%	-17%
Fuel Comb. Industrial	3%	15%	-18%	5%	10%	-56%	-9%
Fuel Comb. Other	-6%	-1%	-5%	-7%	-6%	-38%	-10%
Highway Vehicles	-69%	-32%	-78%	-28%	-66%	-61%	-76%
Metals Processing	0%	17%	6%	-8%	-7%	-7%	-8%
Miscellaneous[29]	-4%	7%	-7%	17%	8%	-8%	-2%
Off-Highway	-1%	23%	-44%	-51%	-52%	-78%	-44%
Other Industrial Processes[29]	<-0.5%	-5%	1%	-1%	-2%	6%	1%
Petroleum & Related Industries	51%	1%	38%	109%	138%	-78%	60%
Solvent Utilization	6%	-13%	3%	1%	3%	-48%	3%
Storage & Transport	-66%	-23%	2%	-11%	-7%	3099%	-32%
Waste Disposal & Recycling	<0.5%	-3%	5%	<0.5%	<0.5%	-1%	1%
Totals	-32%	5%	-54%	12%	-0.8%	-73%	-24%

[29] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

5.3 Point EGU and Non-EGU Emissions Comparison by State[30,31]

Table 5-7 compares the Base Year 2011 and revised 2028 point EGU and non-EGU emissions for Alabama.

Table 5-7. Alabama Base Year 2011 and Revised 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Base Year 2011 EGU Emissions (tpy)	Revised 2028 EGU Emissions (tpy)	% Diff for EGU	Base Year 2011 Non-EGU Emissions (tpy)	Revised 2028 Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	12,888	10,747	-16.6%	68,197	61,719	-9.5%
NH_3	556	685	23.2%	1,937	1,622	-16.3%
NO_x	64,008	20,008	-68.7%	59,791	50,817	-15.0%
PM_{10}-PRI	8,026	2,742	-65.8%	19,981	17,065	-14.6%
$PM_{2.5}$-PRI	5,591	2,063	-63.1%	16,418	14,057	-14.4%
SO_2	186,219	8,366	-95.5%	59,672	50,691	-15.1%
VOC	1,163	1,787	53.7%	25,594	23,747	-7.2%

Table 5-8 compares the Base Year 2011 and revised 2028 point EGU and non-EGU emissions for Florida.

Table 5-8. Florida Base Year 2011 and Revised 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Base Year 2011 EGU Emissions (tpy)	Revised 2028 EGU Emissions (tpy)	% Diff for EGU	Base Year 2011 Non-EGU Emissions (tpy)	Revised 2028 Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	43,819	18,224	-58.4%	85,603	106,181	24.0%
NH_3	3,394	3,150	-7.2%	2,462	1,303	-47.0%
NO_x	68,655	25,050	-63.5%	40,973	44,960	9.7%
PM_{10}-PRI	13,069	10,303	-21.2%	13,768	13,869	0.7%
$PM_{2.5}$-PRI	10,882	9,145	-16.0%	11,406	12,001	5.2%
SO_2	95,423	24,005	-74.8%	37,440	28,978	-22.6%
VOC	3,332	1,298	-61.0%	26,268	26,711	1.7%

[30] "Point EGU Emissions" included all EGU emission process records plus all non-EGU emission process records occurring at EGUs (e.g., commercial-sized boilers operating at the EGU). "Point Non-EGU Emissions" included non-EGU sources, such as industrial/commercial/institutional emission sources plus point source location emissions from aircrafts (e.g., landing/takeoffs), commercial marine vessels, and railyards.

[31] The revised 2028 emissions presented in Tables 5-7 through 5-16 are reflective of the emissions update finalized on 3/31/2020.

Table 5-9 compares the Base Year 2011 and revised 2028 point EGU and non-EGU emissions for Georgia.

Table 5-9. Georgia Base Year 2011 and Revised 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Base Year 2011 EGU Emissions (tpy)	Revised 2028 EGU Emissions (tpy)	% Diff for EGU	Base Year 2011 Non-EGU Emissions (tpy)	Revised 2028 Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	12,146	9,751	-19.7%	64,554	57,324	-11.2%
NH_3	899	1,176	30.9%	5,809	5,595	-3.7%
NO_x	54,911	24,588	-55.2%	48,234	41,298	-14.4%
PM_{10}-PRI	8,921	5,140	-42.4%	15,671	12,387	-21.0%
$PM_{2.5}$-PRI	6,189	4,263	-31.1%	12,471	9,655	-22.6%
SO_2	186,799	17,574	-90.6%	28,999	18,593	-35.9%
VOC	1,140	1,042	-8.6%	27,437	24,528	-10.6%

Table 5-10 compares the Base Year 2011 and revised 2028 point EGU and non-EGU emissions for Kentucky.

Table 5-10. Kentucky Base Year 2011 and Revised 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Base Year 2011 EGU Emissions (tpy)	Revised 2028 EGU Emissions (tpy)	% Diff for EGU	Base Year 2011 Non-EGU Emissions (tpy)	Revised 2028 Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	14,804	11,462	-22.6%	84,931	86,053	1.3%
NH_3	757	669	-11.6%	507	454	-10.4%
NO_x	92,279	32,696	-64.6%	31,537	29,435	-6.7%
PM_{10}-PRI	13,841	9,326	-32.6%	18,775	15,931	-15.1%
$PM_{2.5}$-PRI	9,453	7,402	-21.7%	12,466	10,483	-15.9%
SO_2	247,413	49,586	-80.0%	21,723	16,051	-26.1%
VOC	1,568	887	-43.4%	44,495	43,588	-2.0%

Table 5-11 compares the Base Year 2011 and revised 2028 point EGU and non-EGU emissions for Mississippi.

Table 5-11. Mississippi Base Year 2011 and Revised 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Base Year 2011 EGU Emissions (tpy)	Revised 2028 EGU Emissions (tpy)	% Diff for EGU	Base Year 2011 Non-EGU Emissions (tpy)	Revised 2028 Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	7,317	4,153	-43.2%	33,953	37,591	10.7%
NH_3	402	579	44.0%	1,912	1,693	-11.5%
NO_x	28,039	12,209	-56.5%	37,698	34,645	-8.1%
PM_{10}-PRI	2,378	1,456	-38.8%	9,653	9,236	-4.3%
$PM_{2.5}$-PRI	1,892	1,119	-40.8%	8,320	7,809	-6.1%
SO_2	43,349	3,236	-92.5%	14,793	5,169	-65.1%
VOC	535	413	-22.8%	26,908	27,155	0.9%

Table 5-12 compares the Base Year 2011 and revised 2028 point EGU and non-EGU emissions for North Carolina.

Table 5-12. North Carolina Base Year 2011 and Revised 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Base Year 2011 EGU Emissions (tpy)	Revised 2028 EGU Emissions (tpy)	% Diff for EGU	Base Year 2011 Non-EGU Emissions (tpy)	Revised 2028 Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	35,106	8,239	-76.5%	43,994	46,329	5.3%
NH_3	216	806	273.2%	1,471	1,348	-8.4%
NO_x	48,813	20,978	-57.0%	35,138	37,956	8.0%
PM_{10}-PRI	9,915	3,644	-63.2%	10,129	12,602	24.4%
$PM_{2.5}$-PRI	7,572	3,244	-57.2%	6,982	8,653	23.9%
SO_2	79,022	9,571	-87.9%	27,050	14,776	-45.4%
VOC	956	812	-15.0%	37,172	47,061	26.6%

Table 5-13 compares the Base Year 2011 and revised 2028 point EGU and non-EGU emissions for South Carolina.

Table 5-13. South Carolina Base Year 2011 and Revised 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Base Year 2011 EGU Emissions (tpy)	Revised 2028 EGU Emissions (tpy)	% Diff for EGU	Base Year 2011 Non-EGU Emissions (tpy)	Revised 2028 Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	17,424	12,711	-27.0%	88,270	91,019	3.1%
NH_3	268	863	222.3%	1,835	1,762	-4.0%
NO_x	26,476	10,707	-59.6%	25,513	25,463	-0.2%
PM_{10}-PRI	10,519	3,432	-67.4%	7,364	6,495	-11.8%
$PM_{2.5}$-PRI	8,365	2,730	-67.4%	5,187	4,670	-10.0%
SO_2	68,307	10,695	-84.3%	26,593	18,906	-28.9%
VOC	750	476	-36.5%	23,927	21,974	-8.2%

Table 5-14 compares the Base Year 2011 and revised 2028 point EGU and non-EGU emissions for Tennessee.

Table 5-14. Tennessee Base Year 2011 and Revised 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Base Year 2011 EGU Emissions (tpy)	Revised 2028 EGU Emissions (tpy)	% Diff for EGU	Base Year 2011 Non-EGU Emissions (tpy)	Revised 2028 Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	5,366	3,614	-32.6%	46,109	48,801	5.8%
NH_3	242	174	-27.9%	1,073	1,001	-6.7%
NO_x	27,000	7,814	-71.1%	38,354	35,140	-8.4%
PM_{10}-PRI	5,194	2,629	-49.4%	11,613	11,020	-5.1%
$PM_{2.5}$-PRI	4,162	2,430	-41.6%	8,330	8,150	-2.2%
SO_2	120,139	10,030	-91.7%	35,849	11,027	-69.2%
VOC	725	541	-25.4%	33,662	33,224	-1.3%

Table 5-15 compares the Base Year 2011 and revised 2028 point EGU and non-EGU emissions for Virginia.

Table 5-15. Virginia Base Year 2011 and Revised 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Base Year 2011 EGU Emissions (tpy)	Revised 2028 EGU Emissions (tpy)	% Diff for EGU	Base Year 2011 Non-EGU Emissions (tpy)	Revised 2028 Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	6,782	5,811	-14.3%	31,202	35,075	12.4%
NH_3	263	2,365	798.8%	1,549	1,490	-3.8%
NO_x	40,141	10,436	-74.0%	37,212	31,236	-16.1%
PM_{10}-PRI	6,380	3,942	-38.2%	5,856	5,834	-0.4%
$PM_{2.5}$-PRI	1,464	1,509	3.0%	4,585	4,633	1.0%
SO_2	75,748	1,976	-97.4%	20,570	16,575	-19.4%
VOC	825	455	-44.8%	17,257	17,457	1.2%

Table 5-16 compares the Base Year 2011 and revised 2028 point EGU and non-EGU emissions for West Virginia.

Table 5-16. West Virginia Base Year 2011 and Revised 2028 Point EGU and Non-EGU Emissions Comparison

Pollutant	Base Year 2011 EGU Emissions (tpy)	Revised 2028 EGU Emissions (tpy)	% Diff for EGU	Base Year 2011 Non-EGU Emissions (tpy)	Revised 2028 Non-EGU Emissions (tpy)	% Diff for Non-EGU
CO	10,418	8,661	-16.9%	34,111	33,439	-2.0%
NH_3	68	50	-26.7%	216	187	-13.3%
NO_x	56,620	49,874	-11.9%	24,888	18,327	-26.4%
PM_{10}-PRI	11,469	6,877	-40.0%	5,109	3,600	-29.5%
$PM_{2.5}$-PRI	9,483	5,480	-42.2%	3,156	2,599	-17.6%
SO_2	100,108	47,744	-52.3%	15,710	5,971	-62.0%
VOC	1,024	1,162	13.4%	8,830	6,994	-20.8%

5.4 Nonpoint, Onroad, Nonroad, and Point-Fires Modeling Files Emissions Comparison by State

Emissions totals for each state from the modeling platform sector files are presented in this section. Specifically, state data emissions were extracted from these modeling sector files:

- Nonpoint data files:
  - 2011ek_cb6v2_v6_11g_inputs_nonpoint.zip;
  - 2011el_cb6v2_v6_11g_inputs_nonpoint.zip; and
  - 2028el_cb6v2_v6_11g_inputs_nonpoint.zip
- Onroad data files:
  - 2011ek_onroad_SMOKE_MOVES_MOVES2014a_forOTAQ_21jan2016_v2_AL_to_MO.zip;
  - 2011ek_onroad_SMOKE_MOVES_MOVES2014a_forOTAQ_21jan2016_v2_MT_to_WY.zip;
  - 2011el_onroad_SMOKE_MOVES2014a_ff10_part1.zip;
  - 2011el_onroad_SMOKE_MOVES2014a_ff10_part2.zip;
  - 2028el_onroad_SMOKE_MOVES2014a_ff10_part1.zip; and
  - 2028el_onroad_SMOKE_MOVES2014a_ff10_part2.zip
- Nonroad data files:
  - 2011ek_cb6v2_v6_11g_inputs_nonroad_part1.zip;
  - 2011ek_cb6v2_v6_11g_inputs_nonroad_part2.zip;
  - 2028el_cb6v2_v6_11g_inputs_nonroad_part1.zip; and
  - 2028el_cb6v2_v6_11g_inputs_nonroad_part2.zip
- Point-Fires data files:
  - 2011ek_cb6v2_v6_11g_inputs_ptfire.zip (used for both 2011 and 2028)

Table 5-17 compares the Base Year 2011 and final revised 2028 nonpoint, onroad, nonroad, and point fire emissions modeling files for Alabama.

Table 5-17. Alabama Base Year 2011 and Revised 2028 Nonpoint, Onroad, Nonroad, and Point-Fire Emissions Comparison

Pollutant	Base Year 2011 Emissions (tpy)	Final 2028 Emissions (tpy)	% Difference
Nonpoint Modeling Files			
CO	127,779	124,390	-3%
NH_3	61,118	67,011	10%
NO_x	45,871	31,534	-31%
PM_{10}-PRI[32]	433,089	483,650	12%
$PM_{2.5}$-PRI[32]	88,576	98,737	11%
SO_2	25,048	9,799	-61%
VOC	90,646	76,396	-16%
Onroad Modeling Files			
CO	701,397	182,602	-74%
NH_3	2,724	1,703	-37%
NO_x	152,732	30,113	-80%
PM_{10}-PRI	8,001	4,984	-38%
$PM_{2.5}$-PRI	4,611	1,322	-71%
SO_2	683	262	-62%
VOC	75,523	15,013	-80%
Nonroad Modeling Files			
CO	245,942	236,571	-4%
NH_3	32	40	26%
NO_x	22,869	11,092	-51%
PM_{10}-PRI	2,464	1,175	-52%
$PM_{2.5}$-PRI	2,336	1,100	-53%
SO_2	65	39	-40%
VOC	41,818	21,639	-48%
Point-Fires Modeling Files			
CO	666,279	666,279	0%
NH_3	11,041	11,041	0%
NO_x	14,551	14,551	0%
PM_{10}-PRI	72,656	72,656	0%
$PM_{2.5}$-PRI	61,573	61,573	0%
SO_2	6,677	6,677	0%
VOC	158,720	158,720	0%

[32] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Table 5-18 compares the Base Year 2011 and final 2028 nonpoint, onroad, nonroad, and point fire emissions modeling files for Florida.

Table 5-18. Florida Base Year 2011 and Revised 2028 Nonpoint, Onroad, Nonroad, and Point-Fire Emissions Comparison

Pollutant	Base Year 2011 Emissions (tpy)	Final 2028 Emissions (tpy)	% Difference
Nonpoint Modeling Files			
CO	121,431	96,505	-21%
NH_3	38,676	39,562	2%
NO_x	70,123	53,341	-24%
PM_{10}-PRI[33]	338,905	424,169	25%
$PM_{2.5}$-PRI[33]	80,117	91,158	14%
SO_2	27,743	3,283	-88%
VOC	262,124	225,801	-14%
Onroad Modeling Files			
CO	1,784,678	679,511	-62%
NH_3	7,465	5,737	-23%
NO_x	308,752	72,019	-77%
PM_{10}-PRI	21,329	19,834	-7%
$PM_{2.5}$-PRI	9,377	4,412	-53%
SO_2	2,104	823	-61%
VOC	183,609	51,019	-72%
Nonroad Modeling Files			
CO	1,078,298	1,075,489	<-1%
NH_3	142	184	29%
NO_x	98,584	48,803	-50%
PM_{10}-PRI	10,126	4,950	-51%
$PM_{2.5}$-PRI	9,627	4,632	-52%
SO_2	275	173	-37%
VOC	162,907	84,066	-48%
Point-Fires Modeling Files			
CO	960,190	960,190	0%
NH_3	15,918	15,918	0%
NO_x	21,279	21,279	0%
PM_{10}-PRI	104,982	104,982	0%
$PM_{2.5}$-PRI	88,968	88,968	0%
SO_2	9,716	9,716	0%
VOC	228,822	228,822	0%

[33] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Table 5-19 compares the Base Year 2011 and final 2028 nonpoint, onroad, nonroad, and point fire emissions modeling files for Georgia.

Table 5-19. Georgia Base Year 2011 and Revised 2028 Nonpoint, Onroad, Nonroad, and Point-Fire Emissions Comparison

Pollutant	Base Year 2011 Emissions (tpy)	Final 2028 Emissions (tpy)	% Difference
Nonpoint Modeling Files			
CO	290,246	252,648	-13%
NH_3	92,275	100,237	9%
NO_x	42,536	31,117	-27%
PM_{10}-PRI[34]	772,828	912,072	18%
$PM_{2.5}$-PRI[34]	125,942	137,751	9%
SO_2	7,005	734	-90%
VOC	143,814	129,739	-10%
Onroad Modeling Files			
CO	1,018,645	305,264	-70%
NH_3	4,492	2,983	-34%
NO_x	223,223	48,973	-78%
PM_{10}-PRI	12,518	8,914	-29%
$PM_{2.5}$-PRI	6,829	2,289	-66%
SO_2	1,088	443	-59%
VOC	109,005	25,629	-76%
Nonroad Modeling Files			
CO	452,457	454,076	<1%
NH_3	61	79	30%
NO_x	44,449	19,888	-55%
PM_{10}-PRI	4,732	2,344	-50%
$PM_{2.5}$-PRI	4,503	2,194	-51%
SO_2	125	75	-40%
VOC	58,581	34,950	-40%
Point-Fires Modeling Files			
CO	983,659	983,659	0%
NH_3	8,170	8,170	0%
NO_x	38,964	38,964	0%
PM_{10}-PRI	153,155	153,155	0%
$PM_{2.5}$-PRI	133,137	133,137	0%
SO_2	10,684	10,684	0%
VOC	75,128	75,128	0%

[34] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Table 5-20 compares the Base Year 2011 and final 2028 nonpoint, onroad, nonroad, and point fire emissions modeling files for Kentucky.

Table 5-20. Kentucky Base Year 2011 and Revised 2028 Nonpoint, Onroad, Nonroad, and Point-Fire Emissions Comparison

Pollutant	Base Year 2011 Emissions (tpy)	Final 2028 Emissions (tpy)	% Difference
Nonpoint Modeling Files			
CO	118,950	141,116	19%
NH_3	51,760	53,467	3%
NO_x	60,862	69,311	14%
PM_{10}-PRI[35]	216,674	243,588	12%
$PM_{2.5}$-PRI[35]	44,792	48,623	9%
SO_2	1,694	2,226	31%
VOC	104,019	108,990	5%
Onroad Modeling Files			
CO	498,702	157,636	-68%
NH_3	2,106	1,437	-32%
NO_x	115,685	27,819	-76%
PM_{10}-PRI	5,480	3,448	-37%
$PM_{2.5}$-PRI	3,345	1,015	-70%
SO_2	502	209	-58%
VOC	50,326	12,938	-74%
Nonroad Modeling Files			
CO	190,707	180,166	-6%
NH_3	30	39	29%
NO_x	24,375	11,084	-55%
PM_{10}-PRI	2,467	1,014	-59%
$PM_{2.5}$-PRI	2,354	956	-59%
SO_2	64	39	-39%
VOC	30,470	16,066	-47%
Point-Fires Modeling Files			
CO	180,432	180,432	0%
NH_3	2,972	2,972	0%
NO_x	3,018	3,018	0%
PM_{10}-PRI	18,852	18,852	0%
$PM_{2.5}$-PRI	15,976	15,976	0%
SO_2	1,526	1,526	0%
VOC	42,725	42,725	0%

[35] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Table 5-21 compares the Base Year 2011 and final 2028 nonpoint, onroad, nonroad, and point fire emissions modeling files for Mississippi.

Table 5-21. Mississippi Base Year 2011 and Revised 2028 Nonpoint, Onroad, Nonroad, and Point-Fire Emissions Comparison

Pollutant	Base Year 2011 Emissions (tpy)	Final 2028 Emissions (tpy)	% Difference
Nonpoint Modeling Files			
CO	104,572	57,361	-45%
NH_3	56,088	60,993	9%
NO_x	25,076	16,137	-36%
PM_{10}-PRI[36]	972,660	1,187,604	22%
$PM_{2.5}$-PRI[36]	120,310	138,504	15%
SO_2	2,183	238	-89%
VOC	94,802	76,414	-19%
Onroad Modeling Files			
CO	433,332	117,589	-73%
NH_3	1,794	1,115	-38%
NO_x	91,026	17,788	-80%
PM_{10}-PRI	4,491	3,100	-31%
$PM_{2.5}$-PRI	2,538	814	-68%
SO_2	405	165	-59%
VOC	46,084	9,317	-80%
Nonroad Modeling Files			
CO	145,614	134,734	-7%
NH_3	22	28	25%
NO_x	17,266	7,850	-55%
PM_{10}-PRI	1,811	729	-60%
$PM_{2.5}$-PRI	1,722	685	-60%
SO_2	46	28	-40%
VOC	28,862	14,206	-51%
Point-Fires Modeling Files			
CO	325,044	325,044	0%
NH_3	5,381	5,381	0%
NO_x	6,791	6,791	0%
PM_{10}-PRI	35,170	35,170	0%
$PM_{2.5}$-PRI	29,805	29,805	0%
SO_2	3,163	3,163	0%
VOC	77,346	77,346	0%

[36] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Table 5-22 compares the Base Year 2011 and final 2028 nonpoint, onroad, nonroad, and point fire emissions modeling files for North Carolina.

Table 5-22. North Carolina Base Year 2011 and Revised 2028 Nonpoint, Onroad, Nonroad, and Point-Fire Emissions Comparison

Pollutant	Base Year 2011 Emissions (tpy)	Final 2028 Emissions (tpy)	% Difference
Nonpoint Modeling Files			
CO	116,898	101,080	-14%
NH_3	168,537	183,531	9%
NO_x	31,121	24,308	-22%
PM_{10}-PRI[37]	207,809	235,279	13%
$PM_{2.5}$-PRI[37]	52,107	56,009	7%
SO_2	10,486	6,958	-34%
VOC	117,162	117,765	1%
Onroad Modeling Files			
CO	1,145,623	252,167	-78%
NH_3	4,486	2,730	-39%
NO_x	204,008	30,968	-85%
PM_{10}-PRI	10,447	6,512	-38%
$PM_{2.5}$-PRI	5,510	1,646	-70%
SO_2	1,082	311	-71%
VOC	112,173	21,709	-81%
Nonroad Modeling Files			
CO	462,851	451,827	-2%
NH_3	62	81	30%
NO_x	46,950	21,309	-55%
PM_{10}-PRI	4,799	2,307	-52%
$PM_{2.5}$-PRI	4,568	2,162	-53%
SO_2	131	78	-40%
VOC	61,753	35,012	-43%
Point-Fires Modeling Files			
CO	86,087	86,087	0%
NH_3	727	727	0%
NO_x	3,466	3,466	0%
PM_{10}-PRI	13,552	13,552	0%
$PM_{2.5}$-PRI	11,745	11,745	0%
SO_2	950	950	0%
VOC	6,671	6,671	0%

[37] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Table 5-23 compares the Base Year 2011 and final 2028 nonpoint, onroad, nonroad, and point fire emissions modeling files for South Carolina.

Table 5-23. South Carolina Base Year 2011 and Revised 2028 Nonpoint, Onroad, Nonroad, and Point-Fire Emissions Comparison

Pollutant	Base Year 2011 Emissions (tpy)	Final 2028 Emissions (tpy)	% Difference
Nonpoint Modeling Files			
CO	84,986	73,221	-14%
NH_3	30,215	31,686	5%
NO_x	22,008	18,573	-16%
PM_{10}-PRI[38]	280,076	341,478	22%
$PM_{2.5}$-PRI[38]	49,289	55,352	12%
SO_2	5,878	2,230	-62%
VOC	74,281	63,679	-14%
Onroad Modeling Files			
CO	475,876	155,913	-67%
NH_3	2,104	1,410	-33%
NO_x	109,374	23,263	-79%
PM_{10}-PRI	6,618	4,504	-32%
$PM_{2.5}$-PRI	3,766	1,152	-69%
SO_2	504	215	-57%
VOC	51,164	12,546	-75%
Nonroad Modeling Files			
CO	233,460	224,476	-4%
NH_3	31	40	28%
NO_x	23,155	10,831	-53%
PM_{10}-PRI	2,343	1,128	-52%
$PM_{2.5}$-PRI	2,228	1,057	-53%
SO_2	65	39	-40%
VOC	34,267	18,266	-47%
Point-Fires Modeling Files			
CO	200,969	200,969	0%
NH_3	3,323	3,323	0%
NO_x	4,017	4,017	0%
PM_{10}-PRI	21,583	21,583	0%
$PM_{2.5}$-PRI	18,290	18,290	0%
SO_2	1,900	1,900	0%
VOC	47,771	47,771	0%

[38] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Table 5-24 compares the Base Year 2011 and final 2028 nonpoint, onroad, nonroad, and point fire emissions modeling files for Tennessee.

Table 5-24. Tennessee Base Year 2011 and Revised 2028 Nonpoint, Onroad, Nonroad, and Point-Fire Emissions Comparison

Pollutant	Base Year 2011 Emissions (tpy)	Final 2028 Emissions (tpy)	% Difference
Nonpoint Modeling Files			
CO	78,166	73,680	-6%
NH_3	35,917	37,108	3%
NO_x	40,792	32,375	-21%
PM_{10}-PRI[39]	160,910	176,868	10%
$PM_{2.5}$-PRI[39]	43,771	47,181	8%
SO_2	2,321	1,378	-41%
VOC	102,554	91,016	-11%
Onroad Modeling Files			
CO	739,041	233,423	-68%
NH_3	3,017	2,130	-29%
NO_x	182,796	44,927	-75%
PM_{10}-PRI	9,927	6,734	-32%
$PM_{2.5}$-PRI	5,778	1,811	-69%
SO_2	769	338	-56%
VOC	80,463	20,483	-75%
Nonroad Modeling Files			
CO	294,062	280,967	-4%
NH_3	40	52	29%
NO_x	31,193	14,268	-54%
PM_{10}-PRI	3,189	1,430	-55%
$PM_{2.5}$-PRI	3,035	1,342	-56%
SO_2	86	51	-40%
VOC	44,035	23,638	-46%
Point-Fires Modeling Files			
CO	124,436	124,436	0%
NH_3	2,057	2,057	0%
NO_x	2,430	2,430	0%
PM_{10}-PRI	13,312	13,312	0%
$PM_{2.5}$-PRI	11,282	11,282	0%
SO_2	1,159	1,159	0%
VOC	29,563	29,563	0%

[39] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Table 5-25 compares the Base Year 2011 and final 2028 nonpoint, onroad, nonroad, and point fire emissions modeling files for Virginia.

Table 5-25. Virginia Base Year 2011 and Revised 2028 Nonpoint, Onroad, Nonroad, and Point-Fire Emissions Comparison

Pollutant	Base Year 2011 Emissions (tpy)	Final 2028 Emissions (tpy)	% Difference
Nonpoint Modeling Files			
CO	134,660	129,368	-4%
NH_3	44,658	47,102	5%
NO_x	52,907	40,758	-23%
PM_{10}-PRI[40]	156,518	170,012	9%
$PM_{2.5}$-PRI[40]	42,217	44,144	5%
SO_2	9,258	5,472	-41%
VOC	129,987	132,858	2%
Onroad Modeling Files			
CO	566,315	232,611	-59%
NH_3	3,341	2,242	-33%
NO_x	145,507	35,427	-76%
PM_{10}-PRI	7,106	4,302	-39%
$PM_{2.5}$-PRI	4,368	1,309	-70%
SO_2	711	279	-61%
VOC	63,152	18,550	-71%
Nonroad Modeling Files			
CO	364,630	370,012	1%
NH_3	48	62	30%
NO_x	34,799	16,203	-53%
PM_{10}-PRI	3,676	1,922	-48%
$PM_{2.5}$-PRI	3,495	1,797	-49%
SO_2	97	59	-40%
VOC	45,062	27,307	-39%
Point-Fires Modeling Files			
CO	164,874	164,874	0%
NH_3	2,718	2,718	0%
NO_x	2,890	2,890	0%
PM_{10}-PRI	17,344	17,344	0%
$PM_{2.5}$-PRI	14,699	14,699	0%
SO_2	1,435	1,435	0%
VOC	39,078	39,078	0%

[40] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Table 5-26 compares the Base Year 2011 and final 2028 nonpoint, onroad, nonroad, and point fire emissions modeling files for West Virginia.

Table 5-26. West Virginia Base Year 2011 and Revised 2028 Nonpoint, Onroad, Nonroad, and Point-Fire Emissions Comparison

Pollutant	Base Year 2011 Emissions (tpy)	Final 2028 Emissions (tpy)	% Difference
Nonpoint Modeling Files			
CO	81,184	94,327	16%
NH_3	9,640	10,265	6%
NO_x	41,832	42,223	1%
PM_{10}-PRI[41]	96,024	96,523	1%
$PM_{2.5}$-PRI[41]	18,977	19,534	3%
SO_2	4,926	4,639	-6%
VOC	73,665	152,452	107%
Onroad Modeling Files			
CO	185,437	55,258	-70%
NH_3	734	489	-33%
NO_x	41,840	10,124	-76%
PM_{10}-PRI	2,101	1,273	-39%
$PM_{2.5}$-PRI	1,269	375	-70%
SO_2	179	72	-60%
VOC	20,493	5,208	-75%
Nonroad Modeling Files			
CO	84,687	84,367	<-1%
NH_3	10	12	26%
NO_x	6,495	3,390	-48%
PM_{10}-PRI	856	434	-49%
$PM_{2.5}$-PRI	808	406	-50%
SO_2	19	11	-42%
VOC	15,158	8,543	-44%
Point-Fires Modeling Files			
CO	86,171	86,171	0%
NH_3	1,416	1,416	0%
NO_x	1,269	1,269	0%
PM_{10}-PRI	8,849	8,849	0%
$PM_{2.5}$-PRI	7,499	7,499	0%
SO_2	676	676	0%
VOC	20,356	20,356	0%

[41] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

5.5 County-level Comparisons

Figures 5-1 through 5-7 present county-level emissions changes for each pollutant across the VISTAS ten-state area from the 2011 Base Year to the revised 2028 projection year.[42] Decreasing emissions are presented in shades of blue, while increasing emissions are presented in shades of red. Appendix F presents county-level emissions changes for each pollutant by state.

[42] The revised 2028 emissions presented in this Figures 5-1 through 5-7 are reflective of the emissions update finalized on 3/31/2020.

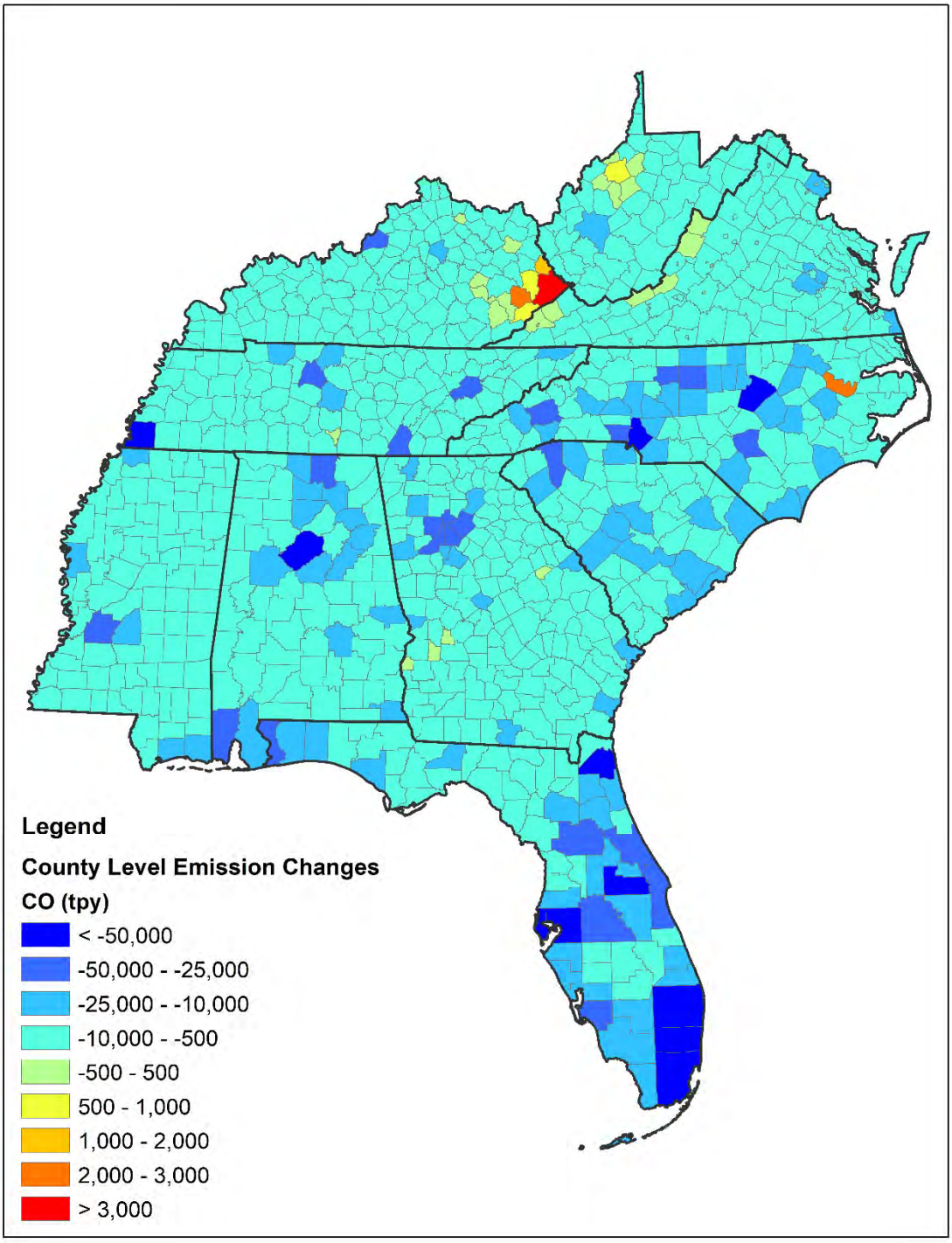

Figure 5-1. County Level CO Emission Changes for the VISTAS Ten States (except Biogenic)

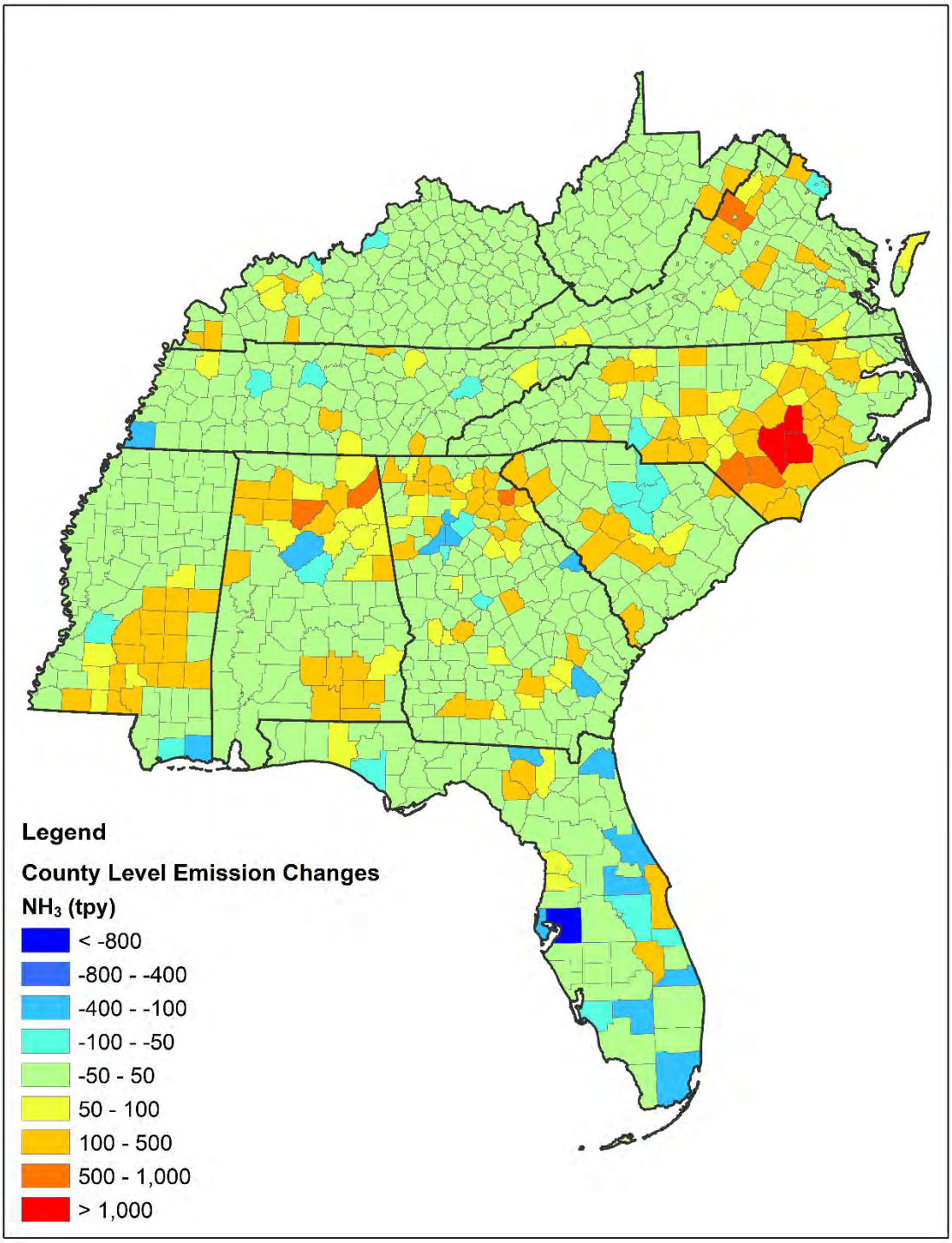

Figure 5-2. County Level NH_3 Emission Changes for the VISTAS Ten States (except Biogenic)

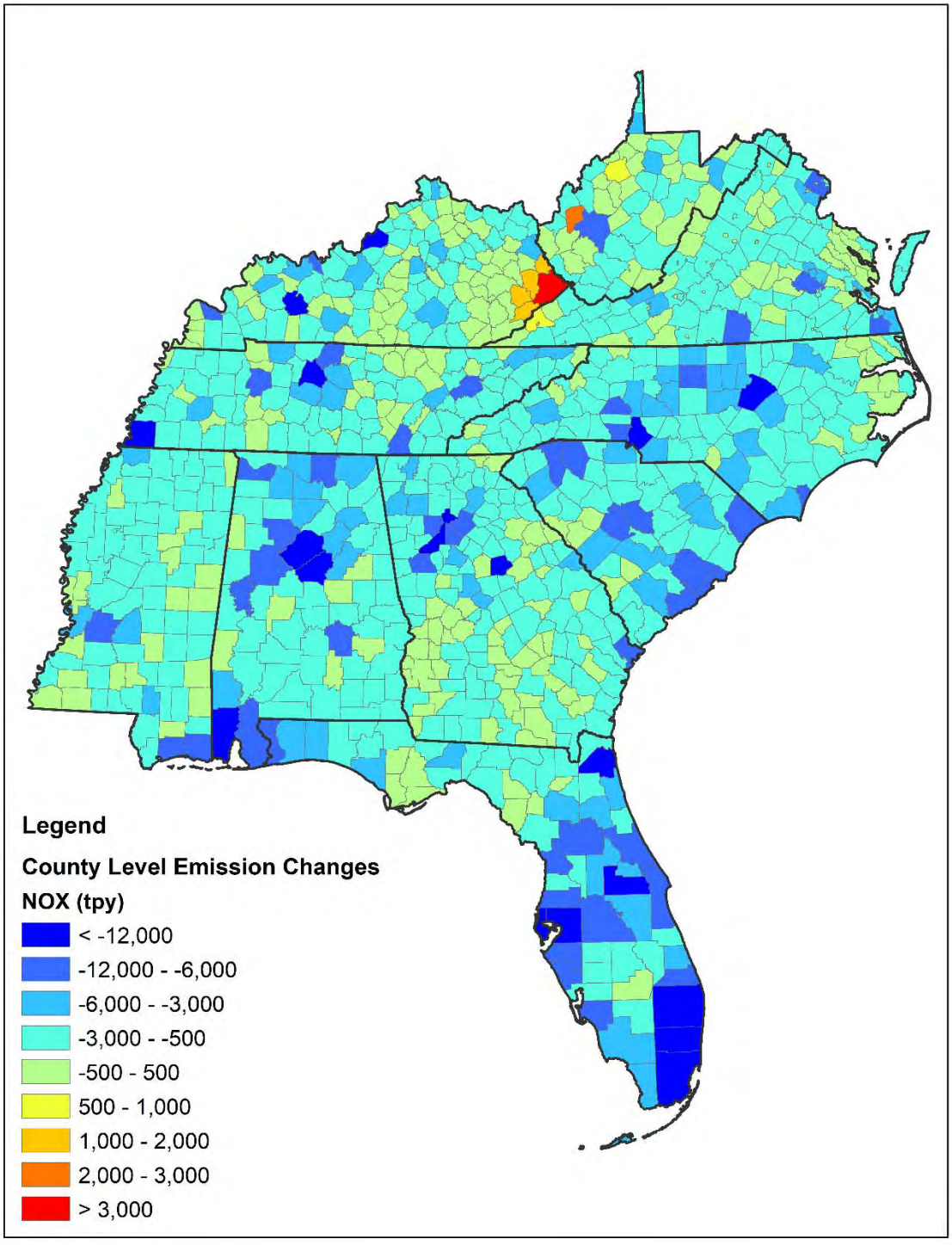

Figure 5-3. County Level NO_x Emission Changes for the VISTAS Ten States (except Biogenic)

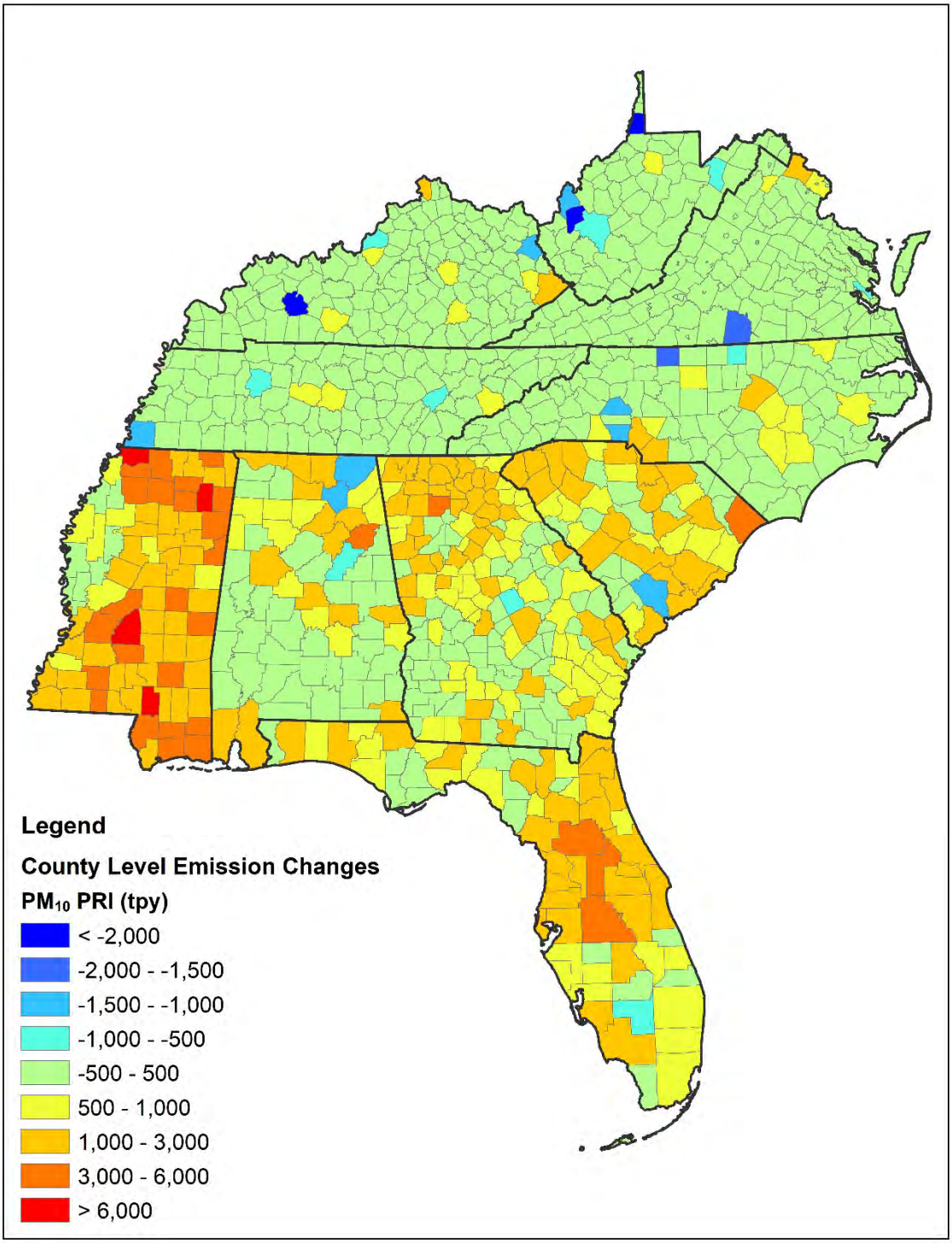

Figure 5-4. County Level PM_{10}-PRI Emission Changes for the VISTAS Ten States (except Biogenic)[43]

[43] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

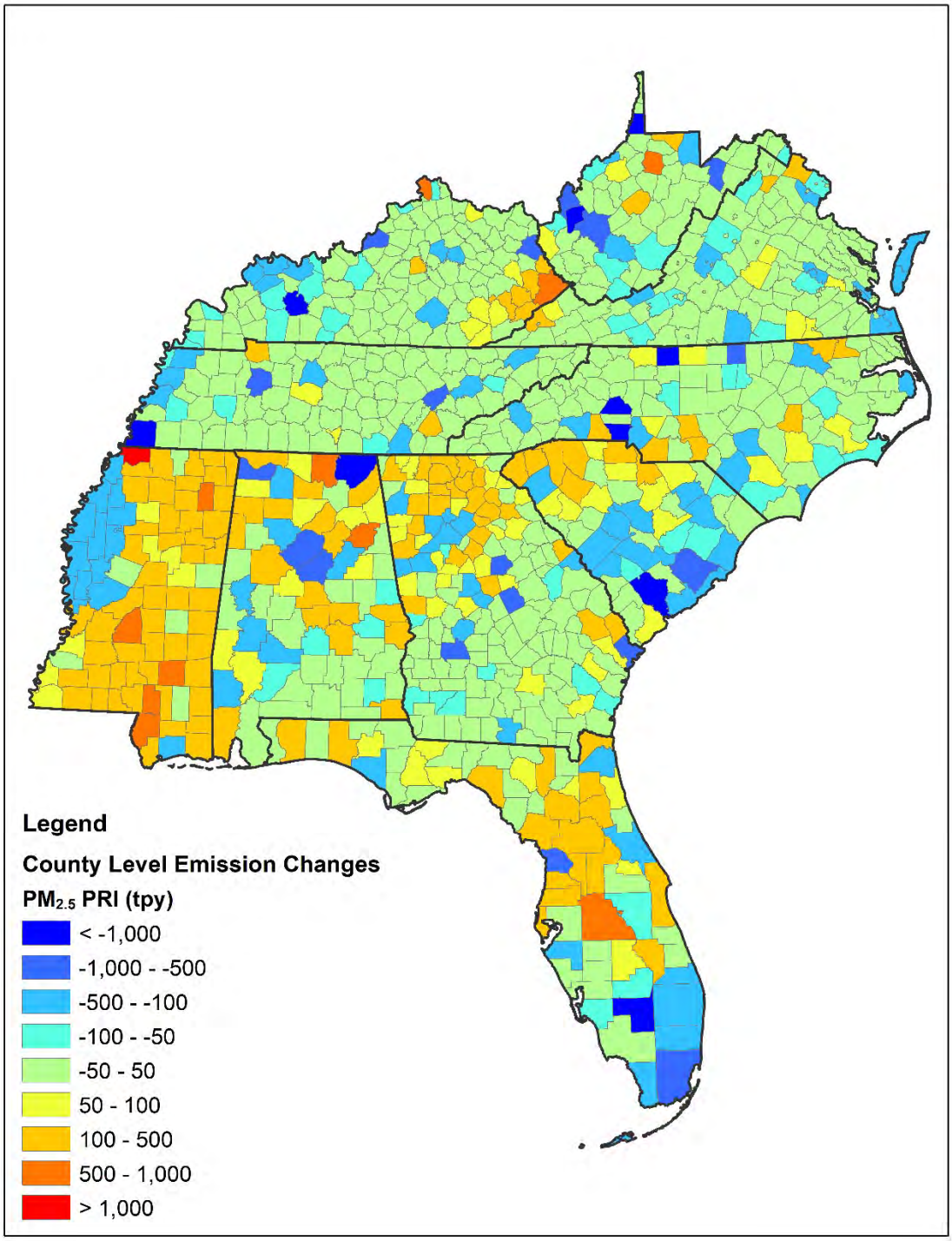

Figure 5-5. County Level $PM_{2.5}$-PRI Emission Changes for the VISTAS Ten States (except Biogenic)[44]

[44] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

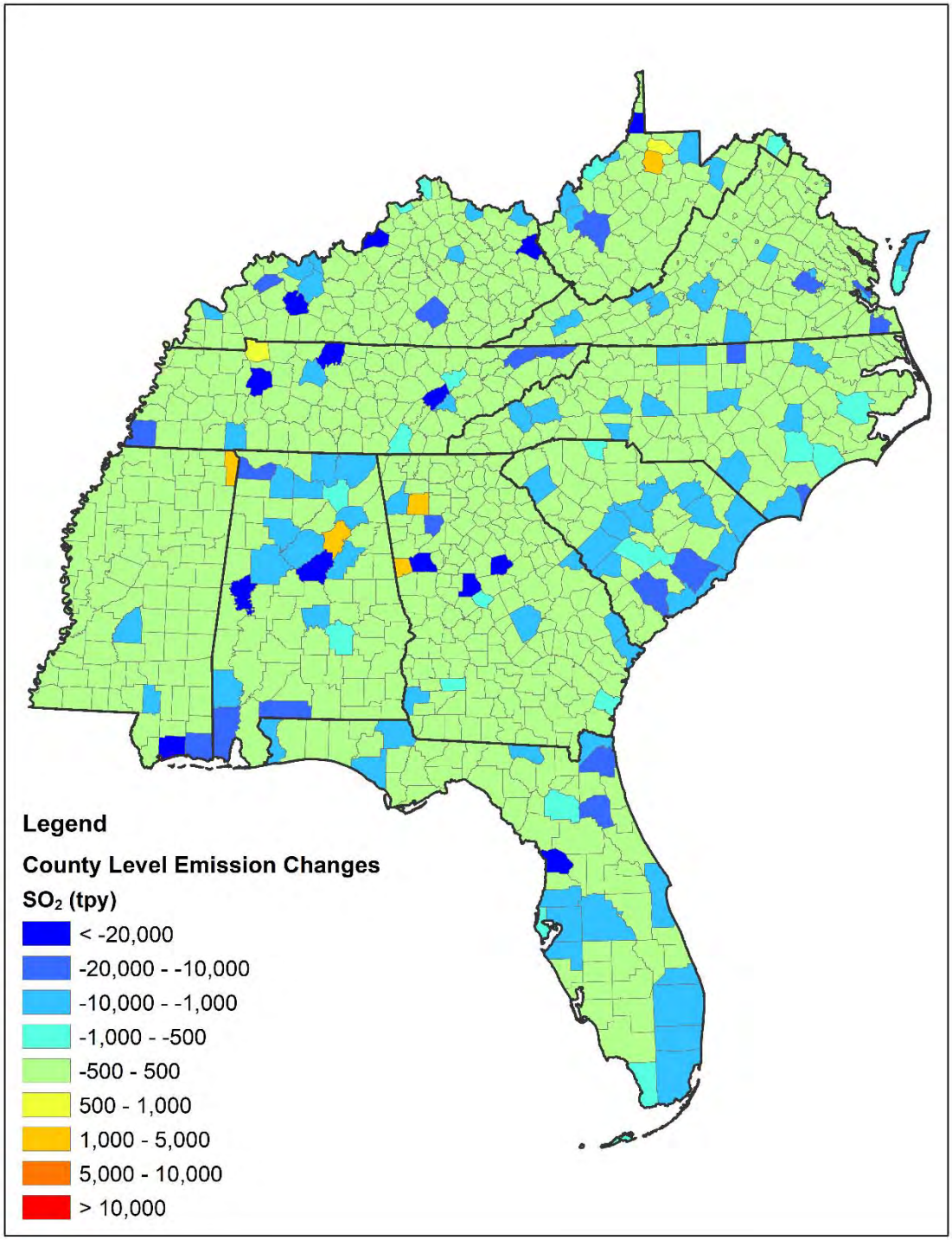

Figure 5-6. County Level SO_2 Emission Changes for the VISTAS Ten States (except Biogenic)

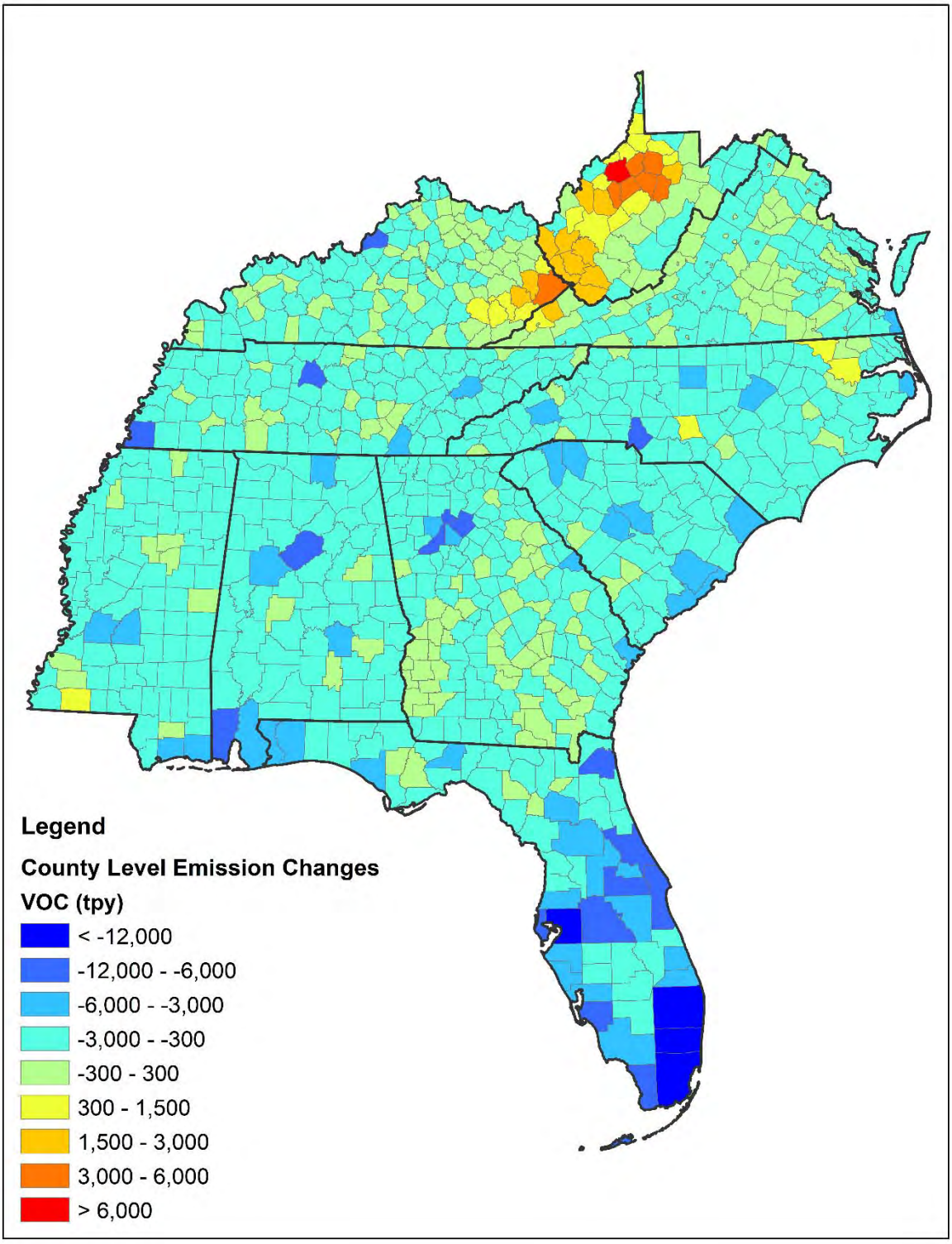

Figure 5-7. County Level VOC Emission Changes for the VISTAS Ten States (except Biogenic)

Appendix A-1.

2011 Emissions Inventory Datasets for the 2011 Emissions Modeling for VISTAS_12 Domain

Appendix A-1. 2011 Emissions Inventory Datasets for the 2011 Emissions Modeling for VISTAS_12 Domain

File Name	File Description	Notes
2011ek_cb6v2_v6_11g_inputs_biogenics.zip	2011 biogenics	Use for all states in the VISTAS_12 Domain.
2011ek_cb6v2_v6_11g_inputs_cem.zip	2011 EGU hourly emissions	Use for all states in the VISTAS_12 Domain.
2011ek_cb6v2_v6_11g_inputs_nonpoint.zip	2011 emissions inventory for nonpoint sources in the U.S.	Use for all states/ areas in the VISTAS_12 Domain. 1. afdust 2. ag 3. agfire 4. cmv (c1c2c3) 5. nonpt (pfc, refueling) 6. np_oilgas 7. rail 8. rwc
2011ek_cb6v2_v6_11g_inputs_nonroad_part1.zip	2011 emissions inventory for nonroad (other) sources in the U.S., part 1	Use for all states in the VISTAS_12 Domain.
2011ek_cb6v2_v6_11g_inputs_nonroad_part2.zip	2011 emissions inventory for nonroad (other) sources in the U.S., part 2	Use for all states in the VISTAS_12 Domain.
2011ek_cb6v2_v6_11g_inputs_onroad.zip	2011 emissions inventory inputs for onroad sources in the U.S., part 1	Use for all states in the VISTAS_12 Domain (if needed). 1. VPOP 2. VMT

Appendix A-1. 2011 Emissions Inventory Datasets for the 2011 Emissions Modeling for VISTAS_12 Domain

File Name	File Description	Notes
		3. SPEED 4. HOTELLING
2011ek_cb6v2_v6_11g_inputs_oth.zip	2011 emissions inventory for U.S., Canada, and Mexico	1. ag (Canada) 2. c3marine (Canada) 3. Mexico and Canada nonpoint 4. Mexico and Canada nonroad 5. Mexico and Canada onroad 6. Mexico and Canada point 7. U.S. Offshore oil and gas platforms 8. afdust (Canada)
2011ek_cb6v2_v6_11g_inputs_point.zip	2011 emissions inventory for point sources in the U.S.	Use for all states in the VISTAS_12 Domain. 1. pt oilgas 2. pt nonipm 3. pt_EGU
2011ek_cb6v2_v6_11g_inputs_ptfire.zip	2011 emissions from point fires, part 1	U.S. fires; Use for all states in the VISTAS_12 Domain.
2011ek_onroad_SMOKE_MOVES_MOVES2014a_forOTAQ_21jan2016_v2_AL_to_MO.zip	2011 emissions inventory for onroad sources in the U.S., part 1	Use for all states in the VISTAS_12 Domain.

Appendix A-1. 2011 Emissions Inventory Datasets for the 2011 Emissions Modeling for VISTAS_12 Domain

File Name	File Description	Notes
2011ek_onroad_SMOKE_MOVES_MOVES2014a_forOTAQ_21jan2016_v2_MT_to_WY.zip	2011 emissions inventory for onroad sources in the U.S., part 2	Use for all states in the VISTAS_12 Domain.
2011el_cb6v2_v6_11g_inputs_nonpoint.zip	2011 emissions inventory for nonpoint sources in the U.S., part 2	Supplement to "ek" version. Use for all states/areas in the VISTAS_12 Domain. 1. cmv (c1c2c3) 2. rail
2011el_cb6v2_v6_11g_inputs_onroad.zip	2011 emissions inventory inputs for onroad sources in the U.S., part 2	Supplement to "ek" version. Use for all states in the VISTAS_12 Domain. 1. VPOP 2. VMT 3. SPEED 4. HOTELLING
2011el_cb6v2_v6_11g_inputs_oth_part1.zip	2011 nonpoint, onroad and nonroad emissions inventory for Canada and Mexico, part 1	Supplement to "ek" version. Use for all areas in the VISTAS_12 Domain. 1. ag (Canada) 2. c3marine (Canada) 3. Mexico and Canada nonpoint 4. Mexico and

Appendix A-1. 2011 Emissions Inventory Datasets for the 2011 Emissions Modeling for VISTAS_12 Domain

File Name	File Description	Notes
		Canada nonroad 5. Mexico (part 1) and Canada onroad
2011el_cb6v2_v6_11g_inputs_oth_part2.zip	2011 onroad emissions for Mexico and point emissions inventory for U.S. platforms, Canada and Mexico, part 2	Supplement to "ek" version. Use for all states in the VISTAS_12 Domain. 1. Mexico onroad (part 2) 2. Mexico and Canada point 3. U.S. Offshore oil and gas platforms
2011el_cb6v2_v6_11g_inputs_ptfire.zip	2011 emissions from point fires, part 2	Mexico and Canada fires. Use for all area in the VISTAS_12 Domain.
2011el_onroad_SMOKE_MOVES2014a_ff10_part1.zip	2011 emissions inventory for onroad sources in the U.S., part 1	Supplement to "ek" version. Use for all states in the VISTAS_12 Domain.

Appendix A-1. 2011 Emissions Inventory Datasets for the 2011 Emissions Modeling for VISTAS_12 Domain

File Name	File Description	Notes
2011el_onroad_SMOKE_MOVES2014a_ff10_part2.zip	2011 emissions inventory for onroad sources in the U.S., part 2	Supplement to "ek" version. Use for all states in the VISTAS_12 Domain.
2011RepCDBs_20151208.zip	2011 county databases for MOVES model	Use for all states in the VISTAS_12 Domain (if needed).

Appendix A-2.

2028 Emissions Inventory Datasets for the 2028 Emissions Modeling

Appendix A-2. 2028 Emissions Inventory Datasets for the 2028 Emissions Modeling

File Name	File Description	Notes
forsmokemonthly.7z	2028 projected EGU emissions from the ERTAC version 2.7 projection tool	Use only for the Non-VISTAS states in the VISTAS_12 Domain. File developed by ERTAC and provided by NC DAQ.
2028el_cb6v2_v6_11g_inputs_point.zip	2028 projected emissions inventory for point sources in the U.S.	Use only for the Non-VISTAS states in the VISTAS_12 Domain 1. pt oilgas 2. pt nonipm 3. pt_EGU (do not use)
2028el_cb6v2_v6_11g_inputs_nonpoint.zip	2028 projected emissions inventory for nonpoint sources in the U.S.	Use for all states/areas in the VISTAS_12 Domain 1. afdust 2. ag 3. c1c2_offshore 4. cmv 5. nonpt 6. np_oilgas (pfc, refueling, cement kilns, biorefineries, other) 7. rail 8. rwc
2011ek_cb6v2_v6_11g_inputs_biogenics.zip	2011 biogenics	U.S. biogenics; carry-forward for the 2028 emissions. Use for all areas in the VISTAS_12 Domain.
2028el_cb6v2_v6_11g_inputs_nonroad_part1.zip	2028 projected emissions inventory for nonroad (other) sources in the U.S., part 1	Use for all areas in the VISTAS_12 Domain.

Appendix A-2. 2028 Emissions Inventory Datasets for the 2028 Emissions Modeling

File Name	File Description	Notes
2028el_cb6v2_v6_11g_inputs_nonroad_part2.zip	2028 projected emissions inventory for nonroad (other) sources in the U.S., part 2	Use for all areas in the VISTAS_12 Domain.
2028el_cb6v2_v6_11g_inputs_onroad.zip	2028 projected emissions inventory inputs for onroad sources in the U.S.	Use for all states in the VISTAS_12 Domain (if needed). 1. VPOP 2. VMT 3. SPEED 4. HOTELLING
2028el_cb6v2_v6_11g_inputs_oth_part1.zip	2028 projected emissions inventory for Canada and Mexico, part 1	Use for all areas in the VISTAS_12 Domain. 1. ag (Canada) 2. c3marine (Canada) 3. Mexico and Canada nonpoint 4. Mexico and Canada nonroad 5. Mexico onroad (part 1) 6. Canada onroad
2028el_cb6v2_v6_11g_inputs_oth_part2.zip	2028 projected emissions inventory for Gulf of Mexico, Canada, and Mexico, part 1	Use for all areas in the VISTAS_12 Domain. 1. Mexico onroad (part 2) 2. Mexico point 3. Canada point 4. U.S. Offshore oil and gas platforms
2011ek_cb6v2_v6_11g_inputs_ptfire.zip	2011 emissions from point fires, part 1	U.S. fires; carry-forward for the 2028 emissions. Use for all states in the VISTAS_12 Domain
2028el_onroad_SMOKE_MOVES2014a_ff10_part1.zip	2028 projected emissions inventory for onroad sources in the U.S., part 1	Use for all areas in the VISTAS_12 Domain

Appendix A-2. 2028 Emissions Inventory Datasets for the 2028 Emissions Modeling

File Name	File Description	Notes
2028el_onroad_SMOKE_MOVES2014a_ff10_part2.zip	2028 projected emissions inventory for onroad sources in the U.S., part 2	Use for all areas in the VISTAS_12 Domain
2011el_cb6v2_v6_11g_inputs_ptfire.zip	2011 emissions from point fires, part 2	Mexico and Canada fires; carry-forward for the 2028 emission. Use for all areas in the VISTAS_12 Domain.
2028el_RepCDBs_20160820.zip	2028 county databases for MOVES model	Use for all states in the VISTAS_12 Domain (if needed).
2028el_CoST_Projection_Packets.zip	2028 projection and control factors, and closures	Use for all states/areas in the VISTAS_12 Domain (if needed).
NCDAQ_2028PY_NonEGU_Point_061918_Final.xlsx[1]	2028 point non-EGU dataset developed by North Carolina	Use only for North Carolina
C2.1.1CONUSv16.0_2028_NCD_fs_ff10_future.csv	2028 projected EGU emissions from the ERTAC version 16.0 projection tool	Use only for the selected VISTAS and non-LADCO states in the VISTAS_12 Domain. File developed by ERTAC and provided by VA DEQ.
C2.1.3CONUSv16.1_2028_fs_ff10_future.csv	2028 projected EGU emissions from the ERTAC version 16.1 projection tool	Use only for the LADCO states. File developed by ERTAC and provided by VA DEQ.
2028fh_inventory_point_27sep2019.zip	2028 projected point source emissions based on EPA's 2016 point sources emissions	Use only for selected VISTAS states.
Additional_2023en_sources_nonERTAC_egu_EASTUS_winter.csv; Additional_2023en_sources_nonERTAC_egu_EASTUS_summer.csv; nonERTAC_sources_outsideVISTAS_outsideWEST_20181008_ff10.csv	2028 small EGU emissions inventory to supplement the 2028 ERTAC emissions inventory prepared by NC DAQ (11/12/2018).	Use only for non-VISTAS states in the VISTAS_12 Domain.

[1] For non-EGU point sources, NC DAQ applied its own facility closures and growth and control factors to North Carolina's 2016 baseyear inventory to develop its 2028 projection year inventory.

Appendix B.

Updated Point Source Emissions

State Abbr.	FIPS Code	Master EIS Facility ID	Facility Name	Pollutant Code	Re-Model Emissions (tpy)	Original Model Emissions (tpy)	Update Reason
AL	01001	7212311	International Paper Company	SO2	708.87	2,286.33	State Directed
AL	01023	7442111	Georgia Pacific	SO2	2,965.80	2,393.68	State Directed
AL	01023	964311	Pruet Production Company-Womack Hill Field O&G Production Facility	CO	0.00	80.14	State Directed
AL	01023	964311	Pruet Production Company-Womack Hill Field O&G Production Facility	NOX	0.00	44.74	State Directed
AL	01023	964311	Pruet Production Company-Womack Hill Field O&G Production Facility	SO2	0.00	298.66	State Directed
AL	01023	964311	Pruet Production Company-Womack Hill Field O&G Production Facility	VOC	0.00	10.47	State Directed
AL	01047	1003511	Globe Metallurgical Inc	SO2	587.30	515.97	State Directed
AL	01053	12787611	Ventex Operating Company	SO2	60.16	376.53	State Directed
AL	01053	7440111	Georgia-Pacific Brewton LLC	SO2	997.46	967.46	State Directed
AL	01053	7440211	Escambia Operating Company LLC	SO2	3,782.18	18,974.39	PSAT Review
AL	01053	985111	Escambia Operating Company LLC	CO	0.00	94.73	PSAT Review
AL	01053	985111	Escambia Operating Company LLC	NOX	0.00	149.64	PSAT Review
AL	01053	985111	Escambia Operating Company LLC	PM10-PRI	0.00	10.07	PSAT Review
AL	01053	985111	Escambia Operating Company LLC	PM25-PRI	0.00	8.24	PSAT Review
AL	01053	985111	Escambia Operating Company LLC	SO2	88.01	8,589.60	PSAT Review
AL	01053	985111	Escambia Operating Company LLC	VOC	0.00	32.91	PSAT Review
AL	01053	985311	Cobra Oil & Gas Corporation	SO2	88.35	184.95	State Directed
AL	01073	1003111	Ala power - MILLER	SO2	1,000.00	1,490.45	State Directed
AL	01073	1057611	UNITED STATES STEEL CORPORATION FAIRFIELD WORKS	CO	0.00	793.59	State Directed
AL	01073	1057611	UNITED STATES STEEL CORPORATION FAIRFIELD WORKS	NH3	0.00	30.61	State Directed
AL	01073	1057611	UNITED STATES STEEL CORPORATION FAIRFIELD WORKS	NOX	0.00	768.68	State Directed
AL	01073	1057611	UNITED STATES STEEL CORPORATION FAIRFIELD WORKS	PM10-PRI	0.00	1,251.73	State Directed

State Abbr.	FIPS Code	Master EIS Facility ID	Facility Name	Pollutant Code	Re-Model Emissions (tpy)	Original Model Emissions (tpy)	Update Reason
AL	01073	1057611	UNITED STATES STEEL CORPORATION FAIRFIELD WORKS	PM25-PRI	0.00	1,019.68	State Directed
AL	01073	1057611	UNITED STATES STEEL CORPORATION FAIRFIELD WORKS	SO2	0.00	705.96	State Directed
AL	01073	1057611	UNITED STATES STEEL CORPORATION FAIRFIELD WORKS	VOC	0.00	387.99	State Directed
AL	01085	1020111	SABIC Innovative Plastics US LLC	SO2	128.91	25.59	State Directed
AL	01091	1002811	Rock-Tenn Mill Company, LLC	SO2	307.82	37.82	State Directed
AL	01097	1056111	Ala Power - Barry	SO2	3,007.57	6,033.17	PSAT Review
AL	01097	1060811	Mobile Energy Services Company	CO	0.00	885.64	State Directed
AL	01097	1060811	Mobile Energy Services Company	NH3	0.00	12.45	State Directed
AL	01097	1060811	Mobile Energy Services Company	NOX	0.00	939.88	State Directed
AL	01097	1060811	Mobile Energy Services Company	PM10-PRI	0.00	31.62	State Directed
AL	01097	1060811	Mobile Energy Services Company	PM25-PRI	0.00	30.78	State Directed
AL	01097	1060811	Mobile Energy Services Company	SO2	0.00	213.77	State Directed
AL	01097	1060811	Mobile Energy Services Company	VOC	0.00	25.85	State Directed
AL	01097	1061511	Four Star Oil Gas Company	SO2	120.75	269.86	State Directed
AL	01097	1061611	Union Oil of California - Chunchula Gas Plant	CO	0.00	103.02	PSAT Review
AL	01097	1061611	Union Oil of California - Chunchula Gas Plant	NOX	0.00	349.23	PSAT Review
AL	01097	1061611	Union Oil of California - Chunchula Gas Plant	PM10-PRI	0.00	2.30	PSAT Review
AL	01097	1061611	Union Oil of California - Chunchula Gas Plant	PM25-PRI	0.00	1.61	PSAT Review
AL	01097	1061611	Union Oil of California - Chunchula Gas Plant	SO2	0.00	2,573.15	PSAT Review
AL	01097	1061611	Union Oil of California - Chunchula Gas Plant	VOC	0.00	80.29	PSAT Review
AL	01097	1061711	ExxonMobil Production Company	SO2	137.62	325.33	State Directed
AL	01097	985911	SSAB Alabama Inc	SO2	378.04	413.29	State Directed
AL	01099	1019211	GP Cellulose Alabama River Cellulose LLC	SO2	1,109.08	998.68	EPA 2028 (2016 Platform)
AL	01103	985511	Ascend Performance Materials LLC	SO2	83.15	53.46	State Directed
AL	01113	1000211	MeadWestvaco Mahrt Mill	SO2	253.90	349.94	State Directed
AL	01115	949611	National Cement Co of Alabama	PM10-PRI	131.69	127.15	State Directed

State Abbr.	FIPS Code	Master EIS Facility ID	Facility Name	Pollutant Code	Re-Model Emissions (tpy)	Original Model Emissions (tpy)	Update Reason
AL	01115	949611	National Cement Co of Alabama	PM25-PRI	72.40	69.85	State Directed
AL	01115	949611	National Cement Co of Alabama	SO2	3,149.04	90.80	State Directed
AL	01117	7440711	Lhoist North America of Alabama, LLC	SO2	138.64	173.70	State Directed
AL	01117	7440811	Unimin Lime Corporation	SO2	38.47	153.16	State Directed
AL	01117	949211	EC Gaston	SO2	4,000.00	2,286.91	State Directed
AL	01117	949311	Lhoist North America of Alabama, LLC	SO2	9,489.71	2,456.35	State Directed
AL	01117	949411	Chemical Lime Co of Alabama	SO2	958.40	0.00	State Directed
AL	01125	7441411	Hunt Refining Company	SO2	52.82	439.68	State Directed
AL	01127	7917311	Alabama Power - Gorgas	CO	0.00	609.88	Area of Influence Analysis
AL	01127	7917311	Alabama Power - Gorgas	NH3	0.00	10.46	Area of Influence Analysis
AL	01127	7917311	Alabama Power - Gorgas	NOX	0.00	3,976.41	Area of Influence Analysis
AL	01127	7917311	Alabama Power - Gorgas	PM10-PRI	0.00	581.43	Area of Influence Analysis
AL	01127	7917311	Alabama Power - Gorgas	PM25-PRI	0.00	241.48	Area of Influence Analysis
AL	01127	7917311	Alabama Power - Gorgas	SO2	0.00	1,410.80	Area of Influence Analysis
AL	01127	7917311	Alabama Power - Gorgas	VOC	0.00	35.56	Area of Influence Analysis
AL	01129	1028611	PowerSouth Energy Coop - Lowman	CO	0.00	364.57	Area of Influence Analysis
AL	01129	1028611	PowerSouth Energy Coop - Lowman	NH3	0.00	23.62	Area of Influence Analysis
AL	01129	1028611	PowerSouth Energy Coop - Lowman	NOX	0.00	2,910.80	Area of Influence Analysis
AL	01129	1028611	PowerSouth Energy Coop - Lowman	PM10-PRI	0.00	645.58	Area of Influence Analysis
AL	01129	1028611	PowerSouth Energy Coop - Lowman	PM25-PRI	0.00	499.28	Area of Influence Analysis
AL	01129	1028611	PowerSouth Energy Coop - Lowman	SO2	0.00	4,394.92	Area of Influence Analysis
AL	01129	1028611	PowerSouth Energy Coop - Lowman	VOC	0.00	25.72	Area of Influence Analysis
AL	01129	1028711	American Midstream Chatom, LLC	CO	0.00	2,035.50	PSAT Review
AL	01129	1028711	American Midstream Chatom, LLC	NOX	0.00	425.87	PSAT Review
AL	01129	1028711	American Midstream Chatom, LLC	PM10-PRI	0.00	6.91	PSAT Review
AL	01129	1028711	American Midstream Chatom, LLC	PM25-PRI	0.00	6.91	PSAT Review
AL	01129	1028711	American Midstream Chatom, LLC	SO2	0.00	3,106.38	PSAT Review

State Abbr.	FIPS Code	Master EIS Facility ID	Facility Name	Pollutant Code	Re-Model Emissions (tpy)	Original Model Emissions (tpy)	Update Reason
AL	01129	1028711	American Midstream Chatom, LLC	VOC	0.00	109.17	PSAT Review
AL	01131	10633711	International Paper	SO2	1,150.00	835.34	State Directed
FL	12017	640611	DUKE ENERGY FLORIDA, INC. (DEF)	CO	422.11	3,238.98	PSAT Review
FL	12017	640611	DUKE ENERGY FLORIDA, INC. (DEF)	NH3	0.47	53.65	PSAT Review
FL	12017	640611	DUKE ENERGY FLORIDA, INC. (DEF)	NOX	1,048.14	2,489.85	PSAT Review
FL	12017	640611	DUKE ENERGY FLORIDA, INC. (DEF)	PM10-PRI	1,231.47	778.69	PSAT Review
FL	12017	640611	DUKE ENERGY FLORIDA, INC. (DEF)	PM25-PRI	960.85	507.92	PSAT Review
FL	12017	640611	DUKE ENERGY FLORIDA, INC. (DEF)	SO2	2,613.52	5,306.41	PSAT Review
FL	12017	640611	DUKE ENERGY FLORIDA, INC. (DEF)	VOC	50.82	101.01	PSAT Review
FL	12031	640211	JEA - Northside	CO	779.12	657.92	PSAT Review
FL	12031	640211	JEA - Northside	NH3	38.86	33.22	PSAT Review
FL	12031	640211	JEA - Northside	NOX	1,037.03	651.79	PSAT Review
FL	12031	640211	JEA - Northside	PM10-PRI	228.42	208.22	PSAT Review
FL	12031	640211	JEA - Northside	PM25-PRI	183.49	163.29	PSAT Review
FL	12031	640211	JEA - Northside	SO2	2,150.49	2,094.48	PSAT Review
FL	12031	640211	JEA - Northside	VOC	38.37	27.67	PSAT Review
FL	12033	752711	GULF POWER - Crist	CO	689.29	1,509.07	PSAT Review
FL	12033	752711	GULF POWER - Crist	NH3	2.91	24.98	PSAT Review
FL	12033	752711	GULF POWER - Crist	NOX	1,146.82	2,998.39	PSAT Review
FL	12033	752711	GULF POWER - Crist	PM10-PRI	867.97	969.21	PSAT Review
FL	12033	752711	GULF POWER - Crist	PM25-PRI	854.40	787.92	PSAT Review
FL	12033	752711	GULF POWER - Crist	SO2	572.17	2,615.65	PSAT Review
FL	12033	752711	GULF POWER - Crist	VOC	15.96	48.13	PSAT Review
FL	12047	769711	WHITE SPRINGS AGRICULTURAL CHEMICALS,INC	CO	12.02	29.47	PSAT Review
FL	12047	769711	WHITE SPRINGS AGRICULTURAL CHEMICALS,INC	NH3	14.38	122.74	PSAT Review
FL	12047	769711	WHITE SPRINGS AGRICULTURAL CHEMICALS,INC	NOX	102.19	112.41	PSAT Review

State Abbr.	FIPS Code	Master EIS Facility ID	Facility Name	Pollutant Code	Re-Model Emissions (tpy)	Original Model Emissions (tpy)	Update Reason
FL	12047	769711	WHITE SPRINGS AGRICULTURAL CHEMICALS,INC	PM10-PRI	3.46	21.55	PSAT Review
FL	12047	769711	WHITE SPRINGS AGRICULTURAL CHEMICALS,INC	PM25-PRI	2.96	8.05	PSAT Review
FL	12047	769711	WHITE SPRINGS AGRICULTURAL CHEMICALS,INC	SO2	1,557.04	3,197.77	PSAT Review
FL	12047	769711	WHITE SPRINGS AGRICULTURAL CHEMICALS,INC	VOC	0.91	0.43	PSAT Review
FL	12057	716411	MOSAIC FERTILIZER, LLC	CO	14.37	9.34	PSAT Review
FL	12057	716411	MOSAIC FERTILIZER, LLC	NH3	56.42	2.89	PSAT Review
FL	12057	716411	MOSAIC FERTILIZER, LLC	NOX	168.76	159.71	PSAT Review
FL	12057	716411	MOSAIC FERTILIZER, LLC	PM10-PRI	36.53	38.39	PSAT Review
FL	12057	716411	MOSAIC FERTILIZER, LLC	PM25-PRI	36.47	38.39	PSAT Review
FL	12057	716411	MOSAIC FERTILIZER, LLC	SO2	1,804.37	3,034.06	PSAT Review
FL	12057	716411	MOSAIC FERTILIZER, LLC	VOC	2.05	0.85	PSAT Review
FL	12085	751511	FLORIDA POWER & LIGHT (PMR)	CO	882.14	43.65	ERTAC Version 16.0 Update
FL	12085	751511	FLORIDA POWER & LIGHT (PMR)	NH3	115.79	244.56	ERTAC Version 16.0 Update
FL	12085	751511	FLORIDA POWER & LIGHT (PMR)	NOX	1,292.86	653.76	ERTAC Version 16.0 Update
FL	12085	751511	FLORIDA POWER & LIGHT (PMR)	PM10-PRI	515.87	111.46	ERTAC Version 16.0 Update
FL	12085	751511	FLORIDA POWER & LIGHT (PMR)	PM25-PRI	395.45	109.75	ERTAC Version 16.0 Update
FL	12085	751511	FLORIDA POWER & LIGHT (PMR)	SO2	34.36	19.52	ERTAC Version 16.0 Update
FL	12085	751511	FLORIDA POWER & LIGHT (PMR)	VOC	144.39	36.42	ERTAC Version 16.0 Update
FL	12086	899911	TARMAC AMERICA LLC	NOX	2,376.00	879.70	PSAT Review
FL	12086	900111	CEMEX CONSTRUCTION MATERIALS FL. LLC.	NOX	2,599.99	910.36	PSAT Review
FL	12099	ORIS57898	Palm Beach Renewable Energy Facility 2	CO	184.36	0.00	EPA 2028 (2016 Platform)
FL	12099	ORIS57898	Palm Beach Renewable Energy Facility 2	NH3	9.73	0.00	EPA 2028 (2016 Platform)
FL	12099	ORIS57898	Palm Beach Renewable Energy Facility 2	NOX	1,068.11	0.00	EPA 2028 (2016 Platform)
FL	12099	ORIS57898	Palm Beach Renewable Energy Facility 2	PM10-PRI	50.88	0.00	EPA 2028 (2016 Platform)
FL	12099	ORIS57898	Palm Beach Renewable Energy Facility 2	PM25-PRI	44.90	0.00	EPA 2028 (2016 Platform)

State Abbr.	FIPS Code	Master EIS Facility ID	Facility Name	Pollutant Code	Re-Model Emissions (tpy)	Original Model Emissions (tpy)	Update Reason
FL	12099	ORIS57898	Palm Beach Renewable Energy Facility 2	SO2	122.78	0.00	EPA 2028 (2016 Platform)
FL	12099	ORIS57898	Palm Beach Renewable Energy Facility 2	VOC	27.09	0.00	EPA 2028 (2016 Platform)
FL	12105	535711	MOSAIC FERTILIZER LLC	CO	0.60	0.00	EPA 2028 (2016 Platform)
FL	12105	535711	MOSAIC FERTILIZER LLC	NOX	49.74	29.46	EPA 2028 (2016 Platform)
FL	12105	535711	MOSAIC FERTILIZER LLC	PM10-PRI	2.98	0.00	EPA 2028 (2016 Platform)
FL	12105	535711	MOSAIC FERTILIZER LLC	PM25-PRI	2.97	0.00	EPA 2028 (2016 Platform)
FL	12105	535711	MOSAIC FERTILIZER LLC	SO2	1,552.84	1,123.50	EPA 2028 (2016 Platform)
FL	12105	535711	MOSAIC FERTILIZER LLC	VOC	3.04	1.45	EPA 2028 (2016 Platform)
FL	12105	717711	MOSAIC FERTILIZER LLC	SO2	4,490.96	7,900.66	PSAT Review
FL	12105	919811	MOSAIC FERTILIZER, LLC	SO2	4,300.52	4,425.56	PSAT Review
GA	13103	3711211	Ga Power Co Plt McIntosh	CO	0.00	34.68	Area of Influence Analysis
GA	13103	3711211	Ga Power Co Plt McIntosh	NH3	0.00	0.29	Area of Influence Analysis
GA	13103	3711211	Ga Power Co Plt McIntosh	NOX	0.00	447.08	Area of Influence Analysis
GA	13103	3711211	Ga Power Co Plt McIntosh	PM10-PRI	0.00	6.99	Area of Influence Analysis
GA	13103	3711211	Ga Power Co Plt McIntosh	PM25-PRI	0.00	5.17	Area of Influence Analysis
GA	13103	3711211	Ga Power Co Plt McIntosh	SO2	0.00	127.27	Area of Influence Analysis
GA	13103	3711211	Ga Power Co Plt McIntosh	VOC	0.00	1.40	Area of Influence Analysis
GA	13115	3713211	Ga Power Company - Plant Hammond	CO	0.00	122.05	Area of Influence Analysis
GA	13115	3713211	Ga Power Company - Plant Hammond	NH3	0.00	1.25	Area of Influence Analysis
GA	13115	3713211	Ga Power Company - Plant Hammond	NOX	0.00	864.86	Area of Influence Analysis
GA	13115	3713211	Ga Power Company - Plant Hammond	PM10-PRI	0.00	75.46	Area of Influence Analysis
GA	13115	3713211	Ga Power Company - Plant Hammond	PM25-PRI	0.00	69.11	Area of Influence Analysis
GA	13115	3713211	Ga Power Company - Plant Hammond	SO2	0.00	772.48	Area of Influence Analysis
GA	13115	3713211	Ga Power Company - Plant Hammond	VOC	0.00	14.59	Area of Influence Analysis
KY	21015	6040811	Duke Energy KY East Bend	CO	492.74	494.74	EPA 2028 (2016 Platform)
KY	21015	6040811	Duke Energy KY East Bend	NH3	1.75	27.00	EPA 2028 (2016 Platform)
KY	21015	6040811	Duke Energy KY East Bend	NOX	2,633.11	3,328.57	EPA 2028 (2016 Platform)

State Abbr.	FIPS Code	Master EIS Facility ID	Facility Name	Pollutant Code	Re-Model Emissions (tpy)	Original Model Emissions (tpy)	Update Reason
KY	21015	6040811	Duke Energy KY East Bend	PM10-PRI	1,200.60	232.25	EPA 2028 (2016 Platform)
KY	21015	6040811	Duke Energy KY East Bend	PM25-PRI	830.61	99.05	EPA 2028 (2016 Platform)
KY	21015	6040811	Duke Energy KY East Bend	SO2	1,308.67	2,680.74	EPA 2028 (2016 Platform)
KY	21015	6040811	Duke Energy KY East Bend	VOC	59.21	59.28	EPA 2028 (2016 Platform)
KY	21015	ORIS84024	PJM_West_KY_Combustion Turbine	CO	0.00	0.01	State Directed
KY	21015	ORIS84024	PJM_West_KY_Combustion Turbine	NH3	0.00	0.00	State Directed
KY	21015	ORIS84024	PJM_West_KY_Combustion Turbine	NOX	0.00	0.18	State Directed
KY	21015	ORIS84024	PJM_West_KY_Combustion Turbine	PM10-PRI	0.00	0.00	State Directed
KY	21015	ORIS84024	PJM_West_KY_Combustion Turbine	PM25-PRI	0.00	0.00	State Directed
KY	21015	ORIS84024	PJM_West_KY_Combustion Turbine	SO2	0.00	0.00	State Directed
KY	21015	ORIS84024	PJM_West_KY_Combustion Turbine	VOC	0.00	0.00	State Directed
KY	21059	5891711	Owensboro Municipal Utilities - Elmer Smith Station	CO	0.00	2.25	Area of Influence Analysis
KY	21059	5891711	Owensboro Municipal Utilities - Elmer Smith Station	NOX	0.00	23.41	Area of Influence Analysis
KY	21059	5891711	Owensboro Municipal Utilities - Elmer Smith Station	PM10-PRI	0.00	8.95	Area of Influence Analysis
KY	21059	5891711	Owensboro Municipal Utilities - Elmer Smith Station	PM25-PRI	0.00	2.91	Area of Influence Analysis
KY	21059	5891711	Owensboro Municipal Utilities - Elmer Smith Station	SO2	0.00	6.72	Area of Influence Analysis
KY	21059	5891711	Owensboro Municipal Utilities - Elmer Smith Station	VOC	0.00	0.34	Area of Influence Analysis
KY	21091	7352411	Century Aluminum of KY LLC	SO2	2,223.56	5,044.16	PSAT Review
KY	21127	6019011	Kentucky Power Co-Big Sandy Plant	CO	60.51	232.51	ERTAC Version 16.0 Update
KY	21127	6019011	Kentucky Power Co-Big Sandy Plant	NH3	7.78	4.79	ERTAC Version 16.0 Update
KY	21127	6019011	Kentucky Power Co-Big Sandy Plant	NOX	910.81	440.63	State Directed
KY	21127	6019011	Kentucky Power Co-Big Sandy Plant	PM10-PRI	111.78	61.18	ERTAC Version 16.0 Update
KY	21127	6019011	Kentucky Power Co-Big Sandy Plant	PM25-PRI	83.76	45.87	ERTAC Version 16.0 Update
KY	21127	6019011	Kentucky Power Co-Big Sandy Plant	SO2	27.41	137.70	State Directed
KY	21127	6019011	Kentucky Power Co-Big Sandy Plant	VOC	7.28	11.76	ERTAC Version 16.0 Update
KY	21127	6019911	Riverside Generating Co LLC	CO	82.18	214.87	ERTAC Version 16.0 Update
KY	21127	6019911	Riverside Generating Co LLC	NH3	31.53	0.00	ERTAC Version 16.0 Update

State Abbr.	FIPS Code	Master EIS Facility ID	Facility Name	Pollutant Code	Re-Model Emissions (tpy)	Original Model Emissions (tpy)	Update Reason
KY	21127	6019911	Riverside Generating Co LLC	NOX	121.85	169.04	State Directed
KY	21127	6019911	Riverside Generating Co LLC	PM10-PRI	7.88	23.38	ERTAC Version 16.0 Update
KY	21127	6019911	Riverside Generating Co LLC	PM25-PRI	3.82	11.36	ERTAC Version 16.0 Update
KY	21127	6019911	Riverside Generating Co LLC	SO2	1.30	1.74	State Directed
KY	21127	6019911	Riverside Generating Co LLC	VOC	4.14	11.72	ERTAC Version 16.0 Update
KY	21145	15073911	Paducah Power System - PPS Power Plant # 1	CO	31.77	23.55	ERTAC Version 16.0 Update
KY	21145	15073911	Paducah Power System - PPS Power Plant # 1	NH3	2.40	0.54	ERTAC Version 16.0 Update
KY	21145	15073911	Paducah Power System - PPS Power Plant # 1	NOX	95.73	71.23	State Directed
KY	21145	15073911	Paducah Power System - PPS Power Plant # 1	PM10-PRI	8.46	6.41	ERTAC Version 16.0 Update
KY	21145	15073911	Paducah Power System - PPS Power Plant # 1	PM25-PRI	7.64	6.37	ERTAC Version 16.0 Update
KY	21145	15073911	Paducah Power System - PPS Power Plant # 1	VOC	1.99	1.50	ERTAC Version 16.0 Update
KY	21161	7335511	East KY Power Coop - Spurlock Station	CO	4,078.53	3,262.04	ERTAC Version 16.0 Update
KY	21161	7335511	East KY Power Coop - Spurlock Station	NH3	26.20	45.04	ERTAC Version 16.0 Update
KY	21161	7335511	East KY Power Coop - Spurlock Station	NOX	2,442.00	3,398.73	State Directed
KY	21161	7335511	East KY Power Coop - Spurlock Station	PM10-PRI	767.28	542.79	ERTAC Version 16.0 Update
KY	21161	7335511	East KY Power Coop - Spurlock Station	PM25-PRI	665.38	426.86	ERTAC Version 16.0 Update
KY	21161	7335511	East KY Power Coop - Spurlock Station	SO2	2,842.30	4,702.60	State Directed
KY	21161	7335511	East KY Power Coop - Spurlock Station	VOC	79.57	133.74	ERTAC Version 16.0 Update
KY	21167	5933111	KY Utilities Co - Brown Station	CO	281.75	298.50	ERTAC Version 16.0 Update
KY	21167	5933111	KY Utilities Co - Brown Station	NH3	14.75	19.51	ERTAC Version 16.0 Update
KY	21167	5933111	KY Utilities Co - Brown Station	NOX	1,572.73	2,049.81	State Directed
KY	21167	5933111	KY Utilities Co - Brown Station	PM10-PRI	447.67	215.51	ERTAC Version 16.0 Update
KY	21167	5933111	KY Utilities Co - Brown Station	PM25-PRI	284.99	105.86	ERTAC Version 16.0 Update
KY	21167	5933111	KY Utilities Co - Brown Station	SO2	699.25	889.94	State Directed
KY	21167	5933111	KY Utilities Co - Brown Station	VOC	31.93	32.65	ERTAC Version 16.0 Update
KY	21177	5196711	Tennessee Valley Authority - Paradise Fossil Plant	CO	238.91	800.62	PSAT Review
KY	21177	5196711	Tennessee Valley Authority - Paradise Fossil Plant	NH3	96.76	94.62	PSAT Review

State Abbr.	FIPS Code	Master EIS Facility ID	Facility Name	Pollutant Code	Re-Model Emissions (tpy)	Original Model Emissions (tpy)	Update Reason
KY	21177	5196711	Tennessee Valley Authority - Paradise Fossil Plant	NOX	740.70	3,114.52	PSAT Review
KY	21177	5196711	Tennessee Valley Authority - Paradise Fossil Plant	PM10-PRI	160.31	606.16	PSAT Review
KY	21177	5196711	Tennessee Valley Authority - Paradise Fossil Plant	PM25-PRI	104.40	353.25	PSAT Review
KY	21177	5196711	Tennessee Valley Authority - Paradise Fossil Plant	SO2	13.20	3,011.01	PSAT Review
KY	21177	5196711	Tennessee Valley Authority - Paradise Fossil Plant	VOC	42.29	147.81	PSAT Review
KY	21185	5353311	Bluegrass Generation Co	CO	12.89	34.70	ERTAC Version 16.0 Update
KY	21185	5353311	Bluegrass Generation Co	NH3	2.91	0.00	ERTAC Version 16.0 Update
KY	21185	5353311	Bluegrass Generation Co	NOX	53.86	19.58	State Directed
KY	21185	5353311	Bluegrass Generation Co	PM10-PRI	3.23	2.70	ERTAC Version 16.0 Update
KY	21185	5353311	Bluegrass Generation Co	PM25-PRI	2.00	2.70	ERTAC Version 16.0 Update
KY	21185	5353311	Bluegrass Generation Co	SO2	0.50	0.18	State Directed
KY	21185	5353311	Bluegrass Generation Co	VOC	0.78	1.32	ERTAC Version 16.0 Update
KY	21199	5787711	East KY Power Coop - Cooper Station	CO	130.04	101.59	ERTAC Version 16.0 Update
KY	21199	5787711	East KY Power Coop - Cooper Station	NH3	5.01	4.57	ERTAC Version 16.0 Update
KY	21199	5787711	East KY Power Coop - Cooper Station	NOX	380.74	445.02	State Directed
KY	21199	5787711	East KY Power Coop - Cooper Station	PM10-PRI	245.98	191.93	ERTAC Version 16.0 Update
KY	21199	5787711	East KY Power Coop - Cooper Station	PM25-PRI	213.42	190.10	ERTAC Version 16.0 Update
KY	21199	5787711	East KY Power Coop - Cooper Station	SO2	175.59	320.43	State Directed
KY	21199	5787711	East KY Power Coop - Cooper Station	VOC	16.11	11.85	ERTAC Version 16.0 Update
MS	28049	6802311	Entergy Mississippi Inc, Rex Brown Plant	CO	0.00	109.80	State Directed
MS	28049	6802311	Entergy Mississippi Inc, Rex Brown Plant	NH3	0.00	4.15	State Directed
MS	28049	6802311	Entergy Mississippi Inc, Rex Brown Plant	NOX	0.00	374.71	State Directed
MS	28049	6802311	Entergy Mississippi Inc, Rex Brown Plant	PM10-PRI	0.00	9.94	State Directed
MS	28049	6802311	Entergy Mississippi Inc, Rex Brown Plant	PM25-PRI	0.00	9.94	State Directed
MS	28049	6802311	Entergy Mississippi Inc, Rex Brown Plant	SO2	0.00	0.80	State Directed
MS	28049	6802311	Entergy Mississippi Inc, Rex Brown Plant	VOC	0.00	7.19	State Directed
MS	28059	8232011	Mississippi Phosphates Corporation	CO	0.00	23.62	Area of Influence Analysis

State Abbr.	FIPS Code	Master EIS Facility ID	Facility Name	Pollutant Code	Re-Model Emissions (tpy)	Original Model Emissions (tpy)	Update Reason
MS	28059	8232011	Mississippi Phosphates Corporation	NH3	0.00	231.34	Area of Influence Analysis
MS	28059	8232011	Mississippi Phosphates Corporation	NOX	0.00	325.71	Area of Influence Analysis
MS	28059	8232011	Mississippi Phosphates Corporation	PM10-PRI	0.00	9.90	Area of Influence Analysis
MS	28059	8232011	Mississippi Phosphates Corporation	PM25-PRI	0.00	9.74	Area of Influence Analysis
MS	28059	8232011	Mississippi Phosphates Corporation	SO2	0.00	1,330.58	Area of Influence Analysis
MS	28059	8232011	Mississippi Phosphates Corporation	VOC	0.00	1.52	Area of Influence Analysis
MS	28073	7154411	South Mississippi Electric Power Association, R D Morrow Plant	CO	34.96	196.04	ERTAC Version 16.0 Update
MS	28073	7154411	South Mississippi Electric Power Association, R D Morrow Plant	NH3	1.84	13.00	ERTAC Version 16.0 Update
MS	28073	7154411	South Mississippi Electric Power Association, R D Morrow Plant	NOX	685.88	4,675.05	ERTAC Version 16.0 Update
MS	28073	7154411	South Mississippi Electric Power Association, R D Morrow Plant	PM10-PRI	69.92	40.52	ERTAC Version 16.0 Update
MS	28073	7154411	South Mississippi Electric Power Association, R D Morrow Plant	PM25-PRI	34.96	40.52	ERTAC Version 16.0 Update
MS	28073	7154411	South Mississippi Electric Power Association, R D Morrow Plant	SO2	83.76	3,372.59	ERTAC Version 16.0 Update
MS	28073	7154411	South Mississippi Electric Power Association, R D Morrow Plant	VOC	4.59	23.46	ERTAC Version 16.0 Update
MS	28121	7288911	Pursue Energy Corporation Thomasville Gas Plant	CO	0.00	3.11	Area of Influence Analysis
MS	28121	7288911	Pursue Energy Corporation Thomasville Gas Plant	NOX	0.00	3.91	Area of Influence Analysis
MS	28121	7288911	Pursue Energy Corporation Thomasville Gas Plant	PM10-PRI	0.00	3.62	Area of Influence Analysis
MS	28121	7288911	Pursue Energy Corporation Thomasville Gas Plant	PM25-PRI	0.00	3.62	Area of Influence Analysis
MS	28121	7288911	Pursue Energy Corporation Thomasville Gas Plant	SO2	0.00	8,993.50	Area of Influence Analysis
MS	28141	17942211	Mississippi Silicon	CO	829.86	0.00	Area of Influence Analysis
MS	28141	17942211	Mississippi Silicon	NOX	1,094.55	0.00	Area of Influence Analysis
MS	28141	17942211	Mississippi Silicon	PM10-PRI	81.10	0.00	Area of Influence Analysis
MS	28141	17942211	Mississippi Silicon	PM25-PRI	72.89	0.00	Area of Influence Analysis
MS	28141	17942211	Mississippi Silicon	SO2	1,243.12	0.00	Area of Influence Analysis
MS	28141	17942211	Mississippi Silicon	VOC	53.70	0.00	Area of Influence Analysis

State Abbr.	FIPS Code	Master EIS Facility ID	Facility Name	Pollutant Code	Re-Model Emissions (tpy)	Original Model Emissions (tpy)	Update Reason
MS	28149	8233711	Entergy Mississippi Inc, Baxter Wilson Plant	CO	214.23	728.53	State Directed
MS	28149	8233711	Entergy Mississippi Inc, Baxter Wilson Plant	NH3	27.05	46.64	State Directed
MS	28149	8233711	Entergy Mississippi Inc, Baxter Wilson Plant	NOX	2,407.36	4,569.86	State Directed
MS	28149	8233711	Entergy Mississippi Inc, Baxter Wilson Plant	PM10-PRI	71.38	117.89	State Directed
MS	28149	8233711	Entergy Mississippi Inc, Baxter Wilson Plant	PM25-PRI	70.43	116.94	State Directed
MS	28149	8233711	Entergy Mississippi Inc, Baxter Wilson Plant	SO2	109.78	113.54	State Directed
MS	28149	8233711	Entergy Mississippi Inc, Baxter Wilson Plant	VOC	49.00	82.68	State Directed
NC	37007	10616211	NCEMC - Anson Plant	CO	119.17	55.40	ERTAC Version 16.0 Update
NC	37007	10616211	NCEMC - Anson Plant	NH3	8.34	0.00	ERTAC Version 16.0 Update
NC	37007	10616211	NCEMC - Anson Plant	NOX	112.47	92.27	ERTAC Version 16.0 Update
NC	37007	10616211	NCEMC - Anson Plant	PM10-PRI	6.25	25.90	ERTAC Version 16.0 Update
NC	37007	10616211	NCEMC - Anson Plant	PM25-PRI	6.25	25.90	ERTAC Version 16.0 Update
NC	37007	10616211	NCEMC - Anson Plant	SO2	0.78	1.06	ERTAC Version 16.0 Update
NC	37007	10616211	NCEMC - Anson Plant	VOC	13.03	18.42	ERTAC Version 16.0 Update
NC	37021	8392811	Duke Energy Progress , Inc. - Asheville Steam Electric Plant	CO	1,124.75	849.41	ERTAC Version 16.0 Update
NC	37021	8392811	Duke Energy Progress , Inc. - Asheville Steam Electric Plant	NH3	78.03	23.08	ERTAC Version 16.0 Update
NC	37021	8392811	Duke Energy Progress , Inc. - Asheville Steam Electric Plant	NOX	2,035.29	873.50	ERTAC Version 16.0 Update
NC	37021	8392811	Duke Energy Progress , Inc. - Asheville Steam Electric Plant	PM10-PRI	258.46	109.34	ERTAC Version 16.0 Update
NC	37021	8392811	Duke Energy Progress , Inc. - Asheville Steam Electric Plant	PM25-PRI	229.57	101.37	ERTAC Version 16.0 Update
NC	37021	8392811	Duke Energy Progress , Inc. - Asheville Steam Electric Plant	SO2	39.03	17.23	ERTAC Version 16.0 Update
NC	37021	8392811	Duke Energy Progress , Inc. - Asheville Steam Electric Plant	VOC	75.16	34.74	ERTAC Version 16.0 Update
NC	37035	8370411	Duke Energy Carolinas, LLC - Marshall Steam Station	CO	1,260.02	1,809.27	PSAT Review
NC	37035	8370411	Duke Energy Carolinas, LLC - Marshall Steam Station	NH3	3.05	3.03	PSAT Review

State Abbr.	FIPS Code	Master EIS Facility ID	Facility Name	Pollutant Code	Re-Model Emissions (tpy)	Original Model Emissions (tpy)	Update Reason
NC	37035	8370411	Duke Energy Carolinas, LLC - Marshall Steam Station	NOX	5,355.79	7,511.05	PSAT Review
NC	37035	8370411	Duke Energy Carolinas, LLC - Marshall Steam Station	PM10-PRI	492.17	1,107.90	PSAT Review
NC	37035	8370411	Duke Energy Carolinas, LLC - Marshall Steam Station	PM25-PRI	398.19	887.14	PSAT Review
NC	37035	8370411	Duke Energy Carolinas, LLC - Marshall Steam Station	SO2	2,654.15	4,139.20	PSAT Review
NC	37035	8370411	Duke Energy Carolinas, LLC - Marshall Steam Station	VOC	56.67	81.94	PSAT Review
NC	37045	16600211	Cleveland County Generating Facility	CO	97.24	58.93	ERTAC Version 16.0 Update
NC	37045	16600211	Cleveland County Generating Facility	NH3	26.94	0.00	ERTAC Version 16.0 Update
NC	37045	16600211	Cleveland County Generating Facility	NOX	196.13	65.63	ERTAC Version 16.0 Update
NC	37045	16600211	Cleveland County Generating Facility	PM10-PRI	49.88	12.96	ERTAC Version 16.0 Update
NC	37045	16600211	Cleveland County Generating Facility	PM25-PRI	49.88	12.96	ERTAC Version 16.0 Update
NC	37045	16600211	Cleveland County Generating Facility	SO2	4.50	1.96	ERTAC Version 16.0 Update
NC	37045	16600211	Cleveland County Generating Facility	VOC	10.06	4.12	ERTAC Version 16.0 Update
NC	37045	ORIS59325	Kings Mountain Energy Center	CO	141.49	0.00	ERTAC Version 16.0 Update
NC	37045	ORIS59325	Kings Mountain Energy Center	NH3	31.13	0.00	ERTAC Version 16.0 Update
NC	37045	ORIS59325	Kings Mountain Energy Center	NOX	707.46	0.00	ERTAC Version 16.0 Update
NC	37045	ORIS59325	Kings Mountain Energy Center	PM10-PRI	90.41	0.00	ERTAC Version 16.0 Update
NC	37045	ORIS59325	Kings Mountain Energy Center	PM25-PRI	81.36	0.00	ERTAC Version 16.0 Update
NC	37045	ORIS59325	Kings Mountain Energy Center	SO2	14.15	0.00	ERTAC Version 16.0 Update
NC	37045	ORIS59325	Kings Mountain Energy Center	VOC	21.51	0.00	ERTAC Version 16.0 Update
NC	37051	8134411	Public Works Commission Butler-Warner Generation Plant	CO	1.01	127.40	ERTAC Version 16.0 Update
NC	37051	8134411	Public Works Commission Butler-Warner Generation Plant	NH3	0.21	0.00	ERTAC Version 16.0 Update
NC	37051	8134411	Public Works Commission Butler-Warner Generation Plant	NOX	29.41	302.26	ERTAC Version 16.0 Update
NC	37051	8134411	Public Works Commission Butler-Warner Generation Plant	PM10-PRI	0.61	6.23	ERTAC Version 16.0 Update

State Abbr.	FIPS Code	Master EIS Facility ID	Facility Name	Pollutant Code	Re-Model Emissions (tpy)	Original Model Emissions (tpy)	Update Reason
NC	37051	8134411	Public Works Commission Butler-Warner Generation Plant	PM25-PRI	0.55	4.53	ERTAC Version 16.0 Update
NC	37051	8134411	Public Works Commission Butler-Warner Generation Plant	SO2	1.27	165.62	ERTAC Version 16.0 Update
NC	37051	8134411	Public Works Commission Butler-Warner Generation Plant	VOC	0.16	1.98	ERTAC Version 16.0 Update
NC	37071	8137511	Duke Power Company, LLC - Allen Steam Station	CO	364.95	335.24	ERTAC Version 16.0 Update
NC	37071	8137511	Duke Power Company, LLC - Allen Steam Station	NH3	1.25	0.11	ERTAC Version 16.0 Update
NC	37071	8137511	Duke Power Company, LLC - Allen Steam Station	NOX	1,410.10	1,124.55	ERTAC Version 16.0 Update
NC	37071	8137511	Duke Power Company, LLC - Allen Steam Station	PM10-PRI	165.51	86.06	ERTAC Version 16.0 Update
NC	37071	8137511	Duke Power Company, LLC - Allen Steam Station	PM25-PRI	100.95	81.03	ERTAC Version 16.0 Update
NC	37071	8137511	Duke Power Company, LLC - Allen Steam Station	SO2	575.40	476.03	ERTAC Version 16.0 Update
NC	37071	8137511	Duke Power Company, LLC - Allen Steam Station	VOC	11.30	8.84	ERTAC Version 16.0 Update
NC	37083	8048111	Roanoke Valley Energy Facility	CO	2.38	462.33	ERTAC Version 16.0 Update
NC	37083	8048111	Roanoke Valley Energy Facility	NH3	0.00	1.19	ERTAC Version 16.0 Update
NC	37083	8048111	Roanoke Valley Energy Facility	NOX	22.09	706.28	ERTAC Version 16.0 Update
NC	37083	8048111	Roanoke Valley Energy Facility	PM10-PRI	5.55	139.82	ERTAC Version 16.0 Update
NC	37083	8048111	Roanoke Valley Energy Facility	PM25-PRI	0.79	75.01	ERTAC Version 16.0 Update
NC	37083	8048111	Roanoke Valley Energy Facility	SO2	6.63	329.57	ERTAC Version 16.0 Update
NC	37083	8048111	Roanoke Valley Energy Facility	VOC	0.18	6.75	ERTAC Version 16.0 Update
NC	37083	8286911	Rosemary Power Station	CO	3.29	4.11	ERTAC Version 16.0 Update
NC	37083	8286911	Rosemary Power Station	NH3	0.72	6.70	ERTAC Version 16.0 Update
NC	37083	8286911	Rosemary Power Station	NOX	44.46	149.15	ERTAC Version 16.0 Update
NC	37083	8286911	Rosemary Power Station	PM10-PRI	2.10	7.80	ERTAC Version 16.0 Update
NC	37083	8286911	Rosemary Power Station	PM25-PRI	1.89	7.80	ERTAC Version 16.0 Update
NC	37083	8286911	Rosemary Power Station	SO2	0.21	7.57	ERTAC Version 16.0 Update
NC	37083	8286911	Rosemary Power Station	VOC	0.65	2.41	ERTAC Version 16.0 Update
NC	37087	7920511	Blue Ridge Paper Products - Canton Mill	CO	1,118.13	1,130.75	State Directed
NC	37087	7920511	Blue Ridge Paper Products - Canton Mill	NOX	2,926.78	2,992.37	State Directed

State Abbr.	FIPS Code	Master EIS Facility ID	Facility Name	Pollutant Code	Re-Model Emissions (tpy)	Original Model Emissions (tpy)	Update Reason
NC	37087	7920511	Blue Ridge Paper Products - Canton Mill	PM10-PRI	320.02	334.42	State Directed
NC	37087	7920511	Blue Ridge Paper Products - Canton Mill	PM25-PRI	251.40	264.81	State Directed
NC	37087	7920511	Blue Ridge Paper Products - Canton Mill	SO2	404.70	1,127.07	State Directed
NC	37087	7920511	Blue Ridge Paper Products - Canton Mill	VOC	1,361.54	1,361.65	State Directed
NC	37109	7731511	Duke Energy Corporation LCTS	CO	15.75	1.37	ERTAC Version 16.0 Update
NC	37109	7731511	Duke Energy Corporation LCTS	NH3	2.02	0.00	ERTAC Version 16.0 Update
NC	37109	7731511	Duke Energy Corporation LCTS	NOX	34.88	97.07	ERTAC Version 16.0 Update
NC	37109	7731511	Duke Energy Corporation LCTS	PM10-PRI	3.15	0.22	ERTAC Version 16.0 Update
NC	37109	7731511	Duke Energy Corporation LCTS	PM25-PRI	1.56	0.17	ERTAC Version 16.0 Update
NC	37109	7731511	Duke Energy Corporation LCTS	SO2	0.78	4.21	ERTAC Version 16.0 Update
NC	37109	7731511	Duke Energy Corporation LCTS	VOC	3.04	0.01	ERTAC Version 16.0 Update
NC	37129	8547211	Duke Energy Progress - L.V. Sutton Electric Plant	CO	647.08	477.71	ERTAC Version 16.0 Update
NC	37129	8547211	Duke Energy Progress - L.V. Sutton Electric Plant	NH3	78.60	0.00	ERTAC Version 16.0 Update
NC	37129	8547211	Duke Energy Progress - L.V. Sutton Electric Plant	NOX	1,079.50	593.73	ERTAC Version 16.0 Update
NC	37129	8547211	Duke Energy Progress - L.V. Sutton Electric Plant	PM10-PRI	264.19	105.10	ERTAC Version 16.0 Update
NC	37129	8547211	Duke Energy Progress - L.V. Sutton Electric Plant	PM25-PRI	231.77	105.10	ERTAC Version 16.0 Update
NC	37129	8547211	Duke Energy Progress - L.V. Sutton Electric Plant	SO2	26.77	15.92	ERTAC Version 16.0 Update
NC	37129	8547211	Duke Energy Progress - L.V. Sutton Electric Plant	VOC	75.03	33.44	ERTAC Version 16.0 Update
NC	37145	7826011	Progress Energy - Roxboro Plant	CO	295.89	2,852.06	ERTAC Version 16.0 Update
NC	37145	7826011	Progress Energy - Roxboro Plant	NH3	1.22	2.87	ERTAC Version 16.0 Update
NC	37145	7826011	Progress Energy - Roxboro Plant	NOX	1,532.13	4,527.72	ERTAC Version 16.0 Update
NC	37145	7826011	Progress Energy - Roxboro Plant	PM10-PRI	144.48	246.60	ERTAC Version 16.0 Update
NC	37145	7826011	Progress Energy - Roxboro Plant	PM25-PRI	138.29	222.96	ERTAC Version 16.0 Update
NC	37145	7826011	Progress Energy - Roxboro Plant	SO2	2,258.04	6,665.46	ERTAC Version 16.0 Update
NC	37145	7826011	Progress Energy - Roxboro Plant	VOC	26.77	70.97	ERTAC Version 16.0 Update
NC	37145	7826111	Duke Energy Progress, Inc. - Mayo Facility	CO	200.77	172.33	ERTAC Version 16.0 Update
NC	37145	7826111	Duke Energy Progress, Inc. - Mayo Facility	NH3	1.34	1.09	ERTAC Version 16.0 Update

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NC	37145	7826111	Duke Energy Progress, Inc. - Mayo Facility	NOX	1,680.33	1,394.56	ERTAC Version 16.0 Update
NC	37145	7826111	Duke Energy Progress, Inc. - Mayo Facility	PM10-PRI	191.23	133.17	ERTAC Version 16.0 Update
NC	37145	7826111	Duke Energy Progress, Inc. - Mayo Facility	PM25-PRI	172.06	116.06	ERTAC Version 16.0 Update
NC	37145	7826111	Duke Energy Progress, Inc. - Mayo Facility	SO2	2,274.46	1,770.36	ERTAC Version 16.0 Update
NC	37145	7826111	Duke Energy Progress, Inc. - Mayo Facility	VOC	25.39	20.46	ERTAC Version 16.0 Update
NC	37153	10631811	NCEMC - Hamlet Plant	CO	58.63	44.77	ERTAC Version 16.0 Update
NC	37153	10631811	NCEMC - Hamlet Plant	NH3	1.77	0.00	ERTAC Version 16.0 Update
NC	37153	10631811	NCEMC - Hamlet Plant	NOX	100.85	77.69	ERTAC Version 16.0 Update
NC	37153	10631811	NCEMC - Hamlet Plant	PM10-PRI	22.26	19.50	ERTAC Version 16.0 Update
NC	37153	10631811	NCEMC - Hamlet Plant	PM25-PRI	20.87	19.50	ERTAC Version 16.0 Update
NC	37153	10631811	NCEMC - Hamlet Plant	SO2	1.07	0.91	ERTAC Version 16.0 Update
NC	37153	10631811	NCEMC - Hamlet Plant	VOC	15.32	13.60	ERTAC Version 16.0 Update
NC	37153	8490411	Duke Energy Progress - Richmond County Turbines	CO	682.89	750.01	ERTAC Version 16.0 Update
NC	37153	8490411	Duke Energy Progress - Richmond County Turbines	NH3	246.14	54.33	ERTAC Version 16.0 Update
NC	37153	8490411	Duke Energy Progress - Richmond County Turbines	NOX	828.11	677.66	ERTAC Version 16.0 Update
NC	37153	8490411	Duke Energy Progress - Richmond County Turbines	PM10-PRI	408.90	228.21	ERTAC Version 16.0 Update
NC	37153	8490411	Duke Energy Progress - Richmond County Turbines	PM25-PRI	388.40	228.21	ERTAC Version 16.0 Update
NC	37153	8490411	Duke Energy Progress - Richmond County Turbines	SO2	41.05	41.46	ERTAC Version 16.0 Update
NC	37153	8490411	Duke Energy Progress - Richmond County Turbines	VOC	111.29	71.33	ERTAC Version 16.0 Update
NC	37157	8009611	Duke Energy Carolinas, LLC - Dan River Combined Cycle Facili	CO	663.90	421.50	ERTAC Version 16.0 Update
NC	37157	8009611	Duke Energy Carolinas, LLC - Dan River Combined Cycle Facili	NH3	43.07	0.00	ERTAC Version 16.0 Update
NC	37157	8009611	Duke Energy Carolinas, LLC - Dan River Combined Cycle Facili	NOX	422.28	142.63	ERTAC Version 16.0 Update
NC	37157	8009611	Duke Energy Carolinas, LLC - Dan River Combined Cycle Facili	PM10-PRI	328.86	92.73	ERTAC Version 16.0 Update
NC	37157	8009611	Duke Energy Carolinas, LLC - Dan River Combined Cycle Facili	PM25-PRI	317.83	92.73	ERTAC Version 16.0 Update

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NC	37157	8009611	Duke Energy Carolinas, LLC - Dan River Combined Cycle Facili	SO2	31.93	14.05	ERTAC Version 16.0 Update
NC	37157	8009611	Duke Energy Carolinas, LLC - Dan River Combined Cycle Facili	VOC	83.60	29.50	ERTAC Version 16.0 Update
NC	37157	8493211	Duke Energy Carolinas, LLC-Rockingham Co Comb. Turb.	CO	231.72	72.88	ERTAC Version 16.0 Update
NC	37157	8493211	Duke Energy Carolinas, LLC-Rockingham Co Comb. Turb.	NH3	42.75	0.00	ERTAC Version 16.0 Update
NC	37157	8493211	Duke Energy Carolinas, LLC-Rockingham Co Comb. Turb.	NOX	412.42	112.04	ERTAC Version 16.0 Update
NC	37157	8493211	Duke Energy Carolinas, LLC-Rockingham Co Comb. Turb.	PM10-PRI	28.31	7.86	ERTAC Version 16.0 Update
NC	37157	8493211	Duke Energy Carolinas, LLC-Rockingham Co Comb. Turb.	PM25-PRI	14.25	3.93	ERTAC Version 16.0 Update
NC	37157	8493211	Duke Energy Carolinas, LLC-Rockingham Co Comb. Turb.	SO2	6.36	2.29	ERTAC Version 16.0 Update
NC	37157	8493211	Duke Energy Carolinas, LLC-Rockingham Co Comb. Turb.	VOC	18.40	5.03	ERTAC Version 16.0 Update
NC	37159	8506911	Duke Energy Carolinas, LLC - Buck Steam Station	CO	240.81	440.27	ERTAC Version 16.0 Update
NC	37159	8506911	Duke Energy Carolinas, LLC - Buck Steam Station	NH3	60.35	0.01	ERTAC Version 16.0 Update
NC	37159	8506911	Duke Energy Carolinas, LLC - Buck Steam Station	NOX	266.71	129.07	ERTAC Version 16.0 Update
NC	37159	8506911	Duke Energy Carolinas, LLC - Buck Steam Station	PM10-PRI	194.83	96.86	ERTAC Version 16.0 Update
NC	37159	8506911	Duke Energy Carolinas, LLC - Buck Steam Station	PM25-PRI	180.32	96.86	ERTAC Version 16.0 Update
NC	37159	8506911	Duke Energy Carolinas, LLC - Buck Steam Station	SO2	22.80	14.68	ERTAC Version 16.0 Update
NC	37159	8506911	Duke Energy Carolinas, LLC - Buck Steam Station	VOC	42.73	30.82	ERTAC Version 16.0 Update
NC	37159	8508011	Plant Rowan County	CO	264.45	226.91	ERTAC Version 16.0 Update
NC	37159	8508011	Plant Rowan County	NH3	44.27	16.01	ERTAC Version 16.0 Update
NC	37159	8508011	Plant Rowan County	NOX	219.09	832.55	ERTAC Version 16.0 Update
NC	37159	8508011	Plant Rowan County	PM10-PRI	107.98	69.41	ERTAC Version 16.0 Update
NC	37159	8508011	Plant Rowan County	PM25-PRI	85.58	69.41	ERTAC Version 16.0 Update
NC	37159	8508011	Plant Rowan County	SO2	9.16	12.41	ERTAC Version 16.0 Update
NC	37159	8508011	Plant Rowan County	VOC	35.79	21.61	ERTAC Version 16.0 Update

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NC	37161	8300611	Duke Energy Carolinas, LLC - Cliffside Steam Station	CO	134.21	1,203.14	ERTAC Version 16.0 Update
NC	37161	8300611	Duke Energy Carolinas, LLC - Cliffside Steam Station	NH3	1.82	1.82	ERTAC Version 16.0 Update
NC	37161	8300611	Duke Energy Carolinas, LLC - Cliffside Steam Station	NOX	326.63	1,944.77	ERTAC Version 16.0 Update
NC	37161	8300611	Duke Energy Carolinas, LLC - Cliffside Steam Station	PM10-PRI	58.94	182.05	ERTAC Version 16.0 Update
NC	37161	8300611	Duke Energy Carolinas, LLC - Cliffside Steam Station	PM25-PRI	51.78	150.92	ERTAC Version 16.0 Update
NC	37161	8300611	Duke Energy Carolinas, LLC - Cliffside Steam Station	SO2	160.99	1,082.23	ERTAC Version 16.0 Update
NC	37161	8300611	Duke Energy Carolinas, LLC - Cliffside Steam Station	VOC	3.99	14.66	ERTAC Version 16.0 Update
NC	37169	8514011	Duke Energy Carolinas, LLC - Belews Creek Steam Station	CO	278.63	917.19	ERTAC Version 16.0 Update
NC	37169	8514011	Duke Energy Carolinas, LLC - Belews Creek Steam Station	NH3	1.00	0.98	ERTAC Version 16.0 Update
NC	37169	8514011	Duke Energy Carolinas, LLC - Belews Creek Steam Station	NOX	1,866.96	5,249.77	ERTAC Version 16.0 Update
NC	37169	8514011	Duke Energy Carolinas, LLC - Belews Creek Steam Station	PM10-PRI	298.50	1,280.95	ERTAC Version 16.0 Update
NC	37169	8514011	Duke Energy Carolinas, LLC - Belews Creek Steam Station	PM25-PRI	298.50	1,097.68	ERTAC Version 16.0 Update
NC	37169	8514011	Duke Energy Carolinas, LLC - Belews Creek Steam Station	SO2	1,384.55	4,946.06	ERTAC Version 16.0 Update
NC	37169	8514011	Duke Energy Carolinas, LLC - Belews Creek Steam Station	VOC	33.90	109.86	ERTAC Version 16.0 Update
NC	37191	7265811	Duke Energy Progress - H.F. Lee Steam Electric Plant	CO	1,409.99	771.04	ERTAC Version 16.0 Update
NC	37191	7265811	Duke Energy Progress - H.F. Lee Steam Electric Plant	NH3	131.77	0.00	ERTAC Version 16.0 Update
NC	37191	7265811	Duke Energy Progress - H.F. Lee Steam Electric Plant	NOX	2,294.56	1,207.12	ERTAC Version 16.0 Update
NC	37191	7265811	Duke Energy Progress - H.F. Lee Steam Electric Plant	PM10-PRI	521.26	168.48	ERTAC Version 16.0 Update
NC	37191	7265811	Duke Energy Progress - H.F. Lee Steam Electric Plant	PM25-PRI	473.53	168.48	ERTAC Version 16.0 Update
NC	37191	7265811	Duke Energy Progress - H.F. Lee Steam Electric Plant	SO2	57.39	26.17	ERTAC Version 16.0 Update

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NC	37191	7265811	Duke Energy Progress - H.F. Lee Steam Electric Plant	VOC	148.45	59.95	ERTAC Version 16.0 Update
SC	45007	13006111	WILSON COMPOSITES LLC CENTRAL PLT	CO	0.00	0.01	State Directed
SC	45007	13006111	WILSON COMPOSITES LLC CENTRAL PLT	NOX	0.00	0.01	State Directed
SC	45007	13006111	WILSON COMPOSITES LLC CENTRAL PLT	PM10-PRI	0.00	0.00	State Directed
SC	45007	13006111	WILSON COMPOSITES LLC CENTRAL PLT	PM25-PRI	0.00	0.00	State Directed
SC	45007	13006111	WILSON COMPOSITES LLC CENTRAL PLT	SO2	0.00	0.00	State Directed
SC	45007	13006111	WILSON COMPOSITES LLC CENTRAL PLT	VOC	0.00	0.41	State Directed
SC	45007	4948311	DUKE ENERGY LEE STEAM STATION	CO	232.76	232.43	ERTAC Version 16.0 Update
SC	45007	4948311	DUKE ENERGY LEE STEAM STATION	NH3	54.18	55.81	ERTAC Version 16.0 Update
SC	45007	4948311	DUKE ENERGY LEE STEAM STATION	NOX	220.70	281.05	ERTAC Version 16.0 Update
SC	45007	4948311	DUKE ENERGY LEE STEAM STATION	PM10-PRI	96.76	97.02	ERTAC Version 16.0 Update
SC	45007	4948311	DUKE ENERGY LEE STEAM STATION	PM25-PRI	97.00	93.76	ERTAC Version 16.0 Update
SC	45007	4948311	DUKE ENERGY LEE STEAM STATION	SO2	18.16	18.61	ERTAC Version 16.0 Update
SC	45007	4948311	DUKE ENERGY LEE STEAM STATION	VOC	27.05	24.07	ERTAC Version 16.0 Update
SC	45009	13006311	SOUTHEASTERN FIBERGLASS PRODUCTS, INC	CO	0.00	0.00	State Directed
SC	45009	13006311	SOUTHEASTERN FIBERGLASS PRODUCTS, INC	NOX	0.00	0.00	State Directed
SC	45009	13006311	SOUTHEASTERN FIBERGLASS PRODUCTS, INC	PM10-PRI	0.00	1.58	State Directed
SC	45009	13006311	SOUTHEASTERN FIBERGLASS PRODUCTS, INC	PM25-PRI	0.00	0.56	State Directed
SC	45009	13006311	SOUTHEASTERN FIBERGLASS PRODUCTS, INC	SO2	0.00	0.00	State Directed
SC	45009	13006311	SOUTHEASTERN FIBERGLASS PRODUCTS, INC	VOC	0.00	4.21	State Directed
SC	45019	4101711	INDUSTRIAL CONTAINER SERVICES SC II LLC	CO	0.00	0.68	State Directed
SC	45019	4101711	INDUSTRIAL CONTAINER SERVICES SC II LLC	NOX	0.00	0.39	State Directed
SC	45019	4101711	INDUSTRIAL CONTAINER SERVICES SC II LLC	PM10-PRI	0.00	0.35	State Directed
SC	45019	4101711	INDUSTRIAL CONTAINER SERVICES SC II LLC	PM25-PRI	0.00	0.20	State Directed
SC	45019	4101711	INDUSTRIAL CONTAINER SERVICES SC II LLC	SO2	0.00	0.00	State Directed
SC	45019	4101711	INDUSTRIAL CONTAINER SERVICES SC II LLC	VOC	0.00	83.60	State Directed
SC	45031	6639811	GALEY & LORD SOCIETY HILL	CO	0.00	12.35	State Directed

State Abbr.	FIPS Code	Master EIS Facility ID	Facility Name	Pollutant Code	Re-Model Emissions (tpy)	Original Model Emissions (tpy)	Update Reason
SC	45031	6639811	GALEY & LORD SOCIETY HILL	NH3	0.00	0.21	State Directed
SC	45031	6639811	GALEY & LORD SOCIETY HILL	NOX	0.00	52.10	State Directed
SC	45031	6639811	GALEY & LORD SOCIETY HILL	PM10-PRI	0.00	6.14	State Directed
SC	45031	6639811	GALEY & LORD SOCIETY HILL	PM25-PRI	0.00	3.86	State Directed
SC	45031	6639811	GALEY & LORD SOCIETY HILL	SO2	0.00	0.82	State Directed
SC	45031	6639811	GALEY & LORD SOCIETY HILL	VOC	0.00	27.09	State Directed
SC	45063	16614811	TIDEWATER BOATS LLC	CO	0.00	0.10	State Directed
SC	45063	16614811	TIDEWATER BOATS LLC	NH3	0.00	0.00	State Directed
SC	45063	16614811	TIDEWATER BOATS LLC	NOX	0.00	0.12	State Directed
SC	45063	16614811	TIDEWATER BOATS LLC	PM10-PRI	0.00	0.67	State Directed
SC	45063	16614811	TIDEWATER BOATS LLC	PM25-PRI	0.00	0.01	State Directed
SC	45063	16614811	TIDEWATER BOATS LLC	SO2	0.00	0.00	State Directed
SC	45063	16614811	TIDEWATER BOATS LLC	VOC	0.00	42.38	State Directed
SC	45063	3793711	TUBE CITY IMS LLC	NOX	0.00	0.03	State Directed
SC	45063	3793711	TUBE CITY IMS LLC	PM10-PRI	0.00	0.89	State Directed
SC	45063	3793711	TUBE CITY IMS LLC	PM25-PRI	0.00	0.70	State Directed
SC	45063	3793711	TUBE CITY IMS LLC	VOC	0.00	0.00	State Directed
SC	45063	4041111	SCE&G MCMEEKIN	CO	73.01	0.01	State Directed
SC	45063	4041111	SCE&G MCMEEKIN	NH3	10.00	0.00	State Directed
SC	45063	4041111	SCE&G MCMEEKIN	NOX	245.06	0.06	State Directed
SC	45063	4041111	SCE&G MCMEEKIN	PM10-PRI	23.01	0.01	State Directed
SC	45063	4041111	SCE&G MCMEEKIN	PM25-PRI	23.00	0.00	State Directed
SC	45063	4041111	SCE&G MCMEEKIN	SO2	2.00	0.00	State Directed
SC	45063	4041111	SCE&G MCMEEKIN	VOC	17.26	0.26	State Directed
SC	45077	3410011	PICKENS COUNTY SOLID WASTE DEPARTMENT	CO	0.00	1.07	State Directed
SC	45077	3410011	PICKENS COUNTY SOLID WASTE DEPARTMENT	NOX	0.00	10.65	State Directed

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SC	45077	3410011	PICKENS COUNTY SOLID WASTE DEPARTMENT	PM10-PRI	0.00	13.05	State Directed
SC	45077	3410011	PICKENS COUNTY SOLID WASTE DEPARTMENT	PM25-PRI	0.00	9.97	State Directed
SC	45077	3410011	PICKENS COUNTY SOLID WASTE DEPARTMENT	SO2	0.00	0.30	State Directed
SC	45077	3410011	PICKENS COUNTY SOLID WASTE DEPARTMENT	VOC	0.00	13.35	State Directed
SC	45085	4962311	METOKOTE:PLANT 7	CO	0.00	1.50	State Directed
SC	45085	4962311	METOKOTE:PLANT 7	NOX	0.00	1.78	State Directed
SC	45085	4962311	METOKOTE:PLANT 7	PM10-PRI	0.00	0.14	State Directed
SC	45085	4962311	METOKOTE:PLANT 7	PM25-PRI	0.00	0.14	State Directed
SC	45085	4962311	METOKOTE:PLANT 7	SO2	0.00	0.01	State Directed
SC	45085	4962311	METOKOTE:PLANT 7	VOC	0.00	26.67	State Directed
TN	47001	6196011	TVA BULL RUN FOSSIL PLANT	CO	0.00	289.00	PSAT Review
TN	47001	6196011	TVA BULL RUN FOSSIL PLANT	NOX	0.00	964.16	PSAT Review
TN	47001	6196011	TVA BULL RUN FOSSIL PLANT	PM10-PRI	0.00	133.20	PSAT Review
TN	47001	6196011	TVA BULL RUN FOSSIL PLANT	PM25-PRI	0.00	111.63	PSAT Review
TN	47001	6196011	TVA BULL RUN FOSSIL PLANT	SO2	0.00	622.54	PSAT Review
TN	47001	6196011	TVA BULL RUN FOSSIL PLANT	VOC	0.00	34.52	PSAT Review
TN	47105	4129211	TATE & LYLE, Loudon	CO	244.44	393.76	PSAT Review
TN	47105	4129211	TATE & LYLE, Loudon	NH3	12.32	2.64	PSAT Review
TN	47105	4129211	TATE & LYLE, Loudon	NOX	230.31	883.25	PSAT Review
TN	47105	4129211	TATE & LYLE, Loudon	PM10-PRI	216.96	270.84	PSAT Review
TN	47105	4129211	TATE & LYLE, Loudon	PM25-PRI	108.82	130.55	PSAT Review
TN	47105	4129211	TATE & LYLE, Loudon	SO2	166.61	472.76	PSAT Review
TN	47105	4129211	TATE & LYLE, Loudon	VOC	385.13	399.10	PSAT Review
TN	47145	4979111	TVA KINGSTON FOSSIL PLANT	CO	145.13	645.01	PSAT Review
TN	47145	4979111	TVA KINGSTON FOSSIL PLANT	NH3	4.36	19.36	PSAT Review

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TN	47145	4979111	TVA KINGSTON FOSSIL PLANT	NOX	379.66	1,687.38	PSAT Review
TN	47145	4979111	TVA KINGSTON FOSSIL PLANT	PM10-PRI	318.58	1,415.93	PSAT Review
TN	47145	4979111	TVA KINGSTON FOSSIL PLANT	PM25-PRI	248.55	1,104.67	PSAT Review
TN	47145	4979111	TVA KINGSTON FOSSIL PLANT	SO2	424.37	1,886.09	PSAT Review
TN	47145	4979111	TVA KINGSTON FOSSIL PLANT	VOC	17.36	77.18	PSAT Review
VA	51001	6960911	Commonwealth Chesapeake Power Station	CO	4.40	0.68	ERTAC Version 16.0 Update
VA	51001	6960911	Commonwealth Chesapeake Power Station	NH3	4.40	0.02	ERTAC Version 16.0 Update
VA	51001	6960911	Commonwealth Chesapeake Power Station	NOX	47.60	9.03	ERTAC Version 16.0 Update
VA	51001	6960911	Commonwealth Chesapeake Power Station	PM10-PRI	6.60	0.79	ERTAC Version 16.0 Update
VA	51001	6960911	Commonwealth Chesapeake Power Station	PM25-PRI	2.20	0.79	ERTAC Version 16.0 Update
VA	51001	6960911	Commonwealth Chesapeake Power Station	SO2	7.74	0.10	ERTAC Version 16.0 Update
VA	51001	6960911	Commonwealth Chesapeake Power Station	VOC	0.38	0.65	ERTAC Version 16.0 Update
VA	51025	17646111	Dominion - Brunswick	CO	488.12	186.59	ERTAC Version 16.0 Update
VA	51025	17646111	Dominion - Brunswick	NH3	337.29	7.76	ERTAC Version 16.0 Update
VA	51025	17646111	Dominion - Brunswick	NOX	293.45	136.93	ERTAC Version 16.0 Update
VA	51025	17646111	Dominion - Brunswick	PM10-PRI	453.45	88.64	ERTAC Version 16.0 Update
VA	51025	17646111	Dominion - Brunswick	PM25-PRI	131.30	88.64	ERTAC Version 16.0 Update
VA	51025	17646111	Dominion - Brunswick	SO2	29.29	13.53	ERTAC Version 16.0 Update
VA	51025	17646111	Dominion - Brunswick	VOC	47.20	37.89	ERTAC Version 16.0 Update
VA	51027	9093011	Buchanan Generation, LLC	CO	31.50	0.00	ERTAC Version 16.0 Update
VA	51027	9093011	Buchanan Generation, LLC	NOX	99.60	14.53	ERTAC Version 16.0 Update
VA	51027	9093011	Buchanan Generation, LLC	PM10-PRI	7.85	1.17	ERTAC Version 16.0 Update
VA	51027	9093011	Buchanan Generation, LLC	PM25-PRI	7.85	1.17	ERTAC Version 16.0 Update
VA	51027	9093011	Buchanan Generation, LLC	SO2	0.77	0.11	ERTAC Version 16.0 Update
VA	51027	9093011	Buchanan Generation, LLC	VOC	2.50	0.38	ERTAC Version 16.0 Update
VA	51029	15432111	Dominion - Bear Garden CT Station	CO	265.37	349.83	ERTAC Version 16.0 Update
VA	51029	15432111	Dominion - Bear Garden CT Station	NH3	183.38	29.21	ERTAC Version 16.0 Update

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VA	51029	15432111	Dominion - Bear Garden CT Station	NOX	176.63	97.50	ERTAC Version 16.0 Update
VA	51029	15432111	Dominion - Bear Garden CT Station	PM10-PRI	246.53	40.28	ERTAC Version 16.0 Update
VA	51029	15432111	Dominion - Bear Garden CT Station	PM25-PRI	71.38	39.74	ERTAC Version 16.0 Update
VA	51029	15432111	Dominion - Bear Garden CT Station	SO2	15.93	3.52	ERTAC Version 16.0 Update
VA	51029	15432111	Dominion - Bear Garden CT Station	VOC	25.66	21.68	ERTAC Version 16.0 Update
VA	51033	6866611	Dominion - Ladysmith CT Station	CO	17.35	1.28	ERTAC Version 16.0 Update
VA	51033	6866611	Dominion - Ladysmith CT Station	NOX	138.26	97.15	ERTAC Version 16.0 Update
VA	51033	6866611	Dominion - Ladysmith CT Station	PM10-PRI	25.97	1.25	ERTAC Version 16.0 Update
VA	51033	6866611	Dominion - Ladysmith CT Station	PM25-PRI	25.97	1.25	ERTAC Version 16.0 Update
VA	51033	6866611	Dominion - Ladysmith CT Station	SO2	4.34	5.77	ERTAC Version 16.0 Update
VA	51033	6866611	Dominion - Ladysmith CT Station	VOC	7.89	4.68	ERTAC Version 16.0 Update
VA	51036	NEW_995120	C4GT	CO	257.82	0.00	ERTAC Version 16.0 Update
VA	51036	NEW_995120	C4GT	NH3	178.15	0.00	ERTAC Version 16.0 Update
VA	51036	NEW_995120	C4GT	NOX	154.69	0.00	ERTAC Version 16.0 Update
VA	51036	NEW_995120	C4GT	PM10-PRI	239.51	0.00	ERTAC Version 16.0 Update
VA	51036	NEW_995120	C4GT	PM25-PRI	69.35	0.00	ERTAC Version 16.0 Update
VA	51036	NEW_995120	C4GT	SO2	15.47	0.00	ERTAC Version 16.0 Update
VA	51036	NEW_995120	C4GT	VOC	24.93	0.00	ERTAC Version 16.0 Update
VA	51041	4181011	Dominion Virginia Power- Chesterfield	CO	124.33	331.72	ERTAC Version 16.0 Update
VA	51041	4181011	Dominion Virginia Power- Chesterfield	NH3	51.91	6.15	ERTAC Version 16.0 Update
VA	51041	4181011	Dominion Virginia Power- Chesterfield	NOX	1,377.07	2,532.66	ERTAC Version 16.0 Update
VA	51041	4181011	Dominion Virginia Power- Chesterfield	PM10-PRI	220.34	489.23	ERTAC Version 16.0 Update
VA	51041	4181011	Dominion Virginia Power- Chesterfield	PM25-PRI	101.98	136.34	ERTAC Version 16.0 Update
VA	51041	4181011	Dominion Virginia Power- Chesterfield	SO2	538.62	1,054.76	ERTAC Version 16.0 Update
VA	51041	4181011	Dominion Virginia Power- Chesterfield	VOC	30.49	55.59	ERTAC Version 16.0 Update
VA	51061	6744911	Dominion - Remington CT Station	CO	5.61	2.86	ERTAC Version 16.0 Update
VA	51061	6744911	Dominion - Remington CT Station	NOX	122.81	57.54	ERTAC Version 16.0 Update

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VA	51061	6744911	Dominion - Remington CT Station	PM10-PRI	23.13	2.15	ERTAC Version 16.0 Update
VA	51061	6744911	Dominion - Remington CT Station	PM25-PRI	23.13	2.15	ERTAC Version 16.0 Update
VA	51061	6744911	Dominion - Remington CT Station	SO2	3.35	1.42	ERTAC Version 16.0 Update
VA	51061	6744911	Dominion - Remington CT Station	VOC	7.47	3.82	ERTAC Version 16.0 Update
VA	51061	9081211	Old Dominion Electric Cooperative - Marsh Run	CO	58.98	1.62	ERTAC Version 16.0 Update
VA	51061	9081211	Old Dominion Electric Cooperative - Marsh Run	NOX	100.21	30.74	ERTAC Version 16.0 Update
VA	51061	9081211	Old Dominion Electric Cooperative - Marsh Run	PM10-PRI	29.49	1.14	ERTAC Version 16.0 Update
VA	51061	9081211	Old Dominion Electric Cooperative - Marsh Run	PM25-PRI	29.49	1.14	ERTAC Version 16.0 Update
VA	51061	9081211	Old Dominion Electric Cooperative - Marsh Run	SO2	1.78	1.87	ERTAC Version 16.0 Update
VA	51061	9081211	Old Dominion Electric Cooperative - Marsh Run	VOC	6.25	2.21	ERTAC Version 16.0 Update
VA	51065	6631311	Dominion - Bremo Power Station	CO	28.81	0.00	ERTAC Version 16.0 Update
VA	51065	6631311	Dominion - Bremo Power Station	NH3	2.68	0.00	ERTAC Version 16.0 Update
VA	51065	6631311	Dominion - Bremo Power Station	NOX	29.01	0.00	ERTAC Version 16.0 Update
VA	51065	6631311	Dominion - Bremo Power Station	PM10-PRI	9.60	0.00	ERTAC Version 16.0 Update
VA	51065	6631311	Dominion - Bremo Power Station	PM25-PRI	28.81	0.00	ERTAC Version 16.0 Update
VA	51065	6631311	Dominion - Bremo Power Station	SO2	0.58	0.00	ERTAC Version 16.0 Update
VA	51065	6631311	Dominion - Bremo Power Station	VOC	1.43	0.00	ERTAC Version 16.0 Update
VA	51065	9078811	Tenaska Virginia Partners, L.P.	CO	483.69	38.79	ERTAC Version 16.0 Update
VA	51065	9078811	Tenaska Virginia Partners, L.P.	NH3	334.23	10.49	ERTAC Version 16.0 Update
VA	51065	9078811	Tenaska Virginia Partners, L.P.	NOX	301.16	192.81	ERTAC Version 16.0 Update
VA	51065	9078811	Tenaska Virginia Partners, L.P.	PM10-PRI	449.35	75.64	ERTAC Version 16.0 Update
VA	51065	9078811	Tenaska Virginia Partners, L.P.	PM25-PRI	130.11	75.64	ERTAC Version 16.0 Update
VA	51065	9078811	Tenaska Virginia Partners, L.P.	SO2	29.04	15.52	ERTAC Version 16.0 Update
VA	51065	9078811	Tenaska Virginia Partners, L.P.	VOC	46.77	12.95	ERTAC Version 16.0 Update
VA	51081	ORIS59913	Greensville Power Station	CO	397.69	393.88	ERTAC Version 16.0 Update
VA	51081	ORIS59913	Greensville Power Station	NH3	274.81	6.77	ERTAC Version 16.0 Update
VA	51081	ORIS59913	Greensville Power Station	NOX	397.69	196.94	ERTAC Version 16.0 Update

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VA	51081	ORIS59913	Greensville Power Station	PM10-PRI	369.46	182.96	ERTAC Version 16.0 Update
VA	51081	ORIS59913	Greensville Power Station	PM25-PRI	106.98	99.85	ERTAC Version 16.0 Update
VA	51081	ORIS59913	Greensville Power Station	SO2	11.93	5.91	ERTAC Version 16.0 Update
VA	51081	ORIS59913	Greensville Power Station	VOC	38.46	33.09	ERTAC Version 16.0 Update
VA	51083	6160611	Dominion/ODEC - Clover Power Station	CO	81.36	161.67	ERTAC Version 16.0 Update
VA	51083	6160611	Dominion/ODEC - Clover Power Station	NH3	0.24	0.52	ERTAC Version 16.0 Update
VA	51083	6160611	Dominion/ODEC - Clover Power Station	NOX	2,309.16	3,682.41	ERTAC Version 16.0 Update
VA	51083	6160611	Dominion/ODEC - Clover Power Station	PM10-PRI	203.13	550.84	ERTAC Version 16.0 Update
VA	51083	6160611	Dominion/ODEC - Clover Power Station	PM25-PRI	22.35	48.36	ERTAC Version 16.0 Update
VA	51083	6160611	Dominion/ODEC - Clover Power Station	SO2	439.19	1,068.01	ERTAC Version 16.0 Update
VA	51083	6160611	Dominion/ODEC - Clover Power Station	VOC	23.27	47.23	ERTAC Version 16.0 Update
VA	51083	ORIS58560	Halifax County Biomass	CO	0.00	129.07	State Directed
VA	51083	ORIS58560	Halifax County Biomass	NOX	0.00	110.59	State Directed
VA	51083	ORIS58560	Halifax County Biomass	PM10-PRI	0.00	41.00	State Directed
VA	51083	ORIS58560	Halifax County Biomass	PM25-PRI	0.00	41.00	State Directed
VA	51083	ORIS58560	Halifax County Biomass	SO2	0.00	0.25	State Directed
VA	51083	ORIS58560	Halifax County Biomass	VOC	0.00	24.20	State Directed
VA	51085	6631811	Doswell Limited Partnership Doswell Energy Center	CO	394.45	475.92	ERTAC Version 16.0 Update
VA	51085	6631811	Doswell Limited Partnership Doswell Energy Center	NH3	229.67	174.71	ERTAC Version 16.0 Update
VA	51085	6631811	Doswell Limited Partnership Doswell Energy Center	NOX	979.54	660.80	ERTAC Version 16.0 Update
VA	51085	6631811	Doswell Limited Partnership Doswell Energy Center	PM10-PRI	372.09	492.24	ERTAC Version 16.0 Update
VA	51085	6631811	Doswell Limited Partnership Doswell Energy Center	PM25-PRI	146.95	230.10	ERTAC Version 16.0 Update
VA	51085	6631811	Doswell Limited Partnership Doswell Energy Center	SO2	36.90	15.21	ERTAC Version 16.0 Update
VA	51085	6631811	Doswell Limited Partnership Doswell Energy Center	VOC	45.97	78.00	ERTAC Version 16.0 Update
VA	51087	6311211	Dominion - Darbytown CT Station	CO	2.12	0.03	ERTAC Version 16.0 Update
VA	51087	6311211	Dominion - Darbytown CT Station	NH3	1.51	0.00	ERTAC Version 16.0 Update
VA	51087	6311211	Dominion - Darbytown CT Station	NOX	53.31	83.70	ERTAC Version 16.0 Update

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VA	51087	6311211	Dominion - Darbytown CT Station	PM10-PRI	2.12	2.90	ERTAC Version 16.0 Update
VA	51087	6311211	Dominion - Darbytown CT Station	PM25-PRI	1.66	2.90	ERTAC Version 16.0 Update
VA	51087	6311211	Dominion - Darbytown CT Station	SO2	22.27	0.70	ERTAC Version 16.0 Update
VA	51087	6311211	Dominion - Darbytown CT Station	VOC	0.41	1.30	ERTAC Version 16.0 Update
VA	51099	6148811	SEI Birchwood Power Facility	CO	40.45	108.89	ERTAC Version 16.0 Update
VA	51099	6148811	SEI Birchwood Power Facility	NH3	0.03	0.09	ERTAC Version 16.0 Update
VA	51099	6148811	SEI Birchwood Power Facility	NOX	64.07	135.91	ERTAC Version 16.0 Update
VA	51099	6148811	SEI Birchwood Power Facility	PM10-PRI	7.20	26.23	ERTAC Version 16.0 Update
VA	51099	6148811	SEI Birchwood Power Facility	PM25-PRI	7.20	22.81	ERTAC Version 16.0 Update
VA	51099	6148811	SEI Birchwood Power Facility	SO2	60.22	149.49	ERTAC Version 16.0 Update
VA	51099	6148811	SEI Birchwood Power Facility	VOC	1.35	3.41	ERTAC Version 16.0 Update
VA	51107	17856211	Panda Stonewall LLC	CO	226.85	235.33	ERTAC Version 16.0 Update
VA	51107	17856211	Panda Stonewall LLC	NH3	156.75	4.05	ERTAC Version 16.0 Update
VA	51107	17856211	Panda Stonewall LLC	NOX	226.85	117.66	ERTAC Version 16.0 Update
VA	51107	17856211	Panda Stonewall LLC	PM10-PRI	210.74	109.31	ERTAC Version 16.0 Update
VA	51107	17856211	Panda Stonewall LLC	PM25-PRI	61.02	59.66	ERTAC Version 16.0 Update
VA	51107	17856211	Panda Stonewall LLC	SO2	6.35	3.29	ERTAC Version 16.0 Update
VA	51107	17856211	Panda Stonewall LLC	VOC	21.94	19.77	ERTAC Version 16.0 Update
VA	51109	5040011	Dominion-Gordonsville Power Station	CO	41.04	29.27	ERTAC Version 16.0 Update
VA	51109	5040011	Dominion-Gordonsville Power Station	NH3	28.36	43.95	ERTAC Version 16.0 Update
VA	51109	5040011	Dominion-Gordonsville Power Station	NOX	112.85	161.82	ERTAC Version 16.0 Update
VA	51109	5040011	Dominion-Gordonsville Power Station	PM10-PRI	38.12	29.62	ERTAC Version 16.0 Update
VA	51109	5040011	Dominion-Gordonsville Power Station	PM25-PRI	11.04	29.62	ERTAC Version 16.0 Update
VA	51109	5040011	Dominion-Gordonsville Power Station	SO2	2.84	3.10	ERTAC Version 16.0 Update
VA	51109	5040011	Dominion-Gordonsville Power Station	VOC	4.97	61.47	ERTAC Version 16.0 Update
VA	51109	9063611	Old Dominion Electric Cooperative Louisa	CO	47.72	2.05	ERTAC Version 16.0 Update
VA	51109	9063611	Old Dominion Electric Cooperative Louisa	NOX	71.14	22.68	ERTAC Version 16.0 Update

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VA	51109	9063611	Old Dominion Electric Cooperative Louisa	PM10-PRI	20.81	3.88	ERTAC Version 16.0 Update
VA	51109	9063611	Old Dominion Electric Cooperative Louisa	PM25-PRI	20.81	3.88	ERTAC Version 16.0 Update
VA	51109	9063611	Old Dominion Electric Cooperative Louisa	SO2	3.00	1.81	ERTAC Version 16.0 Update
VA	51109	9063611	Old Dominion Electric Cooperative Louisa	VOC	5.08	2.02	ERTAC Version 16.0 Update
VA	51153	7520511	Dominion - Possum Point	CO	119.50	82.27	ERTAC Version 16.0 Update
VA	51153	7520511	Dominion - Possum Point	NH3	82.57	3.71	ERTAC Version 16.0 Update
VA	51153	7520511	Dominion - Possum Point	NOX	129.23	234.77	ERTAC Version 16.0 Update
VA	51153	7520511	Dominion - Possum Point	PM10-PRI	111.02	186.77	ERTAC Version 16.0 Update
VA	51153	7520511	Dominion - Possum Point	PM25-PRI	32.15	181.52	ERTAC Version 16.0 Update
VA	51153	7520511	Dominion - Possum Point	SO2	7.31	173.43	ERTAC Version 16.0 Update
VA	51153	7520511	Dominion - Possum Point	VOC	11.56	17.08	ERTAC Version 16.0 Update
VA	51167	5763511	American Electric Power-Clinch River Plant	CO	37.54	13.89	ERTAC Version 16.0 Update
VA	51167	5763511	American Electric Power-Clinch River Plant	NH3	5.25	0.01	ERTAC Version 16.0 Update
VA	51167	5763511	American Electric Power-Clinch River Plant	NOX	228.43	27.72	ERTAC Version 16.0 Update
VA	51167	5763511	American Electric Power-Clinch River Plant	PM10-PRI	75.23	1.71	ERTAC Version 16.0 Update
VA	51167	5763511	American Electric Power-Clinch River Plant	PM25-PRI	56.42	1.71	ERTAC Version 16.0 Update
VA	51167	5763511	American Electric Power-Clinch River Plant	SO2	96.86	11.92	ERTAC Version 16.0 Update
VA	51167	5763511	American Electric Power-Clinch River Plant	VOC	3.38	0.93	ERTAC Version 16.0 Update
VA	51181	4937411	Surry Power Station and Gravel Neck	CO	9.08	7.42	ERTAC Version 16.0 Update
VA	51181	4937411	Surry Power Station and Gravel Neck	NH3	0.00	0.03	ERTAC Version 16.0 Update
VA	51181	4937411	Surry Power Station and Gravel Neck	NOX	155.37	73.90	ERTAC Version 16.0 Update
VA	51181	4937411	Surry Power Station and Gravel Neck	PM10-PRI	9.08	0.28	ERTAC Version 16.0 Update
VA	51181	4937411	Surry Power Station and Gravel Neck	PM25-PRI	7.10	0.27	ERTAC Version 16.0 Update
VA	51181	4937411	Surry Power Station and Gravel Neck	SO2	13.17	15.66	ERTAC Version 16.0 Update
VA	51181	4937411	Surry Power Station and Gravel Neck	VOC	1.77	1.92	ERTAC Version 16.0 Update
VA	51187	17644211	Dominion - Warren	CO	577.48	499.11	ERTAC Version 16.0 Update
VA	51187	17644211	Dominion - Warren	NH3	399.04	8.58	ERTAC Version 16.0 Update

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VA	51187	17644211	Dominion - Warren	NOX	338.10	142.08	ERTAC Version 16.0 Update
VA	51187	17644211	Dominion - Warren	PM10-PRI	536.48	231.84	ERTAC Version 16.0 Update
VA	51187	17644211	Dominion - Warren	PM25-PRI	155.34	126.52	ERTAC Version 16.0 Update
VA	51187	17644211	Dominion - Warren	SO2	34.65	14.97	ERTAC Version 16.0 Update
VA	51187	17644211	Dominion - Warren	VOC	55.84	41.93	ERTAC Version 16.0 Update
VA	51191	7707611	Wolf Hills Energy LLC	CO	4.99	8.20	ERTAC Version 16.0 Update
VA	51191	7707611	Wolf Hills Energy LLC	NOX	65.79	16.70	ERTAC Version 16.0 Update
VA	51191	7707611	Wolf Hills Energy LLC	PM10-PRI	4.36	1.75	ERTAC Version 16.0 Update
VA	51191	7707611	Wolf Hills Energy LLC	PM25-PRI	4.36	1.39	ERTAC Version 16.0 Update
VA	51191	7707611	Wolf Hills Energy LLC	SO2	0.44	0.16	ERTAC Version 16.0 Update
VA	51191	7707611	Wolf Hills Energy LLC	VOC	0.77	0.56	ERTAC Version 16.0 Update
VA	51195	16530111	Dominion - Virginia City Hybrid Energy Center	CO	1,592.17	988.94	ERTAC Version 16.0 Update
VA	51195	16530111	Dominion - Virginia City Hybrid Energy Center	NOX	1,255.18	1,465.39	ERTAC Version 16.0 Update
VA	51195	16530111	Dominion - Virginia City Hybrid Energy Center	PM10-PRI	211.38	224.80	ERTAC Version 16.0 Update
VA	51195	16530111	Dominion - Virginia City Hybrid Energy Center	PM25-PRI	211.49	208.60	ERTAC Version 16.0 Update
VA	51195	16530111	Dominion - Virginia City Hybrid Energy Center	SO2	127.92	150.50	ERTAC Version 16.0 Update
VA	51195	16530111	Dominion - Virginia City Hybrid Energy Center	VOC	25.80	419.78	ERTAC Version 16.0 Update
VA	51199	4565211	Dominion - Yorktown Power Station	CO	10.23	17.80	ERTAC Version 16.0 Update
VA	51199	4565211	Dominion - Yorktown Power Station	NH3	10.26	2.78	ERTAC Version 16.0 Update
VA	51199	4565211	Dominion - Yorktown Power Station	NOX	131.86	133.13	ERTAC Version 16.0 Update
VA	51199	4565211	Dominion - Yorktown Power Station	PM10-PRI	15.37	38.19	ERTAC Version 16.0 Update
VA	51199	4565211	Dominion - Yorktown Power Station	PM25-PRI	5.14	28.18	ERTAC Version 16.0 Update
VA	51199	4565211	Dominion - Yorktown Power Station	SO2	367.69	416.51	ERTAC Version 16.0 Update
VA	51199	4565211	Dominion - Yorktown Power Station	VOC	0.87	3.01	ERTAC Version 16.0 Update
VA	51550	6682611	Dominion - Elizabeth River CT Station	CO	40.64	36.99	ERTAC Version 16.0 Update
VA	51550	6682611	Dominion - Elizabeth River CT Station	NOX	122.10	143.43	ERTAC Version 16.0 Update
VA	51550	6682611	Dominion - Elizabeth River CT Station	PM10-PRI	6.40	6.33	ERTAC Version 16.0 Update

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VA	51550	6682611	Dominion - Elizabeth River CT Station	PM25-PRI	6.40	6.33	ERTAC Version 16.0 Update
VA	51550	6682611	Dominion - Elizabeth River CT Station	SO2	9.14	15.52	ERTAC Version 16.0 Update
VA	51550	6682611	Dominion - Elizabeth River CT Station	VOC	2.88	0.98	ERTAC Version 16.0 Update
VA	51670	5883511	Hopewell Cogeneration Ltd Partnership	CO	59.41	83.19	ERTAC Version 16.0 Update
VA	51670	5883511	Hopewell Cogeneration Ltd Partnership	NH3	34.05	0.04	ERTAC Version 16.0 Update
VA	51670	5883511	Hopewell Cogeneration Ltd Partnership	NOX	557.29	780.01	ERTAC Version 16.0 Update
VA	51670	5883511	Hopewell Cogeneration Ltd Partnership	PM10-PRI	15.76	20.22	ERTAC Version 16.0 Update
VA	51670	5883511	Hopewell Cogeneration Ltd Partnership	PM25-PRI	12.20	15.32	ERTAC Version 16.0 Update
VA	51670	5883511	Hopewell Cogeneration Ltd Partnership	SO2	4.81	16.38	ERTAC Version 16.0 Update
VA	51670	5883511	Hopewell Cogeneration Ltd Partnership	VOC	6.63	17.56	ERTAC Version 16.0 Update
VA	51760	4039911	Spruance Genco LLC	CO	0.00	224.03	ERTAC Version 16.0 Update
VA	51760	4039911	Spruance Genco LLC	NOX	0.00	218.14	ERTAC Version 16.0 Update
VA	51760	4039911	Spruance Genco LLC	PM10-PRI	0.00	35.94	ERTAC Version 16.0 Update
VA	51760	4039911	Spruance Genco LLC	PM25-PRI	0.00	32.03	ERTAC Version 16.0 Update
VA	51760	4039911	Spruance Genco LLC	SO2	0.00	20.01	ERTAC Version 16.0 Update
VA	51760	4039911	Spruance Genco LLC	VOC	0.00	40.35	ERTAC Version 16.0 Update
WV	54001	6328311	DOMINION - PEPPER COMPRESSOR STATION	CO	43.52	25.66	EPA 2028 (2016 Platform)
WV	54001	6328311	DOMINION - PEPPER COMPRESSOR STATION	NOX	175.23	116.79	EPA 2028 (2016 Platform)
WV	54001	6328311	DOMINION - PEPPER COMPRESSOR STATION	PM10-PRI	0.98	0.50	EPA 2028 (2016 Platform)
WV	54001	6328311	DOMINION - PEPPER COMPRESSOR STATION	PM25-PRI	0.52	0.23	EPA 2028 (2016 Platform)
WV	54001	6328311	DOMINION - PEPPER COMPRESSOR STATION	SO2	0.03	0.02	EPA 2028 (2016 Platform)
WV	54001	6328311	DOMINION - PEPPER COMPRESSOR STATION	VOC	77.03	52.91	EPA 2028 (2016 Platform)
WV	54003	16320011	IRS MARTINSBURG CENTER CAMPUS	CO	6.36	0.20	EPA 2028 (2016 Platform)
WV	54003	16320011	IRS MARTINSBURG CENTER CAMPUS	NOX	7.02	3.67	EPA 2028 (2016 Platform)
WV	54003	16320011	IRS MARTINSBURG CENTER CAMPUS	PM10-PRI	0.65	0.17	EPA 2028 (2016 Platform)
WV	54003	16320011	IRS MARTINSBURG CENTER CAMPUS	PM25-PRI	0.52	0.17	EPA 2028 (2016 Platform)
WV	54003	16320011	IRS MARTINSBURG CENTER CAMPUS	SO2	4.97	0.25	EPA 2028 (2016 Platform)

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WV	54003	16320011	IRS MARTINSBURG CENTER CAMPUS	VOC	0.56	0.10	EPA 2028 (2016 Platform)
WV	54003	4987611	CAPITOL CEMENT - ESSROC MARTINSBURG	CO	1,005.26	902.36	EPA 2028 (2016 Platform)
WV	54003	4987611	CAPITOL CEMENT - ESSROC MARTINSBURG	NH3	6.60	6.67	EPA 2028 (2016 Platform)
WV	54003	4987611	CAPITOL CEMENT - ESSROC MARTINSBURG	NOX	938.23	1,006.50	EPA 2028 (2016 Platform)
WV	54003	4987611	CAPITOL CEMENT - ESSROC MARTINSBURG	PM10-PRI	242.68	190.77	EPA 2028 (2016 Platform)
WV	54003	4987611	CAPITOL CEMENT - ESSROC MARTINSBURG	PM25-PRI	114.42	59.98	EPA 2028 (2016 Platform)
WV	54003	4987611	CAPITOL CEMENT - ESSROC MARTINSBURG	SO2	636.30	530.92	EPA 2028 (2016 Platform)
WV	54003	4987611	CAPITOL CEMENT - ESSROC MARTINSBURG	VOC	31.78	33.71	EPA 2028 (2016 Platform)
WV	54003	5001411	GUARDIAN FIBERGLASS, INC.	CO	16.39	12.35	EPA 2028 (2016 Platform)
WV	54003	5001411	GUARDIAN FIBERGLASS, INC.	NOX	29.41	29.30	EPA 2028 (2016 Platform)
WV	54003	5001411	GUARDIAN FIBERGLASS, INC.	SO2	2.82	2.82	EPA 2028 (2016 Platform)
WV	54003	5001411	GUARDIAN FIBERGLASS, INC.	VOC	15.49	12.93	EPA 2028 (2016 Platform)
WV	54003	6328411	QG PRINTING II CORP.	VOC	26.49	29.09	State Directed
WV	54003	6328611	NORTH MOUNTAIN SANITARY LANDFILL	CO	7.47	10.57	State Directed
WV	54003	6328611	NORTH MOUNTAIN SANITARY LANDFILL	NOX	3.74	7.34	State Directed
WV	54003	6328611	NORTH MOUNTAIN SANITARY LANDFILL	PM10-PRI	9.64	10.91	State Directed
WV	54003	6328611	NORTH MOUNTAIN SANITARY LANDFILL	PM25-PRI	6.33	7.60	State Directed
WV	54003	6328611	NORTH MOUNTAIN SANITARY LANDFILL	SO2	1.15	0.49	State Directed
WV	54003	6328611	NORTH MOUNTAIN SANITARY LANDFILL	VOC	2.63	4.24	State Directed
WV	54003	6328911	CONTINENTAL BRICK - MARTINSBURG FACILITY	PM10-PRI	5.15	6.30	State Directed
WV	54003	6328911	CONTINENTAL BRICK - MARTINSBURG FACILITY	PM25-PRI	1.56	1.70	State Directed
WV	54007	4958611	WEYERHAEUSER NR - HEATERS FACILITY	PM10-PRI	152.90	153.40	State Directed
WV	54007	4958611	WEYERHAEUSER NR - HEATERS FACILITY	PM25-PRI	148.51	148.74	State Directed
WV	54007	6234211	BURNSVILLE COMPRESSOR STATION #71	CO	10.55	22.24	State Directed
WV	54007	6234211	BURNSVILLE COMPRESSOR STATION #71	NOX	75.12	162.51	State Directed
WV	54007	6234211	BURNSVILLE COMPRESSOR STATION #71	PM10-PRI	2.54	5.43	State Directed

State Abbr.	FIPS Code	Master EIS Facility ID	Facility Name	Pollutant Code	Re-Model Emissions (tpy)	Original Model Emissions (tpy)	Update Reason
WV	54007	6234211	BURNSVILLE COMPRESSOR STATION #71	PM25-PRI	2.54	5.43	State Directed
WV	54007	6234211	BURNSVILLE COMPRESSOR STATION #71	SO2	0.02	0.04	State Directed
WV	54007	6234211	BURNSVILLE COMPRESSOR STATION #71	VOC	4.19	8.39	State Directed
WV	54009	4864311	MOUNTAIN STATE CARBON, LLC	CO	21,788.27	21,788.69	State Directed
WV	54009	4864311	MOUNTAIN STATE CARBON, LLC	NOX	836.81	855.94	State Directed
WV	54009	4864311	MOUNTAIN STATE CARBON, LLC	PM10-PRI	285.44	309.74	State Directed
WV	54009	4864311	MOUNTAIN STATE CARBON, LLC	PM25-PRI	120.32	128.25	State Directed
WV	54009	4864311	MOUNTAIN STATE CARBON, LLC	SO2	598.47	647.65	State Directed
WV	54009	4864311	MOUNTAIN STATE CARBON, LLC	VOC	215.36	216.19	State Directed
WV	54019	4985711	WEST VIRGINIA ALLOYS, INC.	CO	825.53	567.30	EPA 2028 (2016 Platform)
WV	54019	4985711	WEST VIRGINIA ALLOYS, INC.	NH3	3.00	2.05	EPA 2028 (2016 Platform)
WV	54019	4985711	WEST VIRGINIA ALLOYS, INC.	NOX	1,018.73	680.00	EPA 2028 (2016 Platform)
WV	54019	4985711	WEST VIRGINIA ALLOYS, INC.	PM10-PRI	674.65	269.07	EPA 2028 (2016 Platform)
WV	54019	4985711	WEST VIRGINIA ALLOYS, INC.	PM25-PRI	627.40	245.72	EPA 2028 (2016 Platform)
WV	54019	4985711	WEST VIRGINIA ALLOYS, INC.	SO2	1,080.30	745.20	EPA 2028 (2016 Platform)
WV	54019	4985711	WEST VIRGINIA ALLOYS, INC.	VOC	55.79	38.49	EPA 2028 (2016 Platform)
WV	54021	6256811	DOMINION - JONES COMPRESSOR STATION	VOC	40.50	40.61	State Directed
WV	54021	6256911	GLENVILLE COMPRESSOR STATION #37	CO	6.96	10.95	State Directed
WV	54021	6256911	GLENVILLE COMPRESSOR STATION #37	NOX	55.62	88.39	State Directed
WV	54021	6256911	GLENVILLE COMPRESSOR STATION #37	PM10-PRI	1.38	2.17	State Directed
WV	54021	6256911	GLENVILLE COMPRESSOR STATION #37	PM25-PRI	1.38	2.17	State Directed
WV	54021	6256911	GLENVILLE COMPRESSOR STATION #37	SO2	0.01	0.02	State Directed
WV	54021	6256911	GLENVILLE COMPRESSOR STATION #37	VOC	2.11	3.35	State Directed
WV	54023	6257011	Dominion Resources, Inc. - MOUNT STORM POWER STATION	CO	393.81	992.49	PSAT Review
WV	54023	6257011	Dominion Resources, Inc. - MOUNT STORM POWER STATION	NH3	0.75	0.28	PSAT Review
WV	54023	6257011	Dominion Resources, Inc. - MOUNT STORM POWER STATION	NOX	965.30	1,984.14	PSAT Review

State Abbr.	FIPS Code	Master EIS Facility ID	Facility Name	Pollutant Code	Re-Model Emissions (tpy)	Original Model Emissions (tpy)	Update Reason
WV	54023	6257011	Dominion Resources, Inc. - MOUNT STORM POWER STATION	PM10-PRI	656.36	808.99	PSAT Review
WV	54023	6257011	Dominion Resources, Inc. - MOUNT STORM POWER STATION	PM25-PRI	131.27	542.79	PSAT Review
WV	54023	6257011	Dominion Resources, Inc. - MOUNT STORM POWER STATION	SO2	954.03	2,123.64	PSAT Review
WV	54023	6257011	Dominion Resources, Inc. - MOUNT STORM POWER STATION	VOC	33.47	68.31	PSAT Review
WV	54033	6271311	GRAFTECH INTERNATIONAL HOLDINGS, INC.	CO	671.58	672.97	State Directed
WV	54033	6271311	GRAFTECH INTERNATIONAL HOLDINGS, INC.	NOX	25.37	28.17	State Directed
WV	54033	6271311	GRAFTECH INTERNATIONAL HOLDINGS, INC.	PM10-PRI	19.84	20.85	State Directed
WV	54033	6271311	GRAFTECH INTERNATIONAL HOLDINGS, INC.	PM25-PRI	9.30	9.36	State Directed
WV	54033	6271311	GRAFTECH INTERNATIONAL HOLDINGS, INC.	SO2	76.04	76.05	State Directed
WV	54033	6271311	GRAFTECH INTERNATIONAL HOLDINGS, INC.	VOC	22.24	25.47	State Directed
WV	54033	6271711	ALLEGHENY ENERGY SUPPLY CO, LLC-HARRISON	CO	1,290.91	1,425.68	PSAT Review
WV	54033	6271711	ALLEGHENY ENERGY SUPPLY CO, LLC-HARRISON	NH3	4.93	4.06	PSAT Review
WV	54033	6271711	ALLEGHENY ENERGY SUPPLY CO, LLC-HARRISON	NOX	10,017.31	11,830.88	PSAT Review
WV	54033	6271711	ALLEGHENY ENERGY SUPPLY CO, LLC-HARRISON	PM10-PRI	2,370.72	2,076.83	PSAT Review
WV	54033	6271711	ALLEGHENY ENERGY SUPPLY CO, LLC-HARRISON	PM25-PRI	2,078.22	1,760.03	PSAT Review
WV	54033	6271711	ALLEGHENY ENERGY SUPPLY CO, LLC-HARRISON	SO2	10,356.24	10,082.94	PSAT Review
WV	54033	6271711	ALLEGHENY ENERGY SUPPLY CO, LLC-HARRISON	VOC	192.62	169.75	PSAT Review
WV	54033	9020111	Harrison/Marion Regiona	CO	169.30	169.33	State Directed
WV	54033	9020111	Harrison/Marion Regiona	NOX	4.80	4.83	State Directed
WV	54033	9020111	Harrison/Marion Regiona	PM10-PRI	3.45	3.45	State Directed
WV	54033	9020111	Harrison/Marion Regiona	PM25-PRI	3.17	3.17	State Directed
WV	54033	9020111	Harrison/Marion Regiona	SO2	0.62	0.63	State Directed

State Abbr.	FIPS Code	Master EIS Facility ID	Facility Name	Pollutant Code	Re-Model Emissions (tpy)	Original Model Emissions (tpy)	Update Reason
WV	54033	9020111	Harrison/Marion Regiona	VOC	8.53	8.54	State Directed
WV	54037	11463811	NEEDWOOD FARM	CO	0.00	0.61	State Directed
WV	54037	11463811	NEEDWOOD FARM	NOX	0.00	0.00	State Directed
WV	54037	11463811	NEEDWOOD FARM	PM10-PRI	0.00	0.01	State Directed
WV	54037	11463811	NEEDWOOD FARM	PM25-PRI	0.00	0.01	State Directed
WV	54037	11463811	NEEDWOOD FARM	SO2	0.00	0.00	State Directed
WV	54037	11463811	NEEDWOOD FARM	VOC	0.00	0.01	State Directed
WV	54039	6884211	DUPONT - BELLE	VOC	67.46	568.47	State Directed
WV	54039	6885911	BAYER MATERIALSCIENCE - SOUTH CHARLESTON	VOC	30.98	47.86	State Directed
WV	54041	6900511	DOMINION - KENNEDY COMPRESSOR STATION	VOC	13.05	70.20	State Directed
WV	54041	6900711	DOMINION - LIGHTBURN COMPRESSOR STATION	CO	174.06	175.37	State Directed
WV	54041	6900711	DOMINION - LIGHTBURN COMPRESSOR STATION	NOX	209.61	211.19	State Directed
WV	54041	6900711	DOMINION - LIGHTBURN COMPRESSOR STATION	PM10-PRI	2.92	2.98	State Directed
WV	54041	6900711	DOMINION - LIGHTBURN COMPRESSOR STATION	PM25-PRI	1.37	1.40	State Directed
WV	54041	6900711	DOMINION - LIGHTBURN COMPRESSOR STATION	VOC	124.54	125.15	State Directed
WV	54049	4864511	AMERICAN BITUMINOUS POWER-GRANT TOWN PLT	CO	909.98	825.31	PSAT Review
WV	54049	4864511	AMERICAN BITUMINOUS POWER-GRANT TOWN PLT	NH3	0.34	0.05	PSAT Review
WV	54049	4864511	AMERICAN BITUMINOUS POWER-GRANT TOWN PLT	NOX	1,735.70	1,245.10	PSAT Review
WV	54049	4864511	AMERICAN BITUMINOUS POWER-GRANT TOWN PLT	PM10-PRI	176.15	175.03	PSAT Review
WV	54049	4864511	AMERICAN BITUMINOUS POWER-GRANT TOWN PLT	PM25-PRI	176.15	173.42	PSAT Review
WV	54049	4864511	AMERICAN BITUMINOUS POWER-GRANT TOWN PLT	SO2	2,823.62	2,210.25	PSAT Review

State Abbr.	FIPS Code	Master EIS Facility ID	Facility Name	Pollutant Code	Re-Model Emissions (tpy)	Original Model Emissions (tpy)	Update Reason
WV	54049	4864511	AMERICAN BITUMINOUS POWER-GRANT TOWN PLT	VOC	33.24	39.71	PSAT Review
WV	54049	6901511	NOVELIS	CO	2.52	4.11	State Directed
WV	54049	6901511	NOVELIS	NOX	3.00	4.90	State Directed
WV	54049	6901511	NOVELIS	PM10-PRI	7.17	7.55	State Directed
WV	54049	6901511	NOVELIS	PM25-PRI	7.17	7.55	State Directed
WV	54049	6901511	NOVELIS	SO2	0.02	0.03	State Directed
WV	54049	6901511	NOVELIS	VOC	179.36	179.47	State Directed
WV	54051	4878711	PPG INDUSTRIES, INC., NATRIUM PLANT	CO	121.51	426.00	State Directed
WV	54051	4878711	PPG INDUSTRIES, INC., NATRIUM PLANT	NOX	412.77	573.26	State Directed
WV	54051	4878711	PPG INDUSTRIES, INC., NATRIUM PLANT	PM10-PRI	2.87	25.20	State Directed
WV	54051	4878711	PPG INDUSTRIES, INC., NATRIUM PLANT	PM25-PRI	2.87	25.20	State Directed
WV	54051	4878711	PPG INDUSTRIES, INC., NATRIUM PLANT	SO2	2.23	2.80	State Directed
WV	54051	4878711	PPG INDUSTRIES, INC., NATRIUM PLANT	VOC	22.06	24.00	State Directed
WV	54051	6902311	MITCHELL PLANT	CO	672.28	1,081.07	PSAT Review
WV	54051	6902311	MITCHELL PLANT	NH3	2.58	2.81	PSAT Review
WV	54051	6902311	MITCHELL PLANT	NOX	3,966.73	2,719.62	PSAT Review
WV	54051	6902311	MITCHELL PLANT	PM10-PRI	141.63	1,629.65	PSAT Review
WV	54051	6902311	MITCHELL PLANT	PM25-PRI	110.27	1,298.78	PSAT Review
WV	54051	6902311	MITCHELL PLANT	SO2	4,230.41	5,372.40	PSAT Review
WV	54051	6902311	MITCHELL PLANT	VOC	110.98	129.92	PSAT Review
WV	54053	6760811	APPALACHIAN POWER - MOUNTAINEER PLANT	CO	485.22	1,039.80	ERTAC Version 16.0 Update
WV	54053	6760811	APPALACHIAN POWER - MOUNTAINEER PLANT	NH3	1.58	2.38	ERTAC Version 16.0 Update
WV	54053	6760811	APPALACHIAN POWER - MOUNTAINEER PLANT	NOX	4,772.89	2,589.65	ERTAC Version 16.0 Update
WV	54053	6760811	APPALACHIAN POWER - MOUNTAINEER PLANT	PM10-PRI	485.22	1,301.11	ERTAC Version 16.0 Update

State Abbr.	FIPS Code	Master EIS Facility ID	Facility Name	Pollutant Code	Re-Model Emissions (tpy)	Original Model Emissions (tpy)	Update Reason
WV	54053	6760811	APPALACHIAN POWER - MOUNTAINEER PLANT	PM25-PRI	485.22	1,239.03	ERTAC Version 16.0 Update
WV	54053	6760811	APPALACHIAN POWER - MOUNTAINEER PLANT	SO2	6,362.61	2,213.30	ERTAC Version 16.0 Update
WV	54053	6760811	APPALACHIAN POWER - MOUNTAINEER PLANT	VOC	113.06	124.43	ERTAC Version 16.0 Update
WV	54061	16320111	LONGVIEW POWER	CO	1,560.91	3,513.26	PSAT Review
WV	54061	16320111	LONGVIEW POWER	NH3	1.55	0.00	PSAT Review
WV	54061	16320111	LONGVIEW POWER	NOX	2,237.24	1,556.57	PSAT Review
WV	54061	16320111	LONGVIEW POWER	PM10-PRI	408.65	240.77	PSAT Review
WV	54061	16320111	LONGVIEW POWER	PM25-PRI	402.99	240.77	PSAT Review
WV	54061	16320111	LONGVIEW POWER	SO2	2,336.89	2,313.73	PSAT Review
WV	54061	16320111	LONGVIEW POWER	VOC	165.56	81.22	PSAT Review
WV	54061	6773611	MONONGAHELA POWER CO.- FORT MARTIN POWER	CO	776.23	952.91	PSAT Review
WV	54061	6773611	MONONGAHELA POWER CO.- FORT MARTIN POWER	NH3	2.23	53.16	PSAT Review
WV	54061	6773611	MONONGAHELA POWER CO.- FORT MARTIN POWER	NOX	11,997.76	13,743.32	PSAT Review
WV	54061	6773611	MONONGAHELA POWER CO.- FORT MARTIN POWER	PM10-PRI	1,001.18	904.75	PSAT Review
WV	54061	6773611	MONONGAHELA POWER CO.- FORT MARTIN POWER	PM25-PRI	794.98	904.75	PSAT Review
WV	54061	6773611	MONONGAHELA POWER CO.- FORT MARTIN POWER	SO2	3,056.87	4,881.87	PSAT Review
WV	54061	6773611	MONONGAHELA POWER CO.- FORT MARTIN POWER	VOC	101.24	113.91	PSAT Review
WV	54061	6773811	MORGANTOWN ENERGY ASSOCIATES	CO	136.56	78.20	PSAT Review
WV	54061	6773811	MORGANTOWN ENERGY ASSOCIATES	NH3	0.00	0.81	PSAT Review
WV	54061	6773811	MORGANTOWN ENERGY ASSOCIATES	NOX	216.02	655.58	PSAT Review
WV	54061	6773811	MORGANTOWN ENERGY ASSOCIATES	PM10-PRI	30.78	130.34	PSAT Review
WV	54061	6773811	MORGANTOWN ENERGY ASSOCIATES	PM25-PRI	30.78	78.20	PSAT Review

State Abbr.	FIPS Code	Master EIS Facility ID	Facility Name	Pollutant Code	Re-Model Emissions (tpy)	Original Model Emissions (tpy)	Update Reason
WV	54061	6773811	MORGANTOWN ENERGY ASSOCIATES	SO2	3.30	828.64	PSAT Review
WV	54061	6773811	MORGANTOWN ENERGY ASSOCIATES	VOC	14.32	8.42	PSAT Review
WV	54073	4782811	MONONGAHELA POWER CO-PLEASANTS POWER STA	CO	790.01	1,128.86	PSAT Review
WV	54073	4782811	MONONGAHELA POWER CO-PLEASANTS POWER STA	NH3	2.48	0.00	PSAT Review
WV	54073	4782811	MONONGAHELA POWER CO-PLEASANTS POWER STA	NOX	5,729.00	5,497.37	PSAT Review
WV	54073	4782811	MONONGAHELA POWER CO-PLEASANTS POWER STA	PM10-PRI	1,005.52	1,119.85	PSAT Review
WV	54073	4782811	MONONGAHELA POWER CO-PLEASANTS POWER STA	PM25-PRI	790.03	1,018.30	PSAT Review
WV	54073	4782811	MONONGAHELA POWER CO-PLEASANTS POWER STA	SO2	11,501.78	16,817.43	PSAT Review
WV	54073	4782811	MONONGAHELA POWER CO-PLEASANTS POWER STA	VOC	103.24	135.16	PSAT Review
WV	54073	6153211	CYTEC INDUSTRIES	CO	15.59	31.54	State Directed
WV	54073	6153211	CYTEC INDUSTRIES	NH3	13.00	13.57	State Directed
WV	54073	6153211	CYTEC INDUSTRIES	NOX	10.15	21.19	State Directed
WV	54073	6153211	CYTEC INDUSTRIES	PM10-PRI	2.50	4.61	State Directed
WV	54073	6153211	CYTEC INDUSTRIES	PM25-PRI	2.50	4.61	State Directed
WV	54073	6153211	CYTEC INDUSTRIES	SO2	0.13	0.27	State Directed
WV	54073	6153211	CYTEC INDUSTRIES	VOC	93.49	114.06	State Directed
WV	54073	6776411	PLEASANTS ENERGY, LLC	CO	3.15	0.00	ERTAC Version 16.0 Update
WV	54073	6776411	PLEASANTS ENERGY, LLC	NH3	28.42	0.00	ERTAC Version 16.0 Update
WV	54073	6776411	PLEASANTS ENERGY, LLC	NOX	102.47	0.00	ERTAC Version 16.0 Update
WV	54073	6776411	PLEASANTS ENERGY, LLC	PM10-PRI	9.98	0.00	ERTAC Version 16.0 Update
WV	54073	6776411	PLEASANTS ENERGY, LLC	PM25-PRI	2.35	0.00	ERTAC Version 16.0 Update
WV	54073	6776411	PLEASANTS ENERGY, LLC	SO2	1.90	0.00	ERTAC Version 16.0 Update
WV	54073	6776411	PLEASANTS ENERGY, LLC	VOC	2.92	0.00	ERTAC Version 16.0 Update

State Abbr.	FIPS Code	Master EIS Facility ID	Facility Name	Pollutant Code	Re-Model Emissions (tpy)	Original Model Emissions (tpy)	Update Reason
WV	54079	6789111	APPALACHIAN POWER COMPANY - JOHN E AMOS PLANT	CO	1,094.44	1,921.59	PSAT Review
WV	54079	6789111	APPALACHIAN POWER COMPANY - JOHN E AMOS PLANT	NH3	4.94	6.33	PSAT Review
WV	54079	6789111	APPALACHIAN POWER COMPANY - JOHN E AMOS PLANT	NOX	7,292.59	4,878.10	PSAT Review
WV	54079	6789111	APPALACHIAN POWER COMPANY - JOHN E AMOS PLANT	PM10-PRI	503.54	3,107.89	PSAT Review
WV	54079	6789111	APPALACHIAN POWER COMPANY - JOHN E AMOS PLANT	PM25-PRI	391.39	2,313.87	PSAT Review
WV	54079	6789111	APPALACHIAN POWER COMPANY - JOHN E AMOS PLANT	SO2	6,098.36	10,984.24	PSAT Review
WV	54079	6789111	APPALACHIAN POWER COMPANY - JOHN E AMOS PLANT	VOC	203.29	229.16	PSAT Review
WV	54085	6327111	DOMINION - CRAIG COMPRESSOR STATION	CO	23.47	23.52	State Directed
WV	54085	6327111	DOMINION - CRAIG COMPRESSOR STATION	NOX	170.46	170.53	State Directed
WV	54085	6327111	DOMINION - CRAIG COMPRESSOR STATION	PM10-PRI	1.10	1.11	State Directed
WV	54085	6327111	DOMINION - CRAIG COMPRESSOR STATION	PM25-PRI	0.50	0.51	State Directed
WV	54085	6327111	DOMINION - CRAIG COMPRESSOR STATION	VOC	178.68	203.38	State Directed
WV	54095	6616811	MPM SILICONES LLC SISTERSVILLE PLANT	CO	22.95	26.93	State Directed
WV	54095	6616811	MPM SILICONES LLC SISTERSVILLE PLANT	NOX	67.88	84.79	State Directed
WV	54095	6616811	MPM SILICONES LLC SISTERSVILLE PLANT	PM10-PRI	4.55	20.82	State Directed
WV	54095	6616811	MPM SILICONES LLC SISTERSVILLE PLANT	PM25-PRI	4.55	20.82	State Directed
WV	54095	6616811	MPM SILICONES LLC SISTERSVILLE PLANT	SO2	0.15	0.16	State Directed
WV	54095	6616811	MPM SILICONES LLC SISTERSVILLE PLANT	VOC	200.74	201.05	State Directed
WV	54097	6340511	SAINT-GOBAIN/NORTON IND. CERAMICS CORP.	CO	27.53	27.61	State Directed
WV	54097	6340511	SAINT-GOBAIN/NORTON IND. CERAMICS CORP.	VOC	6.72	6.75	State Directed
WV	54099	6341811	BIG SANDY PEAKER PLANT, LLC	CO	524.40	2.39	State Directed
WV	54099	6341811	BIG SANDY PEAKER PLANT, LLC	NOX	817.20	16.55	State Directed
WV	54099	6341811	BIG SANDY PEAKER PLANT, LLC	PM10-PRI	79.20	1.34	State Directed

State Abbr.	FIPS Code	Master EIS Facility ID	Facility Name	Pollutant Code	Re-Model Emissions (tpy)	Original Model Emissions (tpy)	Update Reason
WV	54099	6341811	BIG SANDY PEAKER PLANT, LLC	PM25-PRI	79.20	1.34	State Directed
WV	54099	6341811	BIG SANDY PEAKER PLANT, LLC	SO2	18.00	0.12	State Directed
WV	54099	6341811	BIG SANDY PEAKER PLANT, LLC	VOC	86.40	0.06	State Directed
WV	54099	6341911	CEREDO ELECTRIC GENERATING STATION	CO	22.91	6.47	ERTAC Version 16.0 Update
WV	54099	6341911	CEREDO ELECTRIC GENERATING STATION	NOX	23.95	4.88	ERTAC Version 16.0 Update
WV	54099	6341911	CEREDO ELECTRIC GENERATING STATION	PM10-PRI	7.64	2.32	ERTAC Version 16.0 Update
WV	54099	6341911	CEREDO ELECTRIC GENERATING STATION	PM25-PRI	7.64	2.32	ERTAC Version 16.0 Update
WV	54099	6341911	CEREDO ELECTRIC GENERATING STATION	SO2	0.47	0.11	ERTAC Version 16.0 Update
WV	54099	6341911	CEREDO ELECTRIC GENERATING STATION	VOC	1.59	0.39	ERTAC Version 16.0 Update
WV	54103	6342511	DOMINION - HASTINGS COMPRESSOR STATION	CO	30.50	30.51	State Directed
WV	54103	6342511	DOMINION - HASTINGS COMPRESSOR STATION	NOX	160.69	160.73	State Directed
WV	54103	6342511	DOMINION - HASTINGS COMPRESSOR STATION	VOC	113.13	120.38	State Directed
WV	54103	6342811	LOGANSPORT COMPRESSOR STATION #49	CO	9.75	10.28	State Directed
WV	54103	6342811	LOGANSPORT COMPRESSOR STATION #49	NOX	60.25	60.54	State Directed
WV	54103	6342811	LOGANSPORT COMPRESSOR STATION #49	PM10-PRI	2.09	2.09	State Directed
WV	54103	6342811	LOGANSPORT COMPRESSOR STATION #49	PM25-PRI	2.09	2.09	State Directed
WV	54103	6342811	LOGANSPORT COMPRESSOR STATION #49	SO2	0.02	0.02	State Directed
WV	54103	6342811	LOGANSPORT COMPRESSOR STATION #49	VOC	3.90	3.90	State Directed

Appendix C.

Point EGU and Point Non-EGU Emissions Change Maps[45]

In the following figures, the color blue indicates reductions in the 2028 VISTAS modeling inventory as compared to the EPA 2028el inventory, while the color red indicates increases in the 2028 VISTAS modeling inventory as compared to the EPA 2028el inventory. The color black indicates little or no changes in emissions. The size of the circle indicates the magnitude of the change.

[45] The revised 2028 emissions and differences presented in Tables 4-5 through 4-14, Figures 4-1 through 4-14, and Appendix C are reflective of the emissions update finalized on 3/31/2020 that was used for the elv5 modeling. It is important to note that several EGU facilities that were in the May 2018 version of the 2028 SESARM emissions inventory (elv3) were reclassified as non-EGUs in the March 2020 version of the 2028 SESARM emissions inventory (elv5) based on updated emissions inventory information from EPA. As such, emissions and differences presented in these tables would also capture emissions changes due to these reclassifications, even if a state did not provide updated emission changes for elv5. This was observed for both Georgia and Virginia, who did not provide elv5 non-EGU sector emissions updates, yet the emissions and differences did not match the values for non-EGU presented in the Task 2A Report due to reclassifications.

Appendix C-1. Alabama 2028 Point EGU and Point Non-EGU Comparisons

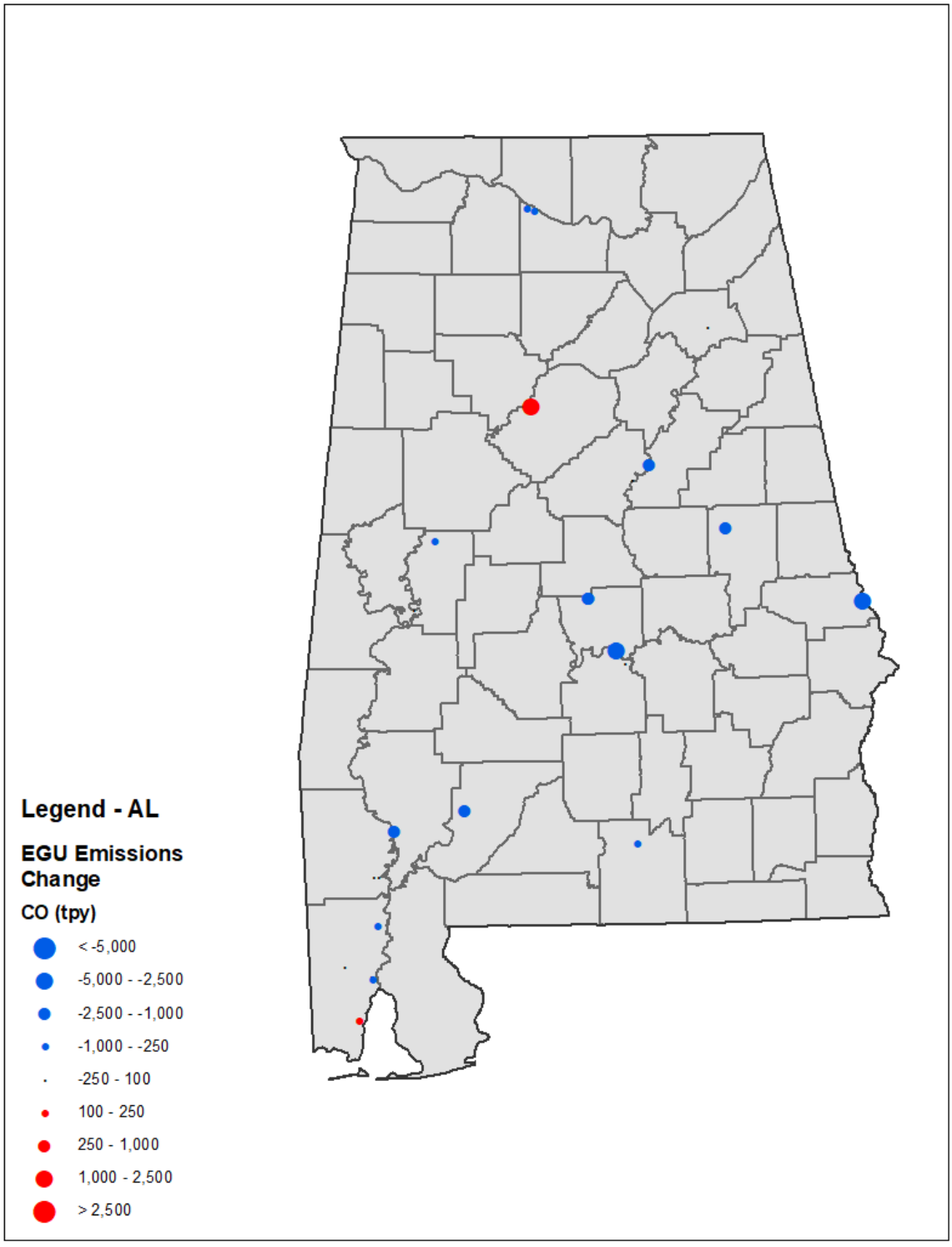

Figure C.1-1. Alabama Point EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

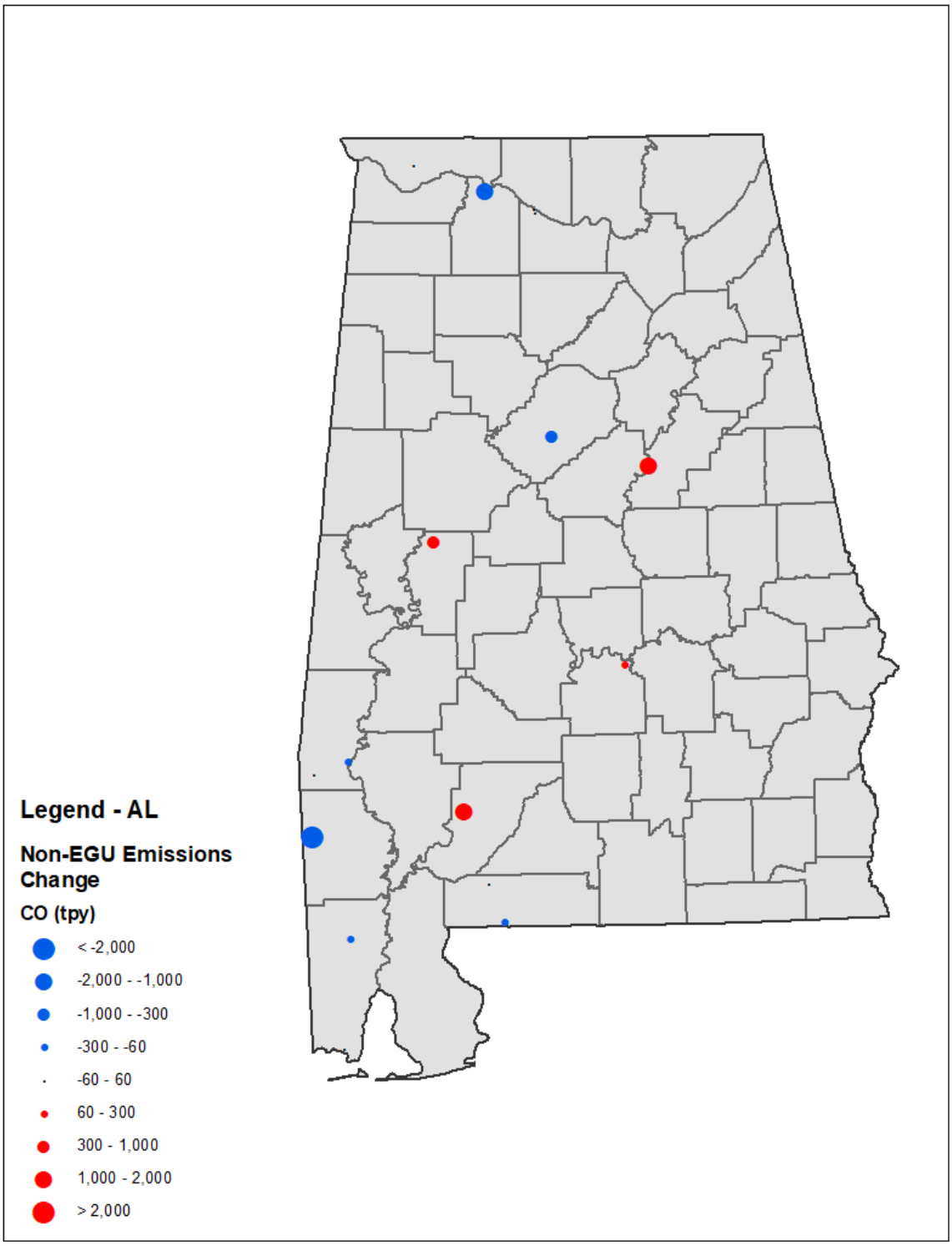

Figure C.1-2. Alabama Point Non-EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

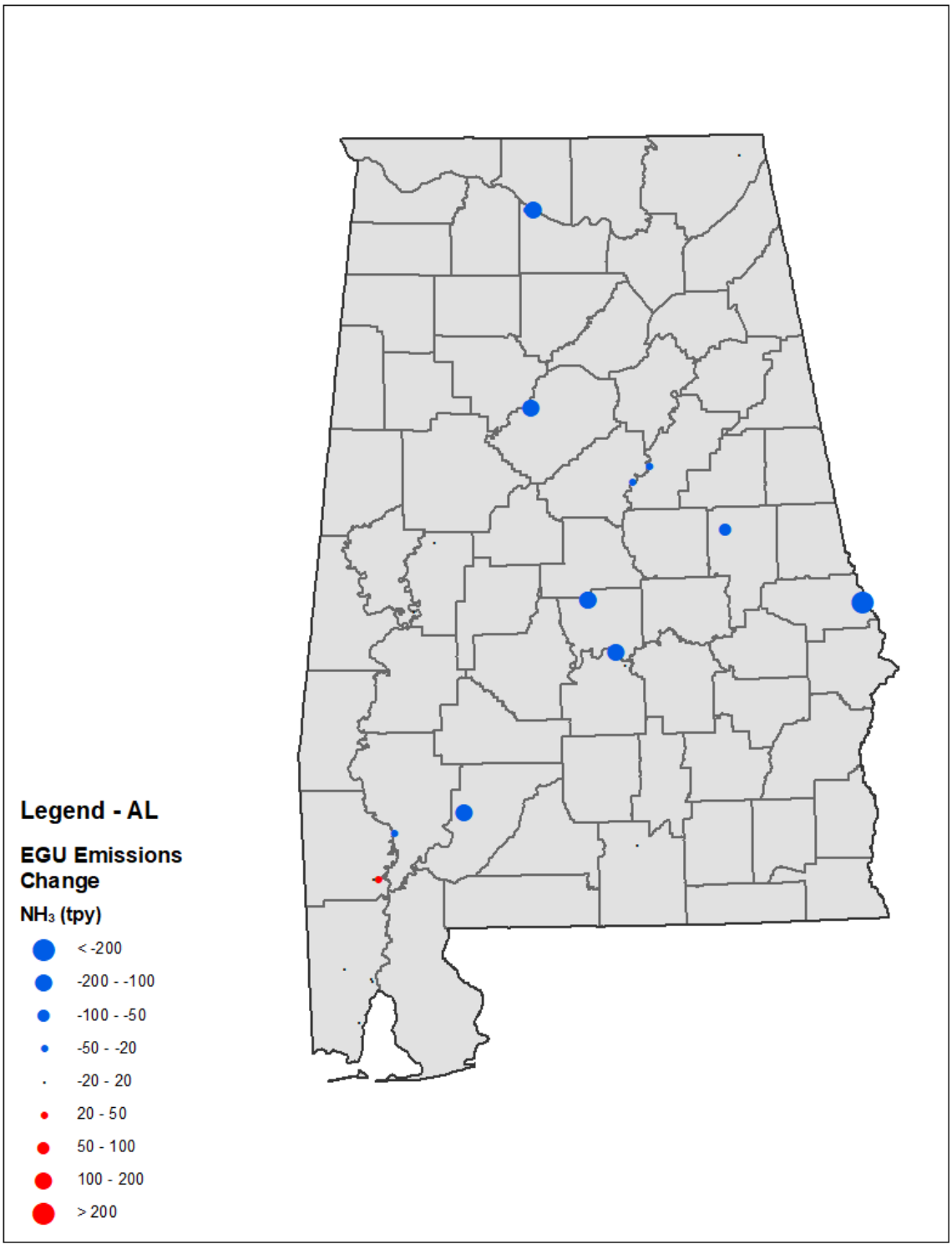

Figure C.1-3. Alabama Point EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

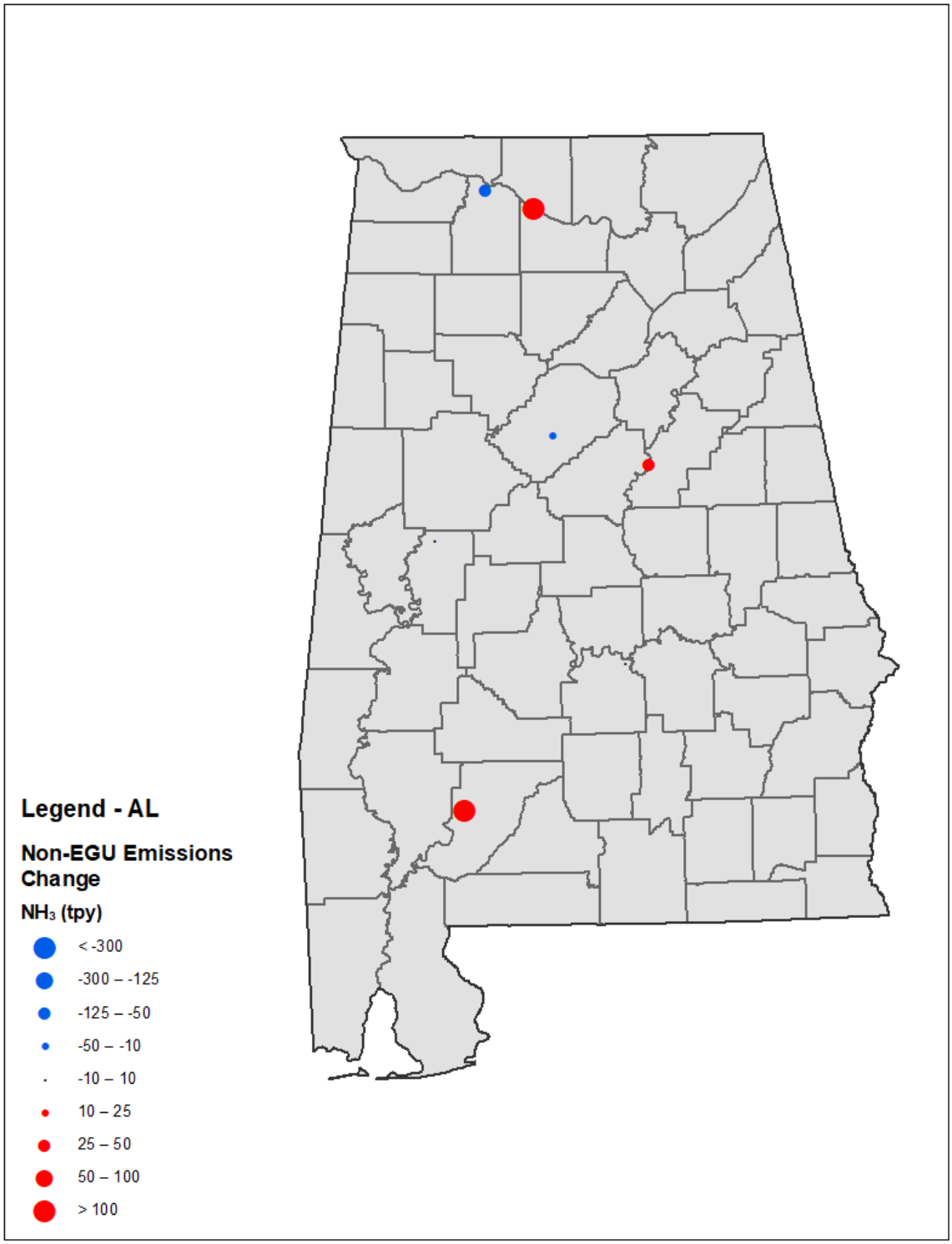

Figure C.1-4. Alabama Point Non-EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

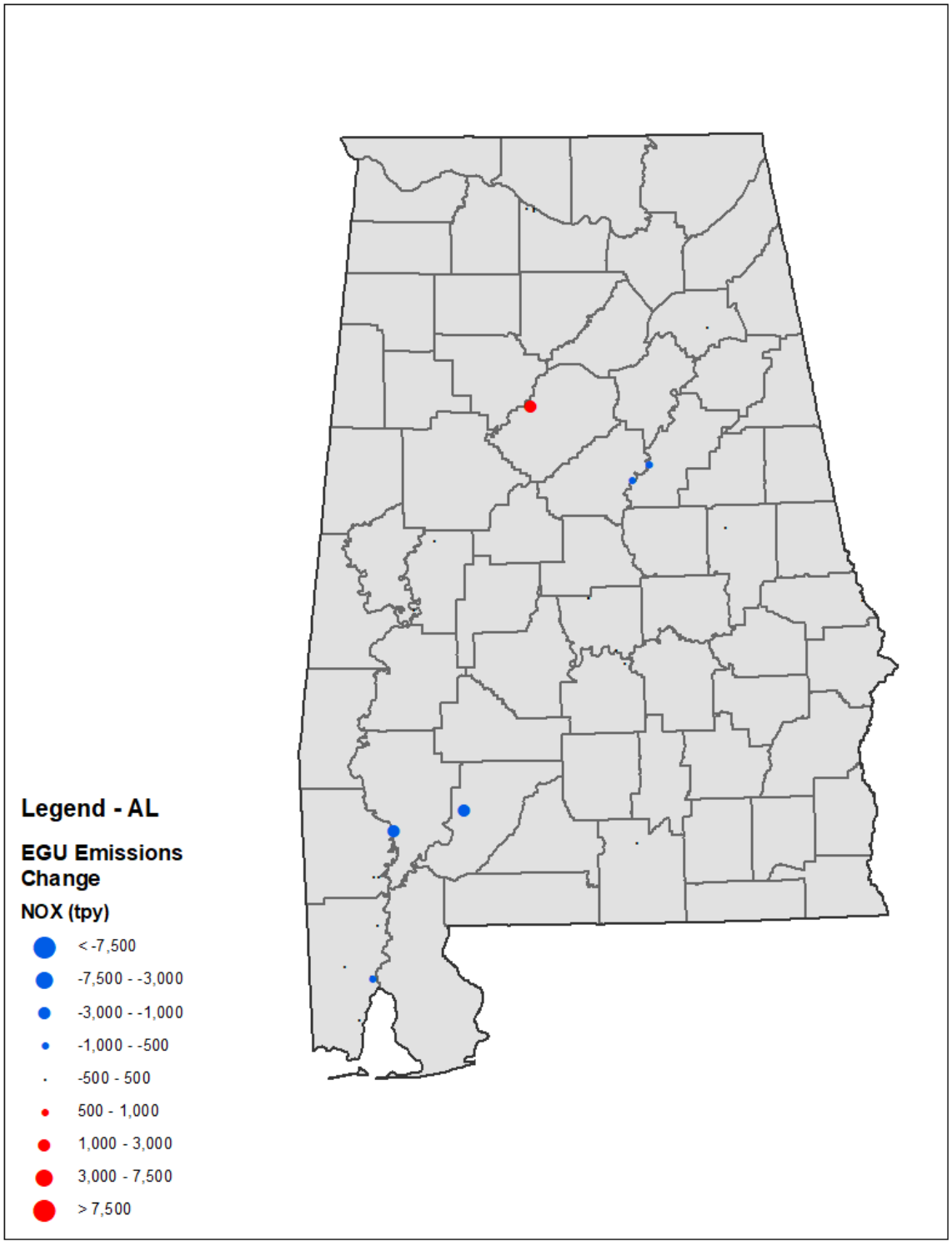

Figure C.1-5. Alabama Point EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

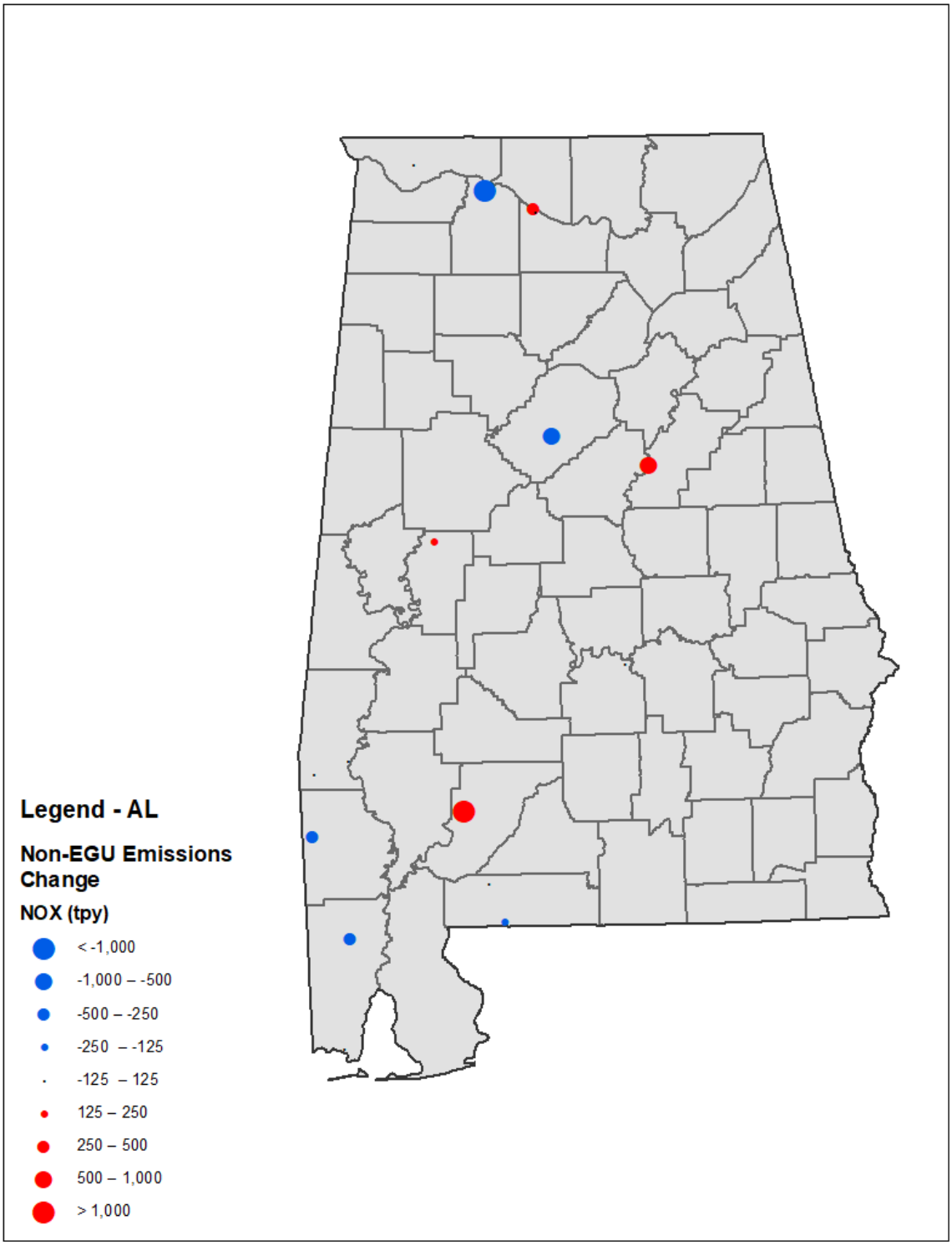

Figure C.1-6. Alabama Point Non-EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

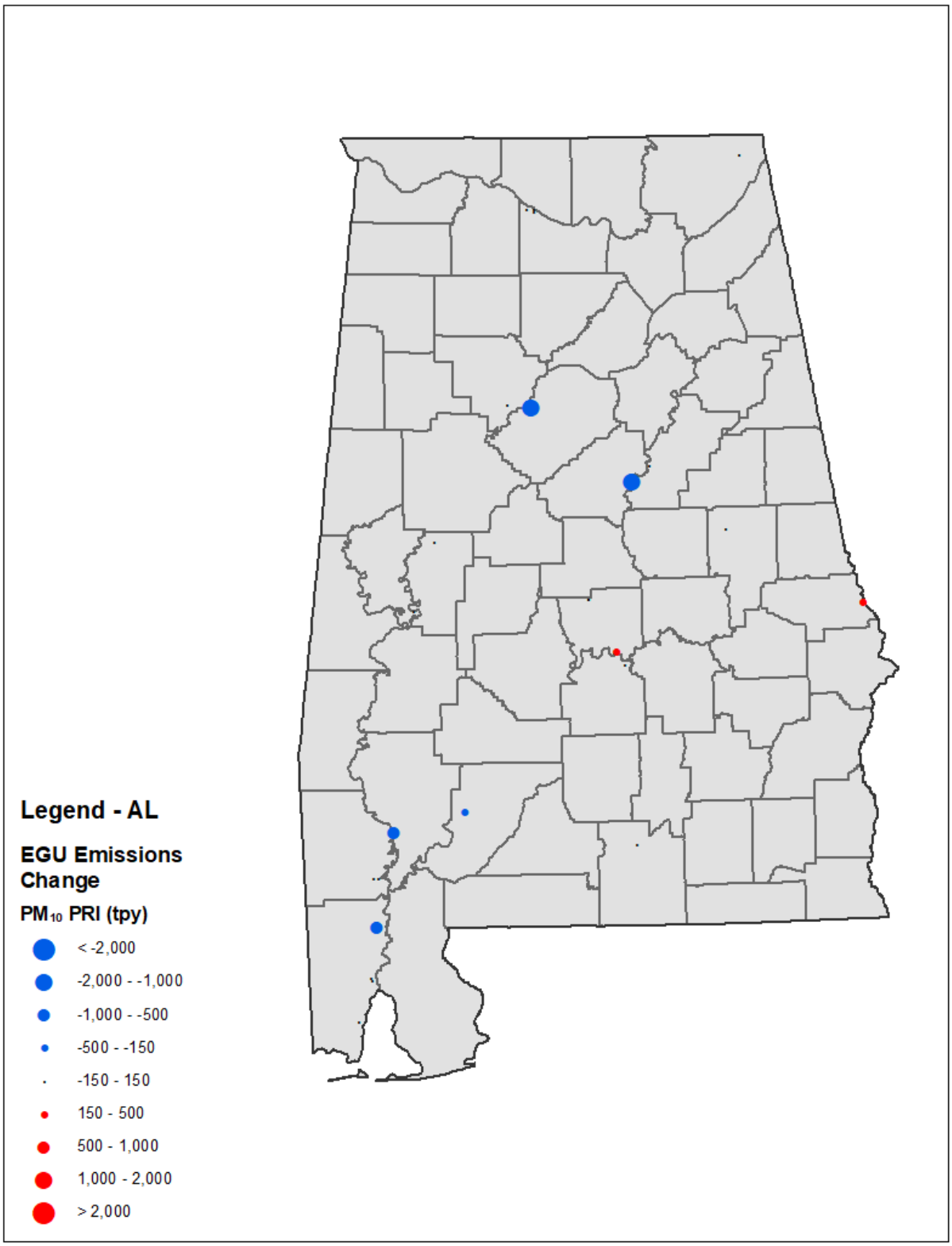

Figure C.1-7. Alabama Point EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

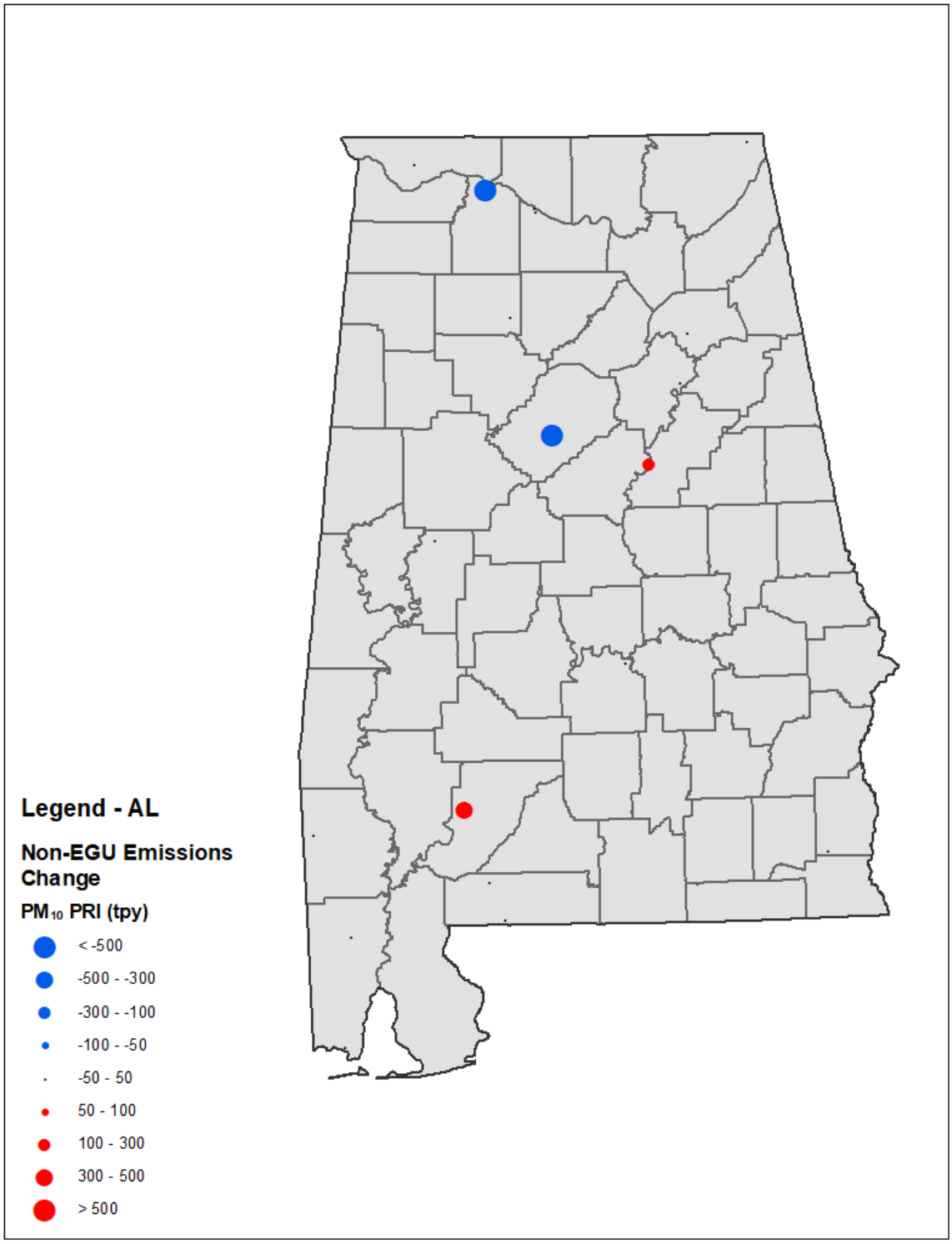

Figure C.1-8. Alabama Point Non-EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

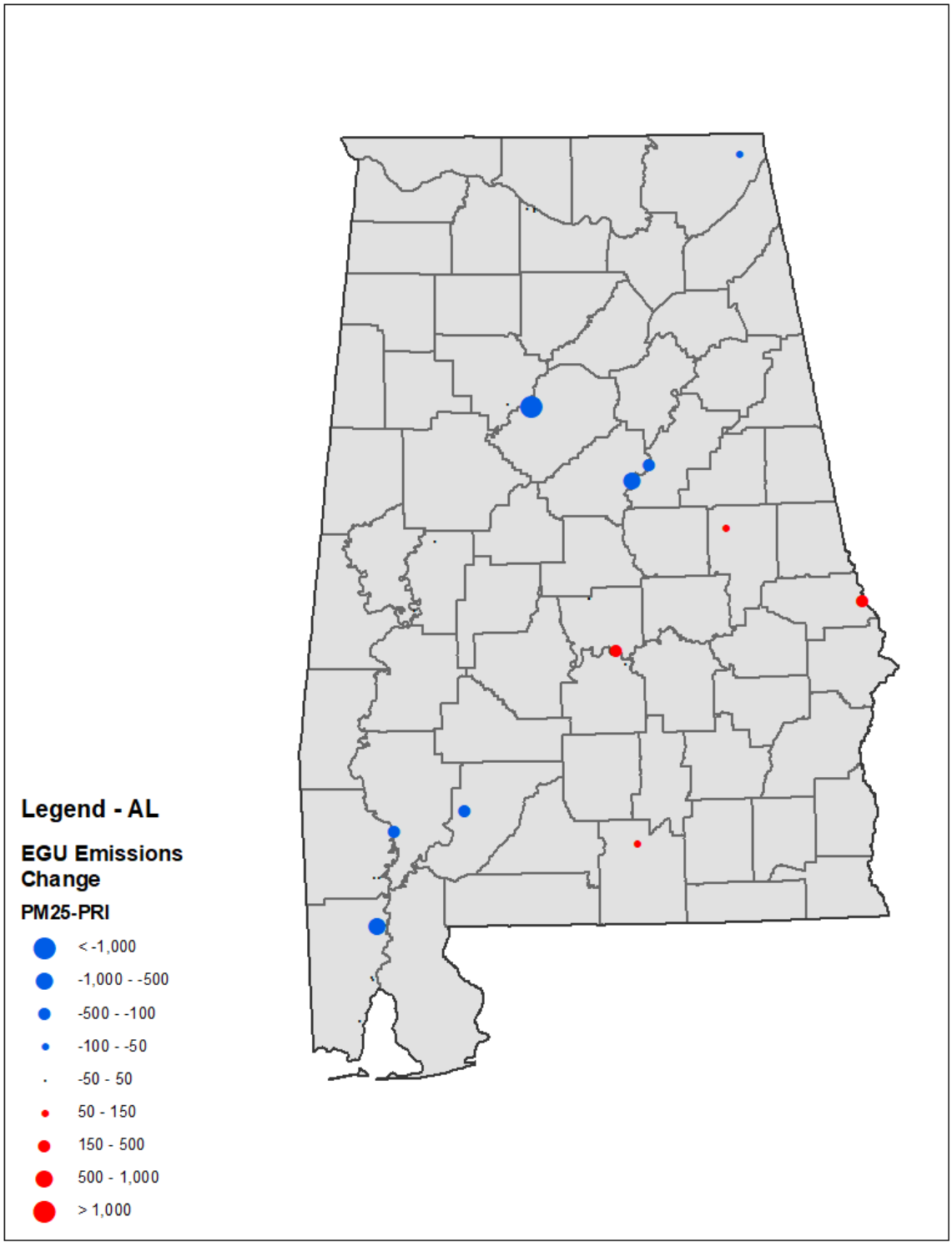

Figure C.1-9. Alabama Point EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

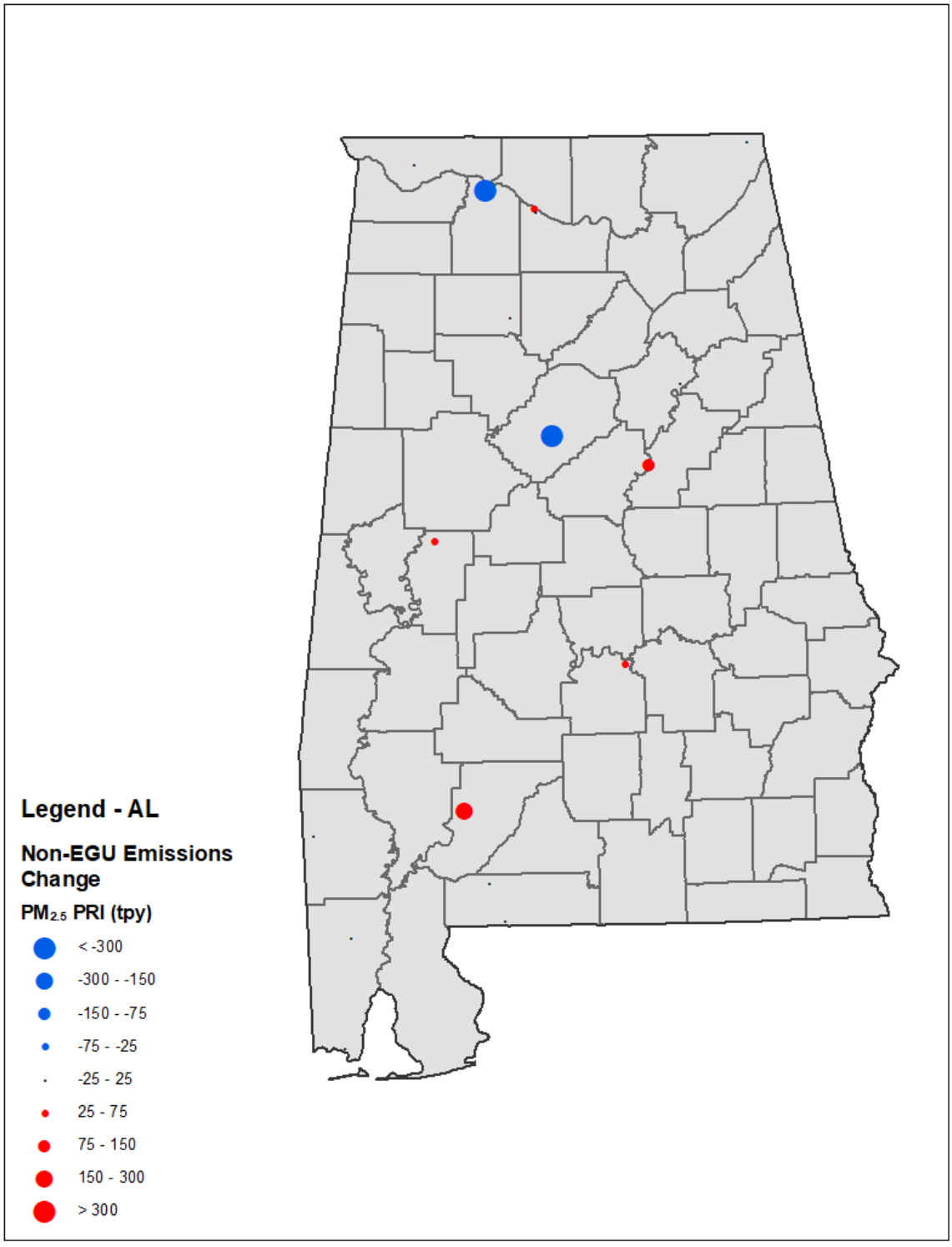

Figure C.1-10. Alabama Point Non-EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

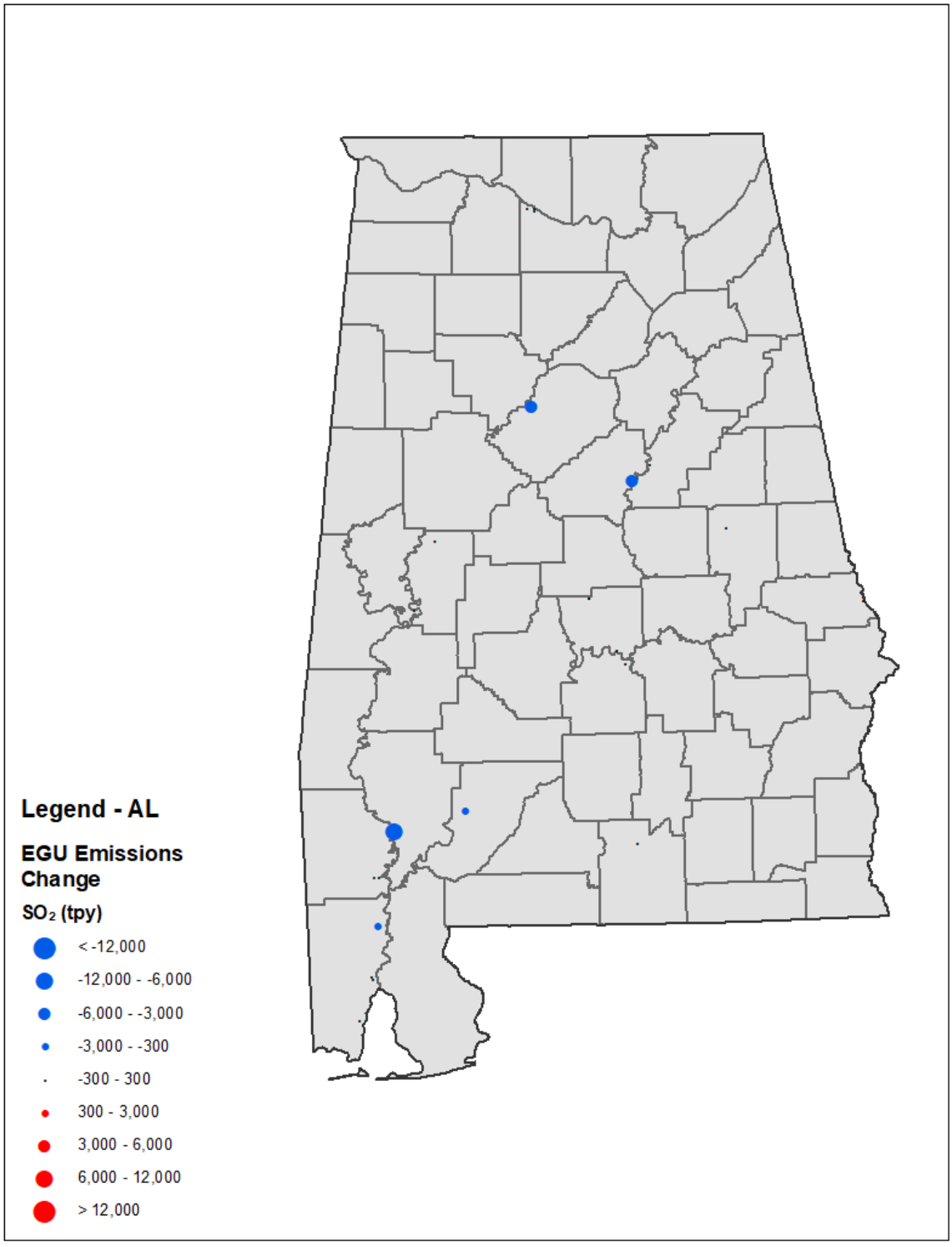

Figure C.1-11. Alabama Point EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

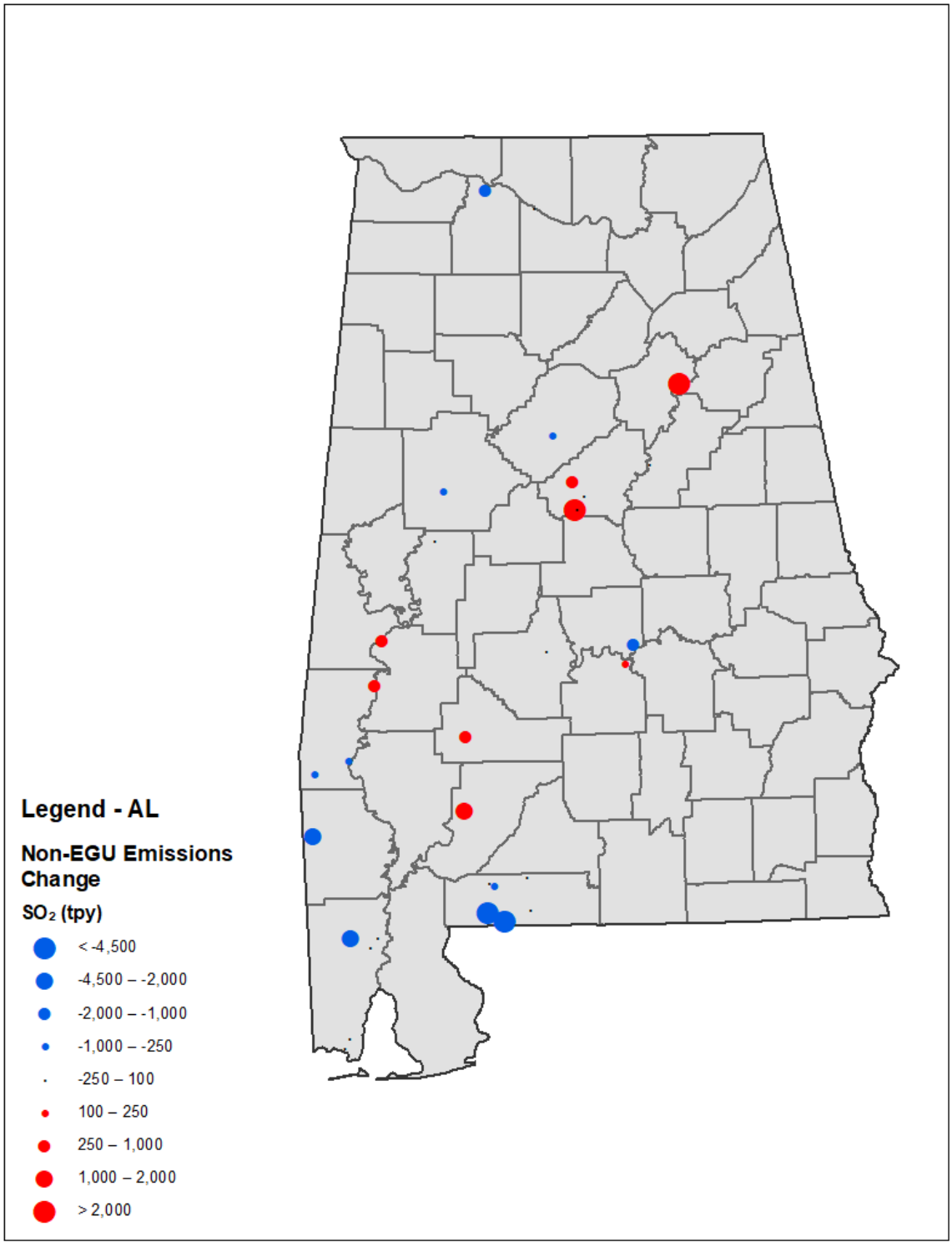

Figure C.1-12. Alabama Point Non-EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

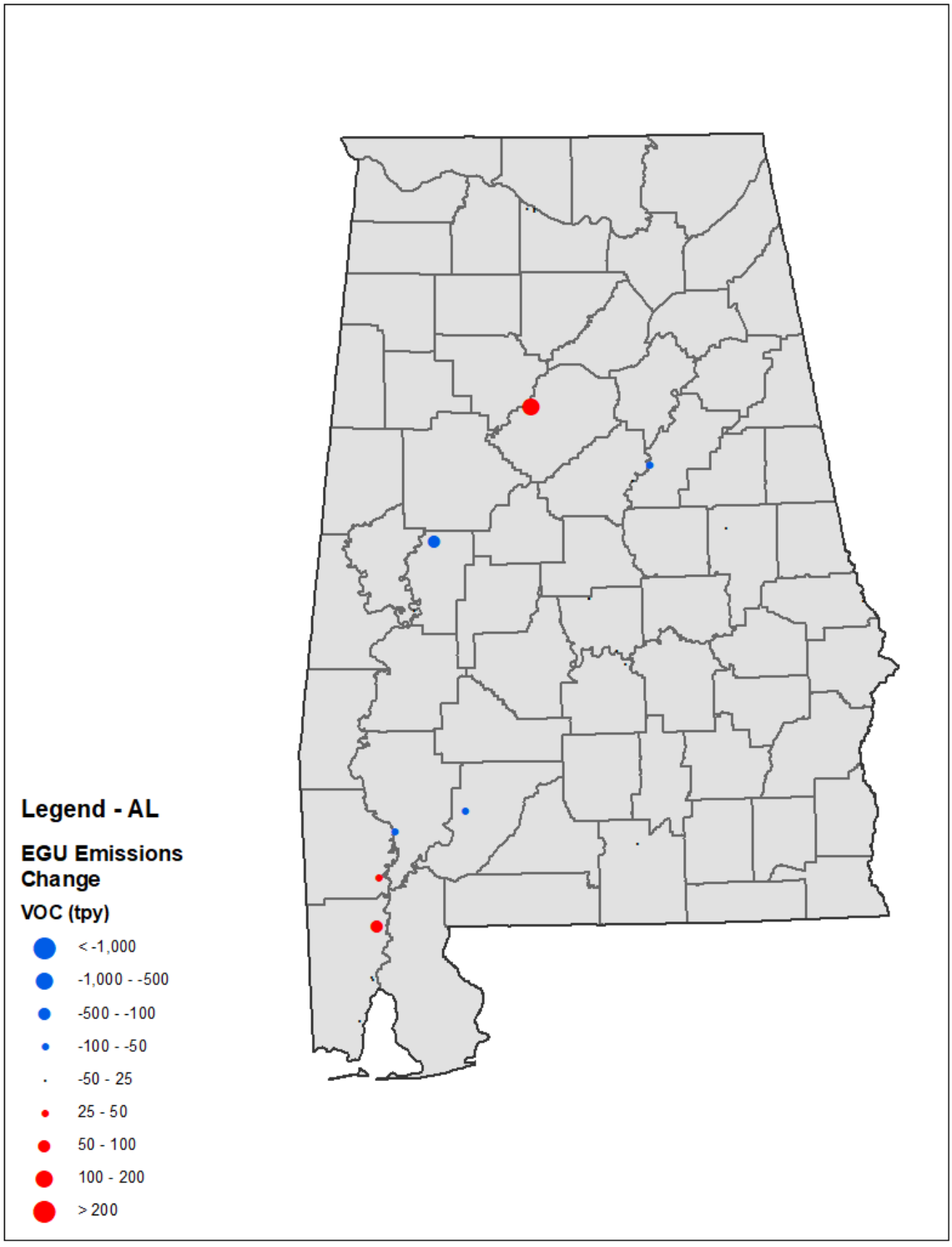

Figure C.1-13. Alabama Point EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

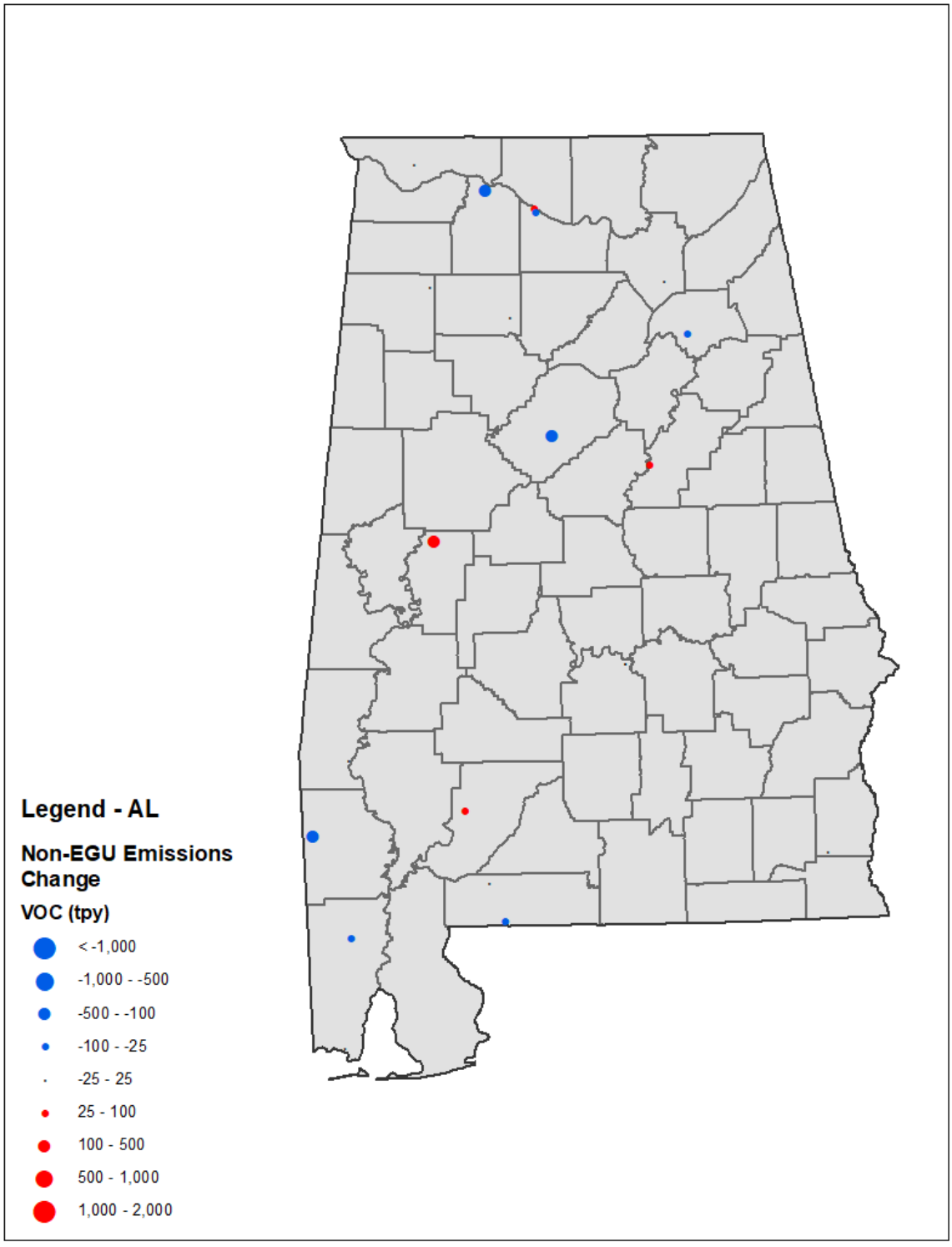

Figure C.1-14. Alabama Point Non-EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

Appendix C-2. Florida 2028 Point EGU and Point Non-EGU Comparisons

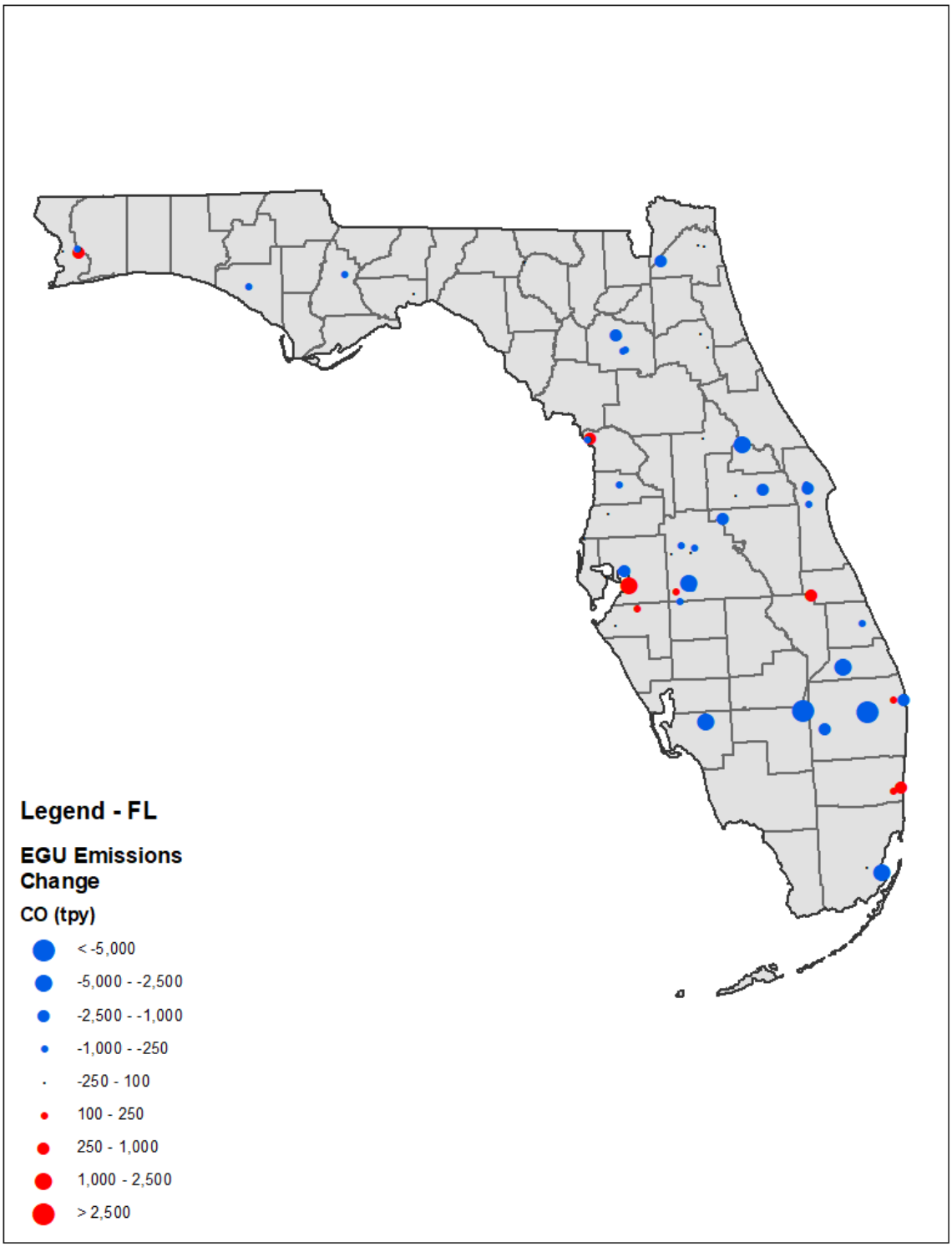

Figure C.2-1. Florida Point EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

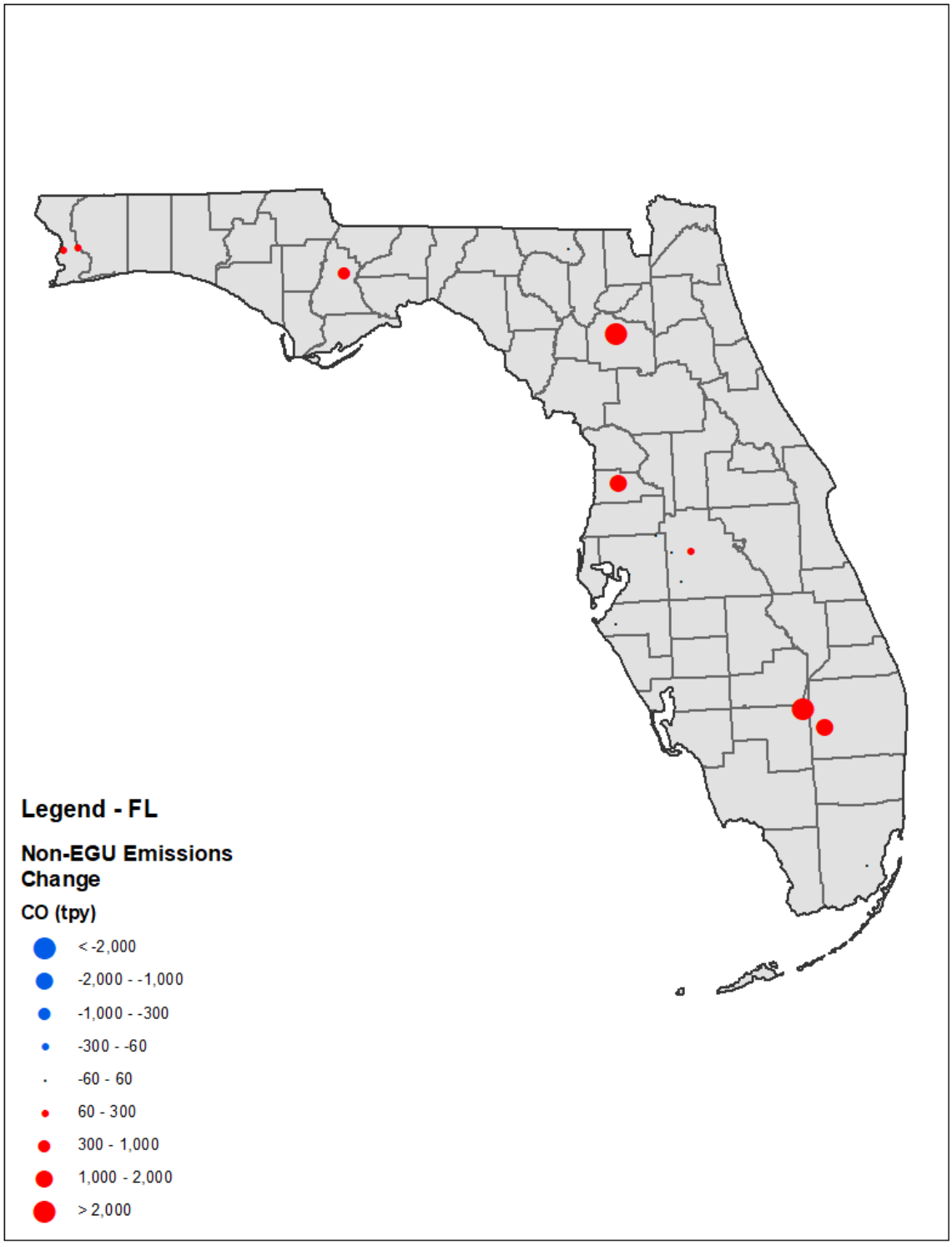

Figure C.2-2. Florida Point Non-EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

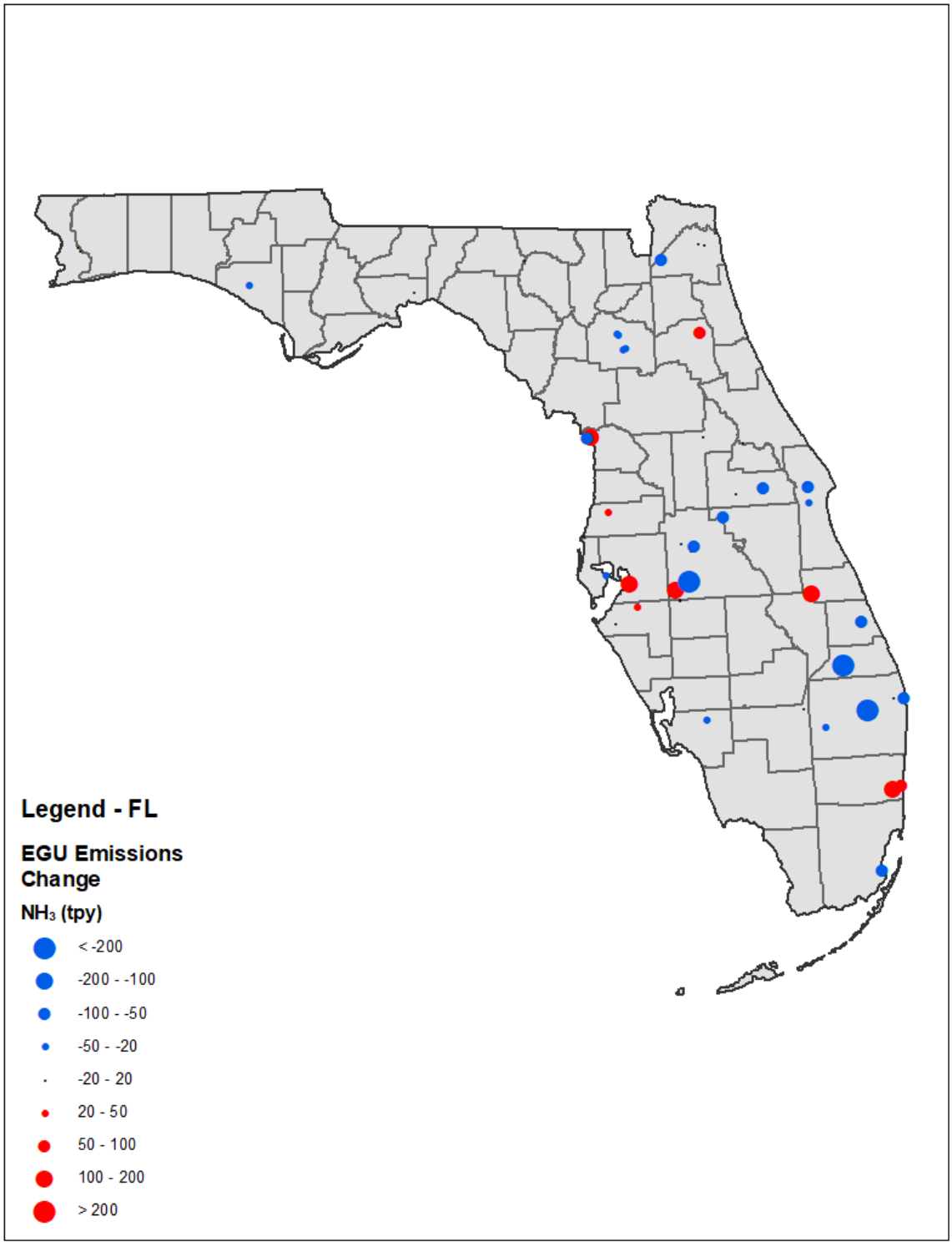

Figure C.2-3. Florida Point EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

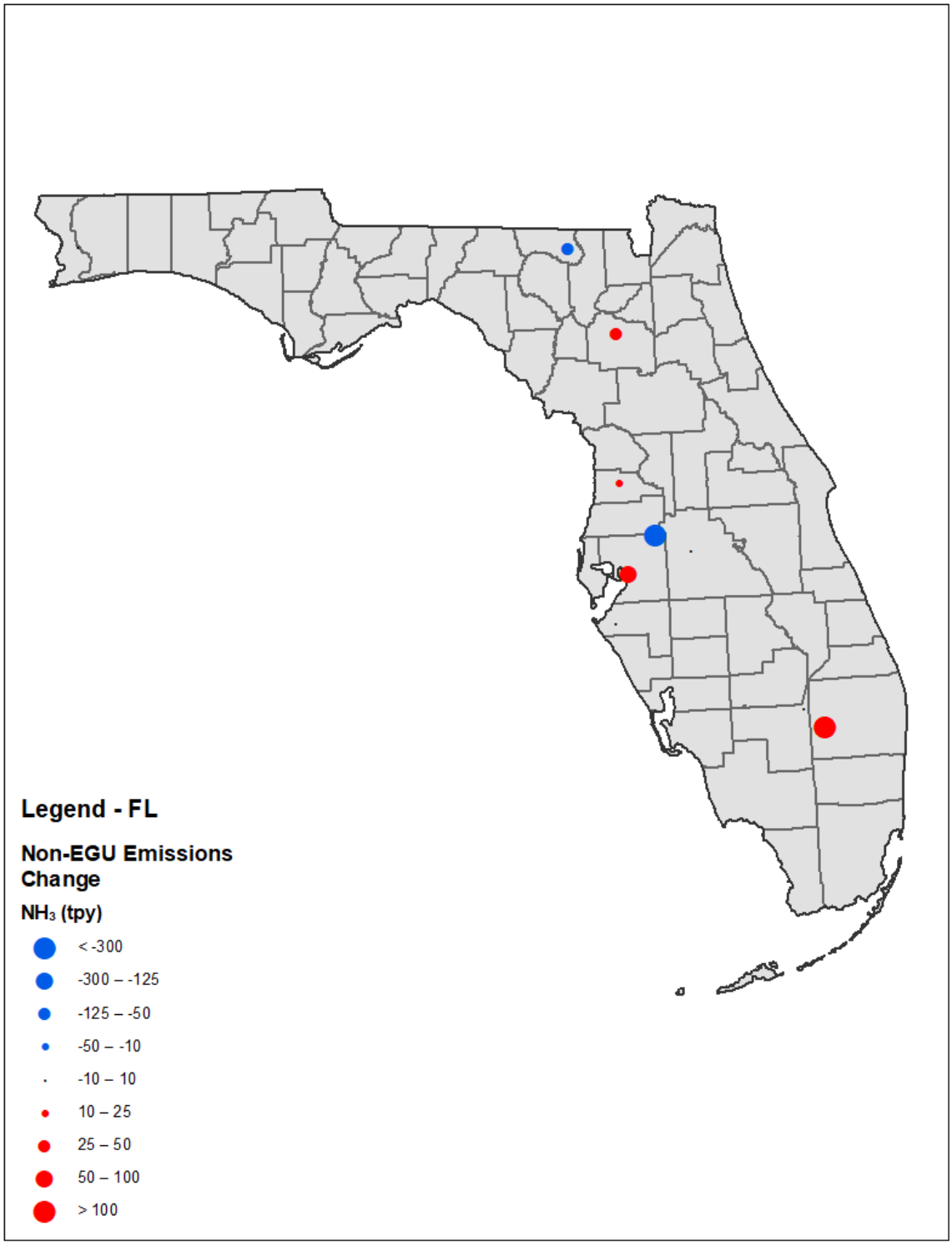

Figure C.2-4. Florida Point Non-EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

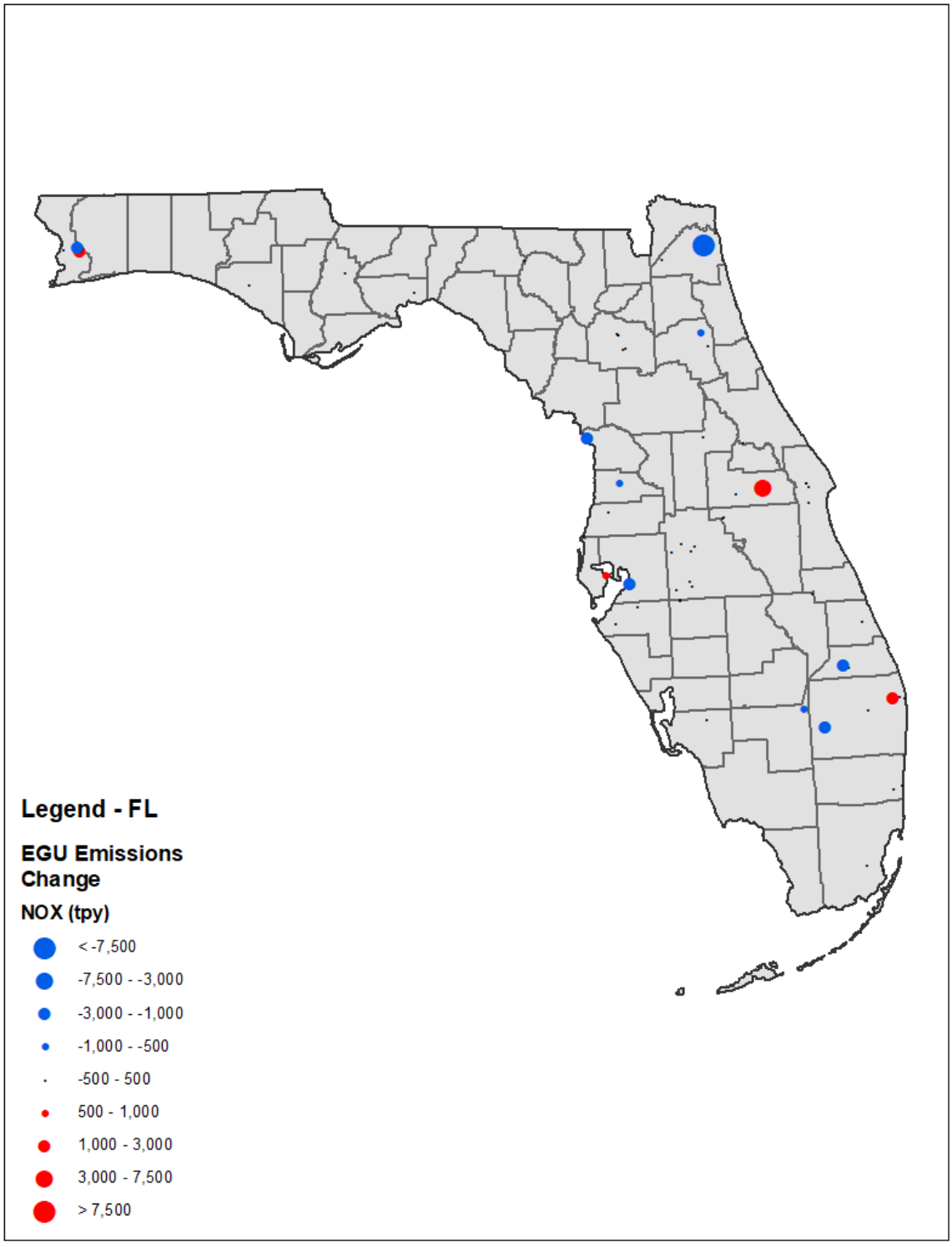

Figure C.2-5. Florida Point EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

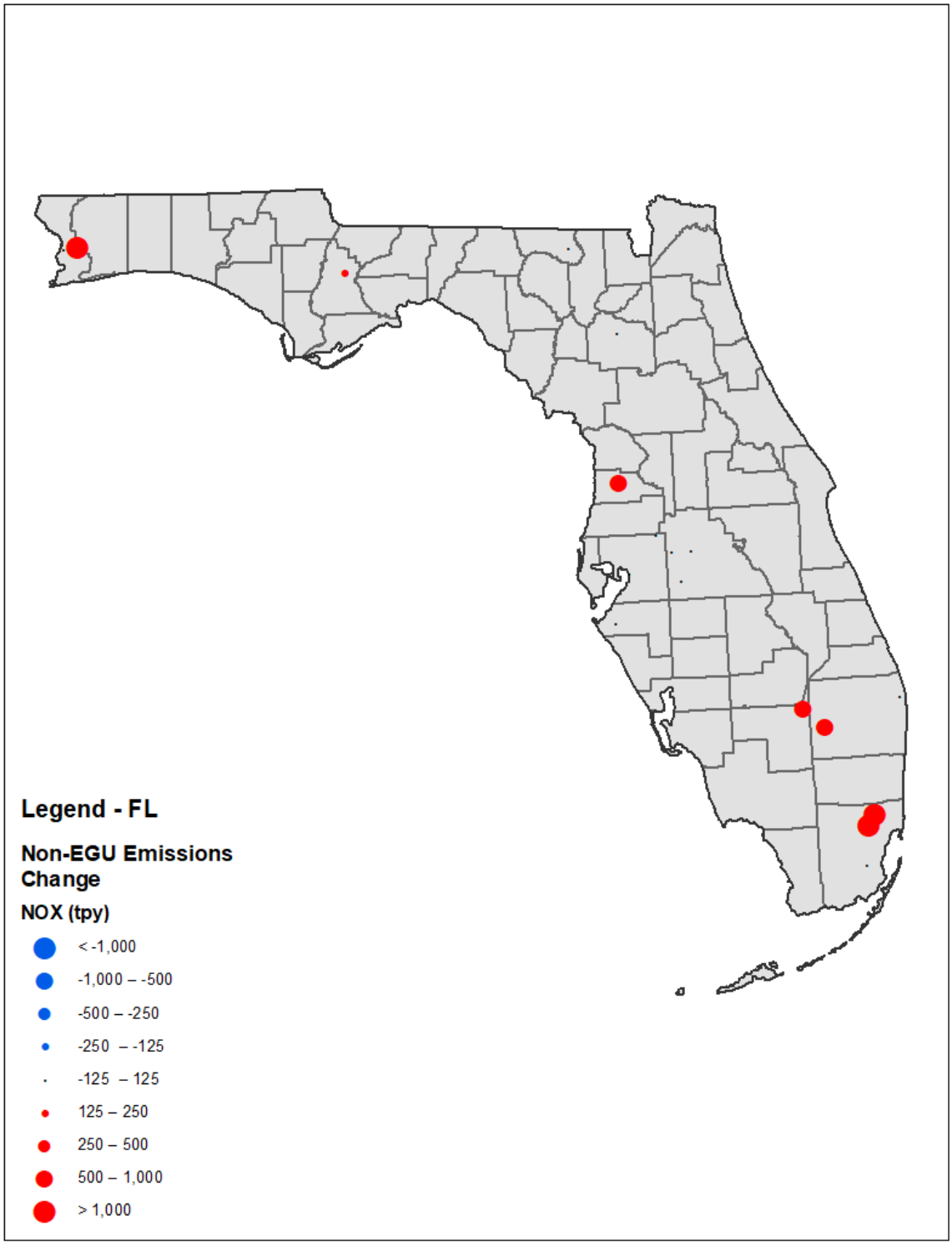

Figure C.2-6. Florida Point Non-EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

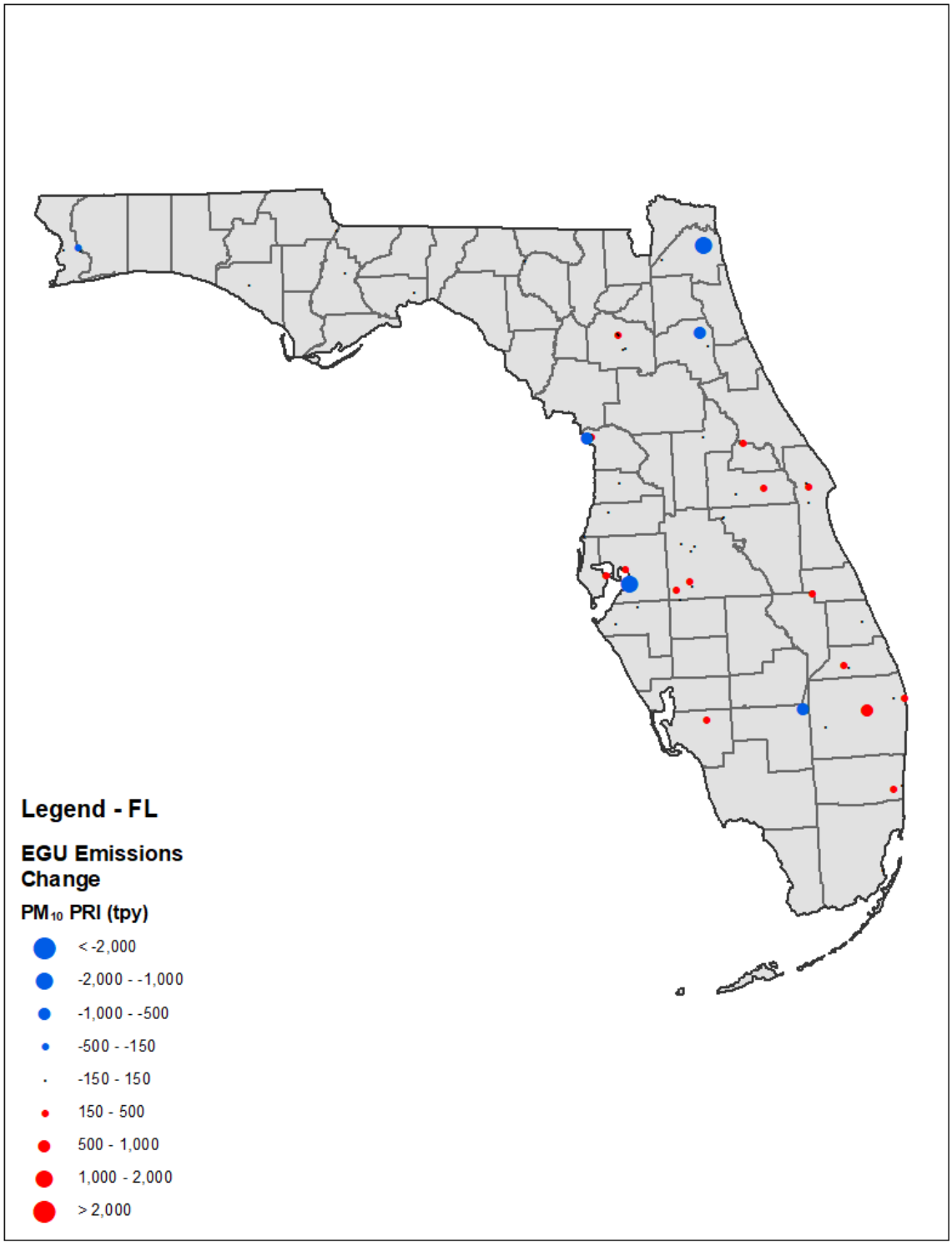

Figure C.2-7. Florida Point EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

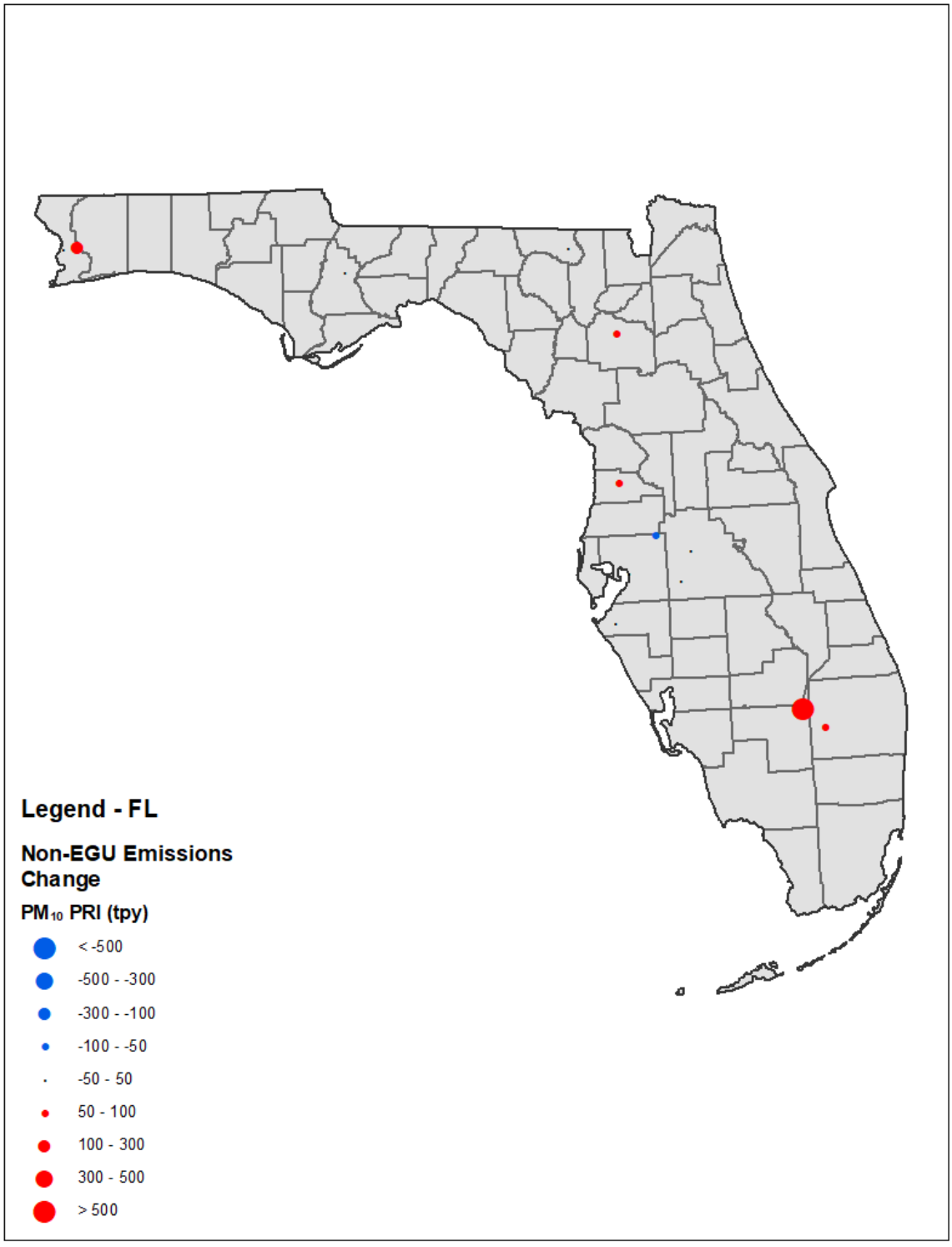

Figure C.2-8. Florida Point Non-EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

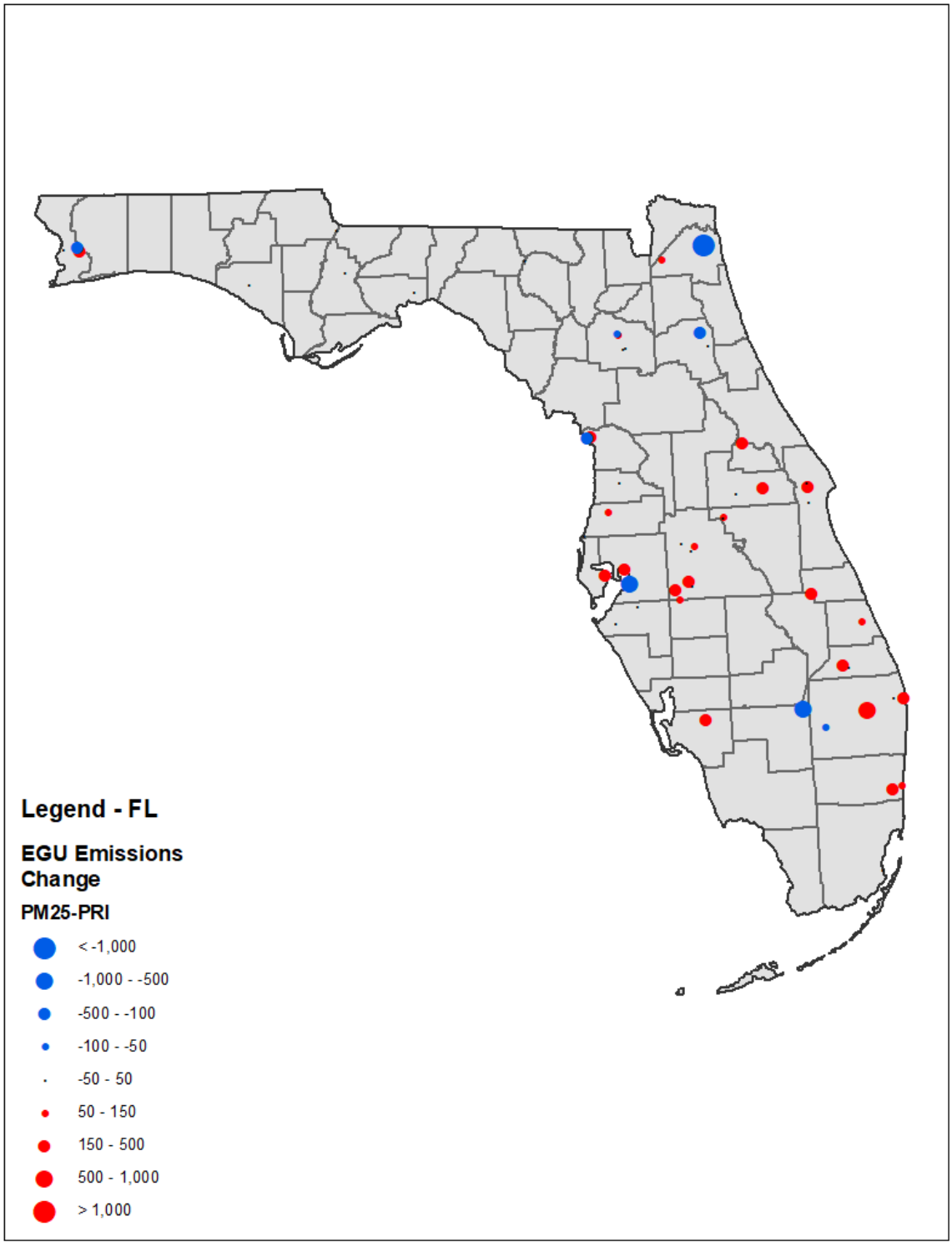

Figure C.2-9. Florida Point EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

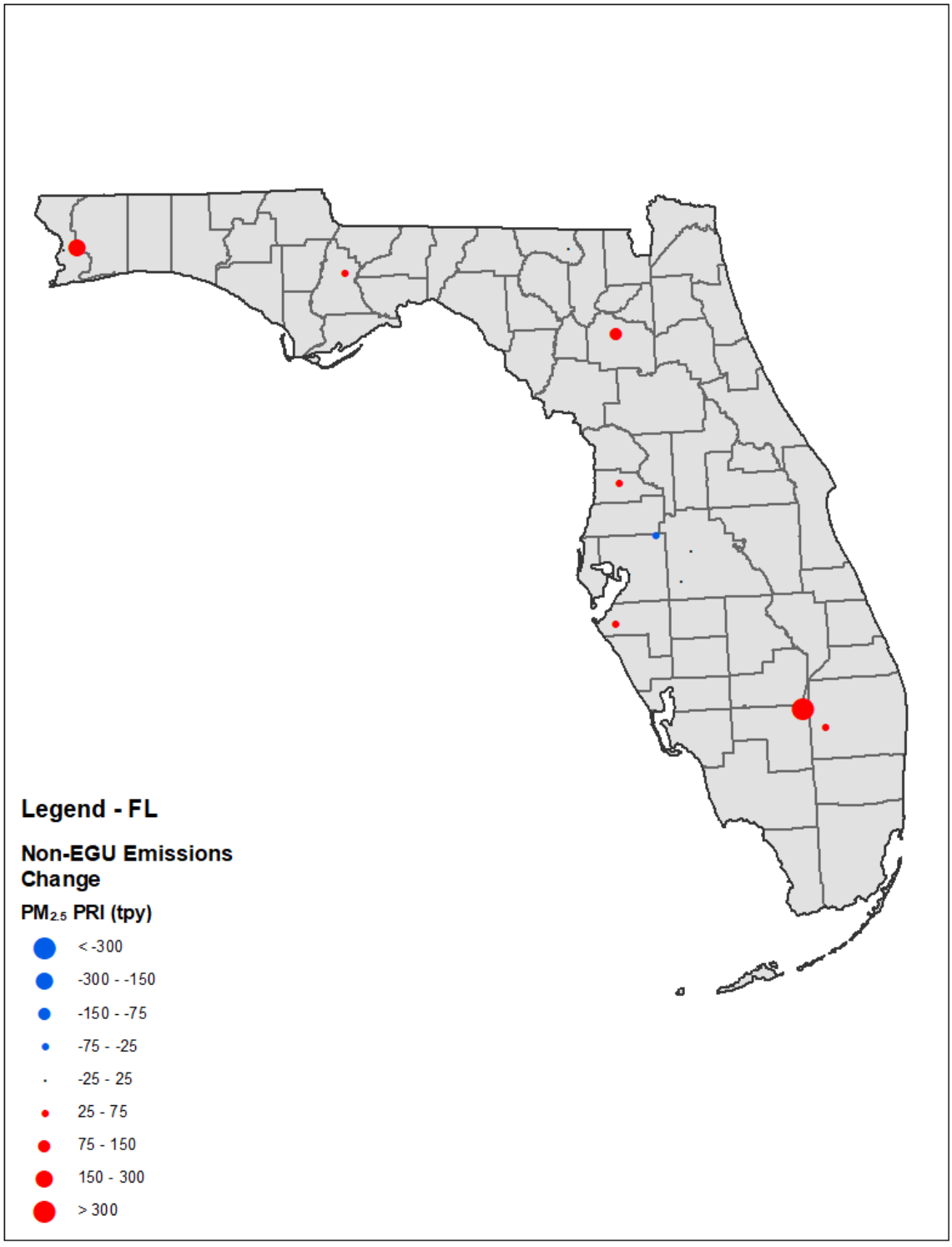

Figure C.2-10. Florida Point Non-EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

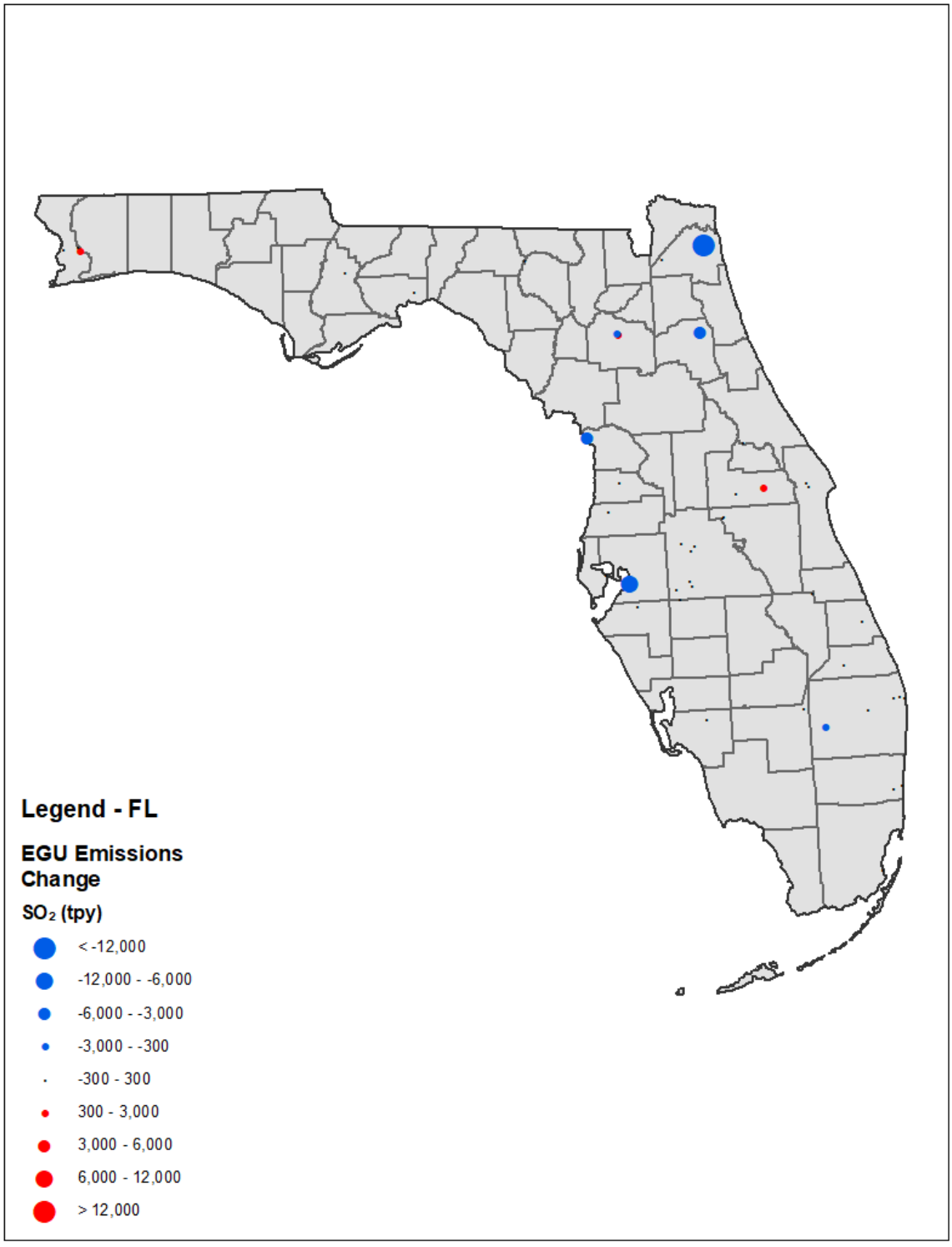

Figure C.2-11. Florida Point EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

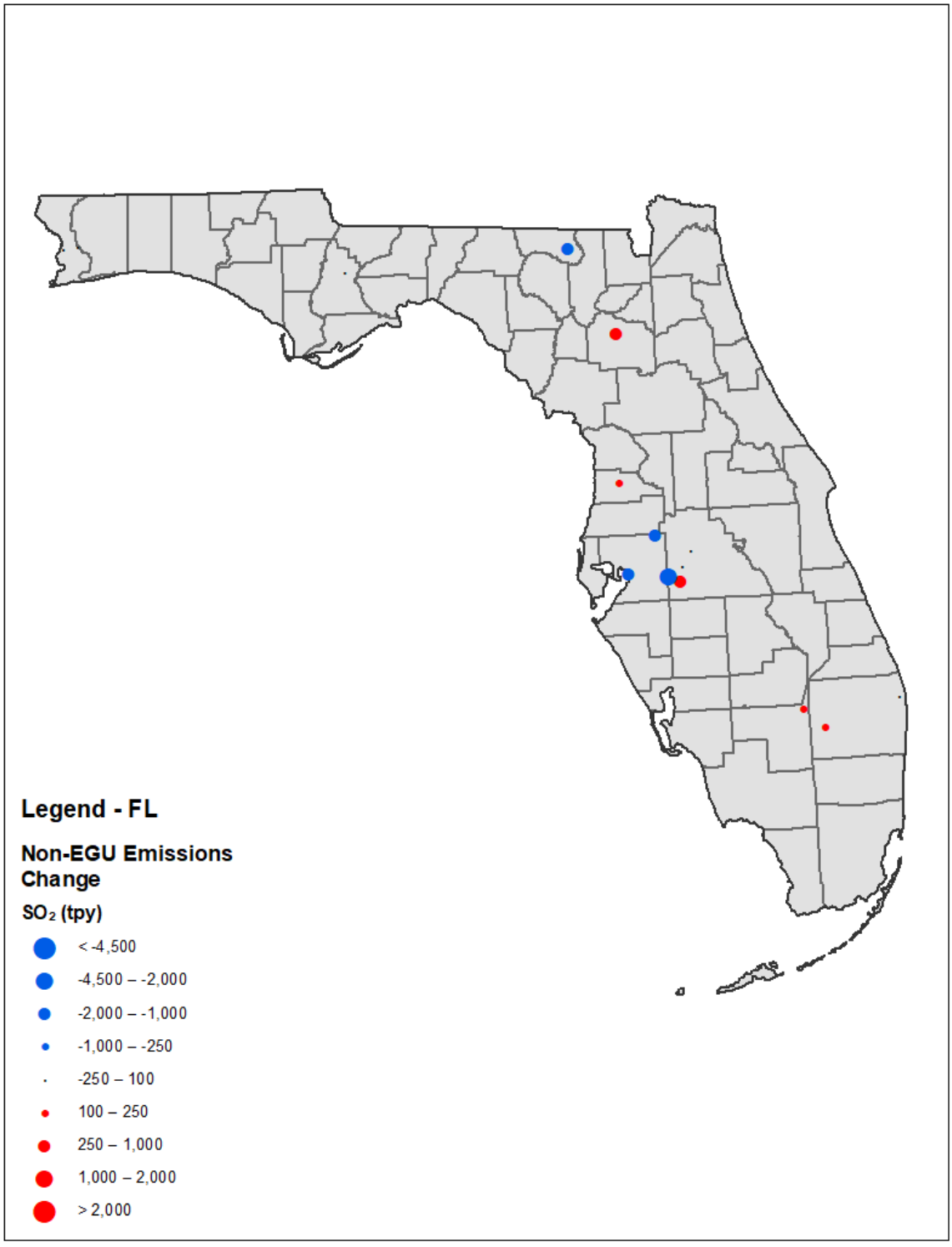

Figure C.2-12. Florida Point Non-EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

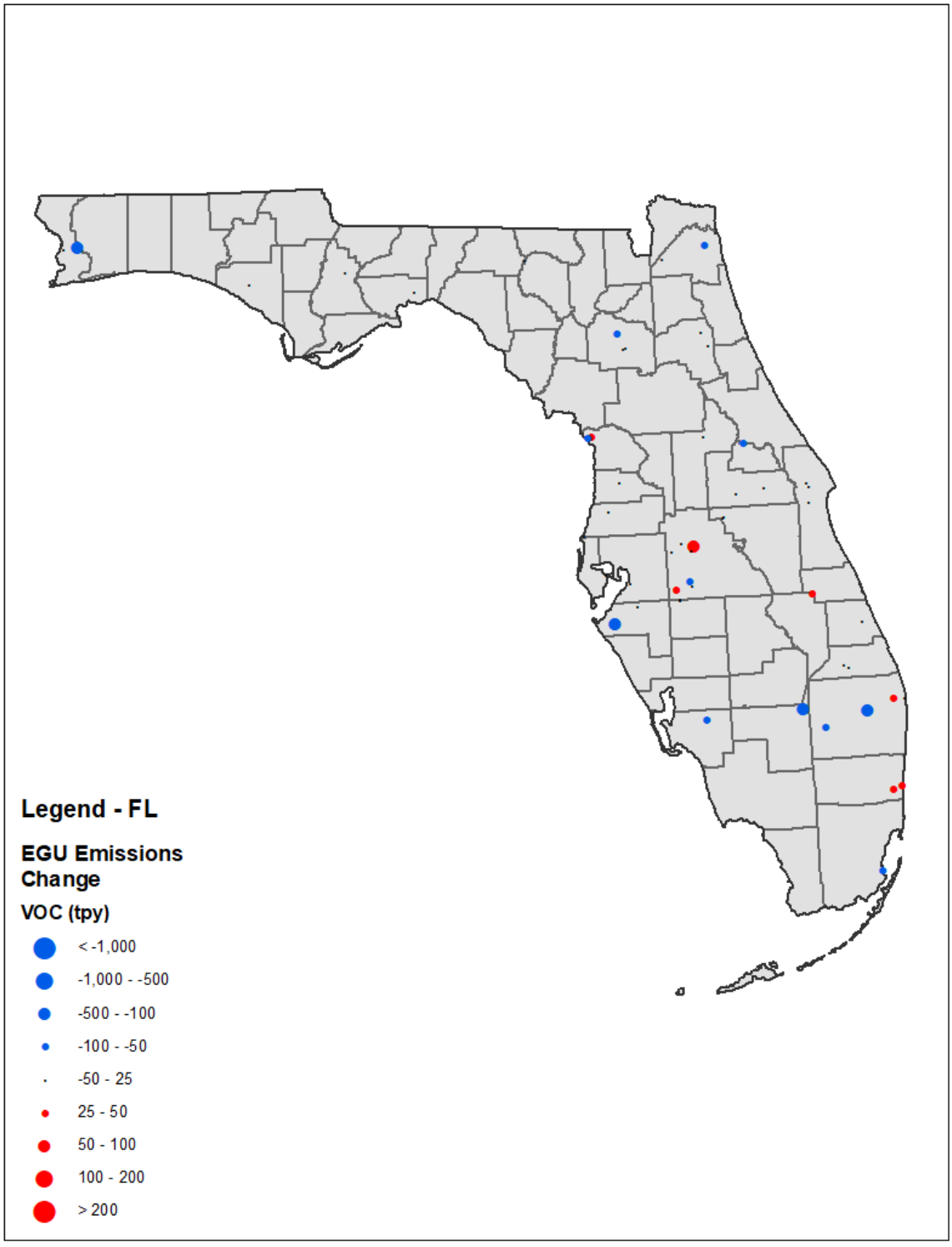

Figure C.2-13. Florida Point EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

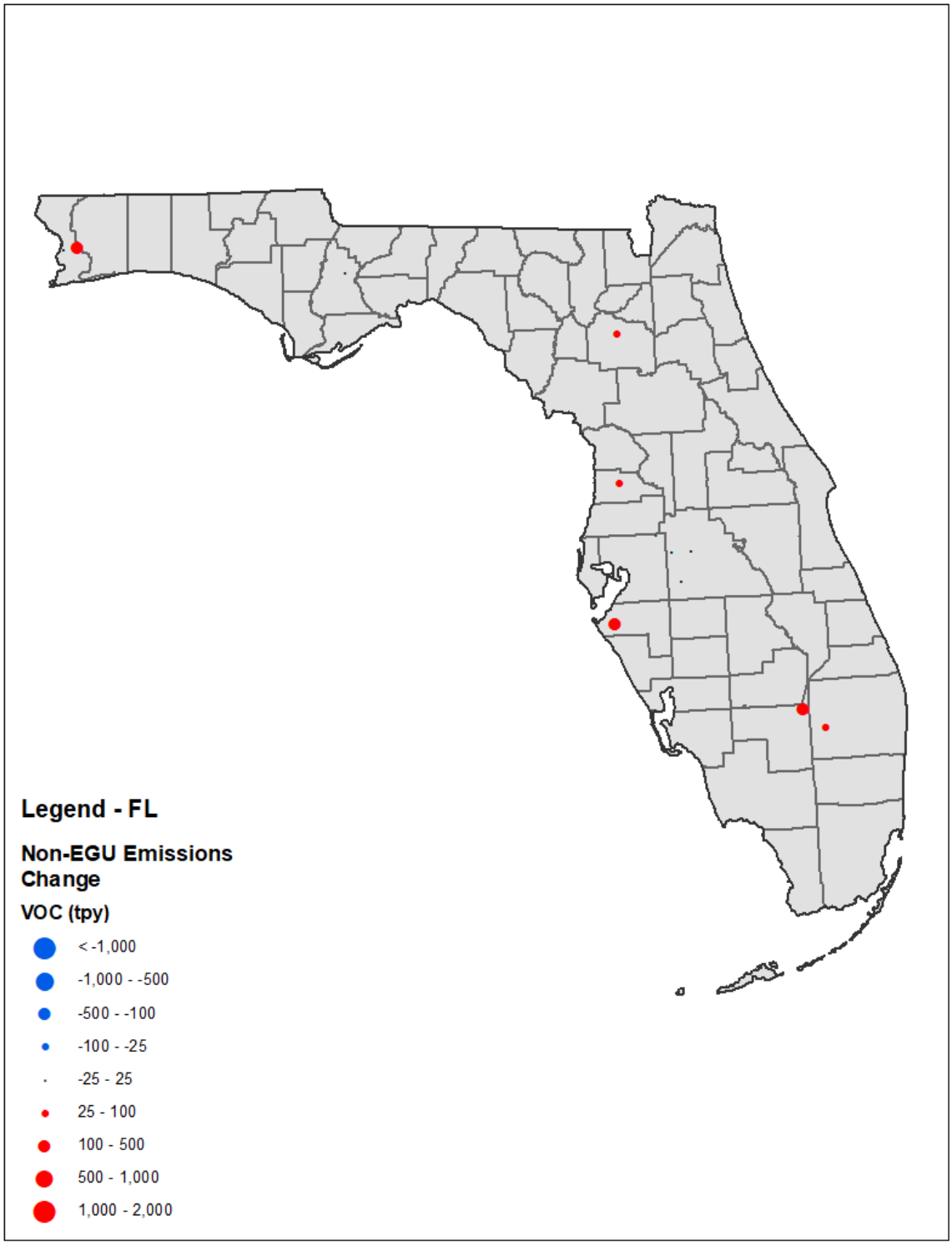

Figure C.2-14. Florida Point Non-EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

Appendix C-3. Georgia 2028 Point EGU and Point Non-EGU Comparisons

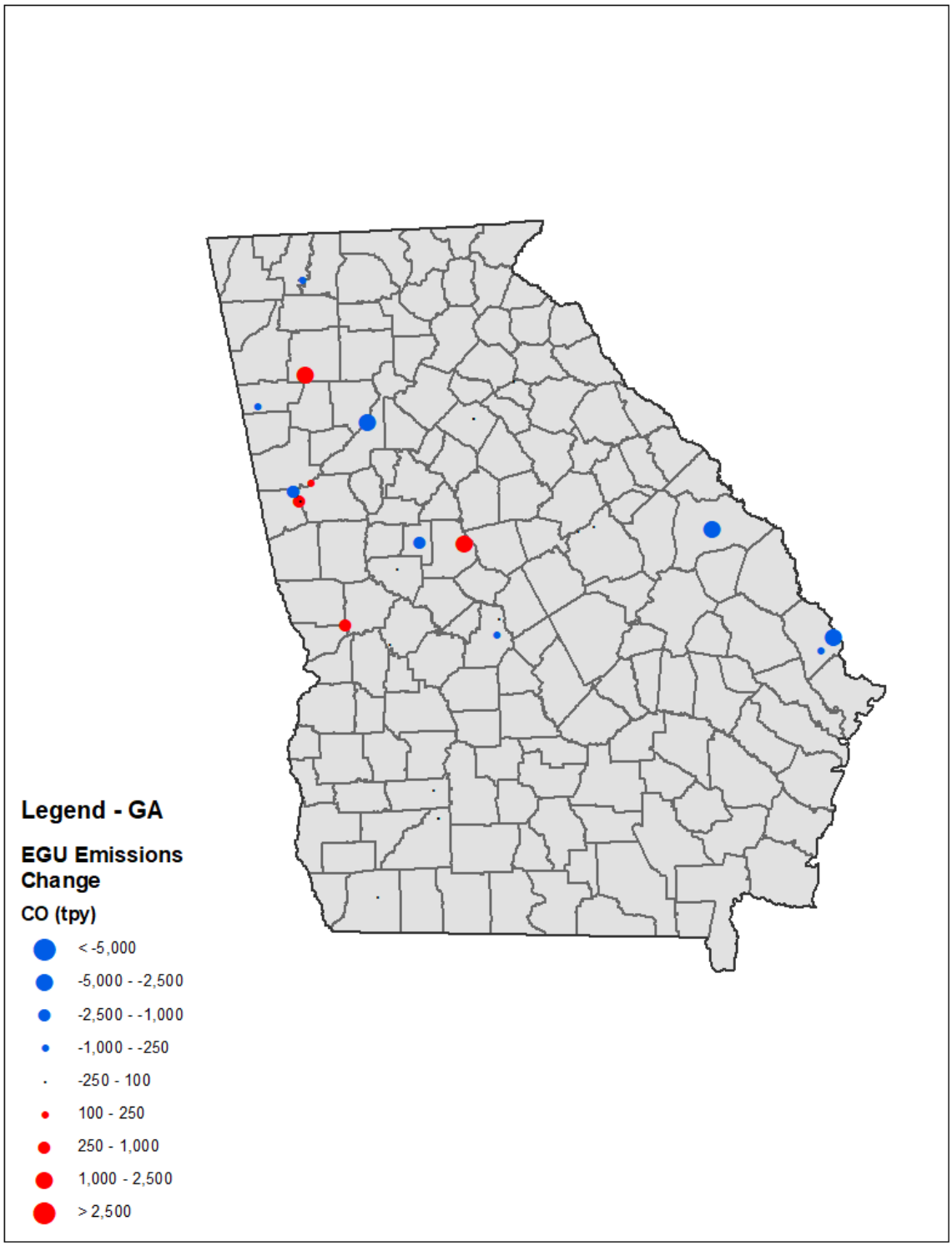

Figure C.3-1. Georgia Point EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

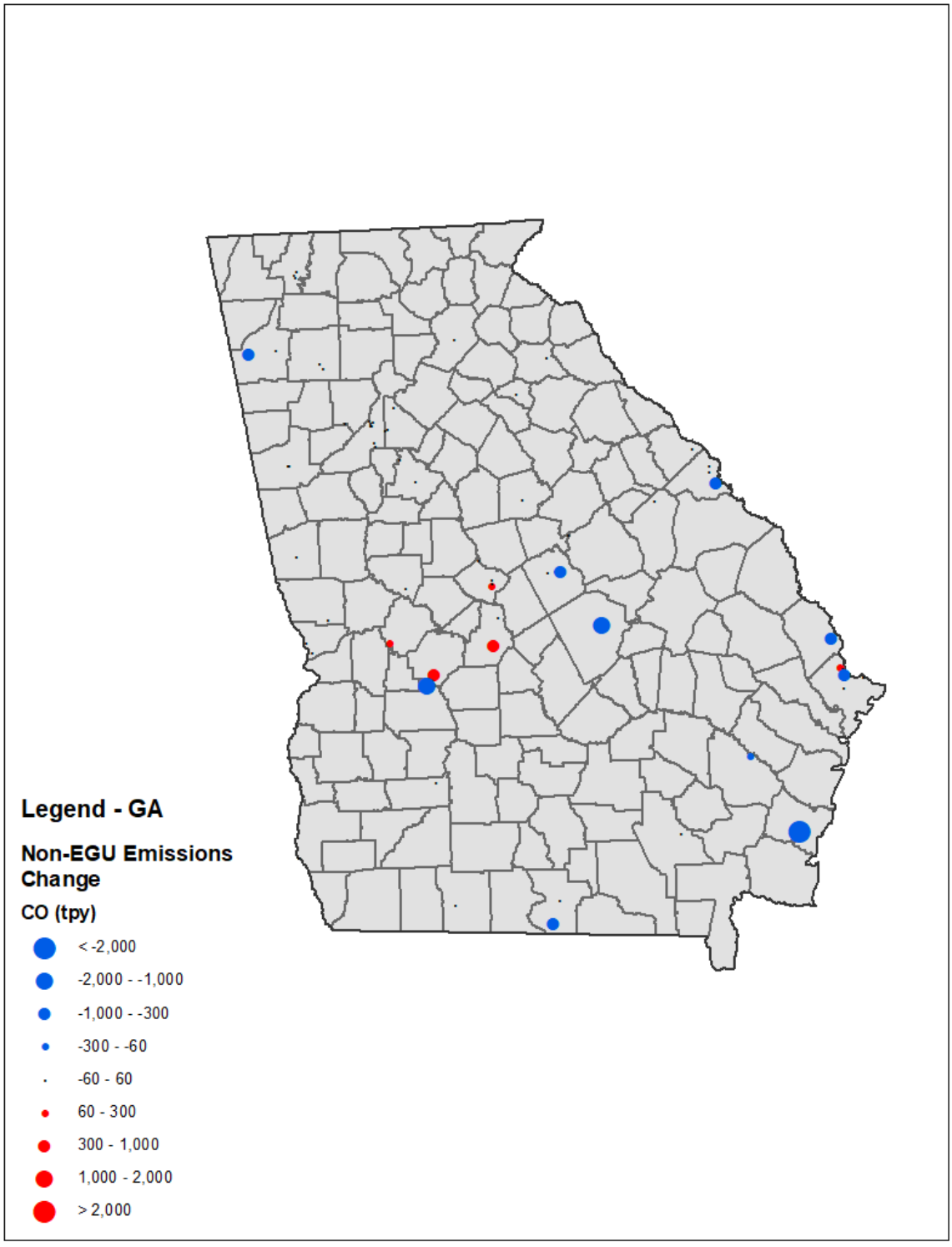

Figure C.3-2. Georgia Point Non-EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

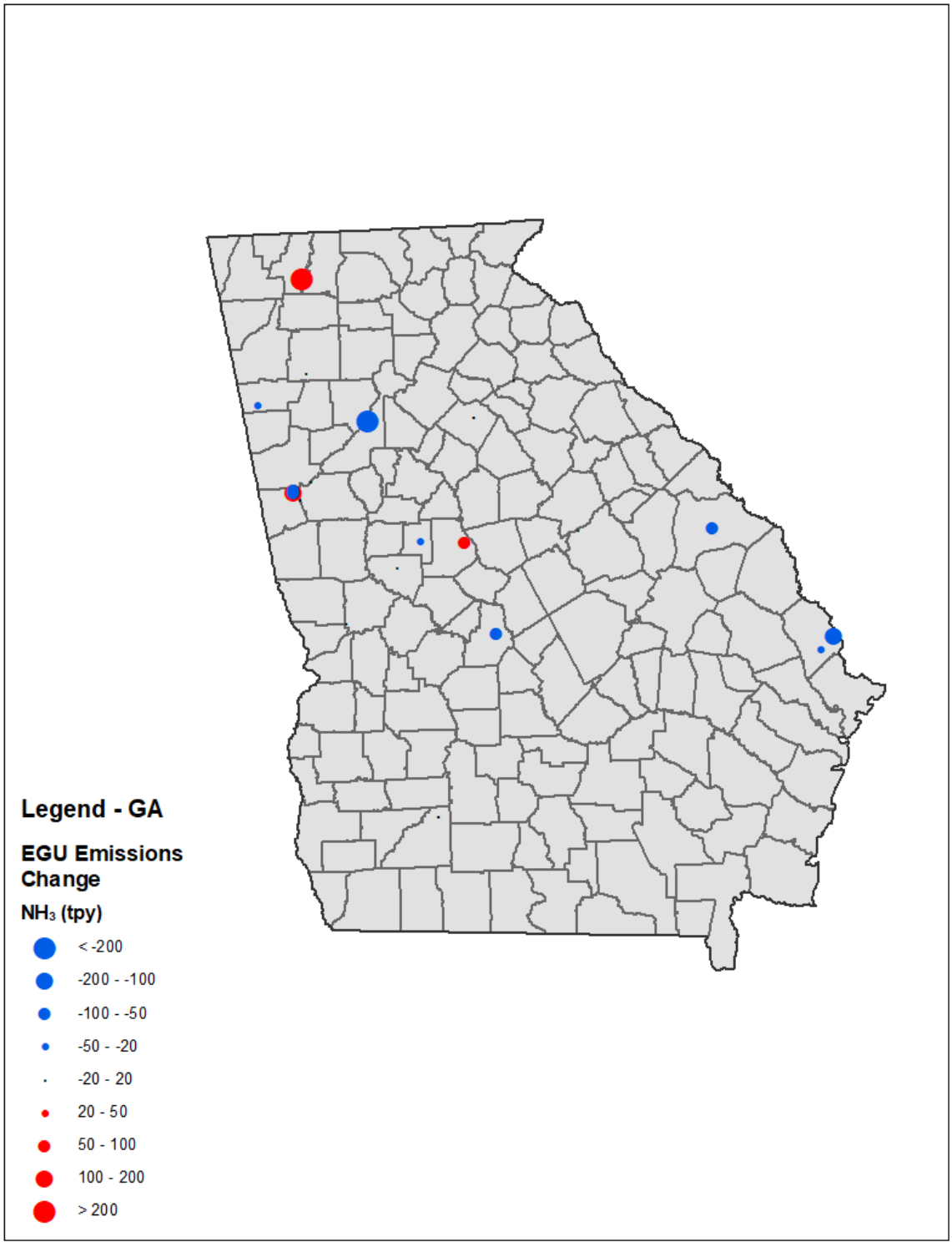

Figure C.3-3. Georgia Point EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

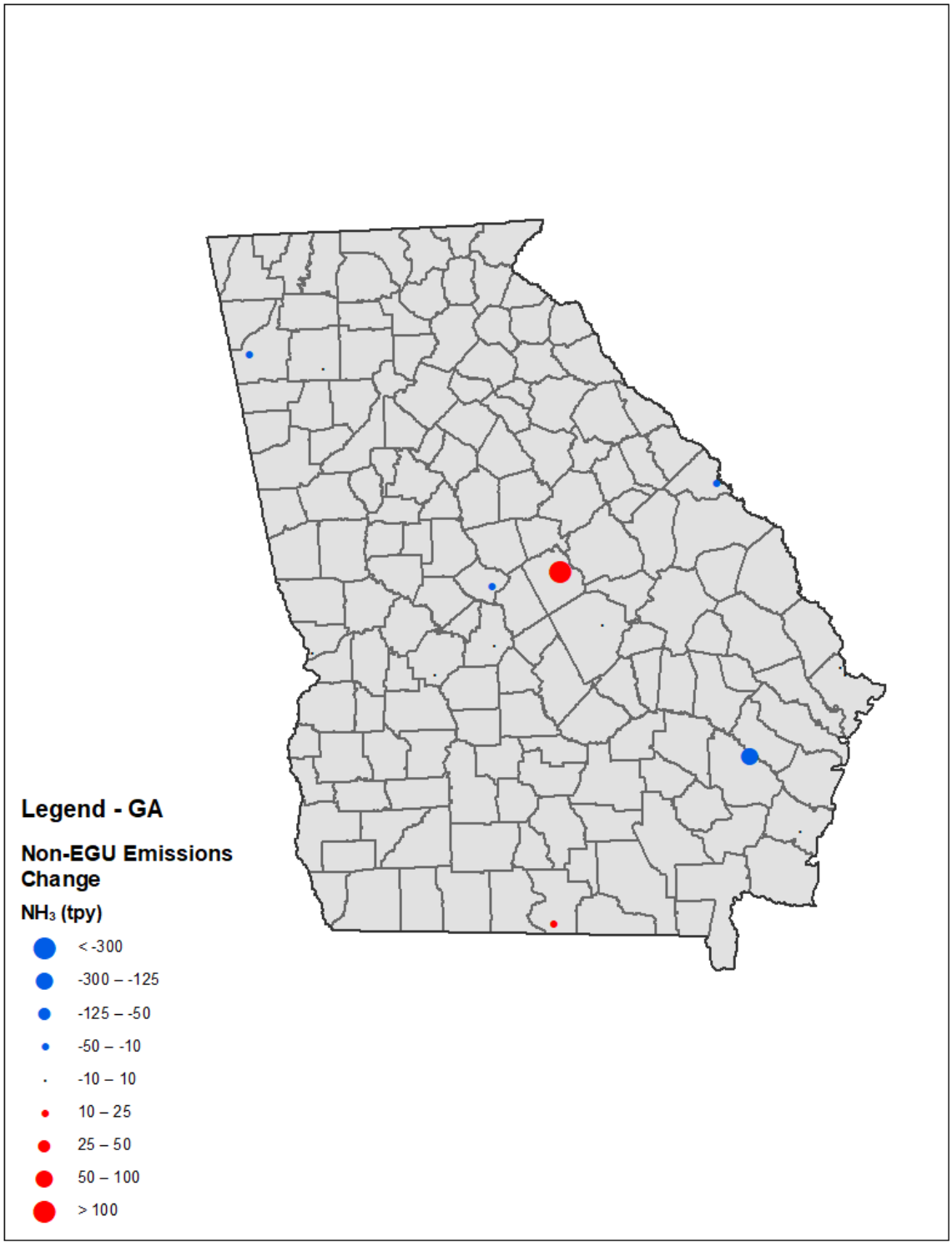

Figure C.3-4. Georgia Point Non-EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

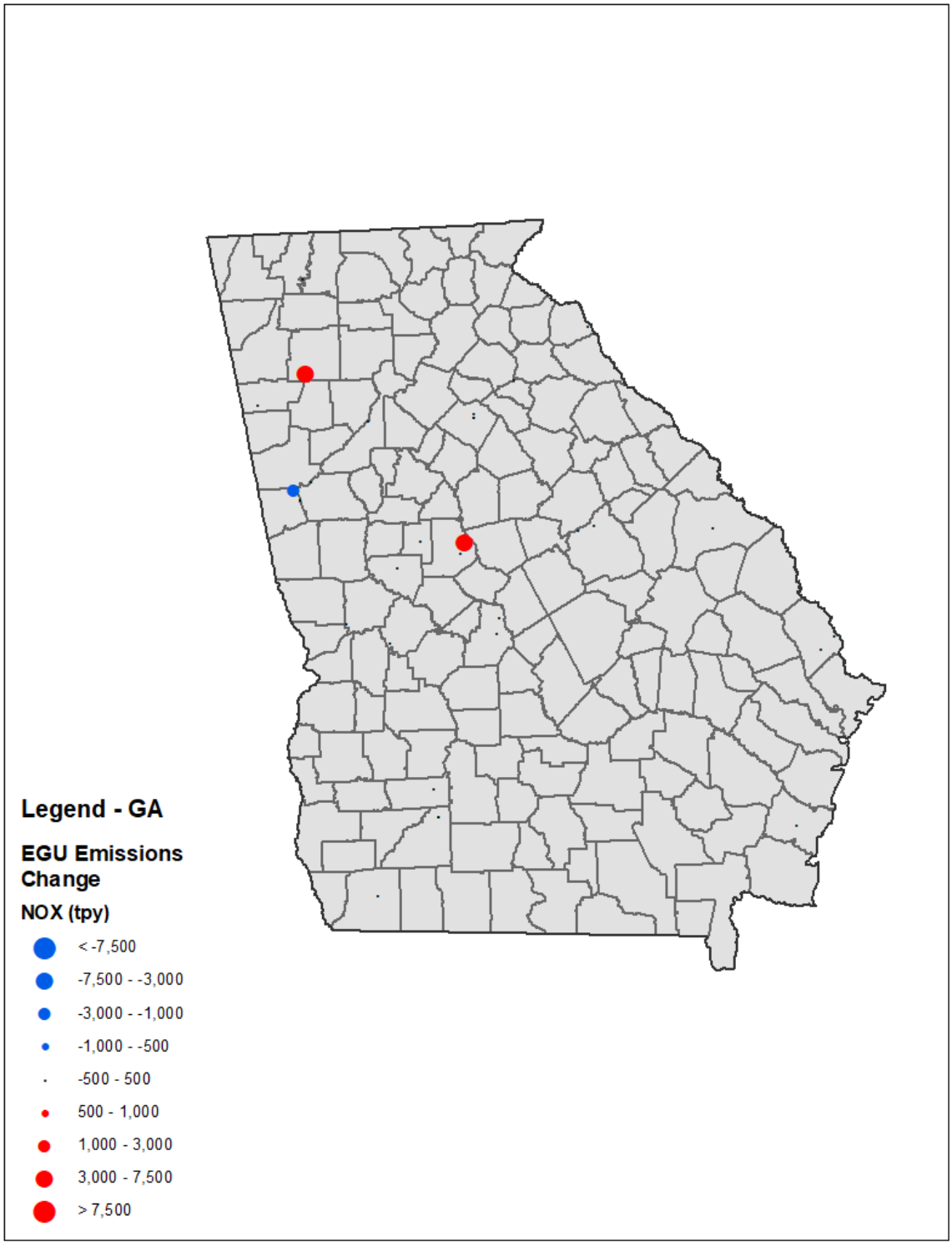

Figure C.3-5. Georgia Point EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

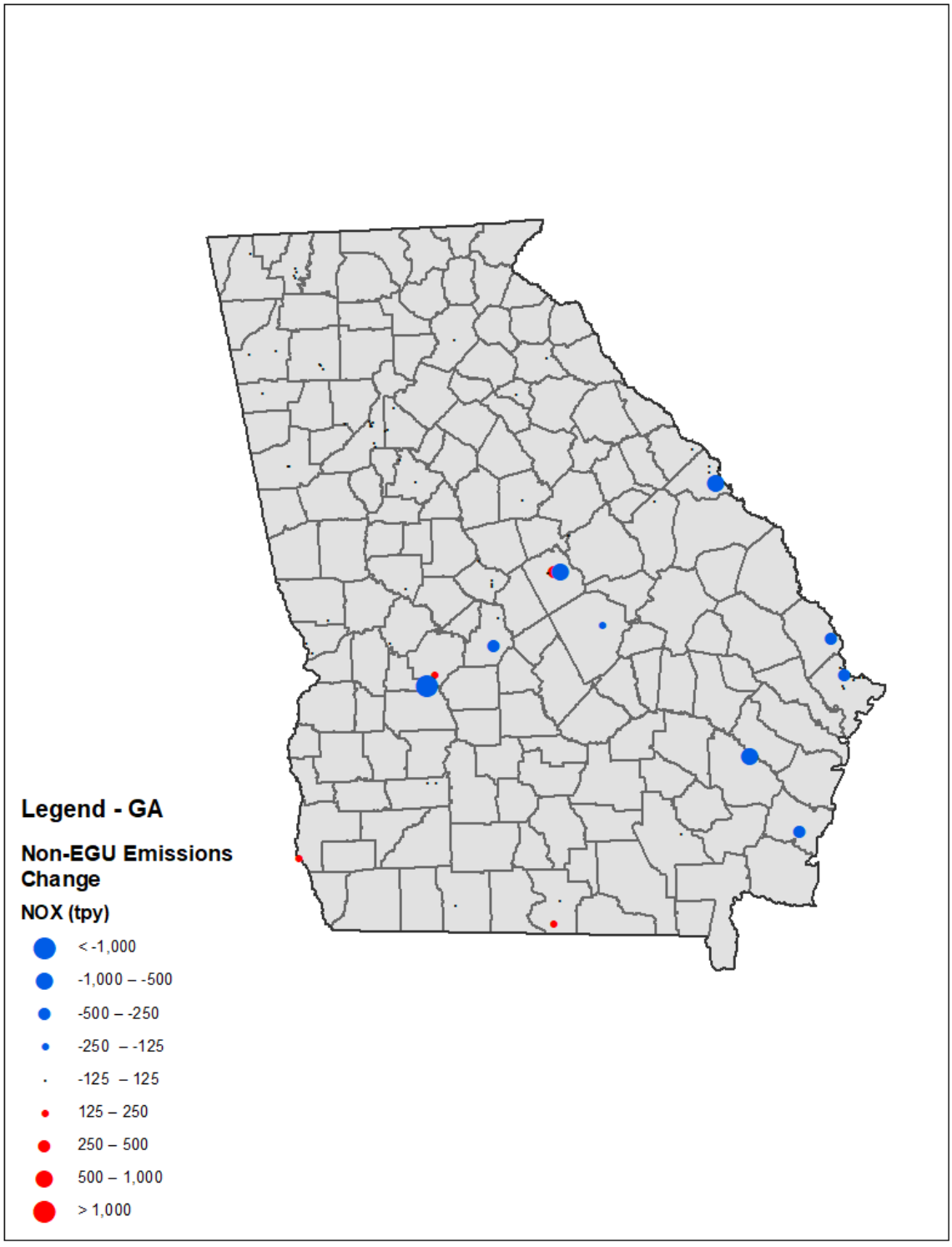

Figure C.3-6. Georgia Point Non-EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

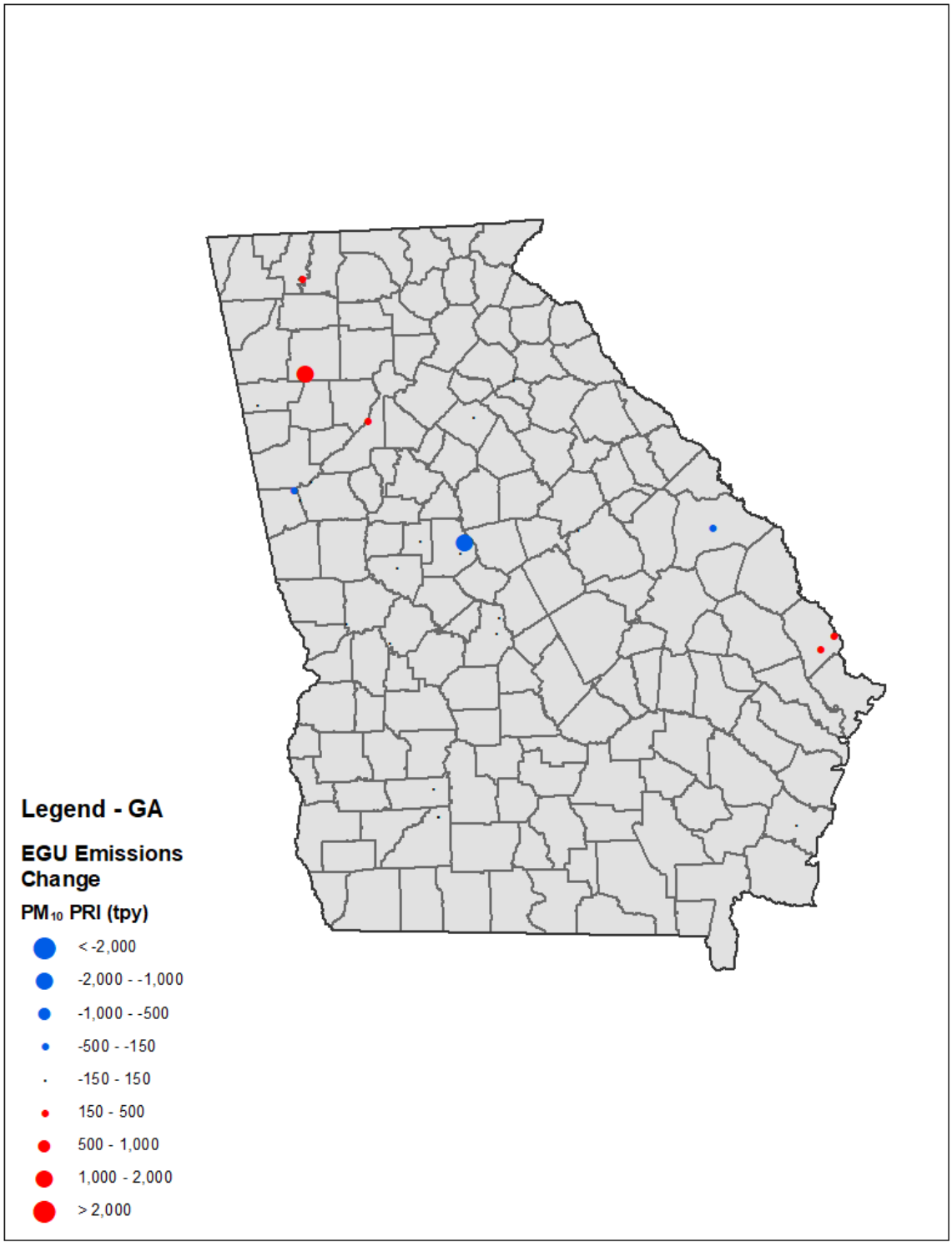

Figure C.3-7. Georgia Point EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

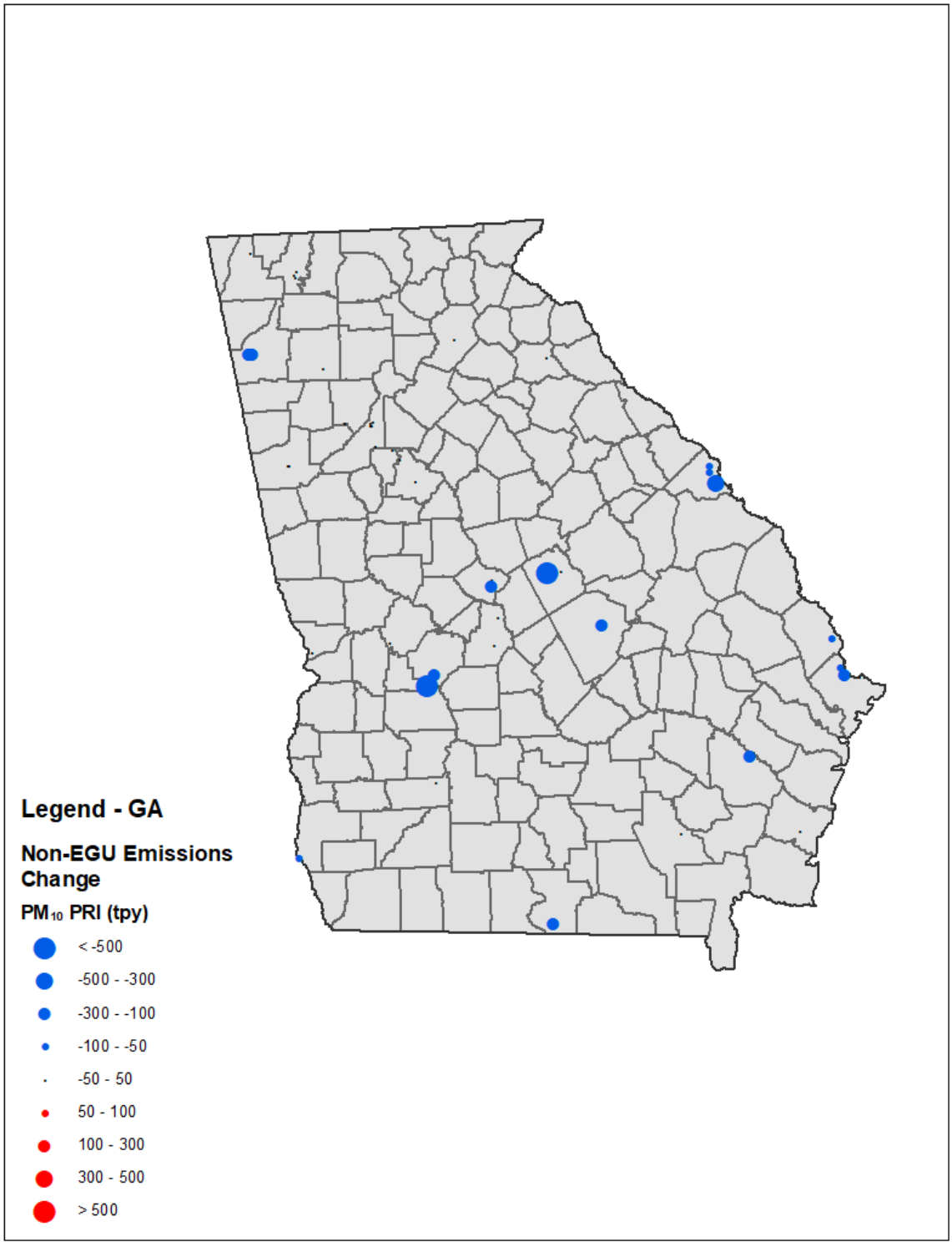

Figure C.3-8. Georgia Point Non-EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

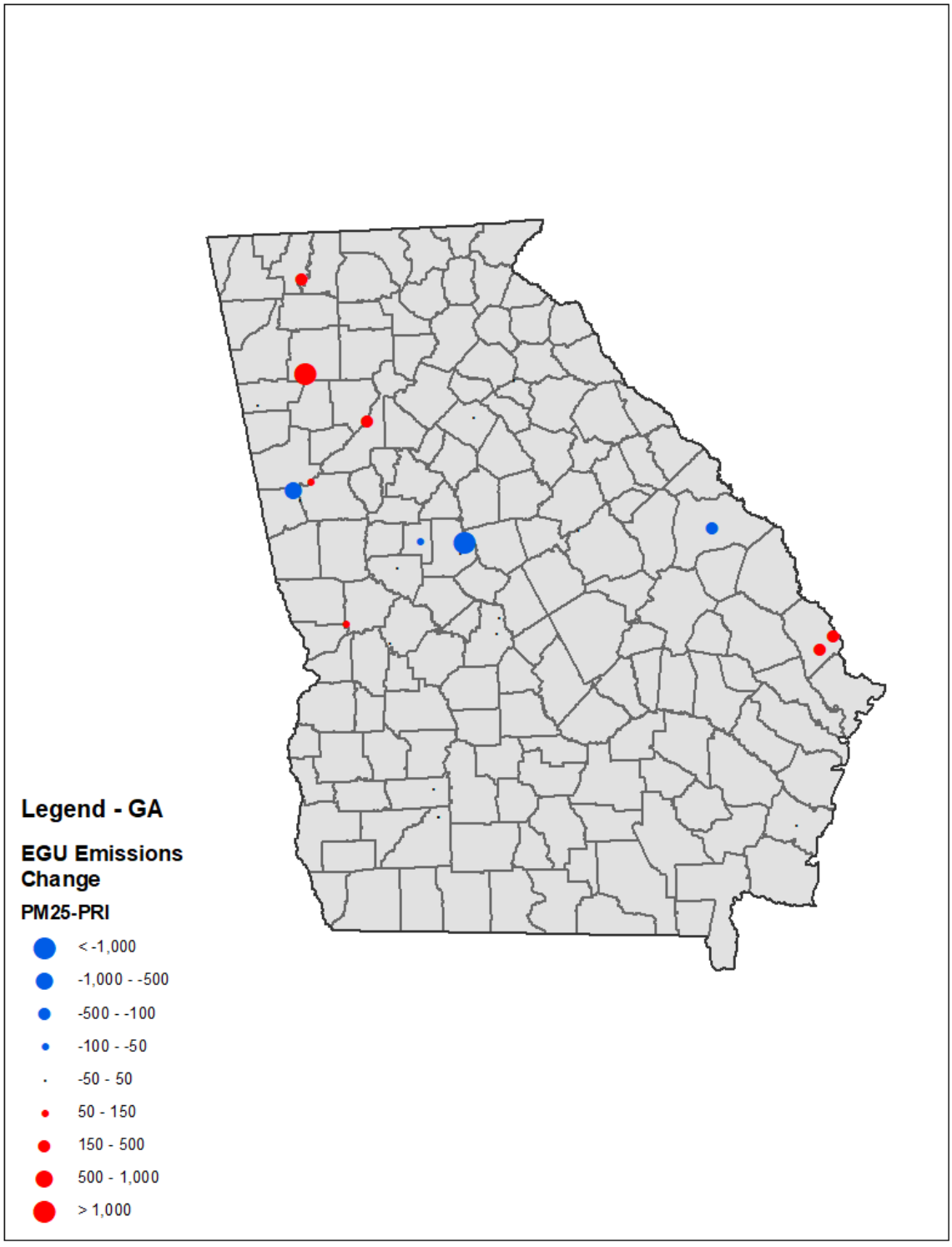

Figure C.3-9. Georgia Point EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

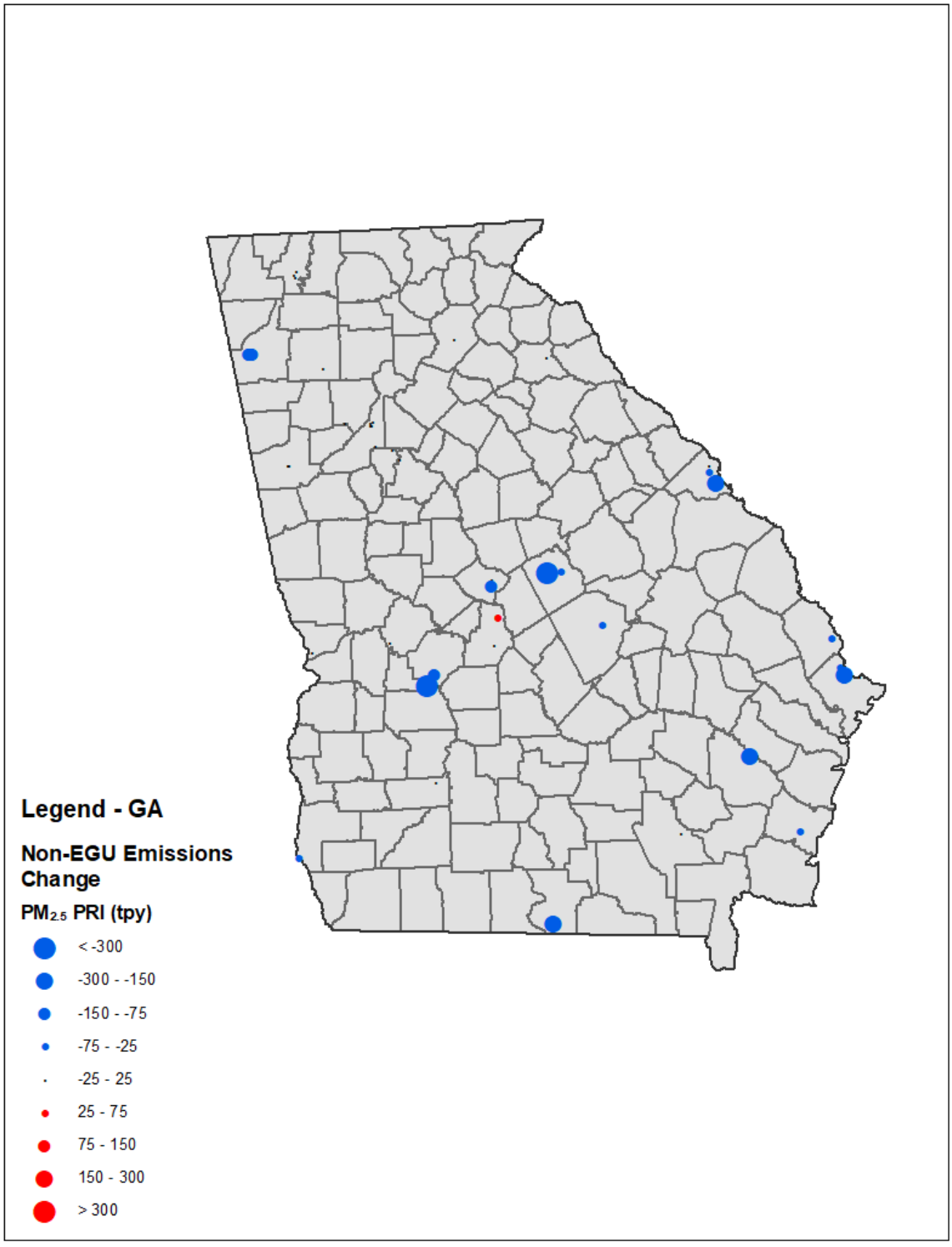

Figure C.3-10. Georgia Point Non-EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

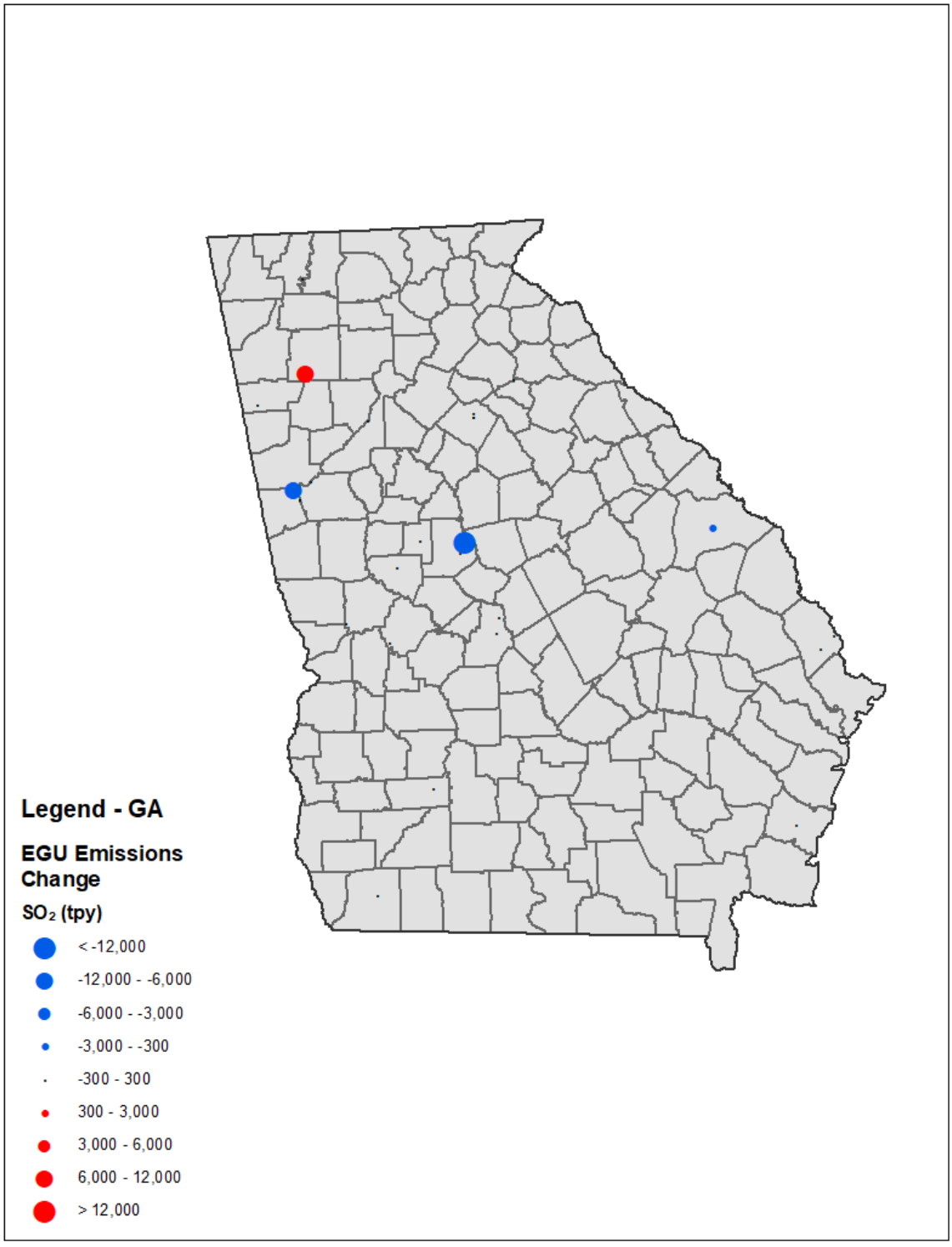

Figure C.3-11. Georgia Point EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

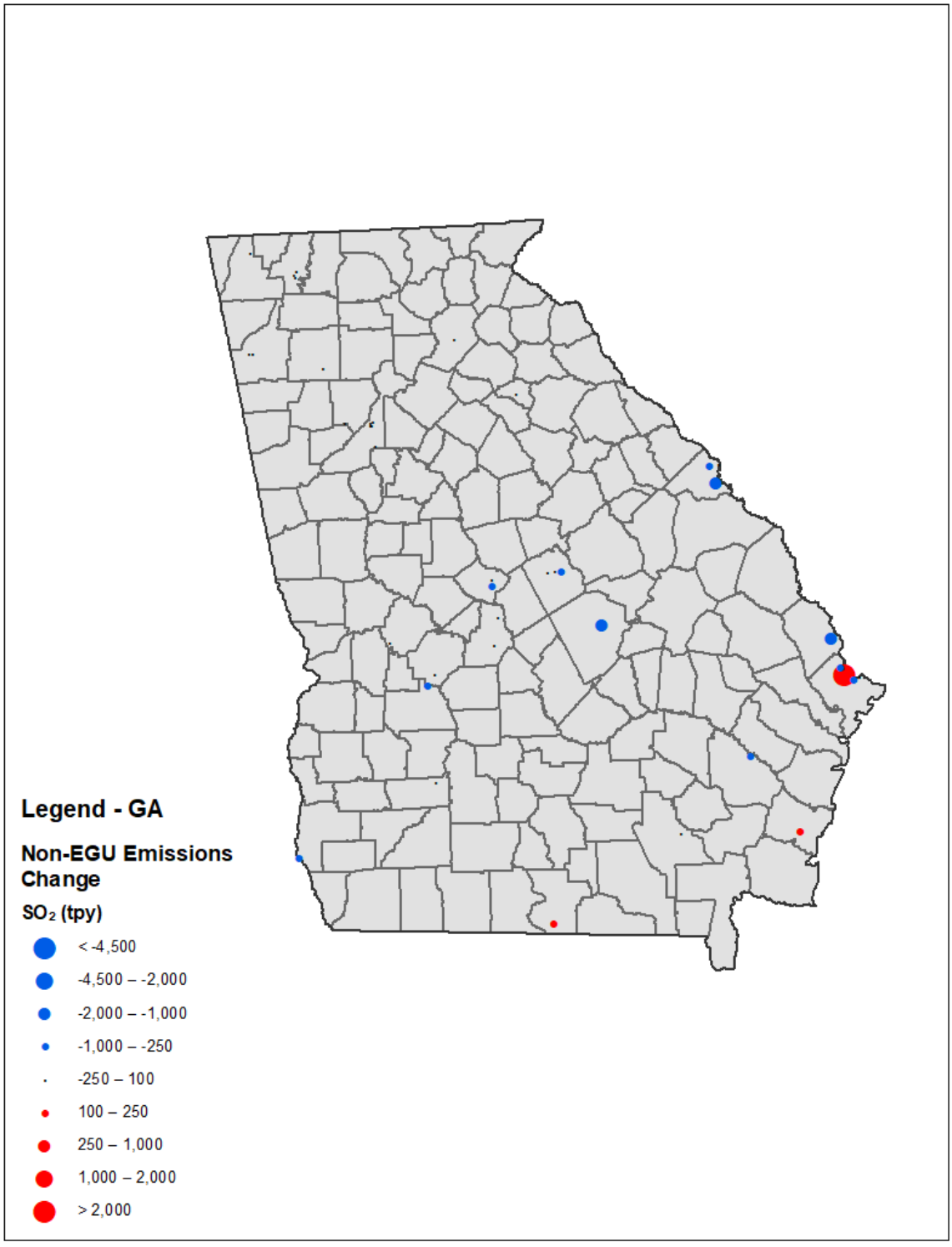

Figure C.3-12. Georgia Point Non-EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

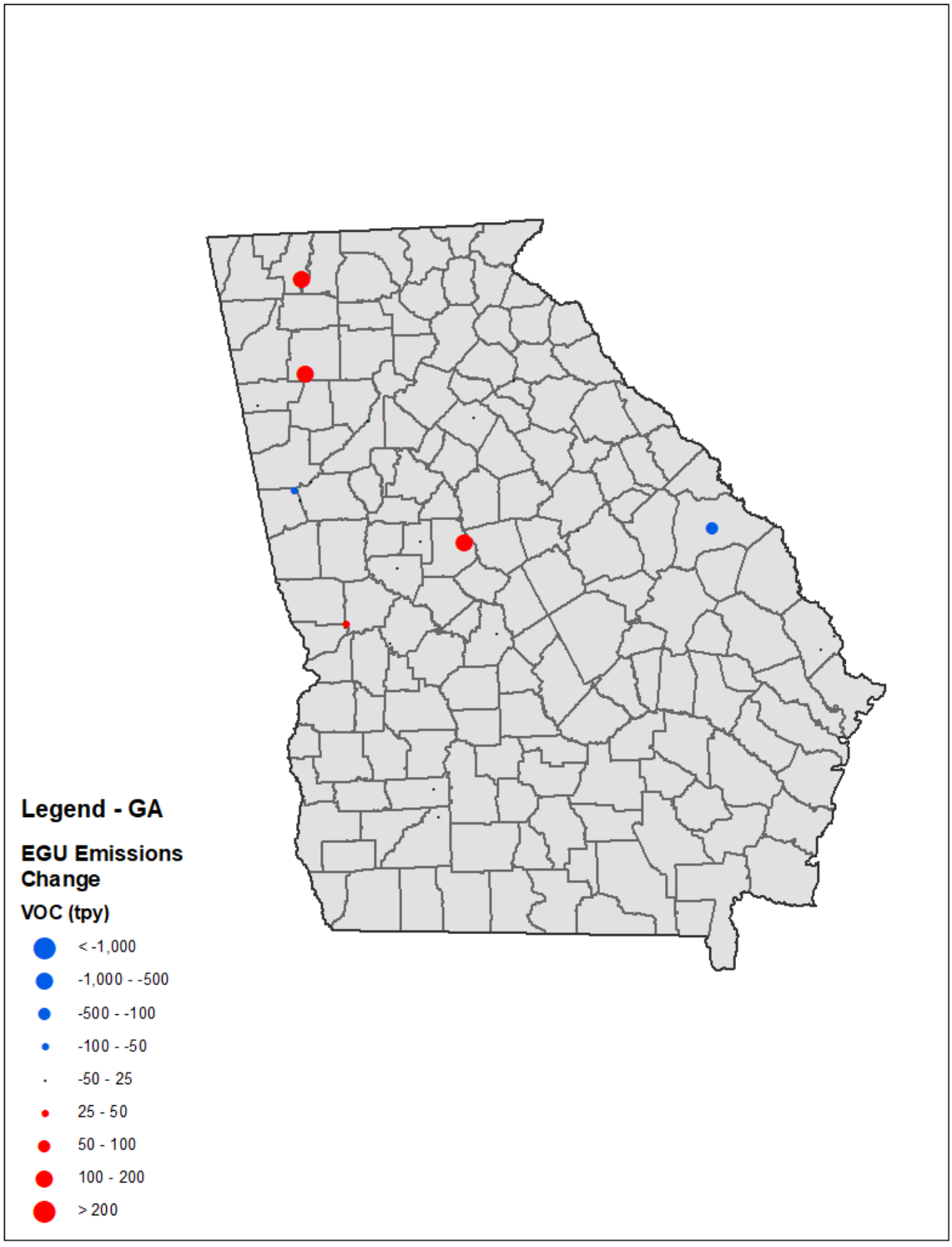

Figure C.3-13. Georgia Point EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

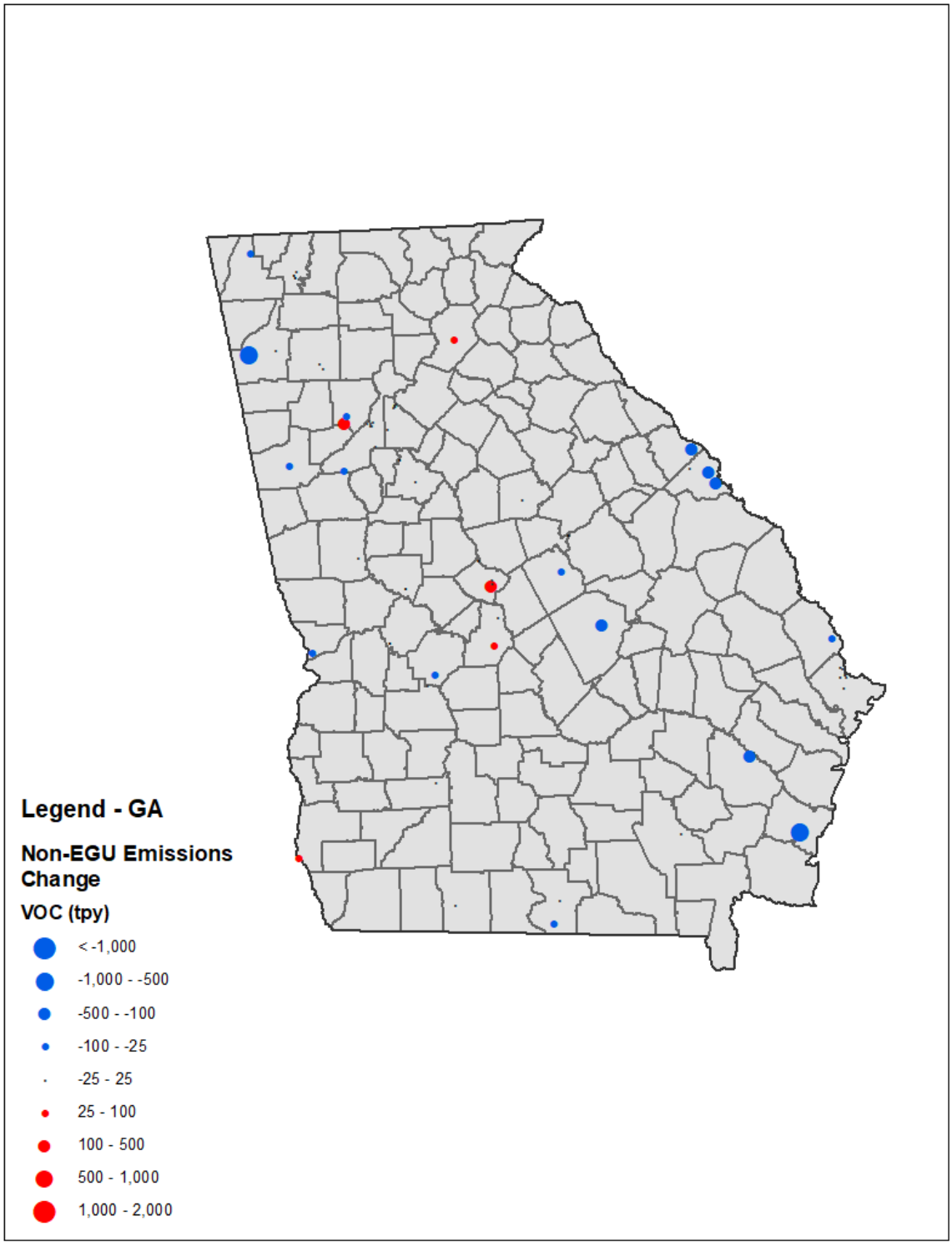

Figure C.3-14. Georgia Point Non-EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

Appendix C-4. Kentucky 2028 Point EGU and Point Non-EGU Comparisons

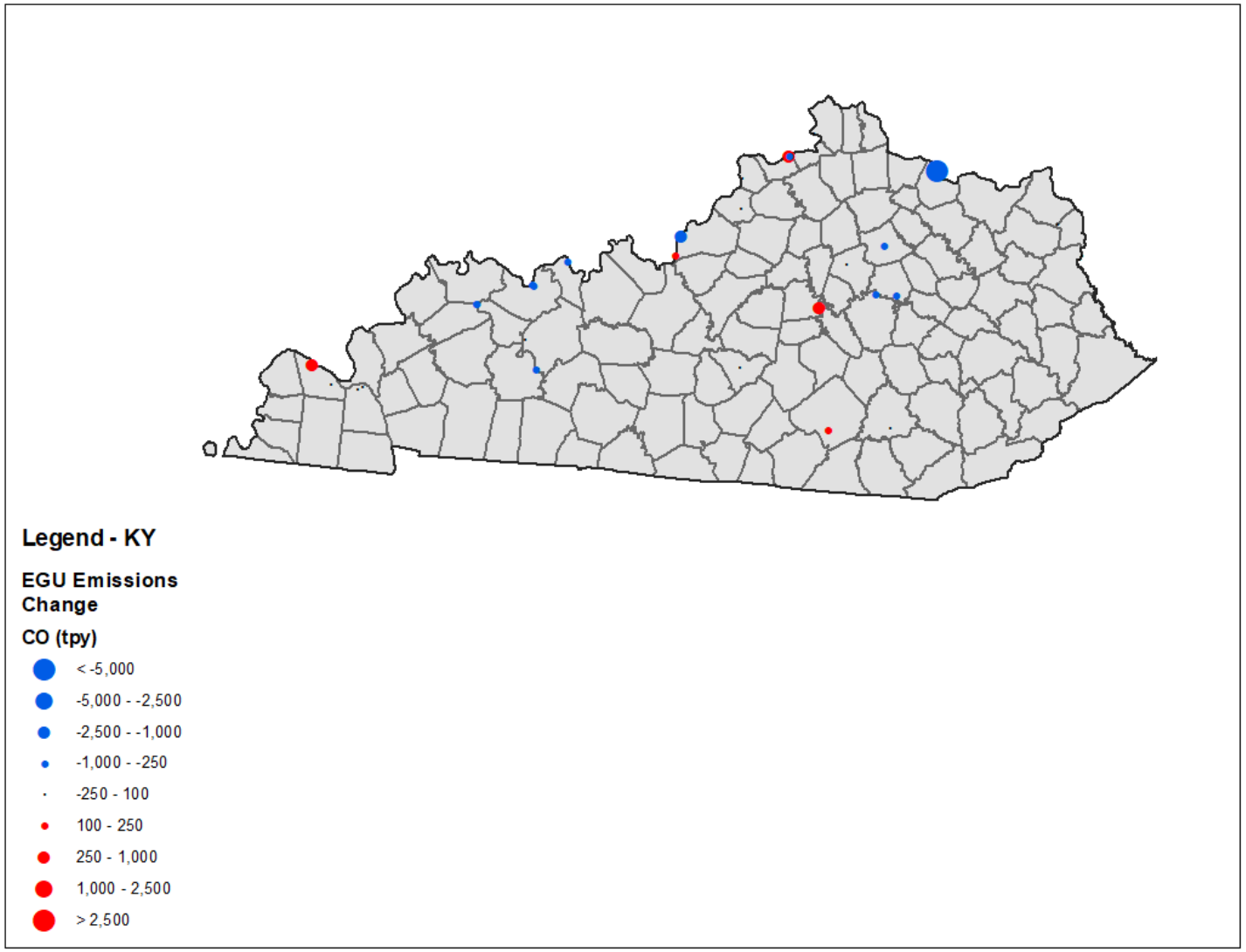

Figure C.4-1. Kentucky Point EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

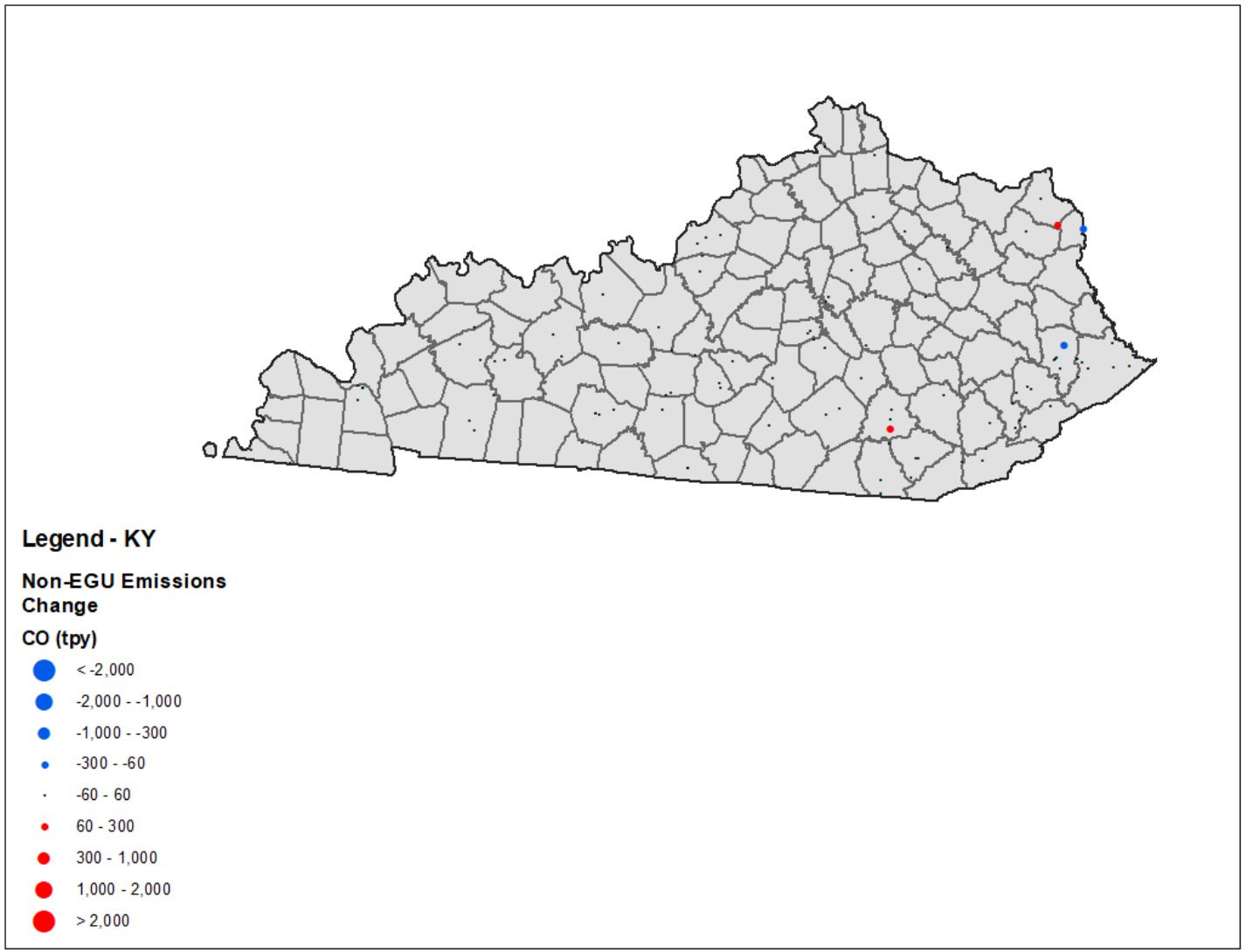

Figure C.4-2. Kentucky Point Non-EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

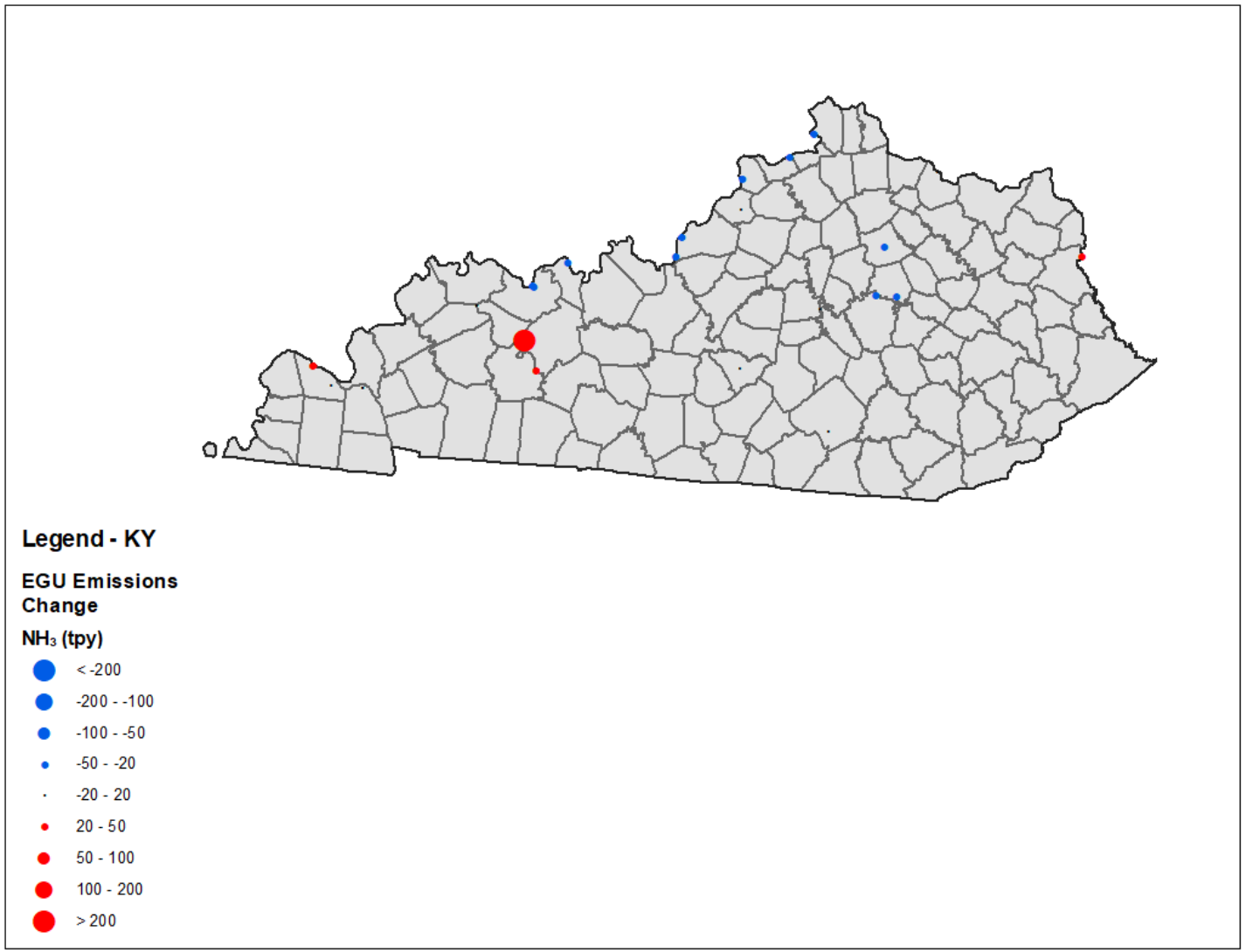

Figure C.4-3. Kentucky Point EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

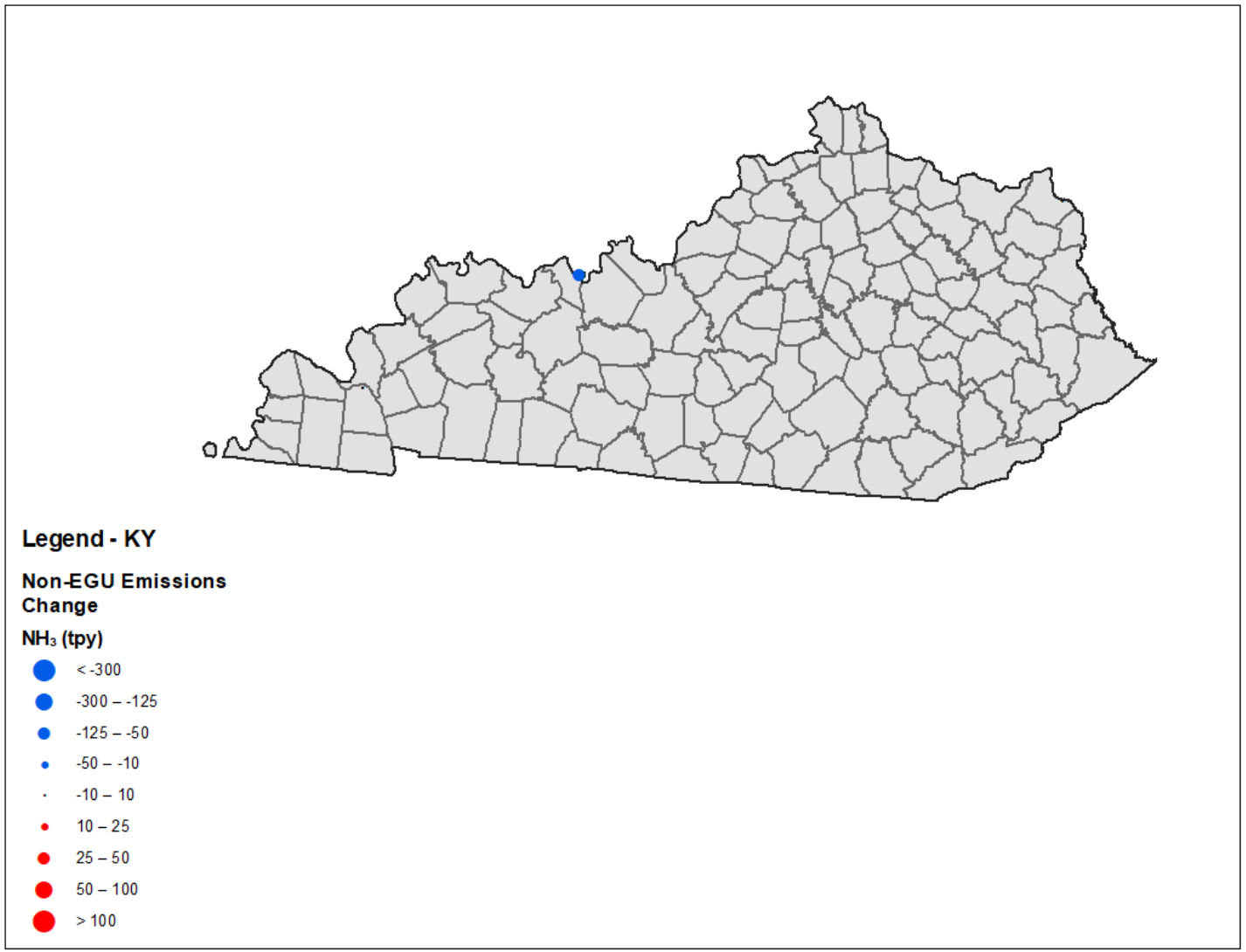

Figure C.4-4. Kentucky Point Non-EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

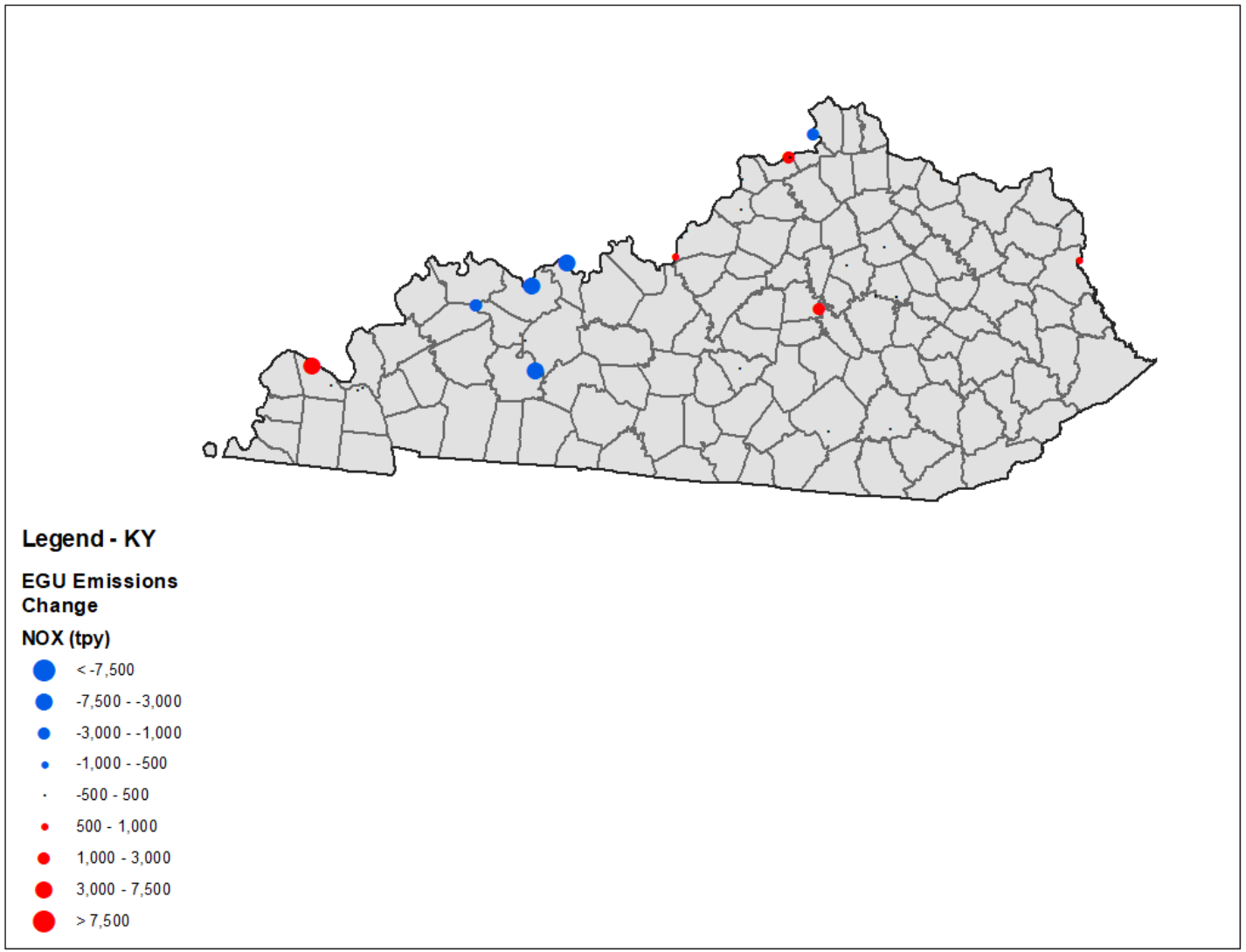

Figure C.4-5. Kentucky Point EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

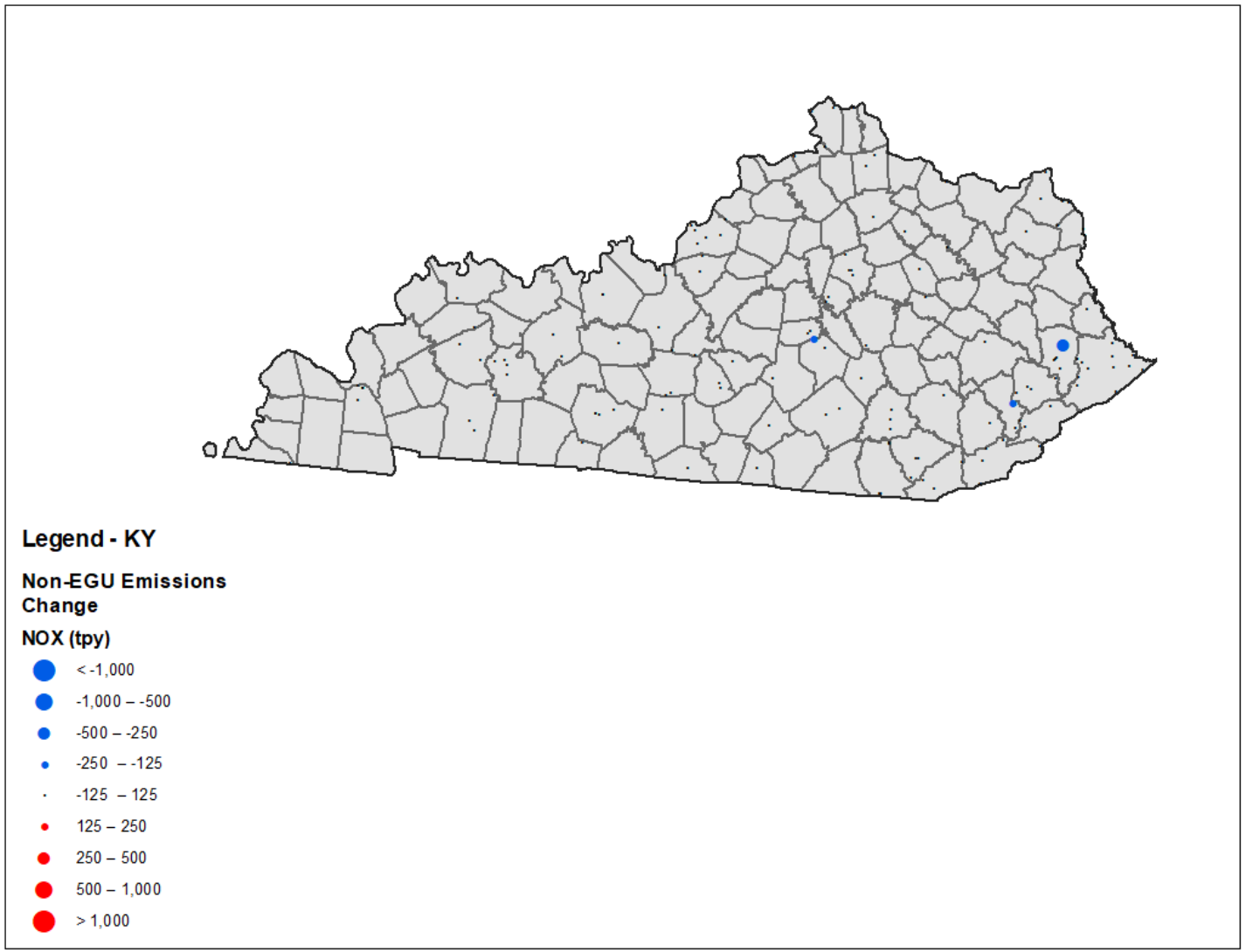

Figure C.4-6. Kentucky Point Non-EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

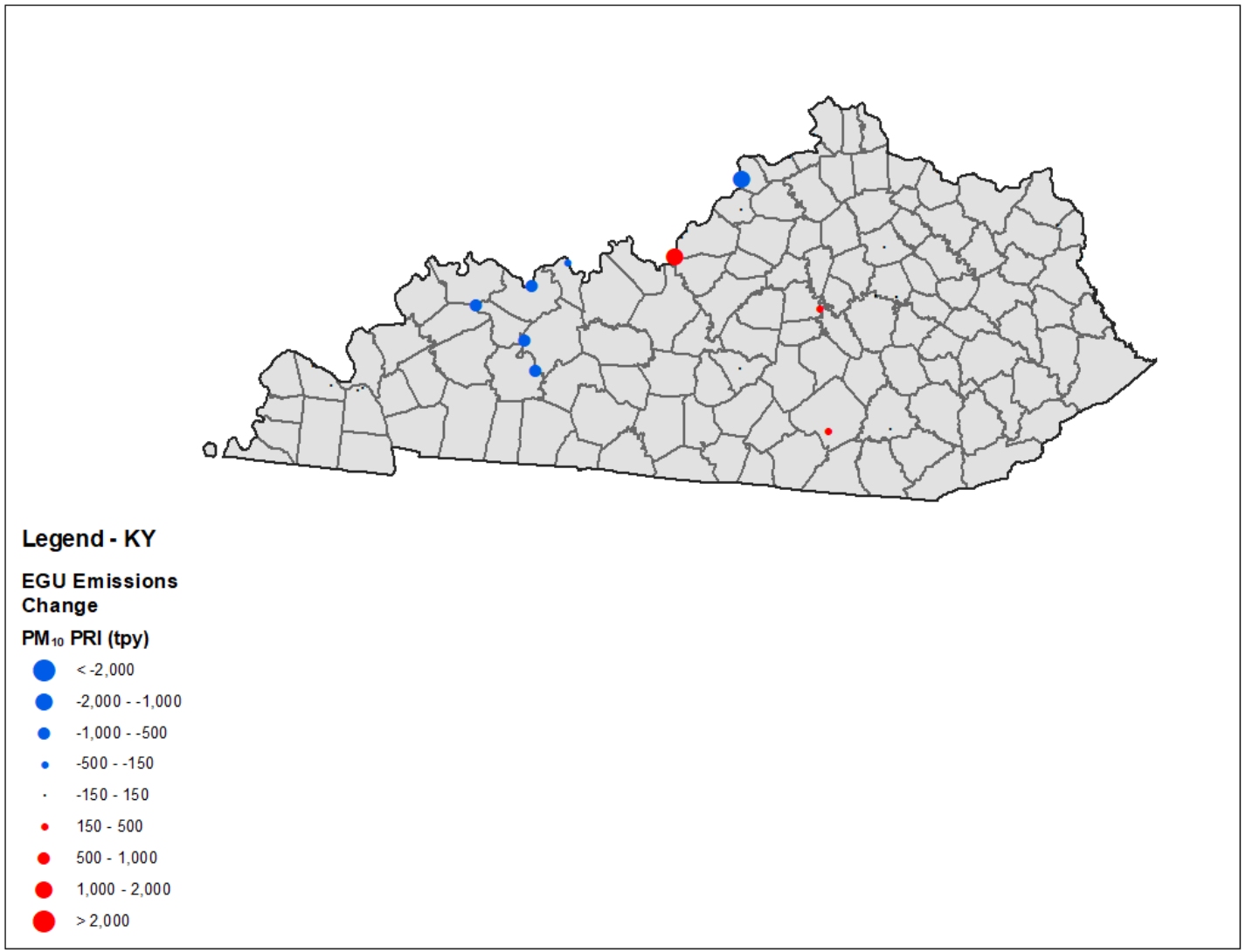

Figure C.4-7. Kentucky Point EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

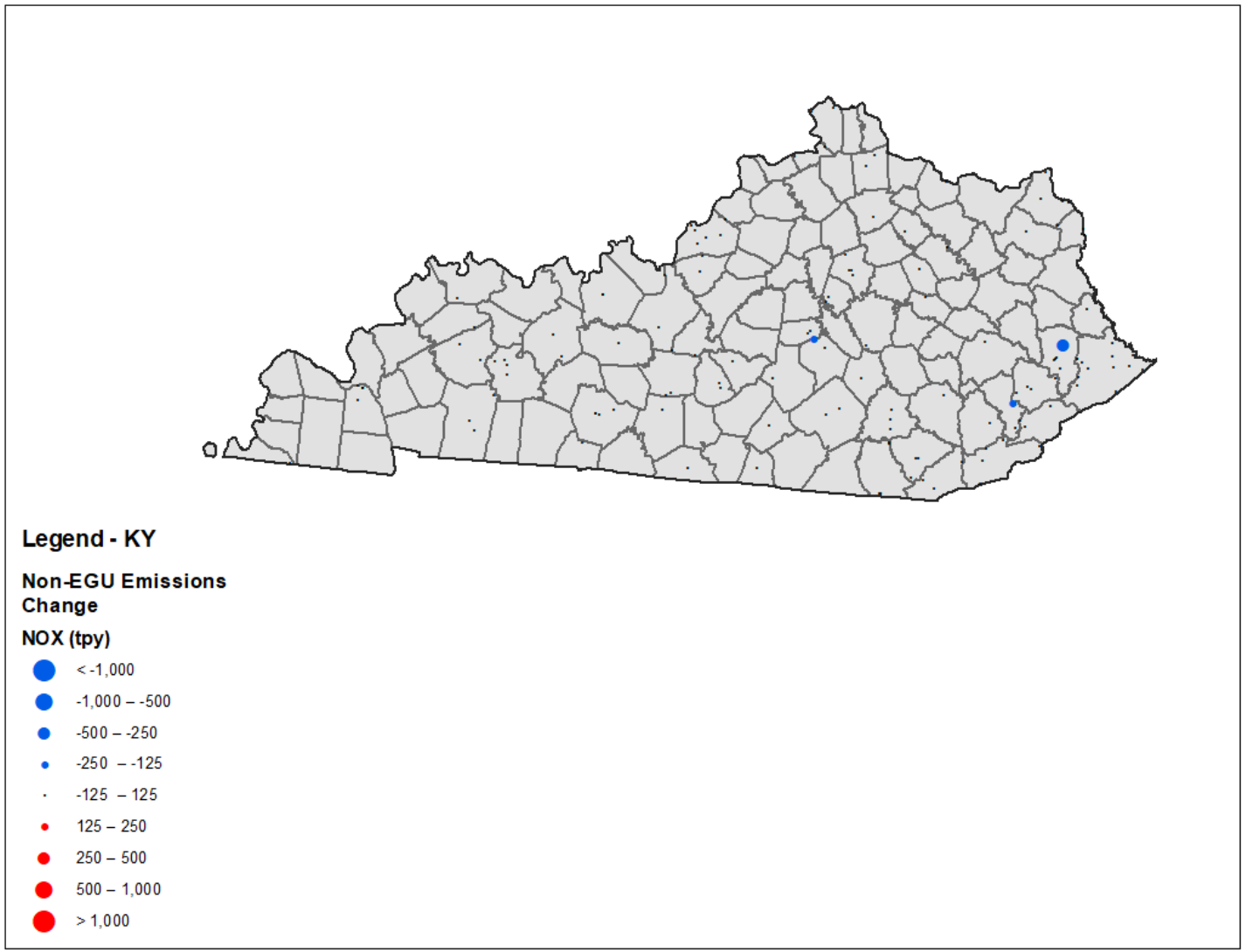

Figure C.4-8. Kentucky Point Non-EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

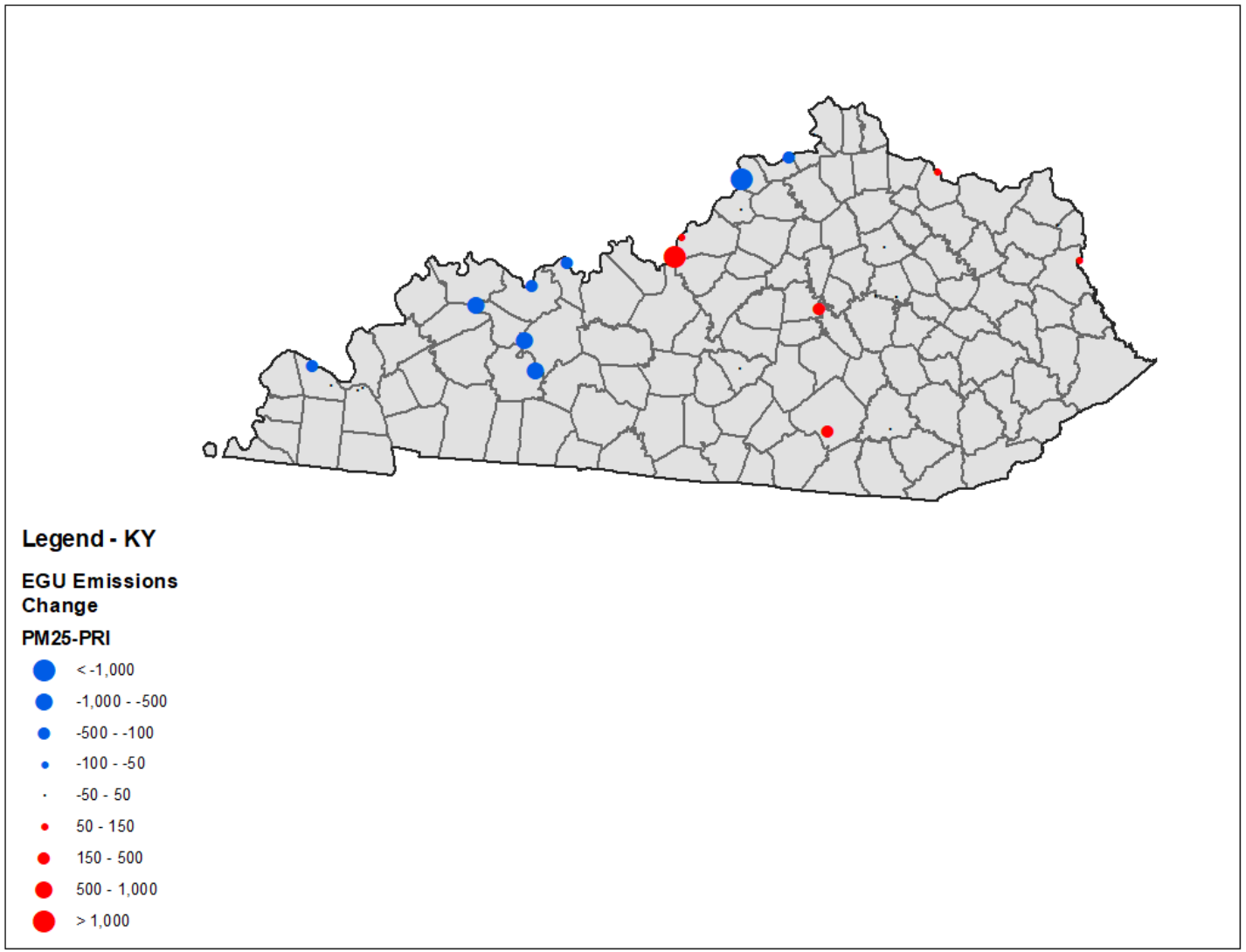

Figure C.4-9. Kentucky Point EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

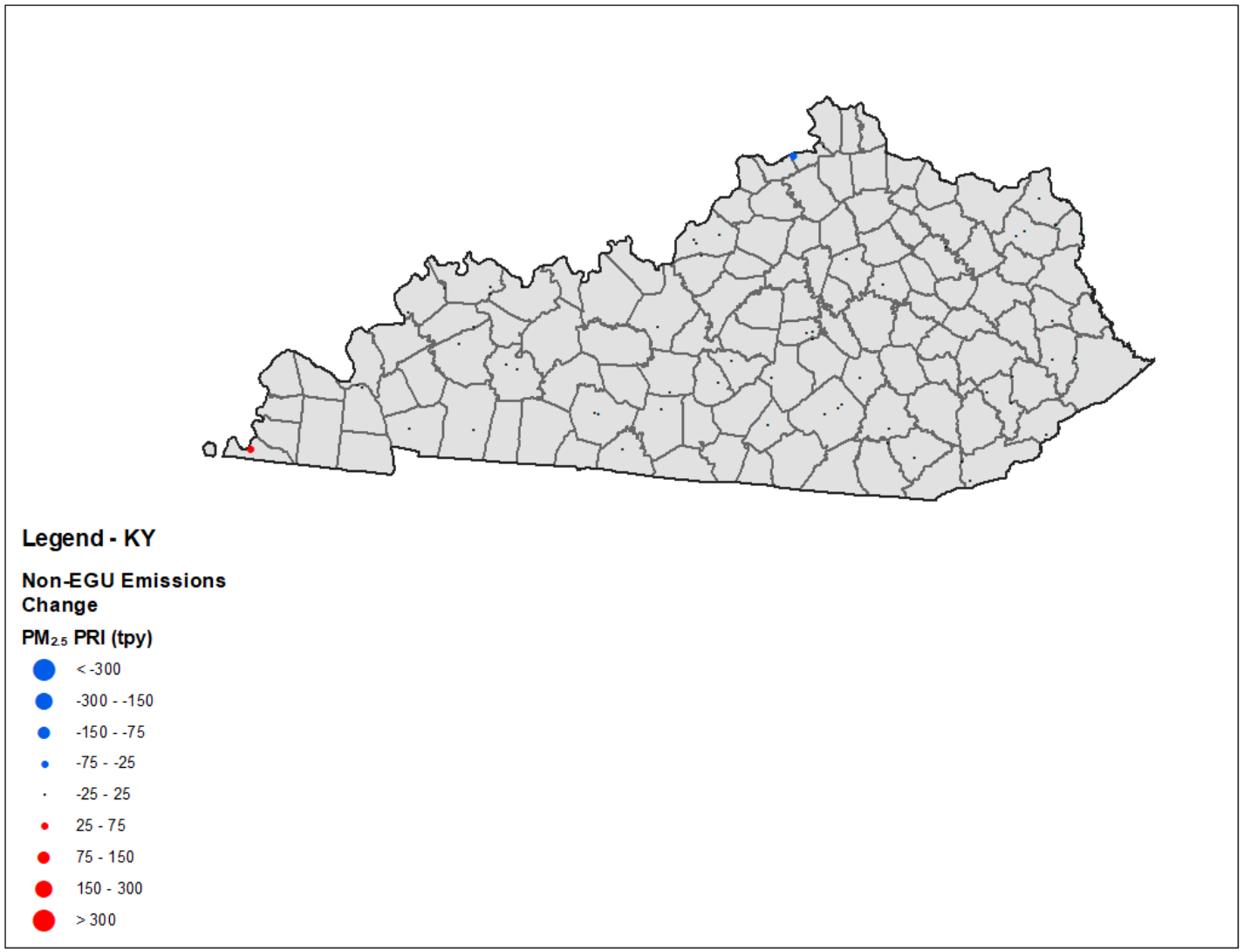

Figure C.4-10. Kentucky Point Non-EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

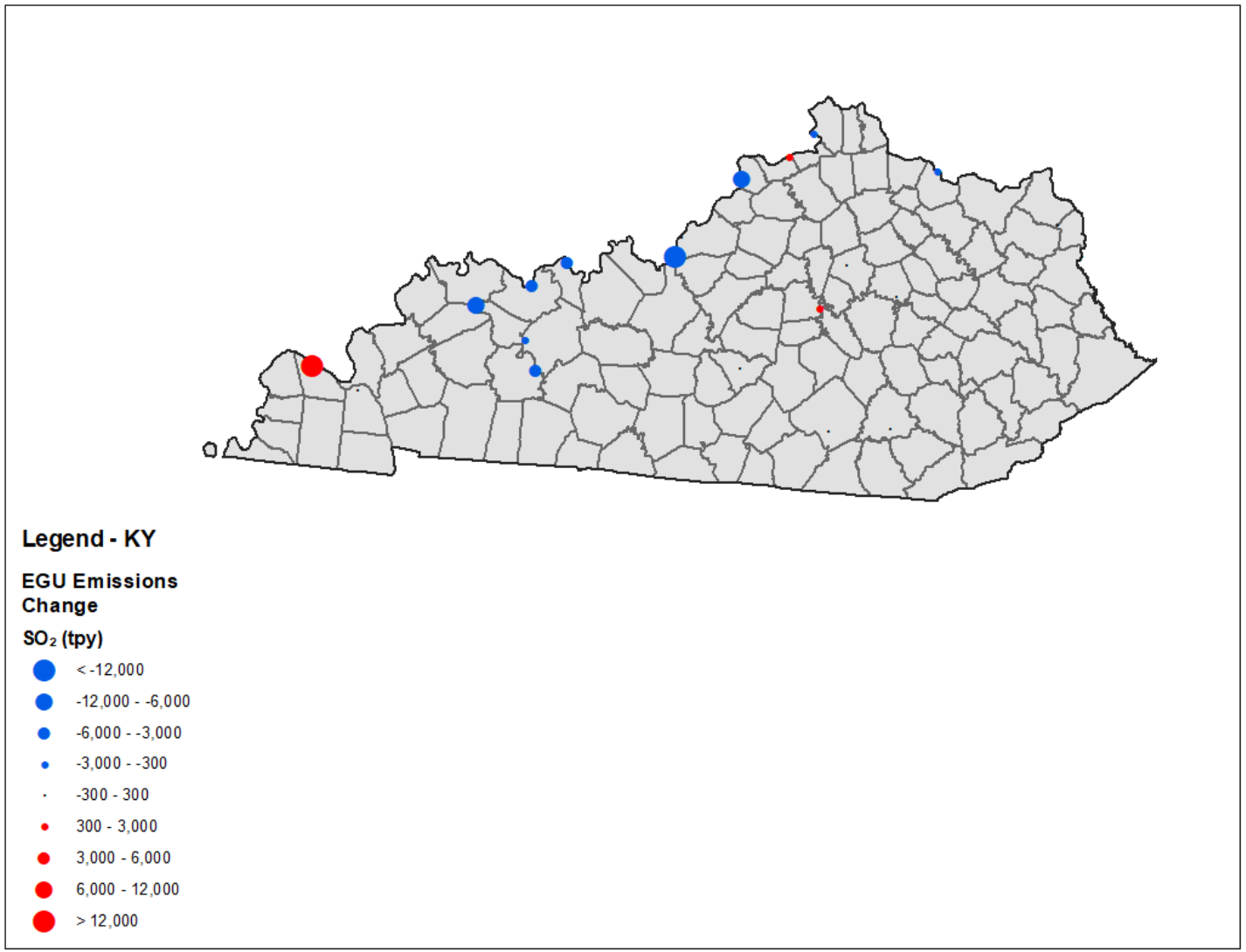

Figure C.4-11. Kentucky Point EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

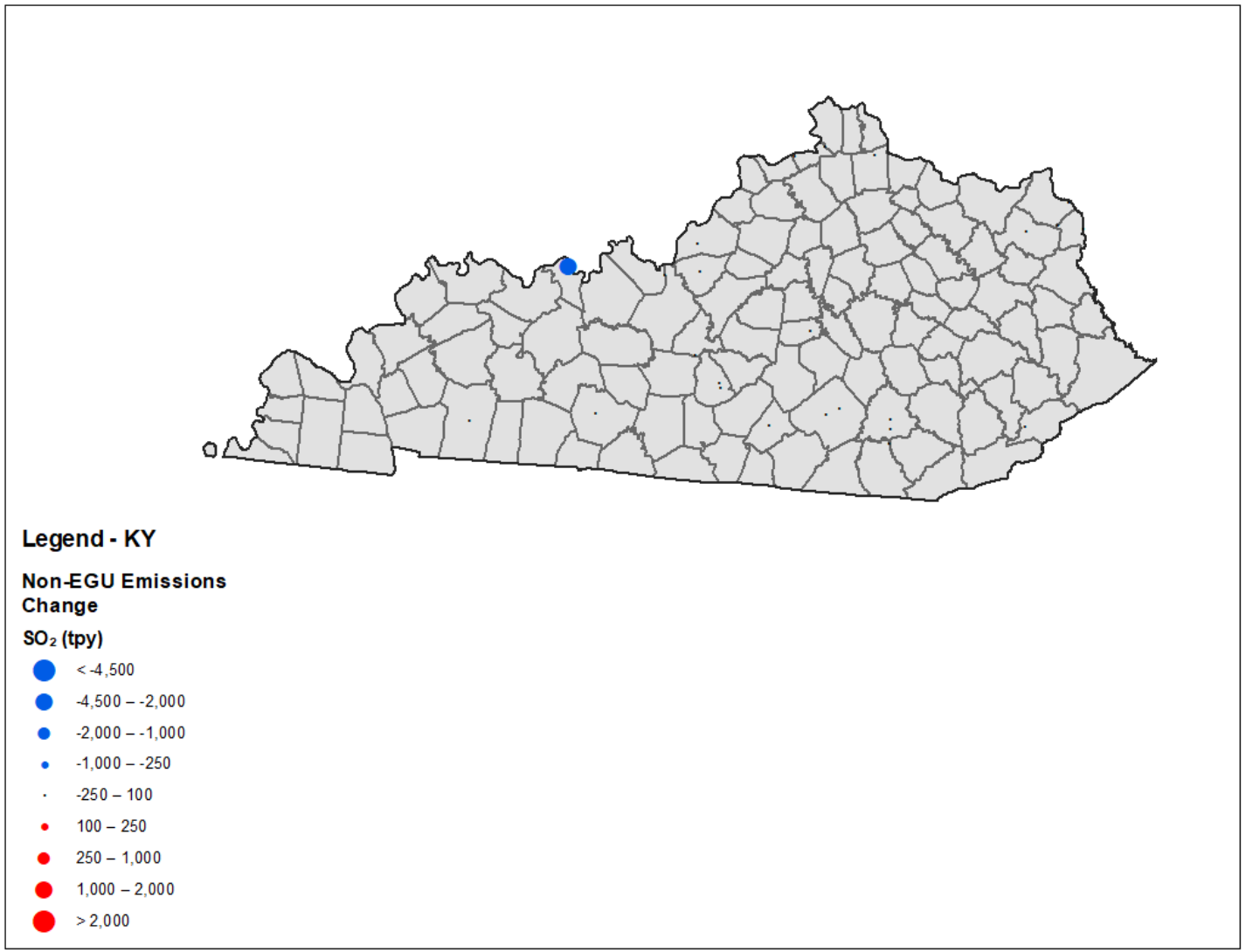

Figure C.4-12. Kentucky Point Non-EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

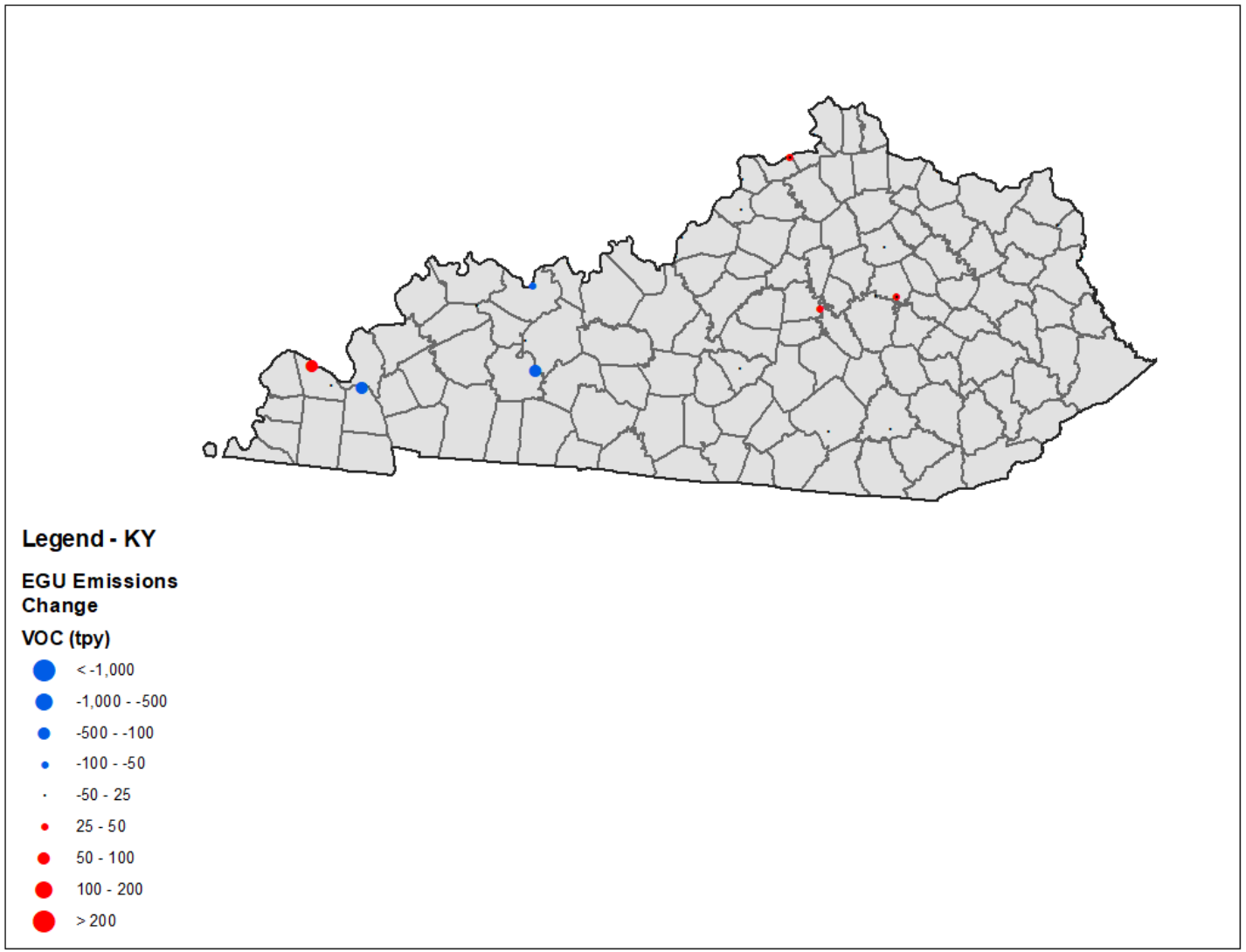

Figure C.4-13. Kentucky Point EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

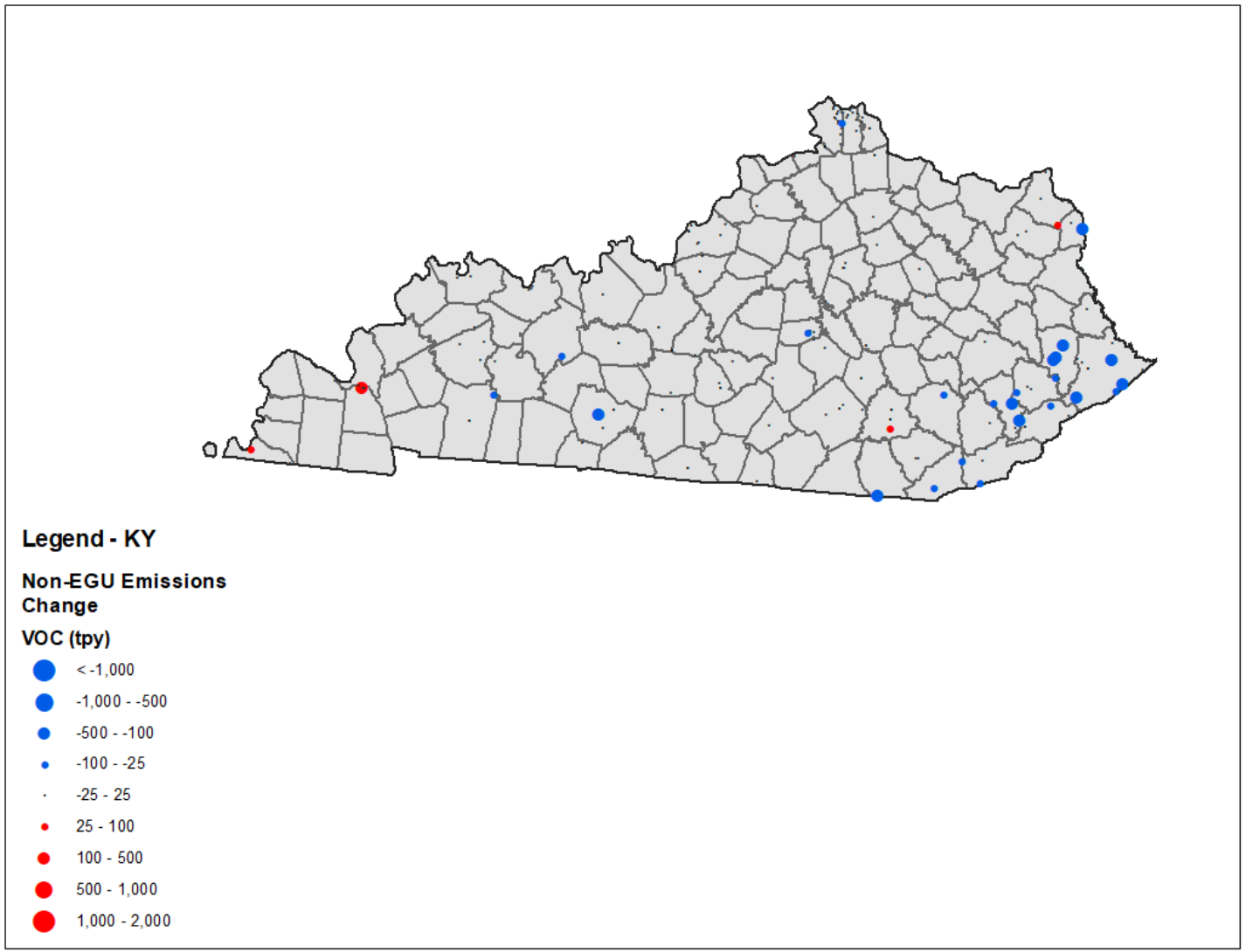

Figure C.4-14. Kentucky Point Non-EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

Appendix C-5. Mississippi 2028 Point EGU and Point Non-EGU Comparisons

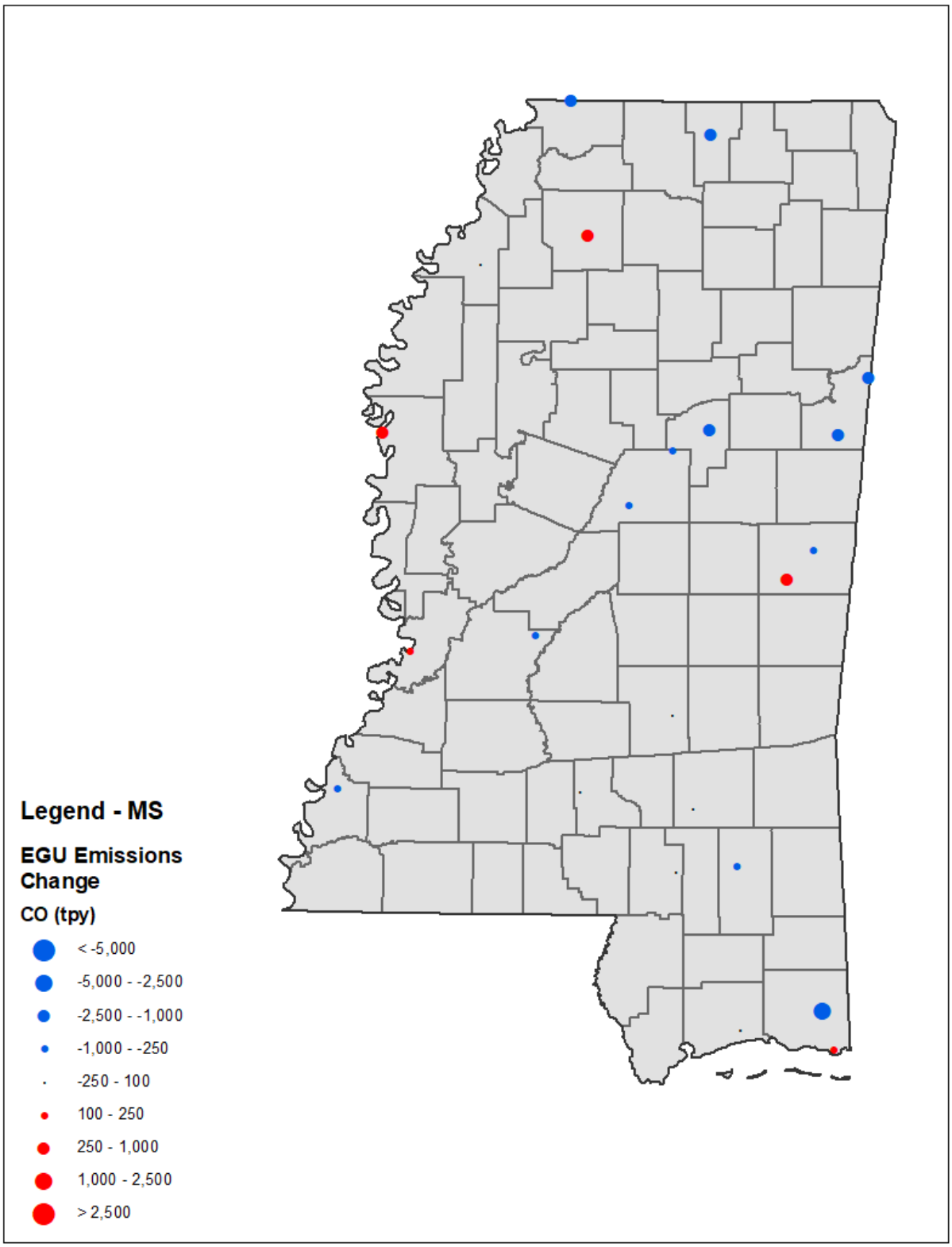

Figure C.0-1. Mississippi Point EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

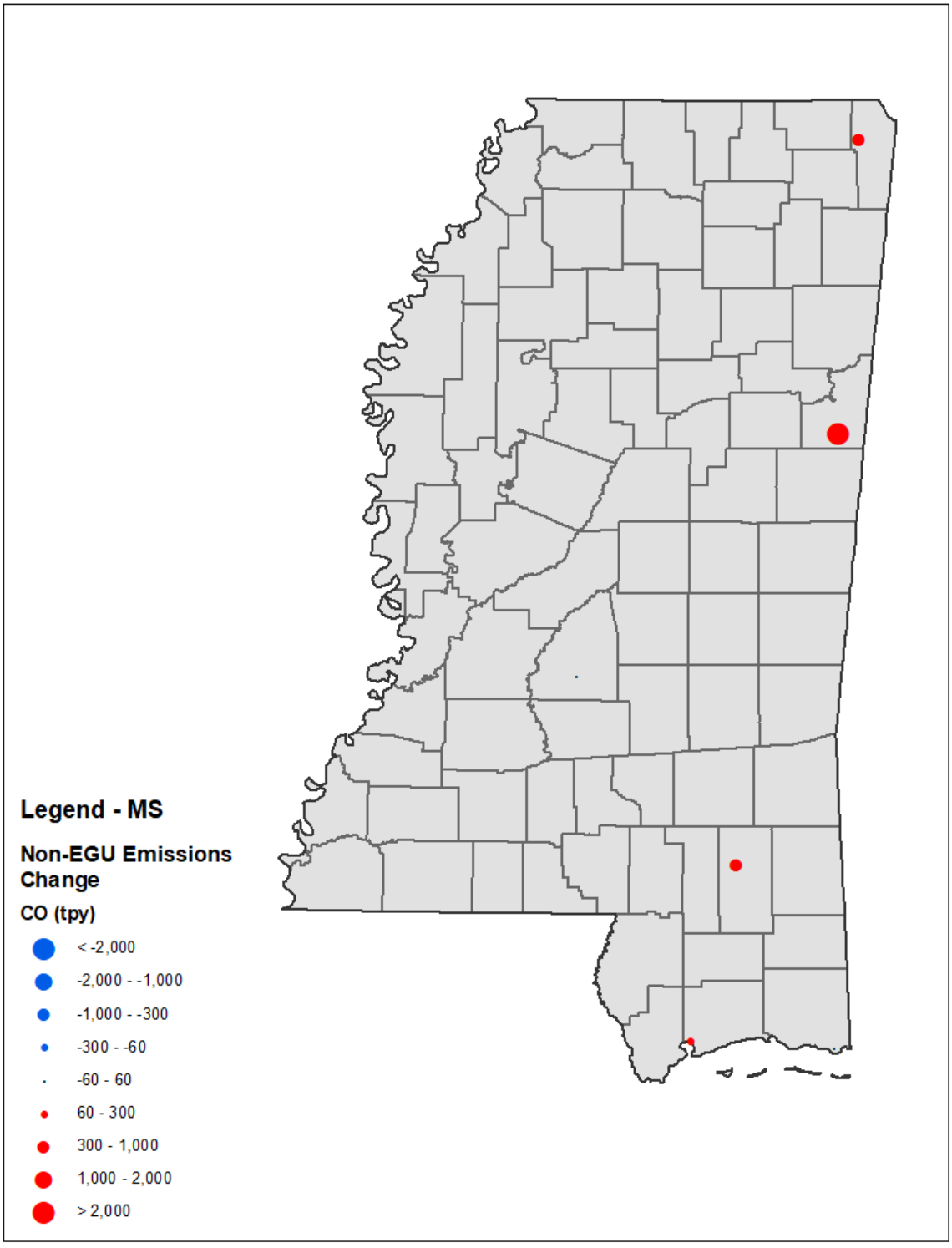

Figure C.0-2. Mississippi Point Non-EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

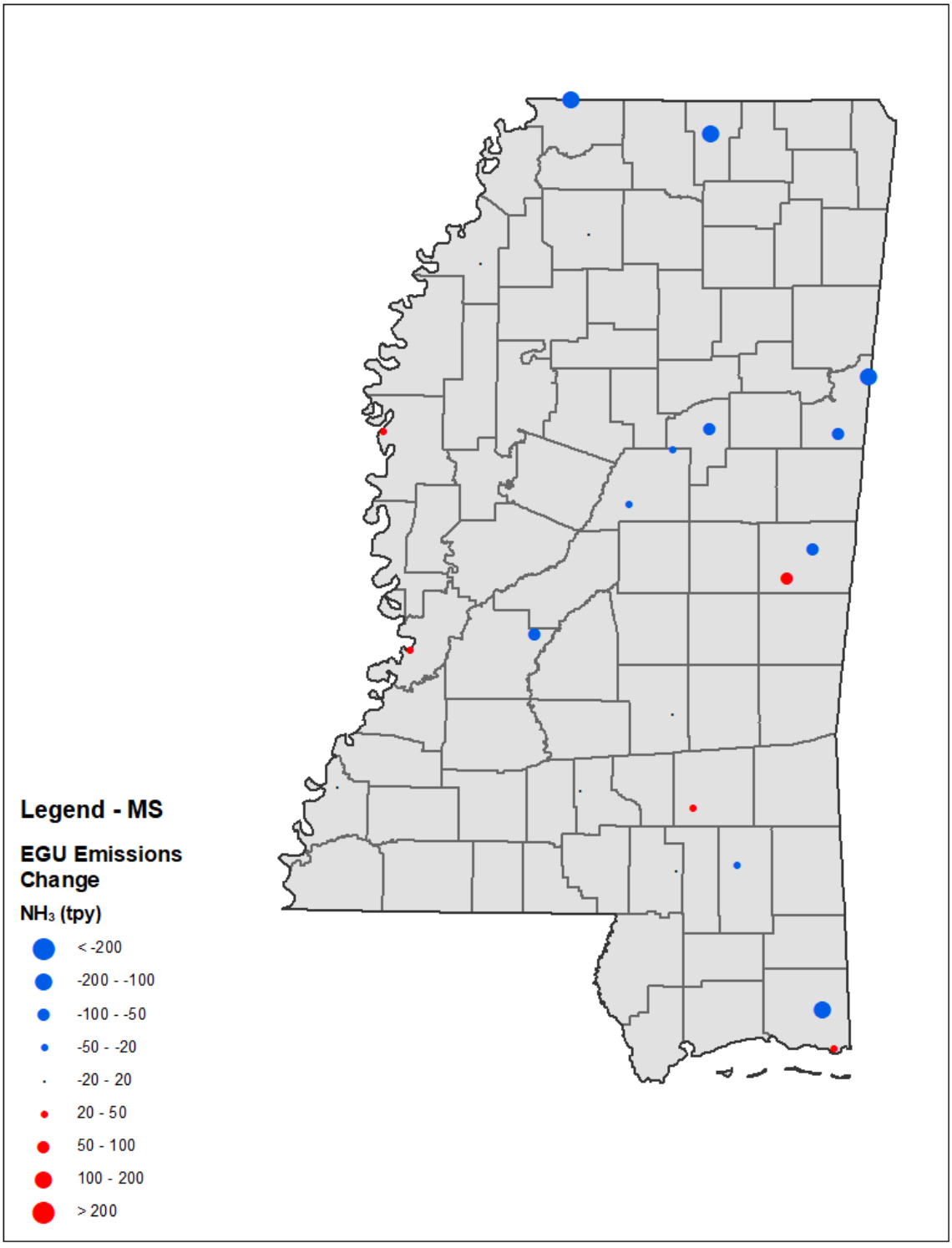

Figure C.0-3. Mississippi Point EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

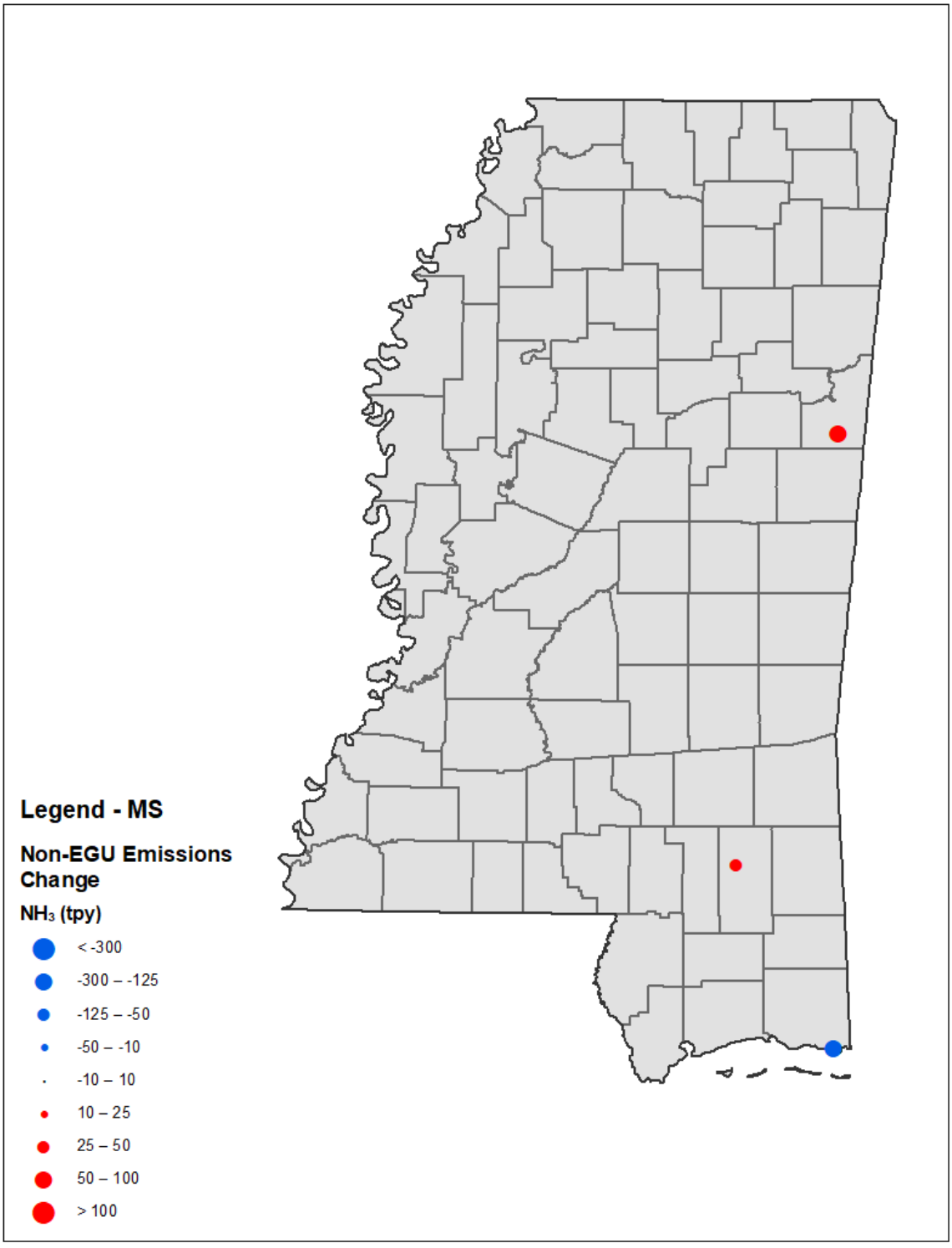

Figure C.0-4. Mississippi Point Non-EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

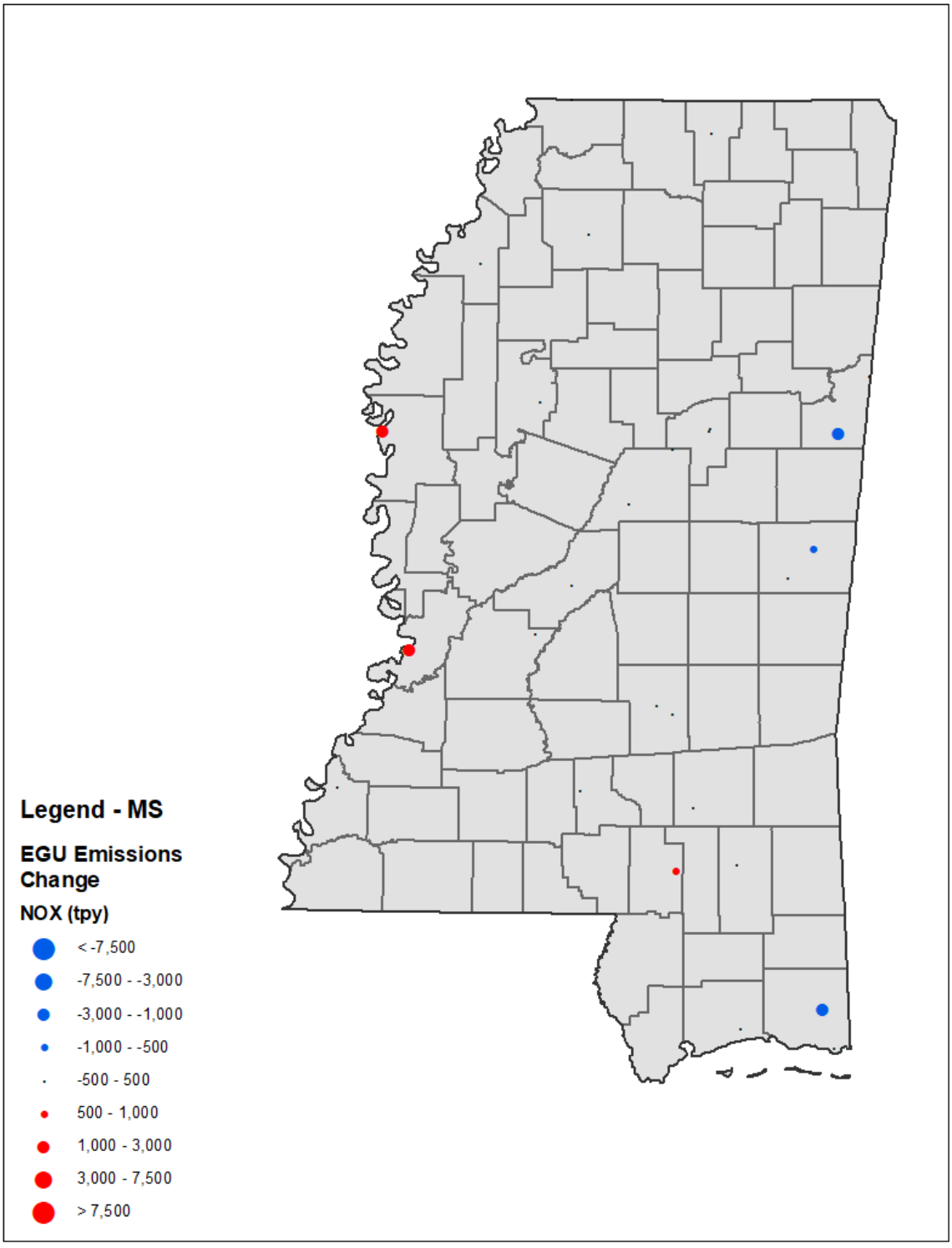

Figure C.0-5. Mississippi Point EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

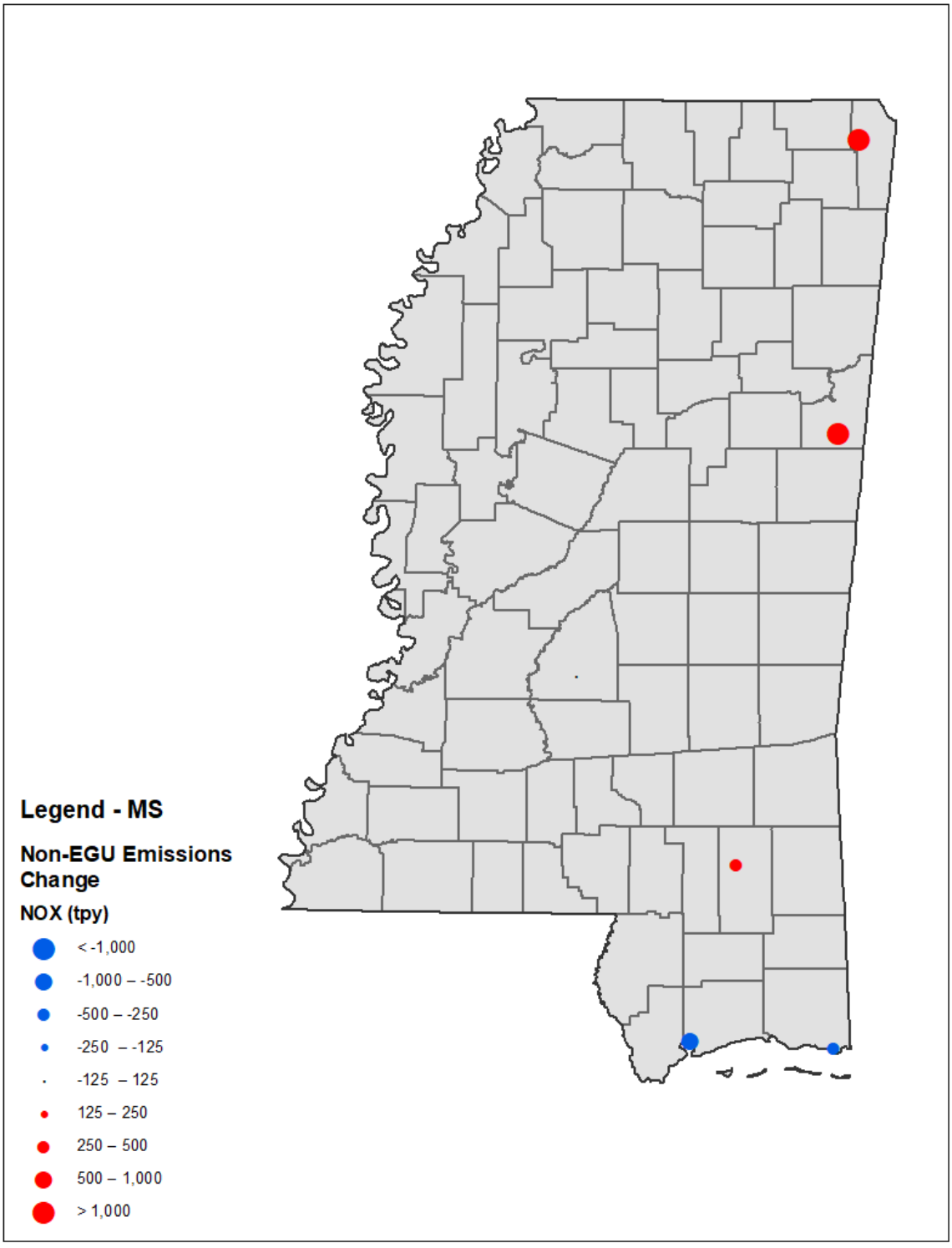

Figure C.0-6. Mississippi Point Non-EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

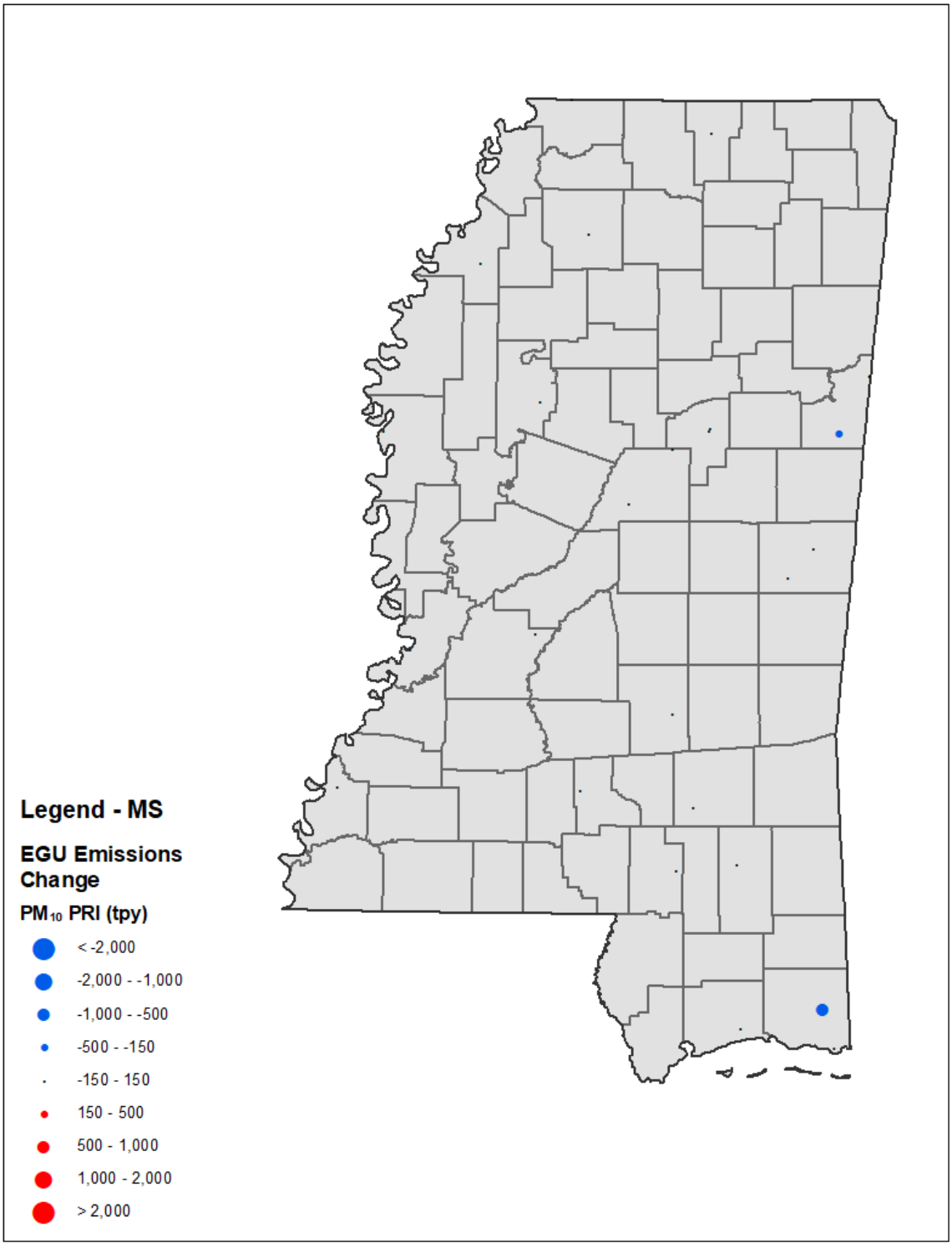

Figure C.0-7. Mississippi Point EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

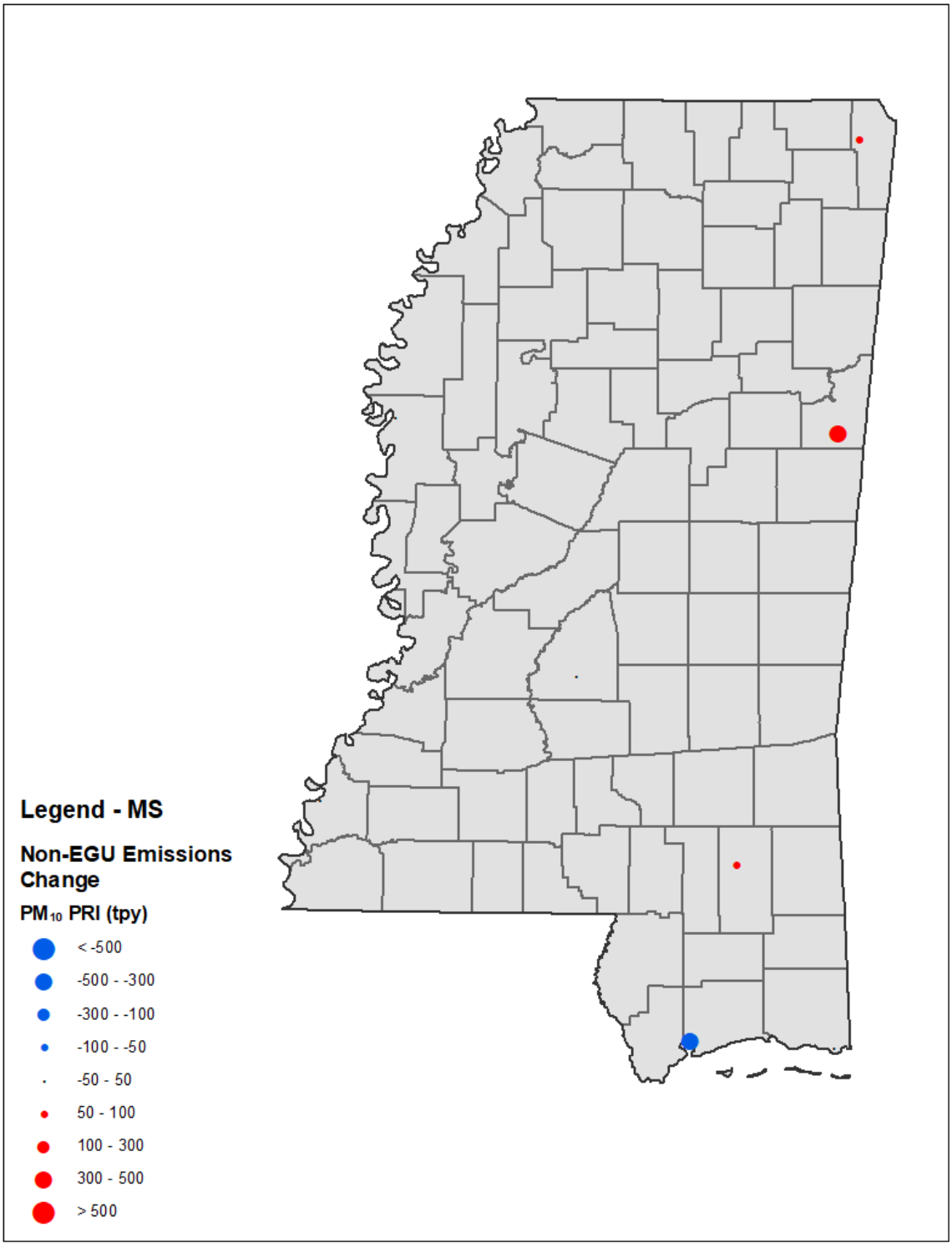

Figure C.0-8. Mississippi Point Non-EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

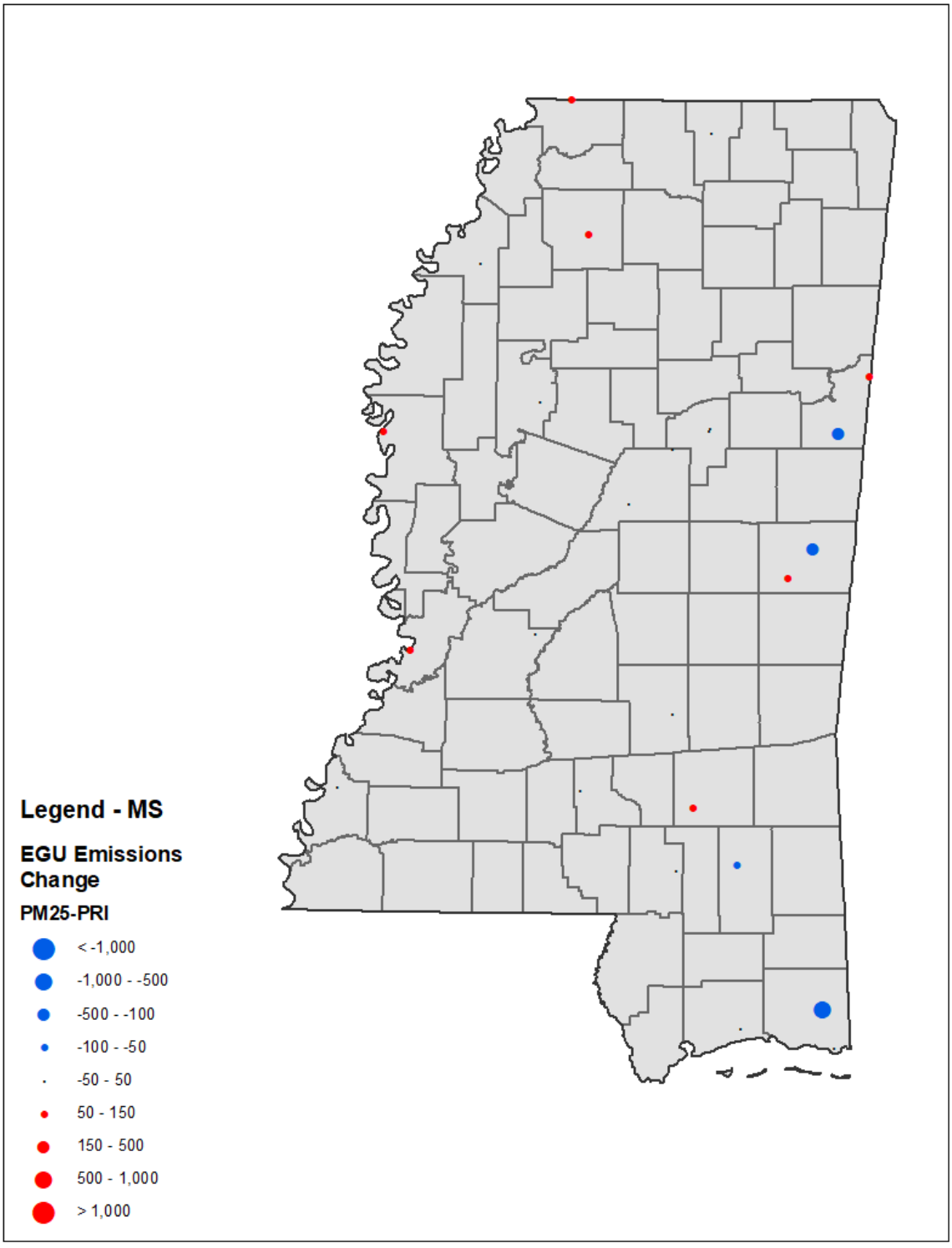

Figure C.0-9. Mississippi Point EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

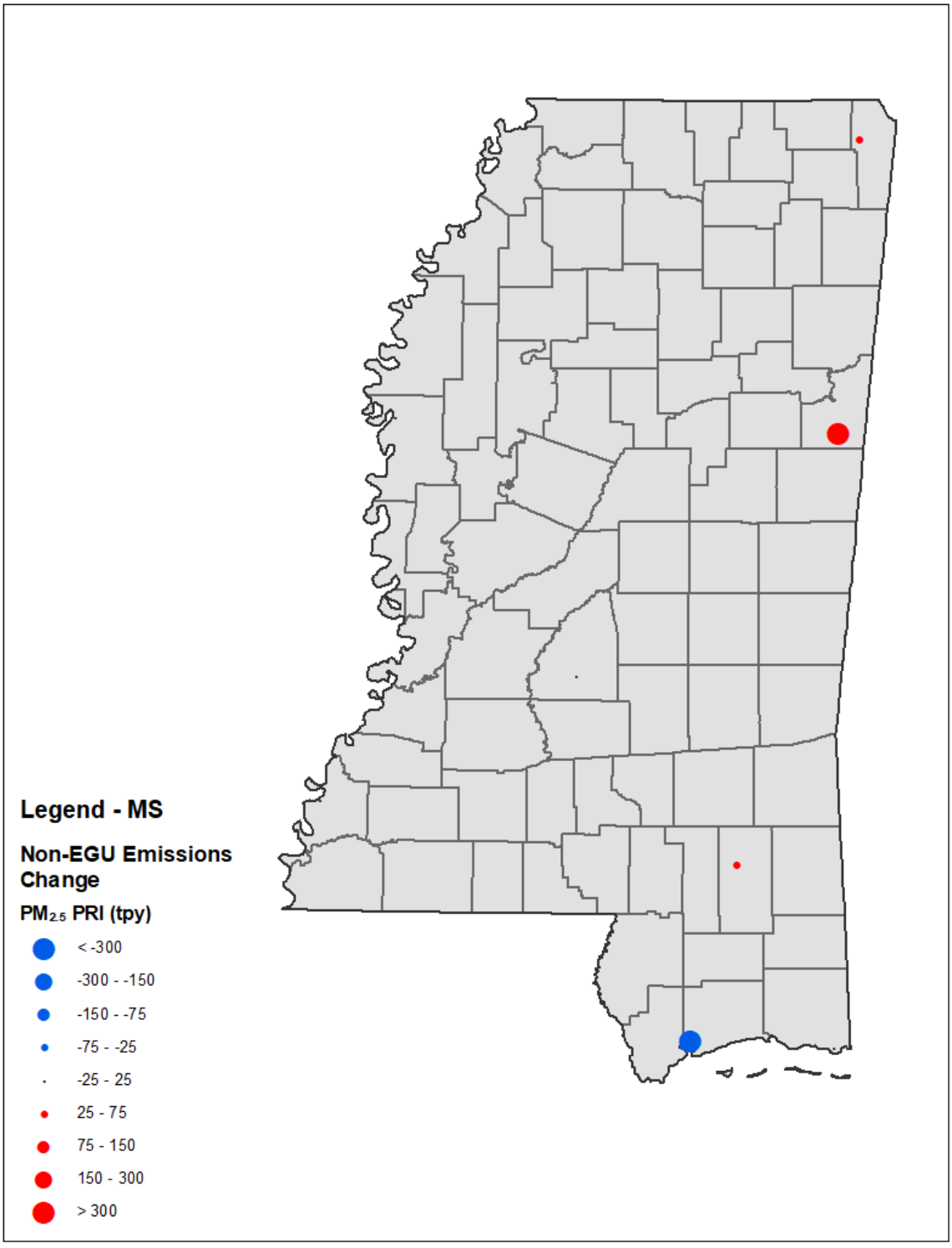

Figure C.0-10. Mississippi Point Non-EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

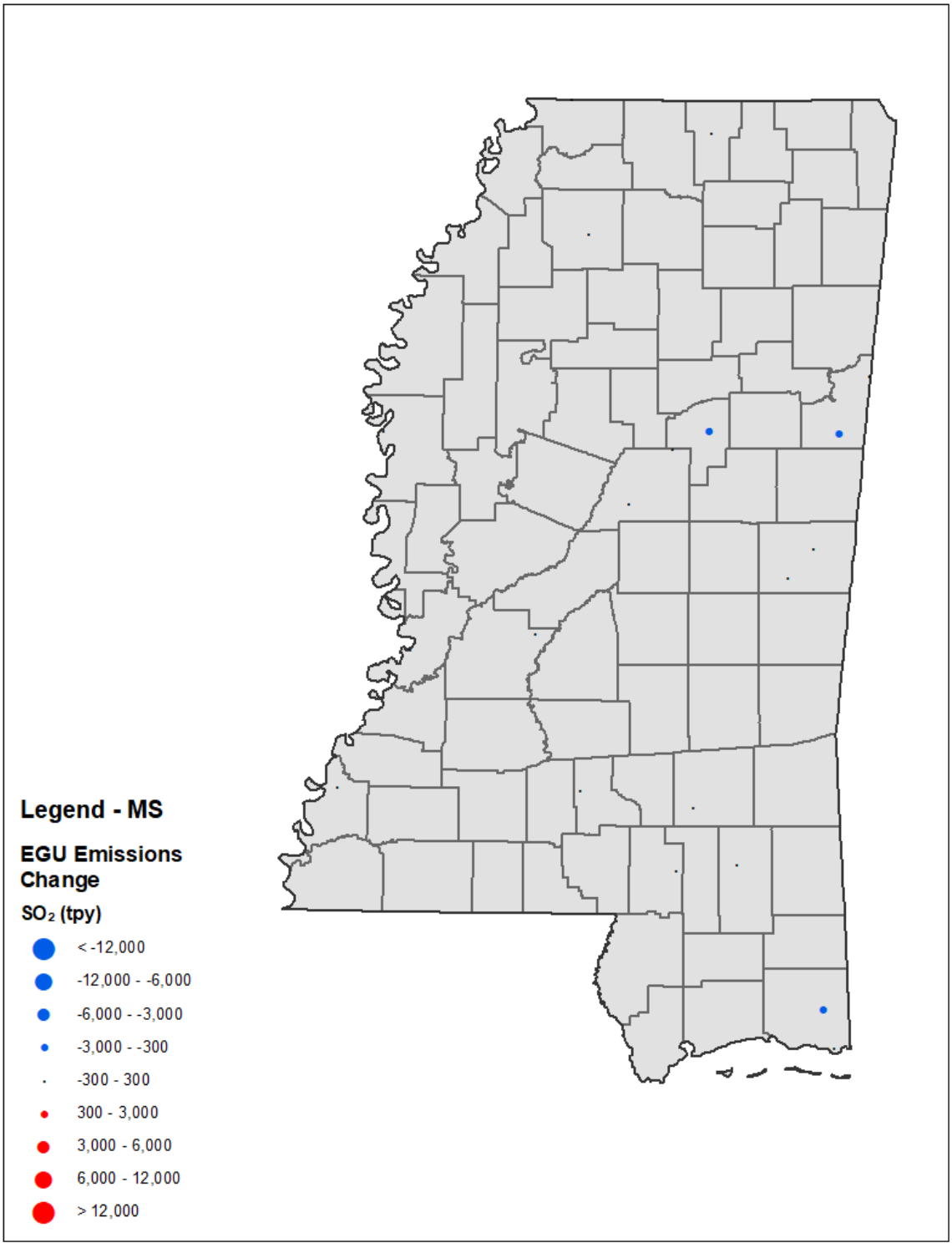

Figure C.0-11. Mississippi Point EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

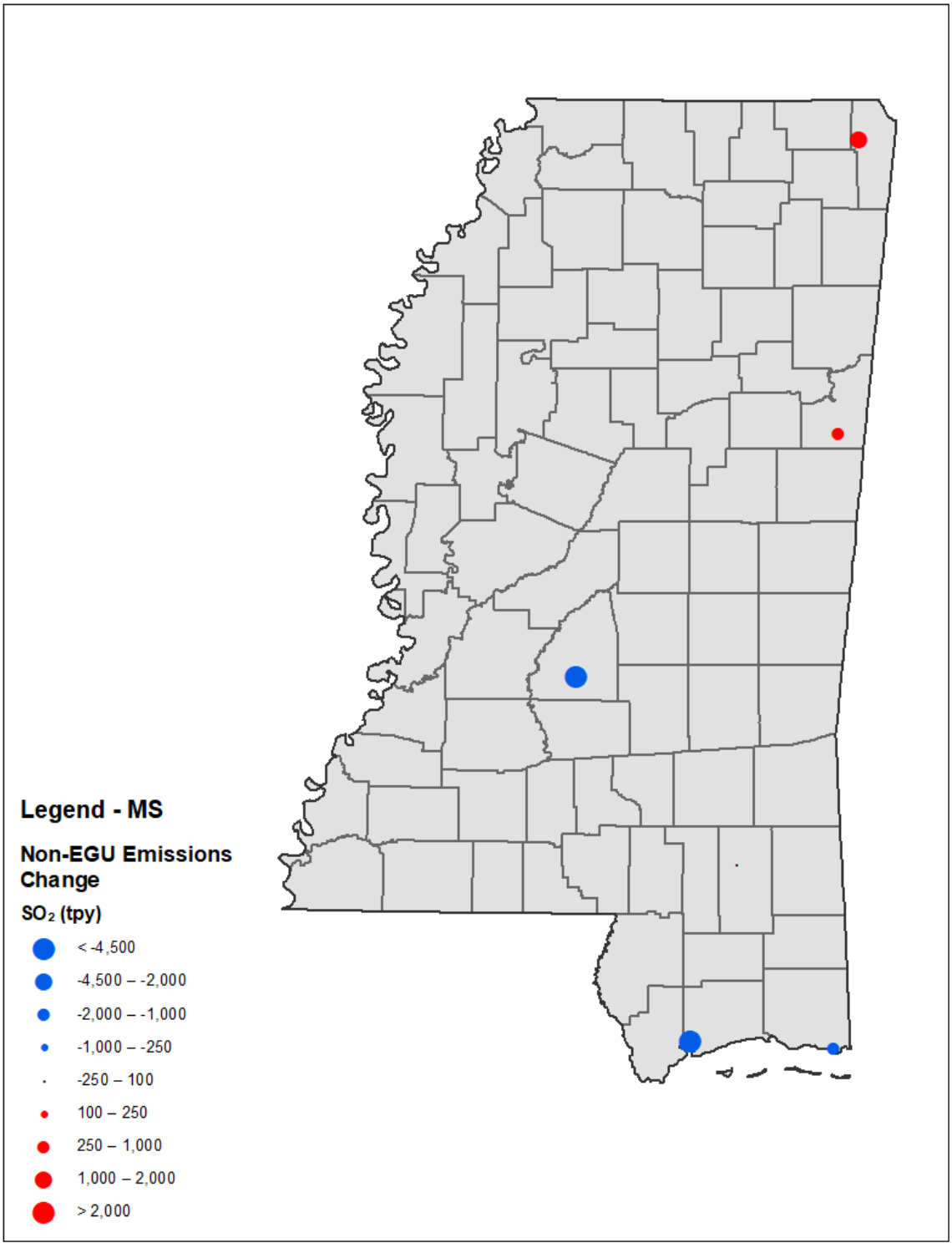

Figure C.0-12. Mississippi Point Non-EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

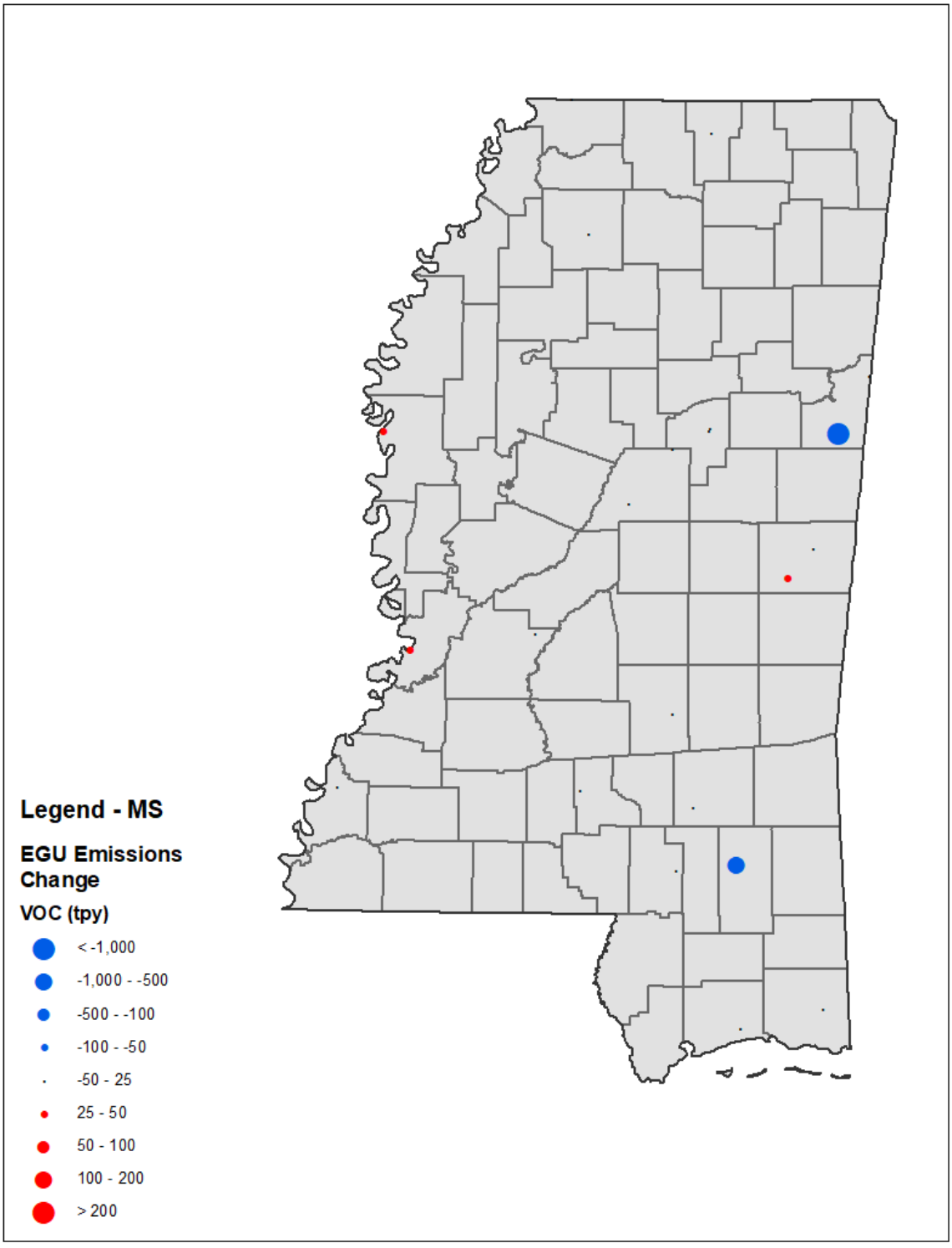

Figure C.0-13. Mississippi Point EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

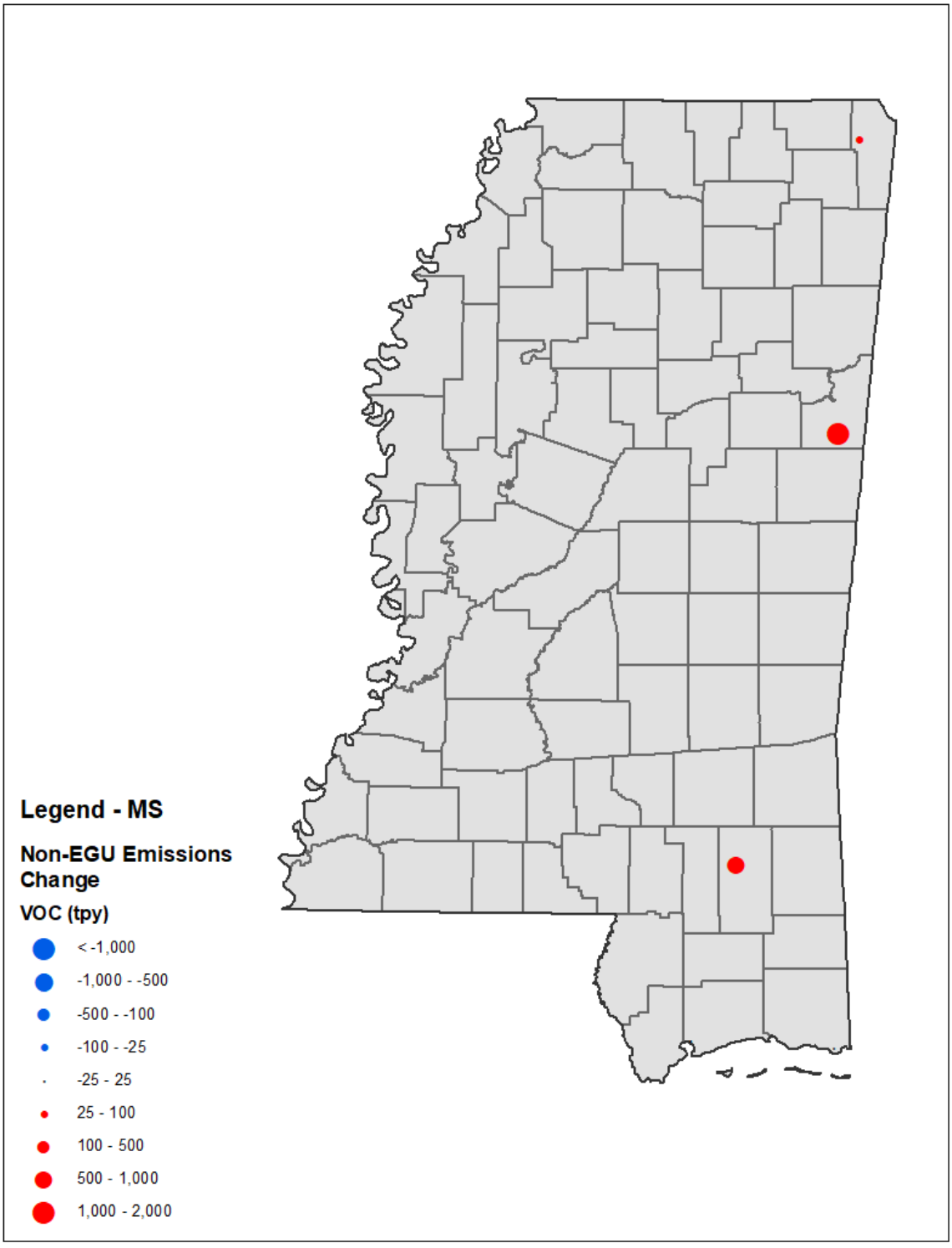

Figure C.0-14. Mississippi Point Non-EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

Appendix C-6. North Carolina 2028 Point EGU and Point Non-EGU Comparisons

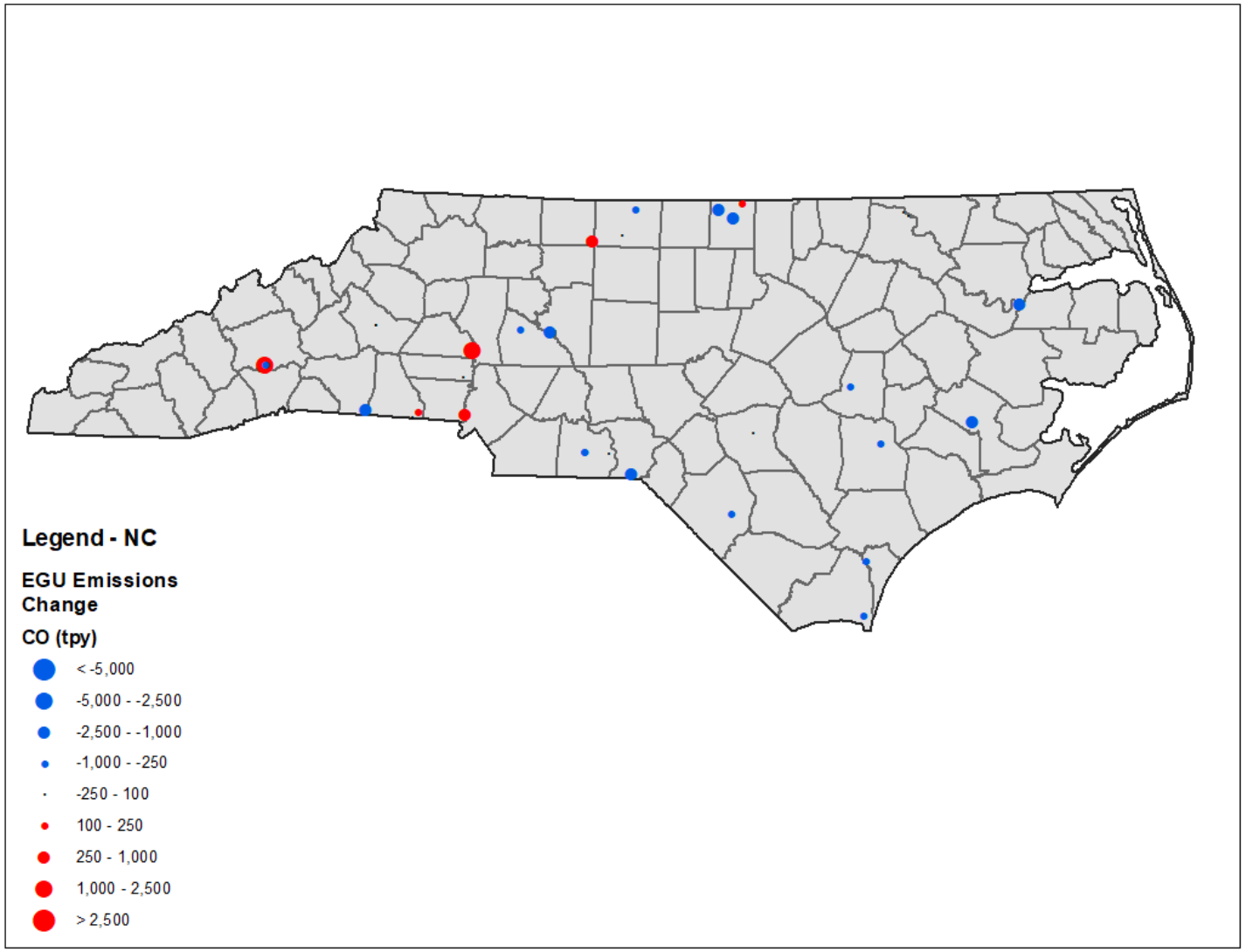

Figure C.6-1. North Carolina Point EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

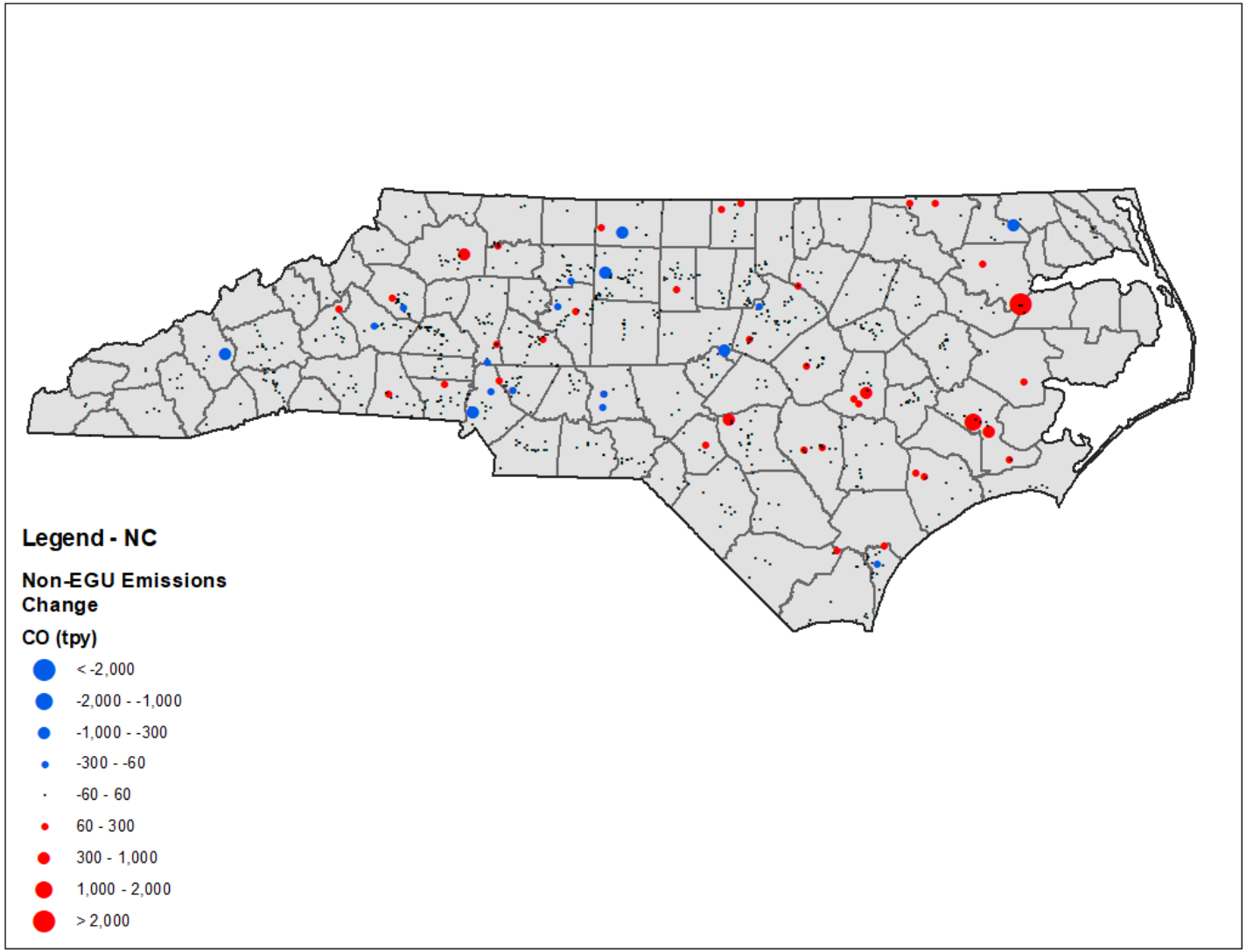

Figure C.6-2. North Carolina Point Non-EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

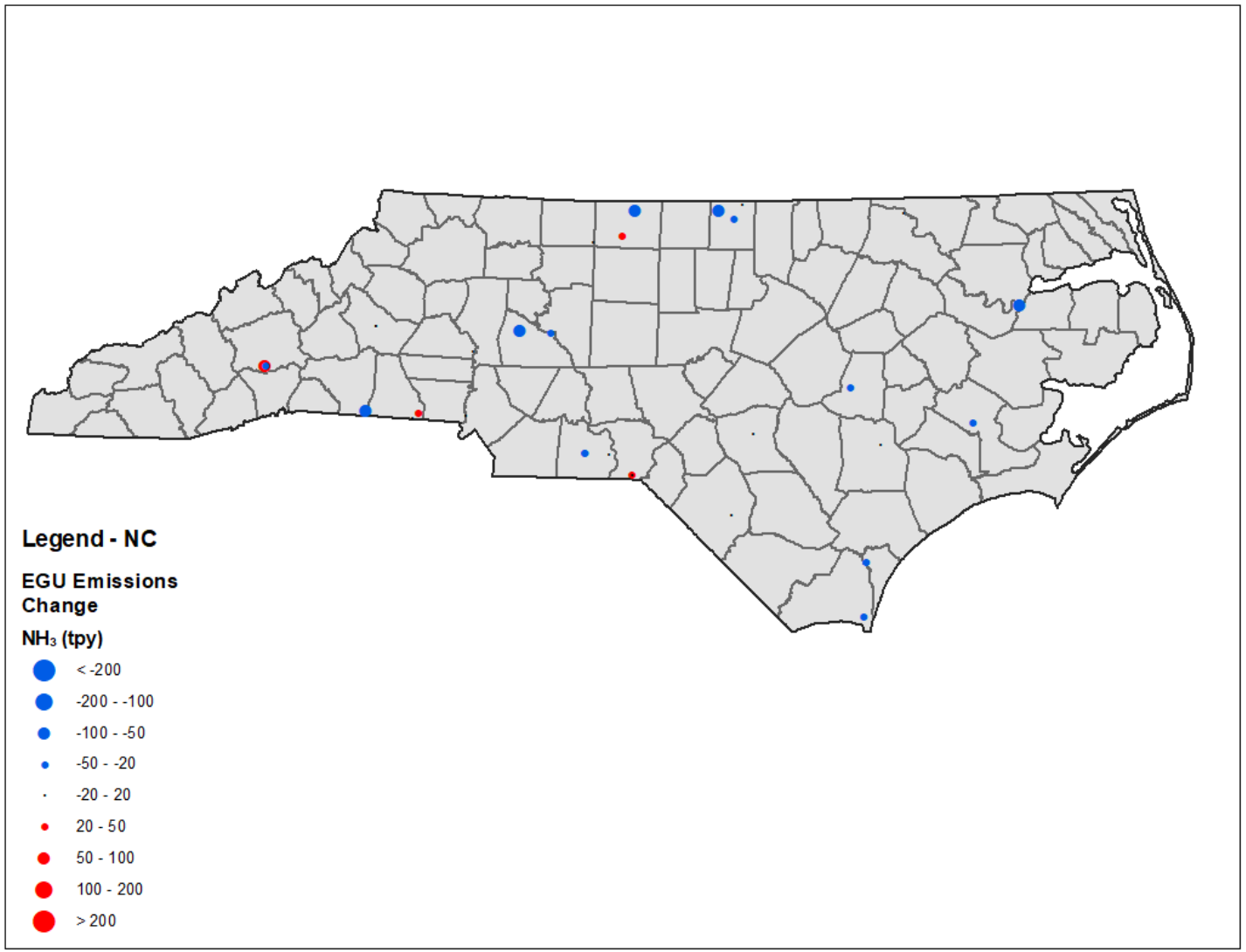

Figure C.6-3. North Carolina Point EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

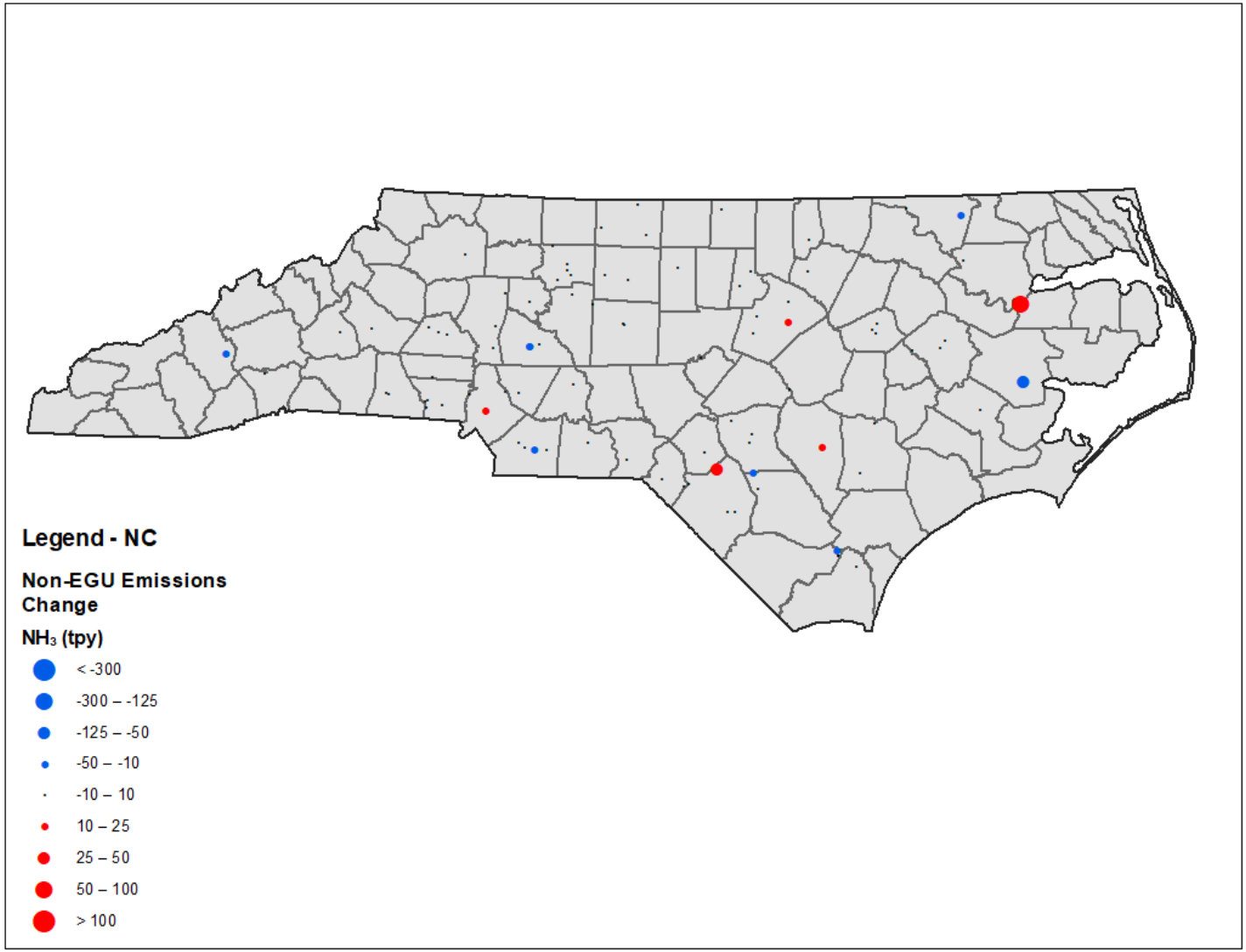

Figure C.6-4. North Carolina Point Non-EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

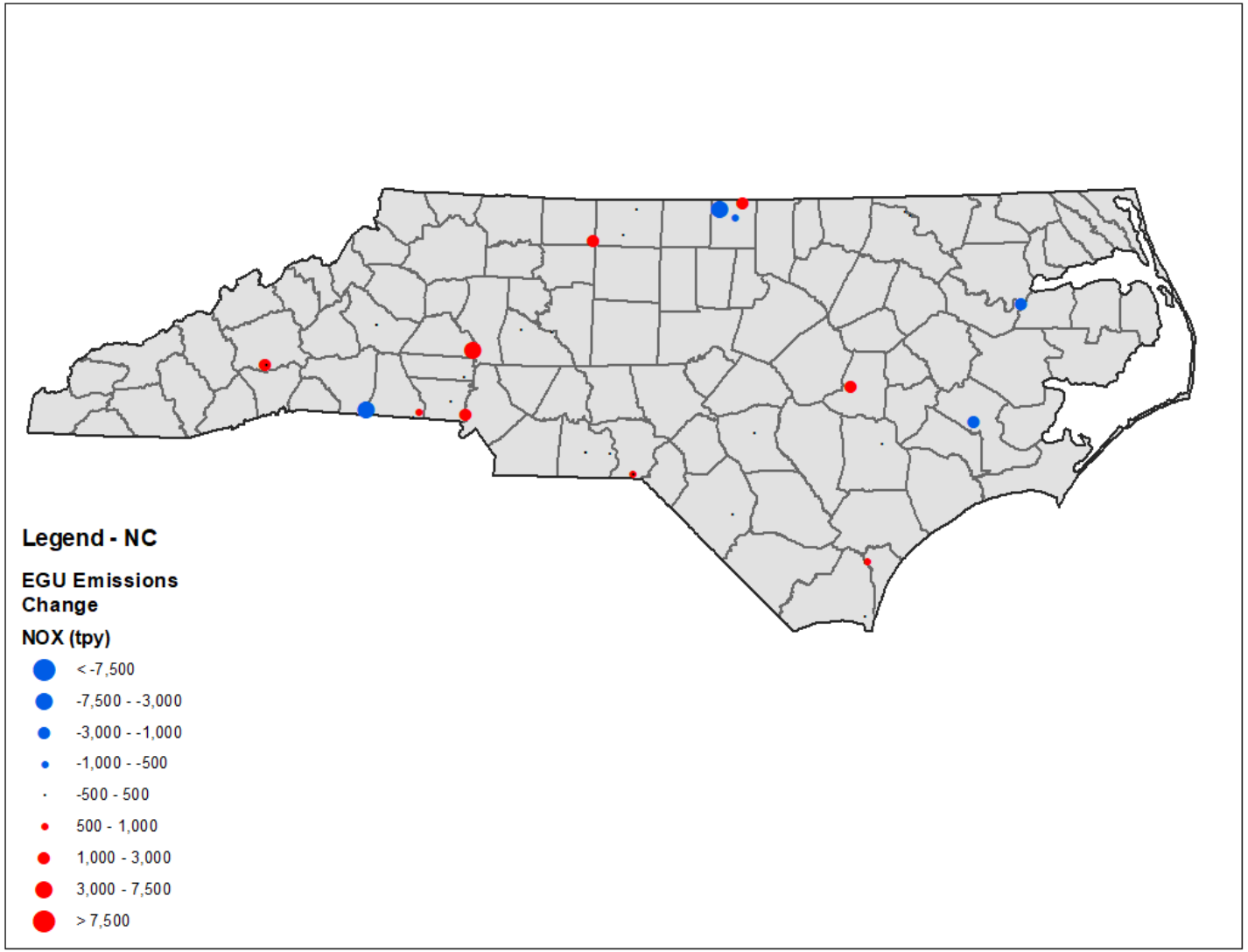

Figure C.6-5. North Carolina Point EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

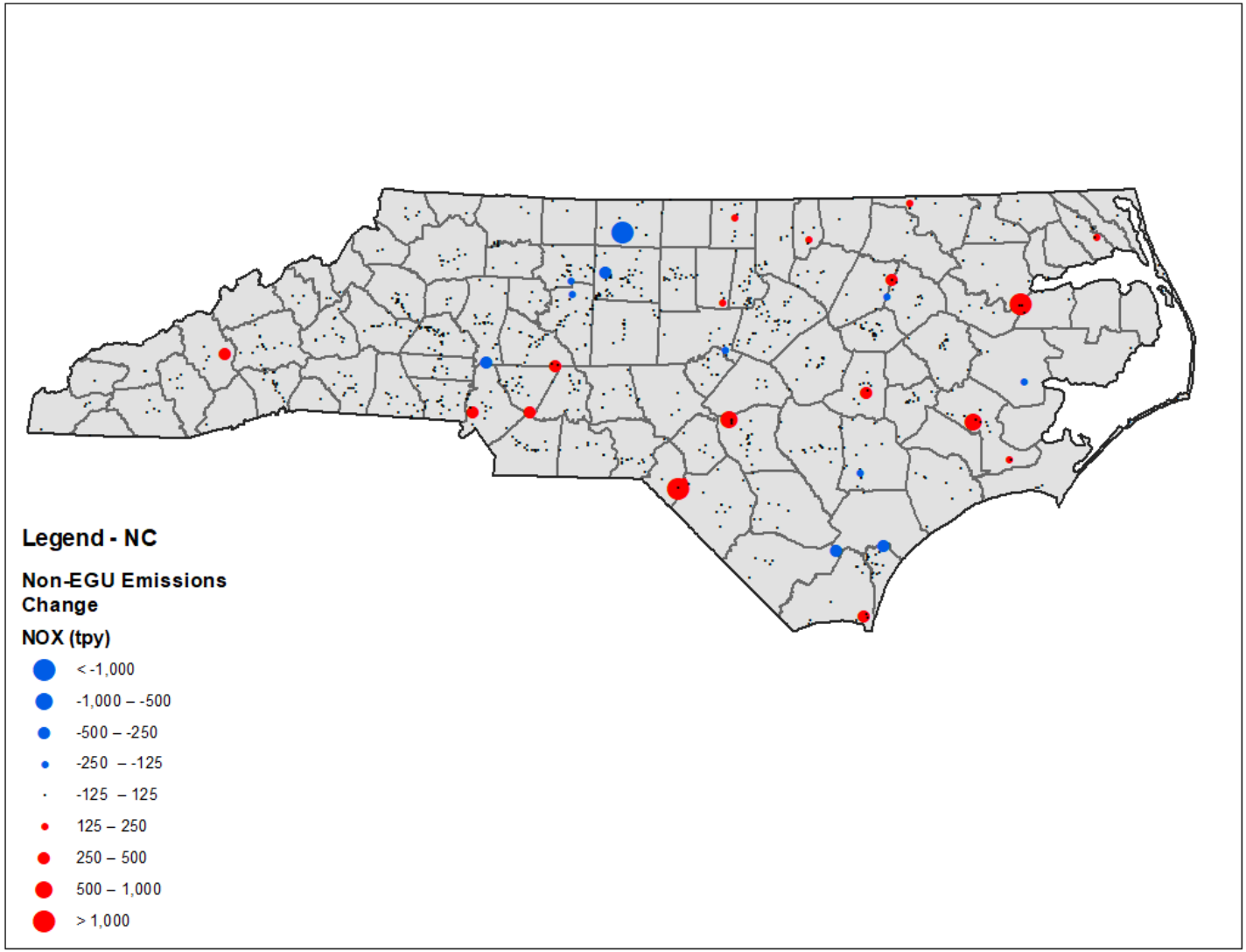

Figure C.6-6. North Carolina Point Non-EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

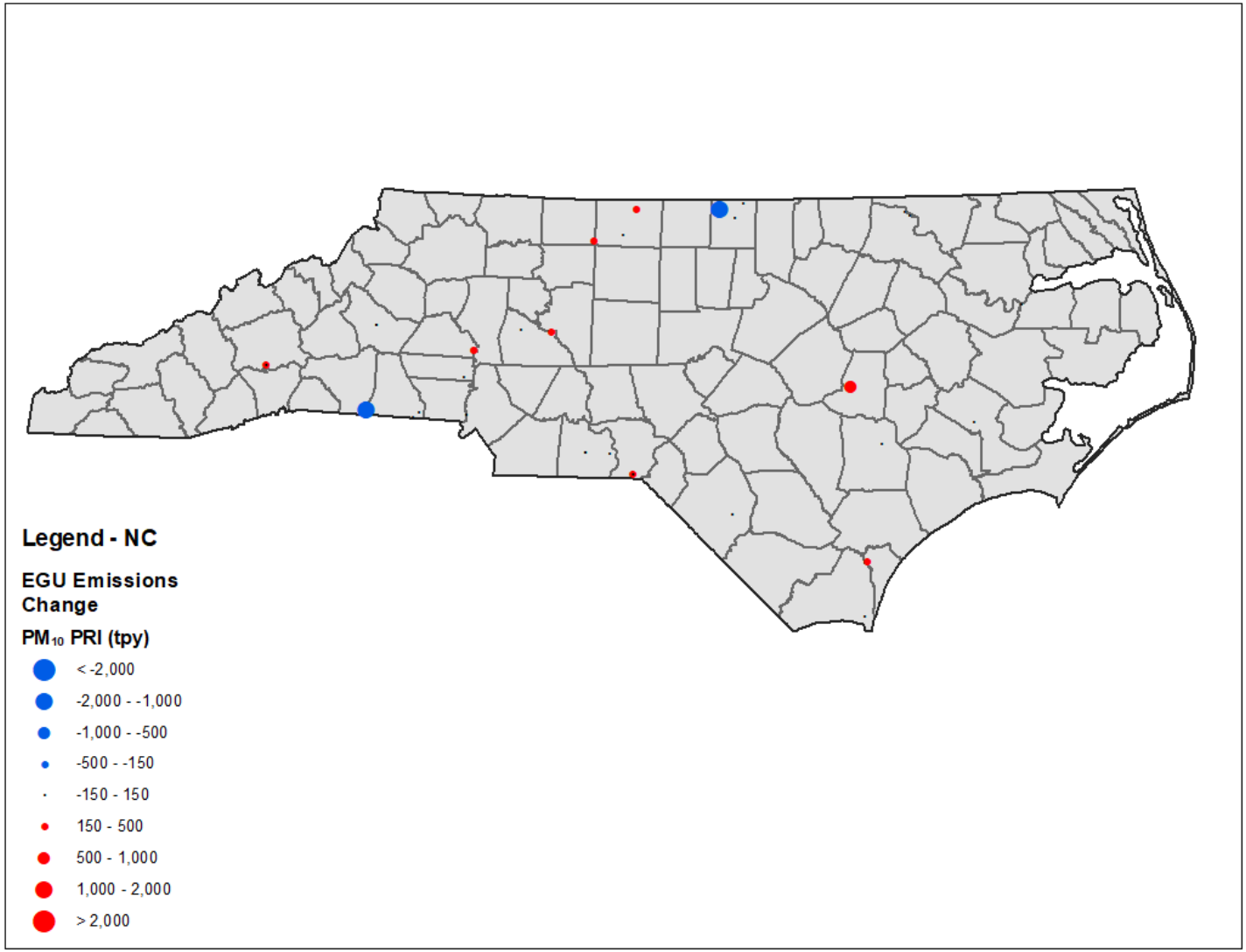

Figure C.6-7. North Carolina Point EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

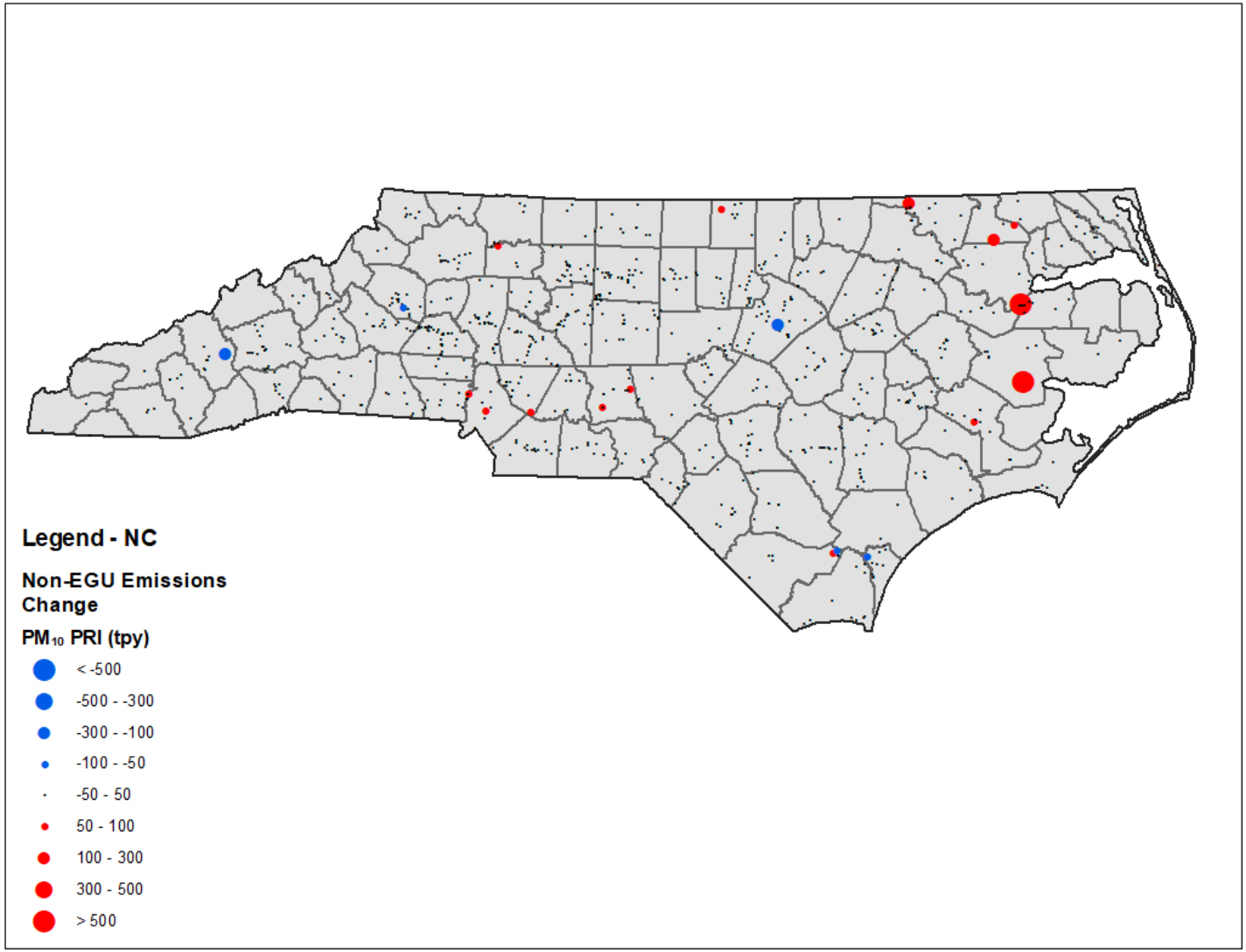

Figure C.6-8. North Carolina Point Non-EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

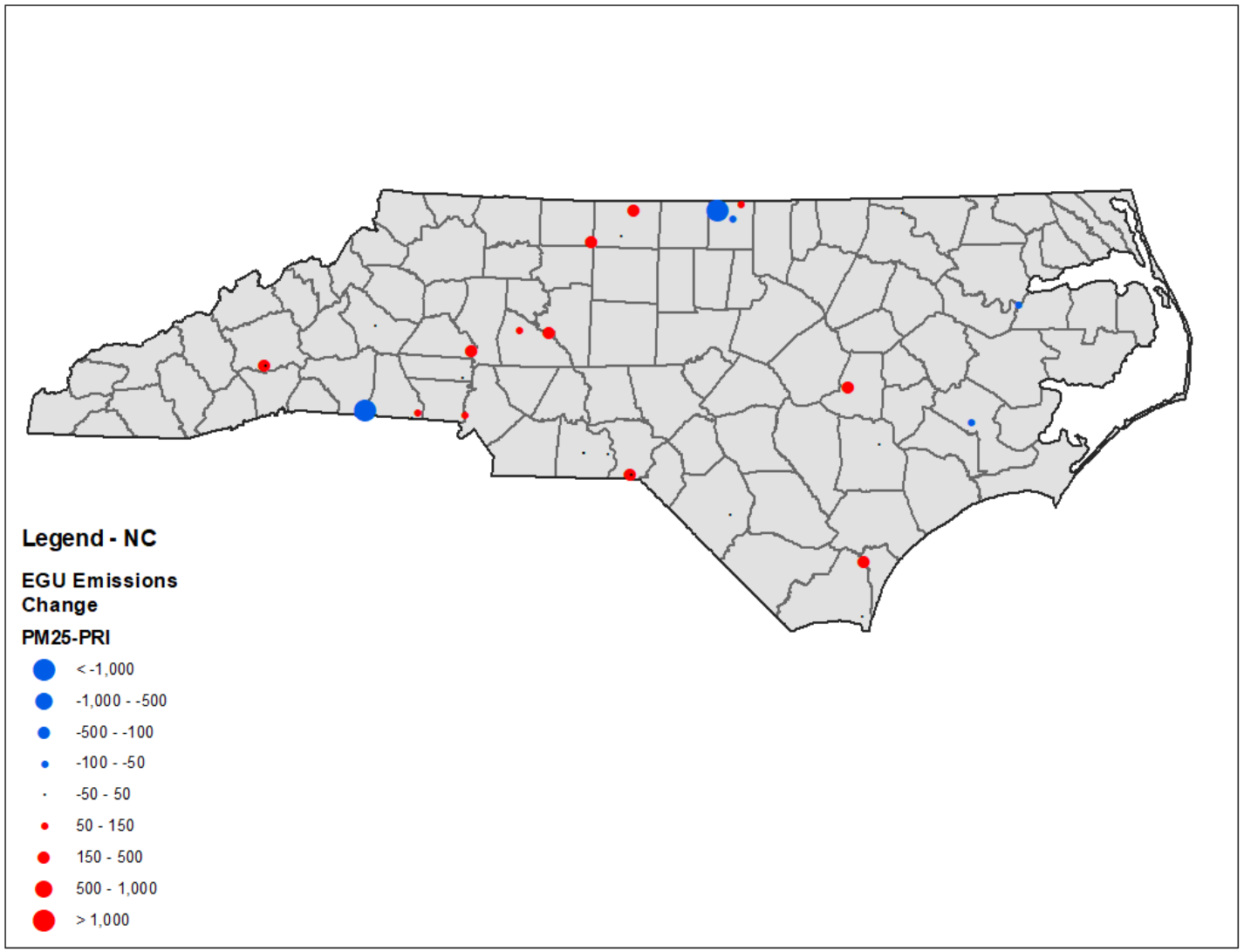

Figure C.6-9. North Carolina Point EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

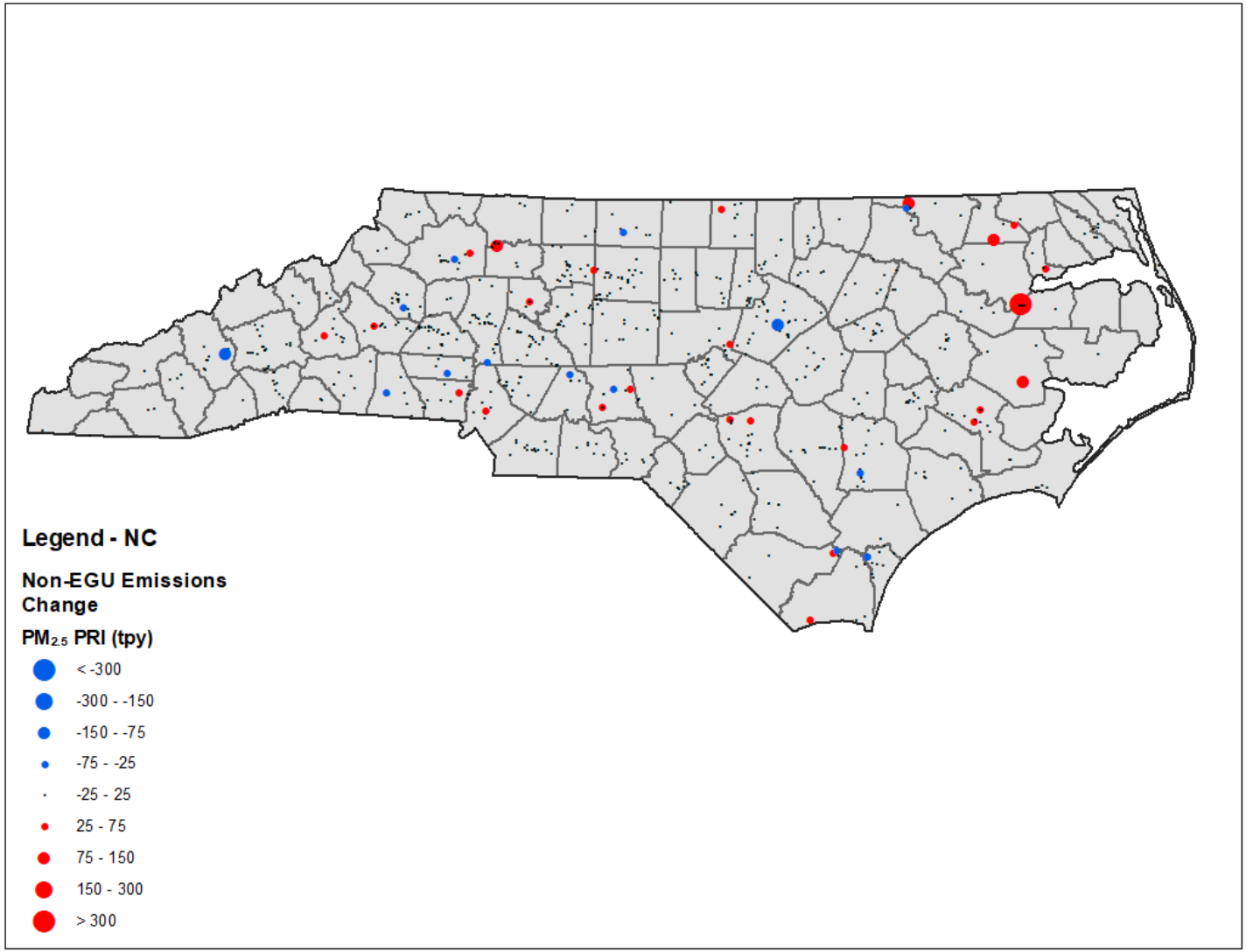

Figure C.6-10. North Carolina Point Non-EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

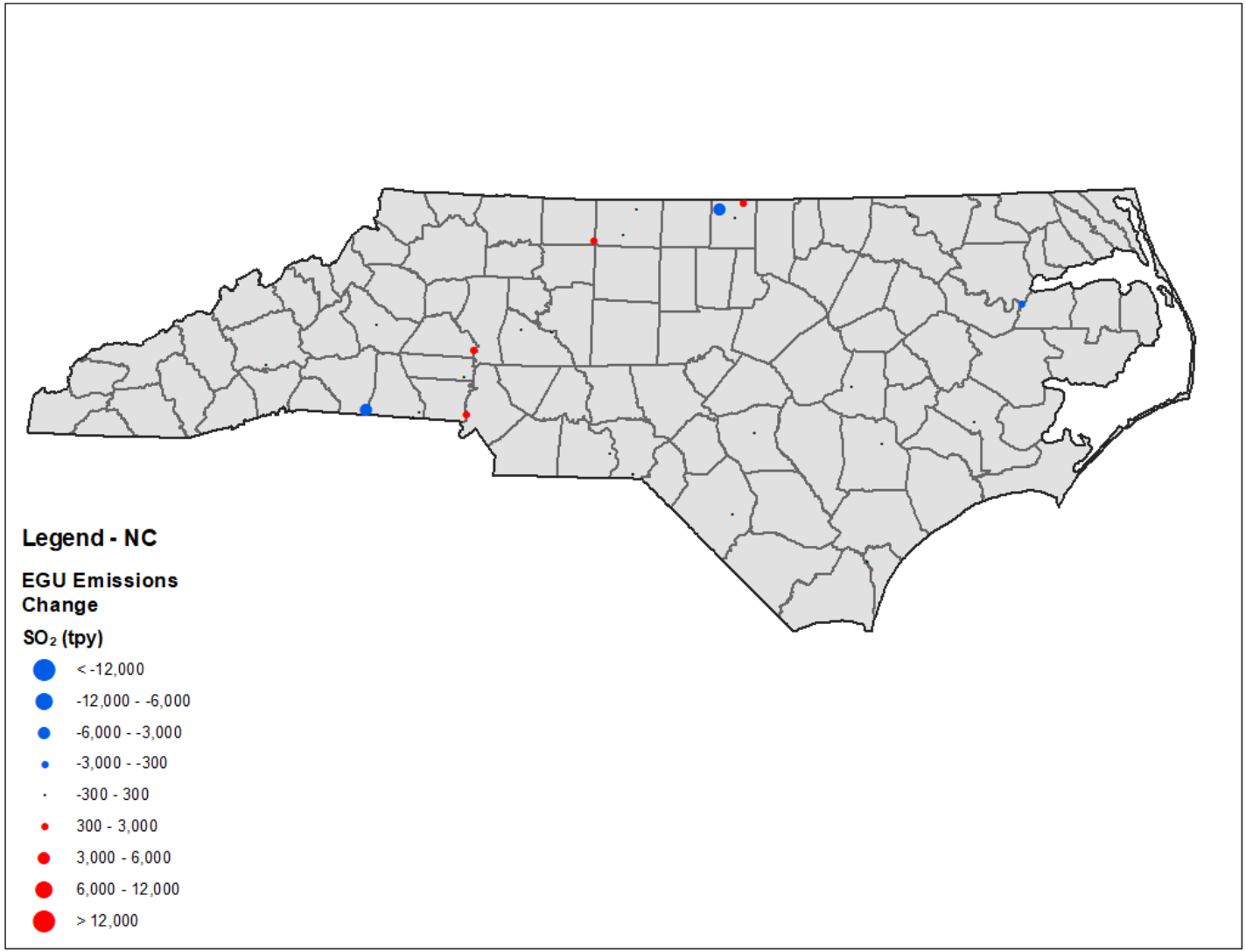

Figure C.6-11. North Carolina Point EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

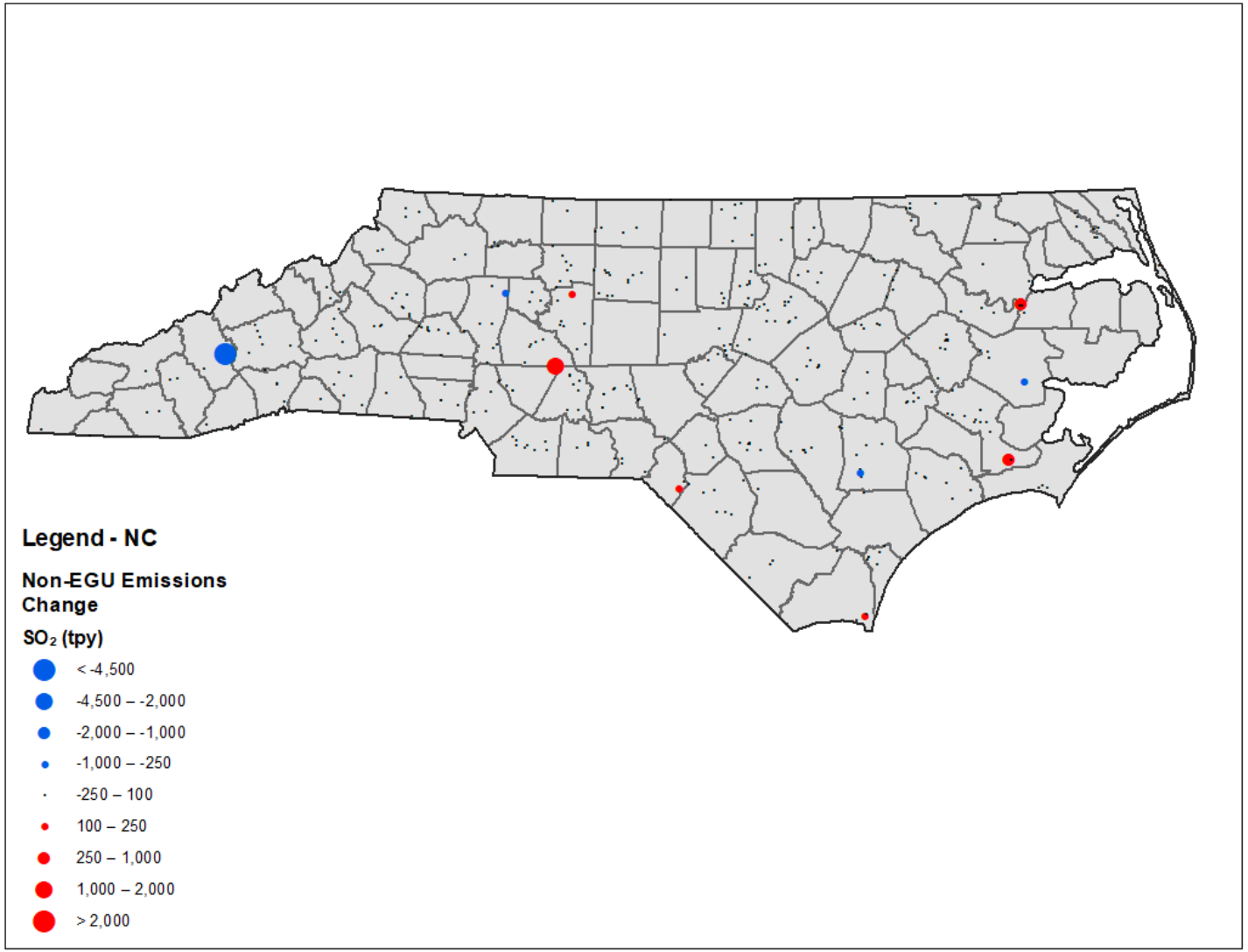

Figure C.6-12. North Carolina Point Non-EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

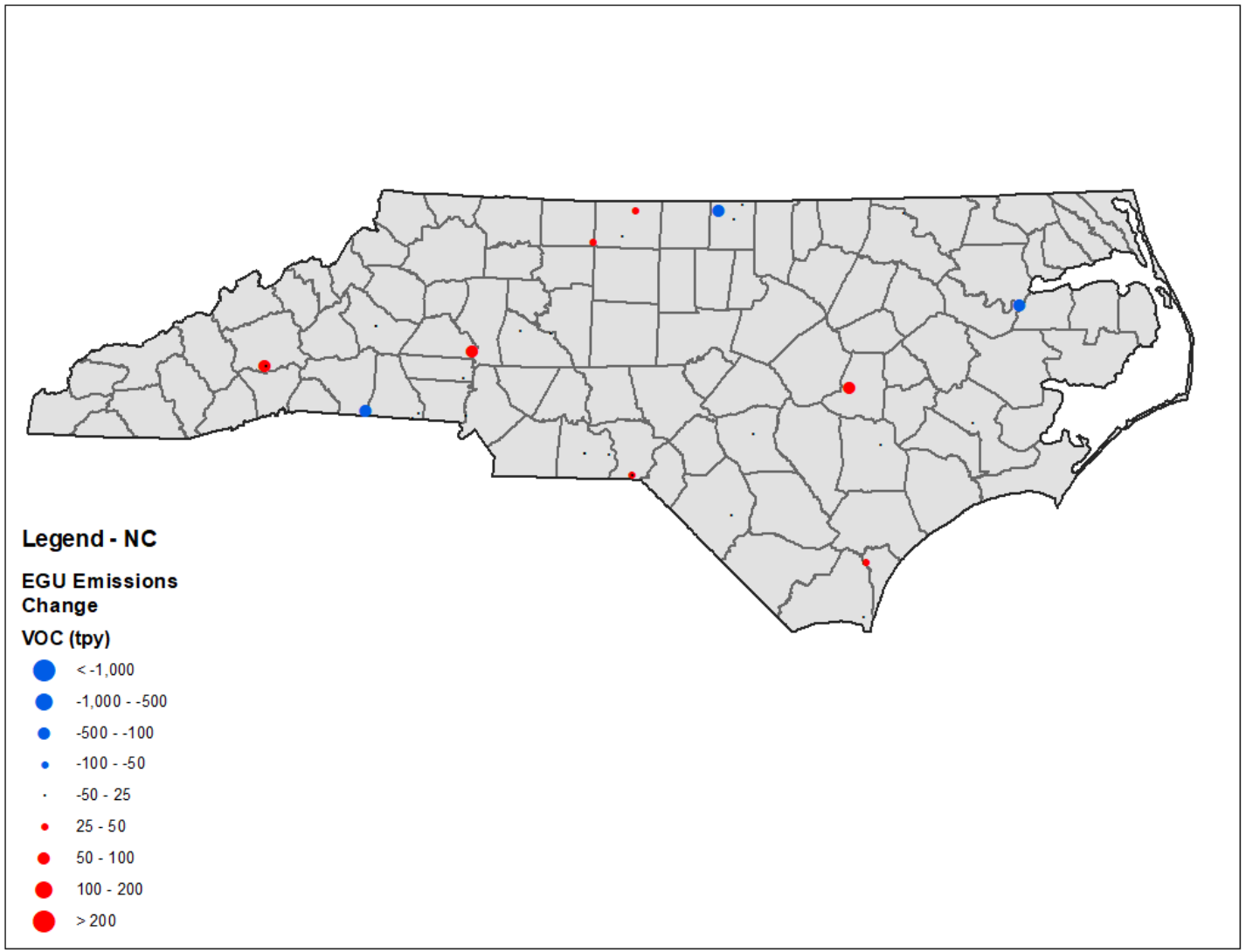

Figure C.6-13. North Carolina Point EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

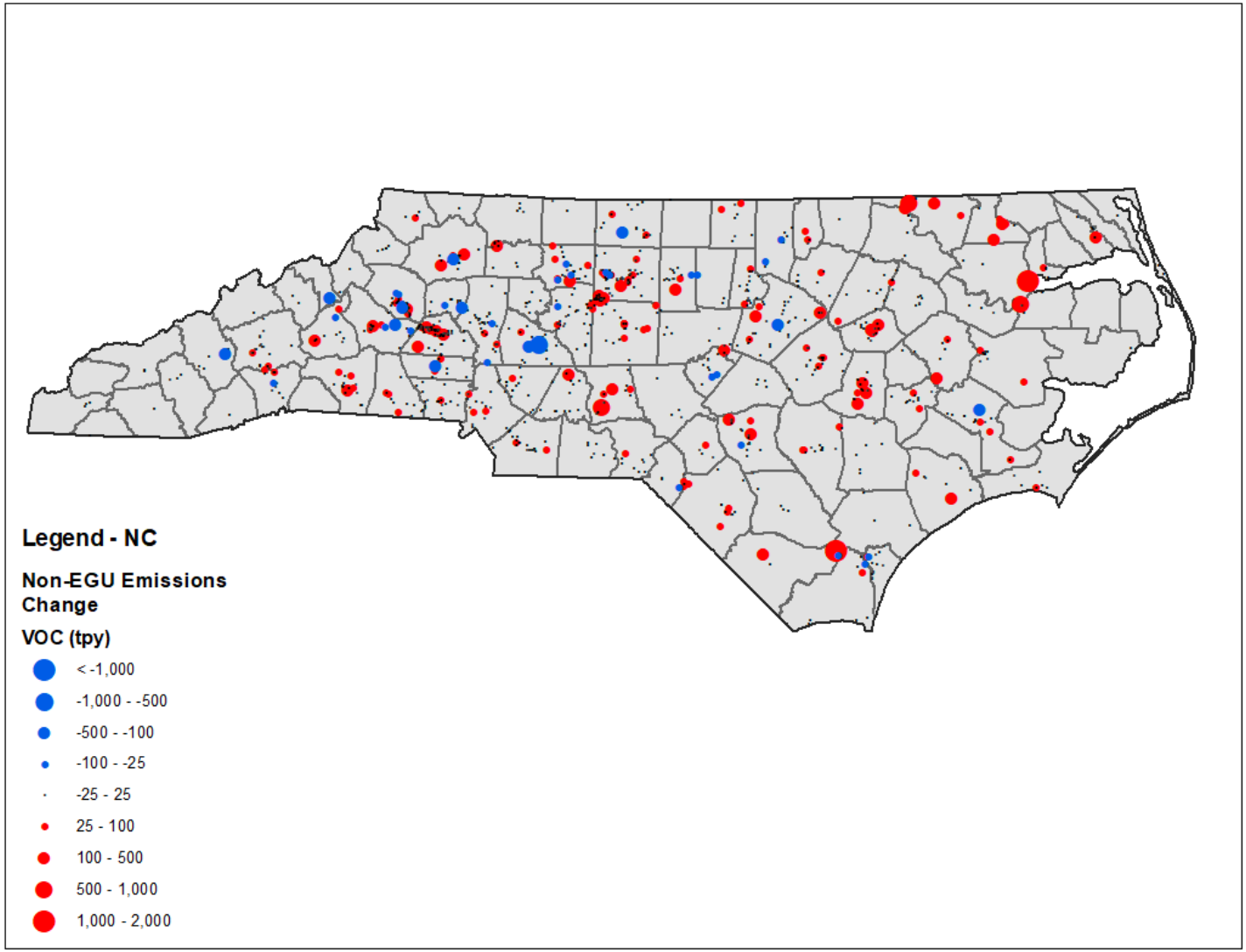

Figure C.6-14. North Carolina Point Non-EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

Appendix C-7. South Carolina 2028 Point EGU and Point Non-EGU Comparisons

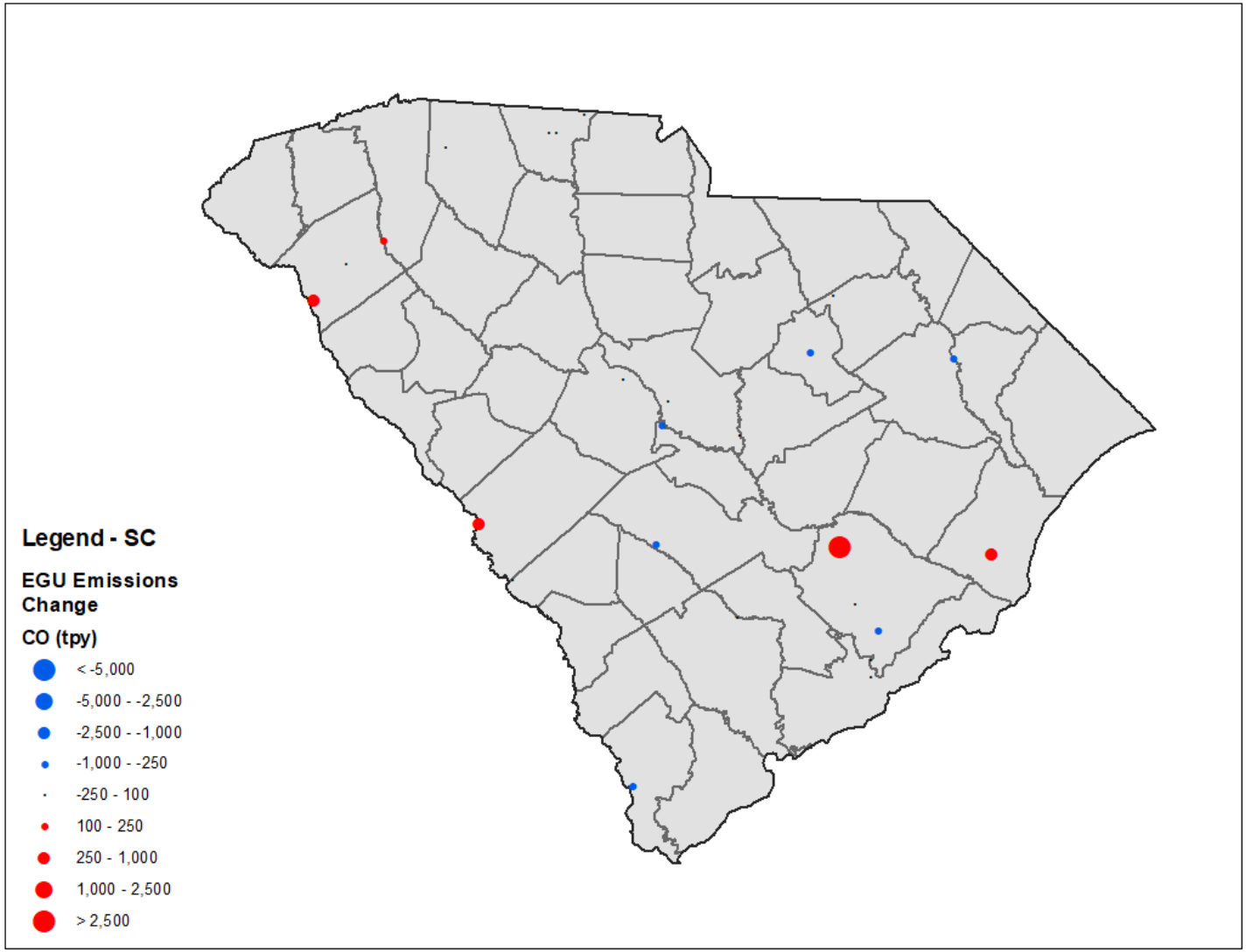

Figure C.7-1. South Carolina Point EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

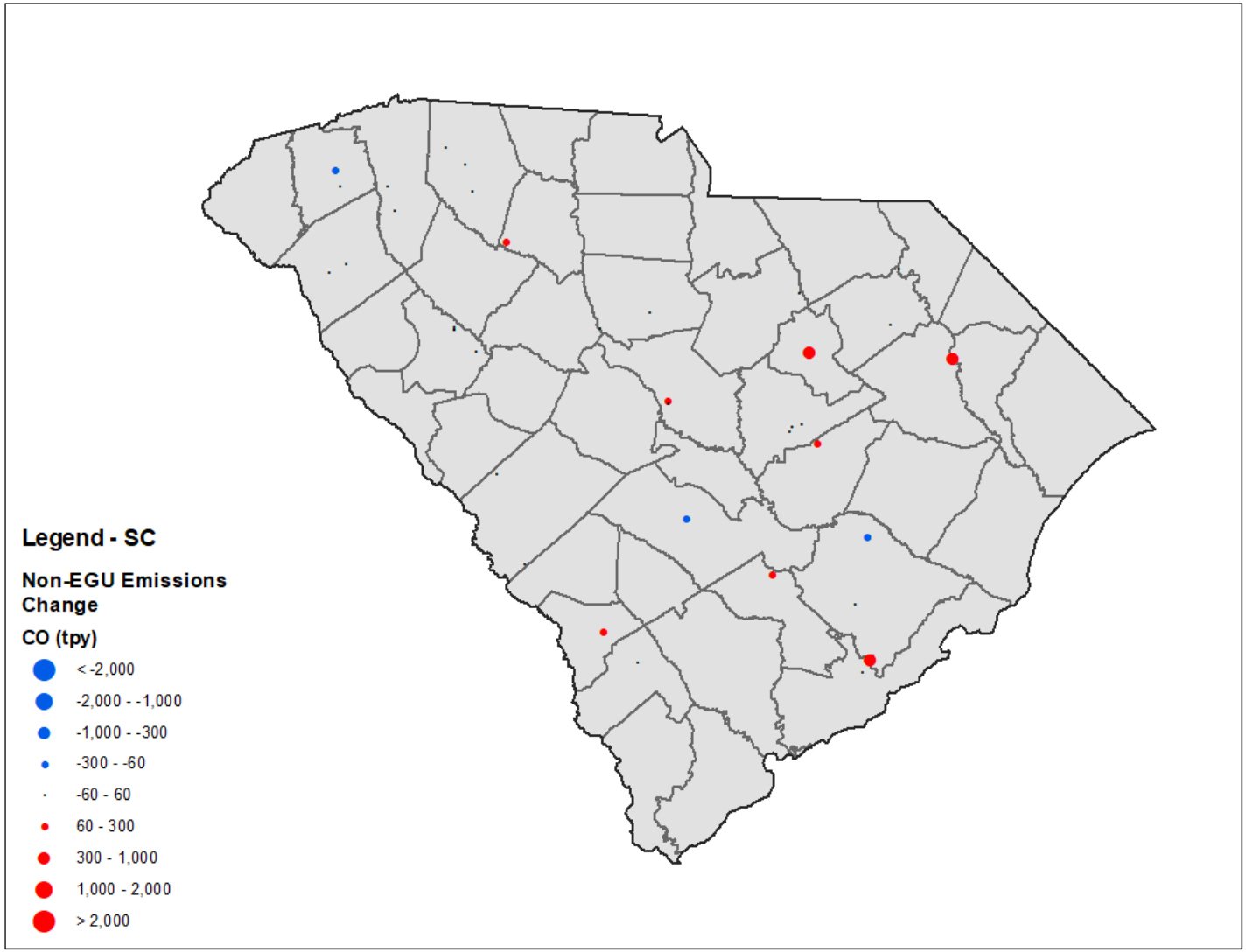

Figure C.7-2. South Carolina Point Non-EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

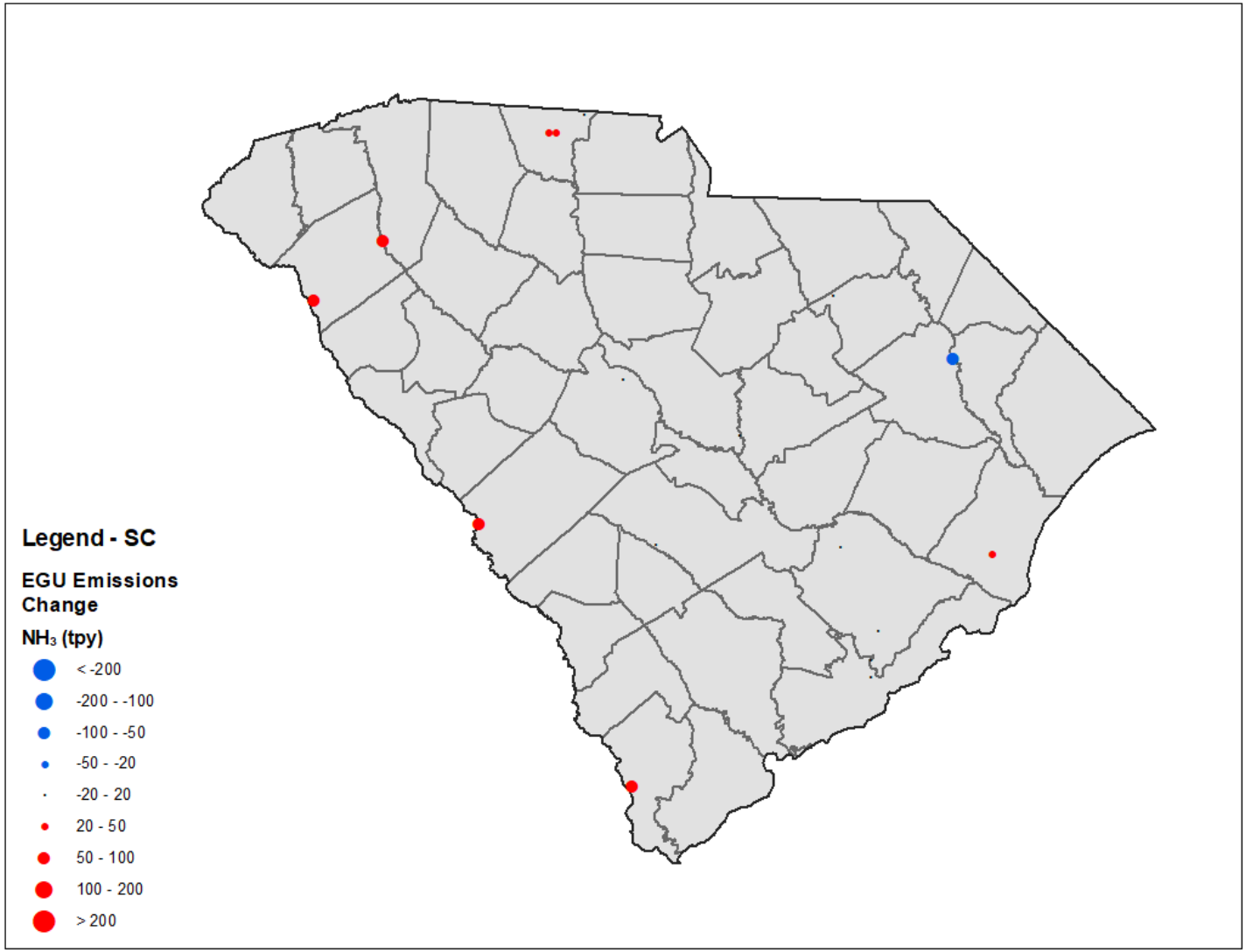

Figure C.7-3. South Carolina Point EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

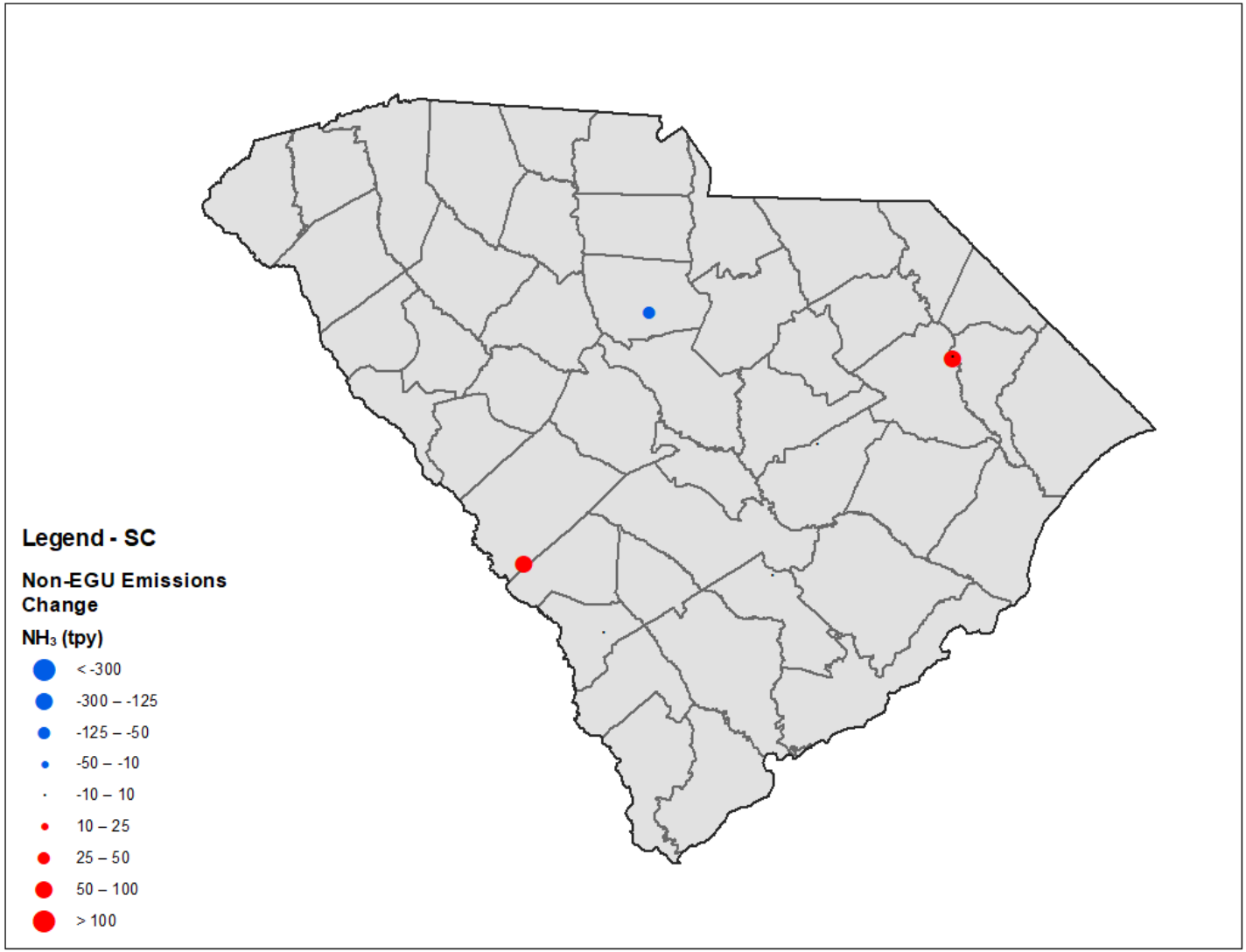

Figure C.7-4. South Carolina Point Non-EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

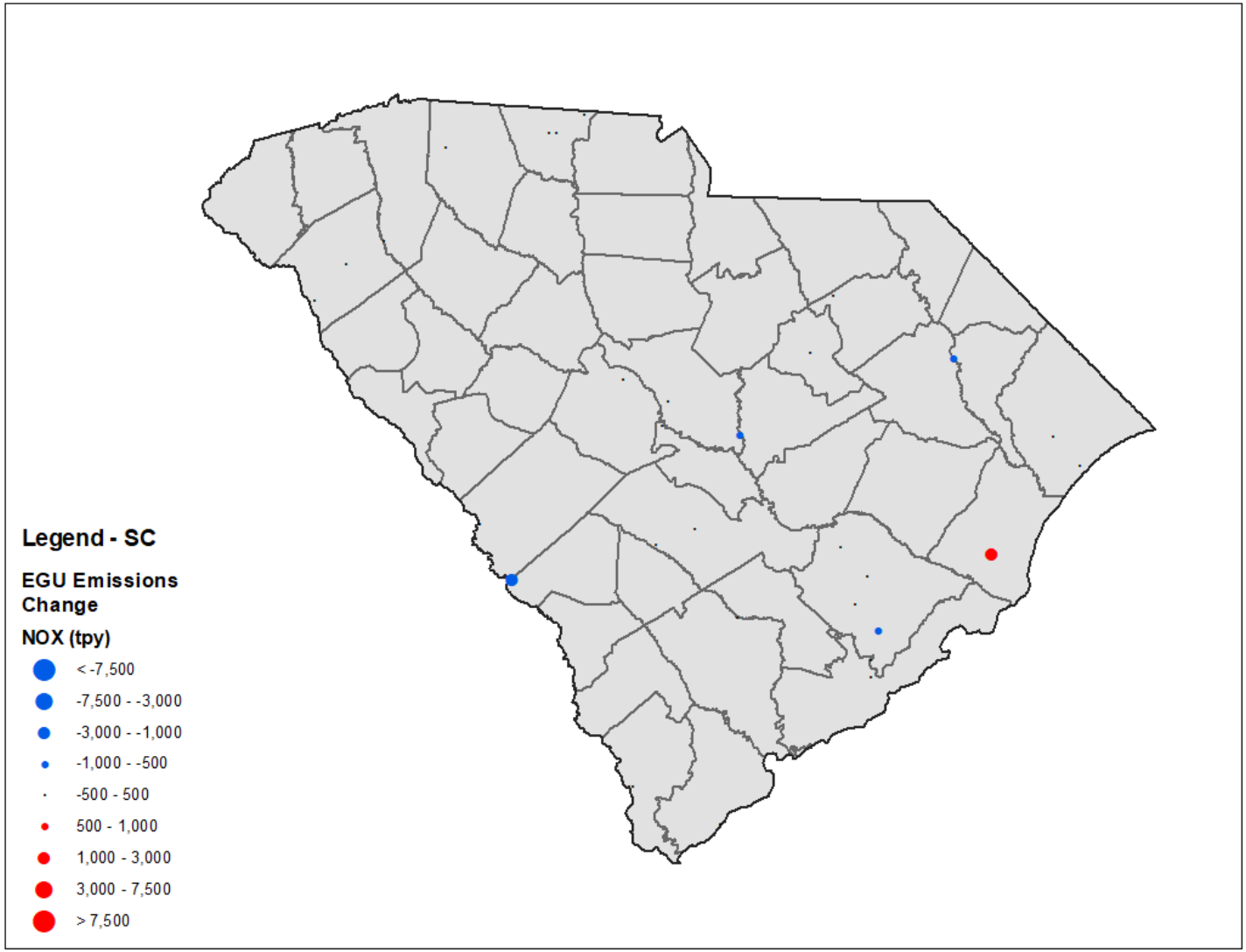

Figure C.7-5. South Carolina Point EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

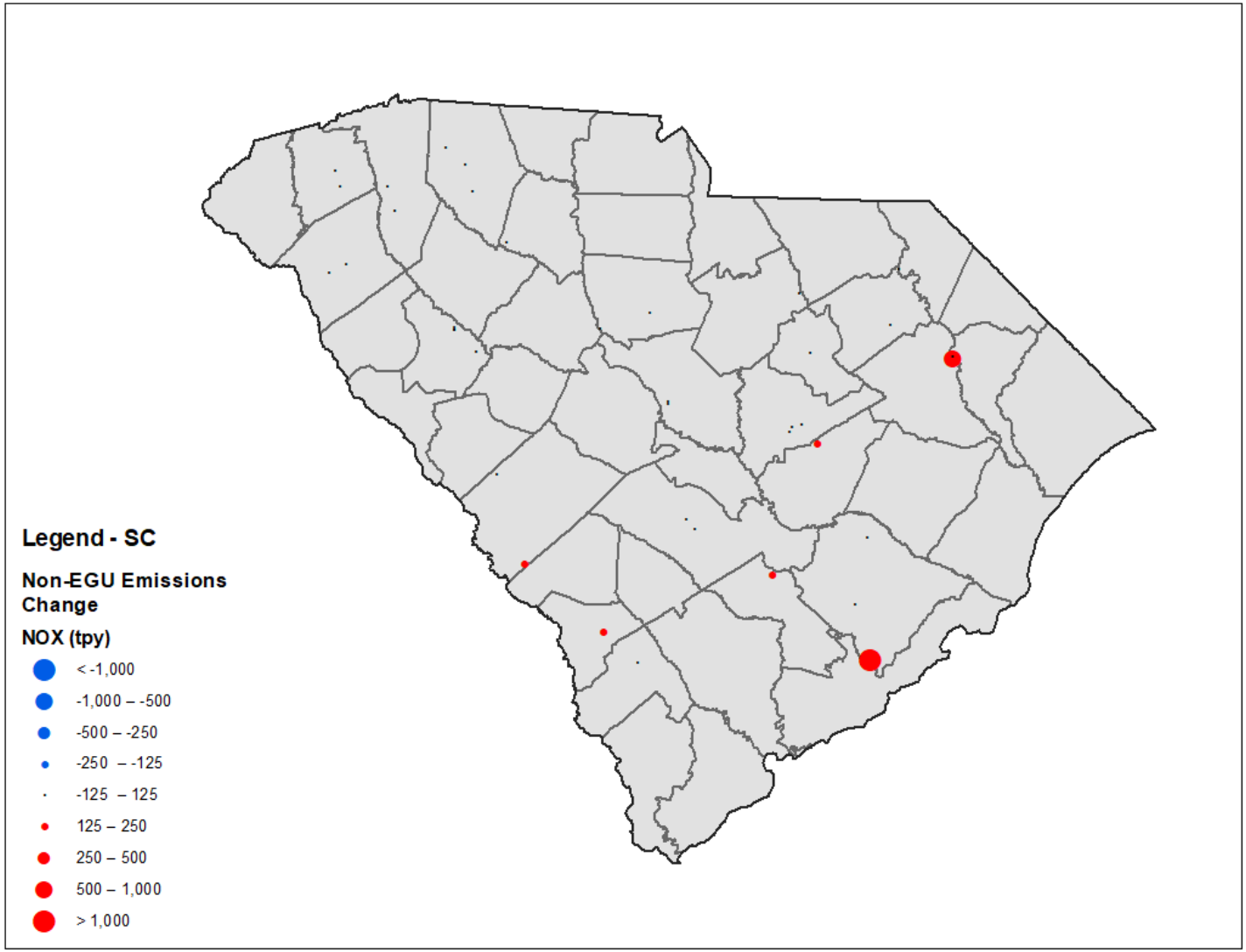

Figure C.7-6. South Carolina Point Non-EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

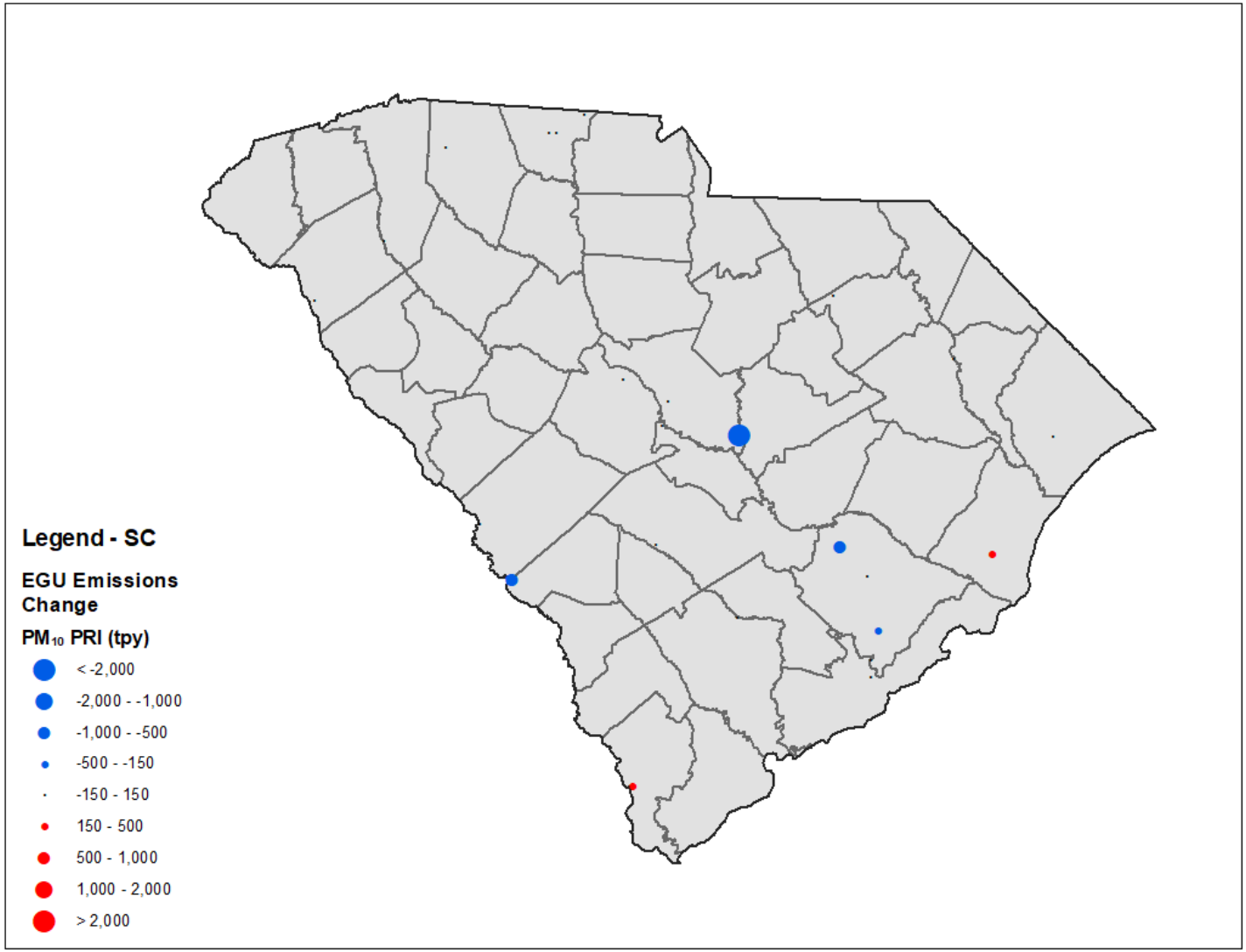

Figure C.7-7. South Carolina Point EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

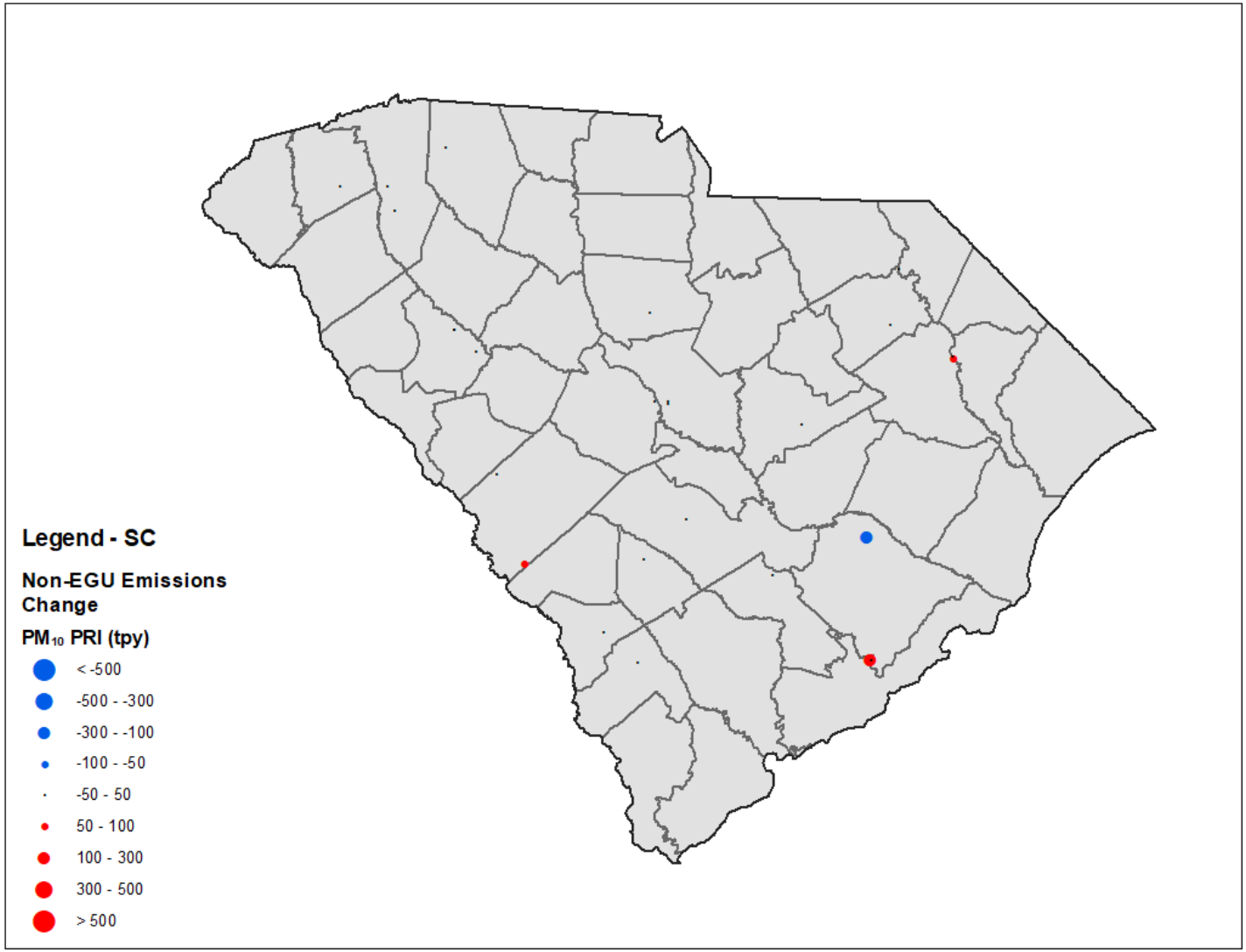

Figure C.7-8. South Carolina Point Non-EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

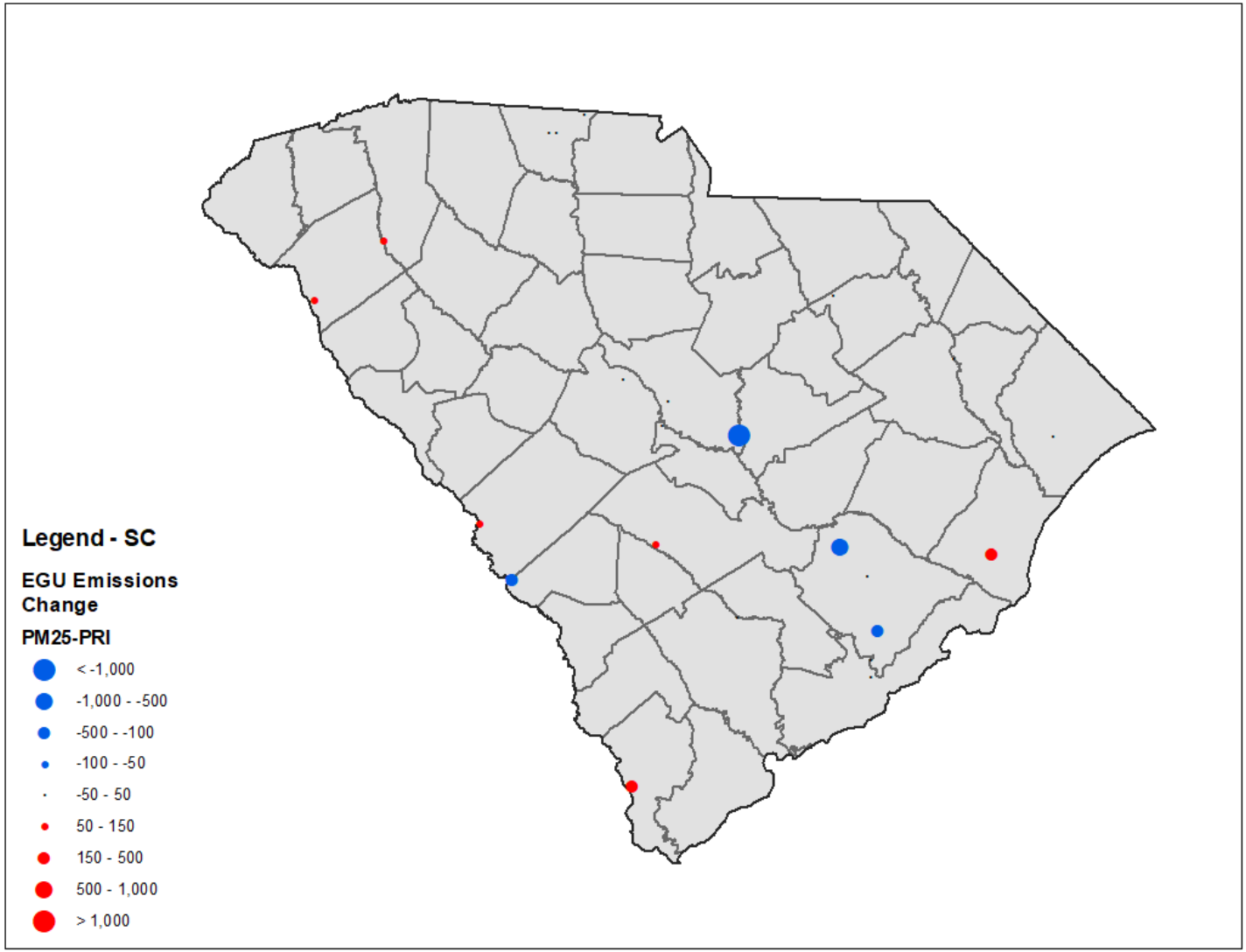

Figure C.7-9. South Carolina Point EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

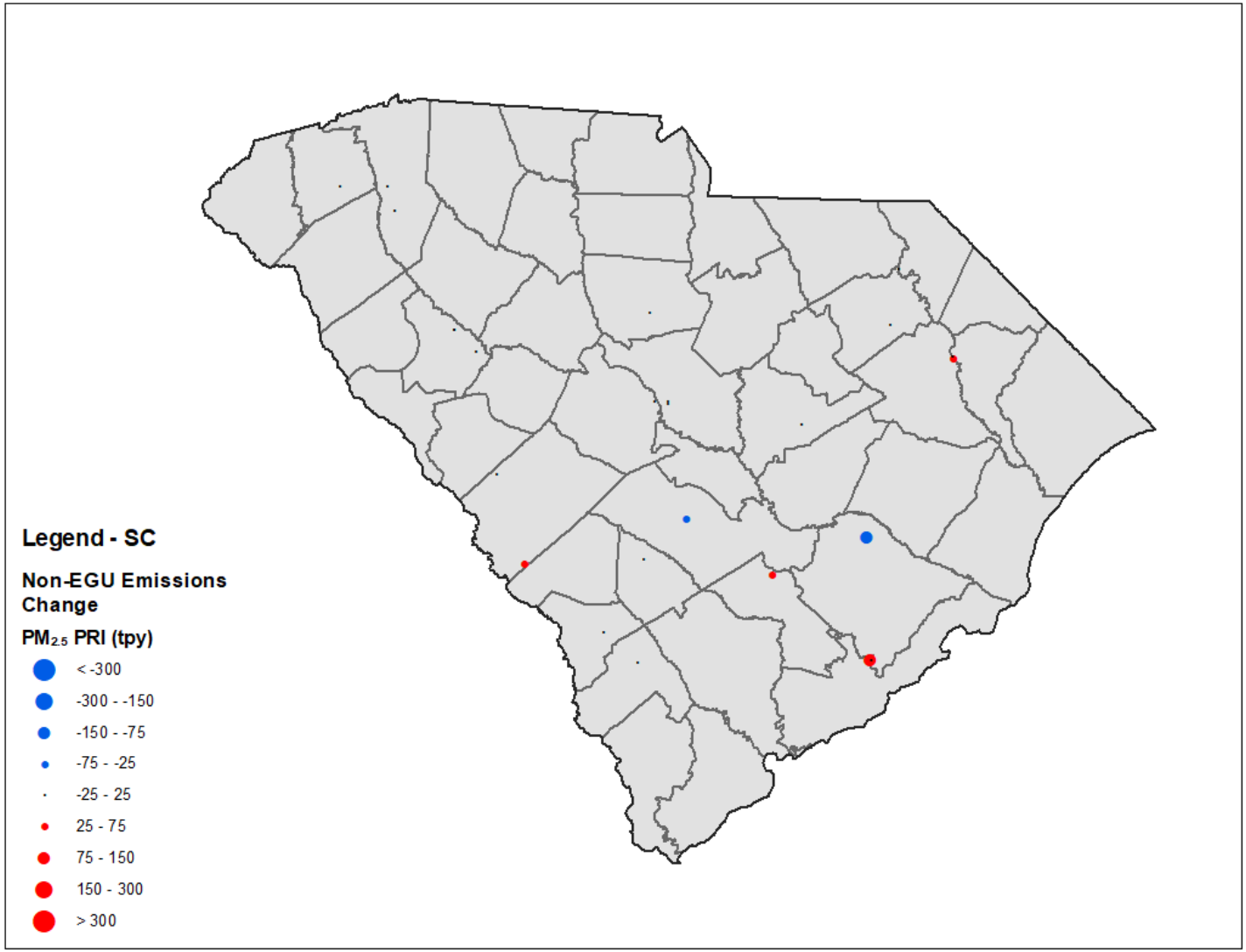

Figure C.7-10. South Carolina Point Non-EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

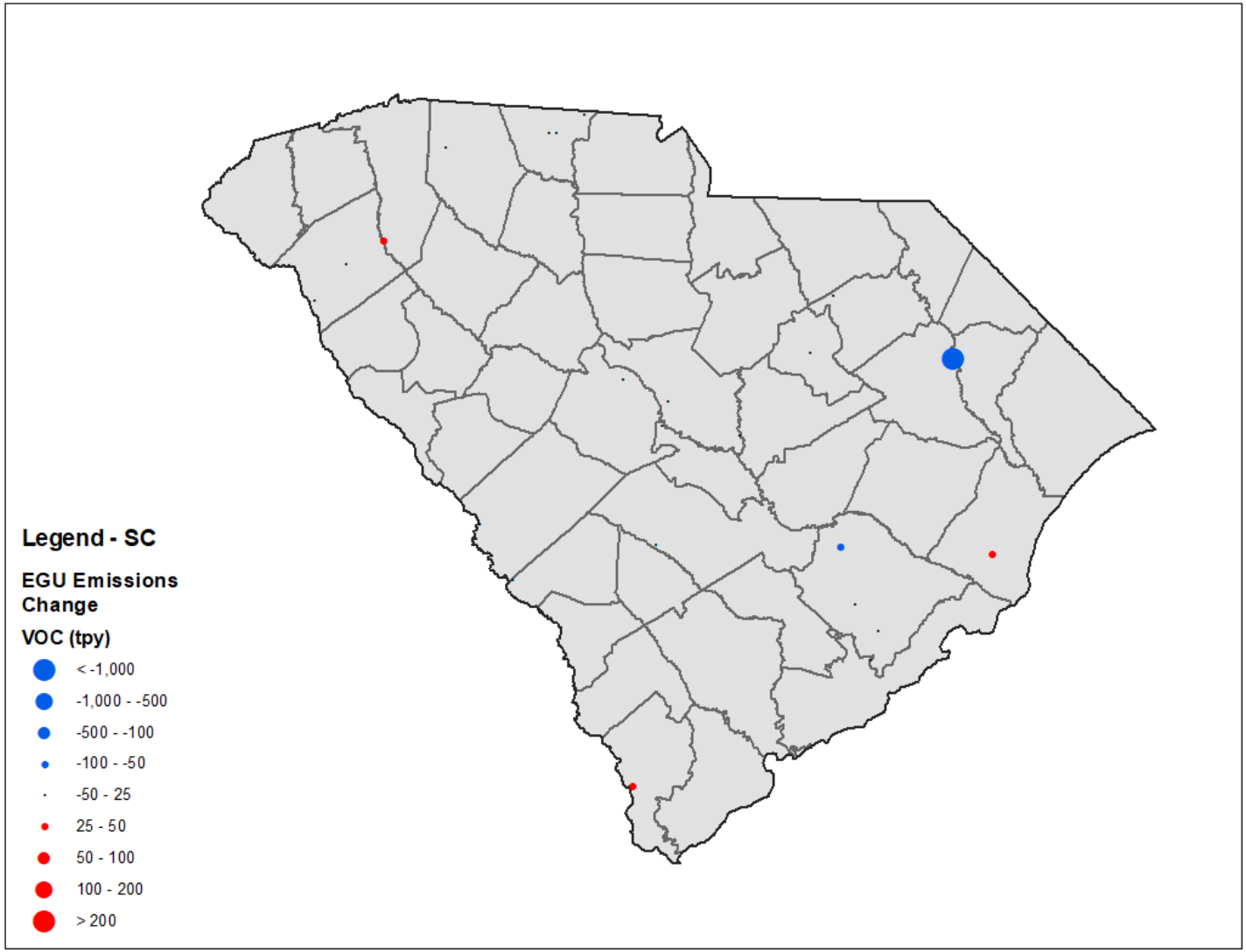

Figure C.7-11. South Carolina Point EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

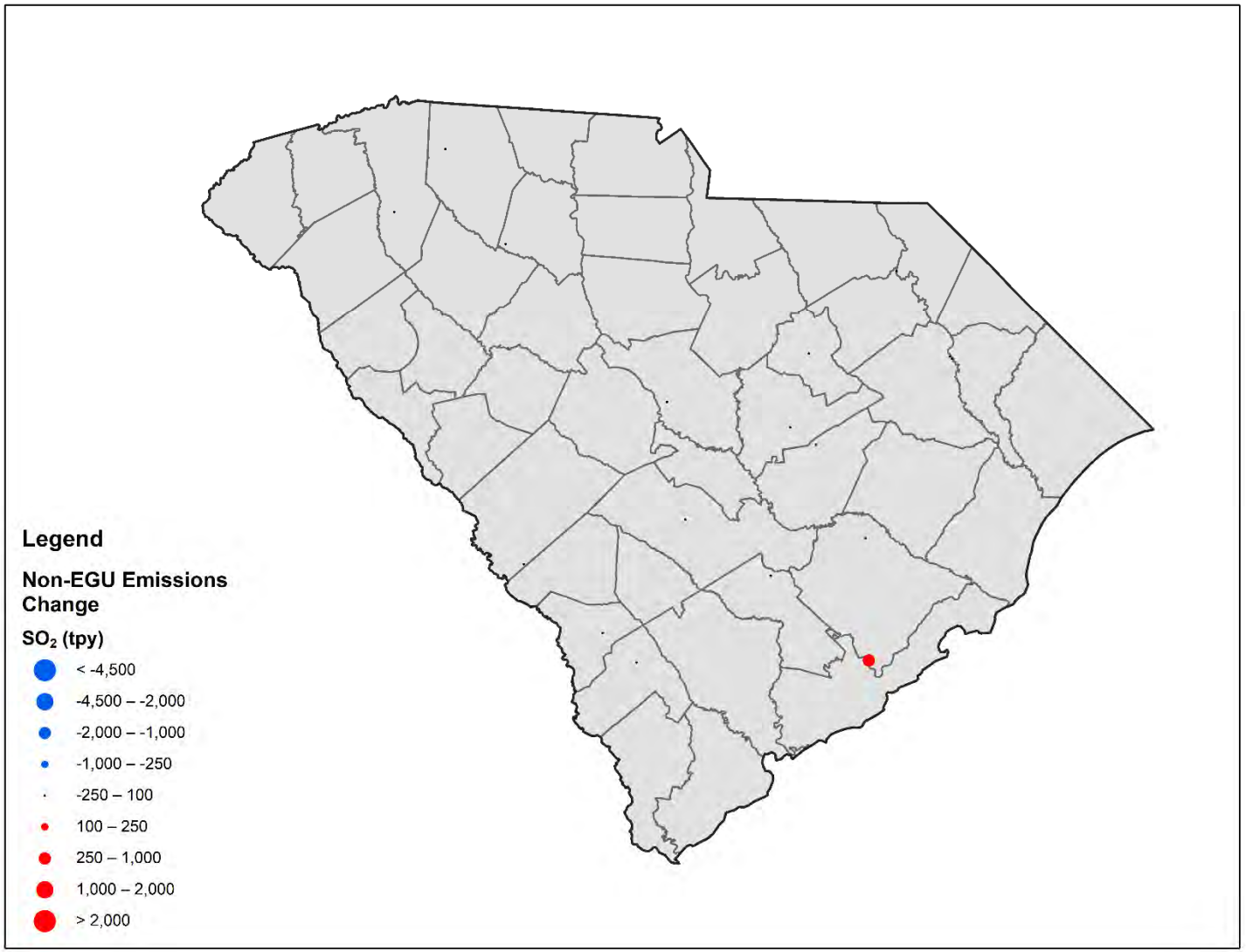

Figure C.7-12. South Carolina Point Non-EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

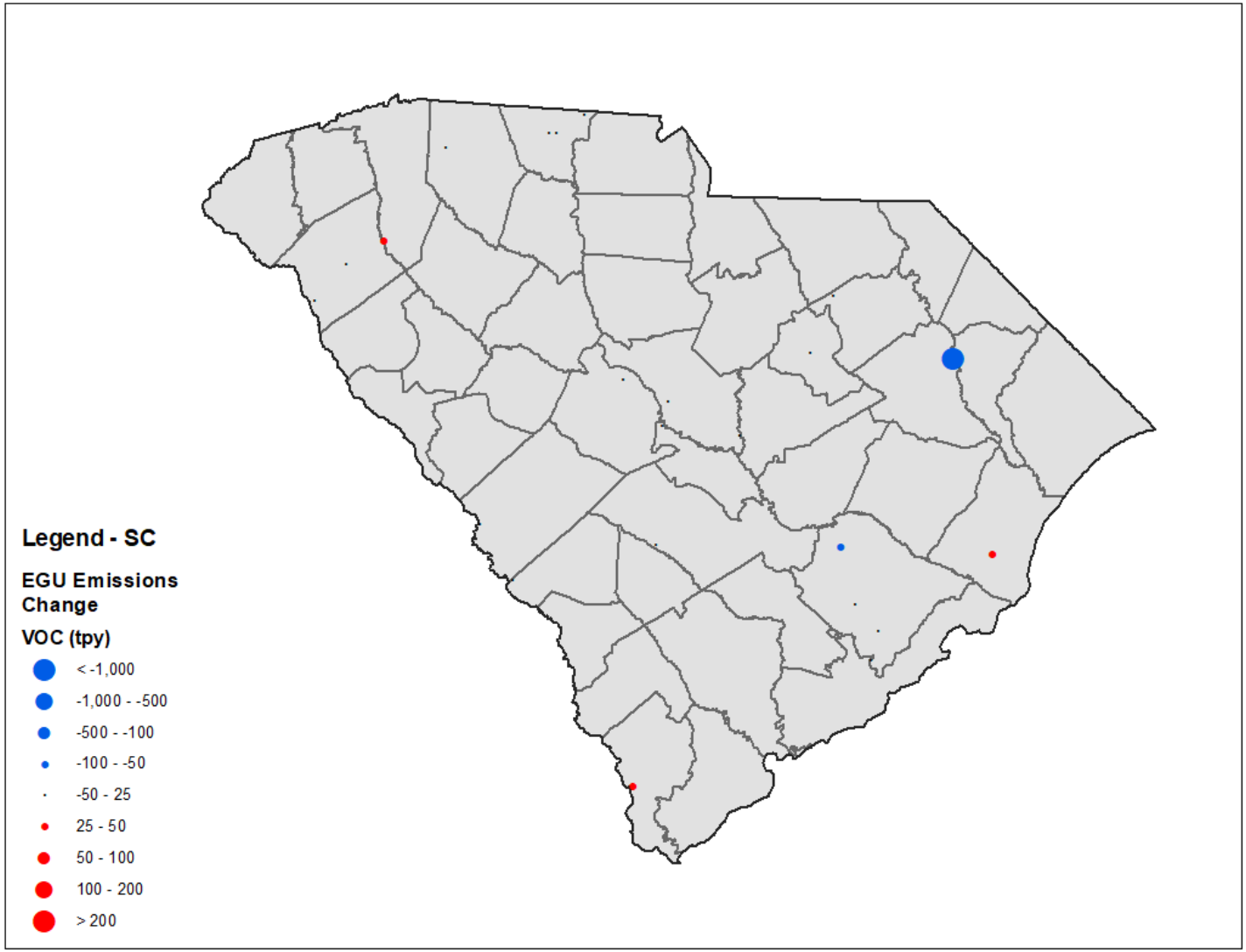

Figure C.7-13. South Carolina Point EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

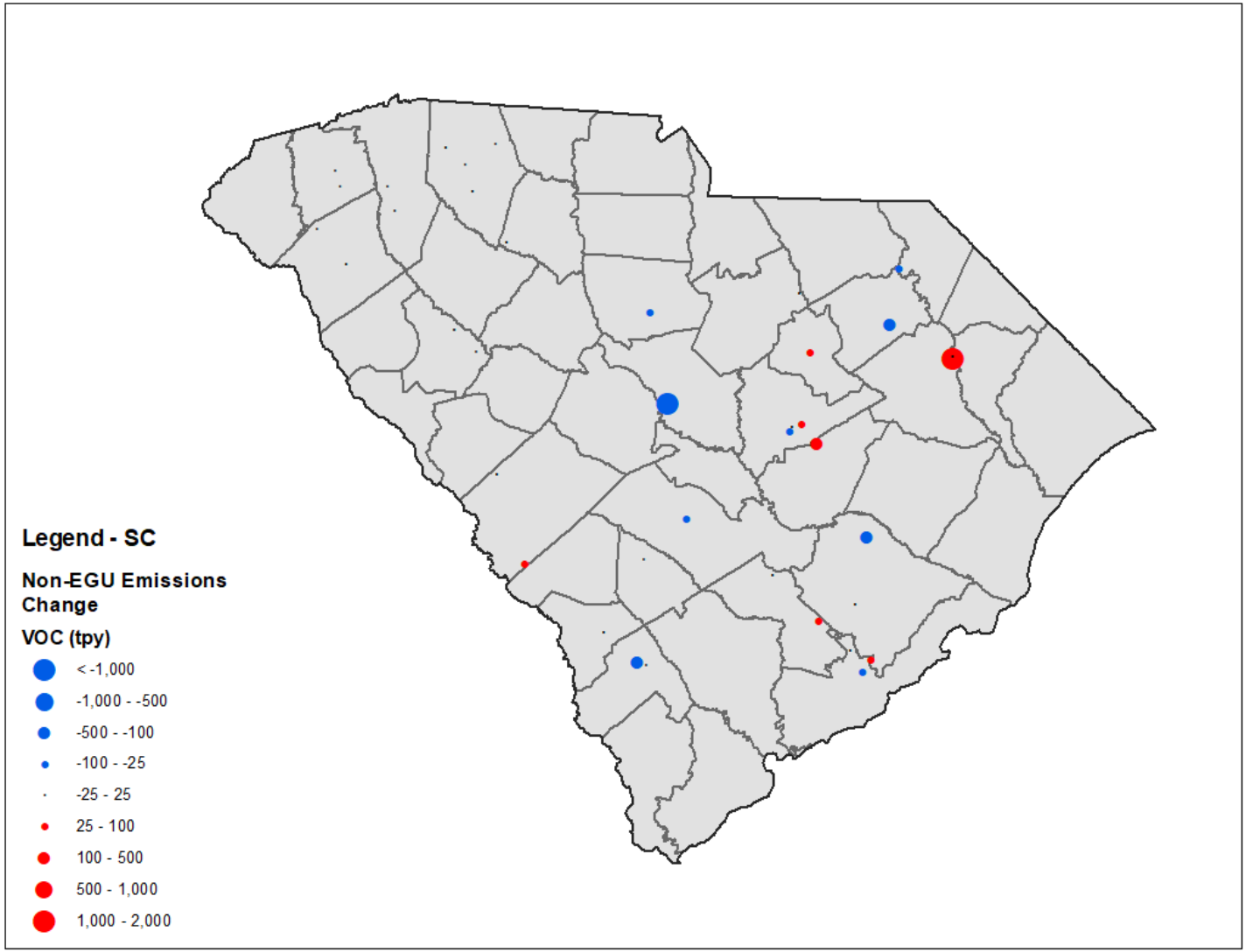

Figure C.7-14. South Carolina Point Non-EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

Appendix C-8. Tennessee 2028 Point EGU and Point Non-EGU Comparisons

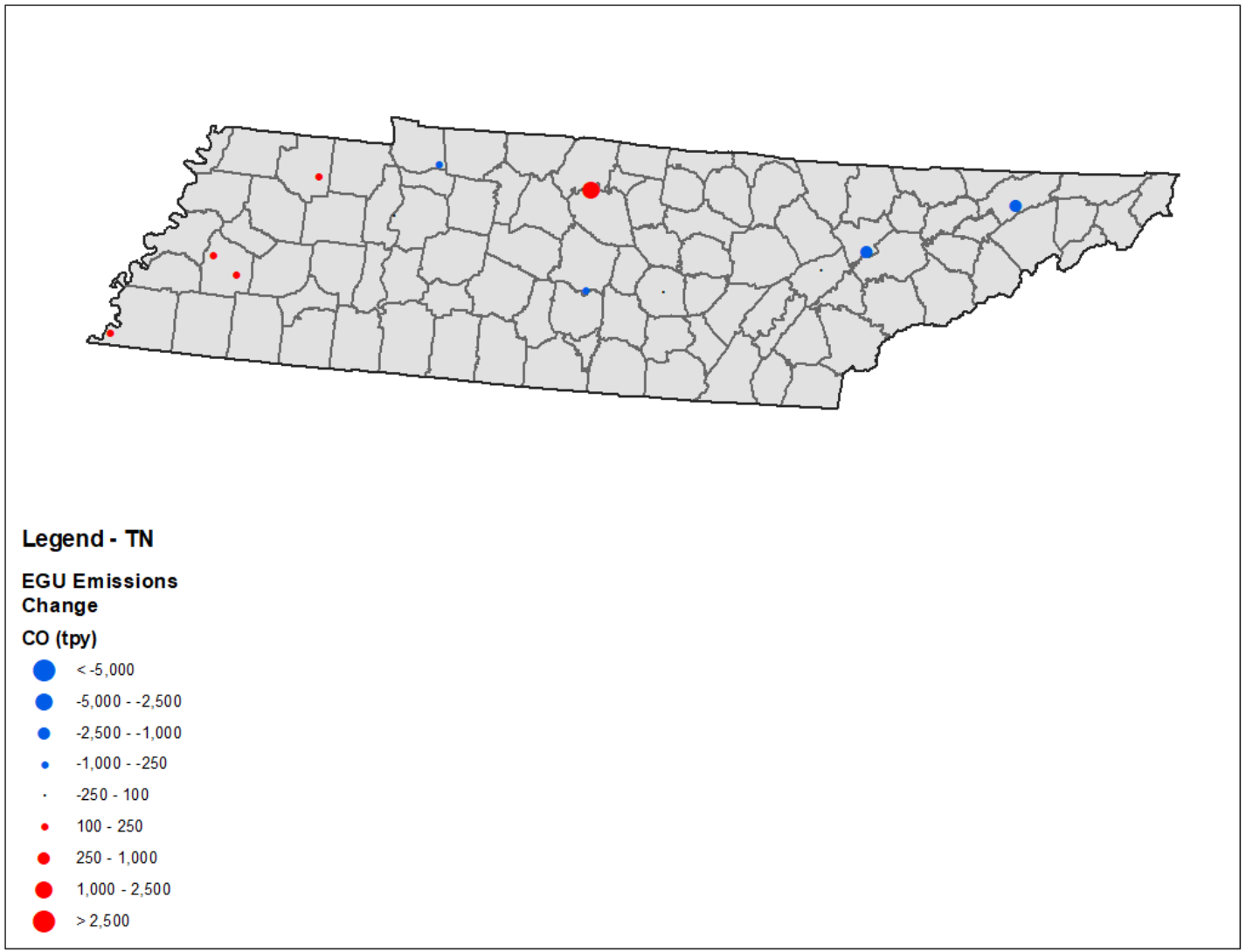

Figure C.8-1. Tennessee Point EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

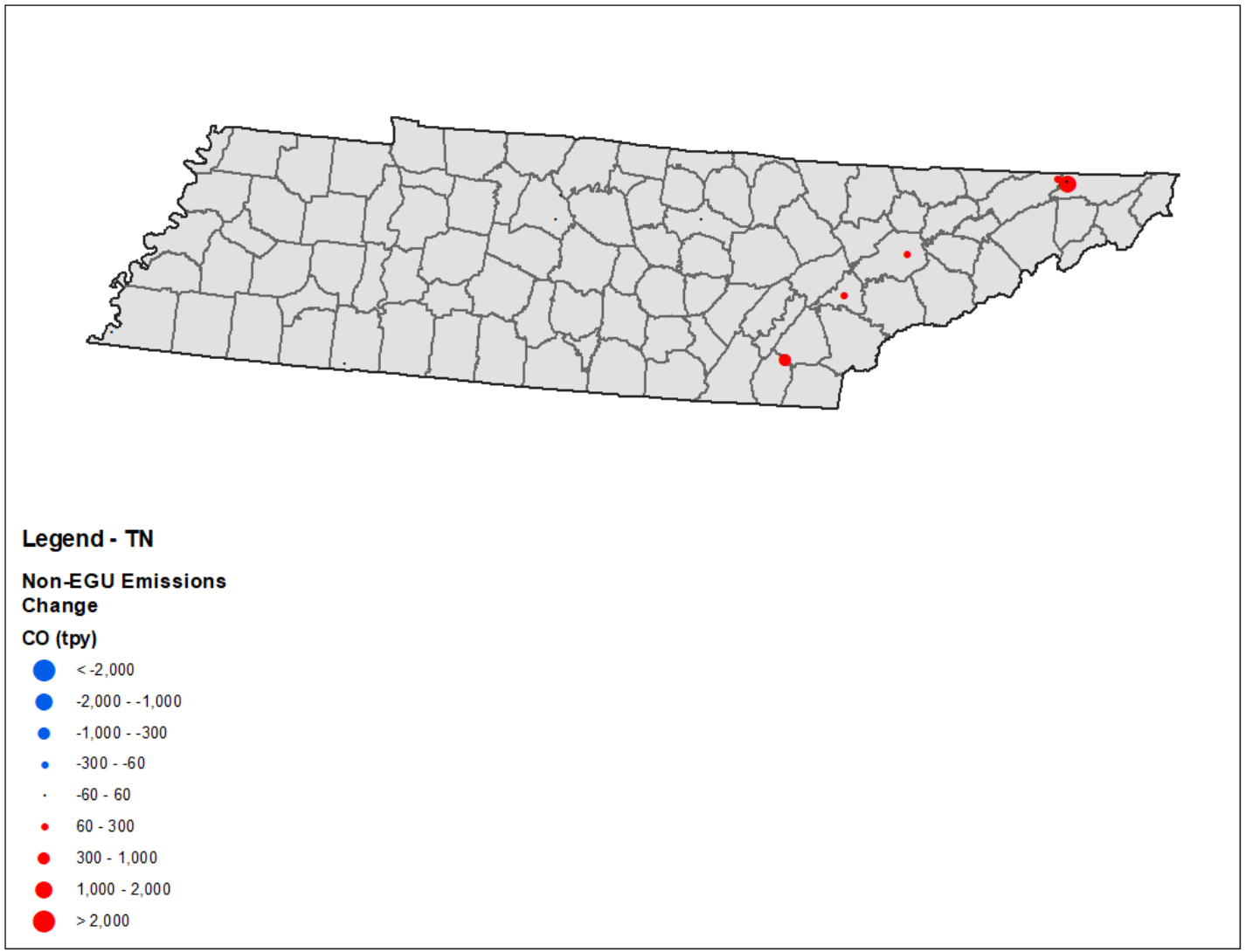

Figure C.8-2. Tennessee Point Non-EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

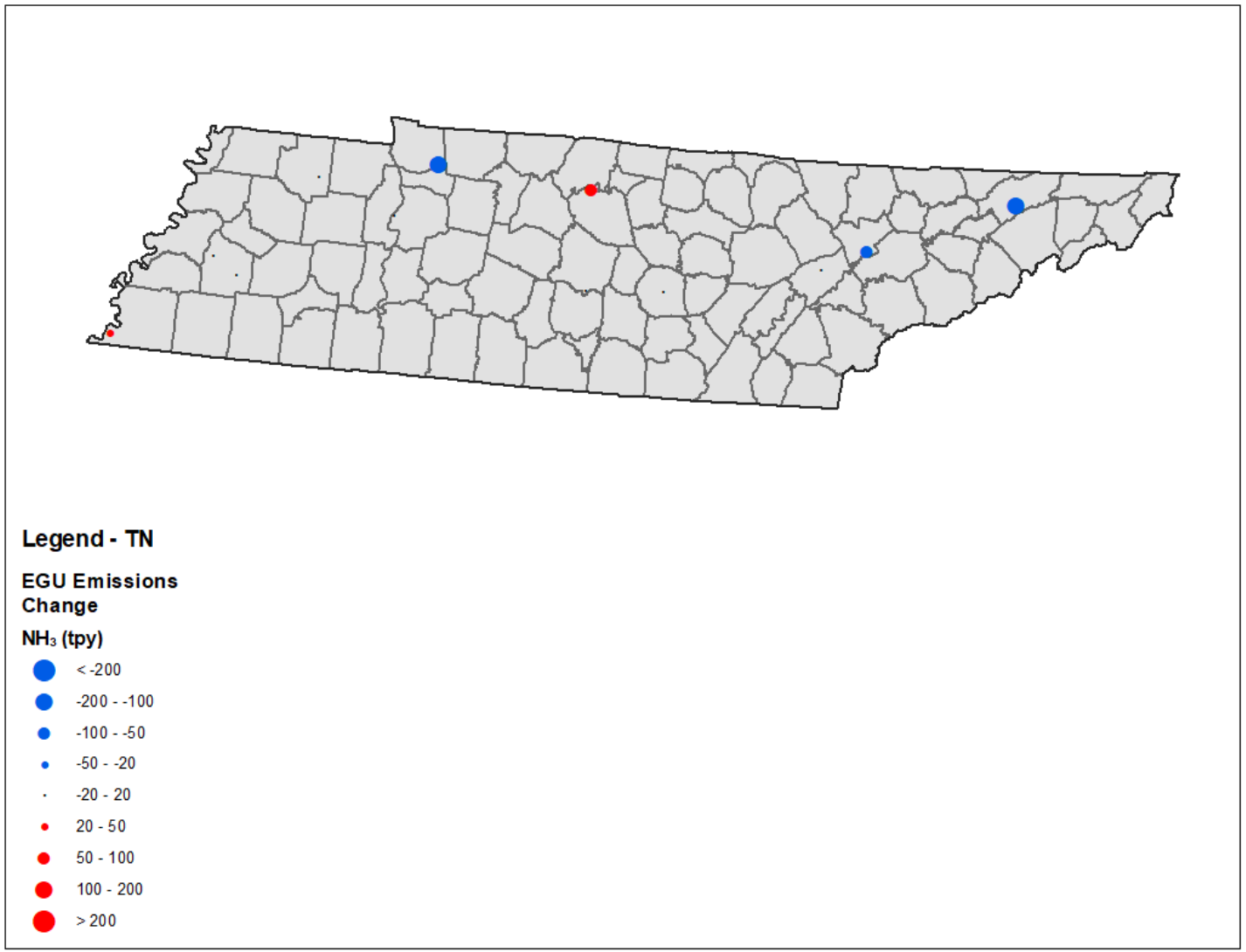

Figure C.8-3. Tennessee Point EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

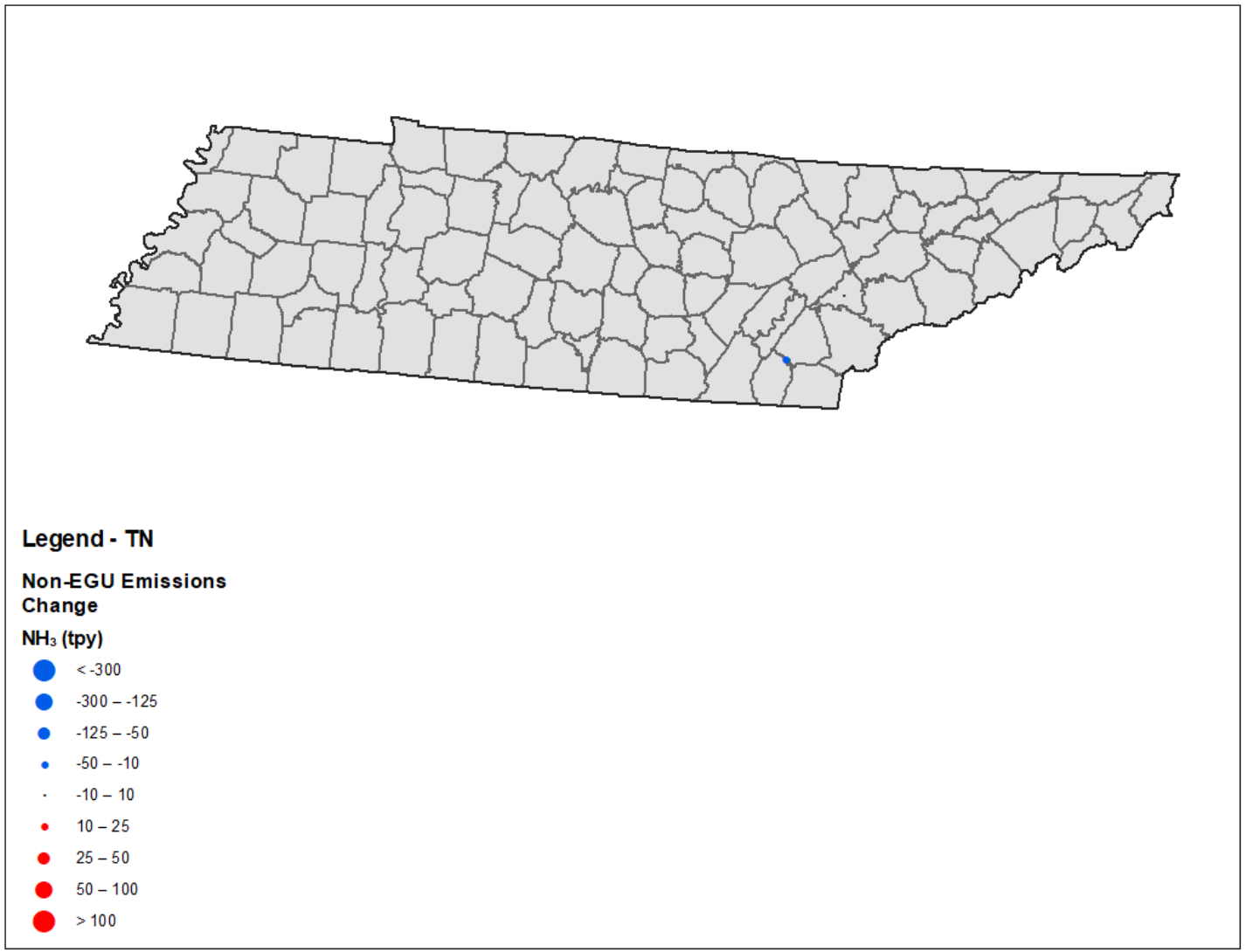

Figure C.8-4. Tennessee Point Non-EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

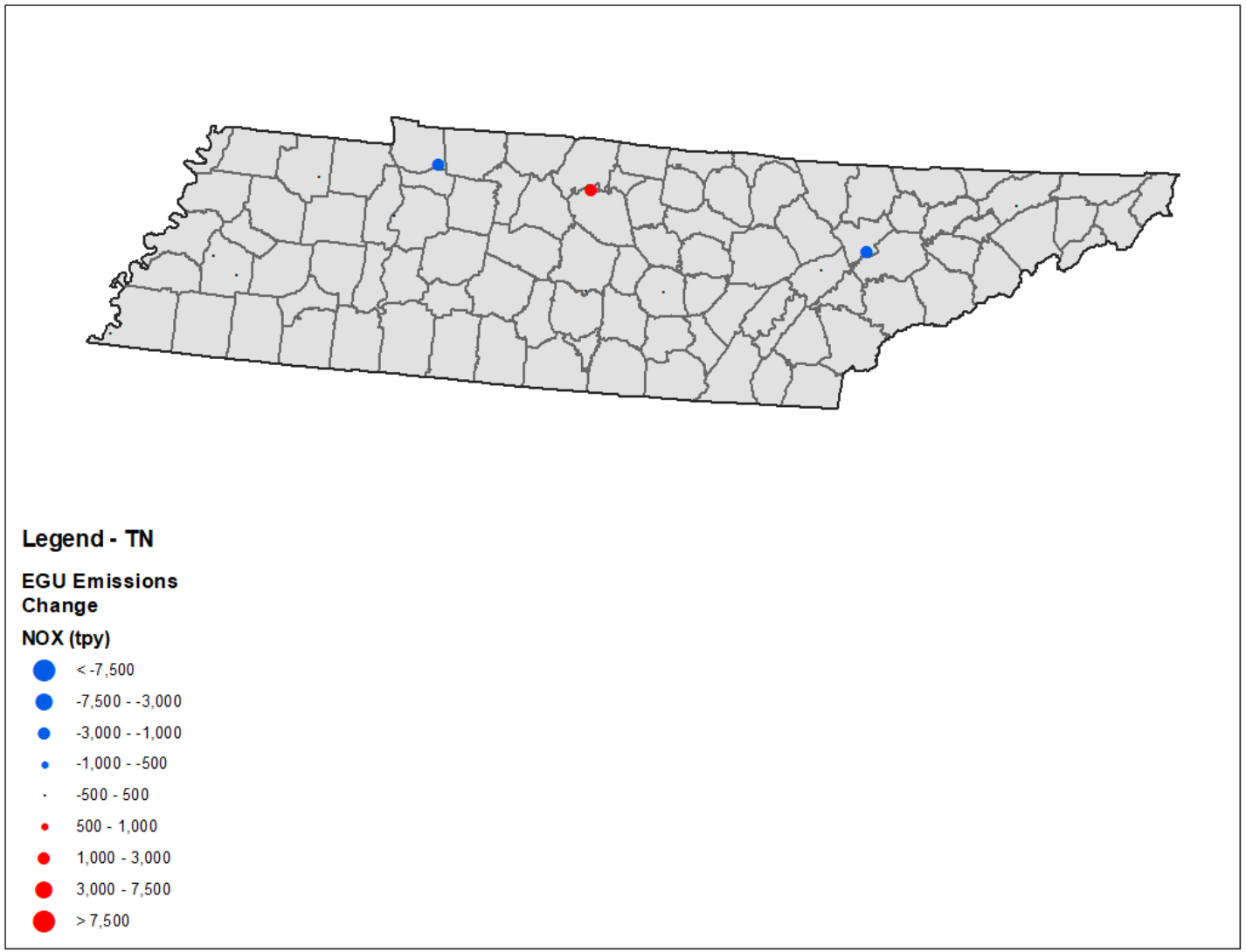

Figure C.8-5. Tennessee Point EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

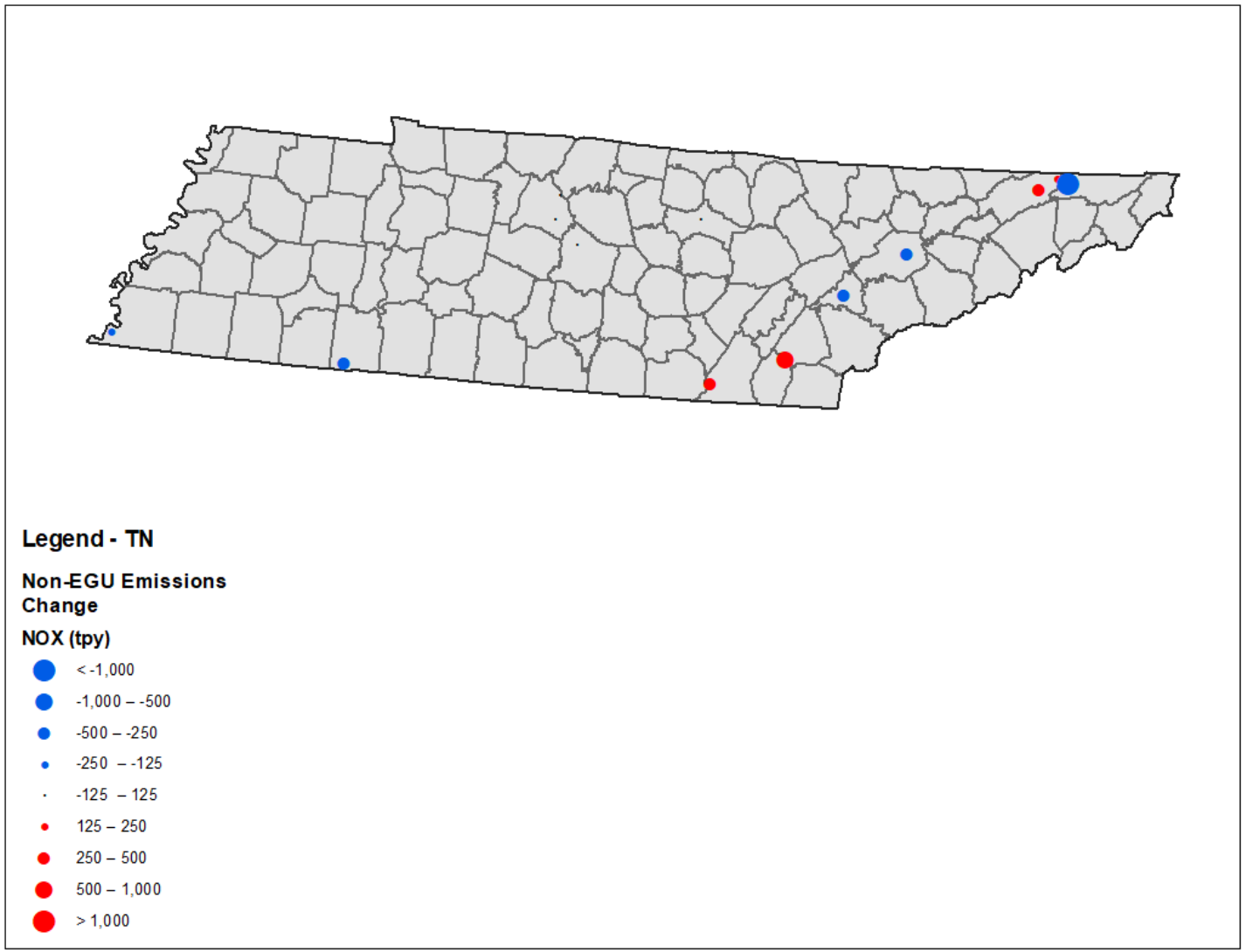

Figure C.8-6. Tennessee Point Non-EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

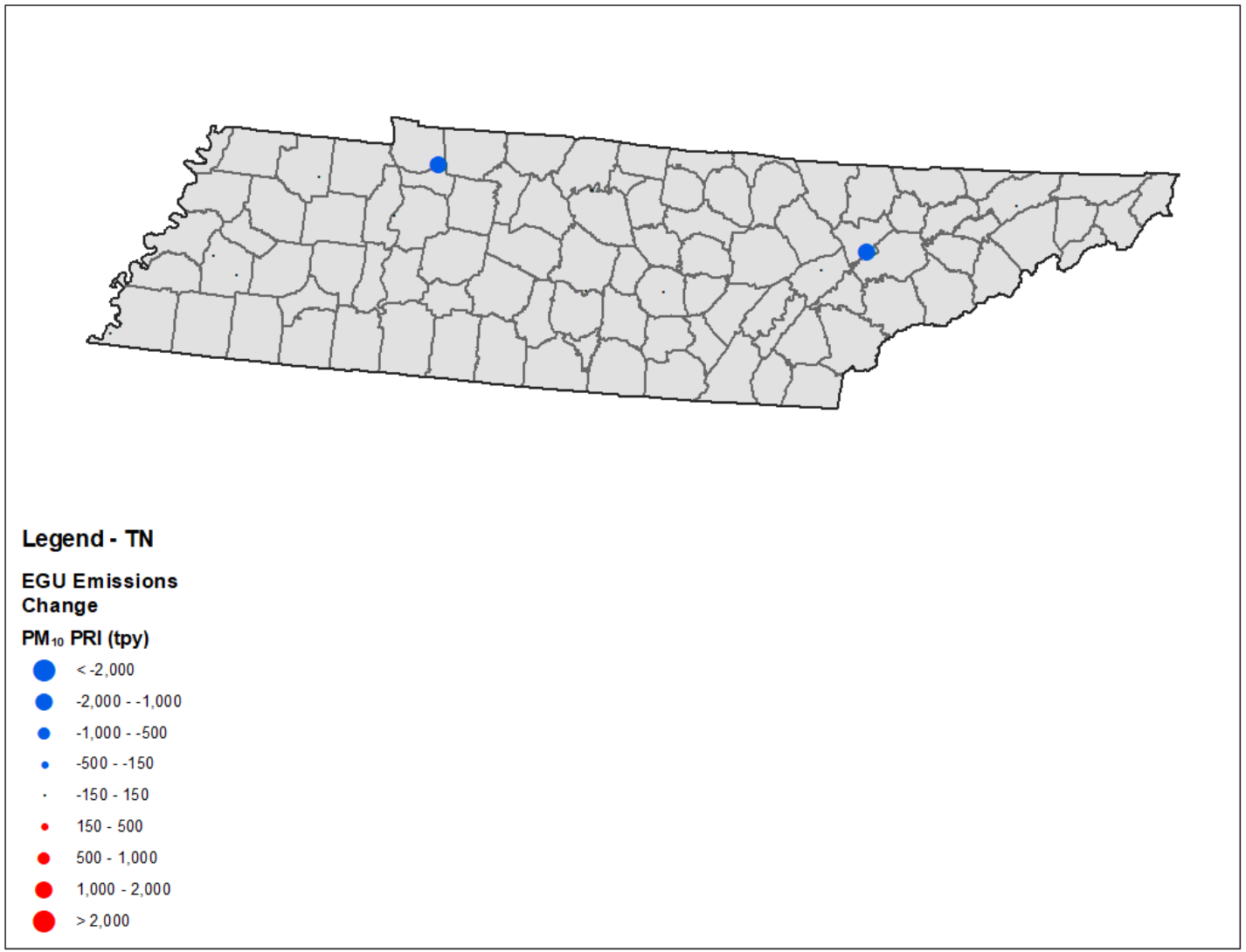

Figure C.8-7. Tennessee Point EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

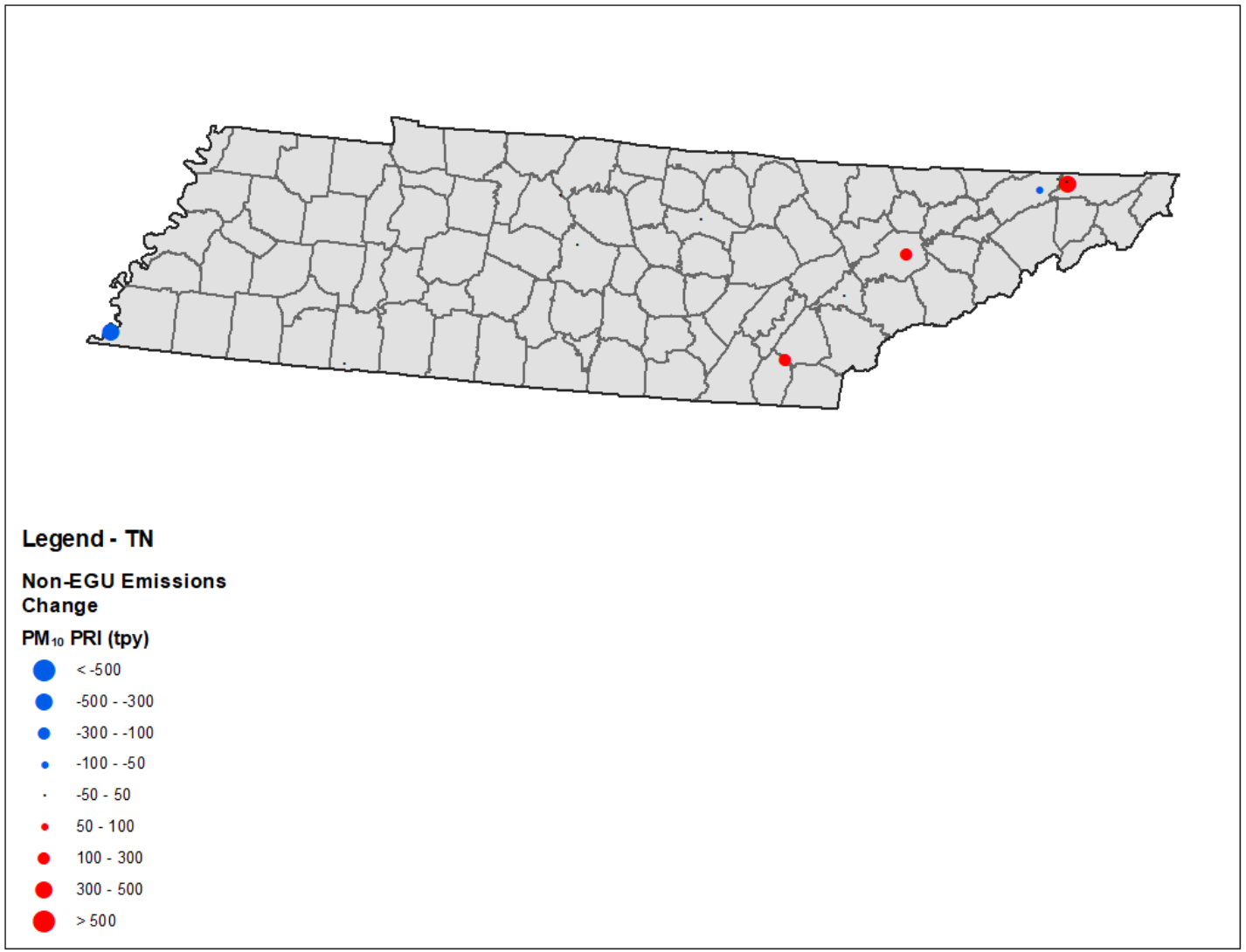

Figure C.8-8. Tennessee Point Non-EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

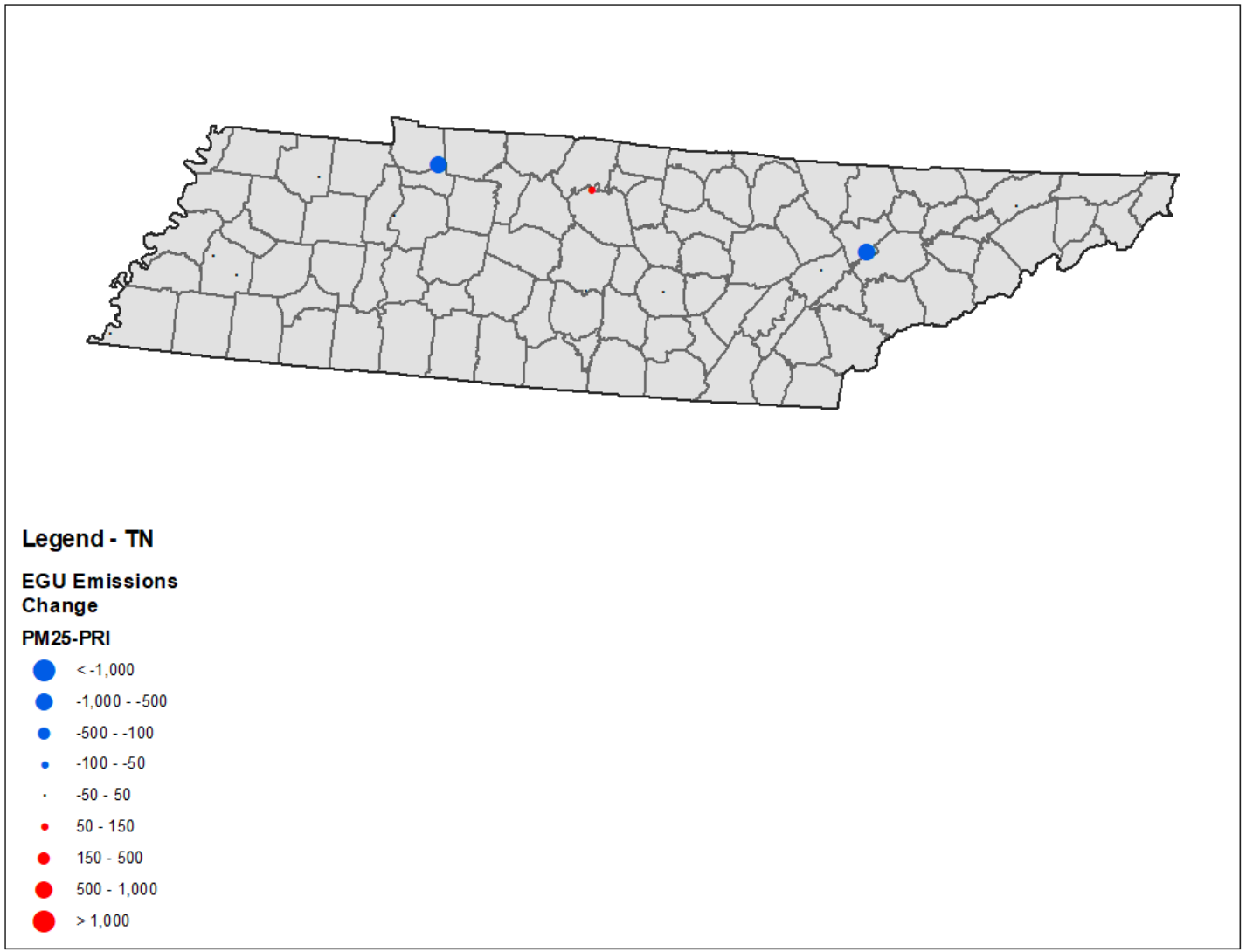

Figure C.8-9. Tennessee Point EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

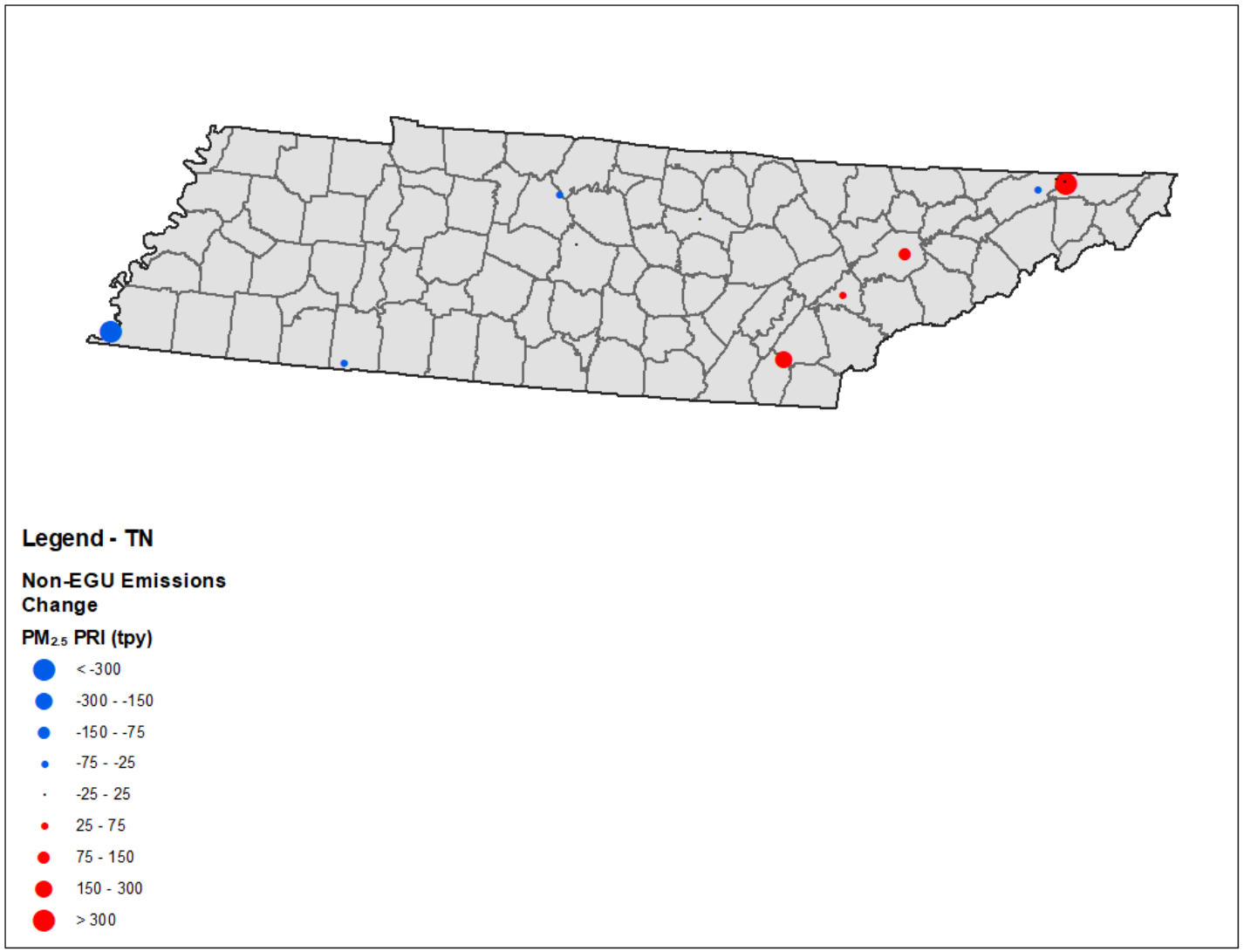

Figure C.8-10. Tennessee Point Non-EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

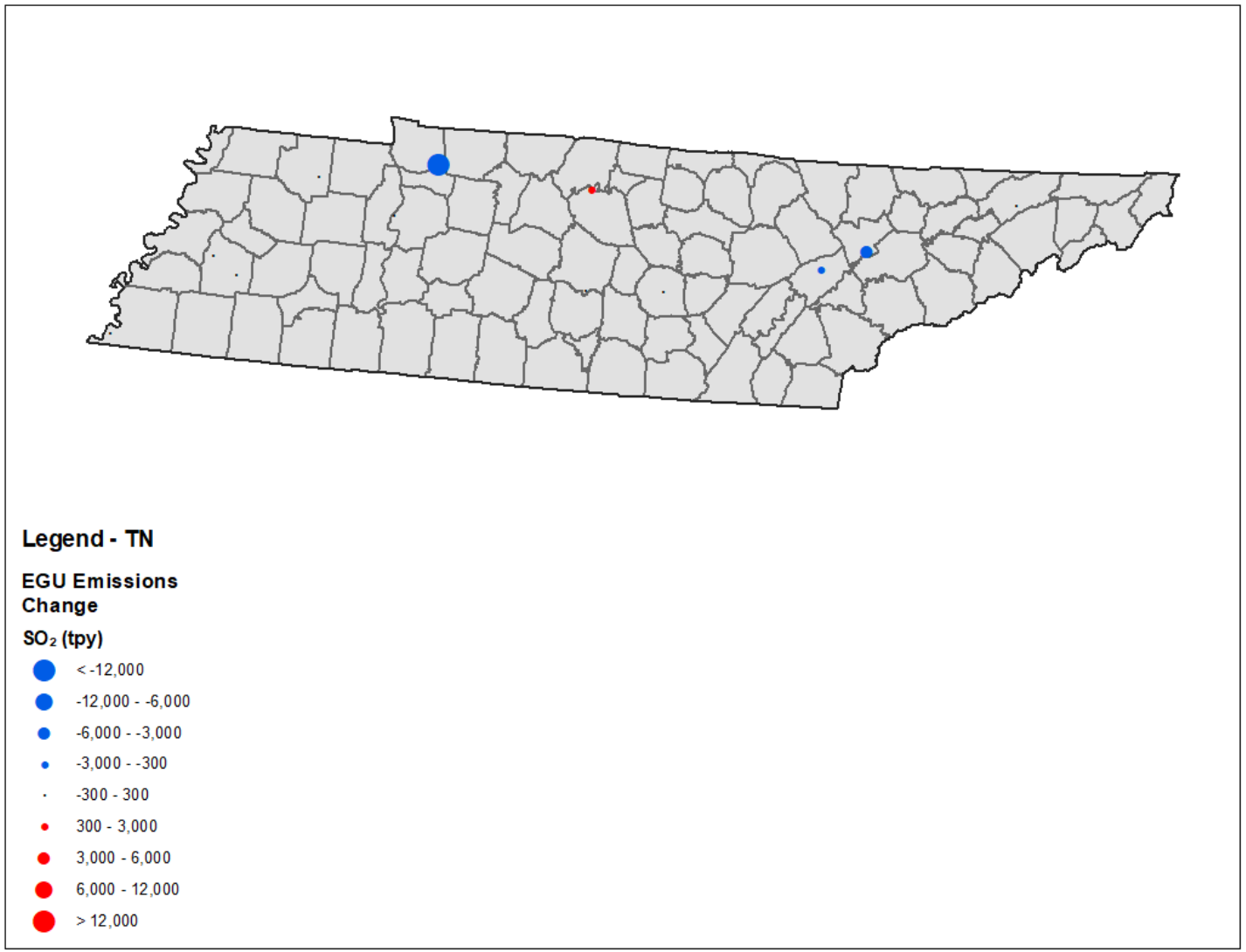

Figure C.8-11. Tennessee Point EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

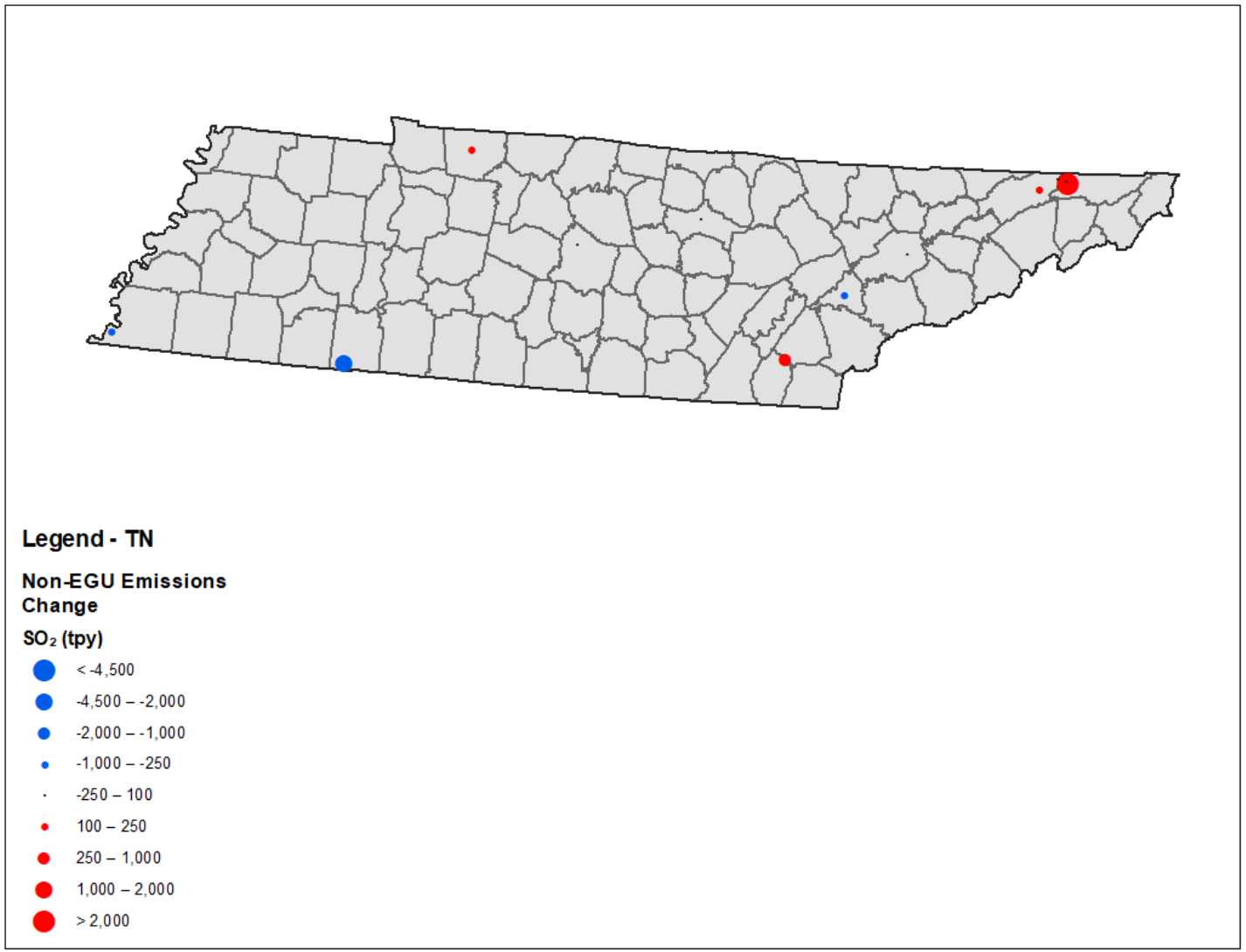

Figure C.8-12. Tennessee Point Non-EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

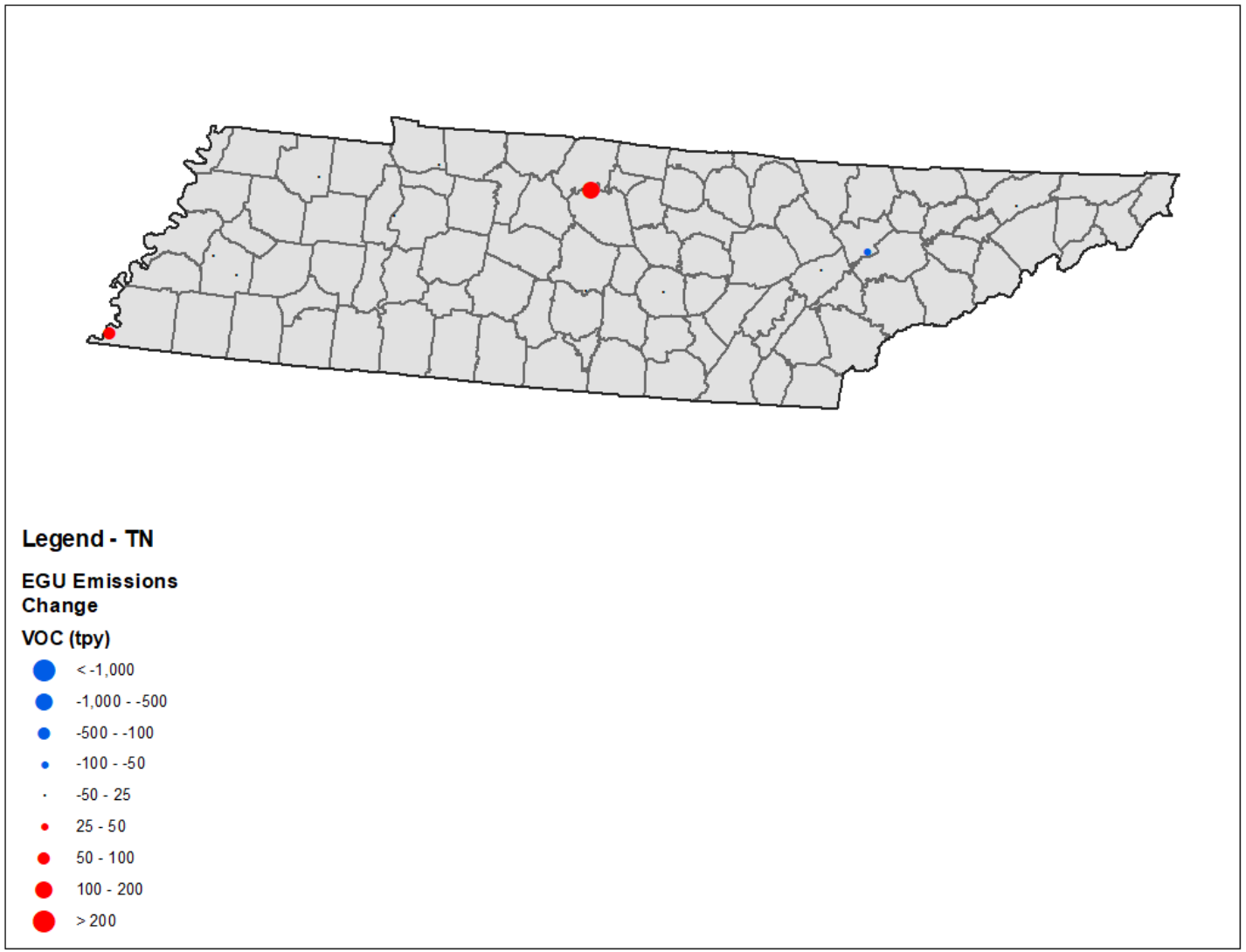

Figure C.8-13. Tennessee Point EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

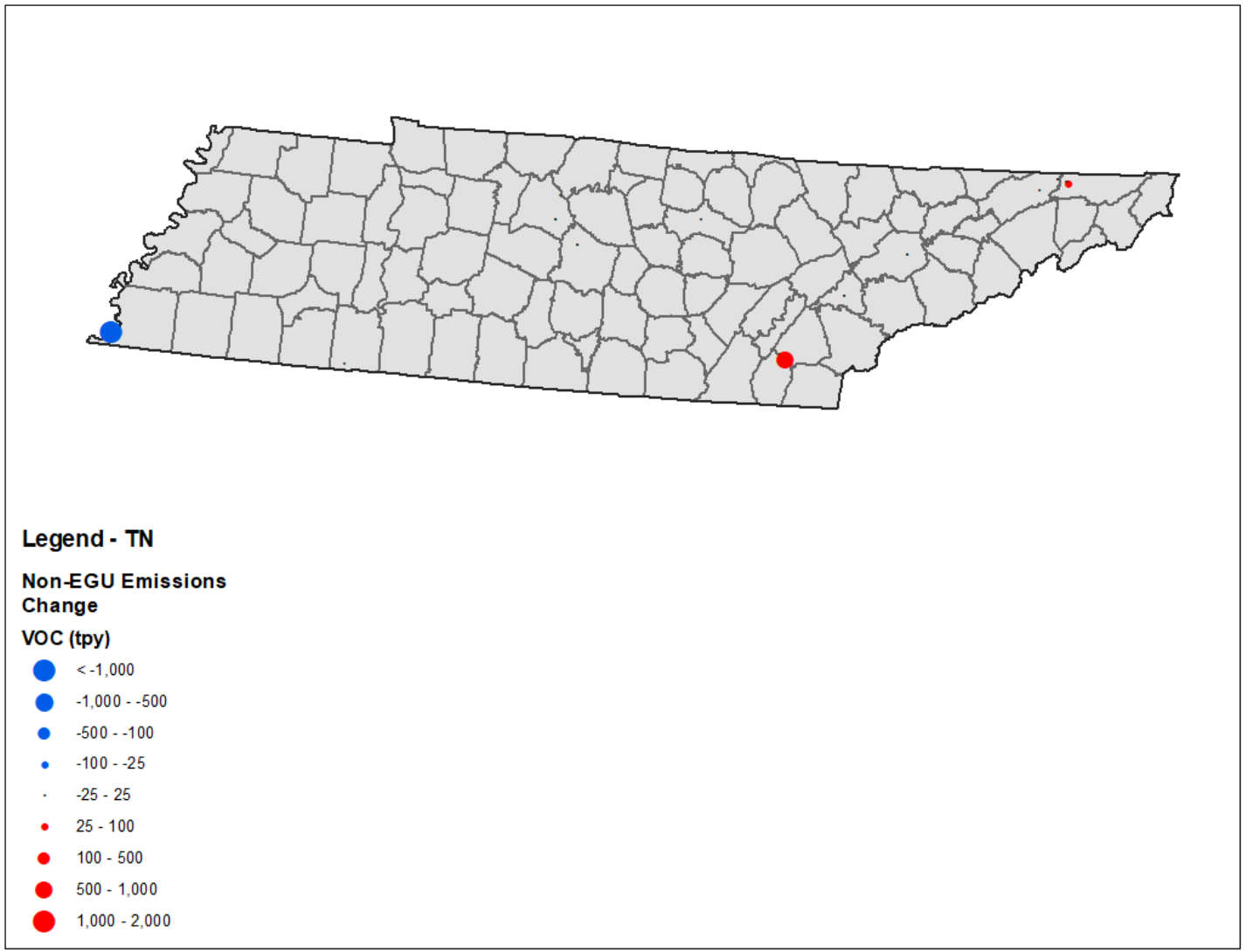

Figure C.8-14. Tennessee Point Non-EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

Appendix C-9. Virginia 2028 Point EGU and Point Non-EGU Comparisons

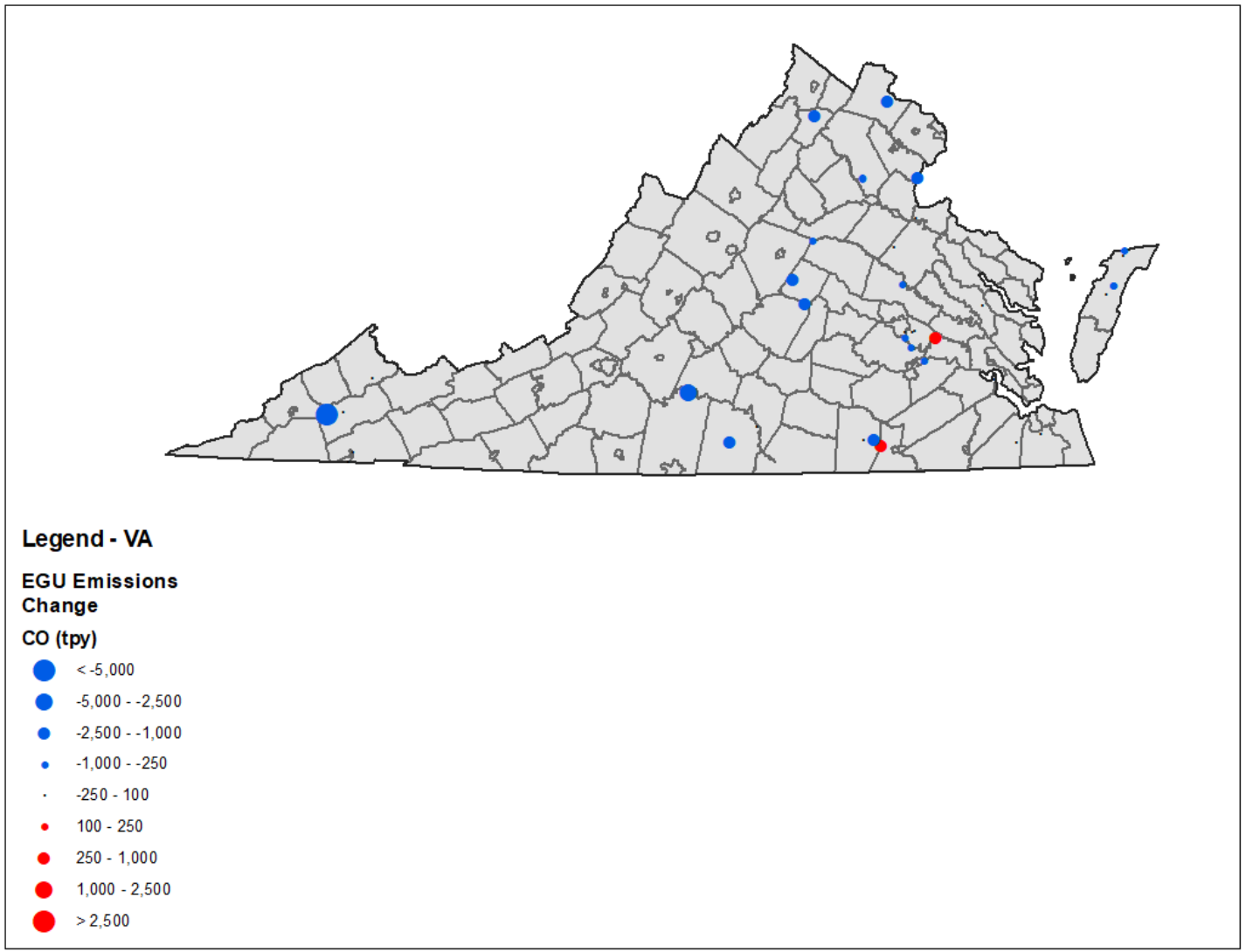

Figure C.9-1. Virginia Point EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

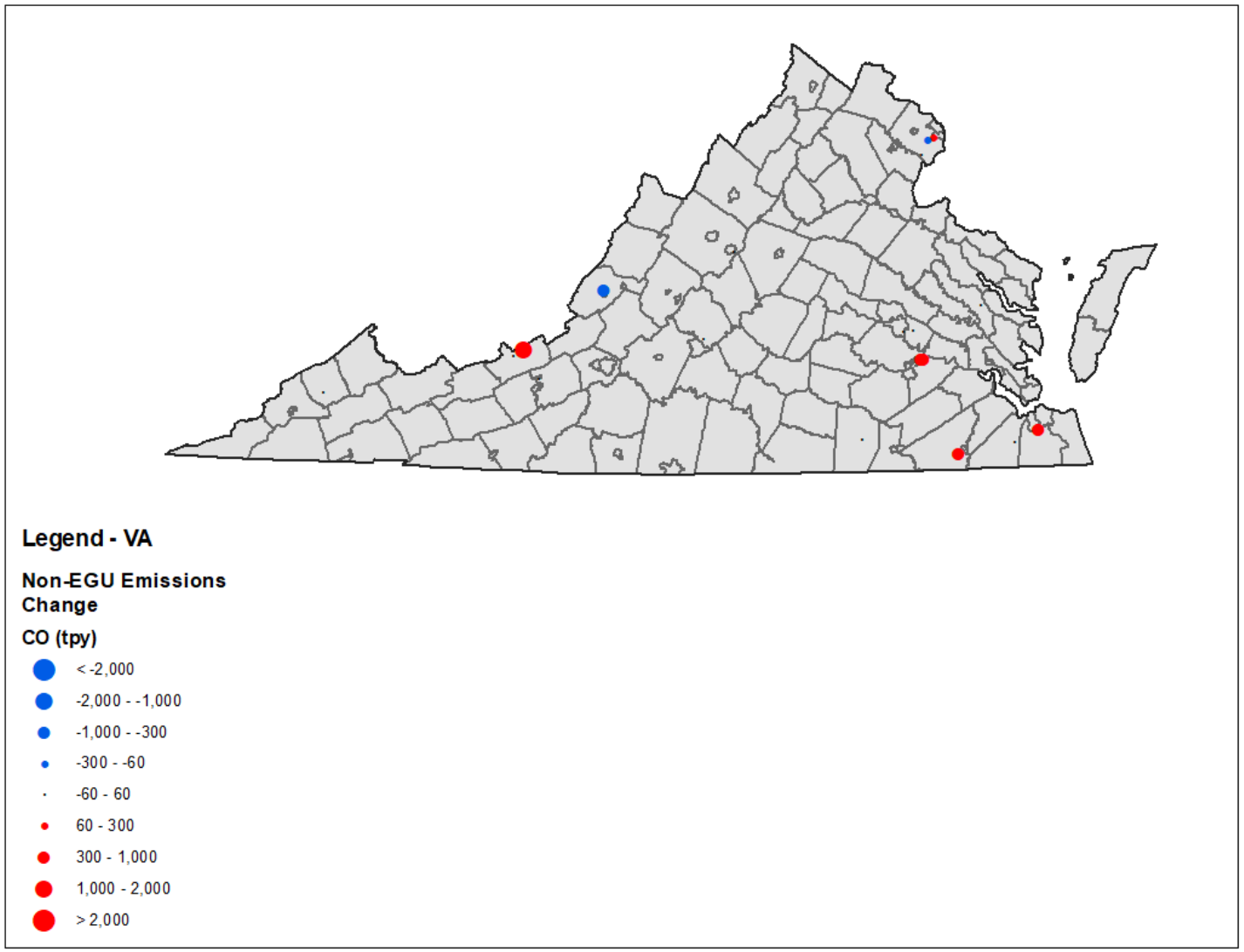

Figure C.9-2. Virginia Point Non-EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

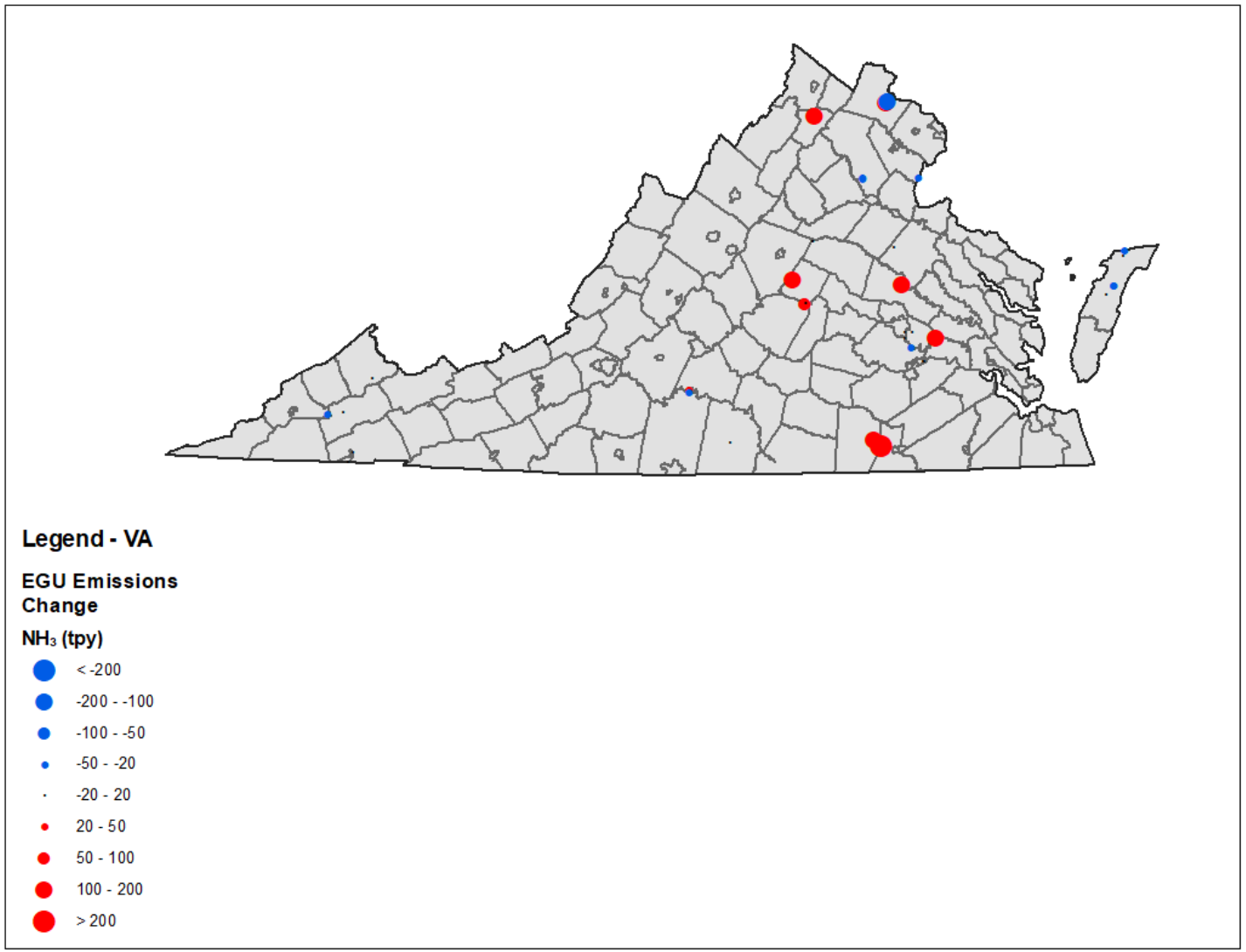

Figure C.9-3. Virginia Point EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

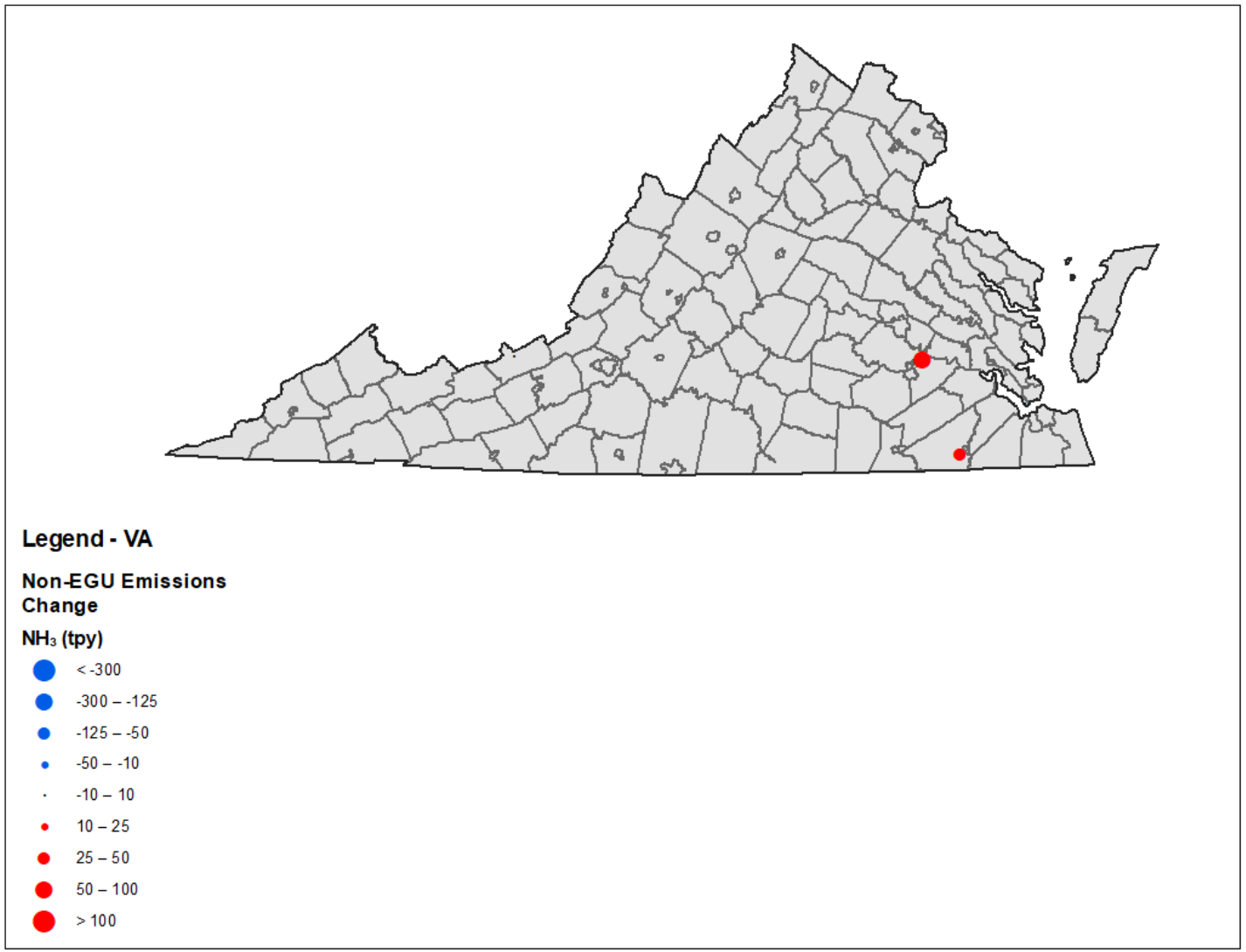

Figure C.9-4. Virginia Point Non-EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

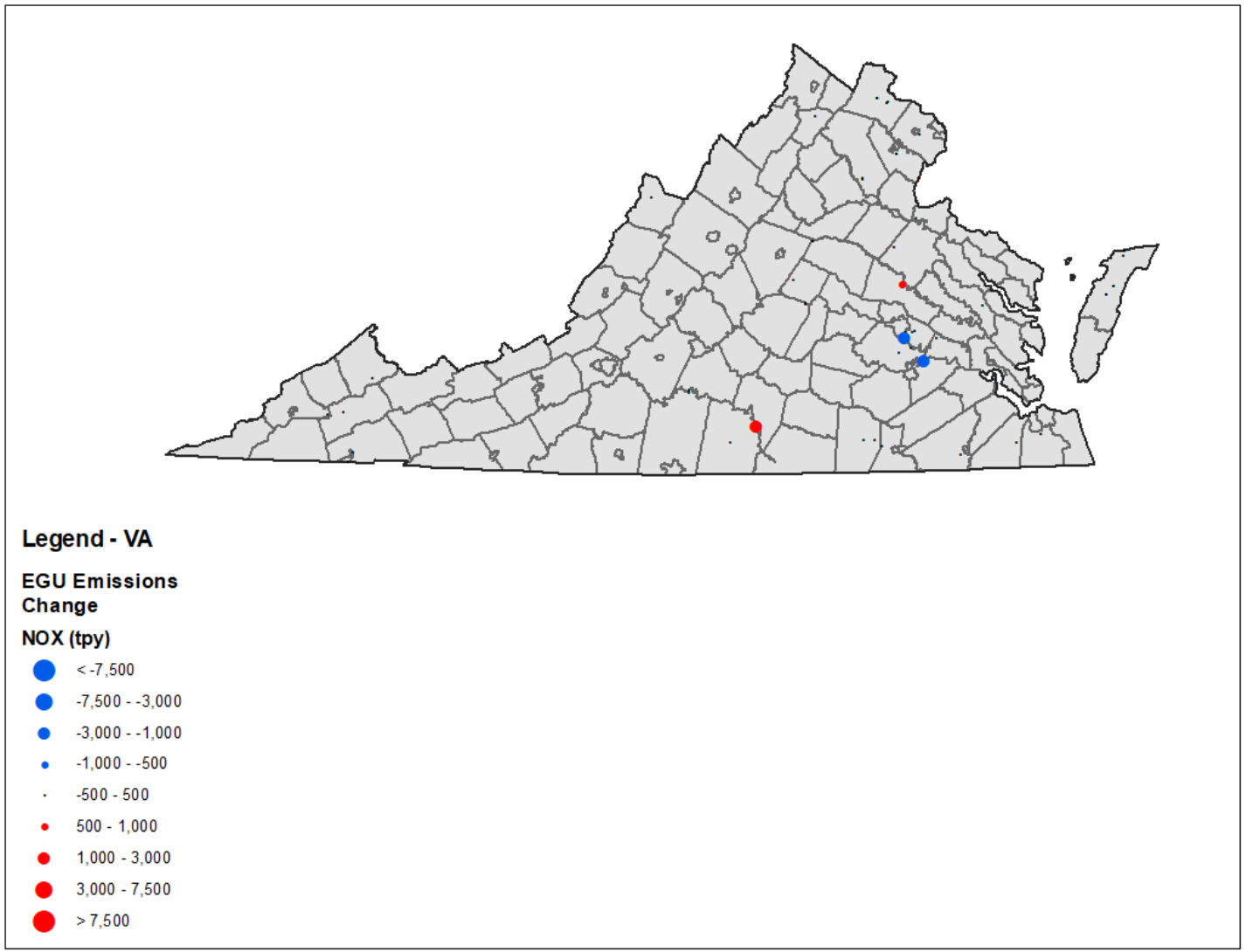

Figure C.9-5. Virginia Point EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

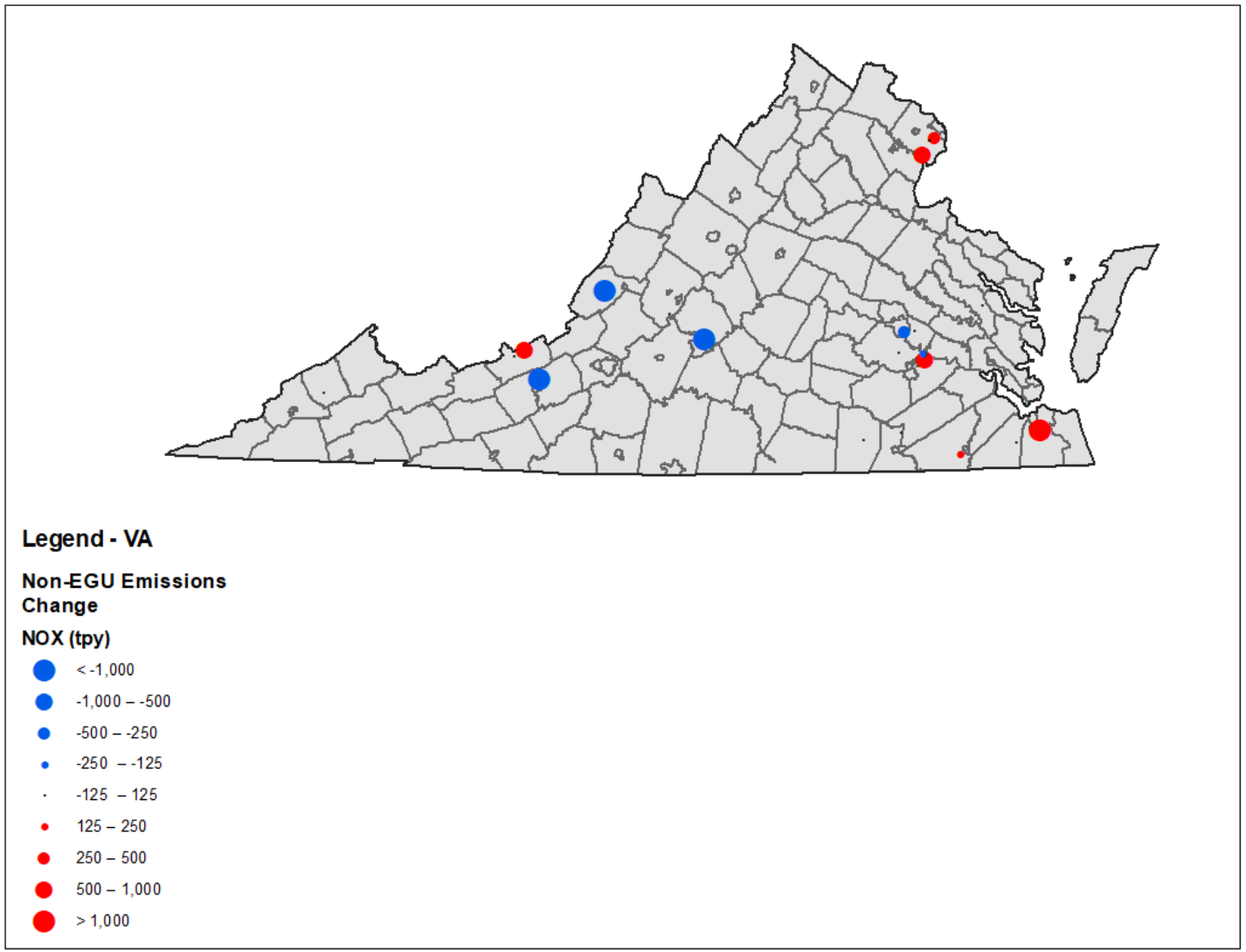

Figure C.9-6. Virginia Point Non-EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

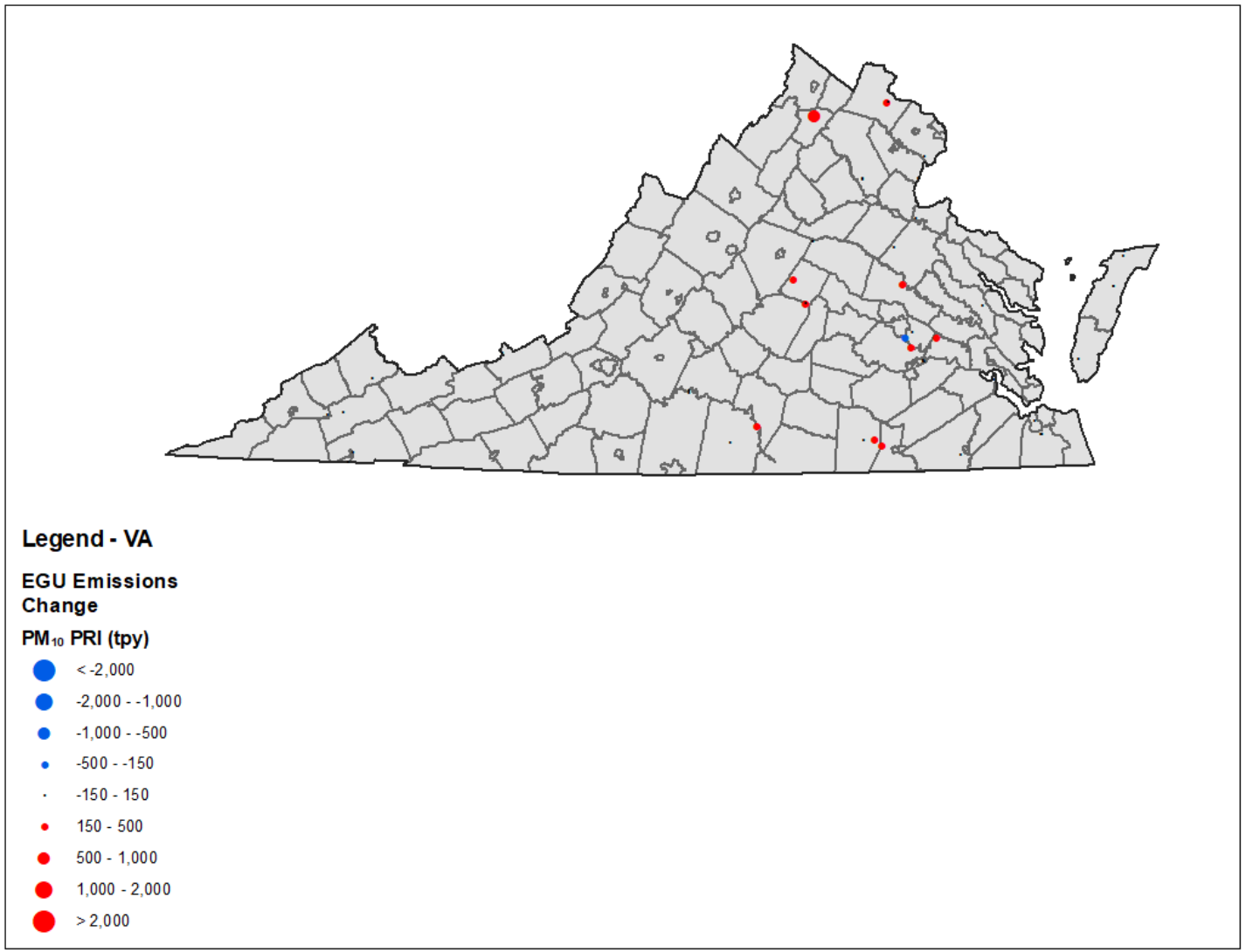

Figure C.9-7. Virginia Point EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

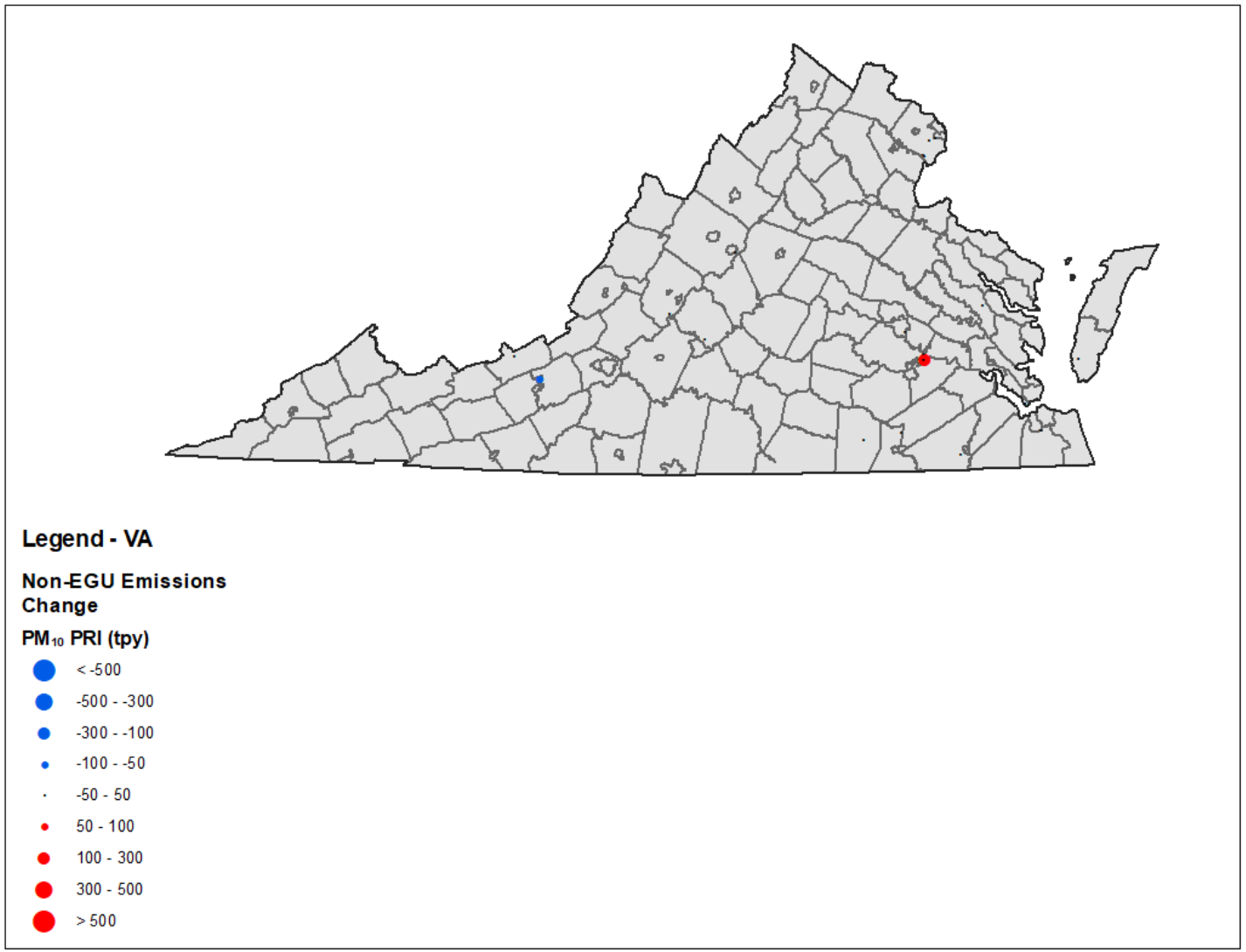

Figure C.9-8. Virginia Point Non-EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

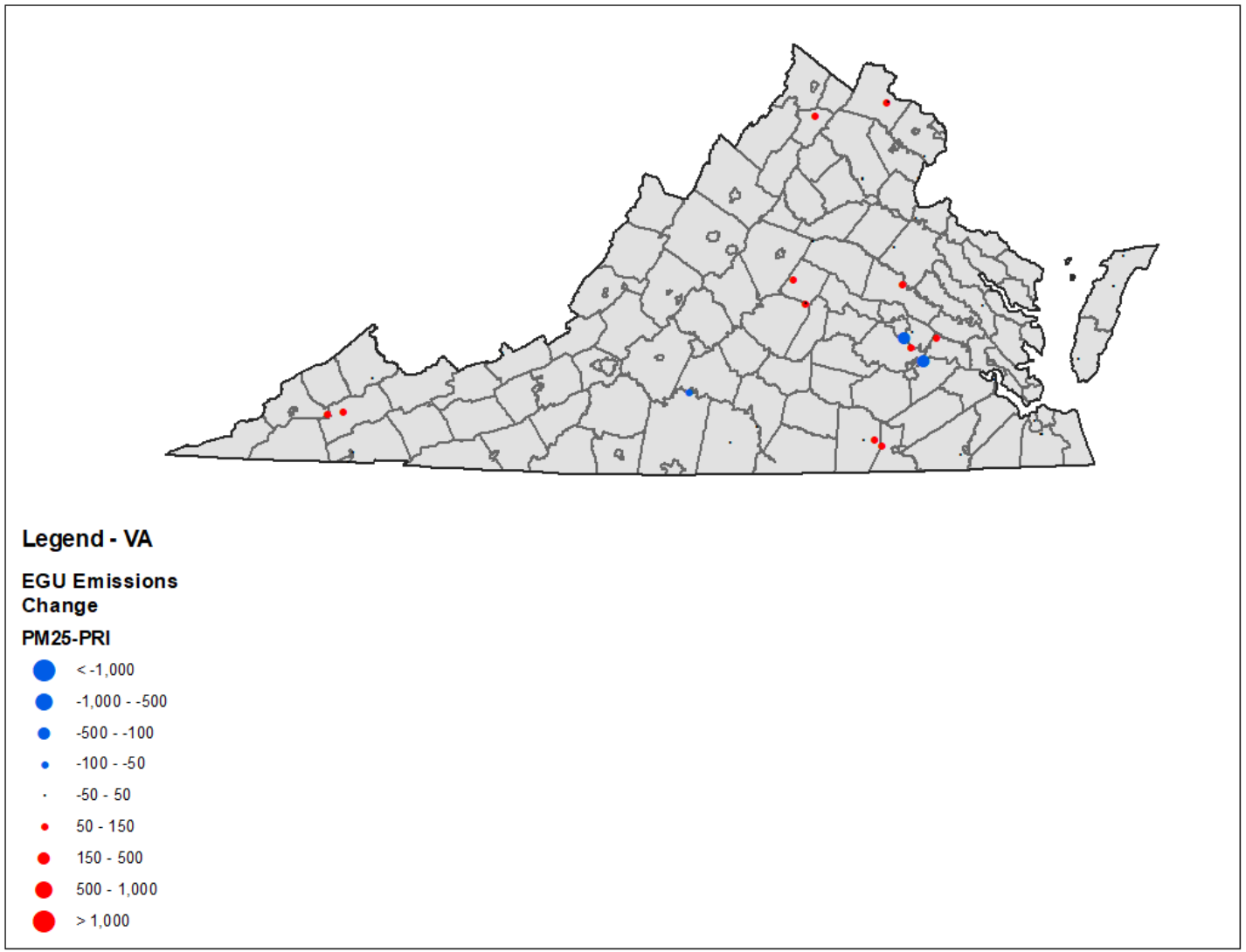

Figure C.9-9. Virginia Point EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

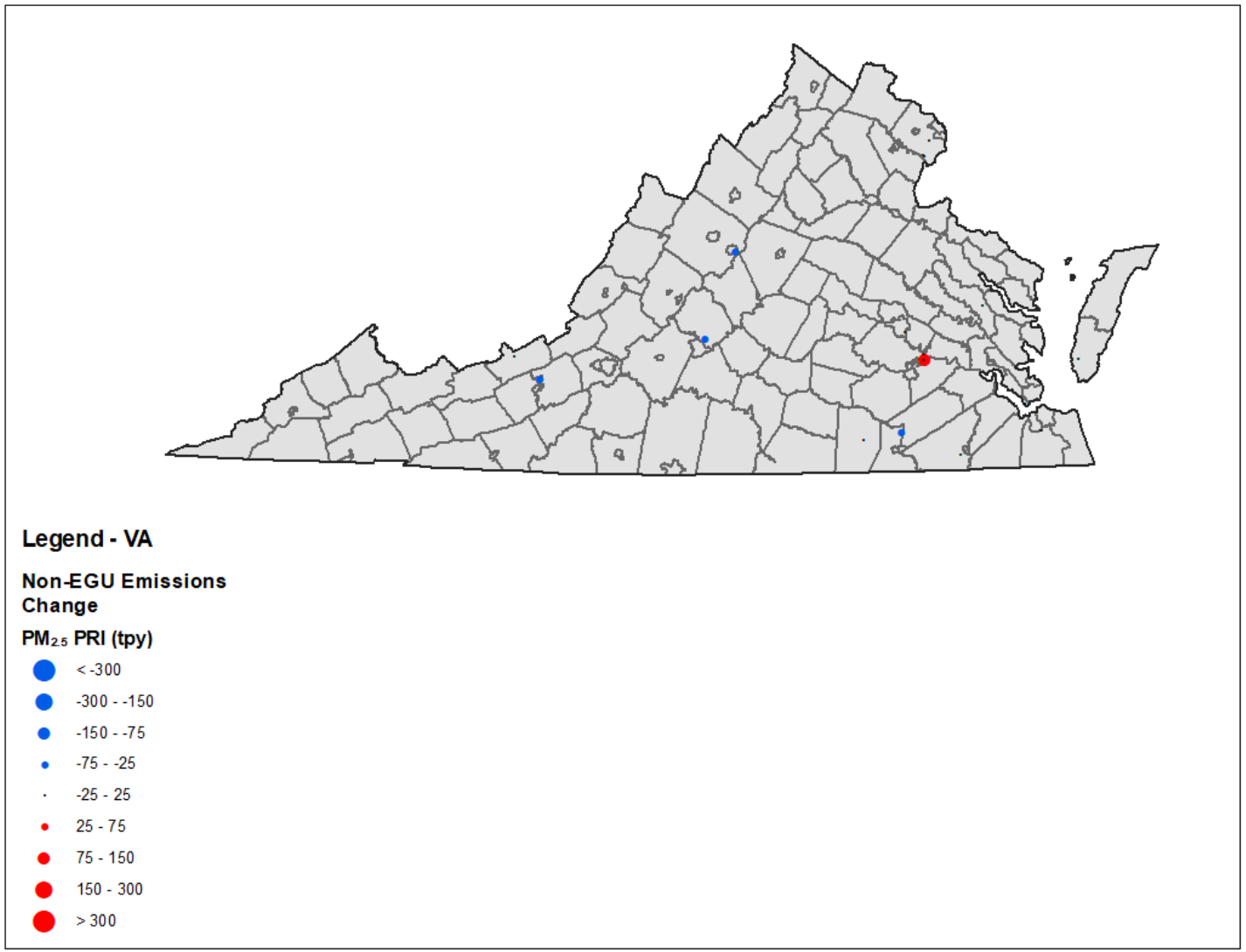

Figure C.9-10. Virginia Point Non-EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

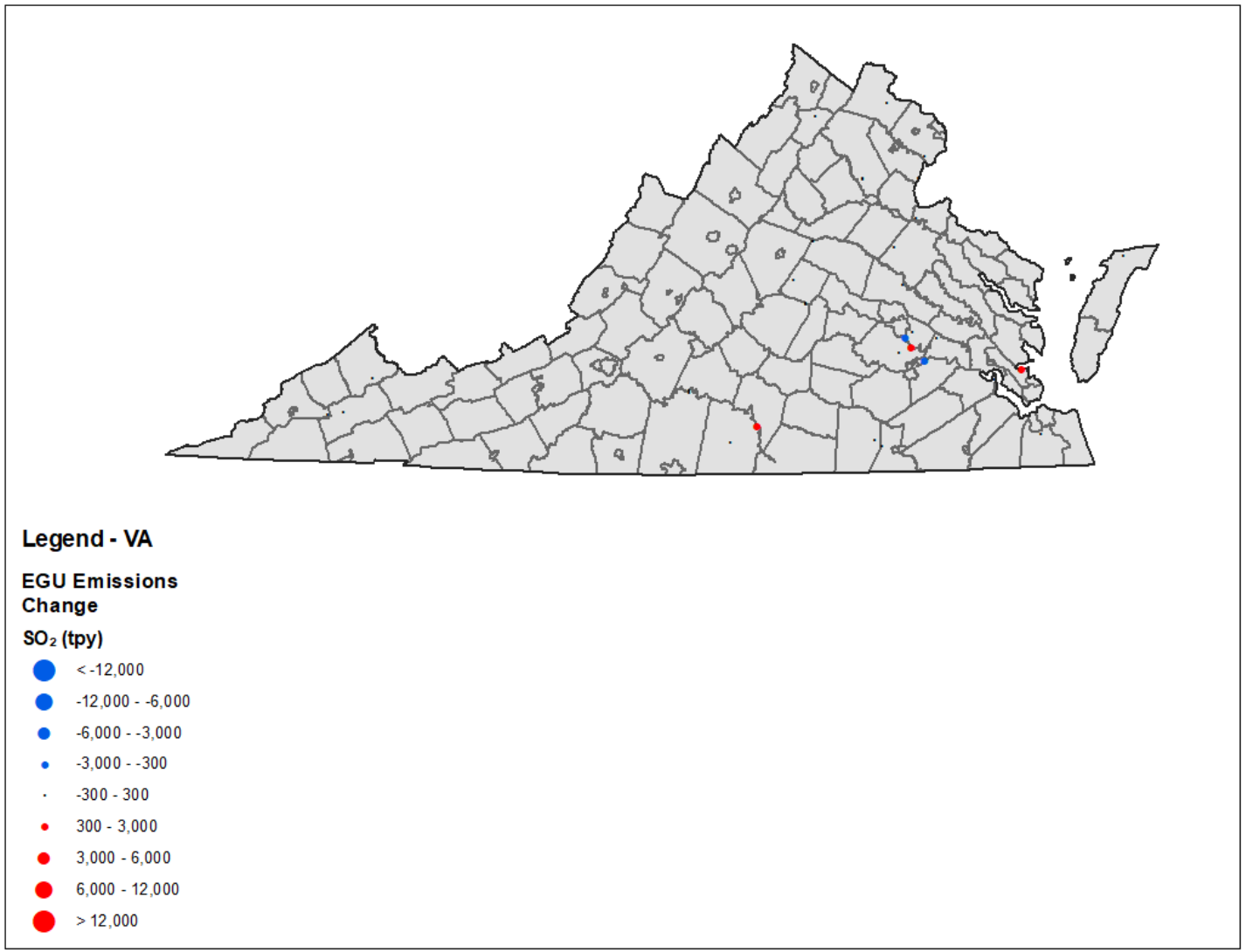

Figure C.9-11. Virginia Point EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

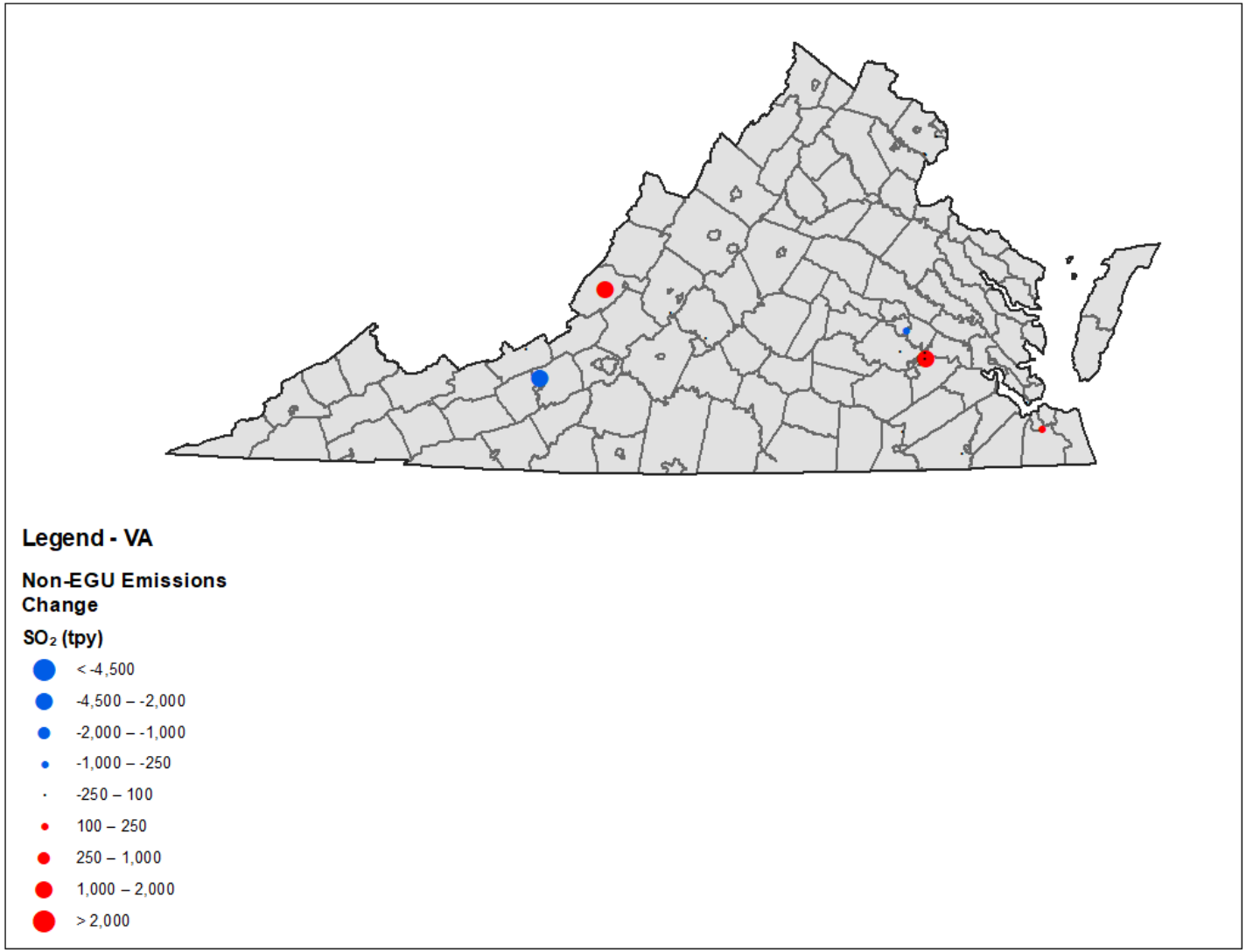

Figure C.9-12. Virginia Point Non-EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

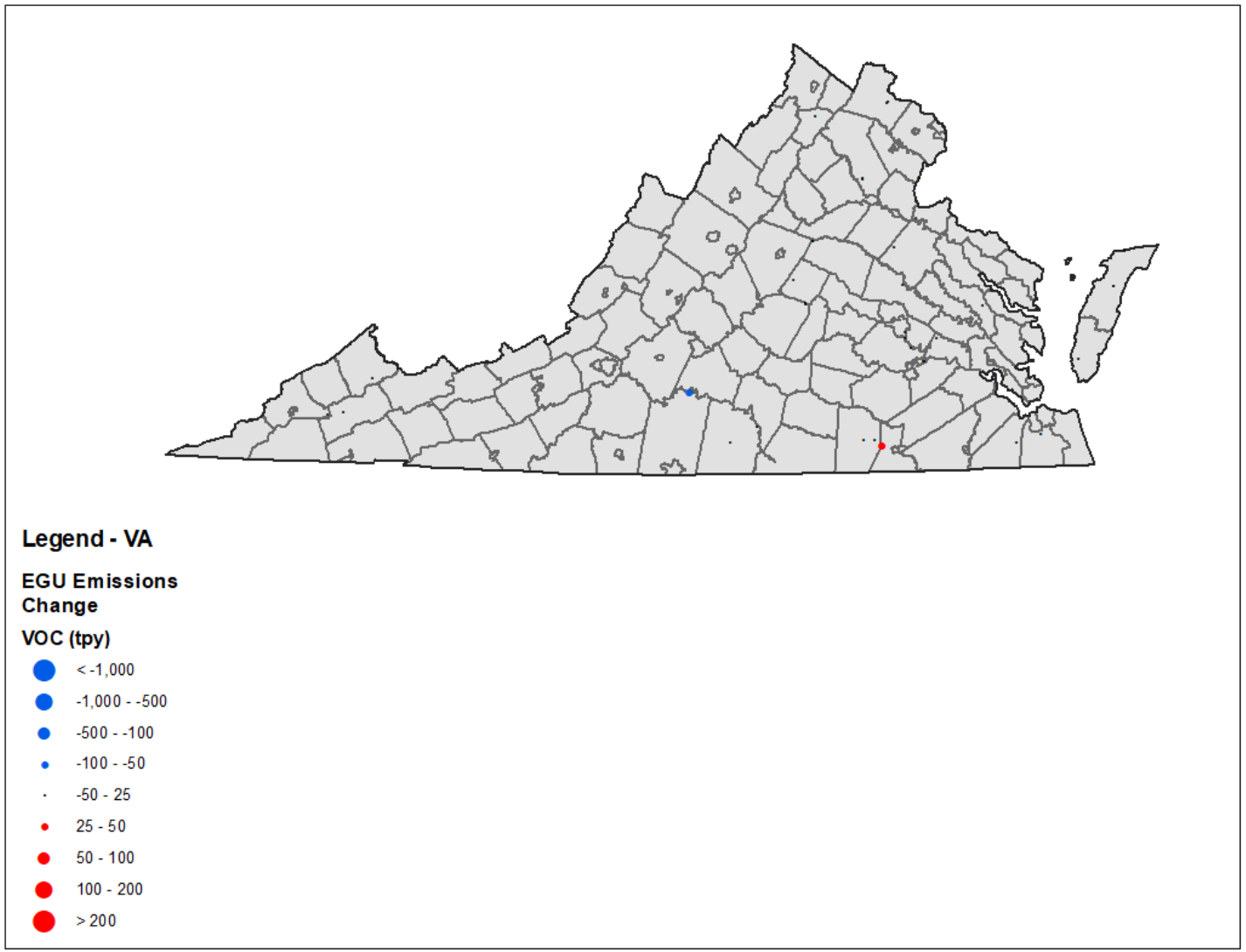

Figure C.9-13. Virginia Point EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

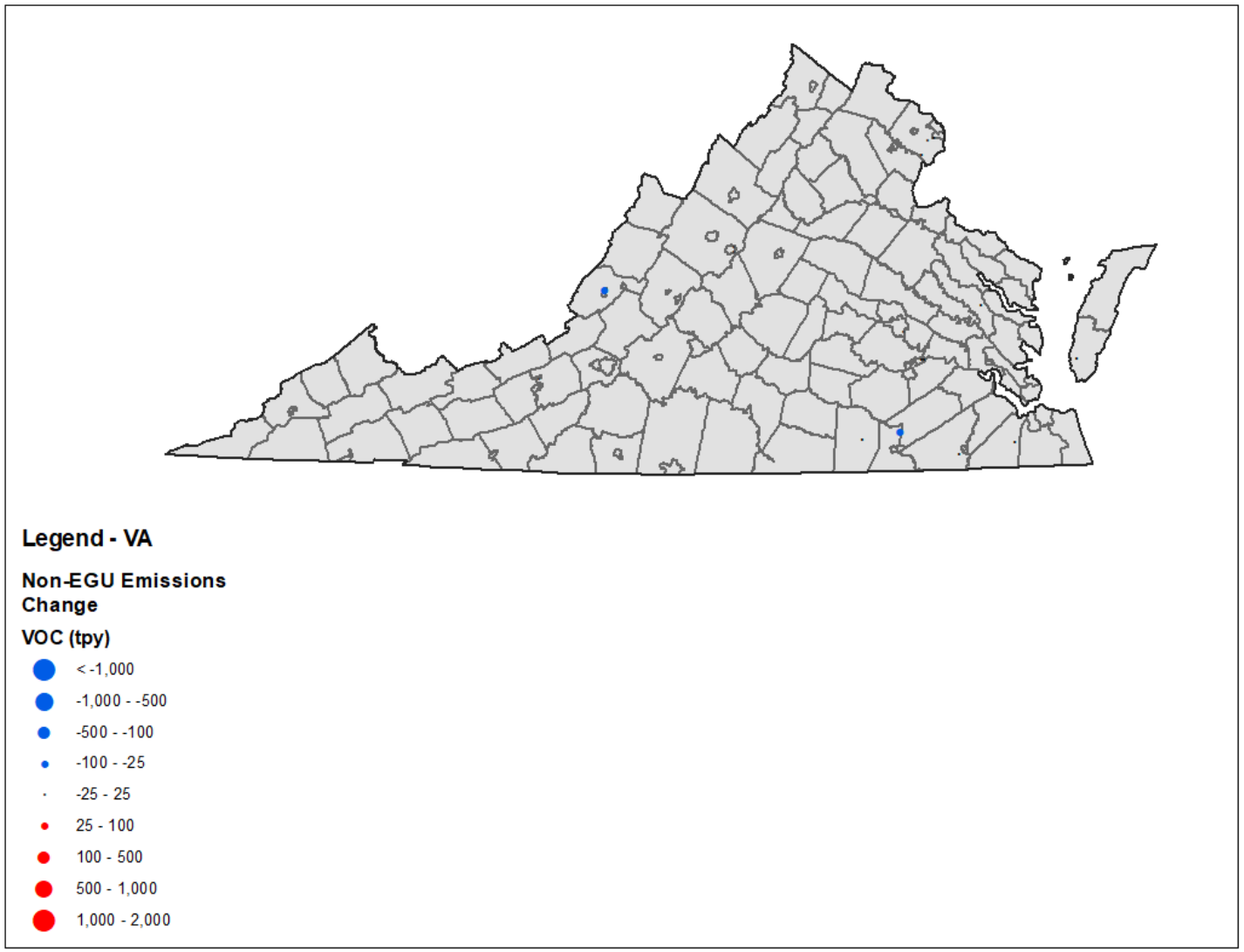

Figure C.9-14. Virginia Point Non-EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

Appendix C-10. West Virginia 2028 Point EGU and Point Non-EGU Comparisons

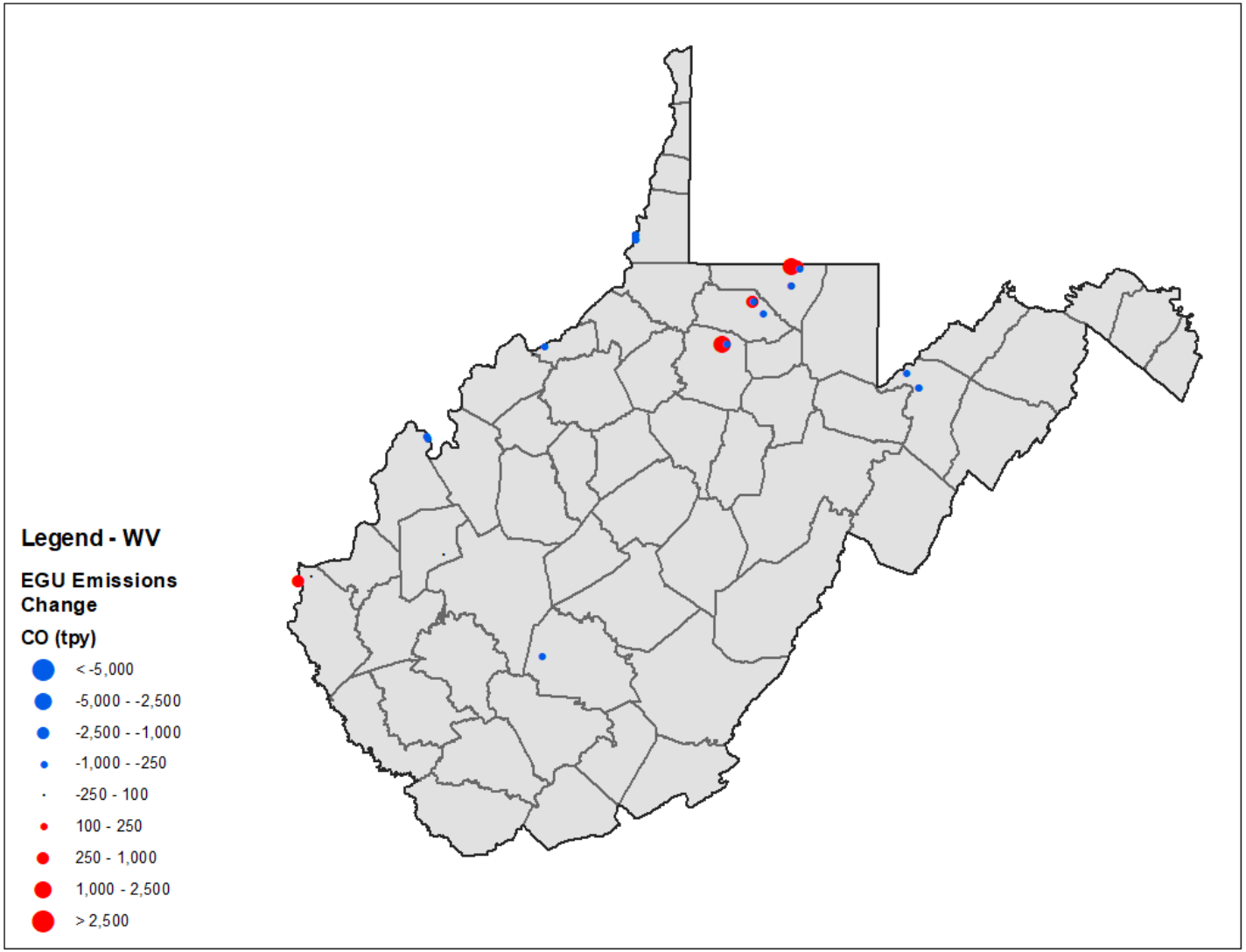

Figure C.10-1. West Virginia Point EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

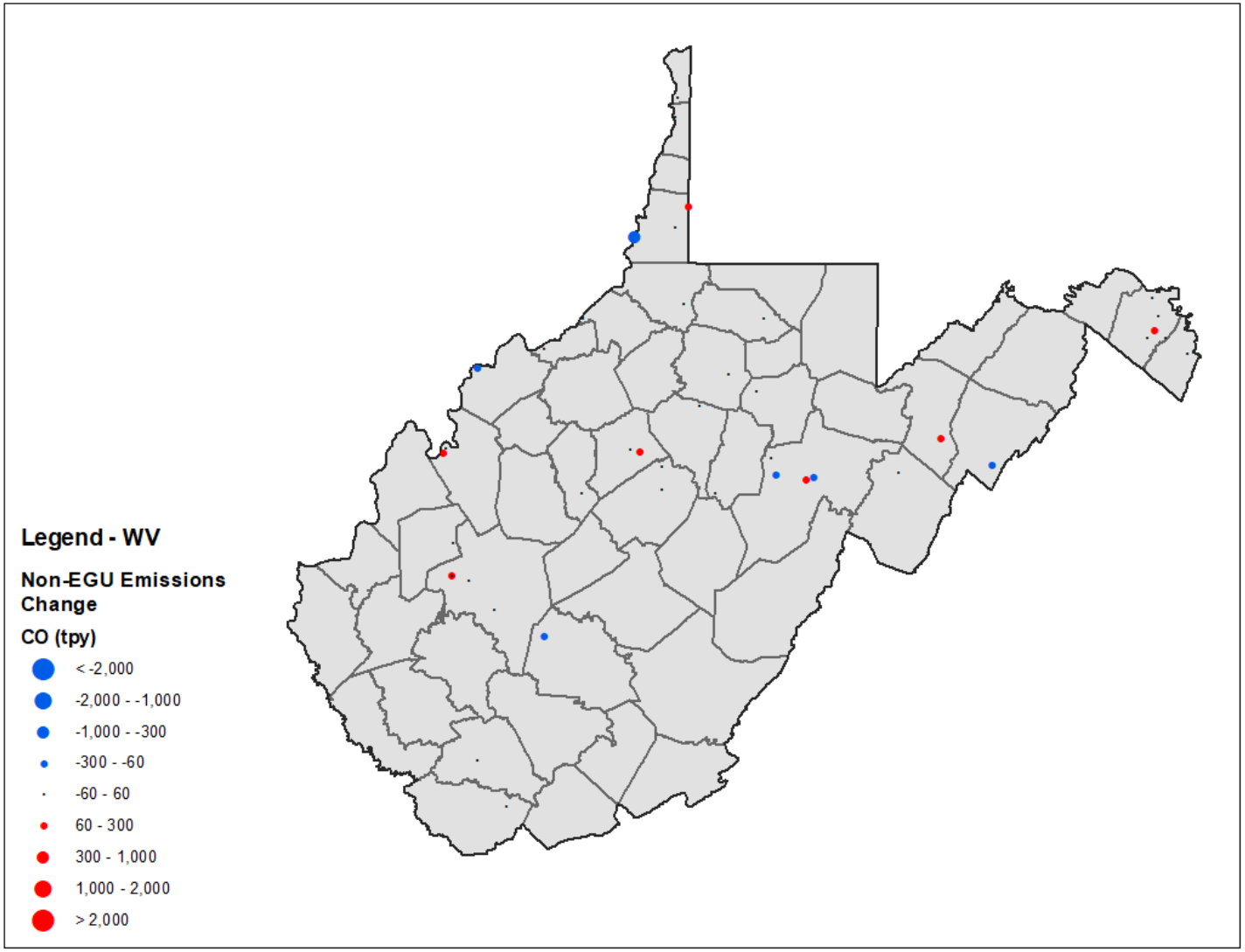

Figure C.10-2. West Virginia Point Non-EGU CO Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

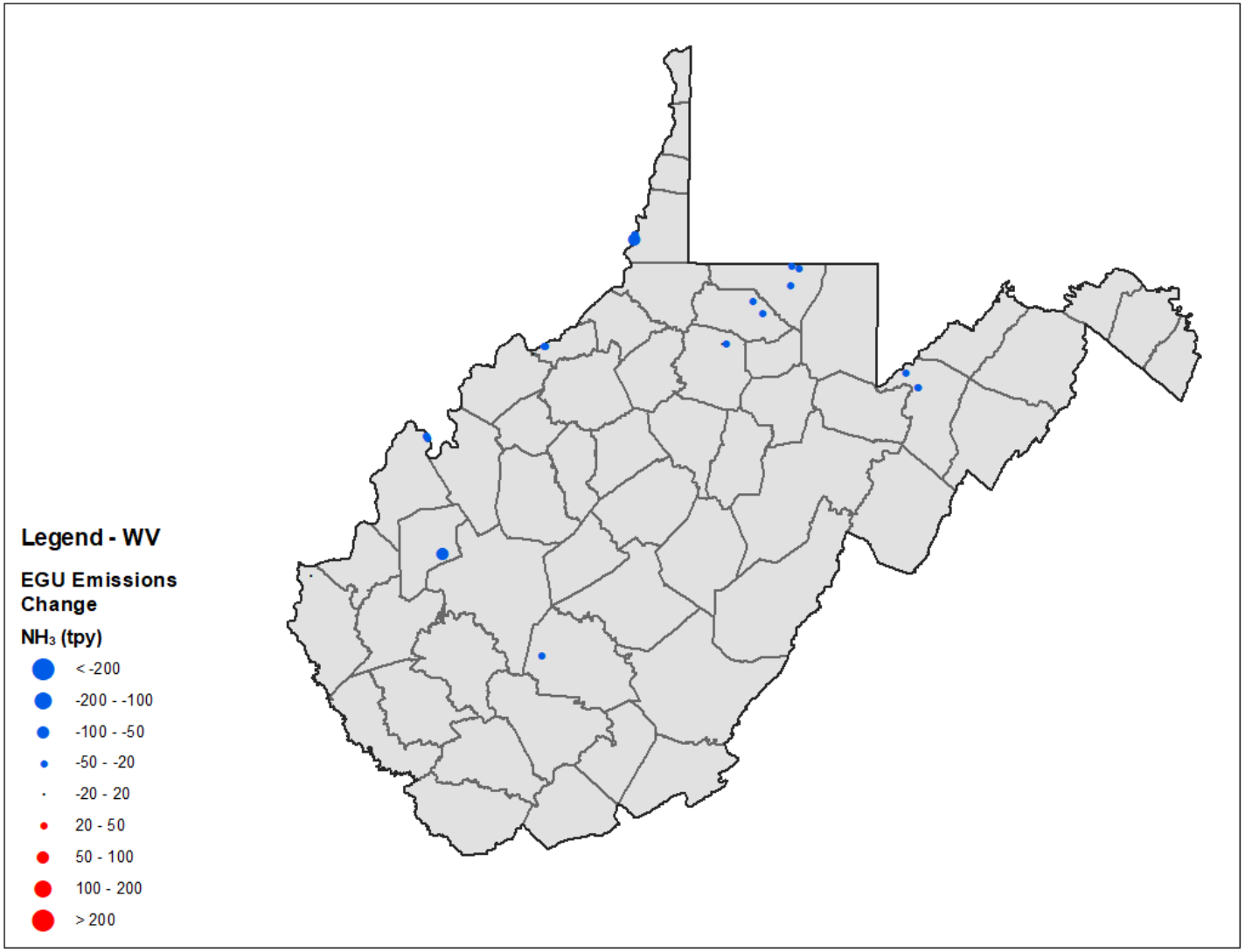

Figure C.10-3. West Virginia Point EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

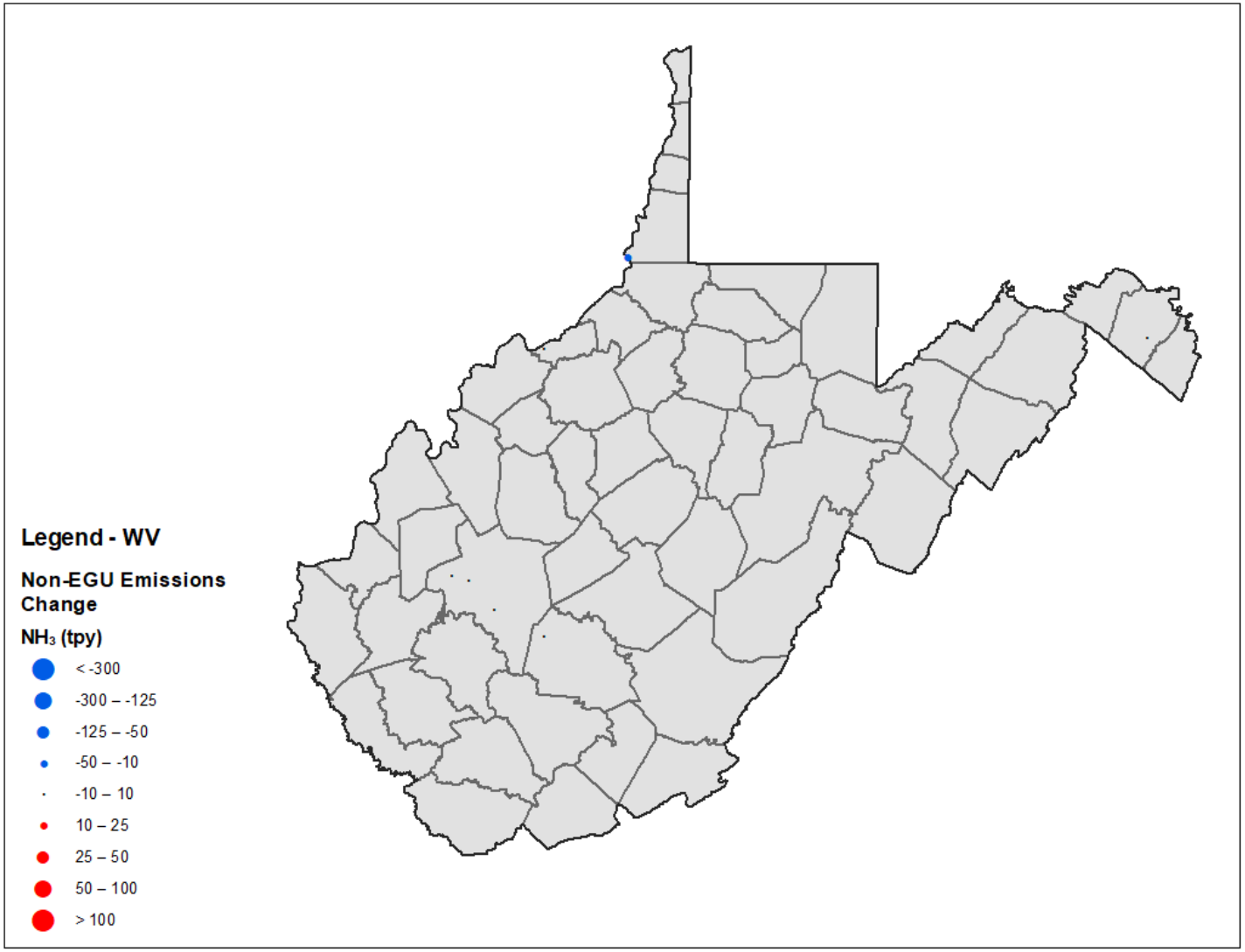

Figure C.10-4. West Virginia Point Non-EGU NH_3 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

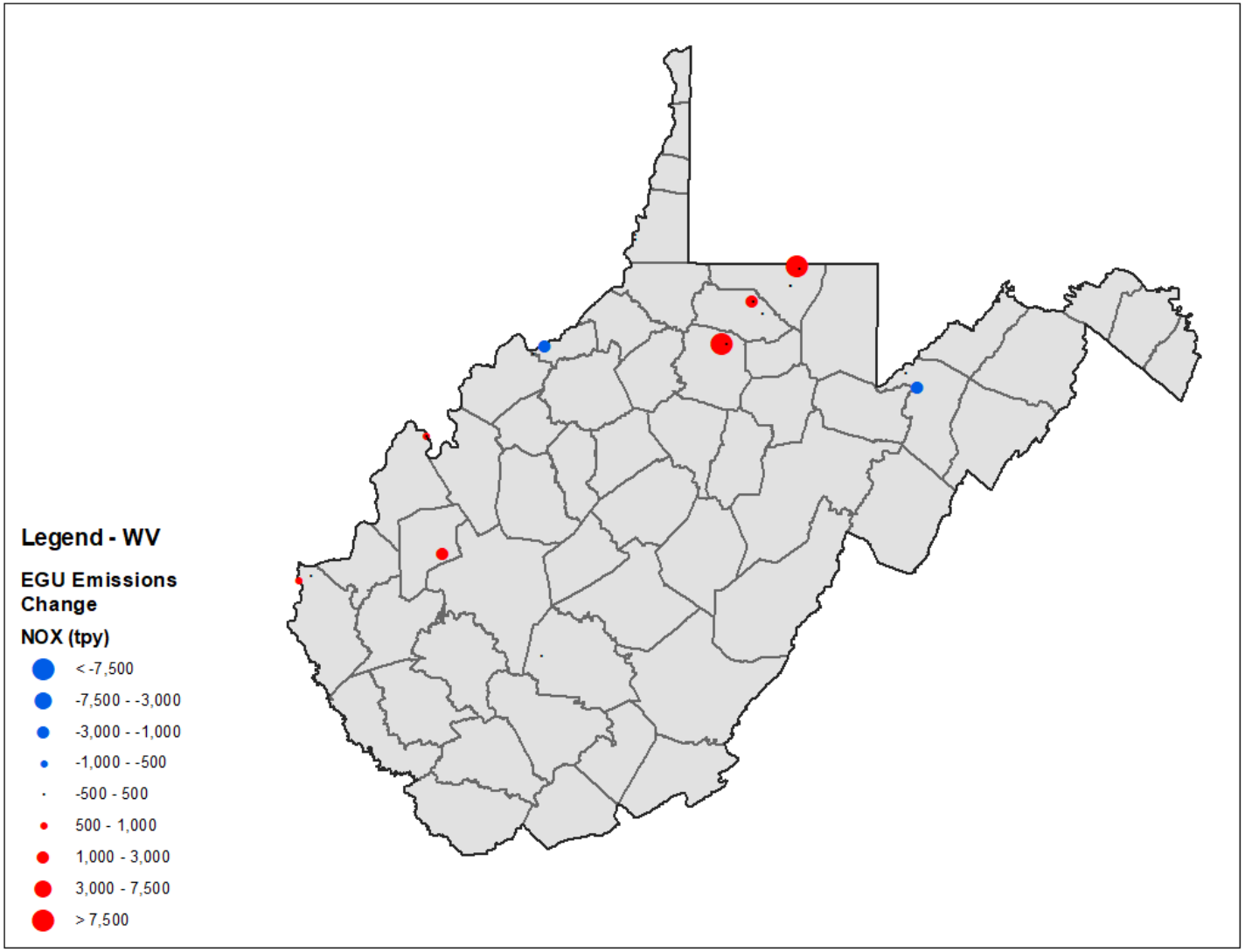

Figure C.10-5. West Virginia Point EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

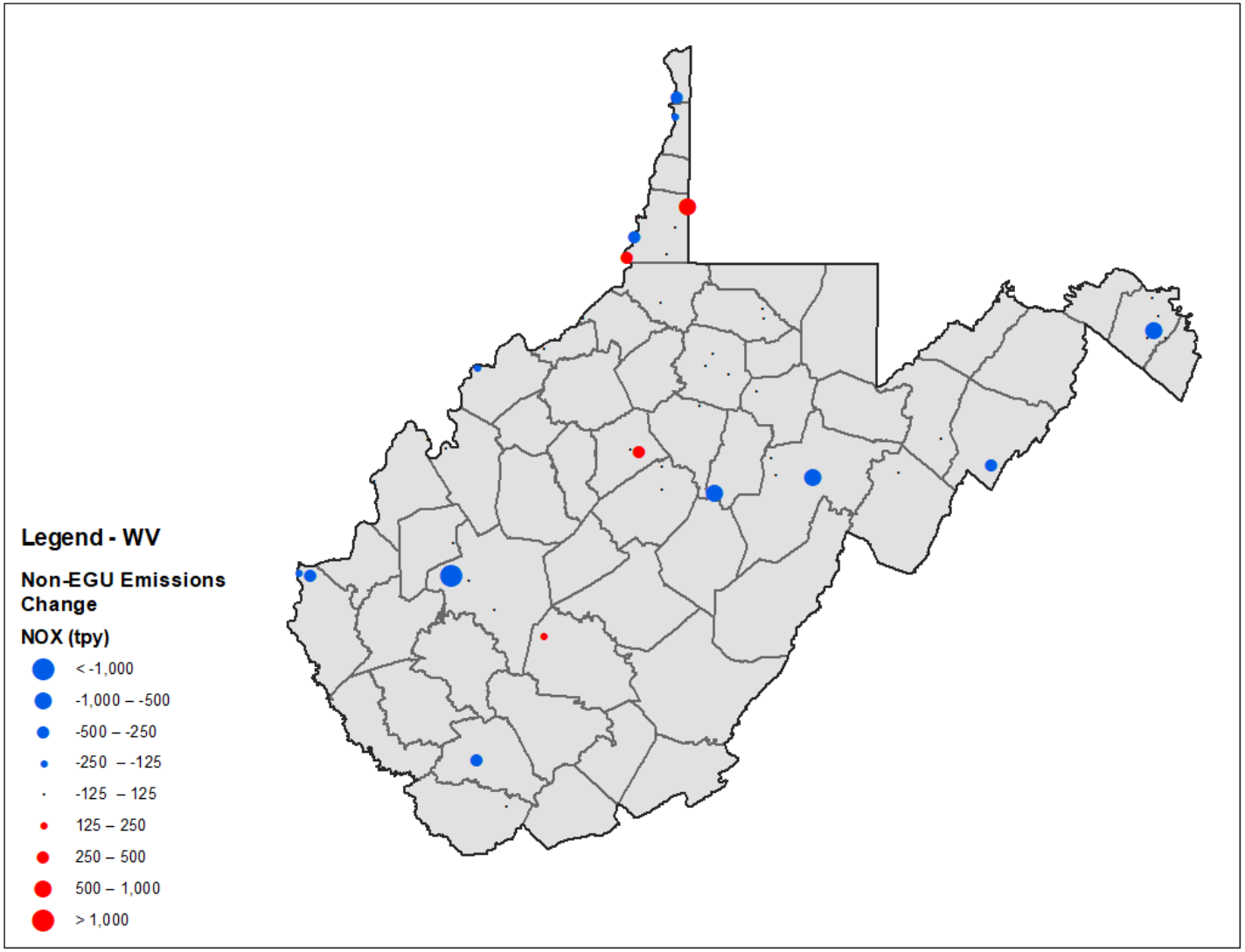

Figure C.10-6. West Virginia Point Non-EGU NO_x Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

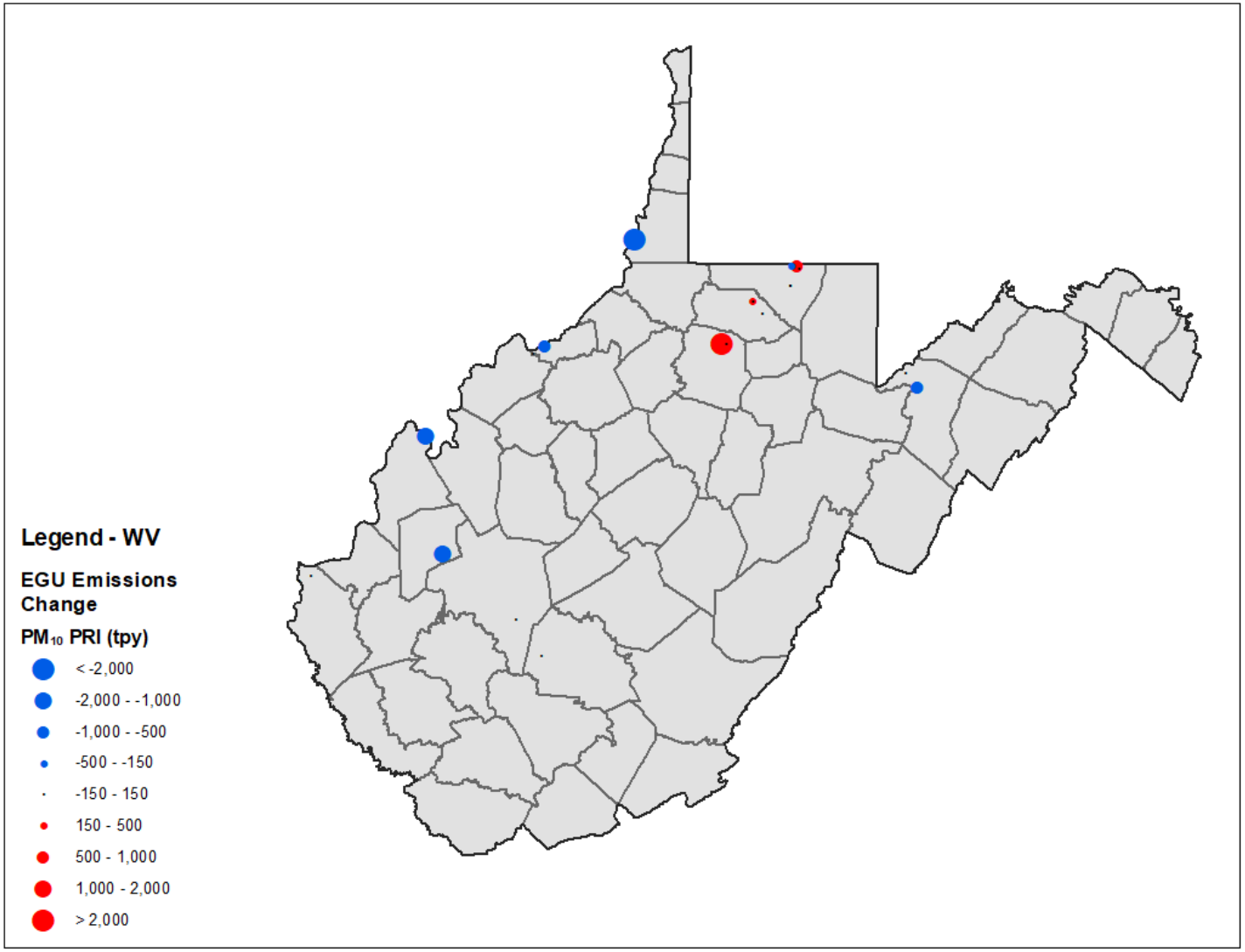

Figure C.10-7. West Virginia Point EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

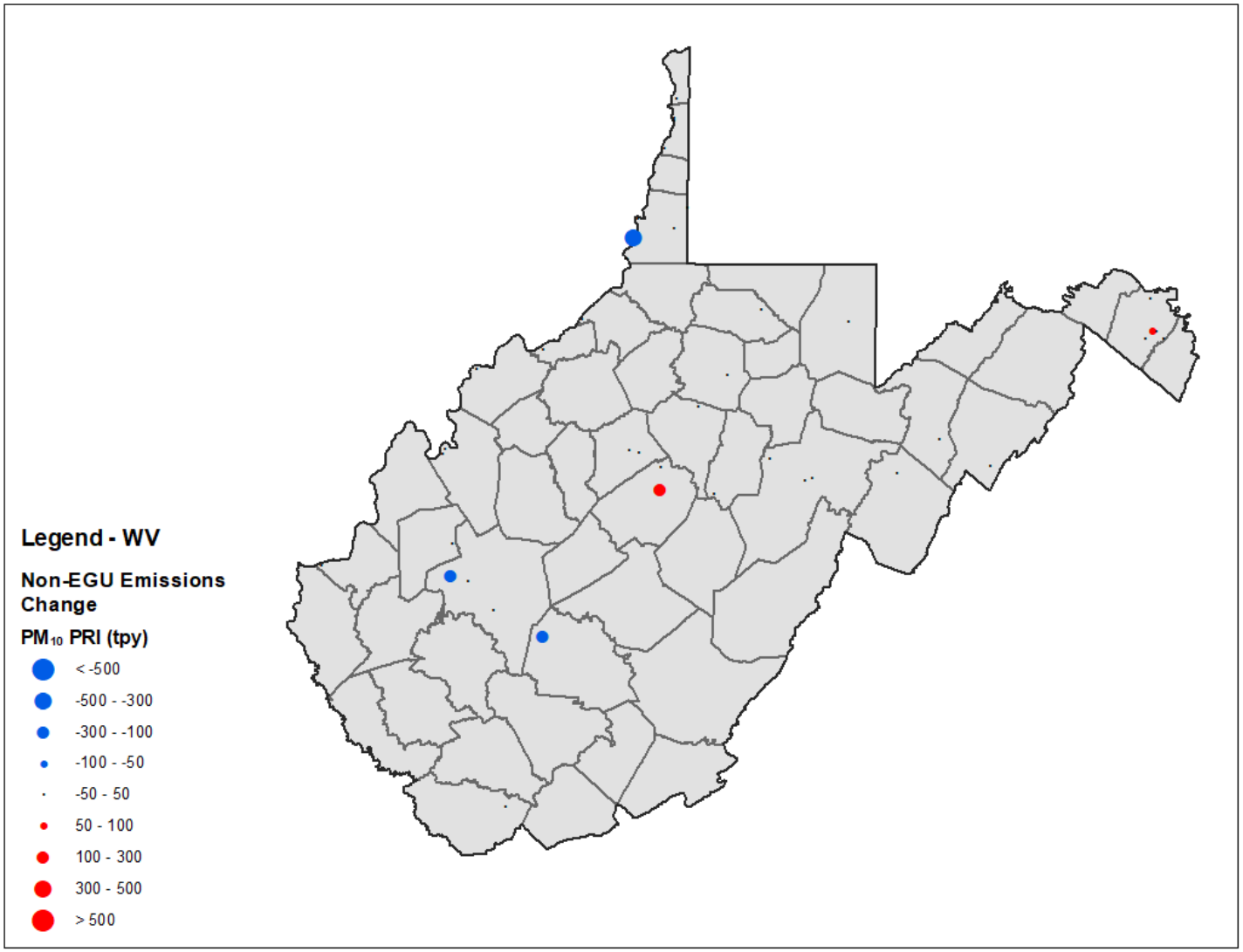

Figure C.10-8. West Virginia Point Non-EGU PM_{10}-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

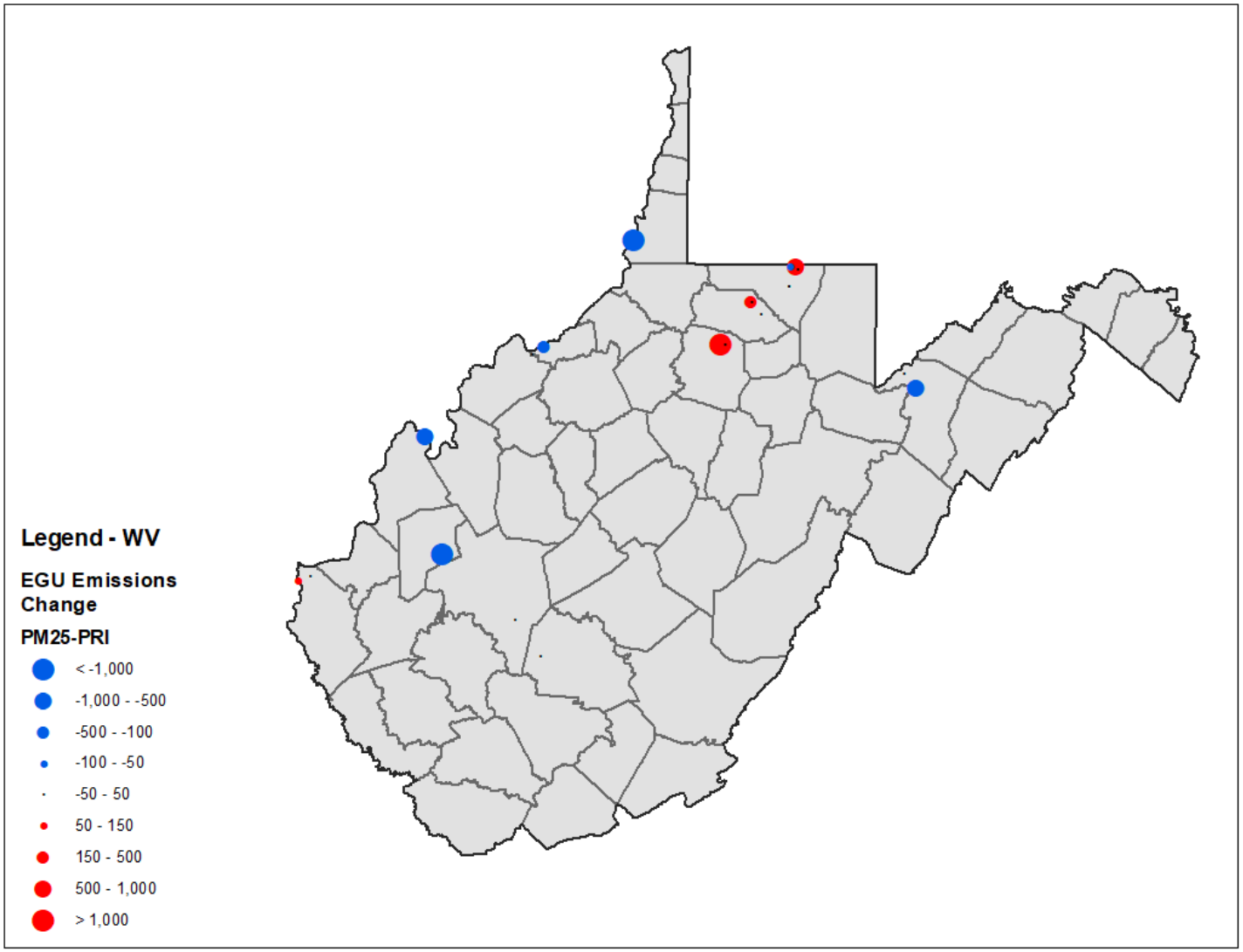

Figure C.10-9. West Virginia Point EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

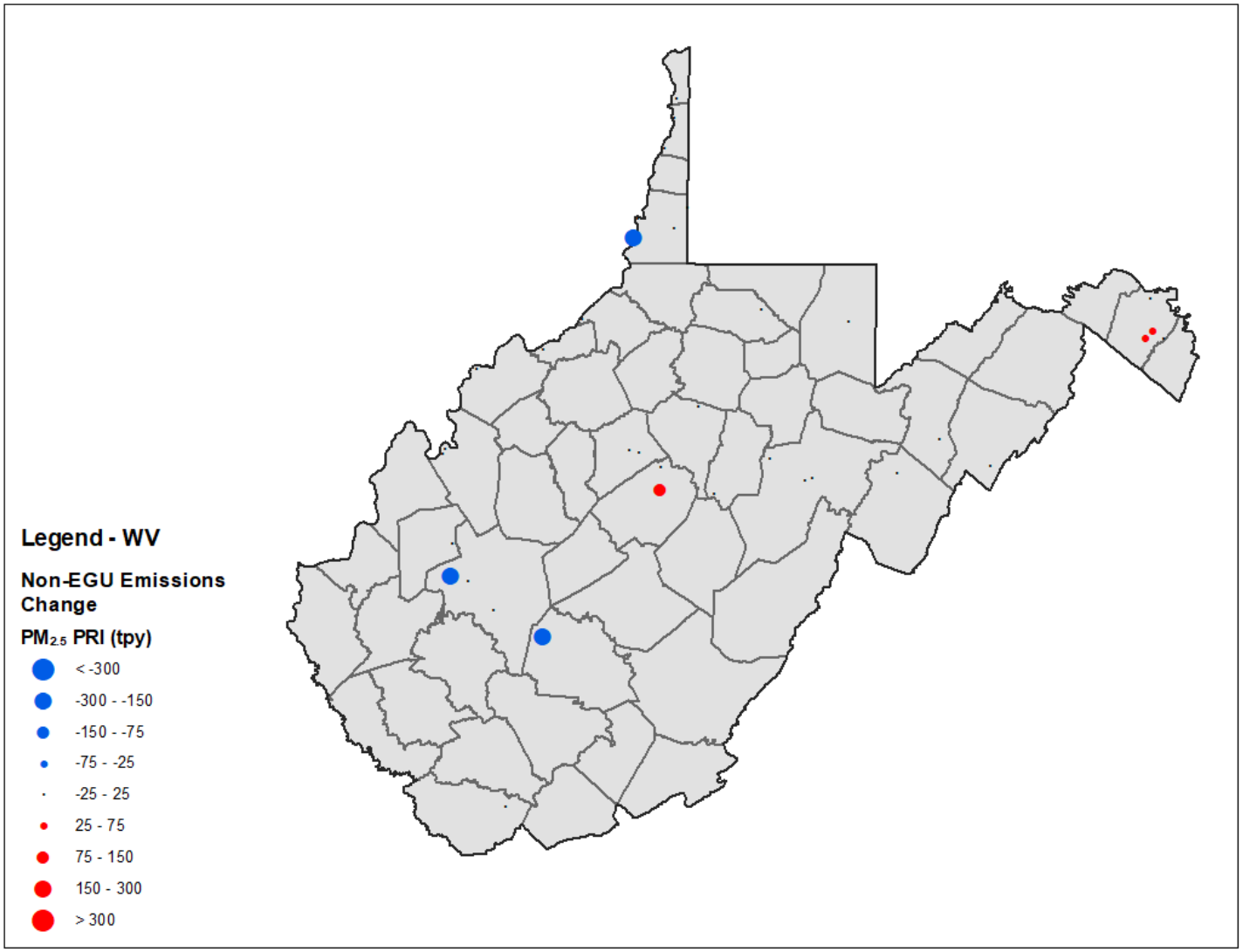

Figure C.10-10. West Virginia Point Non-EGU $PM_{2.5}$-PRI Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

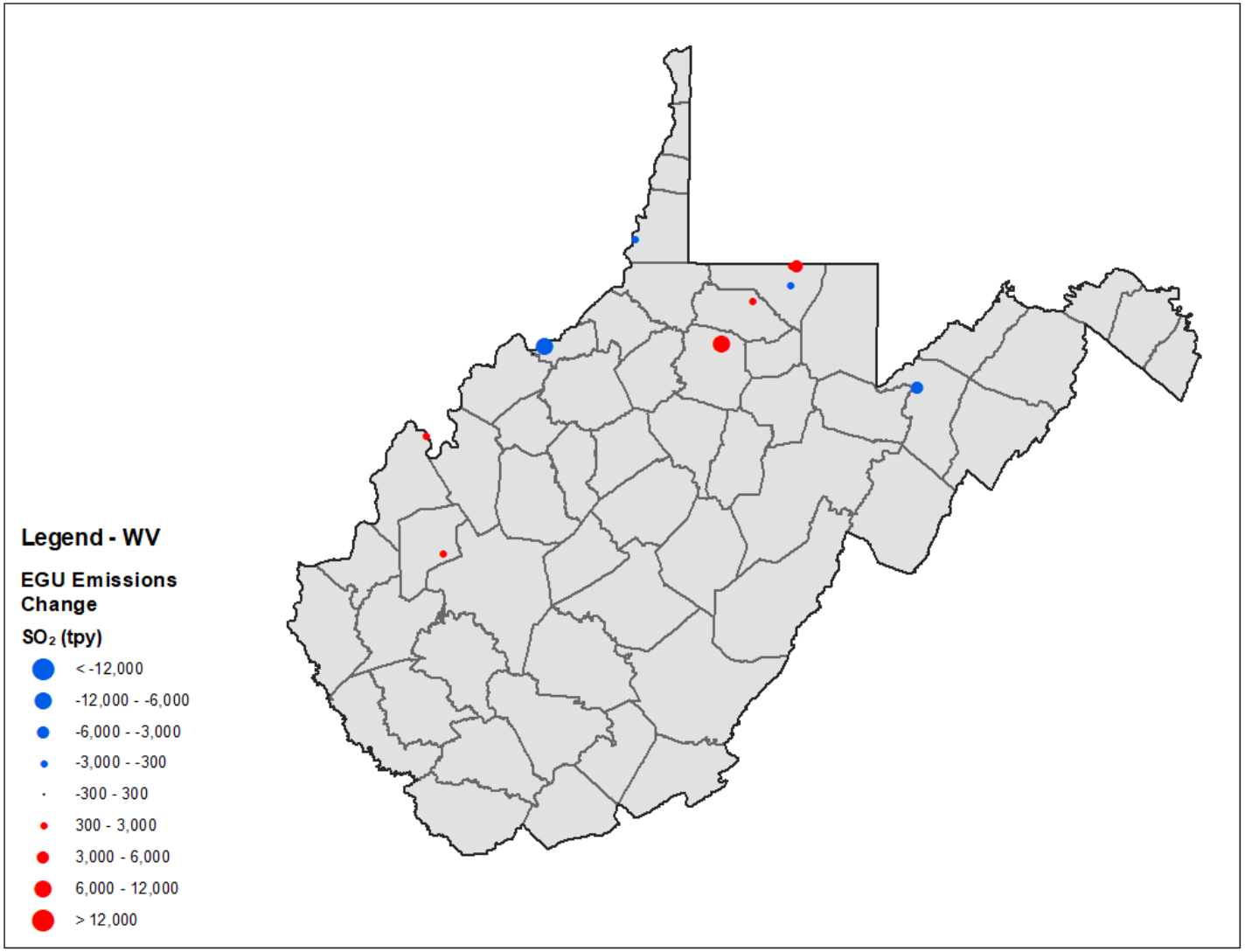

Figure C.10-11. West Virginia Point EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

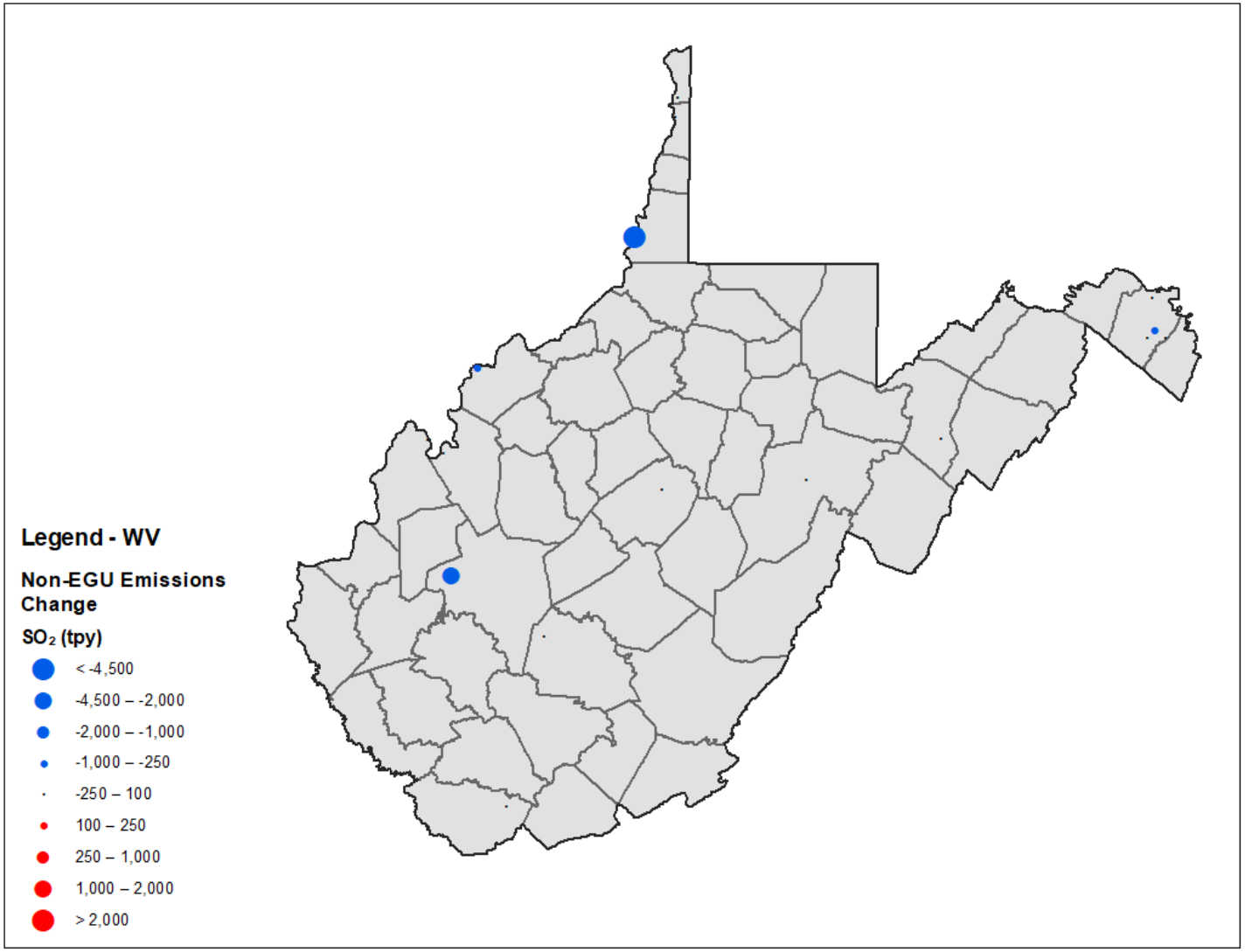

Figure C.10-12. West Virginia Point Non-EGU SO_2 Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

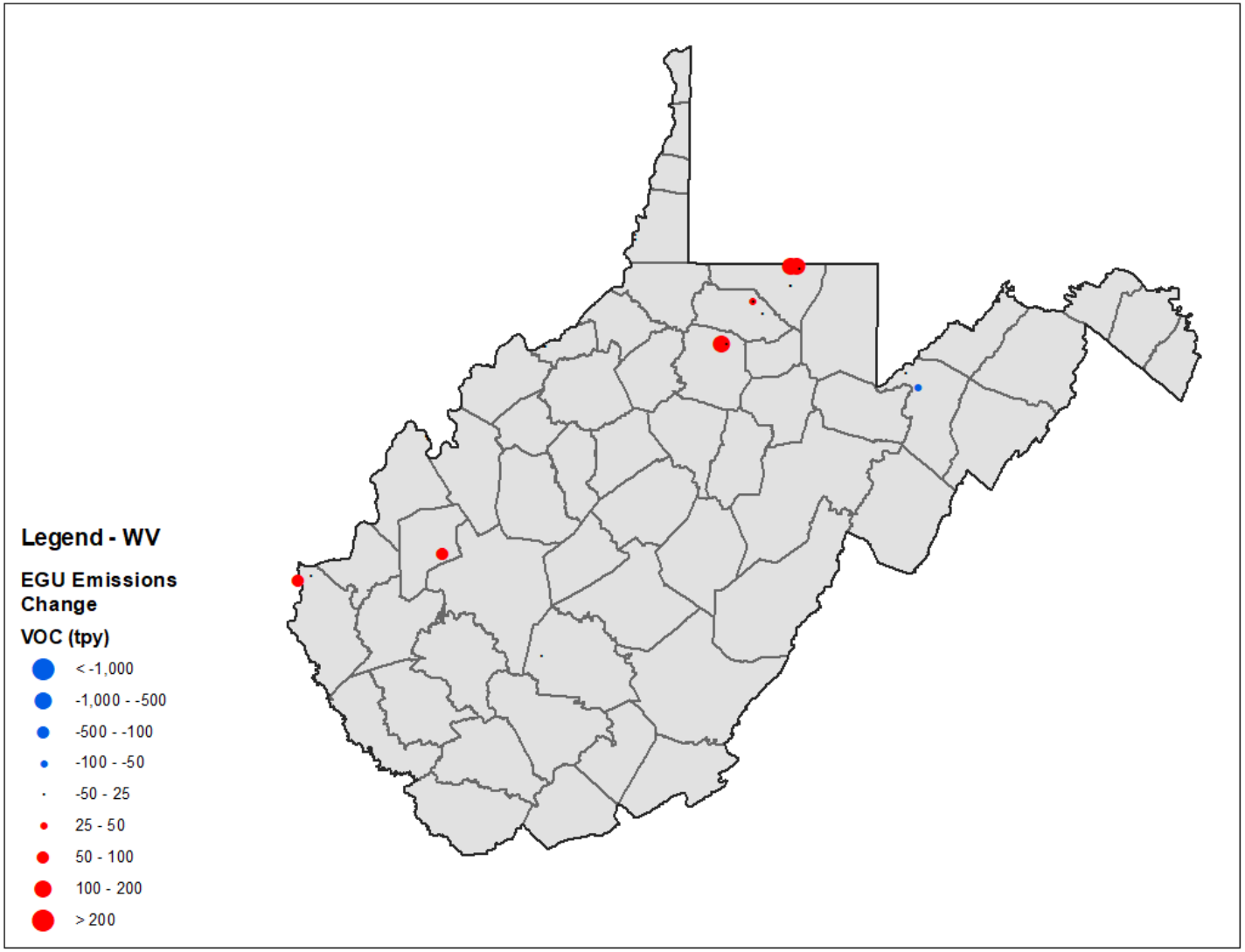

Figure C.10-13. West Virginia Point EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

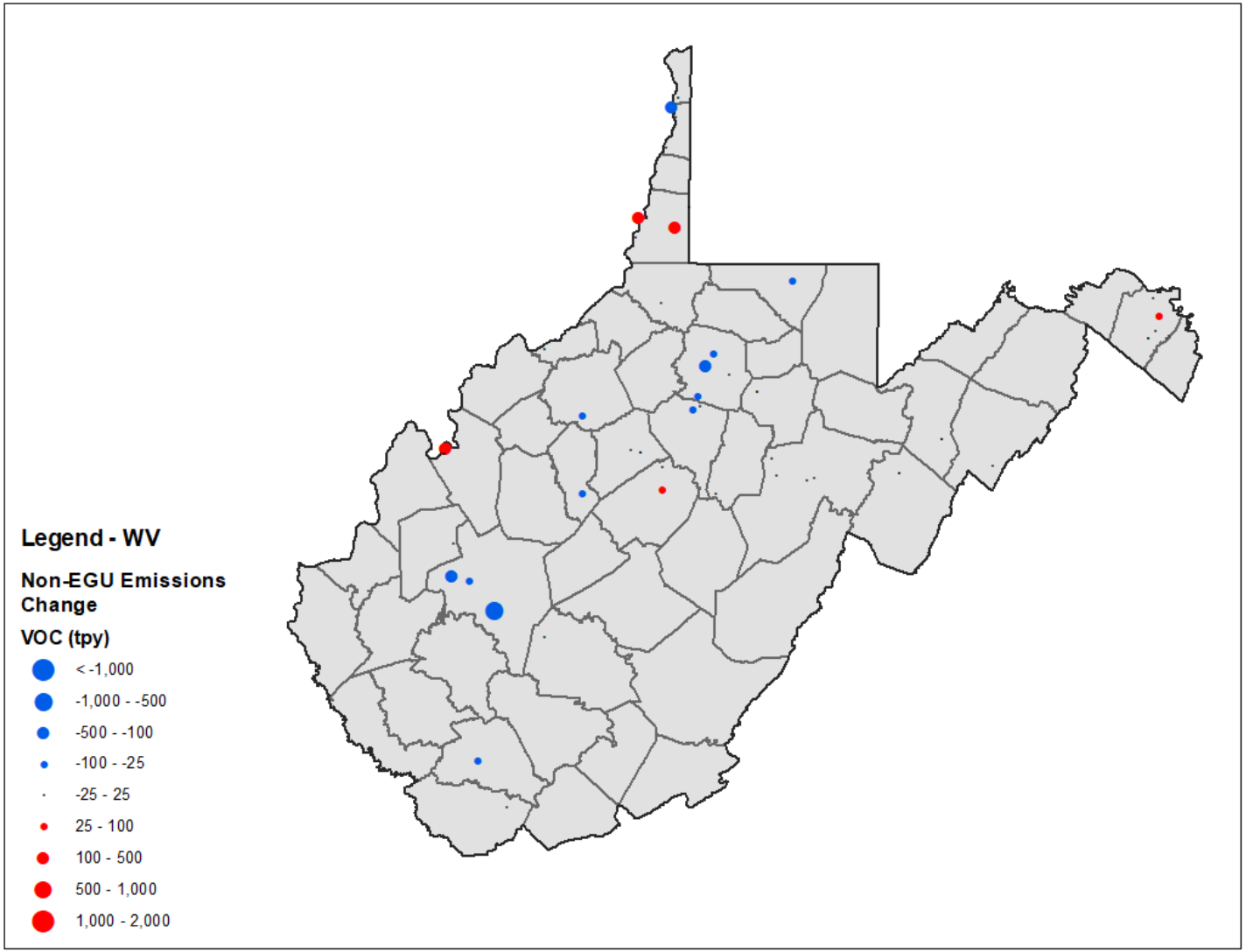

Figure C.10-14. West Virginia Point Non-EGU VOC Emissions Changes from the EPA 2028el Inventory to the Revised 2028 Inventory

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Appendix D.

Afdust Sector Unadjusted and Adjusted PM_{10}-PRI and $PM_{2.5}$-PRI Emissions by State

Fugitive dust emissions from source categories are included in the "afdust" sector. In this report, the tables and charts that include PM_{10}-PRI and $PM_{2.5}$-PRI emissions from the "afdust" sector include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for those categories. For air quality modeling, the emissions for the "afdust" sector are adjusted downward to account for the effects of precipitation and the amount of emissions that are transported by physical forces (e.g., wind, vehicle traffic). Appendix D-1 presents SCCs are included in the "afdust" sector. Appendices D-2 and D-3 present the unadjusted and adjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions, respectively.

Appendix D-1. SCCs Included in the "Afdust" Nonpoint Sector File

SCC	SCC Description	Tier 1 Level Description
2275085000	Mobile Sources: Aircraft; Unpaved Air Strips; Total	Miscellaneous
2294000000	Mobile Sources: Paved Roads; All Paved Roads; Total Fugitives	Miscellaneous
2294000002	Mobile Sources: Paved Roads; All Paved Roads; Total Sanding/Salting – Fugitives	Miscellaneous
2296000000	Mobile Sources: Unpaved Roads; All Unpaved Roads; Total Fugitives	Miscellaneous
2296005000	Mobile Sources: Unpaved Roads; Public Unpaved Roads; Total Fugitives	Miscellaneous
2296010000	Mobile Sources: Unpaved Roads; Industrial Unpaved Roads; Total Fugitives	Miscellaneous
2311000000	Industrial Processes; Construction: SIC 15-17; All Processes; Total	Miscellaneous
2311010000	Industrial Processes; Construction: SIC 15-17; Residential; Total	Miscellaneous
2311020000	Industrial Processes; Construction: SIC 15-17; Industrial/Commercial/Institutional; Total	Miscellaneous
2311030000	Industrial Processes; Construction: SIC 15-17; Road Construction; Total	Miscellaneous
2311040000	Industrial Processes; Construction: SIC 15-17; Special Trade Construction; Total	Miscellaneous
2325000000	Industrial Processes; Mining and Quarrying: SIC 14; All Processes; Total	Other Industrial Processes
2325020000	Industrial Processes; Mining and Quarrying: SIC 14; Crushed and Broken Stone; Total	Other Industrial Processes
2325030000	Industrial Processes; Mining and Quarrying: SIC 14; Sand and Gravel; Total	Other Industrial Processes
2801000000	Misc. Area Sources; Agricultural Production – Crops; Agricultural Crops; Total	Other Industrial Processes
2801000002	Misc. Area Sources; Agricultural Production – Crops; Agricultural Crops; Planting	Other Industrial Processes
2801000003	Misc. Area Sources; Agricultural Production – Crops; Agricultural Crops; Tilling	Miscellaneous
2801000005	Misc. Area Sources; Agricultural Production – Crops; Agricultural Crops; Harvesting	Miscellaneous
2801000008	Misc. Area Sources; Agricultural Production – Crops; Agricultural Crops; Transport	Miscellaneous
2805001000	Misc. Area Sources; Agricultural Production – Livestock; Beef cattle – finishing operations on feedlots (drylots)	Miscellaneous

Appendix D-2. Unadjusted and Adjusted PM_{10}-PRI Emissions by State for the "Afdust" Sector

State	2011 Emissions[1]			2028 Emissions[2]		
	Unadjusted PM_{10} Emissions (tpy)	Adjusted PM_{10} Emissions (tpy)	% Difference	Unadjusted PM_{10} Emissions (tpy)	Adjusted PM_{10} Emissions (tpy)	% Difference
Alabama	380,229	68,124	-82%	430,733	76,874	-82%
Florida	293,589	111,780	-62%	380,488	145,257	-62%
Georgia	735,156	139,833	-81%	881,893	164,382	-81%
Kentucky	199,314	39,138	-80%	227,020	43,921	-81%
Mississippi	960,759	174,453	-82%	1,184,397	209,460	-82%
North Carolina	186,065	39,732	-79%	214,913	45,982	-79%
South Carolina	260,399	61,175	-77%	323,526	76,086	-76%
Tennessee	139,126	31,767	-77%	155,433	34,741	-78%
Virginia	131,973	23,097	-82%	146,912	25,859	-82%
West Virginia	85,879	6,211	-93%	85,917	6,215	-93%
Totals	**3,372,490**	**695,311**	**-79%**	**4,031,230**	**828,777**	**-79%**

[1] 2011 State-level unadjusted and adjusted PM_{10}-PRI emissions were obtained from the "afdust" tab in the following file: ftp://ftp.epa.gov/EmisInventory/2011v6/v3platform/reports/2011el_and_2023el/2011el_cb6v2_v6_11g_state_sector_totals.xlsx

[2] 2028 State-level unadjusted and adjusted PM_{10}-PRI emissions were obtained from the "afdust" tab in the following file: ftp://ftp.epa.gov/EmisInventory/2011v6/v3platform/reports/2028el/2028el_cb6v2_v6_11g_state_sector_totals.xlsx

Appendix D-3. Unadjusted and Adjusted $PM_{2.5}$-PRI Emissions by State for the "Afdust" Sector

State	2011 Emissions			2028 Emissions		
	Unadjusted $PM_{2.5}$ Emissions (tpy)	Adjusted $PM_{2.5}$ Emissions (tpy)	% Difference	Unadjusted $PM_{2.5}$ Emissions (tpy)	Adjusted $PM_{2.5}$ Emissions (tpy)	% Difference
Alabama	47,298	8,560	-82%	53,486	9,629	-82%
Florida	39,755	15,304	-62%	51,667	19,976	-61%
Georgia	90,130	18,014	-80%	106,273	20,730	-80%
Kentucky	29,413	5,992	-80%	33,207	6,651	-80%
Mississippi	108,287	21,280	-80%	131,498	24,923	-81%
North Carolina	33,330	7,225	-78%	38,620	8,387	-78%
South Carolina	31,594	7,492	-76%	38,858	9,204	-76%
Tennessee	25,263	5,843	-77%	28,530	6,443	-77%
Virginia	19,402	3,479	-82%	22,449	4,032	-82%
West Virginia	10,646	764	-93%	10,653	765	-93%
Totals	**435,119**	**93,952**	**-79%**	**515,240**	**110,740**	**-79%**

[1] 2011 State-level unadjusted and adjusted PM_{10}-PRI emissions were obtained from the "afdust" tab in the following file: ftp://ftp.epa.gov/EmisInventory/2011v6/v3platform/reports/2011el_and_2023el/2011el_cb6v2_v6_11g_state_sector_totals.xlsx

[2] 2028 State-level unadjusted and adjusted PM_{10}-PRI emissions were obtained from the "afdust" tab in the following file: ftp://ftp.epa.gov/EmisInventory/2011v6/v3platform/reports/2028el/2028el_cb6v2_v6_11g_state_sector_totals.xlsx

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Appendix E.

Tier-Level Emissions by State[46]

[46] The revised 2028 emissions presented in this Appendix are reflective of the emissions update finalized on 3/31/2020.

Appendix E-1. 2011 Sector 1 Pollutant Emissions (except Biogenic) by State[47]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Alabama							
Chemical & Allied Product Mfg	3,123	183	2,411	704	650	6,559	1,629
Fuel Comb. Elec. Util.	9,958	489	61,687	7,323	4,866	179,323	1,152
Fuel Comb. Industrial	71,865	813	35,447	46,274	34,664	41,322	3,283
Fuel Comb. Other	12,104	466	4,229	1,689	1,654	417	2,038
Highway Vehicles	701,397	2,724	152,732	8,001	4,611	683	75,523
Metals Processing	10,991	76	5,947	5,359	4,647	13,298	1,843
Miscellaneous[47]	670,765	70,977	14,735	445,039	108,297	6,746	159,034
Off-Highway	261,788	44	47,801	3,584	3,369	1,074	43,396
Other Industrial Processes[47]	19,708	1,527	21,546	17,032	8,749	9,569	14,327
Petroleum & Related Industries	14,882	3	11,226	373	354	19,196	22,103
Solvent Utilization	124	2	135	83	61	1	46,790
Storage & Transport	65	<0.5	51	870	653	2	18,726
Waste Disposal & Recycling	45,712	105	1,876	7,885	6,531	175	3,620
Alabama 2011 Totals[a]	**1,822,482**	**77,408**	**359,822**	**544,218**	**179,105**	**278,364**	**393,465**

[a] Total emissions may not add up due to rounding

[47] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-1. 2011 Sector 1 Pollutant Emissions (except Biogenic) by State[48]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Florida							
Chemical & Allied Product Mfg	117	1,662	1,393	415	348	21,948	1,231
Fuel Comb. Elec. Util.	36,344	3,102	69,049	11,621	9,607	95,087	1,931
Fuel Comb. Industrial	72,200	710	31,291	33,061	28,979	15,715	4,576
Fuel Comb. Other	25,015	352	4,601	3,498	3,448	1,183	4,330
Highway Vehicles	1,784,678	7,465	308,752	21,329	9,377	2,104	183,609
Metals Processing	742	<0.5	80	199	165	337	62
Miscellaneous[48]	992,515	53,791	22,844	384,091	129,258	10,473	231,259
Off-Highway	1,120,490	172	159,796	14,009	13,181	20,051	166,582
Other Industrial Processes[48]	13,065	372	8,885	28,504	11,836	4,338	14,485
Petroleum & Related Industries	802	NR[a]	279	92	63	211	2,847
Solvent Utilization	3	NR[a]	2	34	30	<0.5	151,477
Storage & Transport	104	37	154	1,177	592	29	101,966
Waste Disposal & Recycling	27,944	394	1,240	4,151	3,492	1,224	2,707
Florida 2011 Totals[b]	**4,074,019**	**68,056**	**608,367**	**502,180**	**210,376**	**172,701**	**867,062**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[48] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-1. 2011 Sector 1 Pollutant Emissions (except Biogenic) by State[49]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Georgia							
Chemical & Allied Product Mfg	502	2,376	959	476	408	1,580	2,571
Fuel Comb. Elec. Util.	13,543	739	56,037	9,061	6,298	188,009	1,195
Fuel Comb. Industrial	21,837	256	22,274	3,198	2,752	21,358	1,737
Fuel Comb. Other	20,021	1,315	11,233	2,204	2,152	4,660	3,056
Highway Vehicles	1,018,645	4,492	223,223	12,518	6,829	1,088	109,005
Metals Processing	344	NR[a]	149	156	82	92	57
Miscellaneous[49]	1,022,524	99,060	40,646	858,861	220,258	11,424	78,048
Off-Highway	471,960	73	74,217	5,923	5,594	2,562	60,843
Other Industrial Processes[49]	24,548	3,306	15,893	47,506	17,925	3,705	22,763
Petroleum & Related Industries	6	NR[a]	NR[a]	23	11	NR[a]	132
Solvent Utilization	25	36	30	31	30	<0.5	84,352
Storage & Transport	49	1	21	1,015	511	NR[a]	33,985
Waste Disposal & Recycling	227,703	52	7,636	26,852	26,222	223	17,363
Georgia 2011 Totals[b]	**2,821,707**	**111,705**	**452,317**	**967,825**	**289,072**	**234,700**	**415,106**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[49] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-1. 2011 Sector 1 Pollutant Emissions (except Biogenic) by State[50]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Kentucky							
Chemical & Allied Product Mfg	62	28	241	817	708	1,663	2,202
Fuel Comb. Elec. Util.	15,547	757	92,756	13,874	9,495	247,556	1,749
Fuel Comb. Industrial	10,848	97	20,009	2,247	1,981	5,774	1,422
Fuel Comb. Other	48,175	908	5,765	6,891	6,781	1,868	8,390
Highway Vehicles	498,702	2,106	115,685	5,480	3,345	502	50,326
Metals Processing	61,446	1	1,611	4,151	3,402	6,021	2,081
Miscellaneous[50]	190,510	53,765	3,486	204,775	44,517	1,742	43,514
Off-Highway	201,625	46	56,646	3,573	3,392	641	31,999
Other Industrial Processes[50]	4,985	321	5,682	26,177	9,042	6,468	31,759
Petroleum & Related Industries	31,312	NR[a]	24,707	683	633	522	31,085
Solvent Utilization	3	<0.5	5	83	73	<0.5	44,118
Storage & Transport	23	85	6	2,005	484	3	22,606
Waste Disposal & Recycling	25,288	16	1,156	5,335	4,532	161	2,352
Kentucky 2011 Totals[b]	**1,088,525**	**58,131**	**327,756**	**276,088**	**88,386**	**272,922**	**273,603**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[50] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-1. 2011 Sector 1 Pollutant Emissions (except Biogenic) by State[51]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Mississippi							
Chemical & Allied Product Mfg	7,477	521	1,864	487	430	1,377	1,317
Fuel Comb. Elec. Util.	6,154	402	26,602	2,084	1,627	43,259	487
Fuel Comb. Industrial	14,794	1	32,381	3,448	2,935	6,397	3,428
Fuel Comb. Other	7,450	288	2,885	1,029	997	50	1,200
Highway Vehicles	433,332	1,794	91,026	4,491	2,538	405	46,084
Metals Processing	1,313	NR[a]	381	549	546	124	127
Miscellaneous[51]	372,960	61,162	9,080	996,316	142,022	4,248	81,272
Off-Highway	153,473	31	33,132	2,493	2,353	1,029	29,662
Other Industrial Processes[51]	5,127	560	3,204	8,129	5,372	678	10,915
Petroleum & Related Industries	4,592	36	3,641	257	200	6,240	28,840
Solvent Utilization	31	NR[a]	39	115	105	<0.5	38,358
Storage & Transport	368	NR[a]	71	109	70	42	29,068
Waste Disposal & Recycling	42,760	805	1,591	6,657	5,392	91	3,780
Mississippi 2011 Totals[b]	**1,049,833**	**65,600**	**205,895**	**1,026,163**	**164,587**	**63,940**	**274,537**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[51] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-1. 2011 Sector 1 Pollutant Emissions (except Biogenic) by State[52]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
North Carolina							
Chemical & Allied Product Mfg	7,188	658	1,286	738	472	5,507	2,756
Fuel Comb. Elec. Util.	32,828	205	43,911	8,790	6,921	83,925	934
Fuel Comb. Industrial	16,197	75	24,394	3,828	2,899	12,354	1,500
Fuel Comb. Other	29,163	878	9,652	4,724	4,323	7,757	4,611
Highway Vehicles	1,145,623	4,486	204,008	10,447	5,510	1,082	112,173
Metals Processing	2,675	27	324	355	308	556	1,493
Miscellaneous[52]	101,890	168,297	4,047	195,376	45,672	1,068	7,851
Off-Highway	479,335	71	68,433	5,742	5,435	2,472	63,283
Other Industrial Processes[52]	5,731	605	10,261	14,515	6,970	3,279	15,218
Petroleum & Related Industries	773	NR[a]	263	249	160	432	306
Solvent Utilization	53	74	72	145	121	31	95,419
Storage & Transport	2,174	57	125	590	306	7	24,731
Waste Disposal & Recycling	66,928	67	2,720	11,151	9,386	251	5,613
North Carolina 2011 Totals[b]	**1,890,559**	**175,499**	**369,497**	**256,650**	**88,483**	**118,721**	**335,887**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[52] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-1. 2011 Sector 1 Pollutant Emissions (except Biogenic) by State[53]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
South Carolina							
Chemical & Allied Product Mfg	1,217	145	165	132	77	9	2,110
Fuel Comb. Elec. Util.	16,809	268	26,752	10,851	8,604	71,899	607
Fuel Comb. Industrial	19,560	134	17,924	10,314	8,273	15,748	1,103
Fuel Comb. Other	12,508	367	3,283	1,701	1,660	339	2,128
Highway Vehicles	475,876	2,104	109,374	6,618	3,766	504	51,164
Metals Processing	53,733	2	780	572	480	5,139	457
Miscellaneous[53]	214,147	33,020	4,602	280,281	51,363	1,978	48,908
Off-Highway	240,507	37	35,569	3,036	2,856	2,268	35,104
Other Industrial Processes[53]	17,912	1,056	10,251	7,581	4,149	5,223	15,036
Petroleum & Related Industries	NR[a]	NR[a]	NR[a]	NR[a]	NR[a]	NR[a]	31
Solvent Utilization	7	<0.5	1	14	13	<0.5	41,039
Storage & Transport	39	3	26	346	139	1	30,397
Waste Disposal & Recycling	48,668	639	1,817	7,055	5,746	140	4,073
South Carolina 2011 Totals[b]	**1,100,985**	**37,776**	**210,544**	**328,503**	**87,125**	**103,247**	**232,159**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[53] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix D-1. 2011 Sector 1 Pollutant Emissions (except Biogenic) by State[54]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Tennessee							
Chemical & Allied Product Mfg	14,866	310	811	755	426	492	4,412
Fuel Comb. Elec. Util.	5,529	242	27,156	5,191	4,172	120,170	769
Fuel Comb. Industrial	18,910	347	27,988	10,632	9,018	27,778	1,129
Fuel Comb. Other	25,945	787	9,207	3,470	3,182	5,441	5,168
Highway Vehicles	739,041	3,017	182,796	9,927	5,778	769	80,463
Metals Processing	5,066	2	611	1,492	1,251	572	2,923
Miscellaneous[54]	133,301	36,940	2,840	150,164	36,986	1,347	31,052
Off-Highway	309,062	53	60,384	4,242	4,010	767	46,292
Other Industrial Processes[54]	5,668	488	7,449	11,527	6,034	2,550	15,672
Petroleum & Related Industries	2,706	5	1,812	189	160	243	3,559
Solvent Utilization	72	72	84	328	288	15	67,091
Storage & Transport	56	57	37	520	238	5	29,921
Waste Disposal & Recycling	26,959	28	1,392	5,710	4,813	174	2,549
Tennessee 2011 Totals[a]	**1,287,181**	**42,346**	**322,564**	**204,145**	**76,357**	**160,323**	**291,002**

[a] Total emissions may not add up due to rounding

[54] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-1. 2011 Sector 1 Pollutant Emissions (except Biogenic) by State[55]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Virginia							
Chemical & Allied Product Mfg	83	816	7,707	169	73	203	486
Fuel Comb. Elec. Util.	4,984	205	30,213	5,794	1,157	69,077	742
Fuel Comb. Industrial	13,713	226	22,048	5,883	4,817	14,349	950
Fuel Comb. Other	77,919	1,596	11,470	11,302	11,002	4,884	12,940
Highway Vehicles	566,315	3,341	145,507	7,106	4,368	711	63,152
Metals Processing	3,016	NR[a]	812	859	724	5,196	270
Miscellaneous[55]	167,730	45,744	3,186	141,777	33,384	1,487	39,308
Off-Highway	383,506	61	67,844	5,029	4,747	3,355	48,417
Other Industrial Processes[55]	5,644	399	12,766	12,394	5,001	7,028	6,937
Petroleum & Related Industries	12,445	76	9,618	406	284	59	8,525
Solvent Utilization	<0.5	5	<0.5	66	61	0.3057	85,760
Storage & Transport	5	44	2	351	286	0.0250	23,556
Waste Disposal & Recycling	33,103	63	2,283	5,745	4,925	1,469	4,317
Virginia 2011 Totals[b]	**1,268,463**	**52,578**	**313,457**	**196,881**	**70,829**	**107,819**	**295,360**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[55] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-1. 2011 Sector 1 Pollutant Emissions (except Biogenic) by State[56]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
West Virginia							
Chemical & Allied Product Mfg	247	64	402	330	246	145	2,000
Fuel Comb. Elec. Util.	10,106	63	54,289	11,066	9,100	93,080	1,011
Fuel Comb. Industrial	4,424	37	16,592	1,977	1,086	16,306	540
Fuel Comb. Other	19,471	433	8,661	2,893	2,803	760	4,059
Highway Vehicles	185,437	734	41,840	2,101	1,269	179	20,493
Metals Processing	24,179	14	1,806	1,468	1,046	2,069	520
Miscellaneous[56]	86,791	10,610	1,296	76,122	15,876	684	20,396
Off-Highway	89,194	18	22,397	1,428	1,341	204	15,934
Other Industrial Processes[56]	2,726	103	2,464	21,016	3,655	1,983	1,283
Petroleum & Related Industries	27,645	NR[a]	22,041	692	594	6,144	47,734
Solvent Utilization	<0.5	<0.5	<0.5	13	13	<0.5	14,315
Storage & Transport	2	1	4	465	182	<0.5	8,621
Waste Disposal & Recycling	31,785	8	1,152	4,840	3,981	63	2,622
West Virginia 2011 Totals[b]	**482,008**	**12,084**	**172,944**	**124,409**	**41,192**	**121,618**	**139,527**
SESARM 2011 Totals[b]	**16,885,761**	**701,183**	**3,343,164**	**4,427,062**	**1,295,512**	**1,634,354**	**3,517,706**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[56] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-2. 2028 Sector 1 Pollutant Emissions (except Biogenic) by State[57]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Alabama							
Chemical & Allied Product Mfg	3,122	183	2,409	704	650	6,583	1,576
Fuel Comb. Elec. Util.	6,748	424	18,098	1,714	1,190	7,965	910
Fuel Comb. Industrial	73,890	936	27,842	47,304	39,088	18,806	3,413
Fuel Comb. Other	11,352	462	4,100	1,584	1,549	193	1,796
Highway Vehicles	182,602	1,703	30,113	4,984	1,322	262	15,013
Metals Processing[57]	10,759	76	5,434	4,326	3,844	13,072	1,550
Miscellaneous	666,279	76,738	14,567	494,515	113,981	6,679	158,720
Off-Highway	253,400	52	25,355	1,781	1,653	193	22,709
Other Industrial Processes[57]	18,908	1,420	20,732	16,269	8,095	15,773	13,927
Petroleum & Related Industries	9,353	3	7,416	310	292	3,365	15,109
Solvent Utilization	119	2	120	74	54	1	46,658
Storage & Transport	65	<0.5	51	823	604	2,767	12,302
Waste Disposal & Recycling	45,712	105	1,876	7,885	6,531	175	3,620
Alabama 2028 Totals[a]	**1,282,309**	**82,103**	**158,115**	**582,273**	**178,852**	**75,833**	**297,302**

[a] Total emissions may not add up due to rounding

[57] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-2. 2028 Sector 1 Pollutant Emissions (except Biogenic) by State[58]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	Tpy						
Florida							
Chemical & Allied Product Mfg	117	321	1,279	337	295	14,260	1,230
Fuel Comb. Elec. Util.	25,254	3,303	26,425	8,680	7,973	24,565	1,497
Fuel Comb. Industrial	78,811	572	29,867	38,121	33,504	8,477	3,617
Fuel Comb. Other	23,851	348	4,590	3,278	3,248	303	3,860
Highway Vehicles	679,511	5,737	72,019	19,834	4,412	823	51,019
Metals Processing	480	0.247	80	192	159	31	49
Miscellaneous[58]	960,190	54,601	21,346	466,941	138,297	9,727	228,825
Off-Highway	1,125,776	213	94,782	6,737	6,231	2,973	88,560
Other Industrial Processes[58]	13,065	372	12,313	28,693	12,042	4,315	14,315
Petroleum & Related Industries	828	0	293	93	64	211	2,252
Solvent Utilization	3	0	2	33	30	0.0001	151,367
Storage & Transport	104	37	154	971	528	29	68,391
Waste Disposal & Recycling	28,108	349	2,301	4,199	3,534	1,265	2,734
Florida 2028 Totals[b]	**2,936,098**	**65,854**	**265,453**	**578,108**	**210,317**	**66,979**	**617,717**

[1] No emissions reported
[2] Total emissions may not add up due to rounding

[58] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-2. 2028 Sector 1 Pollutant Emissions (except Biogenic) by State[59]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	Tpy						
Georgia							
Chemical & Allied Product Mfg	476	2,266	931	406	353	1,054	2,399
Fuel Comb. Elec. Util.	10,611	842	25,481	5,150	4,242	18,411	1,016
Fuel Comb. Industrial	19,771	435	17,788	2,672	2,311	9,769	1,618
Fuel Comb. Other	19,536	1,312	10,857	1,998	1,950	4,187	2,730
Highway Vehicles	305,264	2,983	48,973	8,914	2,289	443	25,629
Metals Processing	344	NR[a]	149	156	82	92	57
Miscellaneous[59]	984,133	107,020	39,003	998,804	232,719	10,688	75,220
Off-Highway	477,533	91	40,838	2,974	2,769	967	36,837
Other Industrial Processes[59]	17,280	3,202	13,130	45,021	15,808	2,268	20,583
Petroleum & Related Industries	6	NR[a]	NR[a]	22	13	NR[a]	131
Solvent Utilization	24	36	28	31	30	<0.5	83,997
Storage & Transport	49	1	21	1,014	502	NR[a]	23,439
Waste Disposal & Recycling	227,696	52	7,628	26,851	26,221	222	17,361
Georgia 2028 Totals[b]	**2,062,722**	**118,240**	**204,828**	**1,094,012**	**289,290**	**48,102**	**291,017**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[59] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-2. 2028 Sector 1 Pollutant Emissions (except Biogenic) by State[60]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	Tpy						
Kentucky							
Chemical & Allied Product Mfg	62	25	241	816	708	393	2,189
Fuel Comb. Elec. Util.	12,253	671	33,258	7,409	5,781	49,728	1,067
Fuel Comb. Industrial	10,870	106	17,876	2,505	2,214	4,819	1,031
Fuel Comb. Other	43,582	881	5,477	6,158	6,072	1,166	7,183
Highway Vehicles	157,636	1,437	27,819	3,448	1,015	209	12,938
Metals Processing	61,446	1	1,611	4,111	3,383	3,200	2,081
Miscellaneous[60]	180,432	55,494	3,034	230,661	47,310	1,528	42,725
Off-Highway	193,150	55	29,793	1,557	1,464	402	17,094
Other Industrial Processes[60]	4,992	266	5,662	25,483	8,737	6,465	31,489
Petroleum & Related Industries	67,128	NR[a]	47,426	2,795	2,745	1,561	44,846
Solvent Utilization	3	<0.5	5	81	72	<0.5	44,031
Storage & Transport	23	85	6	1,804	427	3	16,169
Waste Disposal & Recycling	25,288	16	1,156	5,330	4,527	161	2,352
Kentucky 2028 Totals[b]	**756,864**	**59,038**	**173,363**	**292,159**	**84,455**	**69,637**	**225,195**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[60] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-2. 2028 Sector 1 Pollutant Emissions (except Biogenic) by State[61]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
Mississippi							
Chemical & Allied Product Mfg	7,454	519	1,841	481	428	49	1,316
Fuel Comb. Elec. Util.	4,172	579	12,229	1,457	1,120	3,237	416
Fuel Comb. Industrial	16,135	11	27,363	3,458	2,820	1,631	3,253
Fuel Comb. Other	7,009	286	2,848	967	935	50	1,056
Highway Vehicles	117,589	1,115	17,788	3,100	814	165	9,317
Metals Processing	2,021	NR[a]	1,446	371	364	1,366	156
Miscellaneous[61]	325,044	66,069	6,803	1,211,587	160,523	3,165	77,346
Off-Highway	143,429	36	16,707	1,074	999	143	14,770
Other Industrial Processes[61]	5,046	332	2,591	7,605	4,901	652	10,632
Petroleum & Related Industries	5,412	38	4,105	322	270	1,407	24,313
Solvent Utilization	30	NR[a]	37	113	104	<0.5	37,486
Storage & Transport	368	NR[a]	71	103	66	42	20,947
Waste Disposal & Recycling	42,760	805	1,591	6,657	5,392	91	3,843
Mississippi 2028 Totals[b]	**676,471**	**69,788**	**95,420**	**1,237,295**	**178,737**	**11,999**	**204,851**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[61] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-2. 2028 Sector 1 Pollutant Emissions (except Biogenic) by State[62]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	Tpy						
North Carolina							
Chemical & Allied Product Mfg	693	471	879	1,184	462	5,056	3,712
Fuel Comb. Elec. Util.	10,563	789	21,401	3,190	2,867	8,976	1,095
Fuel Comb. Industrial	14,319	103	16,775	2,910	2,430	5,139	1,172
Fuel Comb. Other	28,846	881	9,791	4,604	4,246	5,970	4,302
Highway Vehicles	252,167	2,730	30,968	6,512	1,646	311	21,709
Metals Processing	2,122	49	454	547	471	433	1,005
Miscellaneous[62]	86,087	183,286	3,500	221,483	49,500	956	6,672
Off-Highway	471,127	89	39,379	2,994	2,798	1,055	37,520
Other Industrial Processes[62]	11,412	681	12,529	18,192	8,780	4,105	20,374
Petroleum & Related Industries	1,007	0.0587	305	295	263	412	354
Solvent Utilization	79	50	103	177	165	8	110,199
Storage & Transport	278	41	128	654	412	11	15,117
Waste Disposal & Recycling	67,028	53	2,772	11,153	9,420	213	5,800
North Carolina 2028 Totals[a]	**945,729**	**189,222**	**138,986**	**273,895**	**83,458**	**32,644**	**229,032**

[a] Total emissions may not add up due to rounding

[62] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-2. 2028 Sector 1 Pollutant Emissions (except Biogenic) by State[63]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	Tpy						
South Carolina							
Chemical & Allied Product Mfg	1,217	145	165	131	76	4	1,843
Fuel Comb. Elec. Util.	13,527	744	10,993	3,290	2,672	10,762	573
Fuel Comb. Industrial	21,191	259	17,505	11,286	9,498	9,386	1,117
Fuel Comb. Other	11,800	363	3,351	1,580	1,546	309	1,867
Highway Vehicles	155,913	1,410	23,263	4,504	1,152	215	12,546
Metals Processing	53,811	2	861	581	489	5,182	457
Miscellaneous[63]	200,969	34,470	4,033	341,123	56,686	1,902	47,771
Off-Highway	233,340	46	19,154	1,477	1,369	360	19,097
Other Industrial Processes[63]	17,827	1,004	11,697	7,311	3,897	5,724	14,754
Petroleum & Related Industries	NR[a]	NR[a]	NR[a]	NR[a]	NR[a]	NR[a]	29
Solvent Utilization	7	<0.5	1	14	12	<0.5	39,341
Storage & Transport	39	3	26	282	119	1	21,258
Waste Disposal & Recycling	48,667	639	1,806	7,042	5,735	139	4,059
South Carolina 2028 Totals[b]	**758,308**	**39,084**	**92,855**	**378,619**	**83,253**	**33,985**	**164,711**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[63] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-2. 2028 Sector 1 Pollutant Emissions (except Biogenic) by State[64]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	Tpy						
Tennessee							
Chemical & Allied Product Mfg	14,862	310	804	755	426	489	4,397
Fuel Comb. Elec. Util.	3,771	166	8,006	2,618	2,444	10,059	585
Fuel Comb. Industrial	22,671	395	25,234	12,293	10,691	8,076	1,239
Fuel Comb. Other	23,479	779	8,441	3,044	2,928	779	4,906
Highway Vehicles	233,423	2,130	44,927	6,734	1,811	338	20,483
Metals Processing	5,066	2	611	1,492	1,251	681	2,923
Miscellaneous[64]	124,792	38,101	2,450	165,066	39,404	1,162	30,344
Off-Highway	298,569	64	33,596	2,032	1,898	625	25,501
Other Industrial Processes[64]	6,244	463	8,189	11,224	5,779	1,468	14,828
Petroleum & Related Industries	4,956	5	3,193	307	278	149	3,517
Solvent Utilization	72	72	84	328	288	15	67,091
Storage & Transport	56	9	29	393	184	4	19,812
Waste Disposal & Recycling	26,959	28	1,392	5,710	4,813	137	2,839
Tennessee 2028 Totals[a]	**764,921**	**42,522**	**136,954**	**211,994**	**72,196**	**23,983**	**198,464**

[a] Total emissions may not add up due to rounding

[64] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-2. 2028 Sector 1 Pollutant Emissions (except Biogenic) by State[65]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	Tpy						
Virginia							
Chemical & Allied Product Mfg	83	657	1,734	169	73	203	485
Fuel Comb. Elec. Util.	6,232	2,375	10,677	3,858	1,456	1,903	448
Fuel Comb. Industrial	11,294	240	13,962	5,071	4,376	5,776	871
Fuel Comb. Other	74,900	1,581	11,034	10,748	10,507	3,264	11,877
Highway Vehicles	232,611	2,242	35,427	4,302	1,309	279	18,550
Metals Processing	3,016	NR[a]	812	858	723	5,196	270
Miscellaneous[65]	164,877	48,195	3,077	156,214	36,128	1,439	39,107
Off-Highway	391,290	75	37,836	2,576	2,398	892	30,266
Other Industrial Processes[65]	7,256	426	10,337	12,839	5,400	5,294	7,107
Petroleum & Related Industries	12,993	76	9,748	541	424	65	12,152
Solvent Utilization	0.0359	5	0.1435	68	63	0.3057	93,969
Storage & Transport	6	44	2	353	301	0.0274	16,224
Waste Disposal & Recycling	33,192	64	2,305	5,758	4,932	1,483	4,380
Virginia 2028 Totals[a]	**937,750**	**55,979**	**136,950**	**203,356**	**68,090**	**25,795**	**235,704**

[a] Total emissions may not add up due to rounding

[65] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-2. 2028 Sector 1 Pollutant Emissions (except Biogenic) by State[66]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	Tpy						
West Virginia							
Chemical & Allied Product Mfg	249	35	278	296	229	106	1,036
Fuel Comb. Elec. Util.	8,663	50	49,885	6,822	5,462	47,746	1,162
Fuel Comb. Industrial	3,896	31	10,820	1,291	492	6,241	581
Fuel Comb. Other	18,115	427	6,695	2,751	2,671	677	3,472
Highway Vehicles	55,258	489	10,124	1,273	375	72	5,208
Metals Processing	24,088	13	1,839	1,362	973	1,956	499
Miscellaneous[66]	86,171	11,240	1,277	76,051	15,810	677	20,356
Off-Highway	89,372	20	11,934	696	649	35	8,932
Other Industrial Processes[66]	2,616	107	1,941	20,439	3,664	1,350	1,443
Petroleum & Related Industries	42,008	NR[a]	29,242	1,514	1,511	191	130,121
Solvent Utilization	<0.5	NR[a]	NR[a]	2	2	NR[a]	13,610
Storage & Transport	2	<0.5	21	220	74	<0.5	5,687
Waste Disposal & Recycling	31,786	7	1,152	4,840	3,981	63	2,606
West Virginia 2028 Totals[b]	**362,223**	**12,419**	**125,206**	**117,556**	**35,894**	**59,114**	**194,715**
SESARM 2028 Totals[b]	**11,483,395**	**734,250**	**1,528,129**	**4,969,267**	**1,284,542**	**448,072**	**2,658,708**

[a] No emissions reported

[b] Total emissions may not add up due to rounding

[66] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-3. Percent Emissions Change from 2011 to 2028 by Tier 1 Level, Pollutant, and State[67]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	% Difference						
Alabama							
Chemical & Allied Product Mfg	<-0.5%	<0.5%	<-0.5%	<-0.5%	<-0.5%	<0.5%	-3%
Fuel Comb. Elec. Util.	-32%	-13%	-71%	-77%	-76%	-96%	-21%
Fuel Comb. Industrial	3%	15%	-21%	2%	13%	-54%	4%
Fuel Comb. Other	-6%	-1%	-3%	-6%	-6%	-54%	-12%
Highway Vehicles	-74%	-37%	-80%	-38%	-71%	-62%	-80%
Metals Processing	-2%	<-0.5%	-9%	-19%	-17%	-2%	-16%
Miscellaneous[67]	-1%	8%	-0.5%	11%	5%	-1%	<-0.5%
Off-Highway	-3%	19%	-47%	-50%	-51%	-82%	-47%
Other Industrial Processes[67]	-4%	-7%	-4%	-4%	-7%	65%	-3%
Petroleum & Related Industries	-37%	<0.5%	-34%	-17%	-18%	-82%	-32%
Solvent Utilization	-5%	-7%	-11%	-11%	-12%	-39%	<-0.5%
Storage & Transport	<-0.5%	<0.5%	<0.5%	-5%	-7%	160,700%[a]	-34%
Waste Disposal & Recycling	<0.5%	<-0.5%	<0.5%	<-0.5%	<-0.5%	<0.5%	<0.5%
Alabama % Difference	**-30%**	**6%**	**-56%**	**7%**	**<-0.5%**	**-73%**	**-24%**

[a] The reason for this large SO_2 percentage increase for this Tier group was the addition of a new unit operating by 2028 at National Cement Co. of Alabama (EIS Facility ID = 949611). The SO_2 emissions estimate for 2028 is 2,865 tpy, and is not in the EPA 2028 el emissions inventory, but later added by the State. While the percent difference is extremely large, the magnitude increase in SO_2 emissions is less than 4% compared to other SO_2 sources in Alabama.

[67] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-3. Percent Emissions Change from 2011 to 2028 by Tier 1 Level, Pollutant, and State[68]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	% Difference						
Florida							
Chemical & Allied Product Mfg	<-0.5%	-81%	-8%	-19%	-15%	-35%	<-0.5%
Fuel Comb. Elec. Util.	-31%	6%	-62%	-25%	-17%	-74%	-22%
Fuel Comb. Industrial	9%	-19%	-5%	15%	16%	-46%	-21%
Fuel Comb. Other	-5%	-1%	<-0.5%	-6%	-6%	-74%	-11%
Highway Vehicles	-62%	-23%	-77%	-7%	-53%	-61%	-72%
Metals Processing	-35%	<-1%	<-0.5%	-3%	-4%	-91%	-21%
Miscellaneous[68]	-3%	2%	-7%	22%	7%	-7%	-1%
Off-Highway	<0.5%	24%	-41%	-52%	-53%	-85%	-47%
Other Industrial Processes[68]	<-0.5%	<1%	39%	1%	2%	-1%	-1%
Petroleum & Related Industries	3%	NA[a]	5%	1%	2%	<-0.5%	-21%
Solvent Utilization	<0.5%	NA[a]	<0.5%	-3%	-3%	<0.5%	<-0.5%
Storage & Transport	<0.5%	<-0.5%	<0.5%	-18%	-11%	<-0.5%	-33%
Waste Disposal & Recycling	1%	-12%	86%	1%	1%	3%	0.5%
Florida % Difference	**-28%**	**-3%**	**-56%**	**15%**	**<-1%**	**-61%**	**-29%**

[a] NA: No calculation is possible

[68] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-3. Percent Emissions Change from 2011 to 2028 by Tier 1 Level, Pollutant, and State[69]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	% Difference						
Georgia							
Chemical & Allied Product Mfg	-5%	-5%	-3%	-15%	-13%	-33%	-7%
Fuel Comb. Elec. Util.	-22%	14%	-55%	-43%	-33%	-90%	-15%
Fuel Comb. Industrial	-9%	70%	-20%	-16%	-16%	-54%	-7%
Fuel Comb. Other	-2%	<-0.5%	-3%	-9%	-9%	-10%	-11%
Highway Vehicles	-70%	-34%	-78%	-29%	-66%	-59%	-76%
Metals Processing	<-0.5%	NA[a]	<-0.5%	<0.5%	<-0.5%	<0.5%	-1%
Miscellaneous[69]	-4%	8%	-4%	16%	6%	-7%	-4%
Off-Highway	1%	25%	-45%	-50%	-51%	-62%	-40%
Other Industrial Processes[69]	-30%	-3%	-17%	-5%	-12%	-39%	-10%
Petroleum & Related Industries	<0.5%	NA[a]	NA[a]	-6%	22%	NA[a]	-1%
Solvent Utilization	-3%	<-0.5%	-6%	-1%	-1%	-4%	<-0.5%
Storage & Transport	<0.5%	<-0.5%	<-0.5%	<-0.5%	-2%	NA[a]	-31%
Waste Disposal & Recycling	<-0.5%	<-0.5%	<-0.5%	<-0.5%	<-0.5%	<-0.5%	<-0.5%
Georgia % Difference	**-27%**	**6%**	**-55%**	**13%**	**<0.5%**	**-80%**	**-30%**

[a] NA: No calculation is possible

[69] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-3. Percent Emissions Change from 2011 to 2028 by Tier 1 Level, Pollutant, and State[70]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	% Difference						
Kentucky							
Chemical & Allied Product Mfg	<0.5%	-13%	<-0.5%	<-0.5%	<-0.5%	-76%	-1%
Fuel Comb. Elec. Util.	-21%	-11%	-64%	-47%	-39%	-80%	-39%
Fuel Comb. Industrial	<0.5%	9%	-11%	12%	12%	-17%	-28%
Fuel Comb. Other	-10%	-3%	-5%	-11%	-10%	-38%	-14%
Highway Vehicles	-68%	-32%	-76%	-37%	-70%	-58%	-74%
Metals Processing	<-0.5%	<-0.5%	<-0.5%	-1%	-1%	-47%	<-0.5%
Miscellaneous[70]	-5%	3%	-13%	13%	6%	-12%	-2%
Off-Highway	-4%	19%	-47%	-56%	-57%	-37%	-47%
Other Industrial Processes[70]	<0.5%	-17%	<-0.5%	-3%	-3%	<-0.5%	-1%
Petroleum & Related Industries	114%	NA[a]	92%	309%	334%	199%	44%
Solvent Utilization	<-0.5%	<0.5%	<-0.5%	-3%	-2%	<0.5%	<-0.5%
Storage & Transport	<-0.5%	<-0.5%	<-0.5%	-10%	-12%	<-0.5%	-28%
Waste Disposal & Recycling	<-0.5%	<0.5%	<0.5%	<-0.5%	<-1%	<0.5%	<-0.5%
Kentucky % Difference	**-30%**	**2%**	**-47%**	**6%**	**-4%**	**-74%**	**-18%**

[a] NA: No calculation is possible

[70] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-3. Percent Emissions Change from 2011 to 2028 by Tier 1 Level, Pollutant, and State[71]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	% Difference						
Mississippi							
Chemical & Allied Product Mfg	<-0.5%	<-1%	-1%	-1%	-1%	-96%	<-0.5%
Fuel Comb. Elec. Util.	-32%	44%	-54%	-30%	-31%	-93%	-15%
Fuel Comb. Industrial	9%	1066%[a]	-15%	<0.5%	-4%	-75%	-5%
Fuel Comb. Other	-6%	-1%	-1%	-6%	-6%	-1%	-12%
Highway Vehicles	-73%	-38%	-80%	-31%	-68%	-59%	-80%
Metals Processing	54%	NA[a]	280%	-33%	-33%	1006%[b]	23%
Miscellaneous[71]	-13%	8%	-25%	22%	13%	-26%	-5%
Off-Highway	-7%	18%	-50%	-57%	-58%	-86%	-50%
Other Industrial Processes[71]	-2%	-41%	-19%	-6%	-9%	-4%	-3%
Petroleum & Related Industries	18%	5%	13%	25%	35%	-77%	-16%
Solvent Utilization	-3%	NA[c]	-5%	-2%	-1%	-5%	-2%
Storage & Transport	<0.5%	NA[c]	<-1%	-6%	-6%	<0.5%	-28%
Waste Disposal & Recycling	<0.5%	<0.5%	<-1%	<-0.5%	<-0.5%	<-0.5%	2%
Mississippi % Difference	**-36%**	**6%**	**-54%**	**21%**	**9%**	**-81%**	**-25%**

[a] The reason for this large NH_3 percentage increase for this Tier group was the projected increase of wood-fired industrial boilers at three facilities in 2028. The EPA 2028 el NH_3 emissions estimate for 2028 for SCC 10200902 (Wood/Bark Waste-fired boilers) is 10.39 tpy, while the EPA 2011 el NH_3 emissions estimate for the same SCC is 0.85 tpy. While the percent difference is extremely large, the magnitude increase in NH_3 emissions is less than 0.1% compared to other NH_3 sources in Mississippi.

[b] The reason for this large SO_2 percentage increase for this Tier group was the addition of a new facility operating by 2028 at Mississippi Silicon (EIS Facility ID = 17942211). The SO_2 emissions estimate for 2028 is 1,243 tpy, and is not in the EPA 2028 el emissions inventory, but later added by the State. While the percent difference is extremely large, the magnitude increase in SO_2 emissions is less than 1% compared to other SO_2 sources in Mississippi.

[c] NA: No calculation is possible

[71] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-3. Percent Emissions Change from 2011 to 2028 by Tier 1 Level, Pollutant, and State[72]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	% Difference						
North Carolina							
Chemical & Allied Product Mfg	-90%	-28%	-32%	60%	-2%	-8%	35%
Fuel Comb. Elec. Util.	-68%	285%	-51%	-64%	-59%	-89%	17%
Fuel Comb. Industrial	-12%	38%	-31%	-24%	-16%	-58%	-22%
Fuel Comb. Other	-1%	<0.5%	1%	-3%	-2%	-23%	-7%
Highway Vehicles	-78%	-39%	-85%	-38%	-70%	-71%	-81%
Metals Processing	-21%	78%	40%	54%	53%	-22%	-33%
Miscellaneous[72]	-16%	9%	-14%	13%	8%	-11%	-15%
Off-Highway	-2%	26%	-42%	-48%	-49%	-57%	-41%
Other Industrial Processes[72]	99%	13%	22%	25%	26%	25%	34%
Petroleum & Related Industries	30%	NA[a]	16%	18%	64%	-5%	16%
Solvent Utilization	50%	-32%	42%	22%	36%	-74%	15%
Storage & Transport	-87%	-28%	3%	11%	34%	49%	-39%
Waste Disposal & Recycling	<0.5%	-21%	2%	<0.5%	<0.5%	-15%	3%
North Carolina % Difference	**-50%**	**8%**	**-62%**	**7%**	**-6%**	**-73%**	**-32%**

[a] NA: No calculation is possible

[72] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-3. Percent Emissions Change from 2011 to 2028 by Tier 1 Level, Pollutant, and State[73]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	% Difference						
South Carolina							
Chemical & Allied Product Mfg	<-1%	<0.5%	<-0.5%	-1%	-1%	-50%	-13%
Fuel Comb. Elec. Util.	-20%	178%	-59%	-70%	-69%	-85%	-6%
Fuel Comb. Industrial	8%	93%	-2%	9%	15%	-40%	1%
Fuel Comb. Other	-6%	-1%	2%	-7%	-7%	-9%	-12%
Highway Vehicles	-67%	-33%	-79%	-32%	-69%	-57%	-75%
Metals Processing	<0.5%	<0.5%	10%	2%	2%	1%	<0.5%
Miscellaneous[73]	-6%	4%	-12%	22%	10%	-4%	-2%
Off-Highway	-3%	24%	-46%	-51%	-52%	-84%	-46%
Other Industrial Processes[73]	<-0.5%	-5%	14%	-4%	-6%	10%	-2%
Petroleum & Related Industries	NA[a]	NA[a]	NA[a]	NA[a]	NA[a]	NA[a]	-5%
Solvent Utilization	<-0.5%	<-0.5%	<0.5%	-1%	-2%	<0.5%	-4%
Storage & Transport	<0.5%	0%	<0.5%	-18%	-14%	<-0.5%	-30%
<-1%Waste Disposal & Recycling	<-0.5%	<0.5%	-1%	<-1%	<-0.5%	<-0.5%	<-0.5%
South Carolina % Difference	**-31%**	**3%**	**-56%**	**15%**	**-4%**	**-67%**	**-29%**

[a] NA: No calculation is possible

[73] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-3. Percent Emissions Change from 2011 to 2028 by Tier 1 Level, Pollutant, and State[74]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	% Difference						
Tennessee							
Chemical & Allied Product Mfg	<-0.5%	<0.5%	-1%	<-0.5%	<-0.5%	-1%	<-0.5%
Fuel Comb. Elec. Util.	-32%	-31%	-71%	-50%	-41%	-92%	-24%
Fuel Comb. Industrial	20%	14%	-10%	16%	19%	-71%	10%
Fuel Comb. Other	-10%	-1%	-8%	-12%	-8%	-86%	-5%
Highway Vehicles	-68%	-29%	-75%	-32%	-69%	-56%	-75%
Metals Processing	<-0.5%	<-0.5%	<0.5%	<-0.5%	<-0.5%	19%	<0.5%
Miscellaneous[74]	-6%	3%	-14%	10%	7%	-14%	-2%
Off-Highway	-3%	22%	-44%	-52%	-53%	-18%	-45%
Other Industrial Processes[74]	10%	-5%	10%	-3%	-4%	-42%	-5%
Petroleum & Related Industries	83%	<0.5%	76%	63%	74%	-39%	-1%
Solvent Utilization	<0.5%	<-0.5%	<-0.5%	<-0.5%	<-0.5%	<0.5%	<-0.5%
Storage & Transport	<0.5%	-85%	-23%	-25%	-23%	-9%	-34%
Waste Disposal & Recycling	<-0.5%	<0.5%	<-0.5%	<0.5%	<0.5%	-21%	11%
Tennessee % Difference	**-41%**	**<0.5%**	**-58%**	**4%**	**-5%**	**-85%**	**-32%**

[74] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-3. Percent Emissions Change from 2011 to 2028 by Tier 1 Level, Pollutant, and State[75]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	% Difference						
Virginia							
<1%Chemical & Allied Product Mfg	<0.5%	-19%	-78%	<0.5%	<0.5%	<0.5%	<-0.5%
Fuel Comb. Elec. Util.	25%	1058%[a]	-65%	-33%	26%	-97%	-40%
Fuel Comb. Industrial	-18%	6%	-37%	-14%	-9%	-60%	-8%
Fuel Comb. Other	-4%	-1%	-4%	-5%	-5%	-33%	-8%
Highway Vehicles	-59%	-33%	-76%	-39%	-70%	-61%	-71%
Metals Processing	<0.5%	NA[b]	<0.5%	<-0.5%	<-0.5%	<0.5%	<0.5%
Miscellaneous[75]	-2%	5%	-3%	10%	8%	-3%	-1%
Off-Highway	2%	24%	-44%	-49%	-49%	-73%	-37%
Other Industrial Processes[75]	29%	7%	-19%	4%	8%	-25%	2%
Petroleum & Related Industries	4%	<0.5%	1%	33%	49%	11%	43%
Solvent Utilization	<0.5%	1%	<0.5%	4%	4%	<0.5%	10%
Storage & Transport	10%	<-0.5%	8%	1%	5%	9%	-31%
Waste Disposal & Recycling	<0.5%	1%	1%	<0.5%	<0.5%	1%	1%
Virginia % Difference	**-26%**	**6%**	**-56%**	**3%**	**-4%**	**-76%**	**-20%**

[a] The reason for this large NH_3 percentage increase for this Tier group was the projected increase of new electric-generating units at multiple facilities in 2028. The ERTAC v16 2028 el NH_3 emissions estimate for 2028 for this Tier group is 2,375 tpy, which replaced the prior estimates from ERTAC v2.7 of 420 tpy; the EPA 2011 el NH_3 emissions estimate for the same Tier group is 205 tpy. While the percent difference is extremely large, the magnitude increase in NH_3 emissions is approximately 4% compared to other NH_3 sources in Virginia.

[b] NA: No calculation is possible

[75] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

Appendix E-3. Percent Emissions Change from 2011 to 2028 by Tier 1 Level, Pollutant, and State[76]

Tier 1 Description	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	% Difference						
West Virginia							
Chemical & Allied Product Mfg	1%	-46%	-31%	-10%	-7%	-27%	-48%
Fuel Comb. Elec. Util.	-14%	-20%	-8%	-38%	-40%	-49%	15%
Fuel Comb. Industrial	-12%	-16%	-35%	-35%	-55%	-62%	8%
Fuel Comb. Other	-7%	-1%	-23%	-5%	-5%	-11%	-14%
Highway Vehicles	-70%	-33%	-76%	-39%	-70%	-60%	-75%
Metals Processing	<-0.5%	-2%	2%	-7%	-7%	-5%	-4%
Miscellaneous[76]	-1%	6%	-1%	<-0.5%	<-0.5%	-1%	<-0.5%
Off-Highway	<0.5%	14%	-47%	-51%	-52%	-83%	-44%
Other Industrial Processes[76]	-4%	4%	-21%	-3%	<0.5%	-32%	12%
Petroleum & Related Industries	52%	NA[a]	33%	119%	154%	-97%	173%
Solvent Utilization	-28%	-100%	-100%	-87%	-87%	-100%	-5%
Storage & Transport	<-0.5%	-100%	485%	-53%	-59%	<0.5%	-34%
Waste Disposal & Recycling	<0.5%	-8%	<-0.5%	<-0.5%	<-0.5%	<-0.5%	-1%
West Virginia % Difference	**-25%**	**3%**	**-28%**	**-6%**	**-13%**	**-51%**	**40%**
SESARM % Difference	**-32%**	**5%**	**-54%**	**12%**	**-1%**	**-73%**	**-24%**

[a] NA: No calculation is possible

[76] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

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Appendix F.

County Summary Emission Change Maps from 2011 to 2028 for Each State.[77]

In the following figures, the color blue denotes reductions in 2028 from 2011 values while the color red denotes increases in emissions expected in 2028 from 2011 value. The color green denotes little or no change in emissions.

[77] The revised 2028 emissions presented in this Appendix are reflective of the emissions update finalized on 3/31/2020.

Appendix F-1. Alabama County-Level Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory

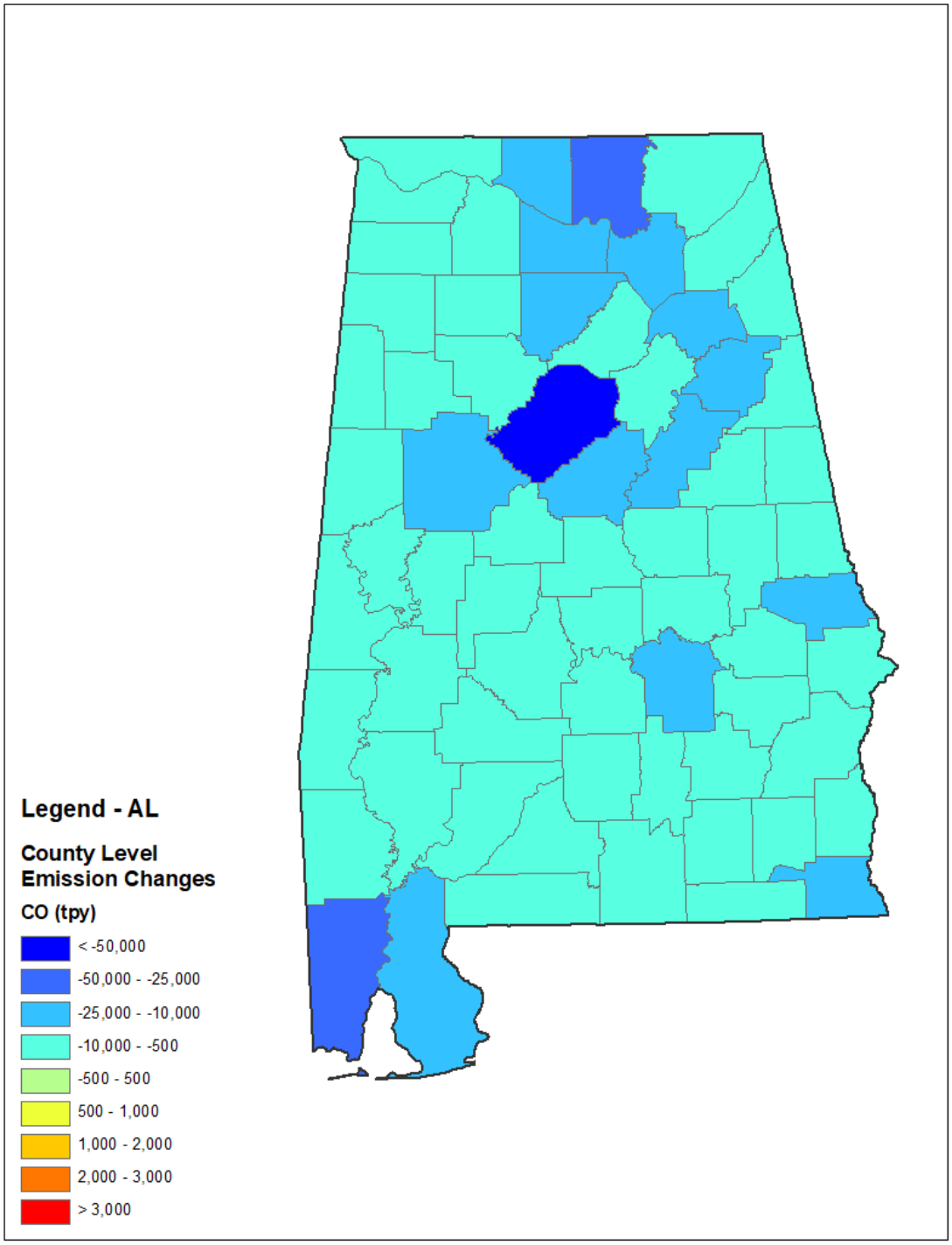

Figure F.1-1. Alabama County Level CO Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

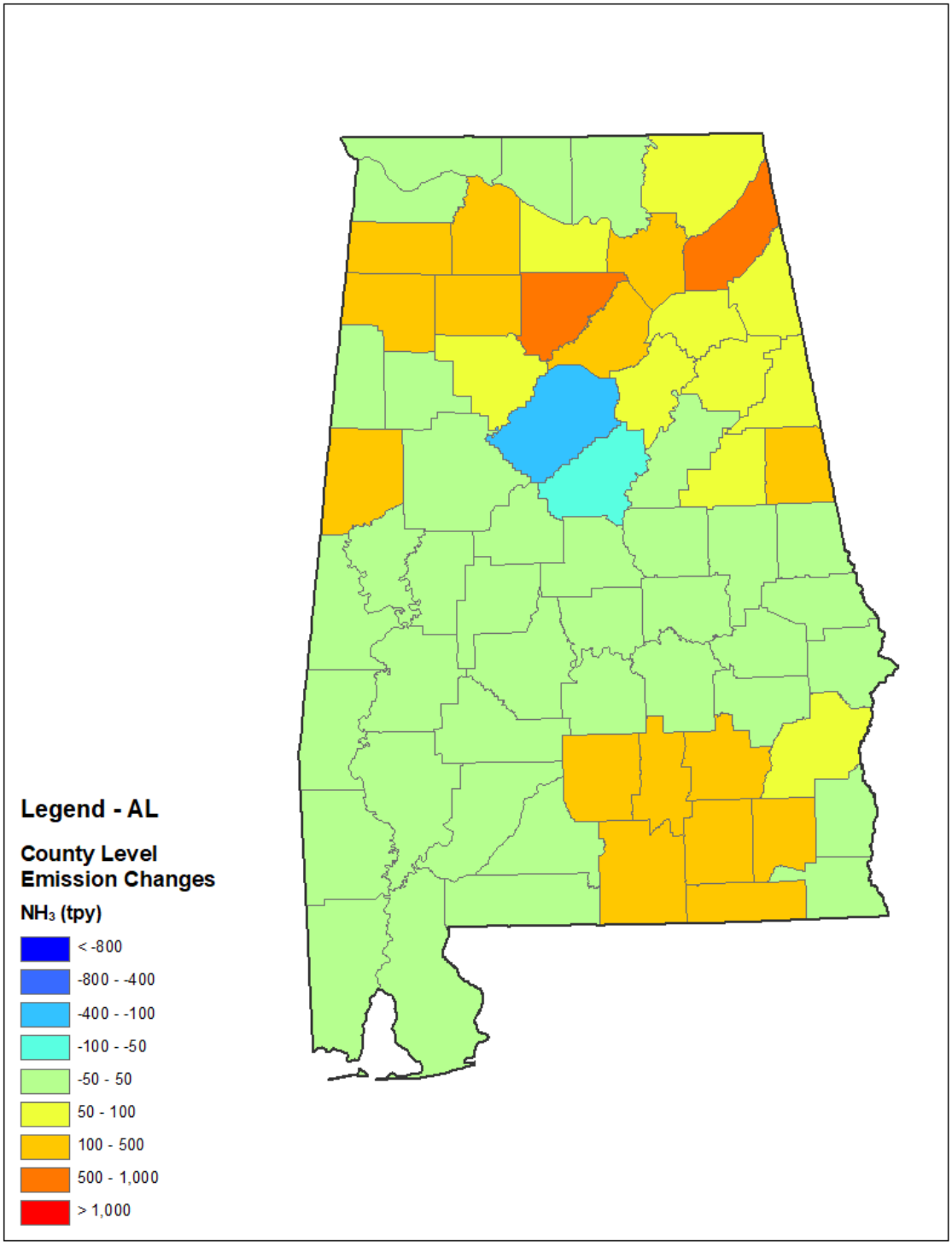

Figure F.1-2. Alabama County Level NH_3 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

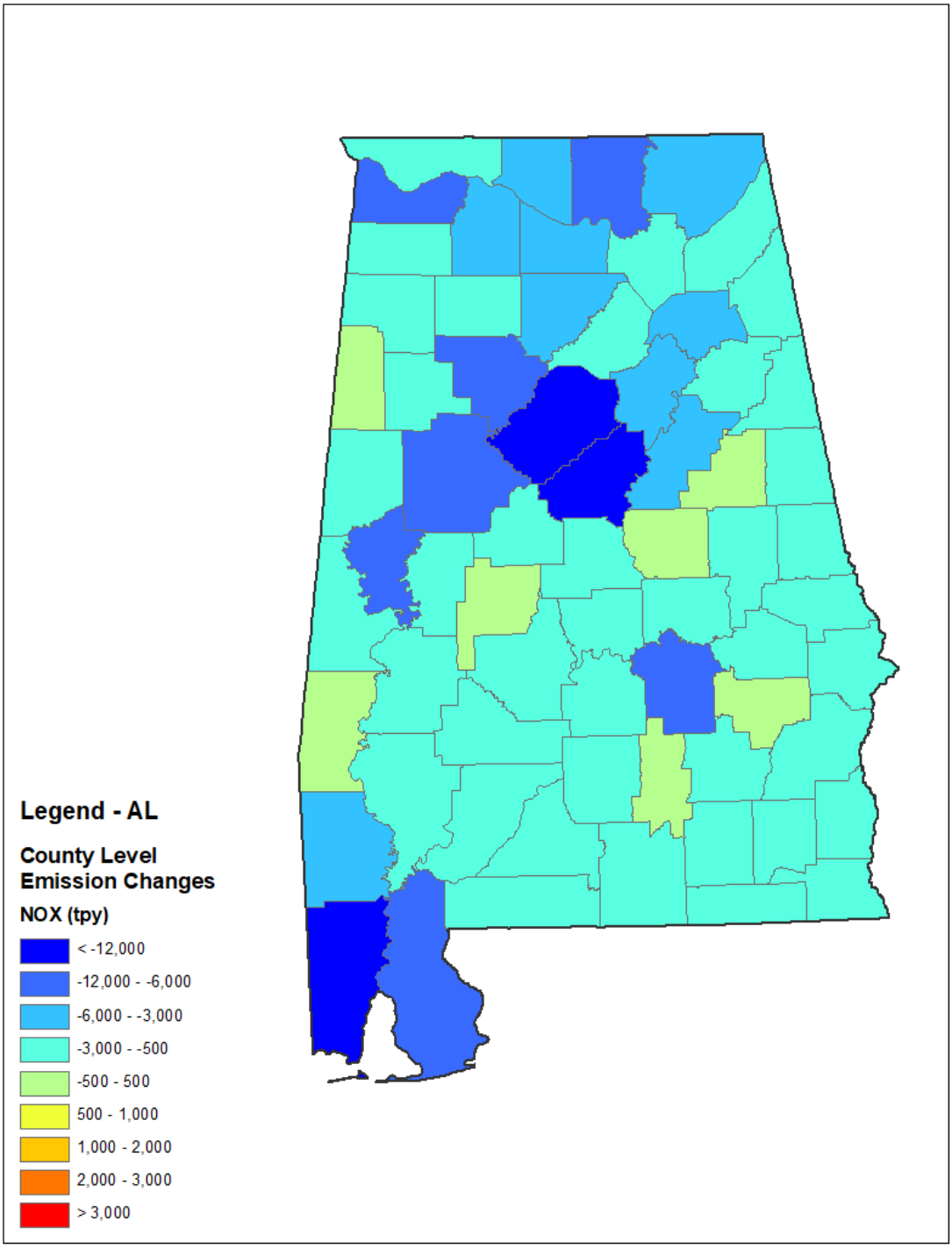

Figure F.1-3. Alabama County Level NO_x Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

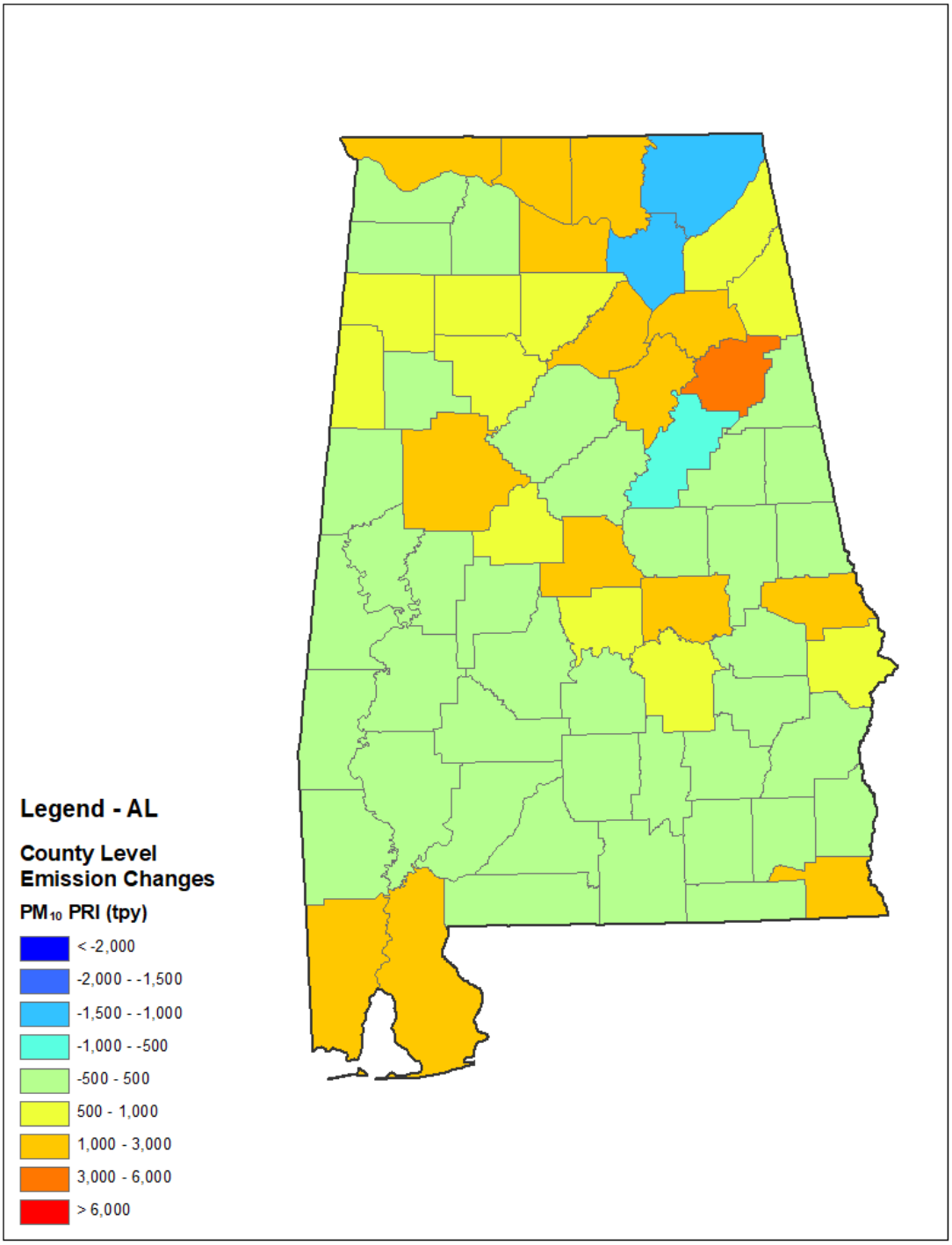

Figure F.1-4. Alabama County Level PM_{10}-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[78]

[78] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

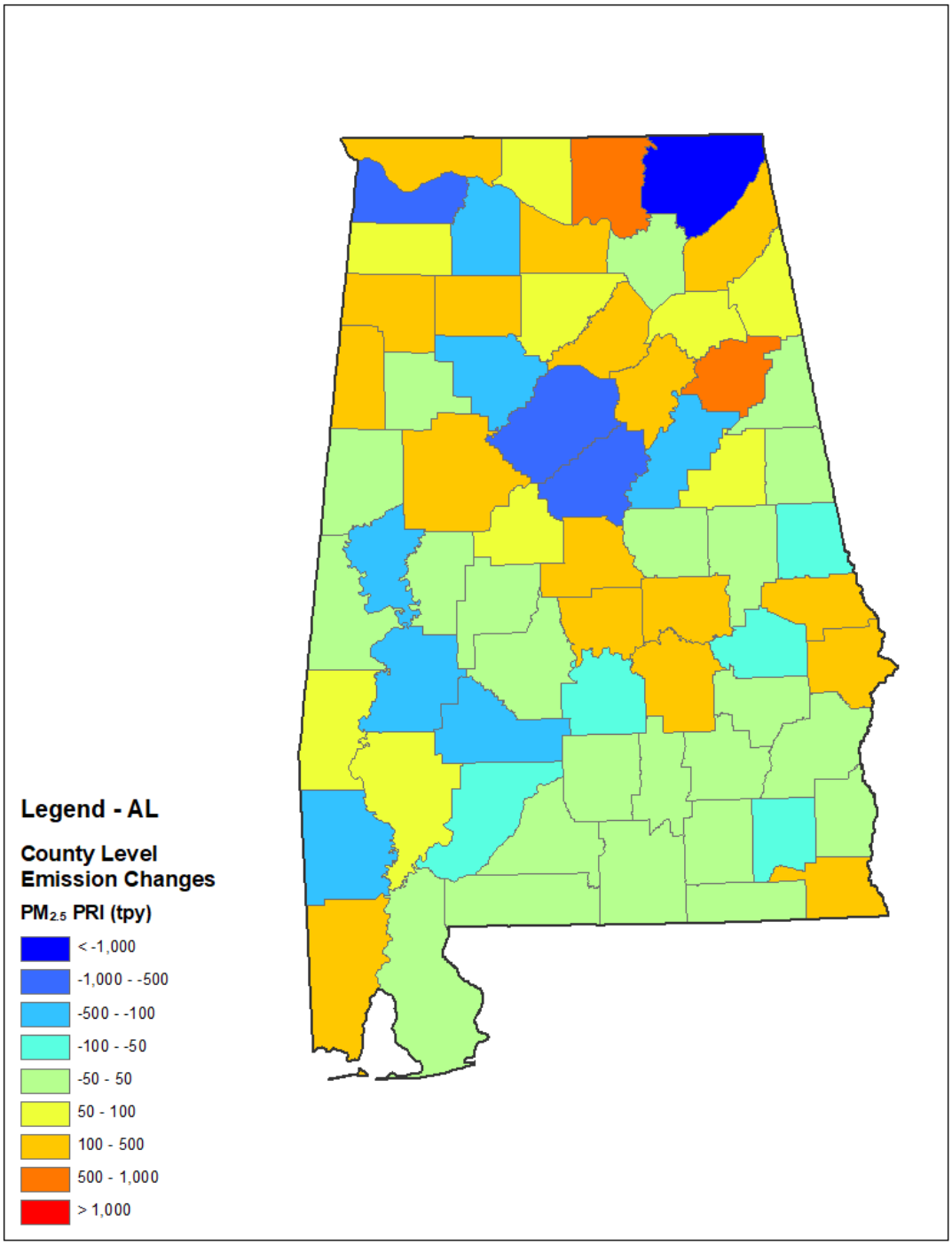

Figure F.1-5. Alabama County Level $PM_{2.5}$-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[79]

[79] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

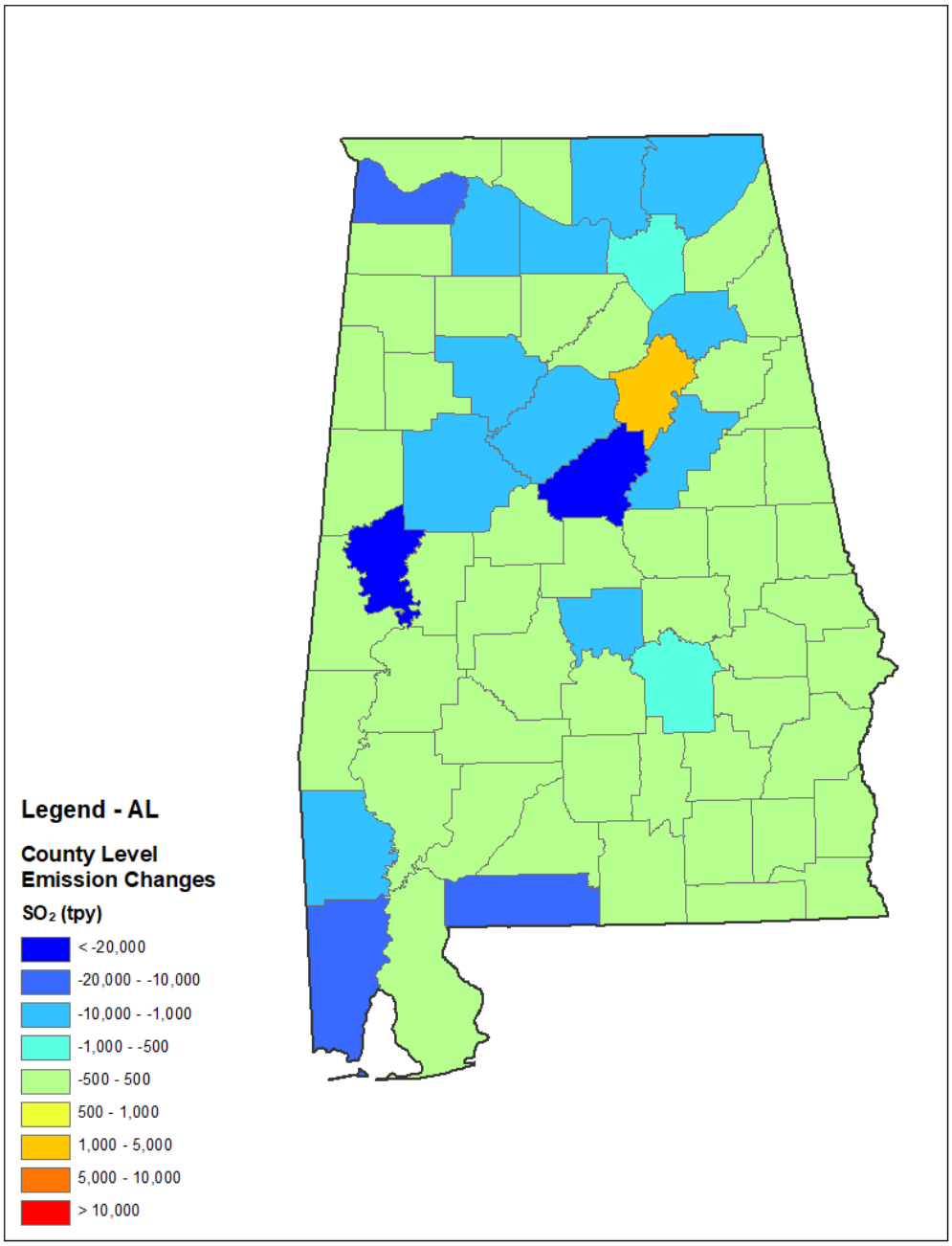

Figure F.1-6. Alabama County Level SO_2 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

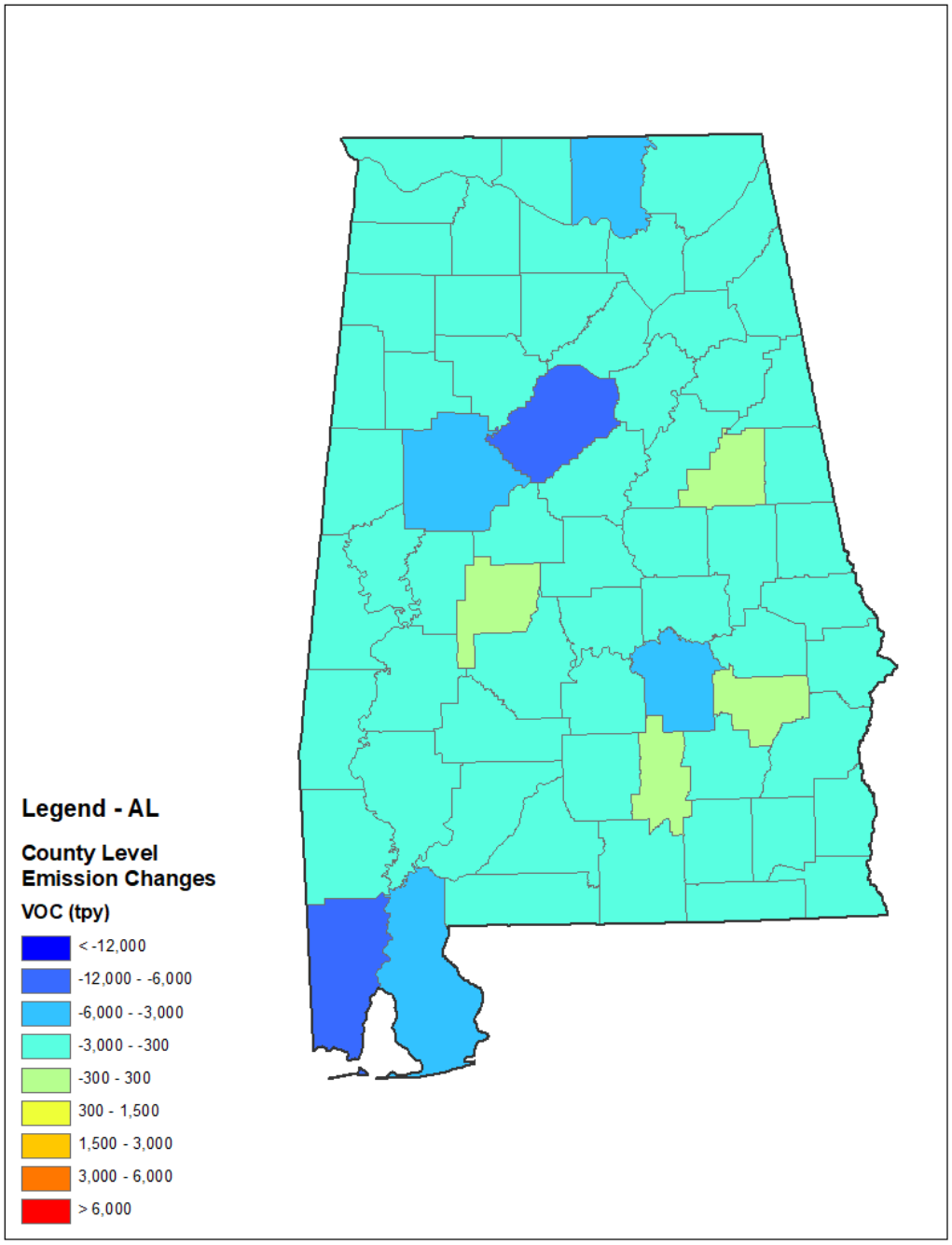

Figure F.1-7. Alabama County Level VOC Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

Appendix F-2. Florida County-Level Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory

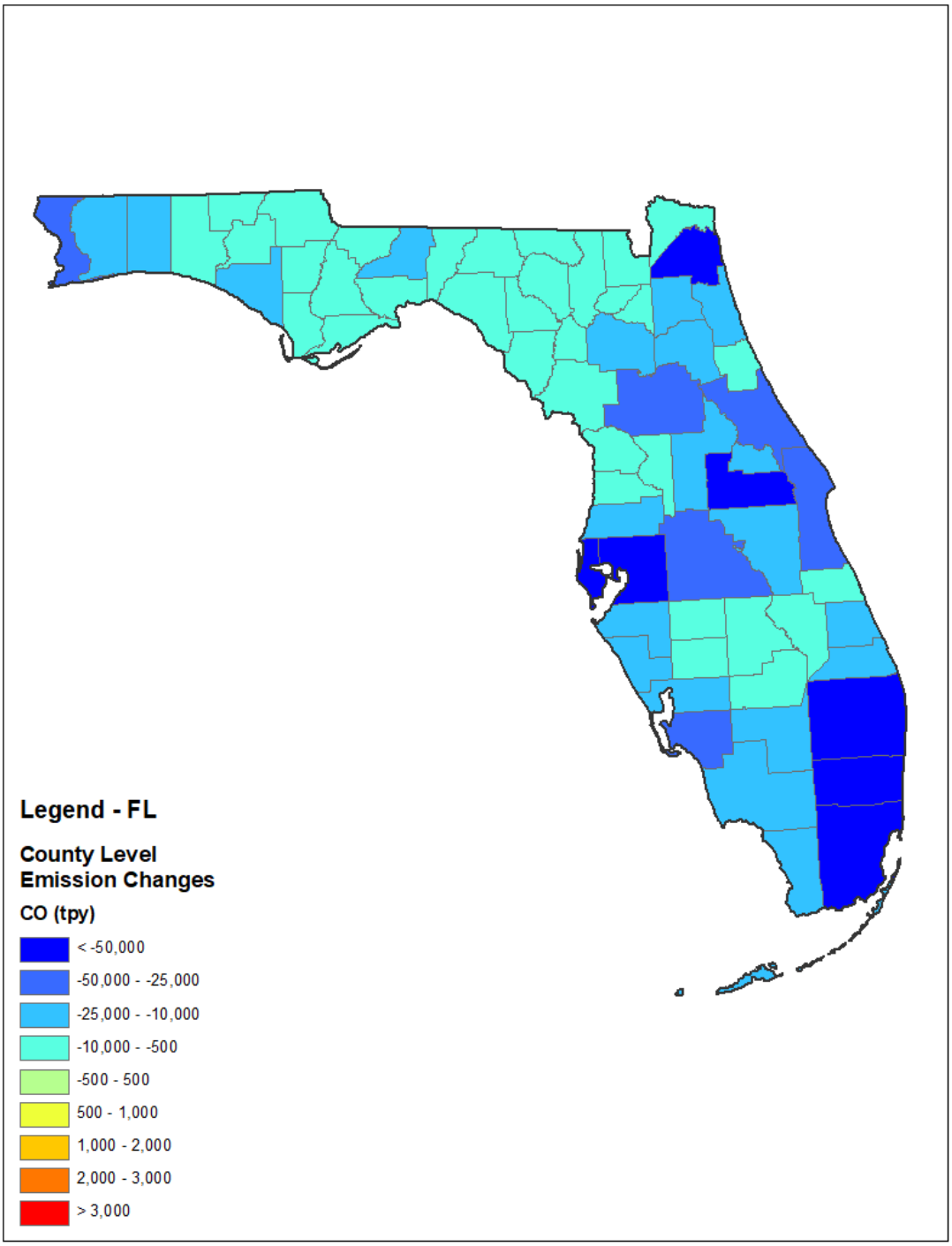

Figure F.2-1. Florida County Level CO Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

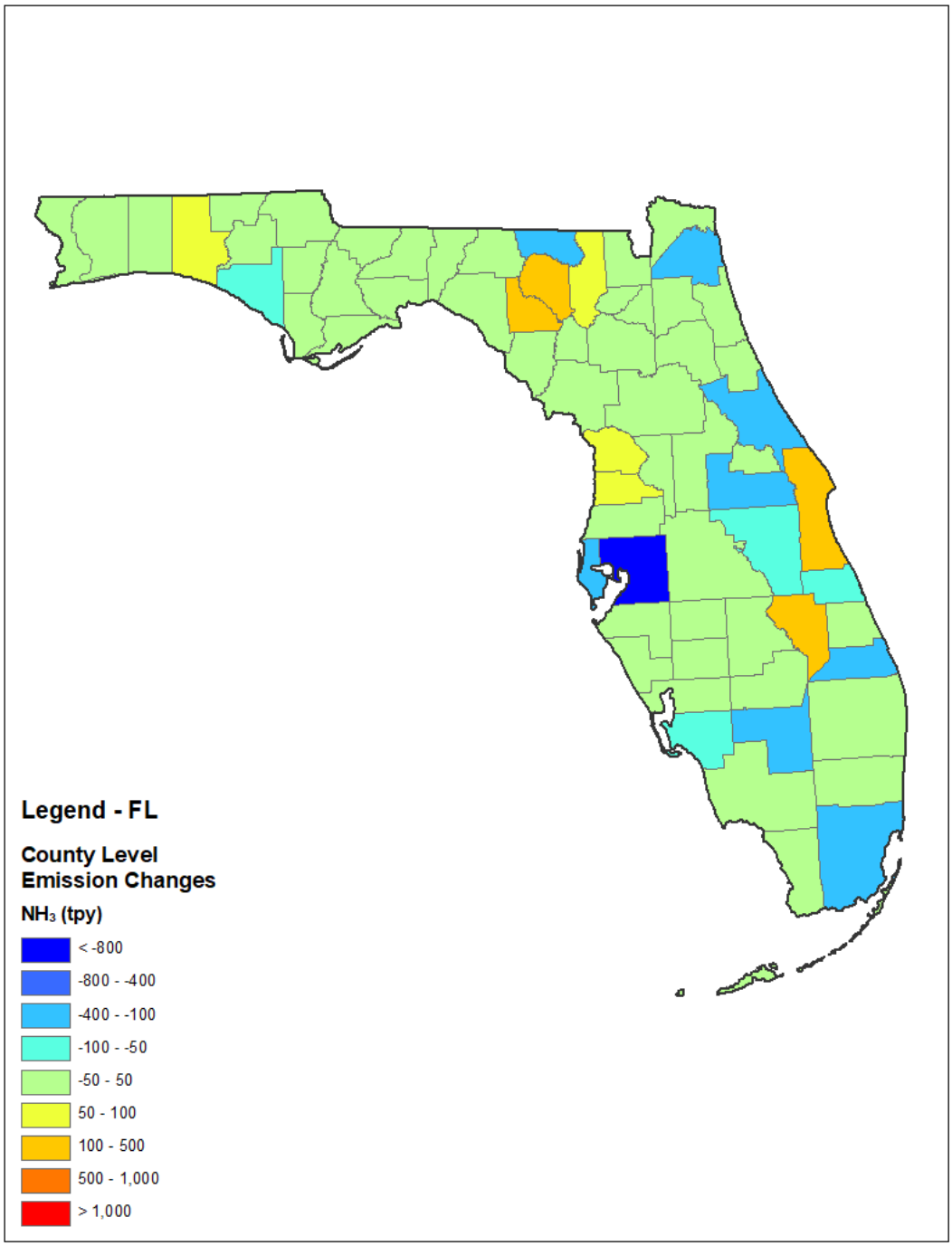

Figure F.2-2. Florida County Level NH_3 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

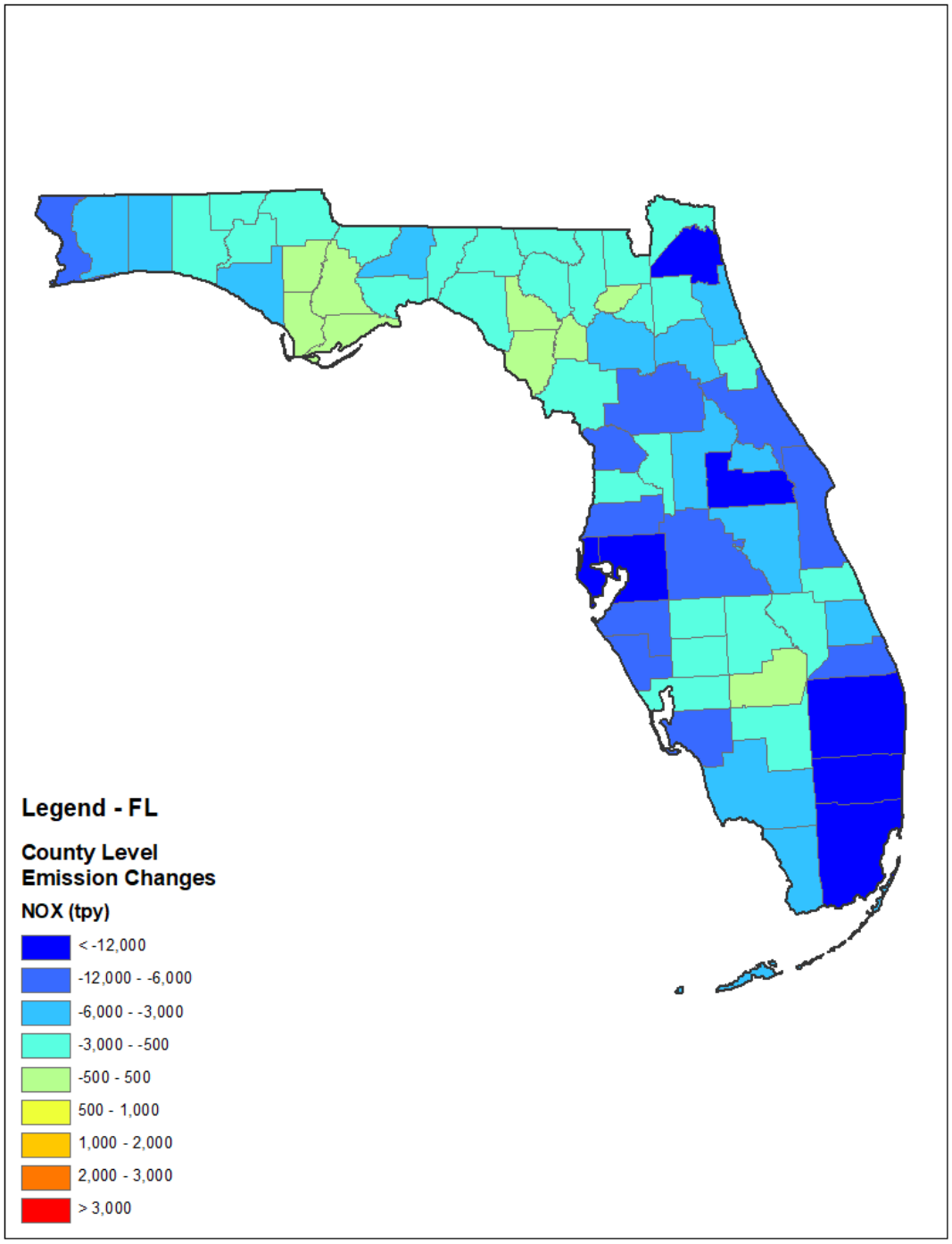

Figure F.2-3. Florida County Level NO_x Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

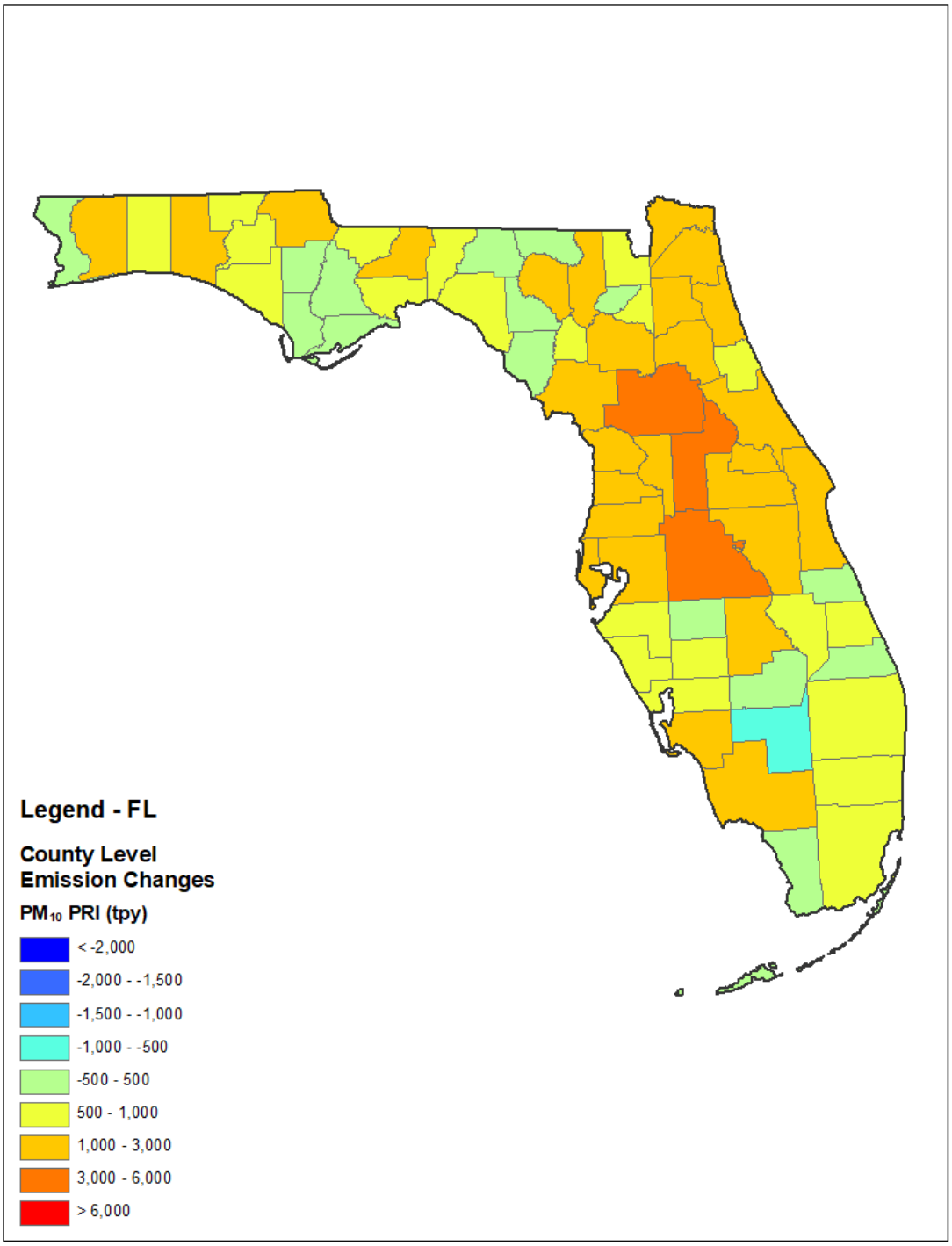

Figure F.2-4. Florida County Level PM_{10}-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[80]

[80] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

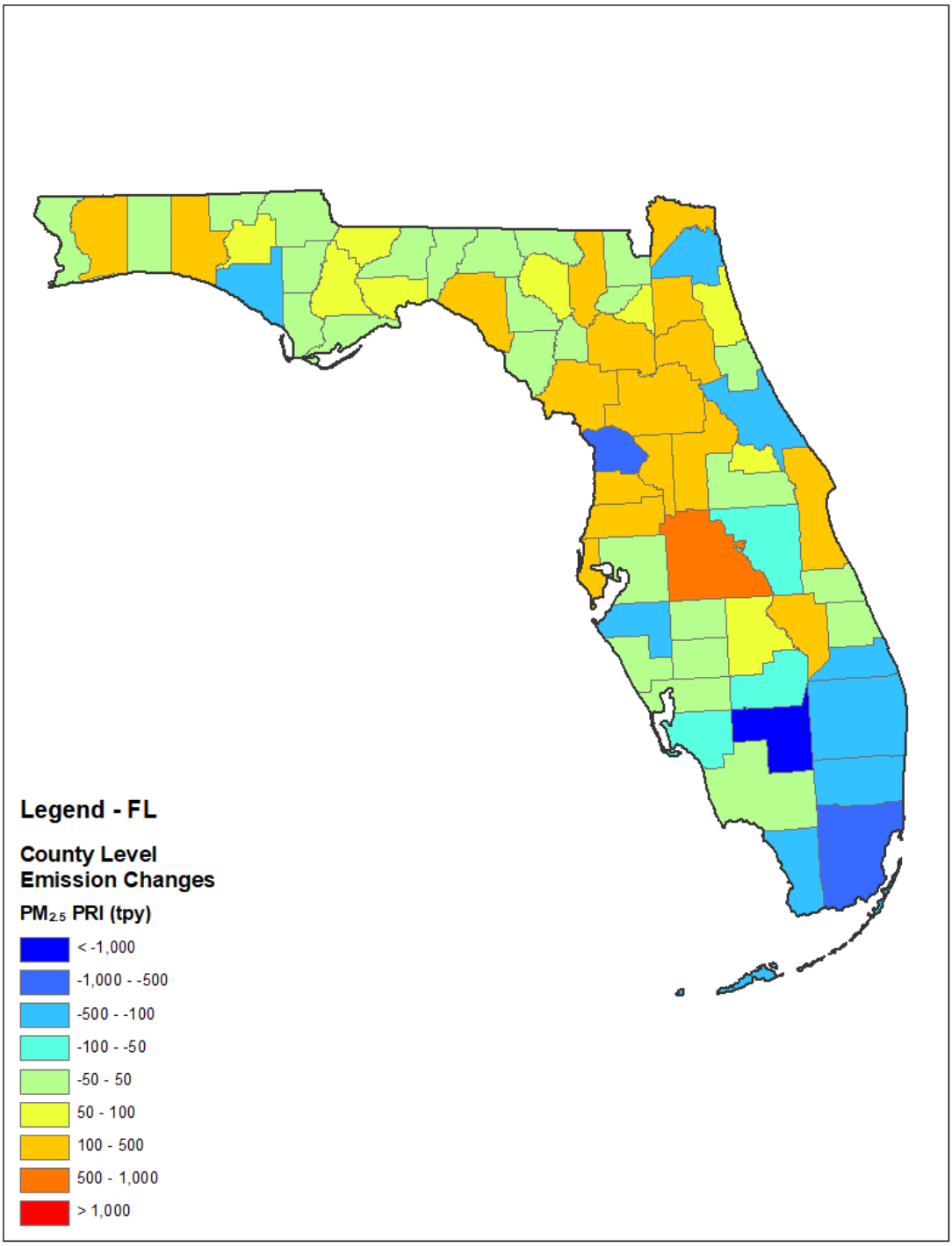

Figure F.2-5. Florida County Level $PM_{2.5}$-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[81]

[81] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

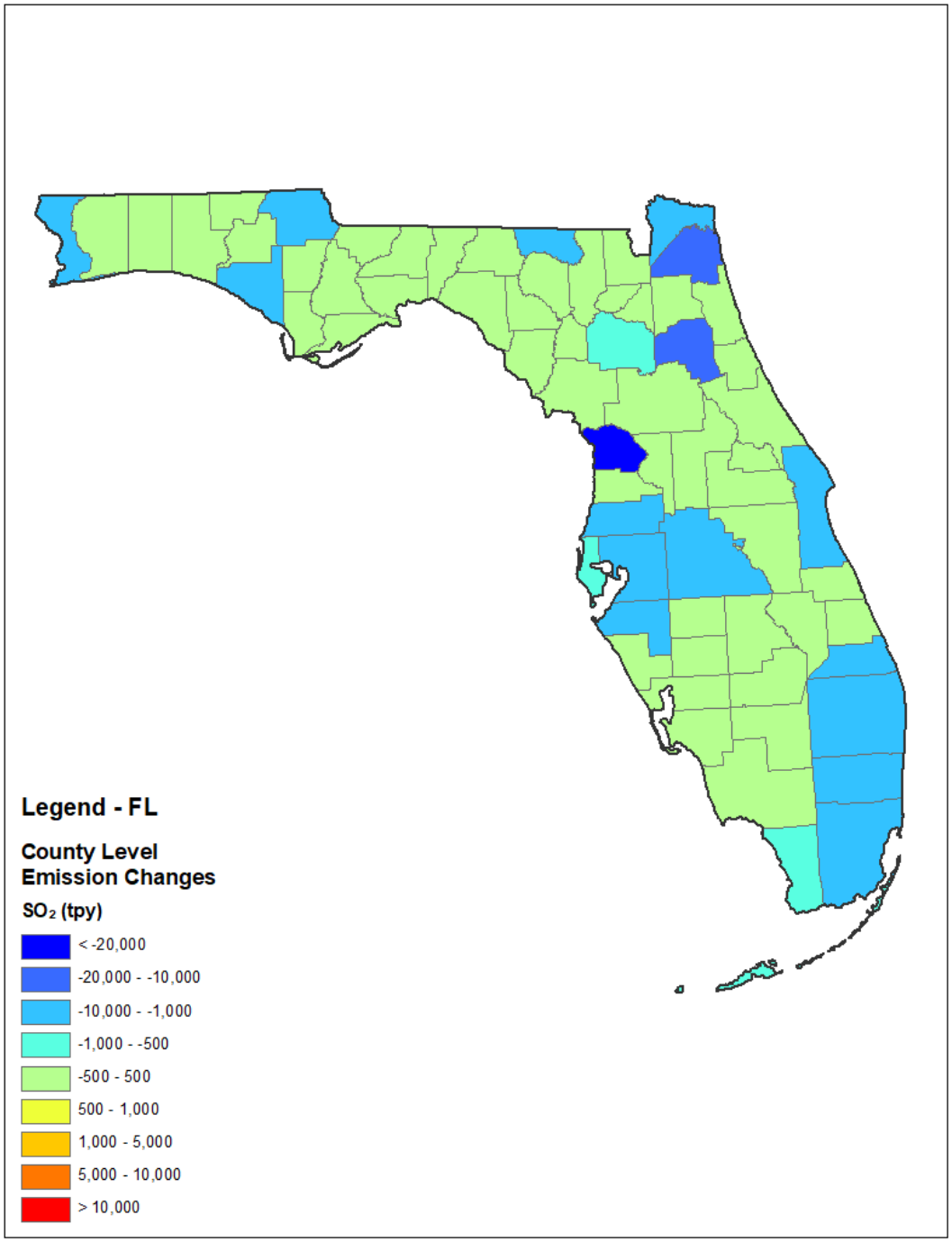

Figure F.2-6. Florida County Level SO_2 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

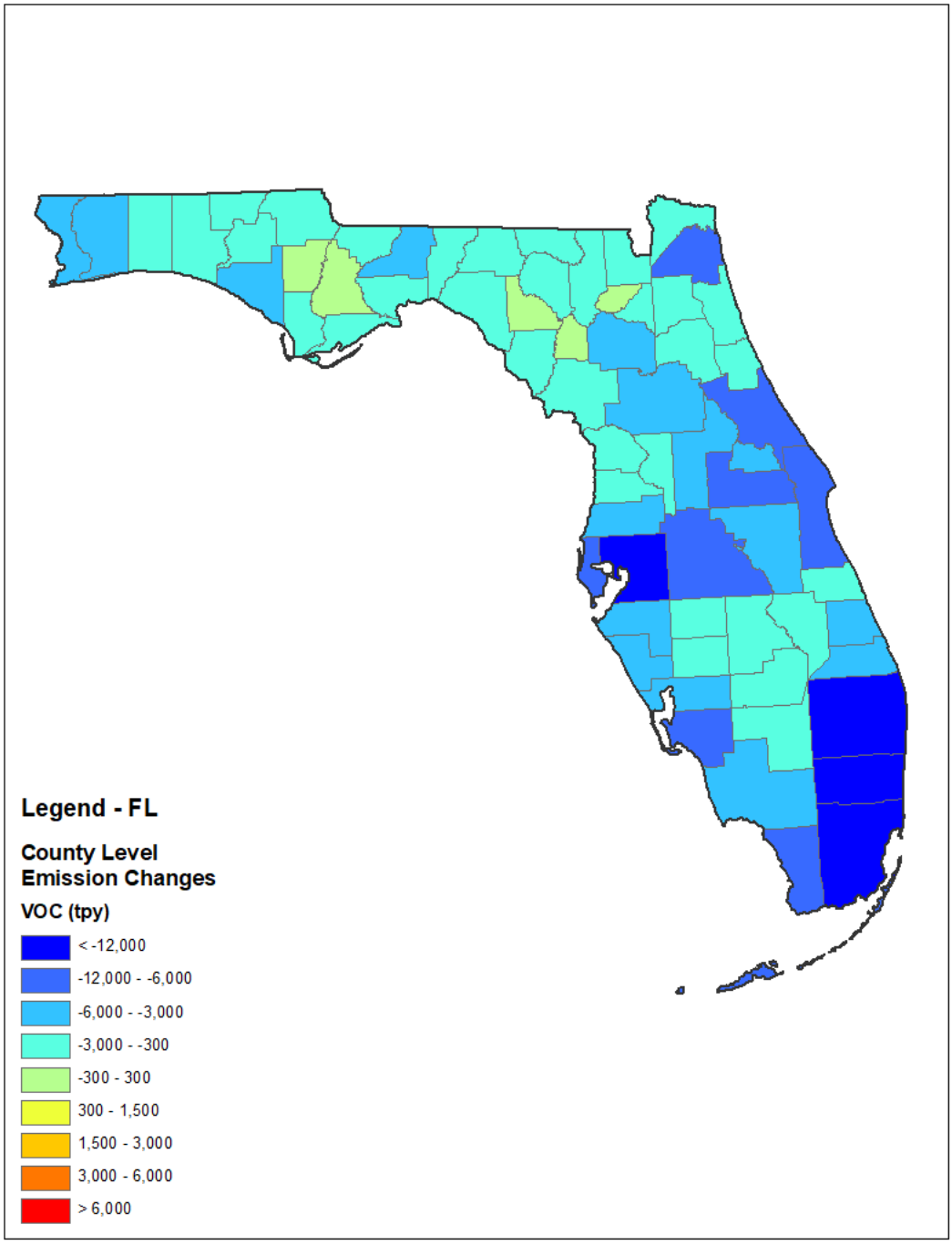

Figure F.2-7. Florida County Level VOC Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

Appendix F-3. Georgia County-Level Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory

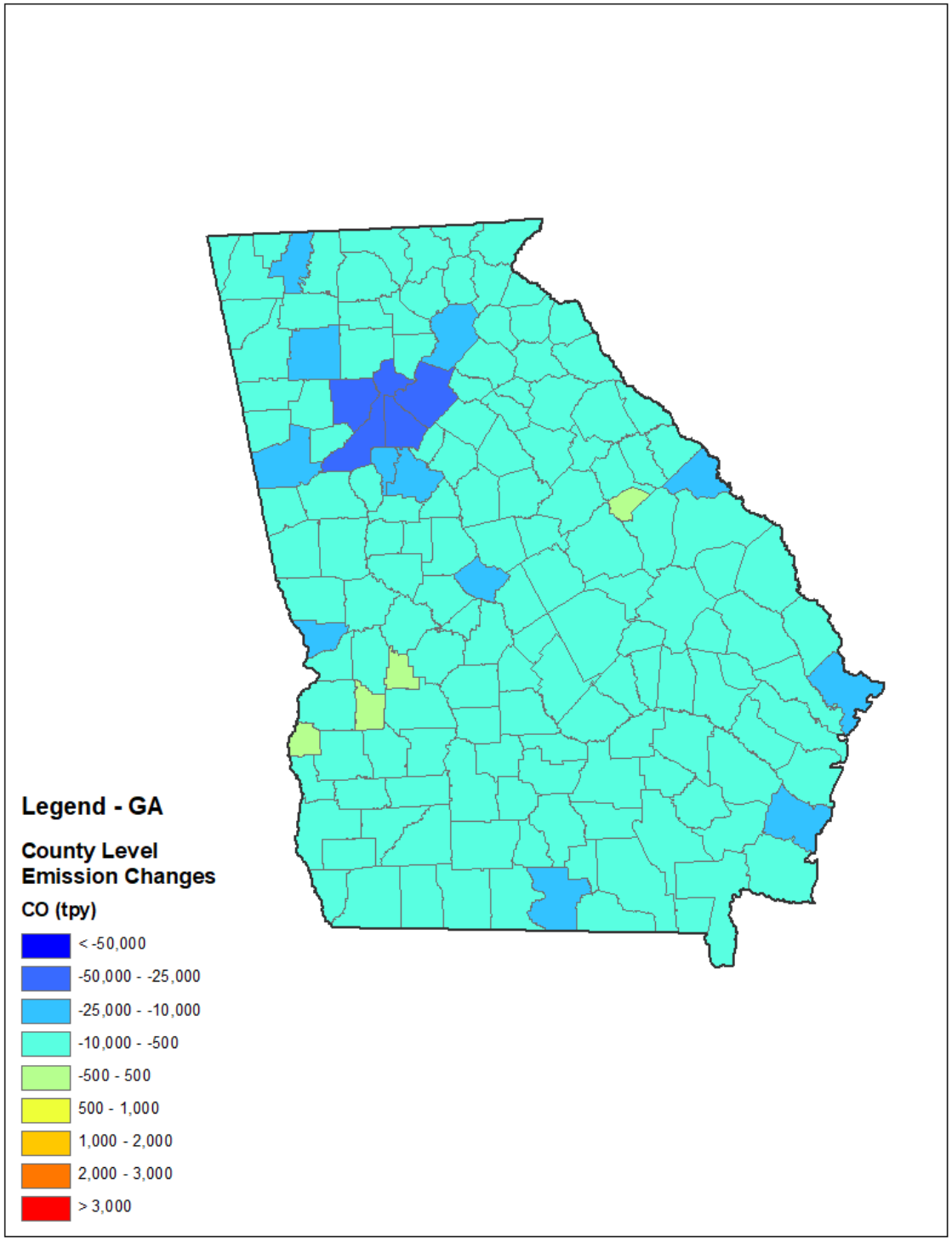

Figure F.3-1. Georgia County Level CO Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

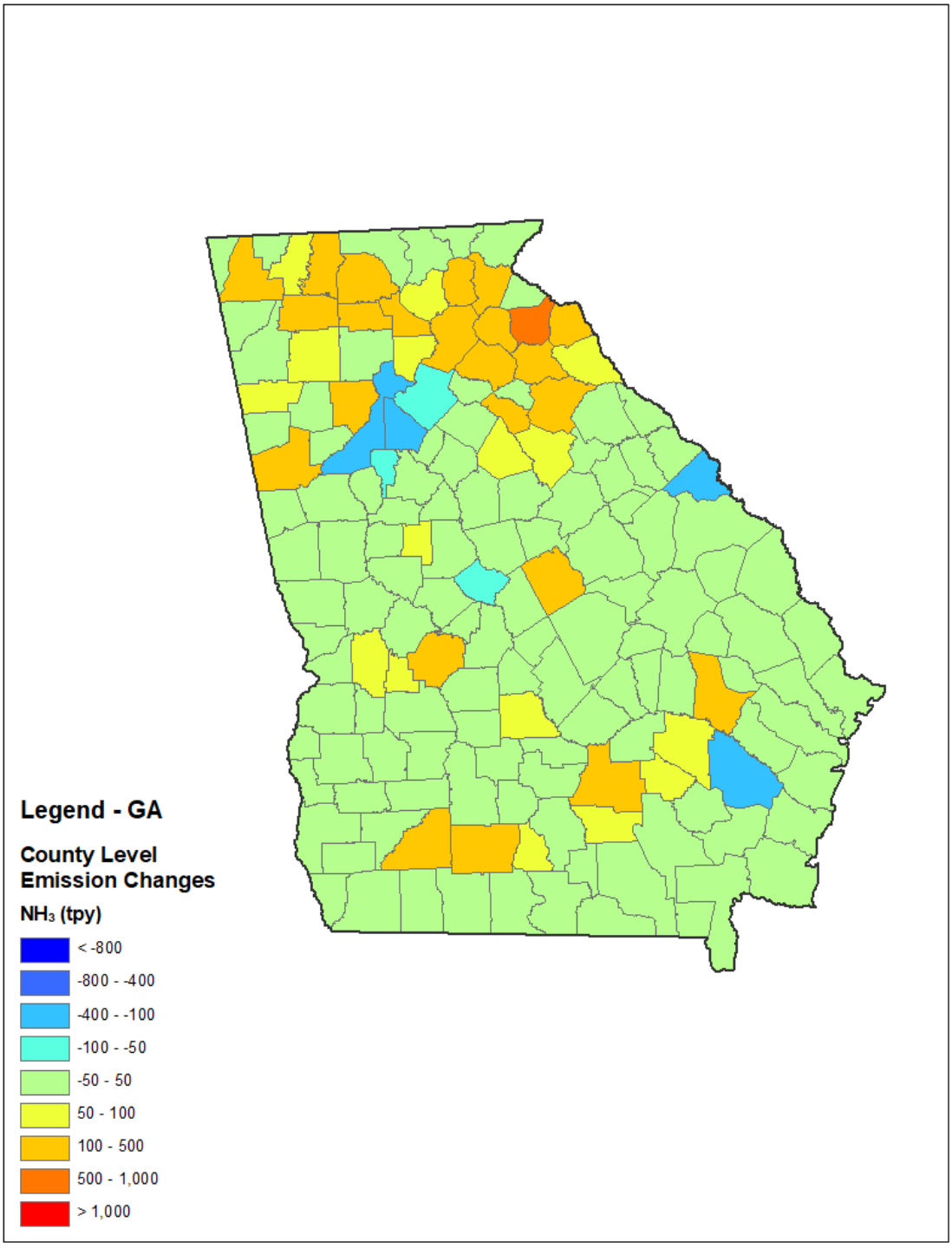

Figure F.3-2. Georgia County Level NH_3 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

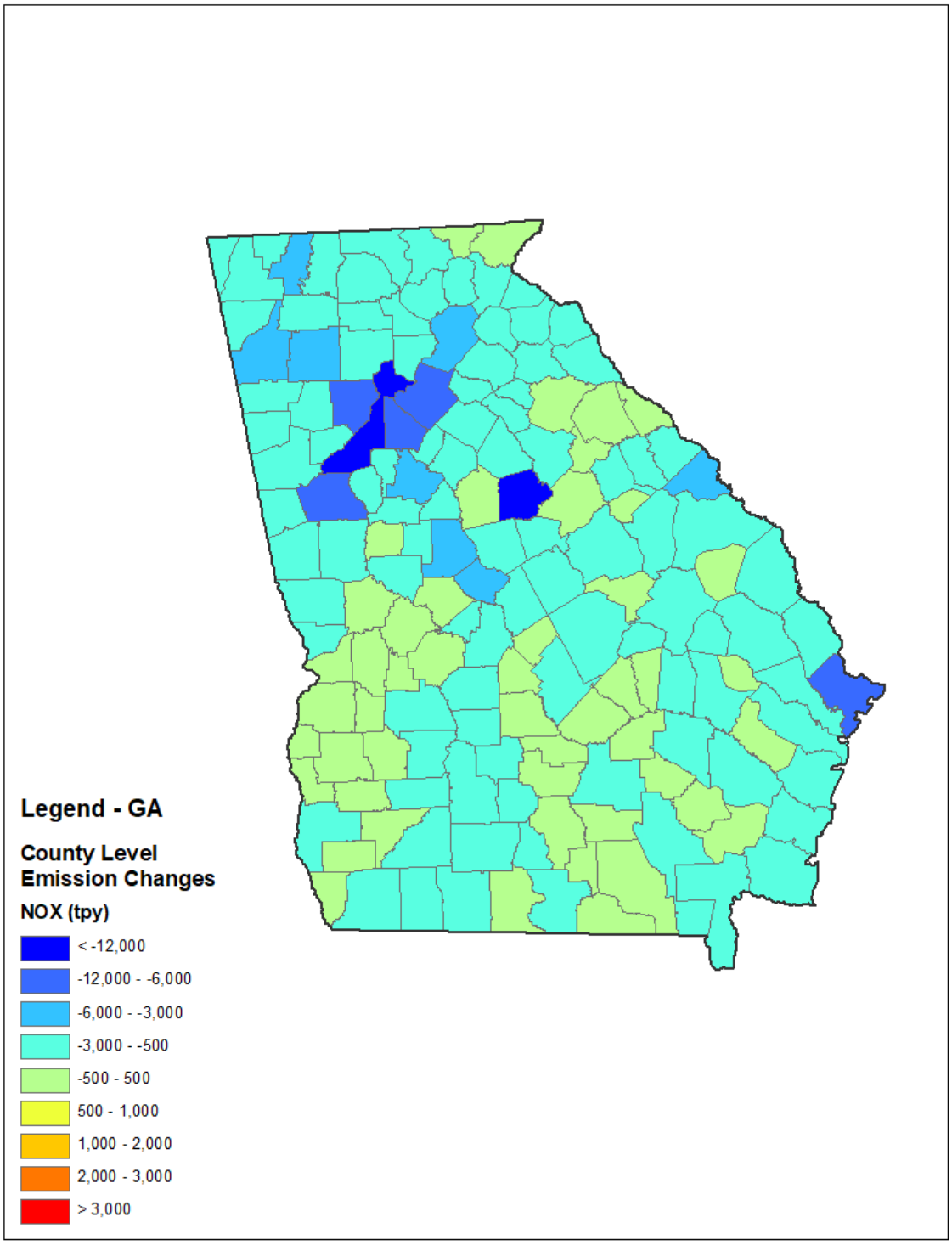

Figure F.3-3. Georgia County Level NO_x Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

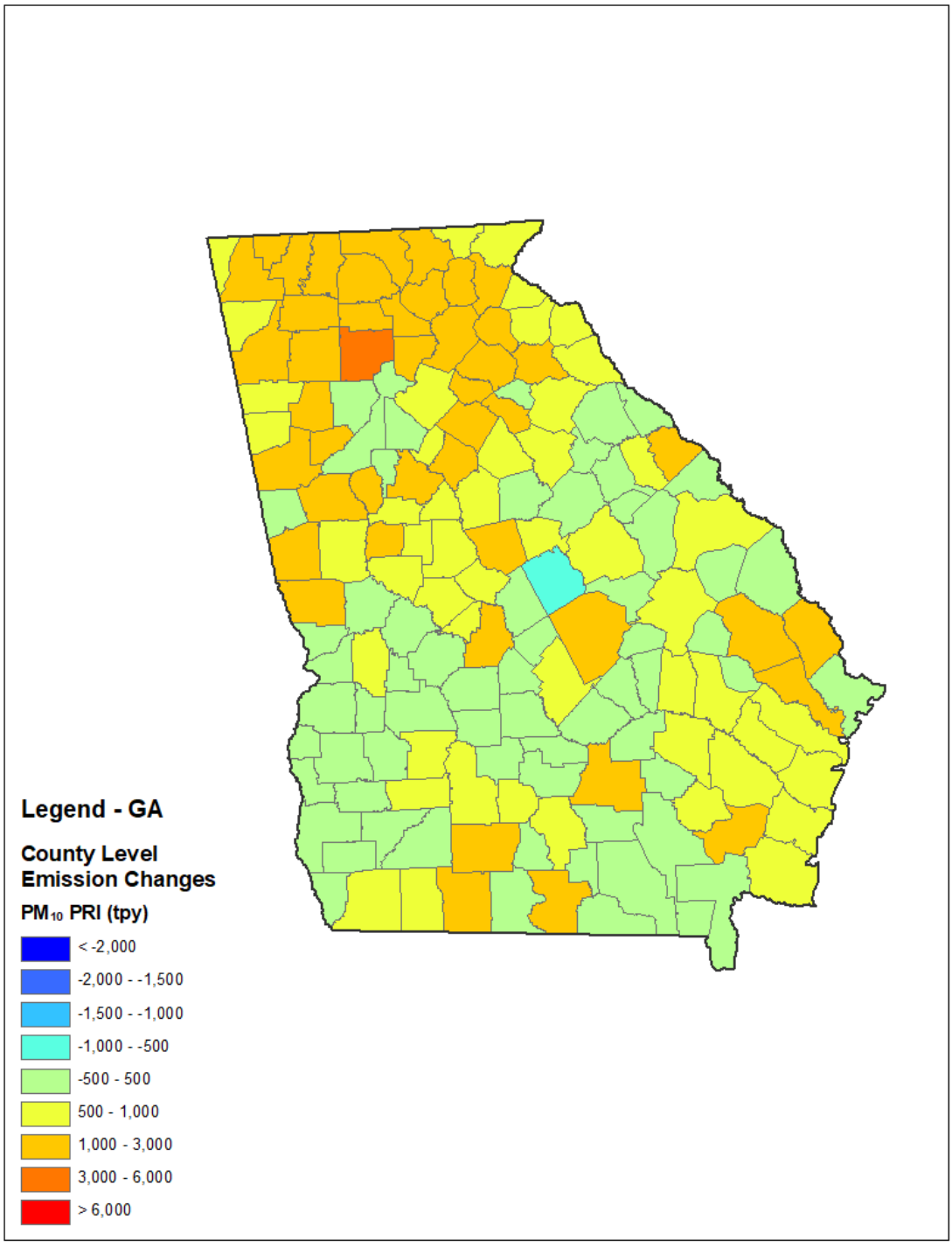

Figure F.3-4. Georgia County Level PM_{10}-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[82]

[82] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

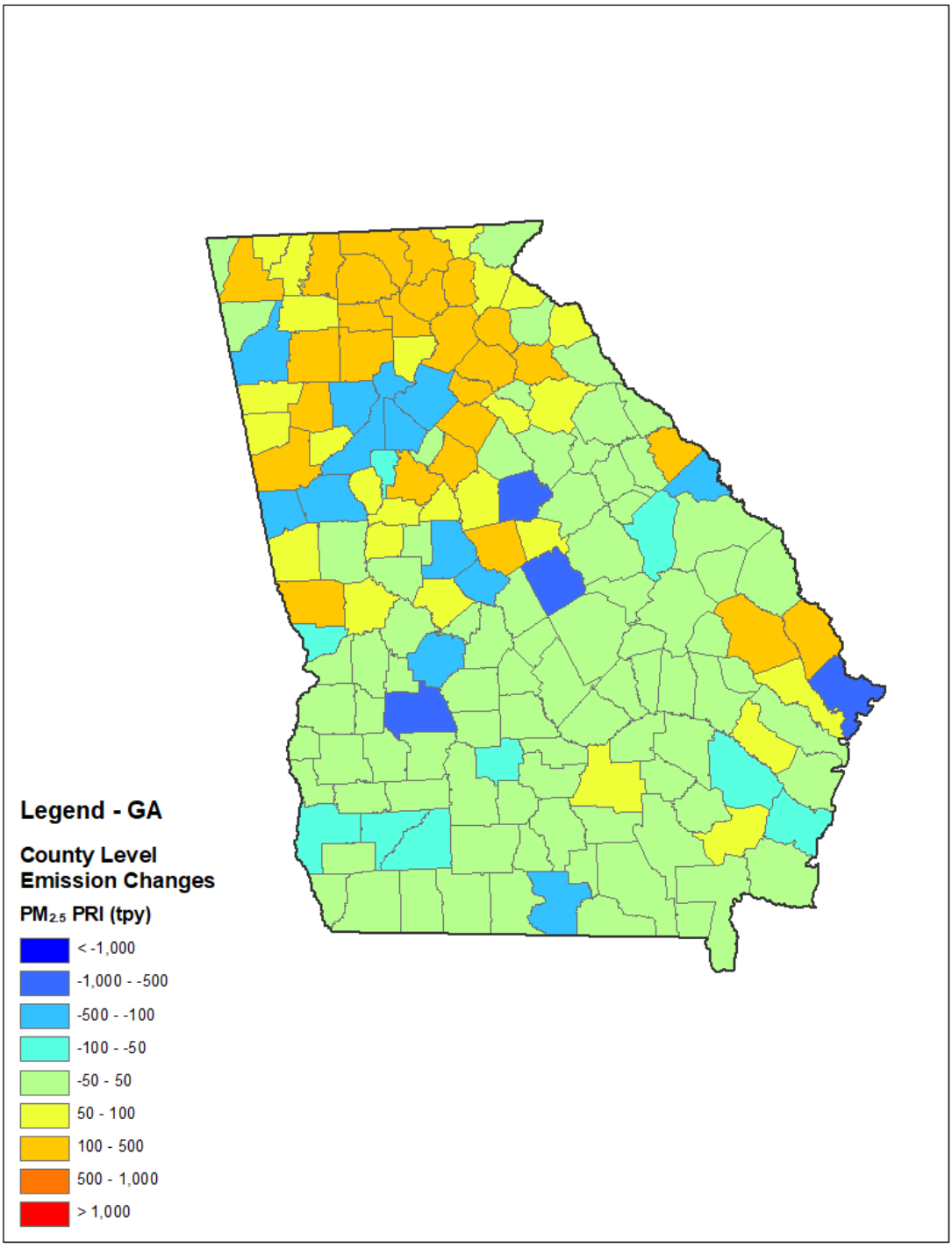

Figure F.3-5. Georgia County Level $PM_{2.5}$-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[83]

[83] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

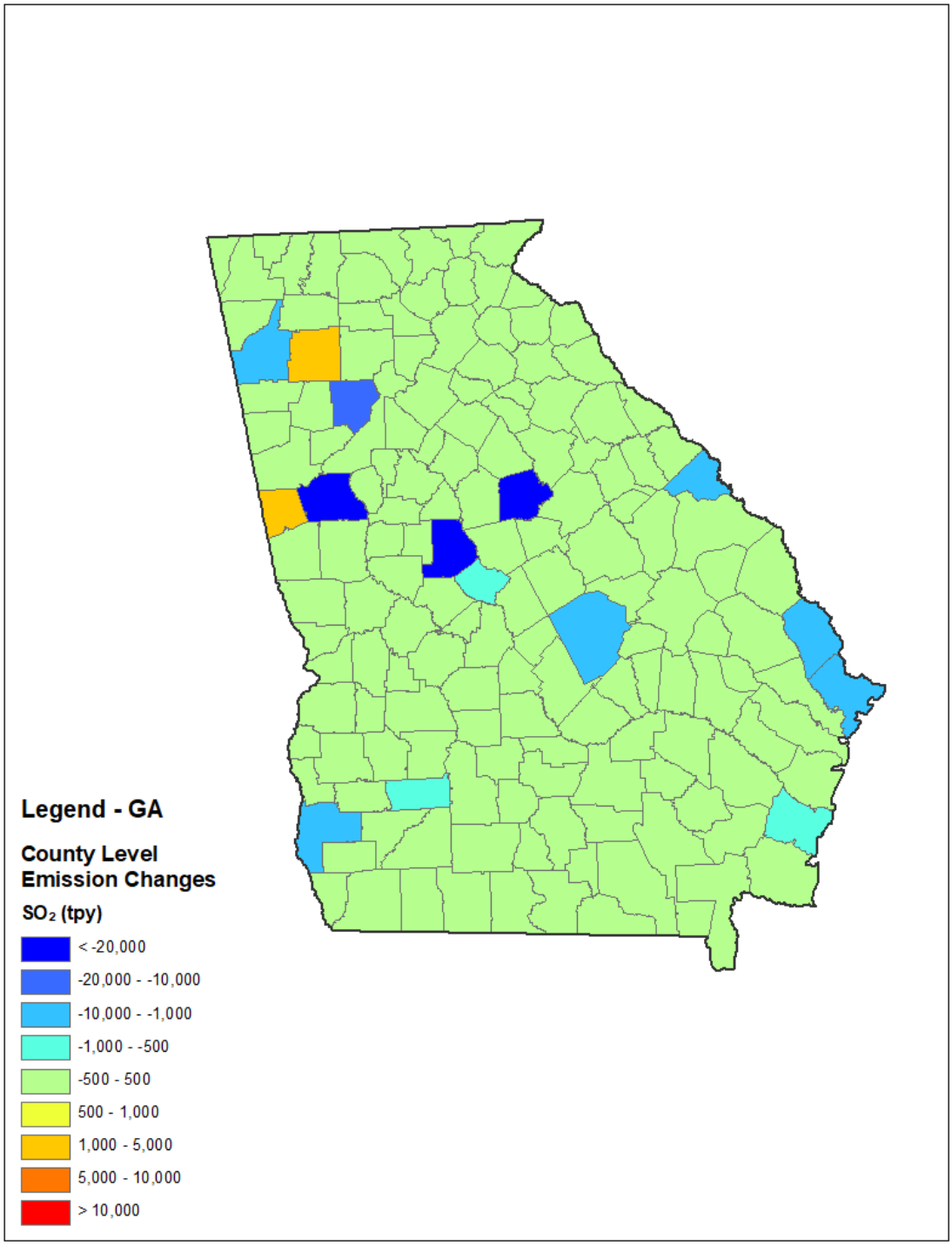

Figure F.3-6. Georgia County Level SO_2 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

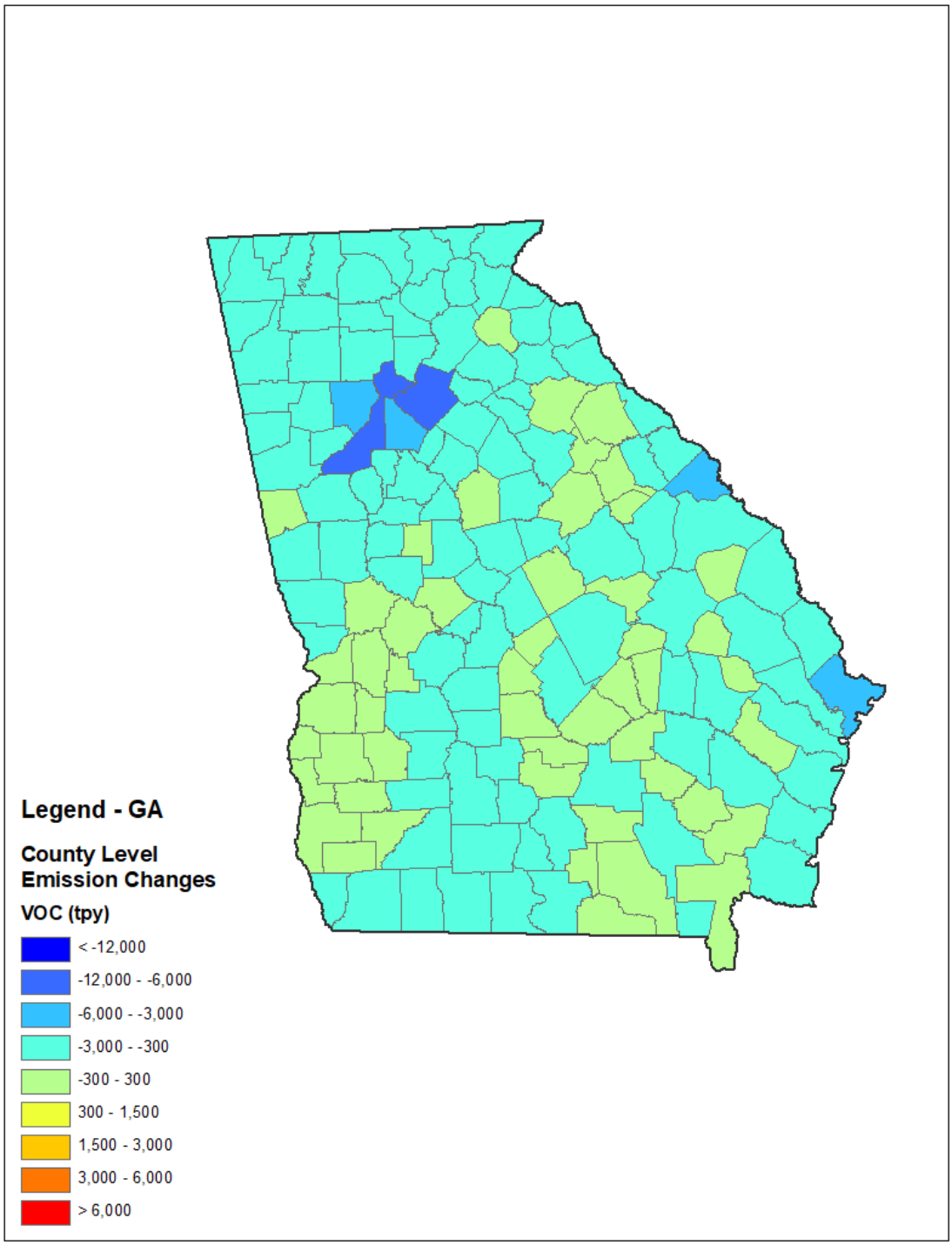

Figure F.3-7. Georgia County Level VOC Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

Appendix F-4. Kentucky County-Level Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory

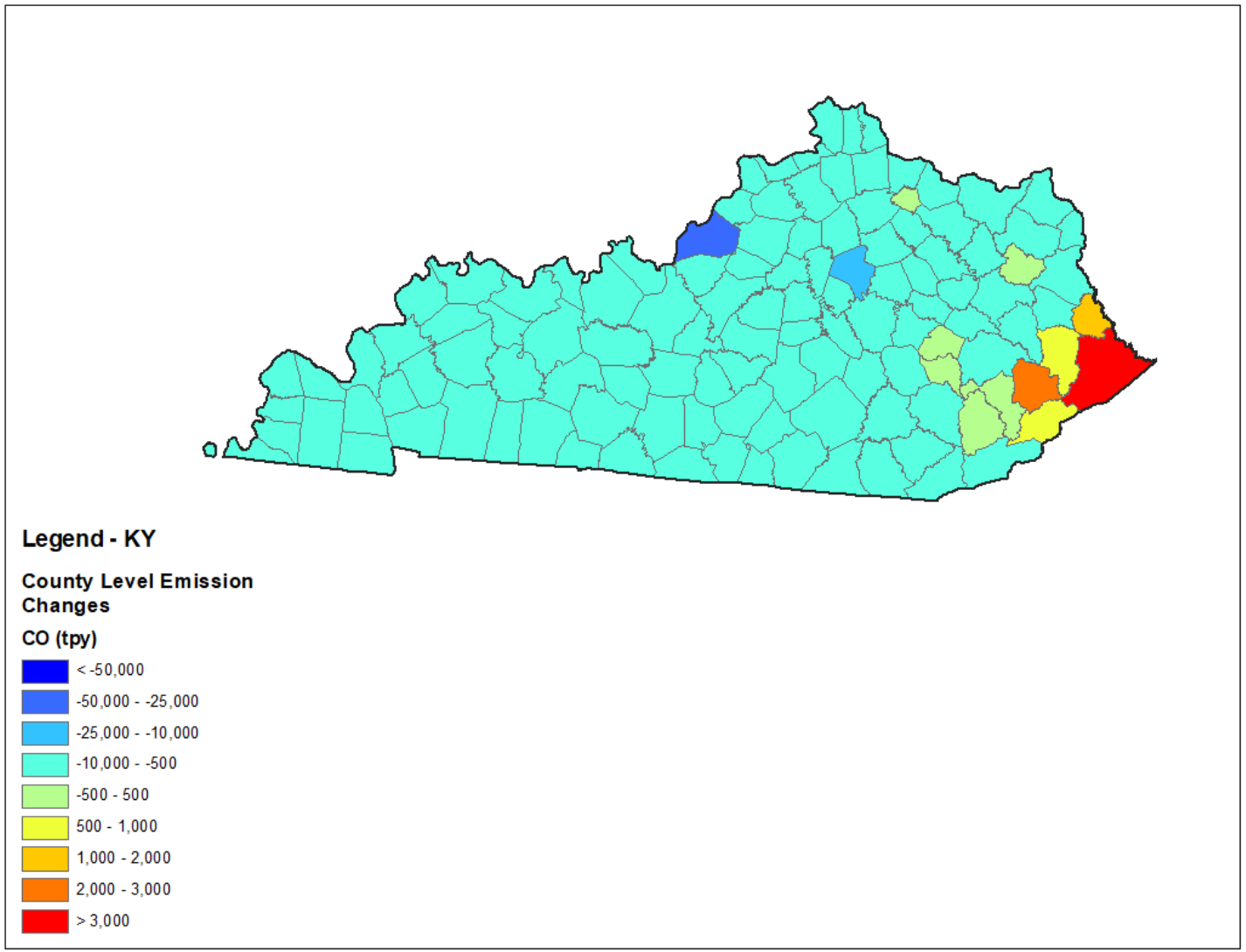

Figure F.4-1. Kentucky County Level CO Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

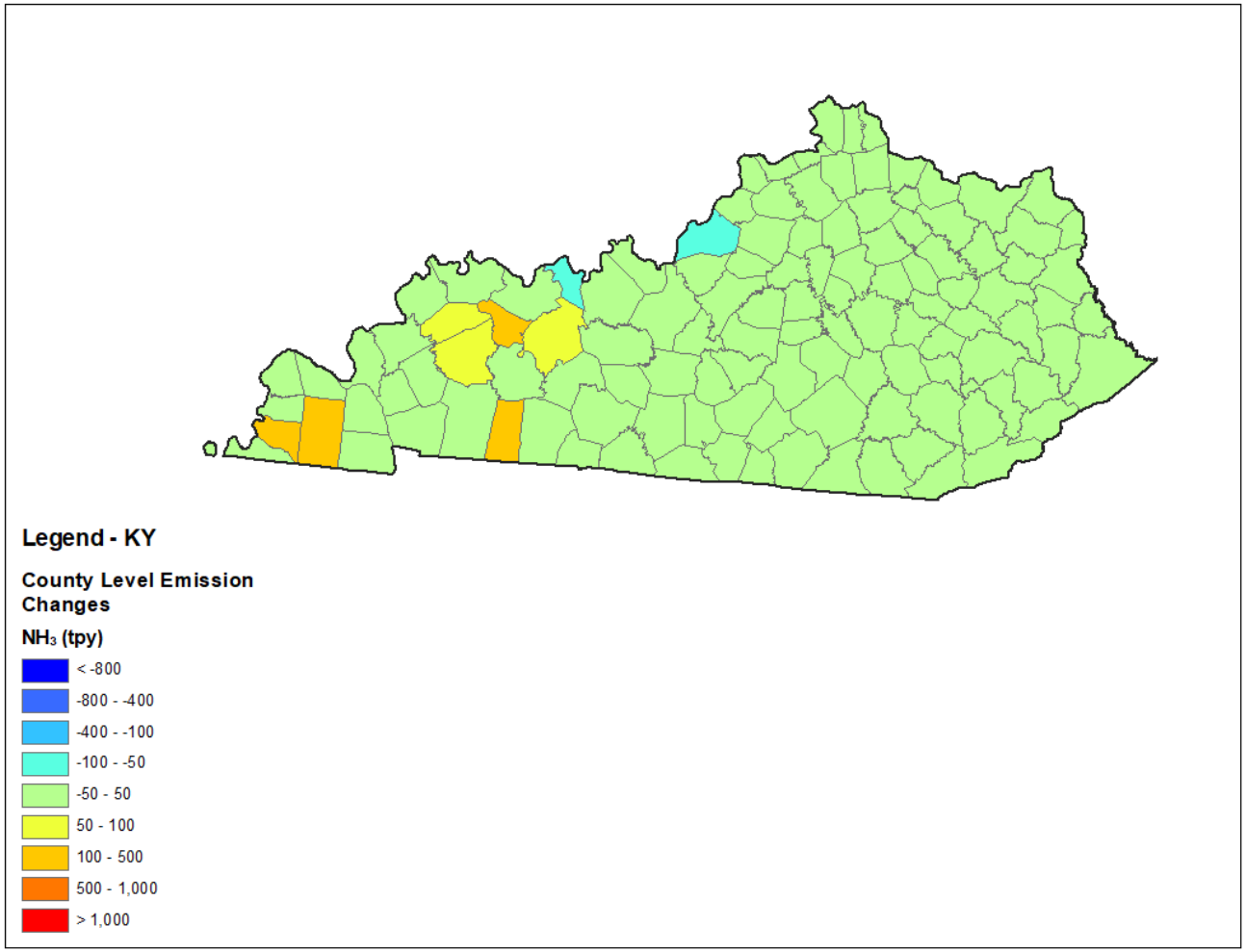

Figure F.4-2. Kentucky County Level NH_3 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

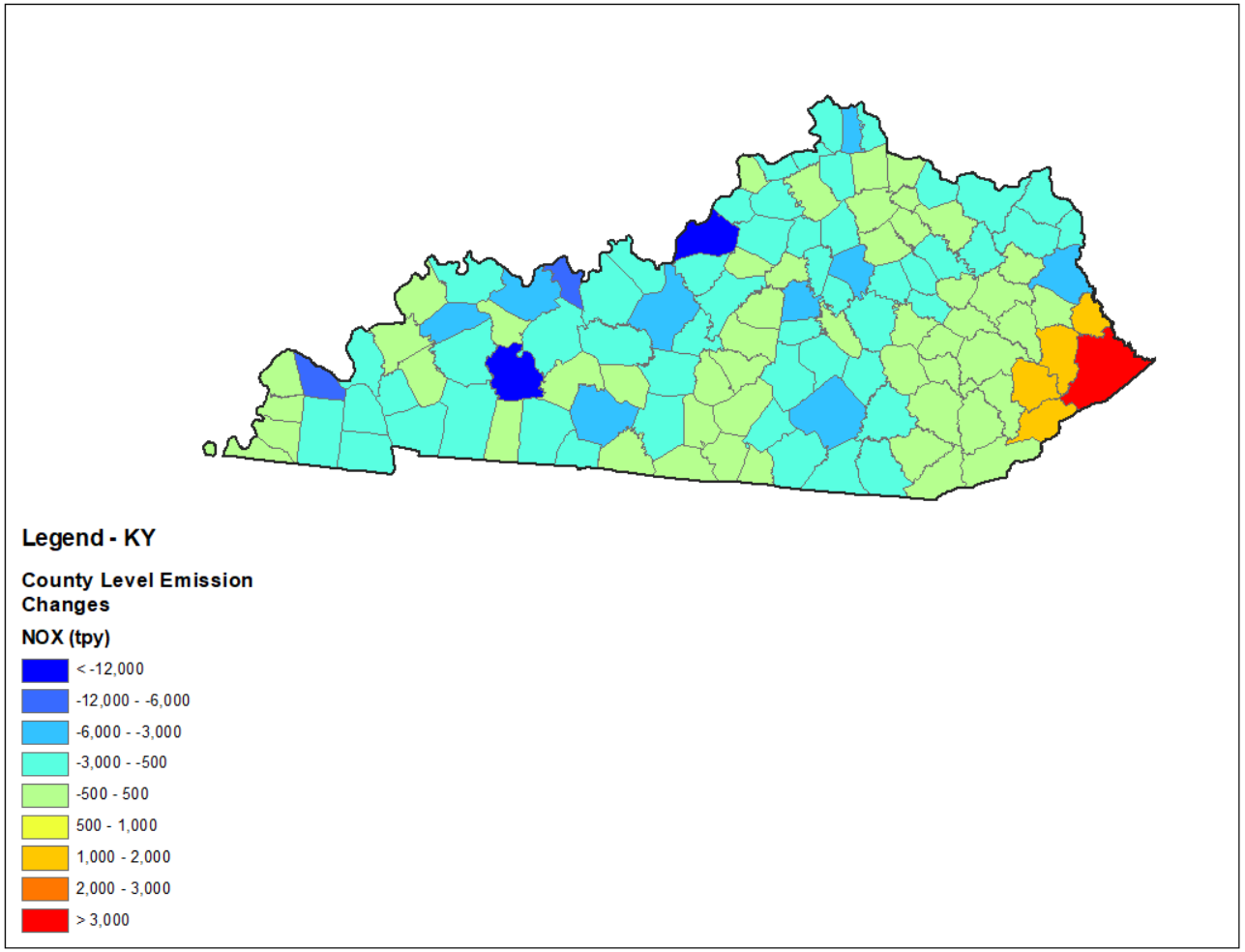

Figure F.4-3. Kentucky County Level NO_x Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

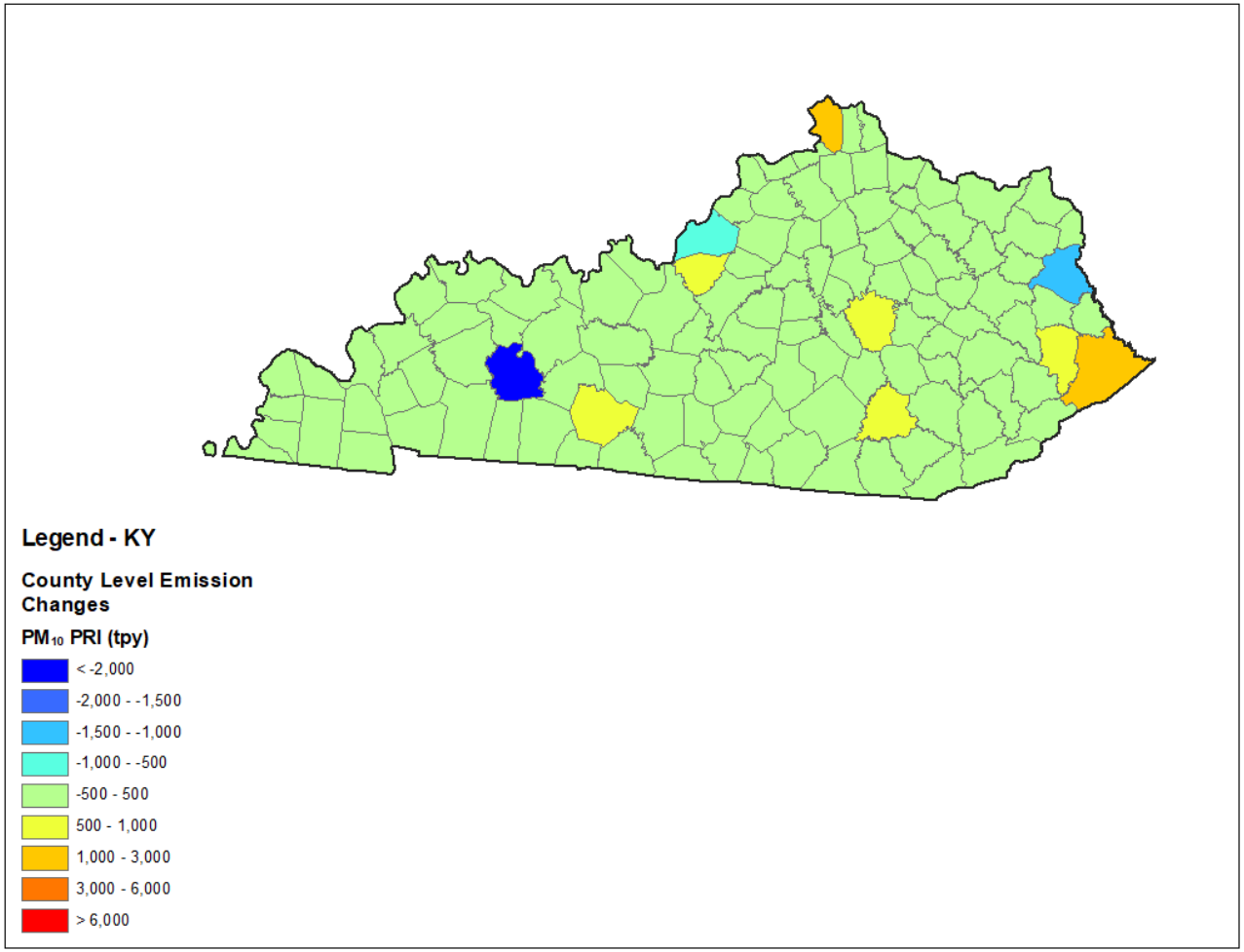

Figure F.4-4. Kentucky County Level PM_{10}-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[84]

[84] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

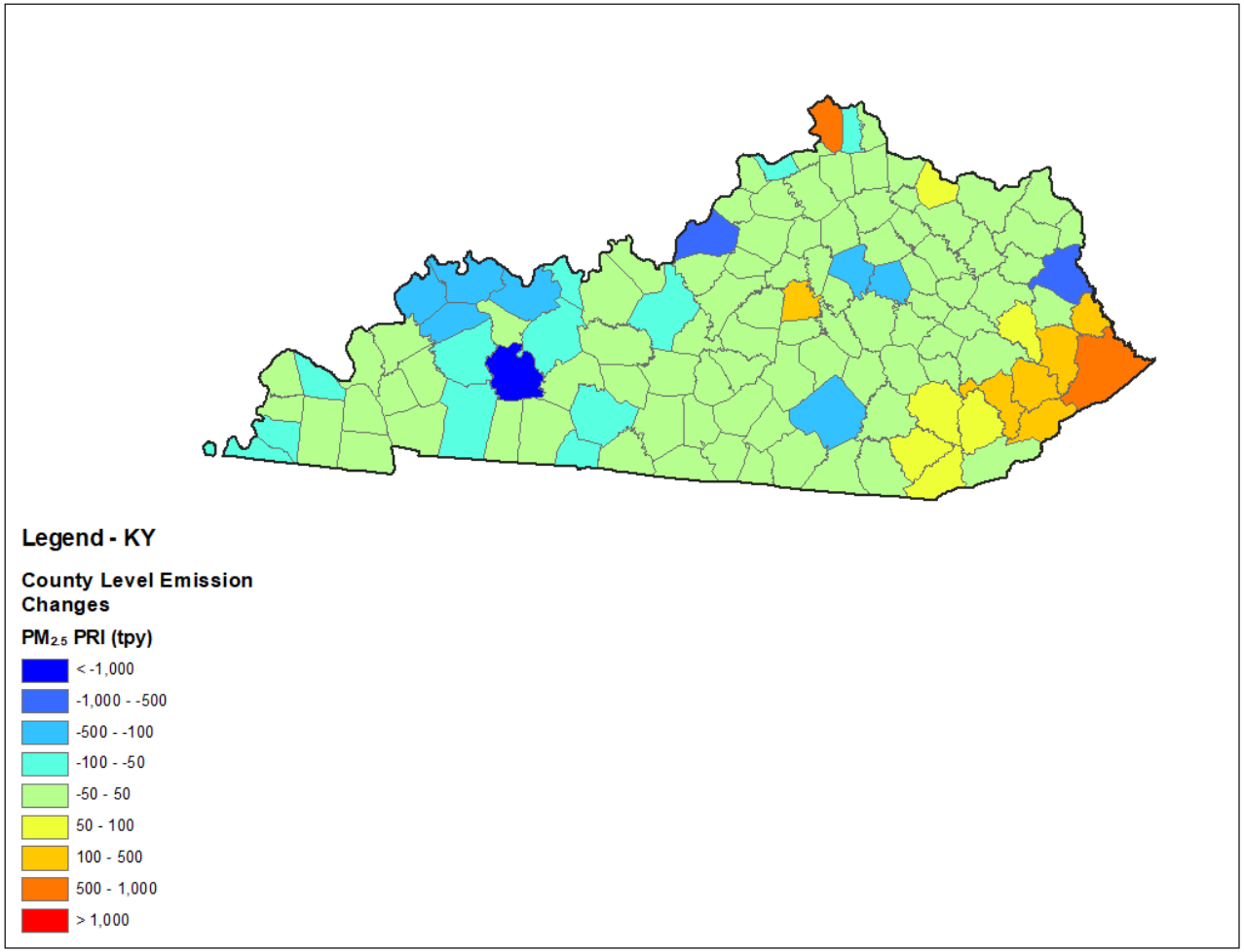

Figure F.4-5. Kentucky County Level $PM_{2.5}$-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[85]

[85] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

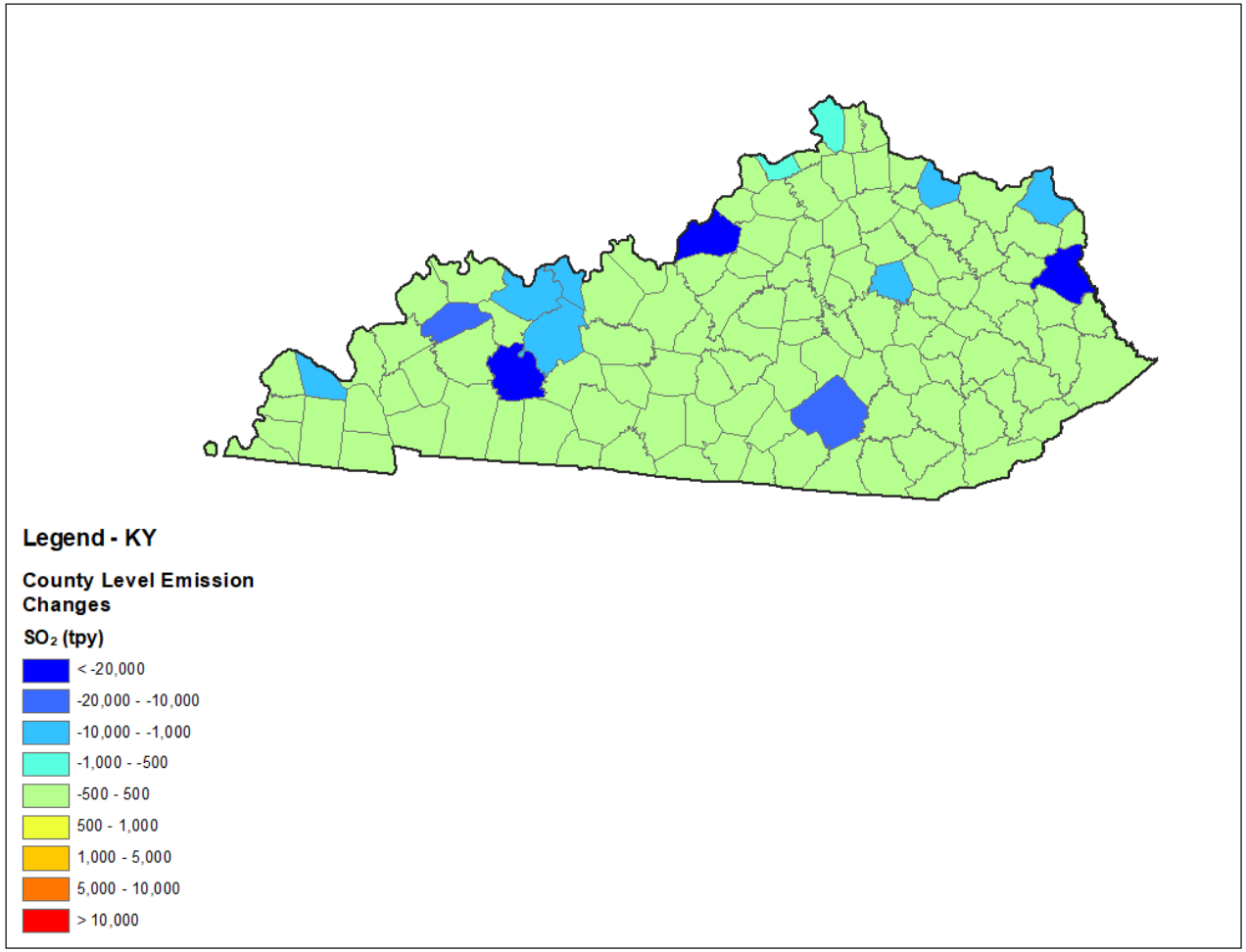

Figure F.4-6. Kentucky County Level SO_2 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

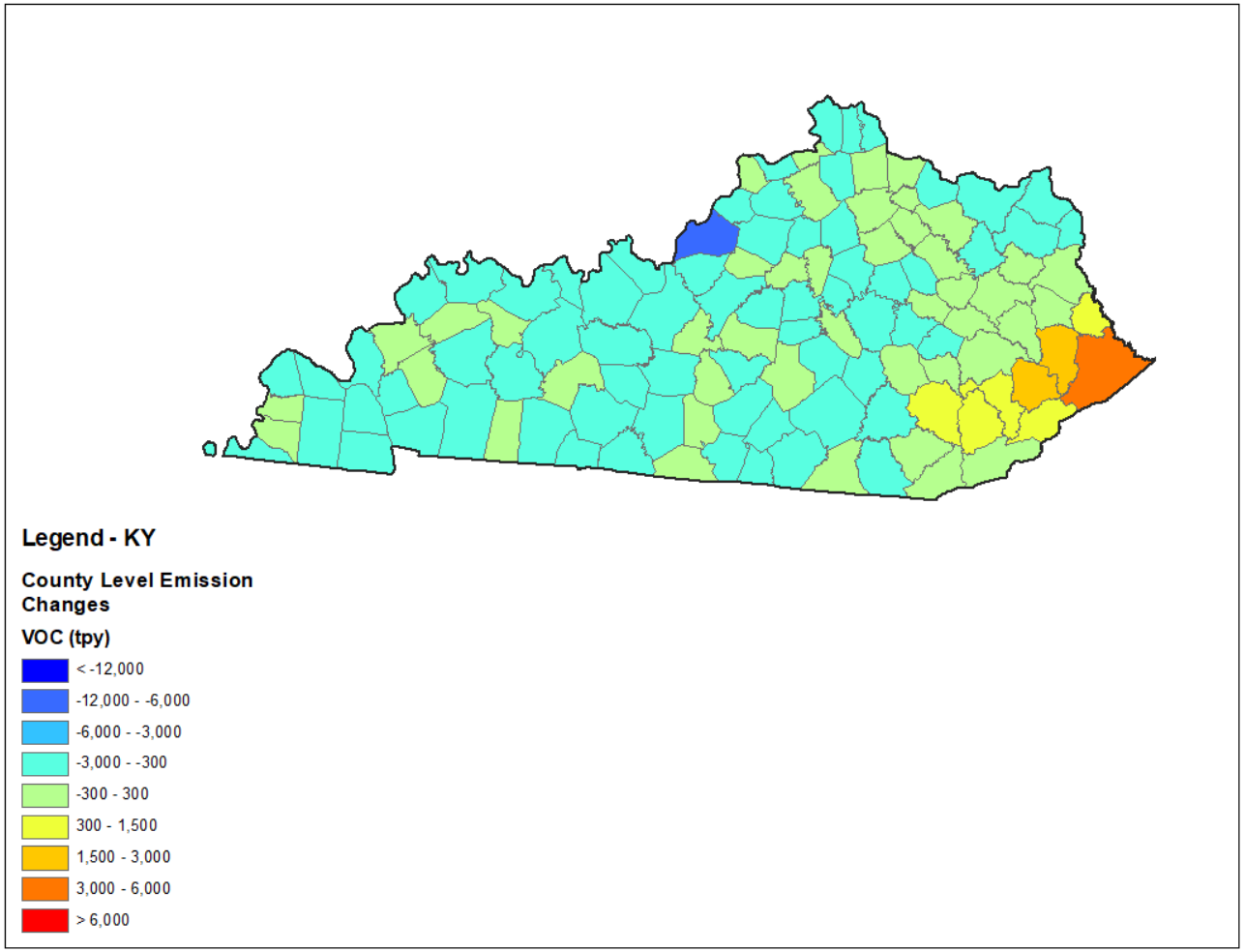

Figure F.4-7. Kentucky County Level VOC Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

Appendix F-5. Mississippi County-Level Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory

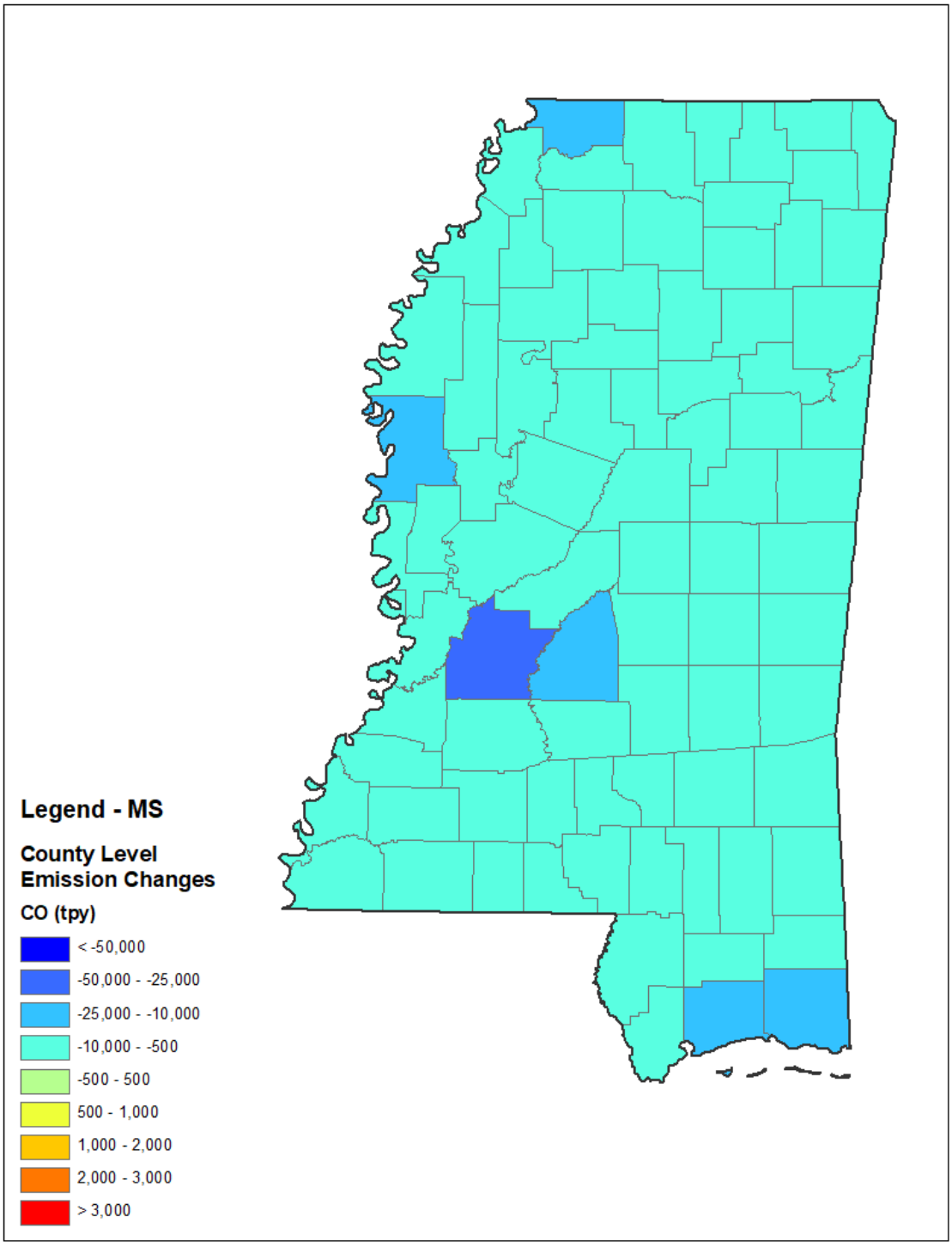

Figure F.0-1. Mississippi County Level CO Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

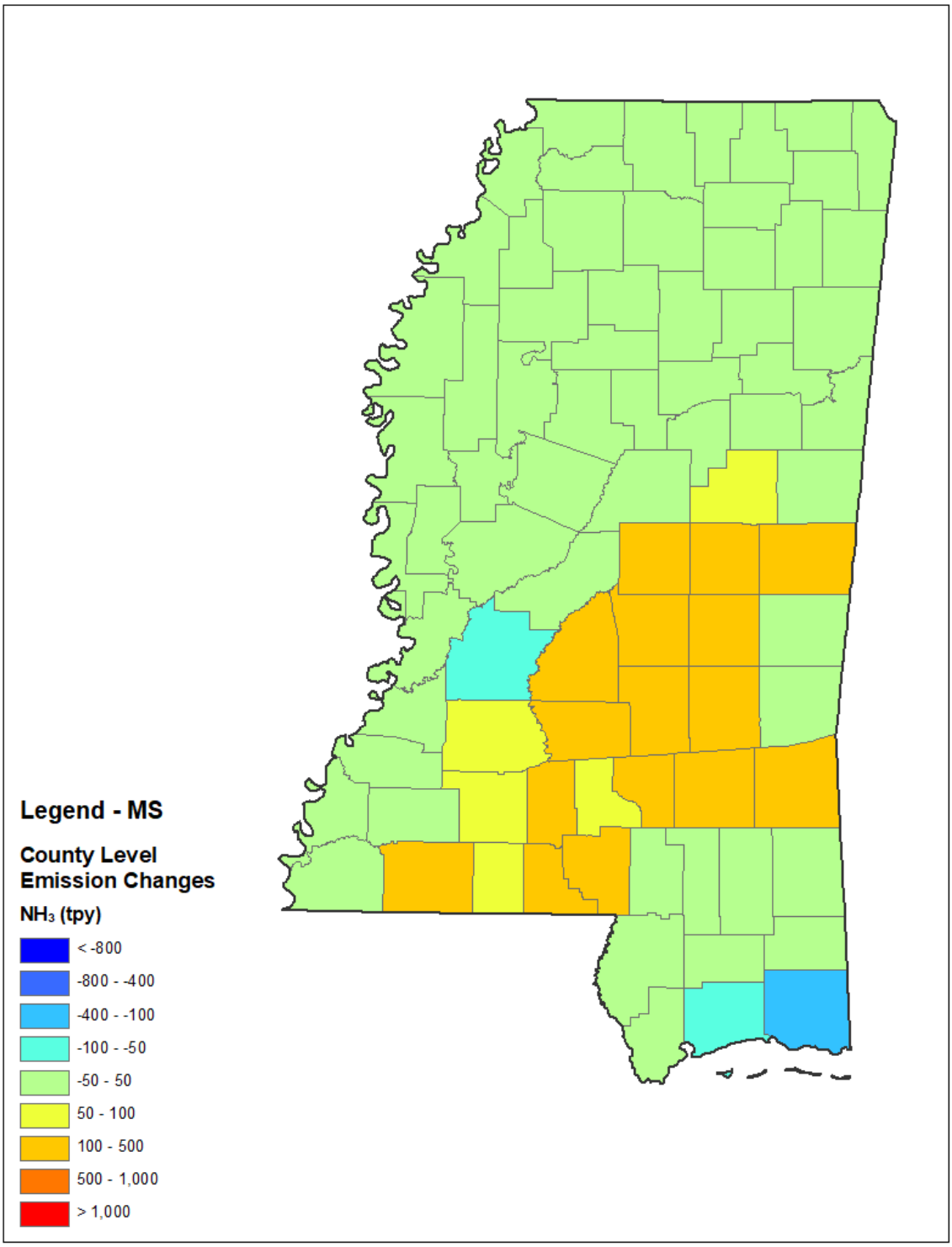

Figure F.0-2. Mississippi County Level NH_3 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

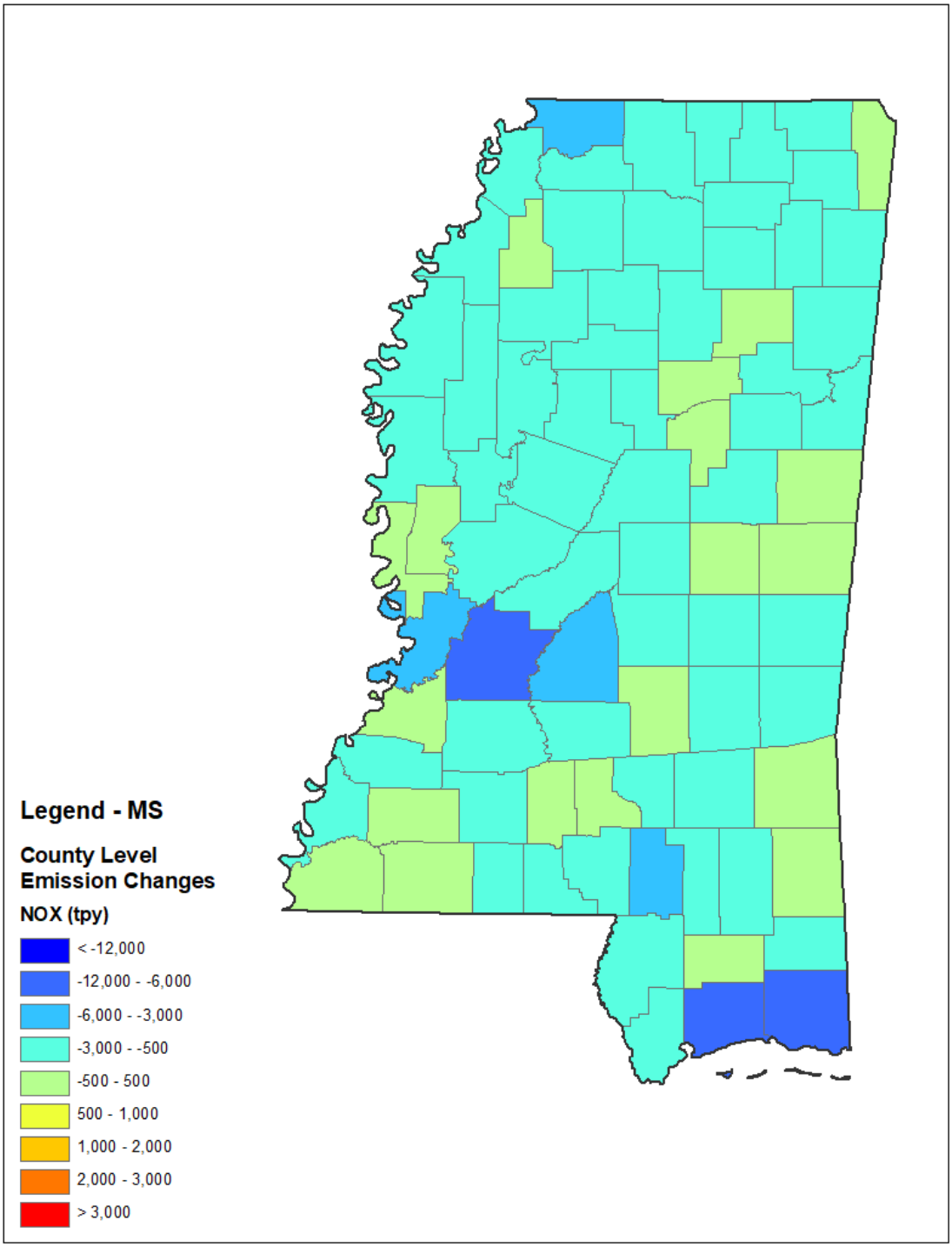

Figure F.0-3. Mississippi County Level NO_x Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

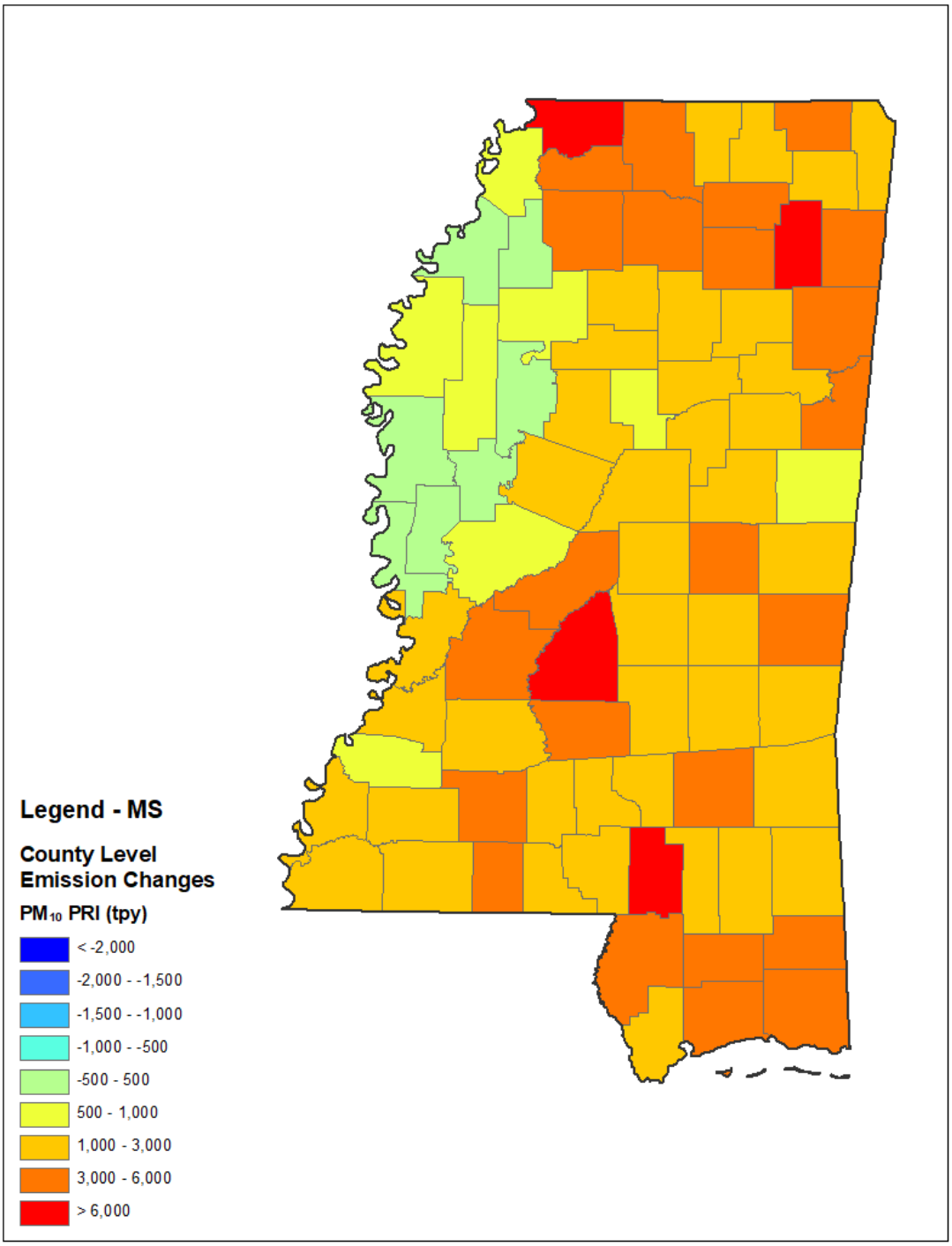

Figure F.0-4. Mississippi County Level PM_{10}-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[86]

[86] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

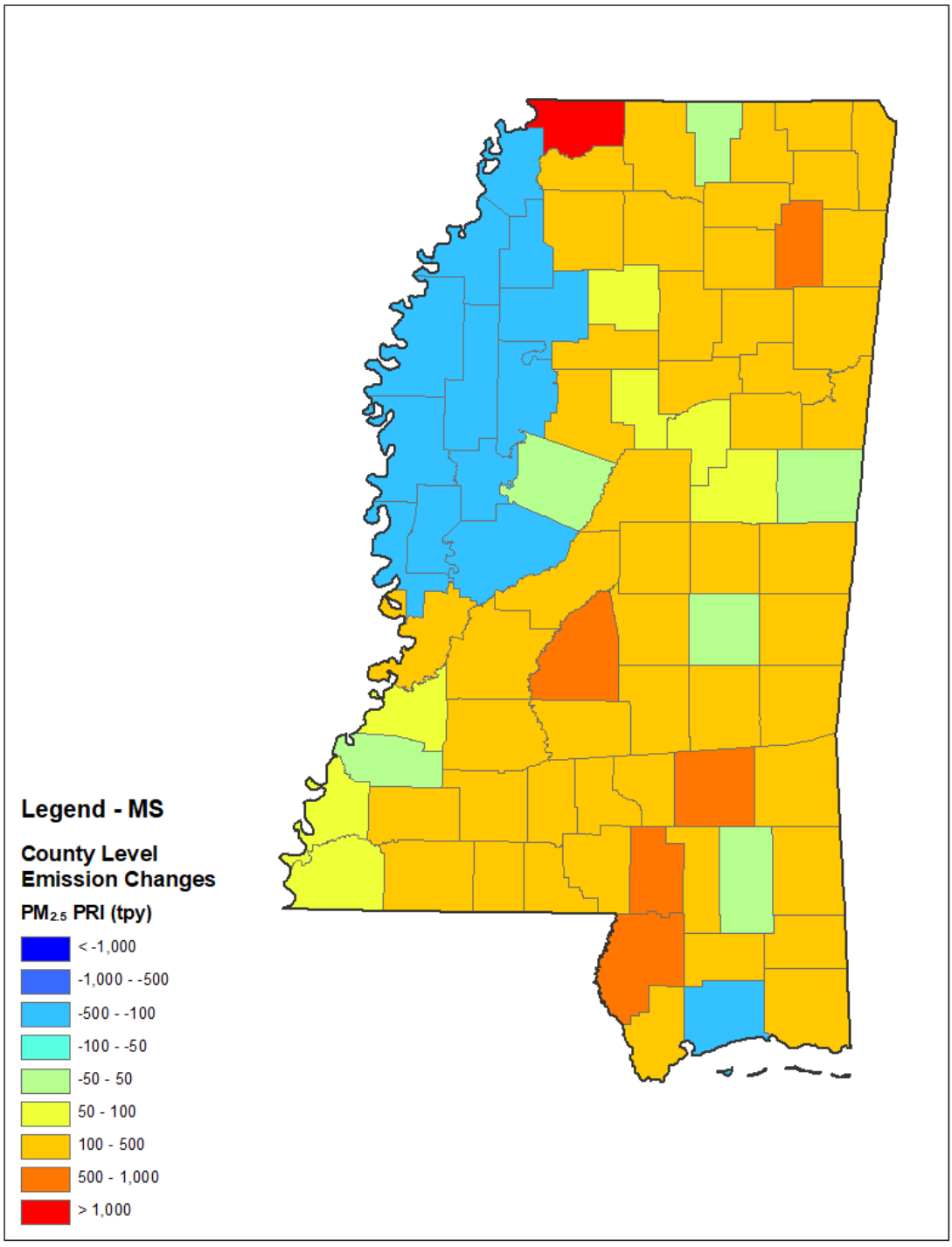

Figure F.0-5. Mississippi County Level $PM_{2.5}$-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[87]

[87] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

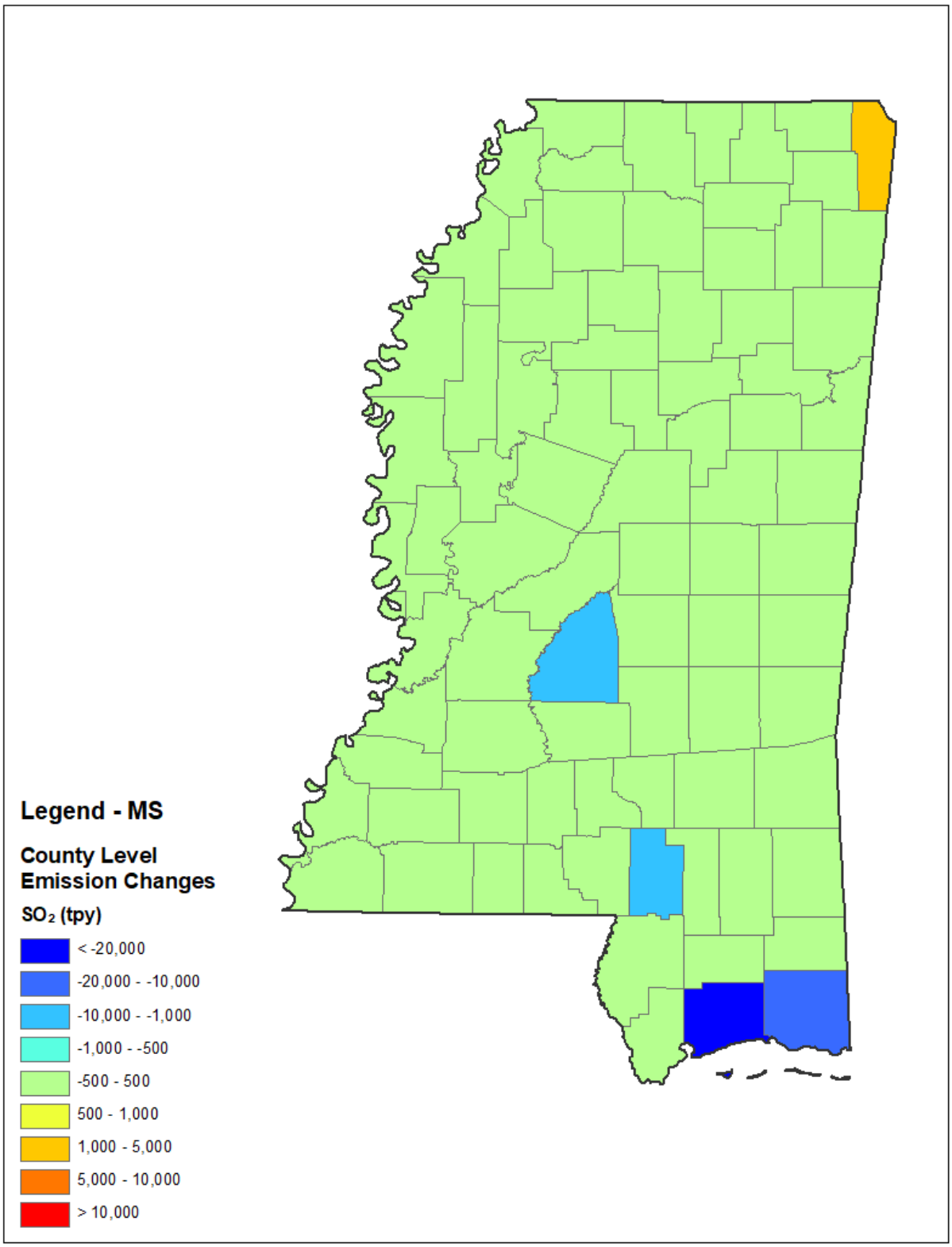

Figure F.0-6. Mississippi County Level SO_2 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

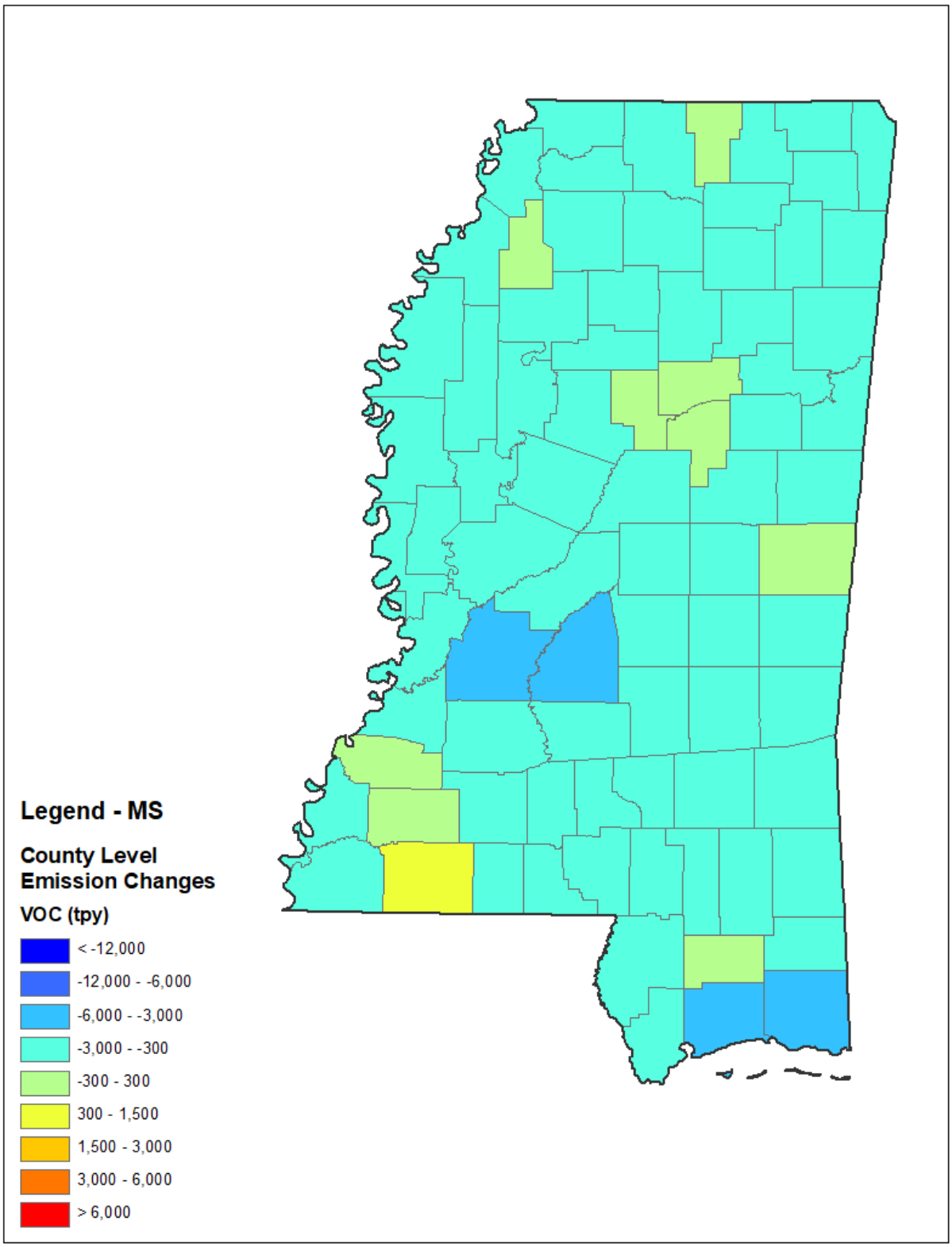

Figure F.0-7. Mississippi County Level VOC Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

Appendix F-6. North Carolina County-Level Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory

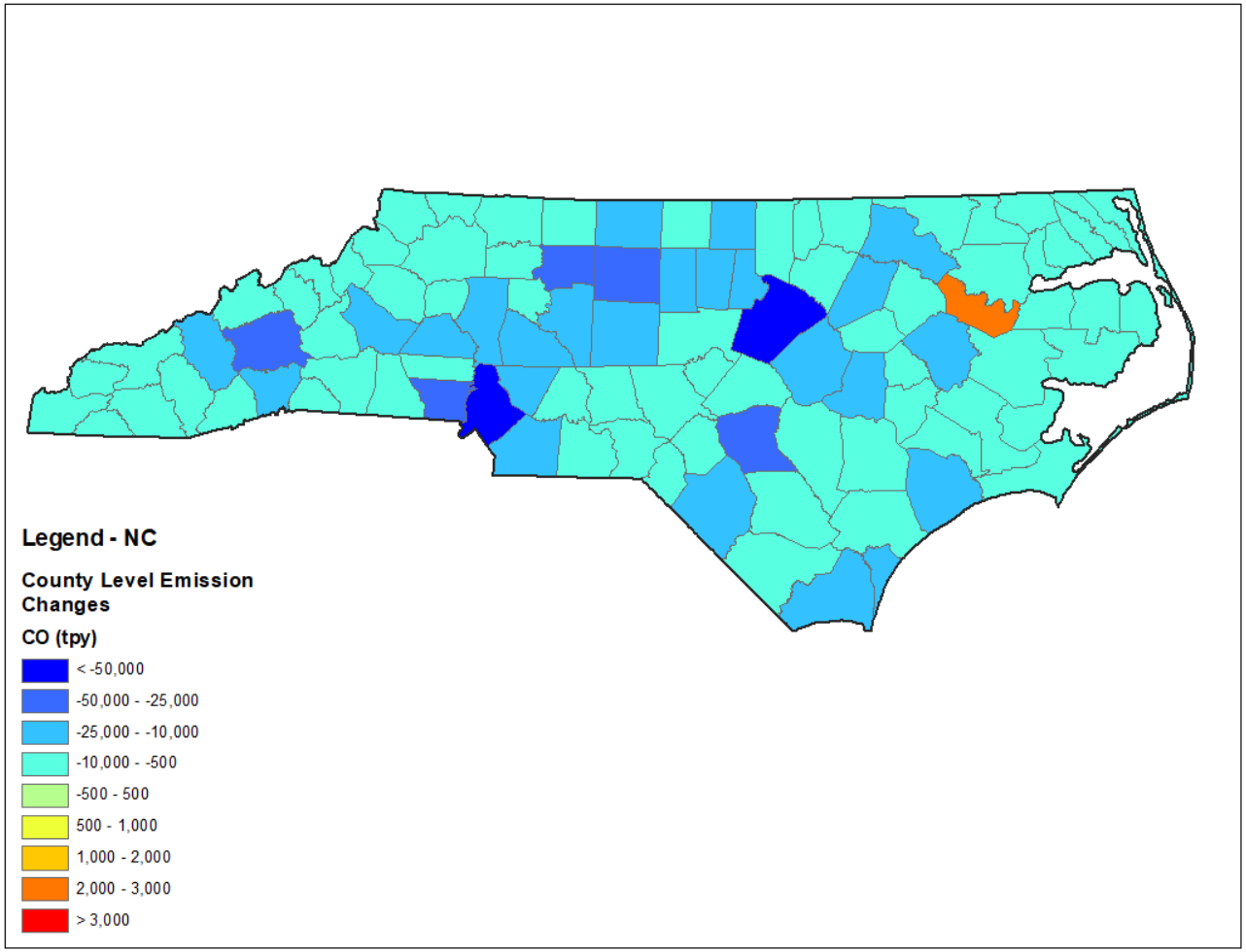

Figure F.6-1. North Carolina County Level CO Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

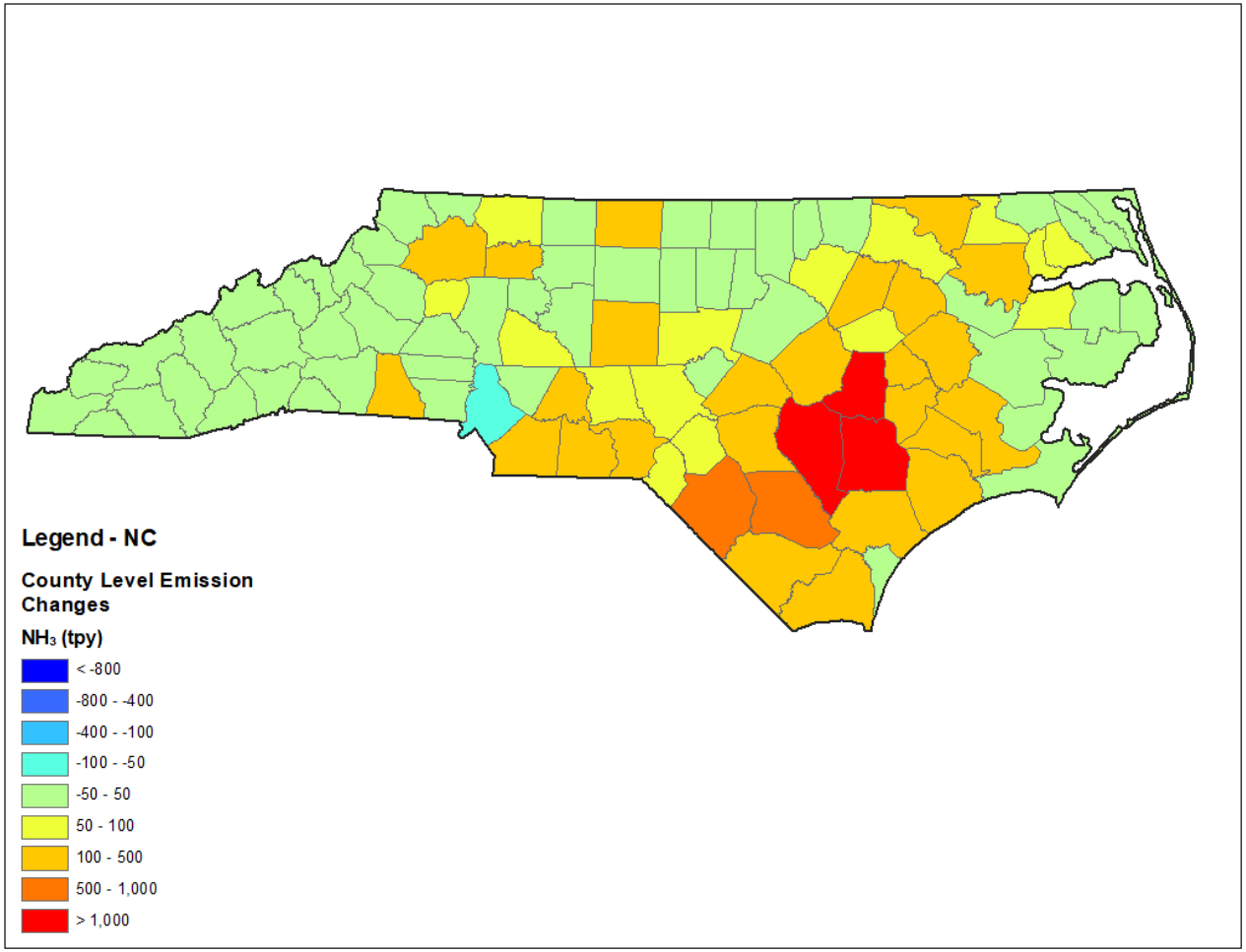

Figure F.6-2. North Carolina County Level NH_3 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

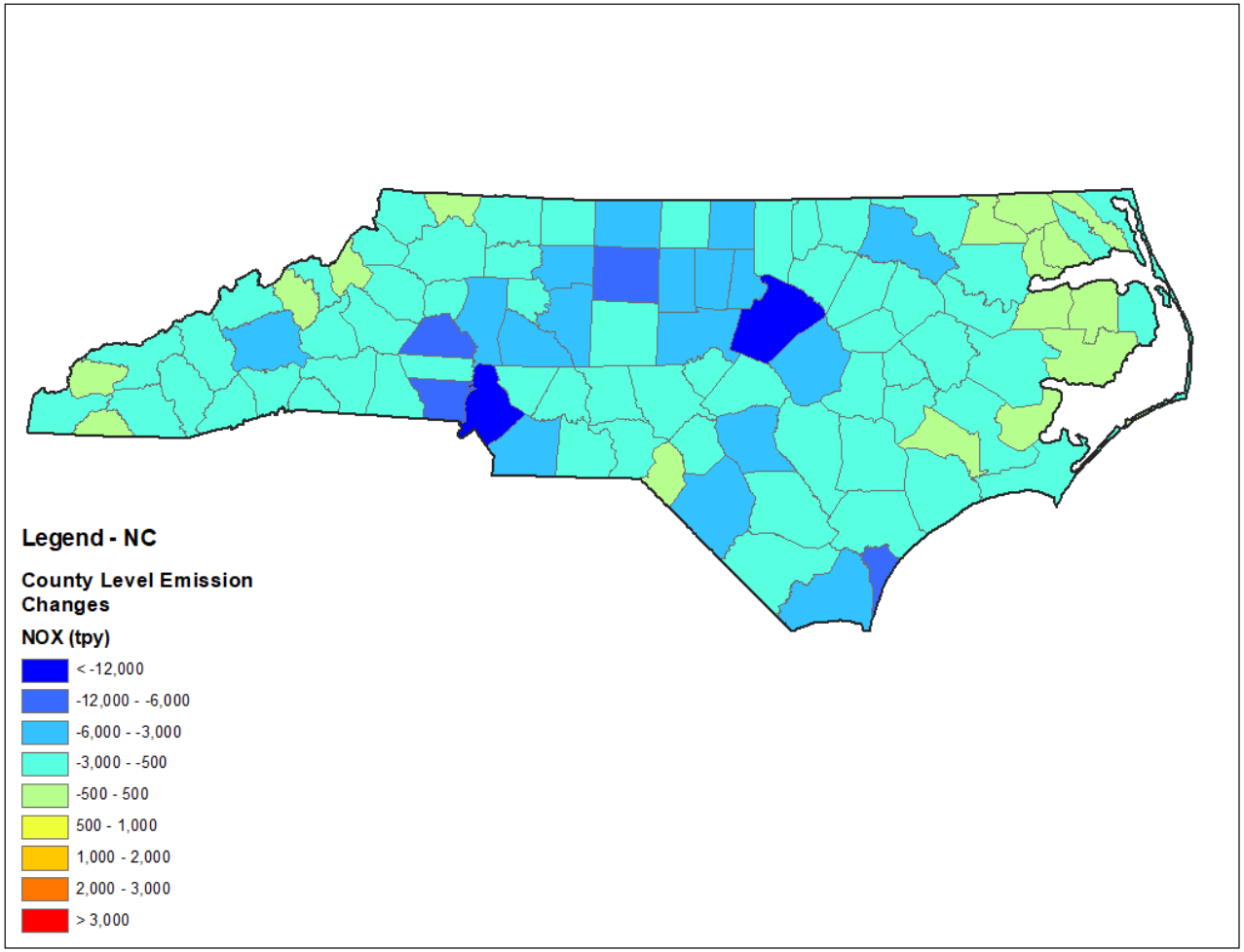

Figure F.6-3. North Carolina County Level NO_x Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

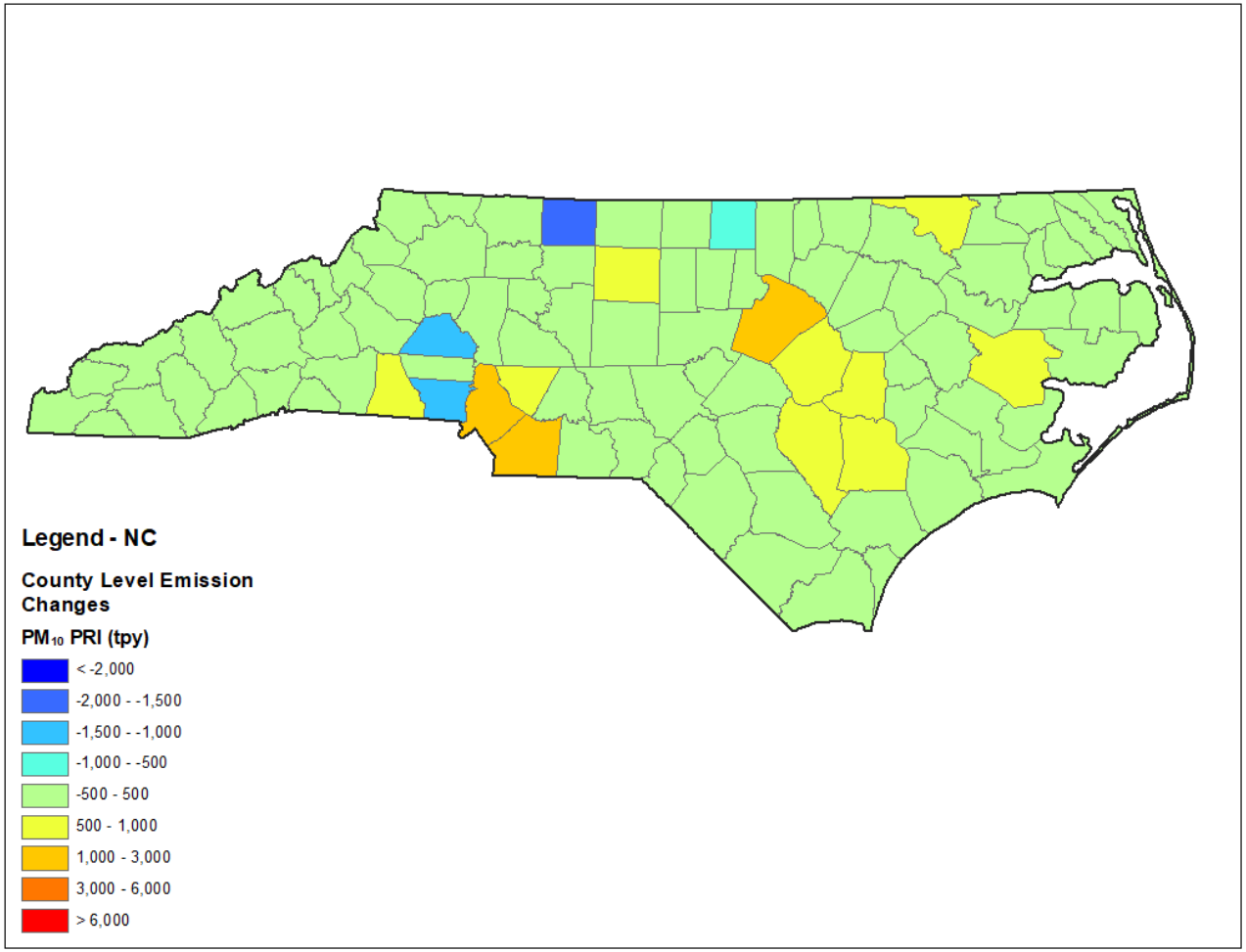

Figure F.6-4. North Carolina County Level PM_{10}-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[88]

[88] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

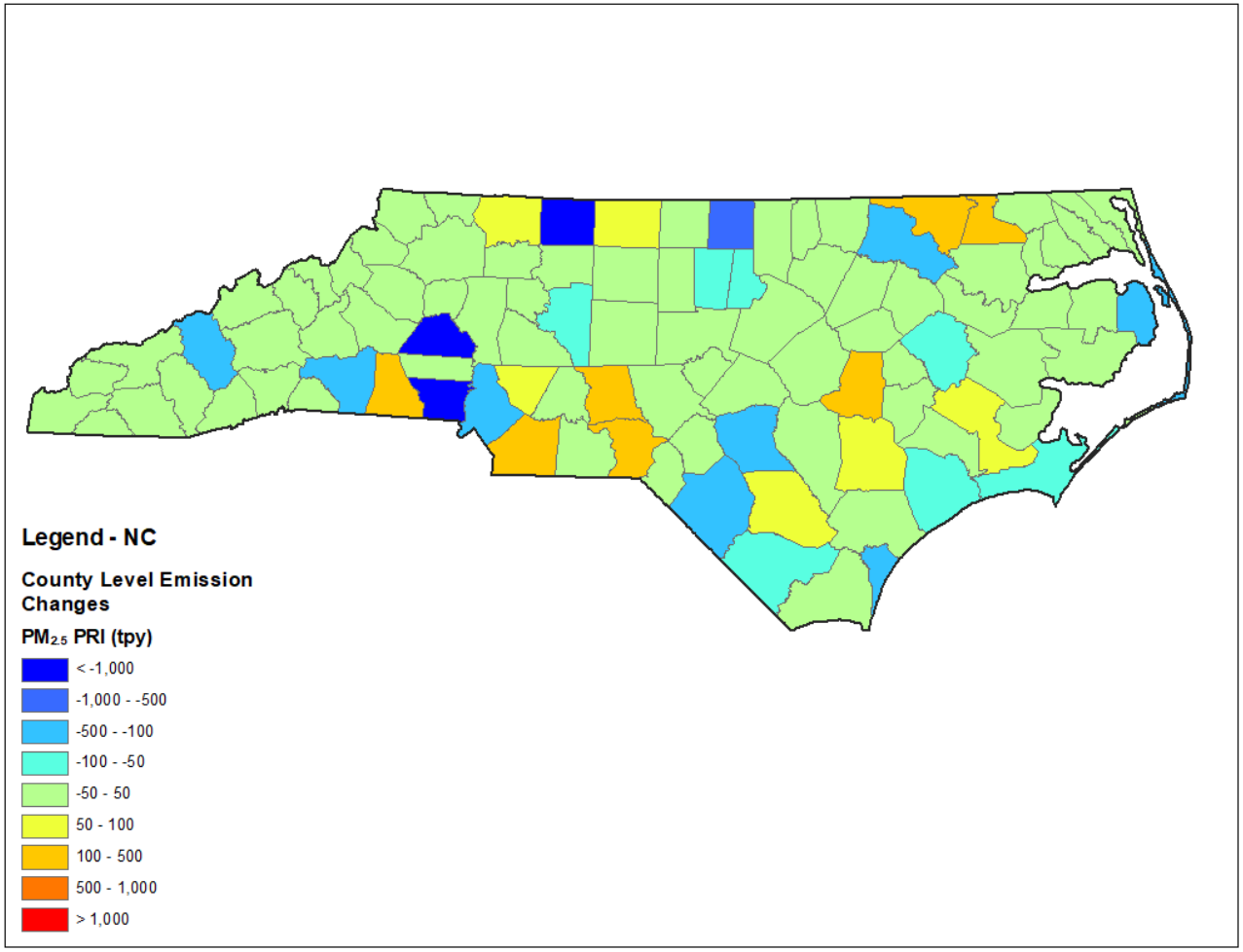

Figure F.6-5. North Carolina County Level $PM_{2.5}$-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[89]

[89] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

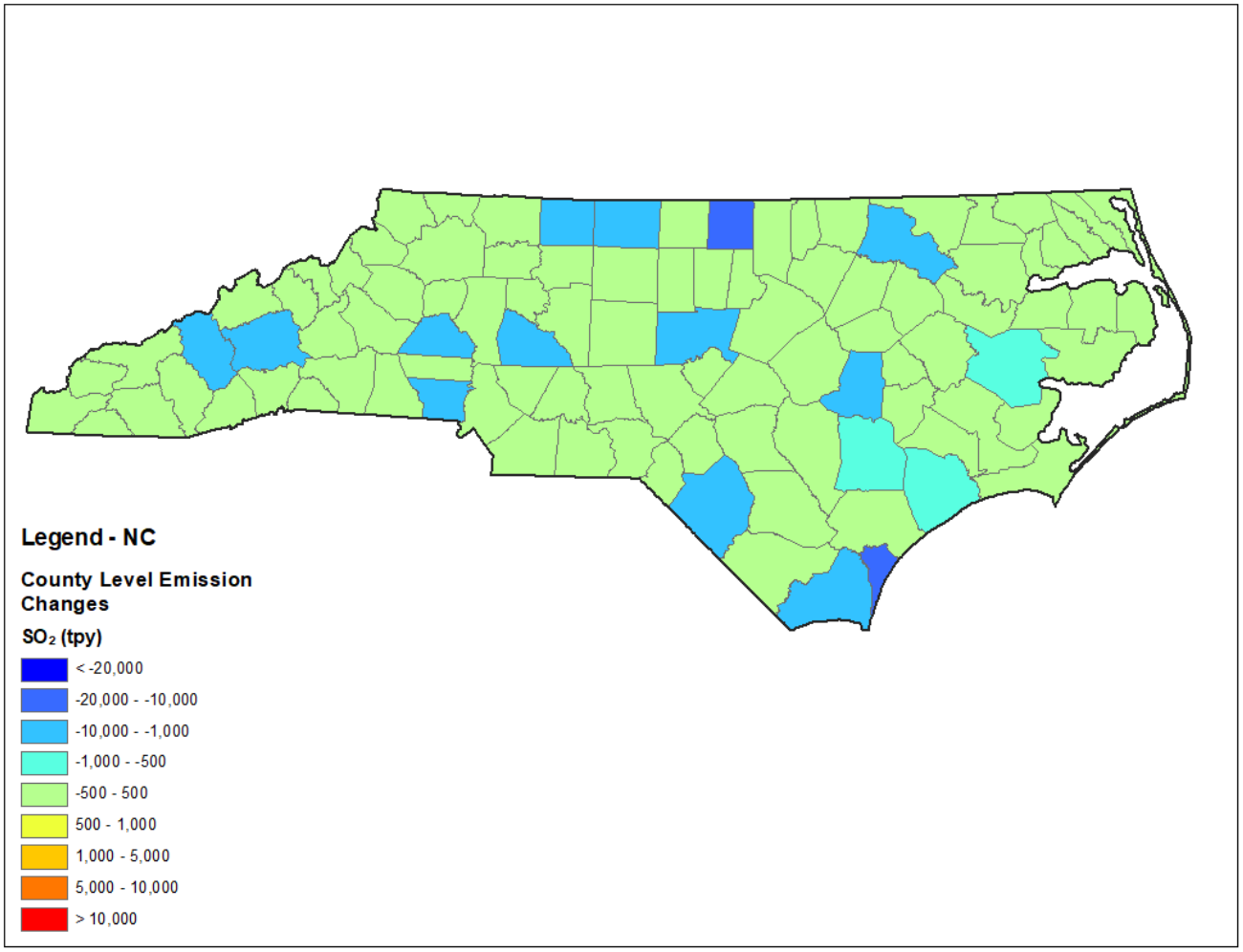

Figure F.6-6. North Carolina County Level SO_2 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

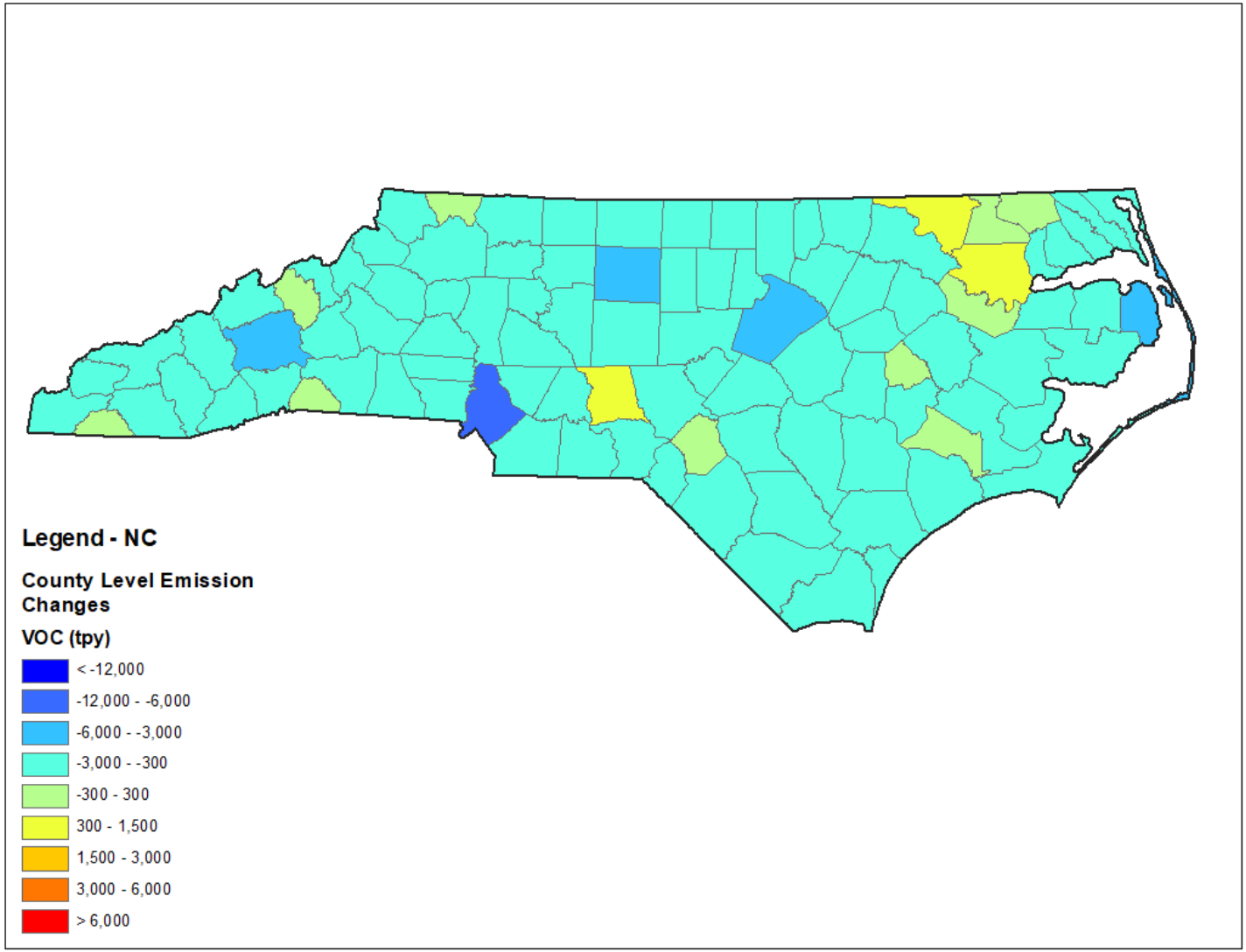

Figure F.6-7. North Carolina County Level VOC Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

Appendix F-7. South Carolina County-Level Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory

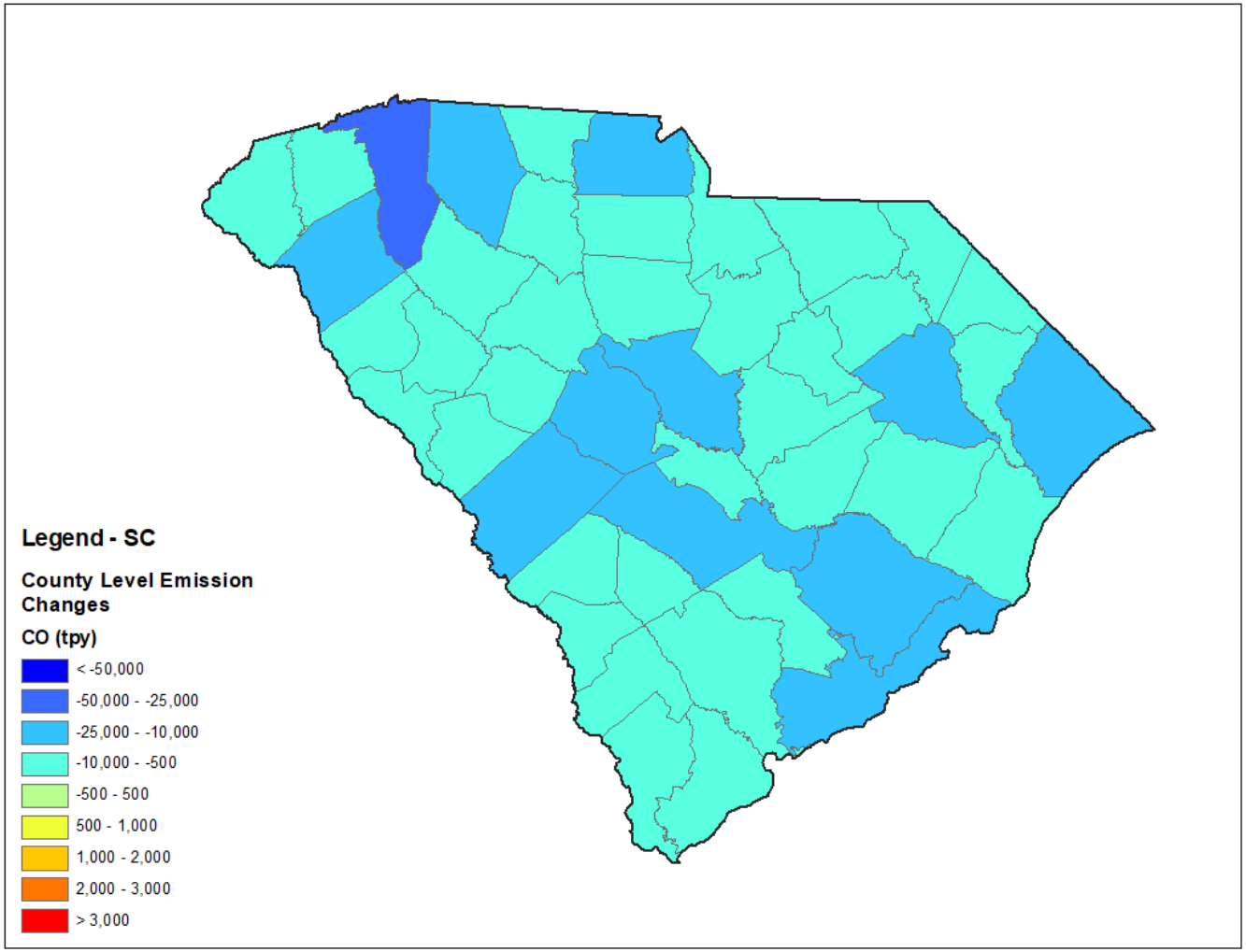

Figure F.7-1. South Carolina County Level CO Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

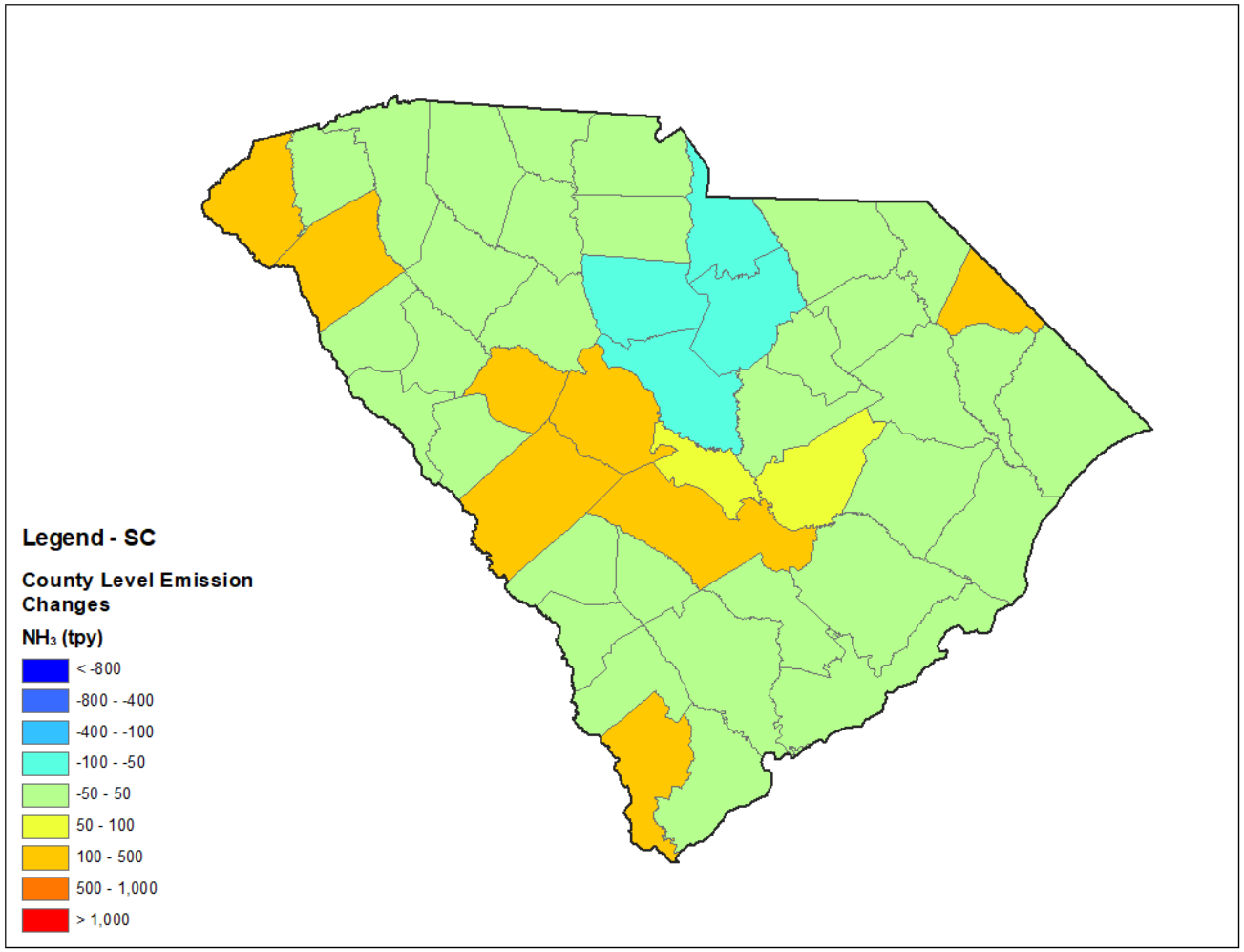

Figure F.7-2. South Carolina County Level NH_3 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

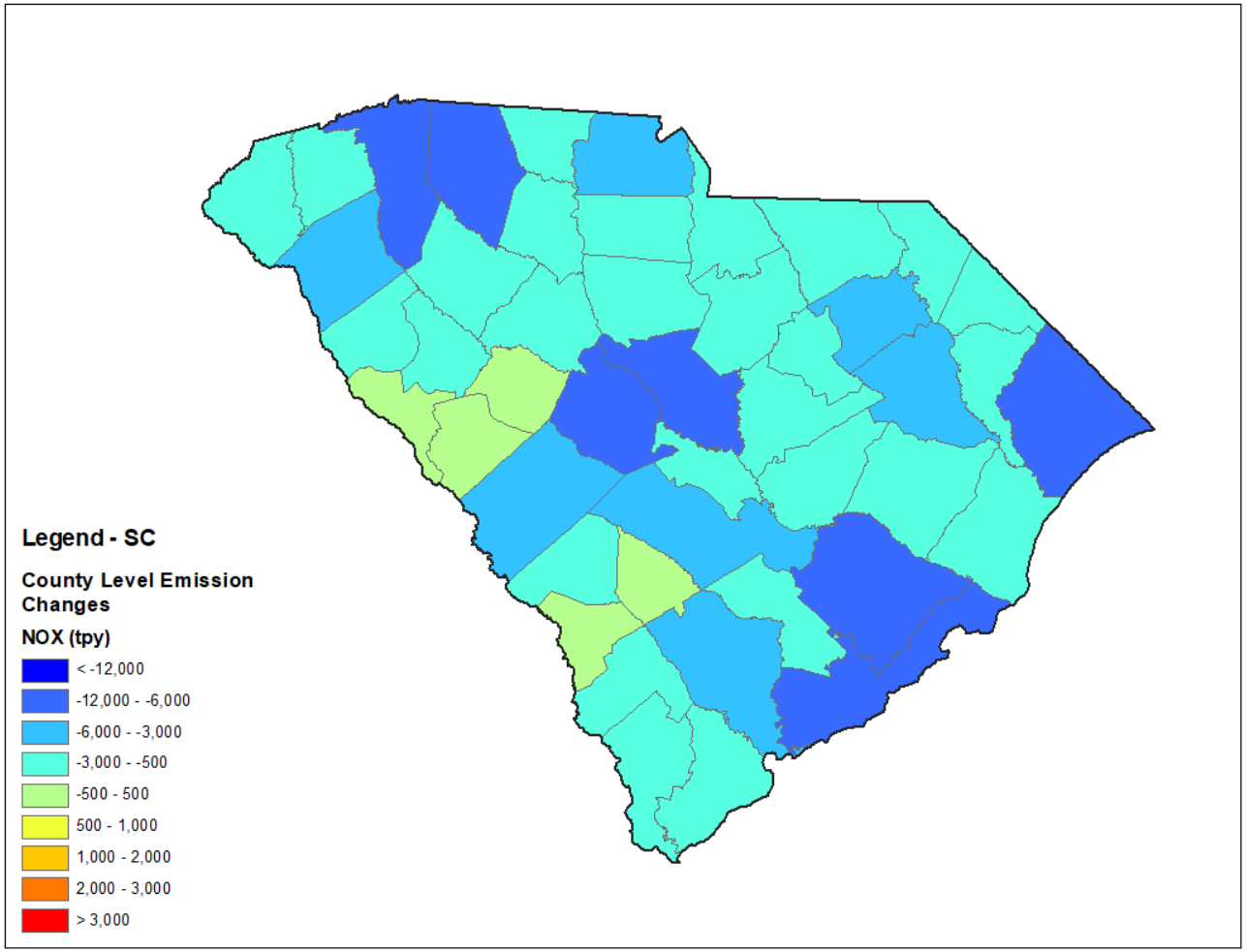

Figure F.7-3. South Carolina County Level NO_x Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

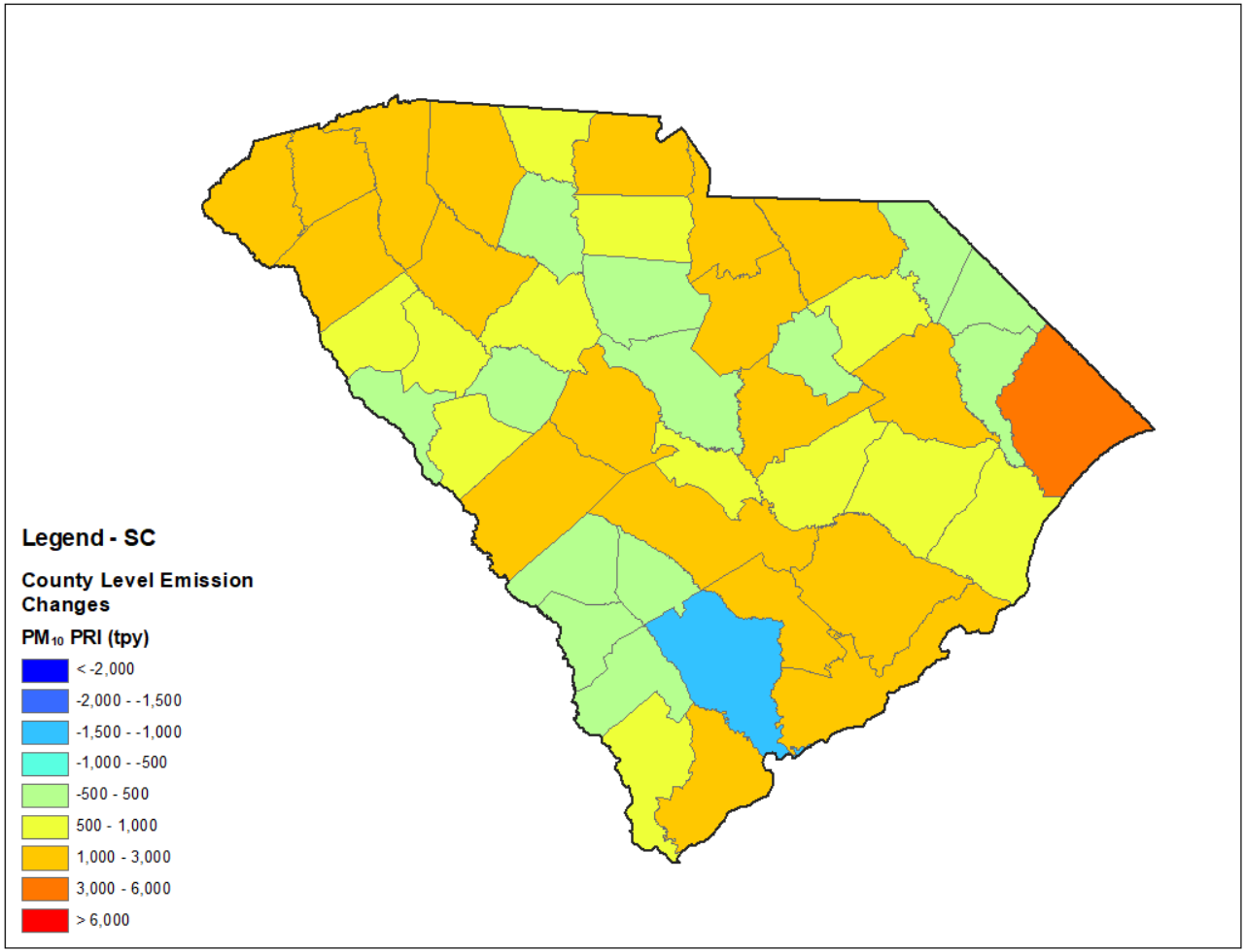

Figure F.7-4. South Carolina County Level PM_{10}-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[90]

[90] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

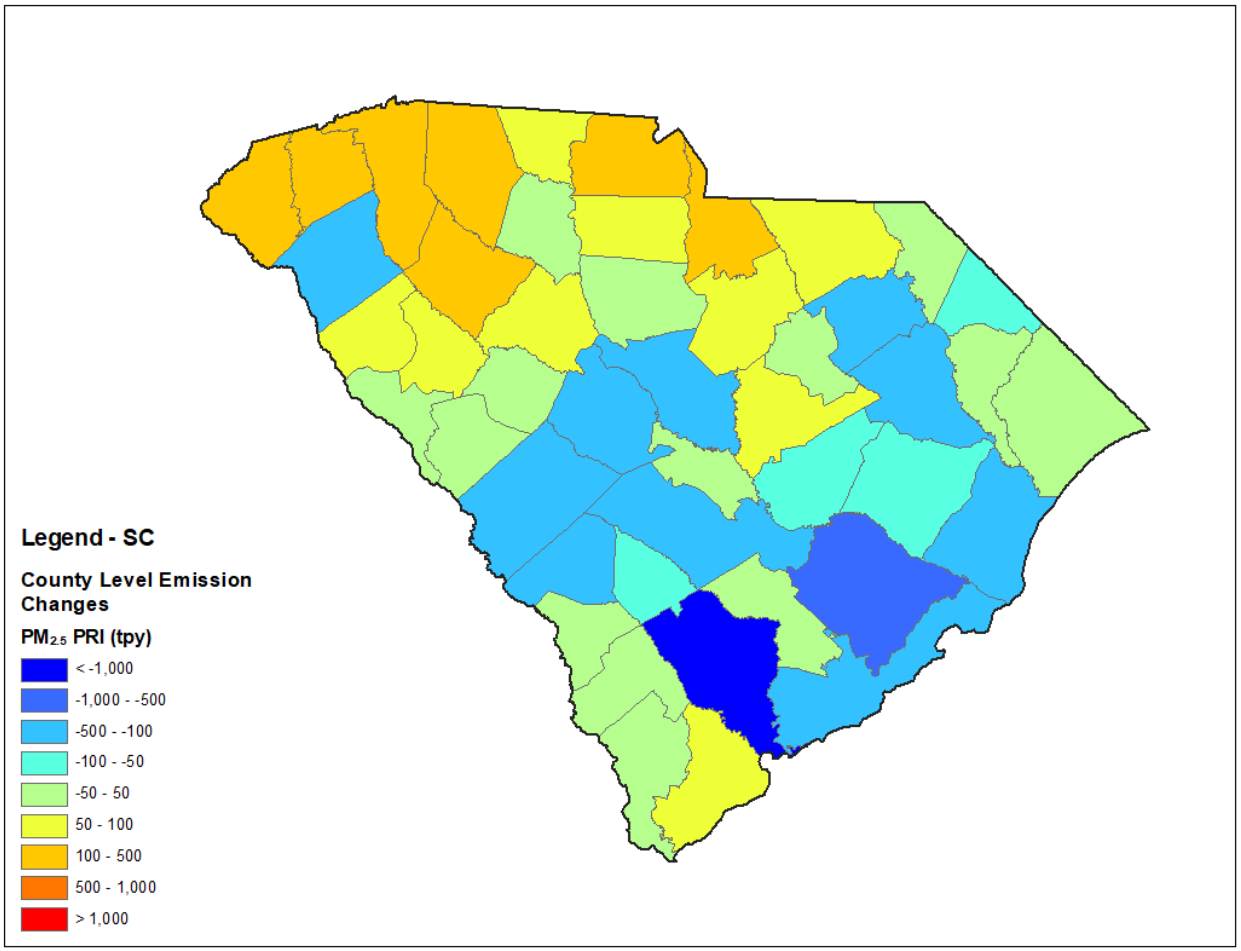

Figure F.7-5. South Carolina County Level $PM_{2.5}$-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[91]

[91] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

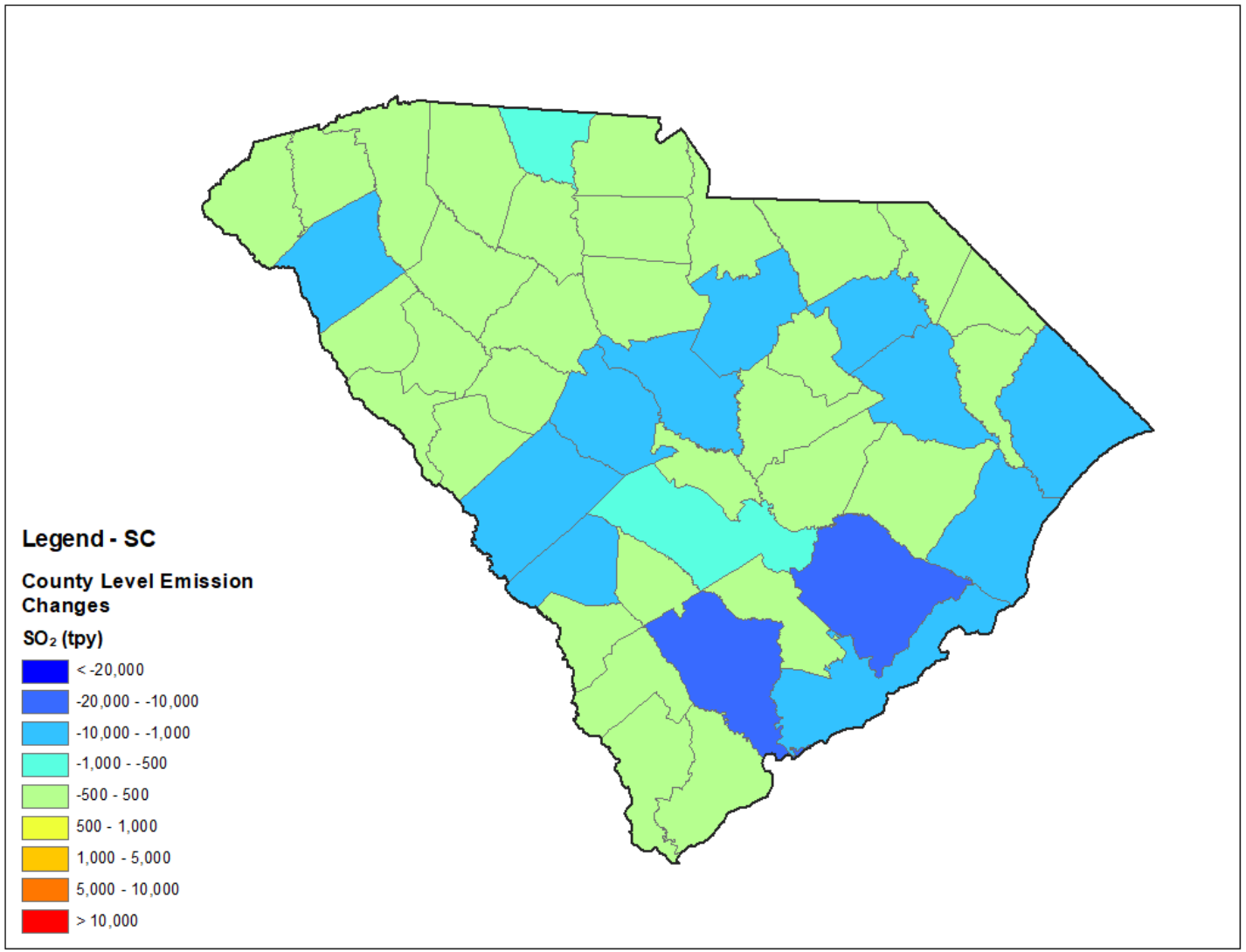

Figure F.7-6. South Carolina County Level SO_2 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

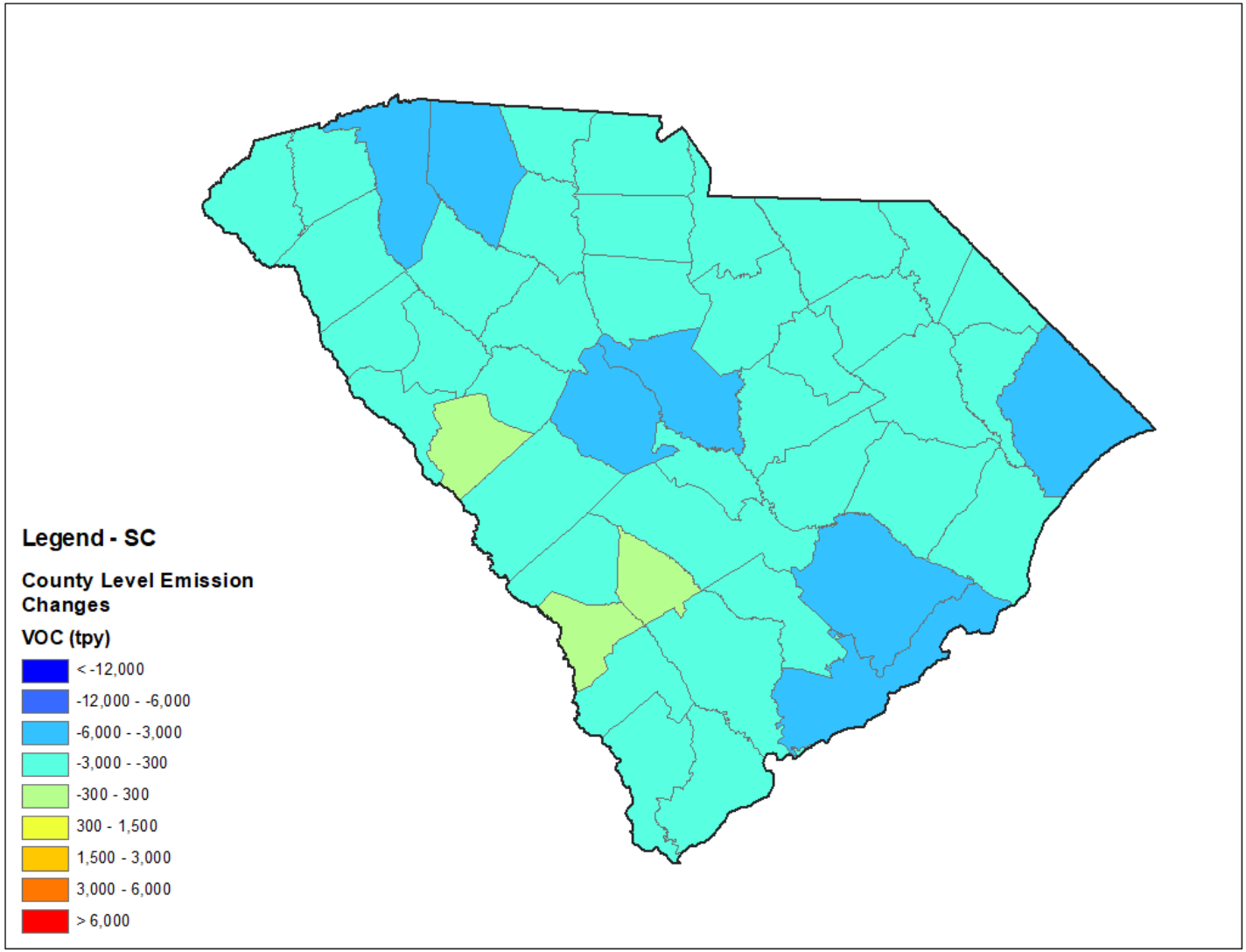

Figure F.7-7. South Carolina County Level VOC Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

Appendix F-8. Tennessee County-Level Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory

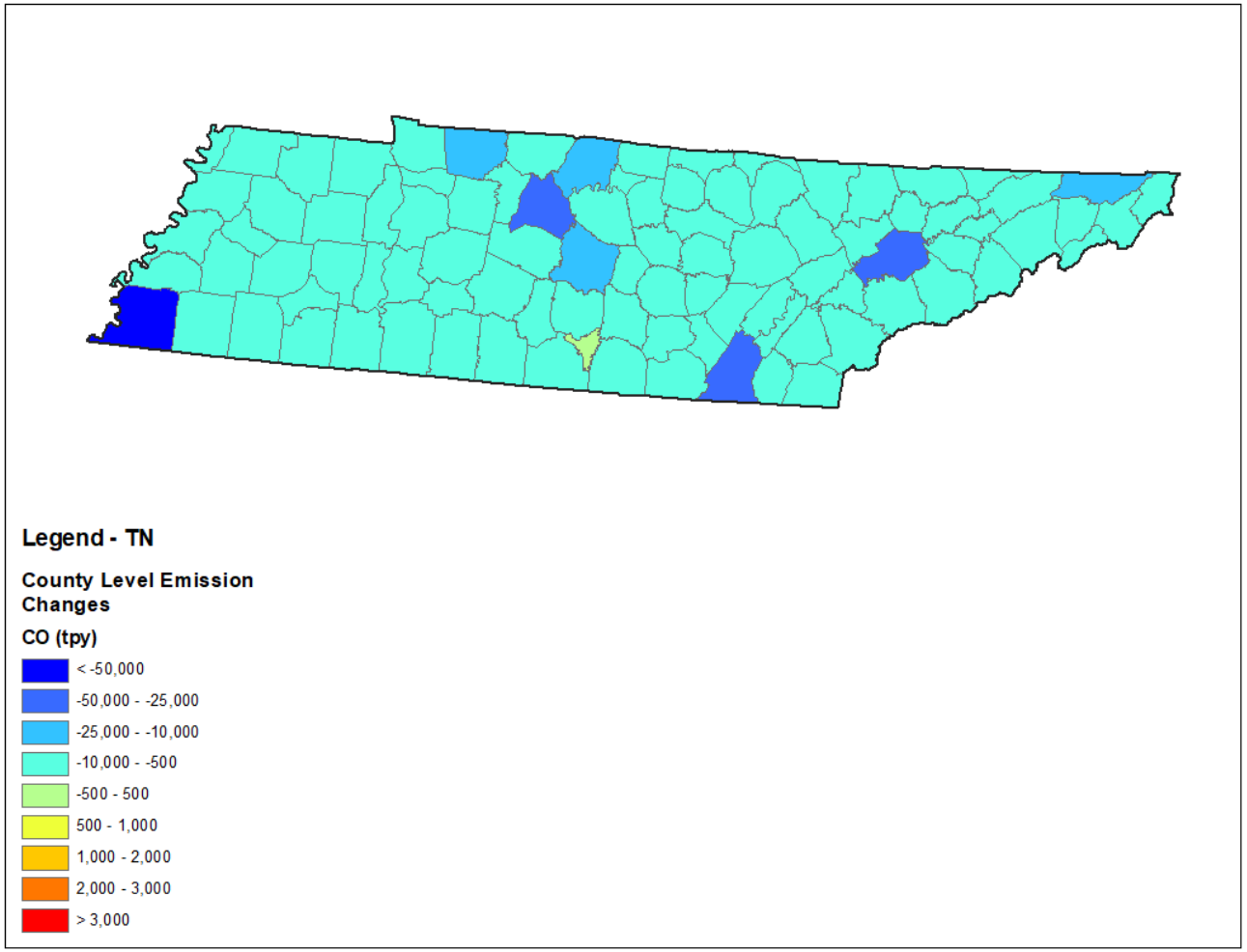

Figure F.8-1. Tennessee County Level CO Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

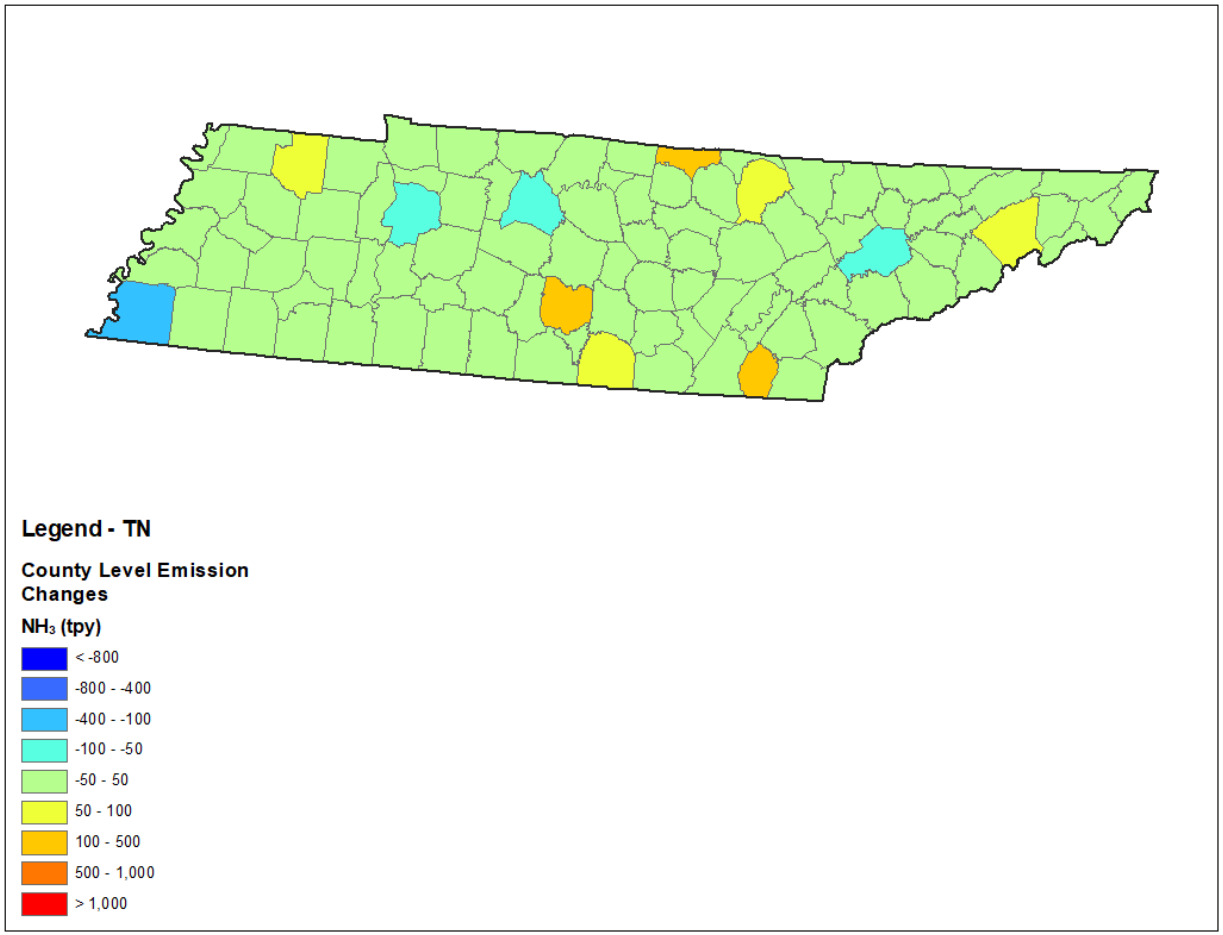

Figure F.8-2. Tennessee County Level NH_3 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

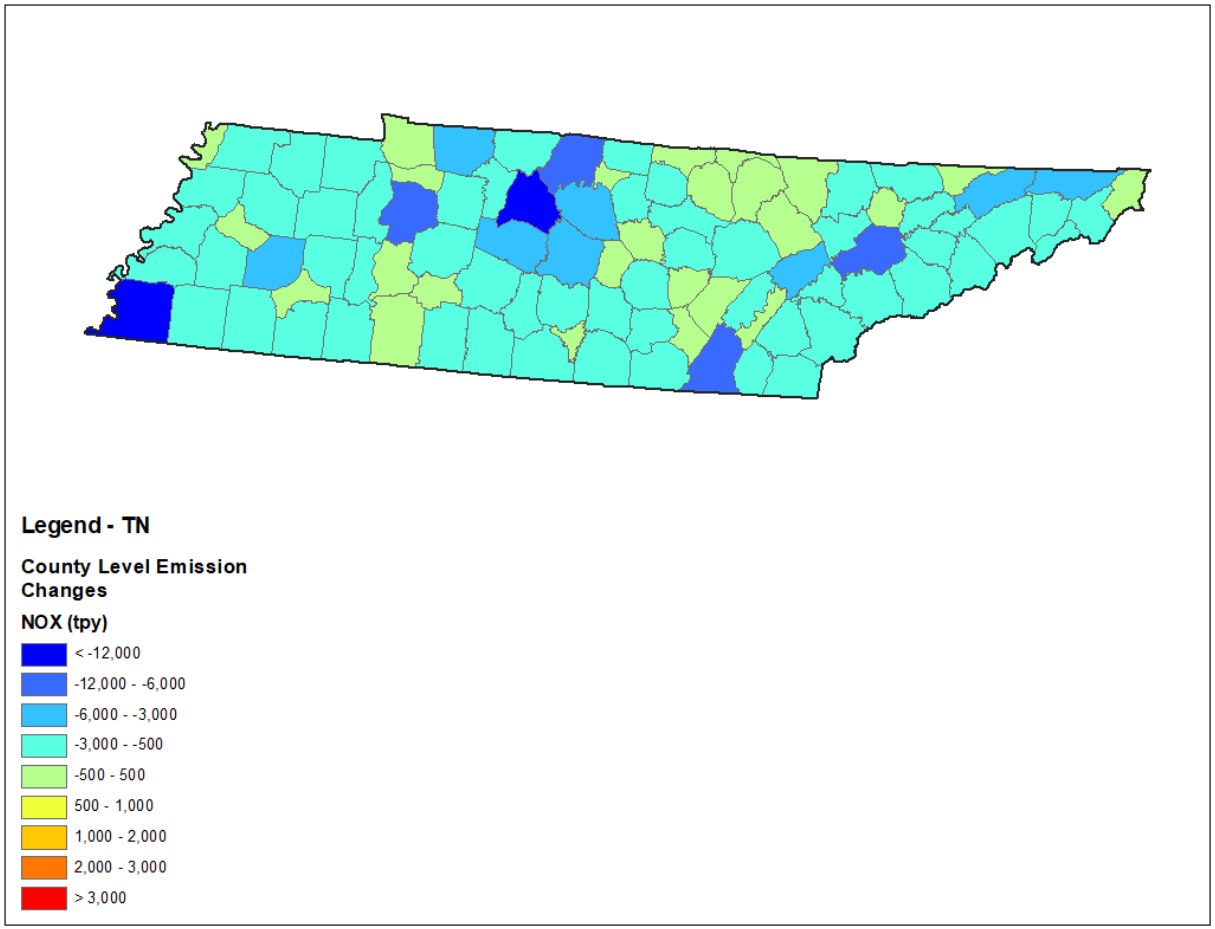

Figure F.8-3. Tennessee County Level NO_x Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

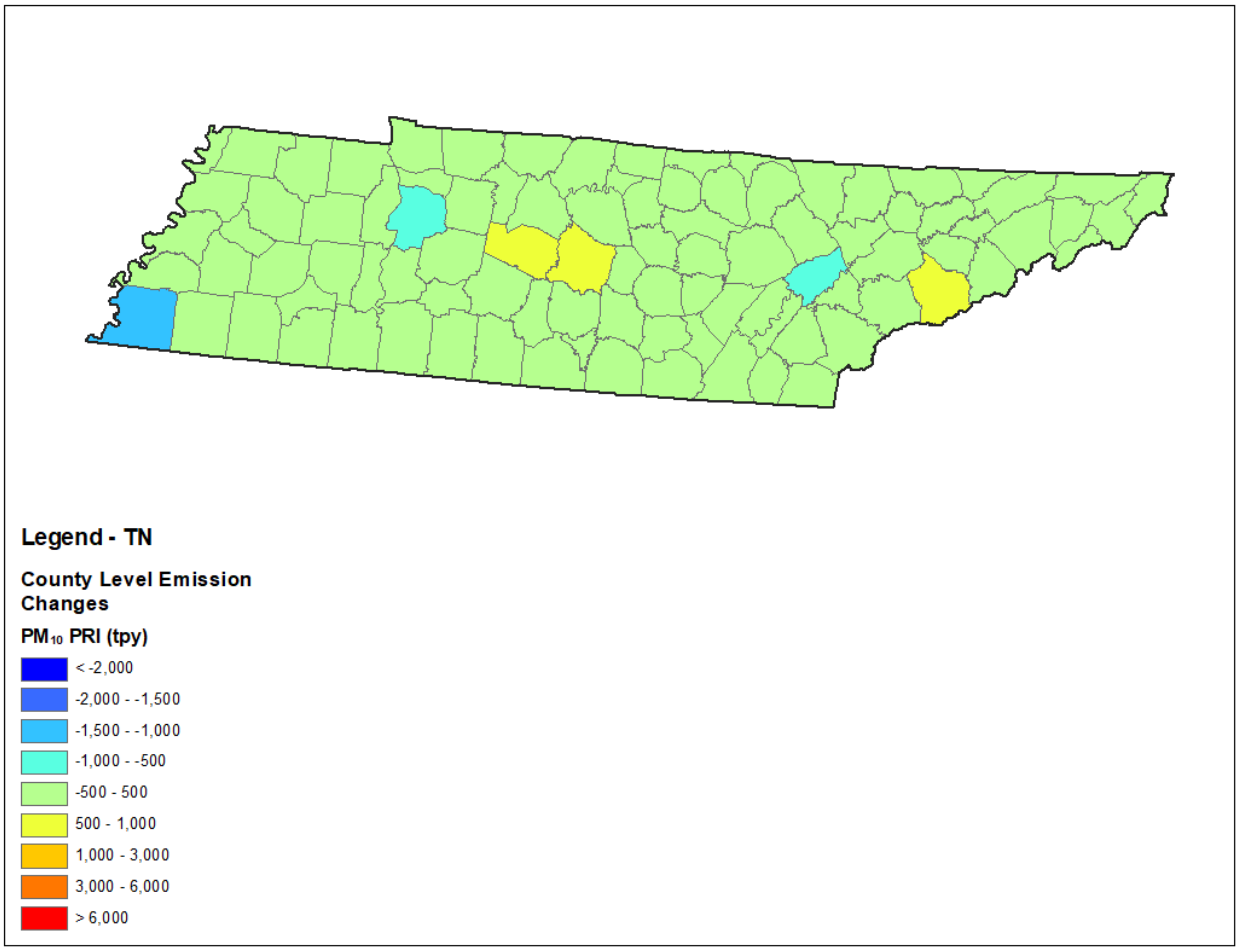

Figure F.8-4. Tennessee County Level PM_{10}-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[92]

[92] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

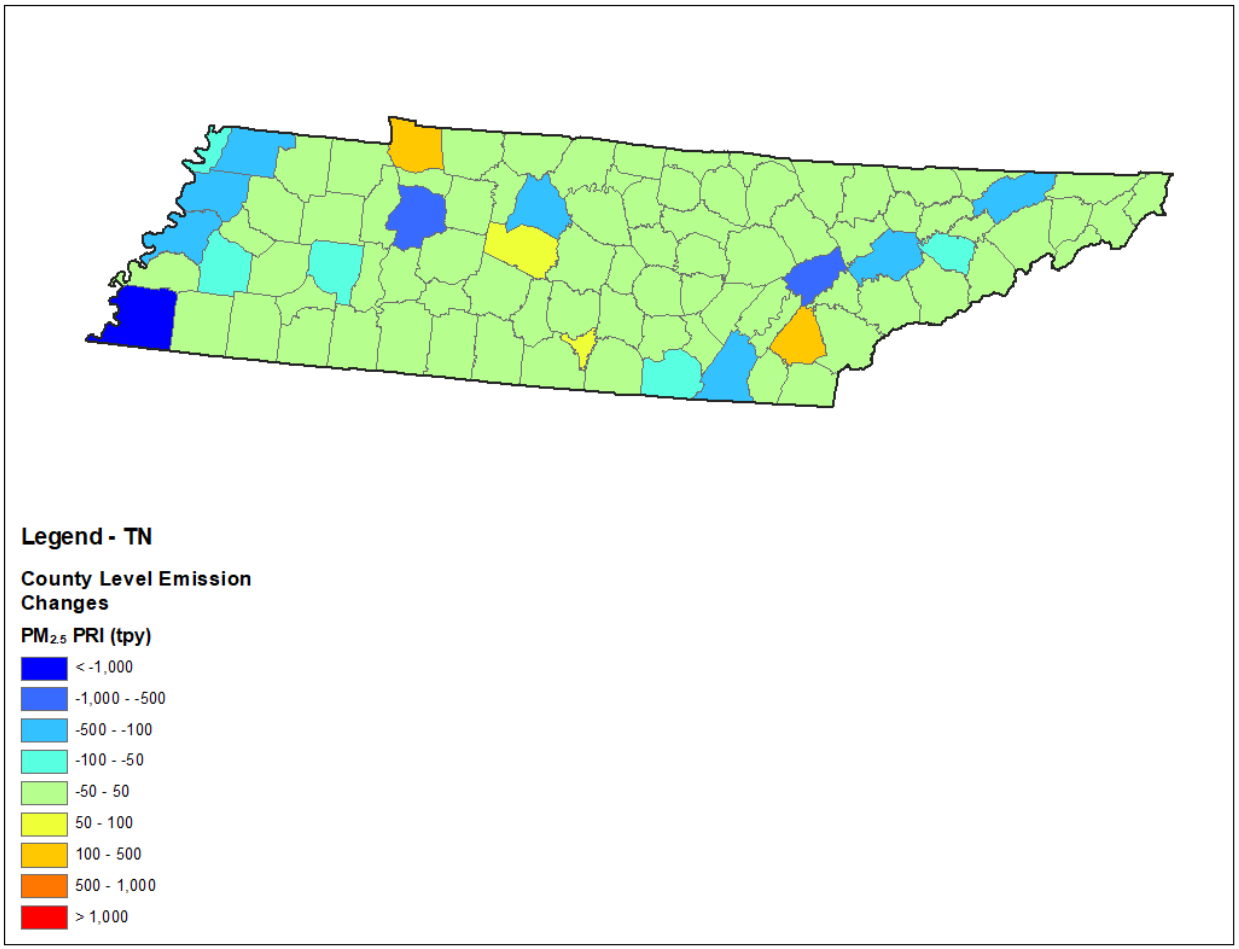

Figure F.8-5. Tennessee County Level $PM_{2.5}$-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[93]

[93] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

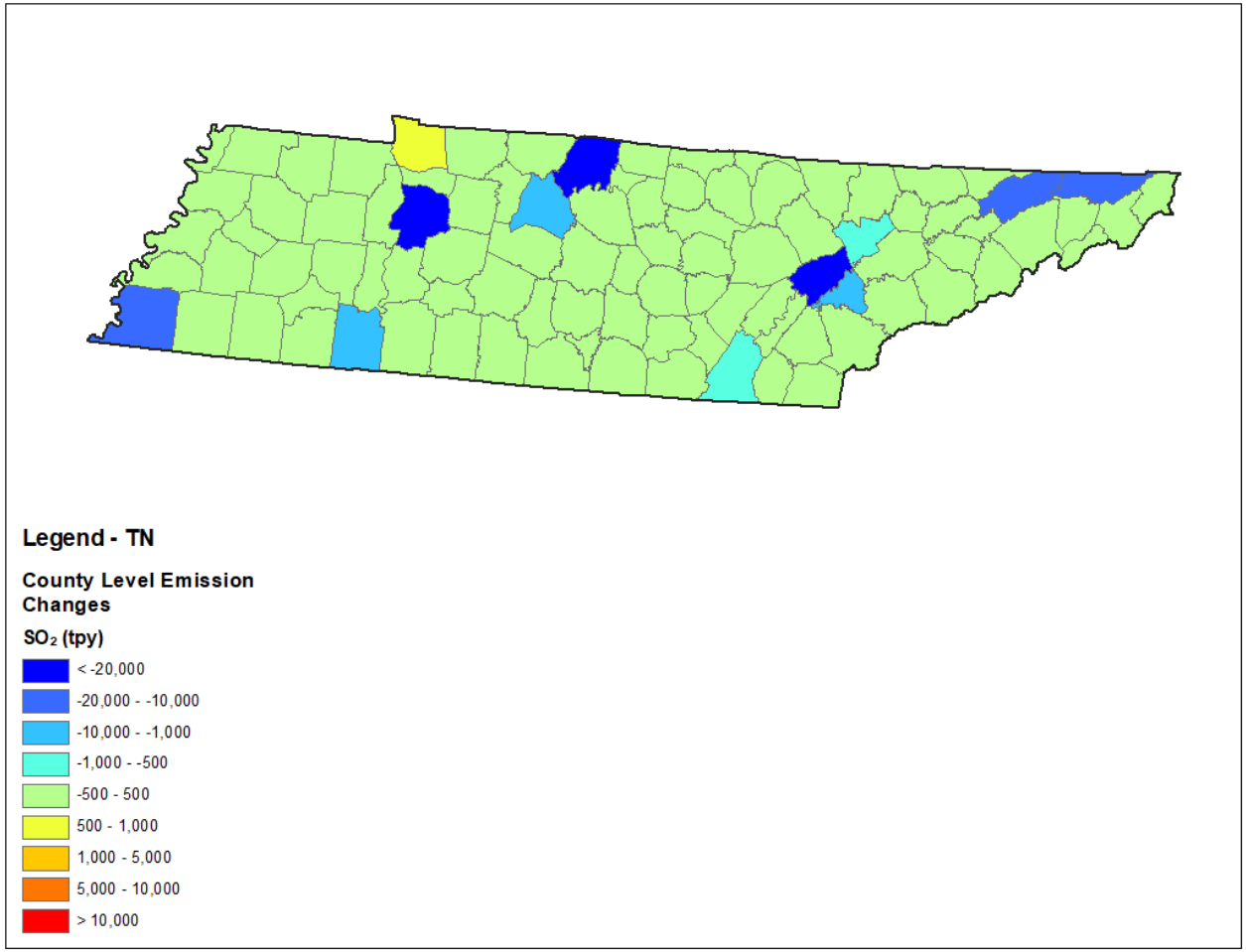

Figure F.8-6. Tennessee County Level SO_2 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

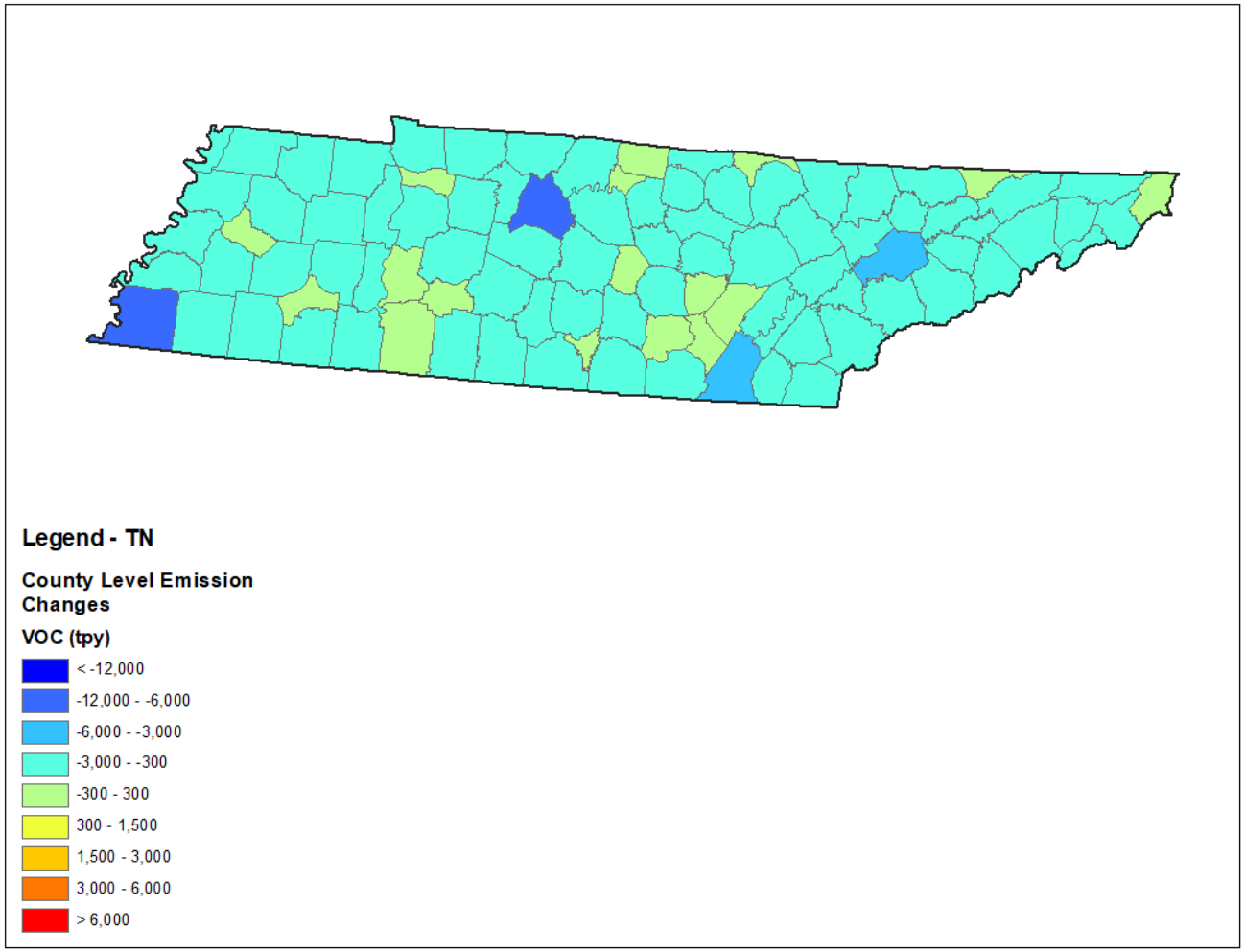

Figure F.8-7. Tennessee County Level VOC Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

Appendix F-9. Virginia County-Level Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory

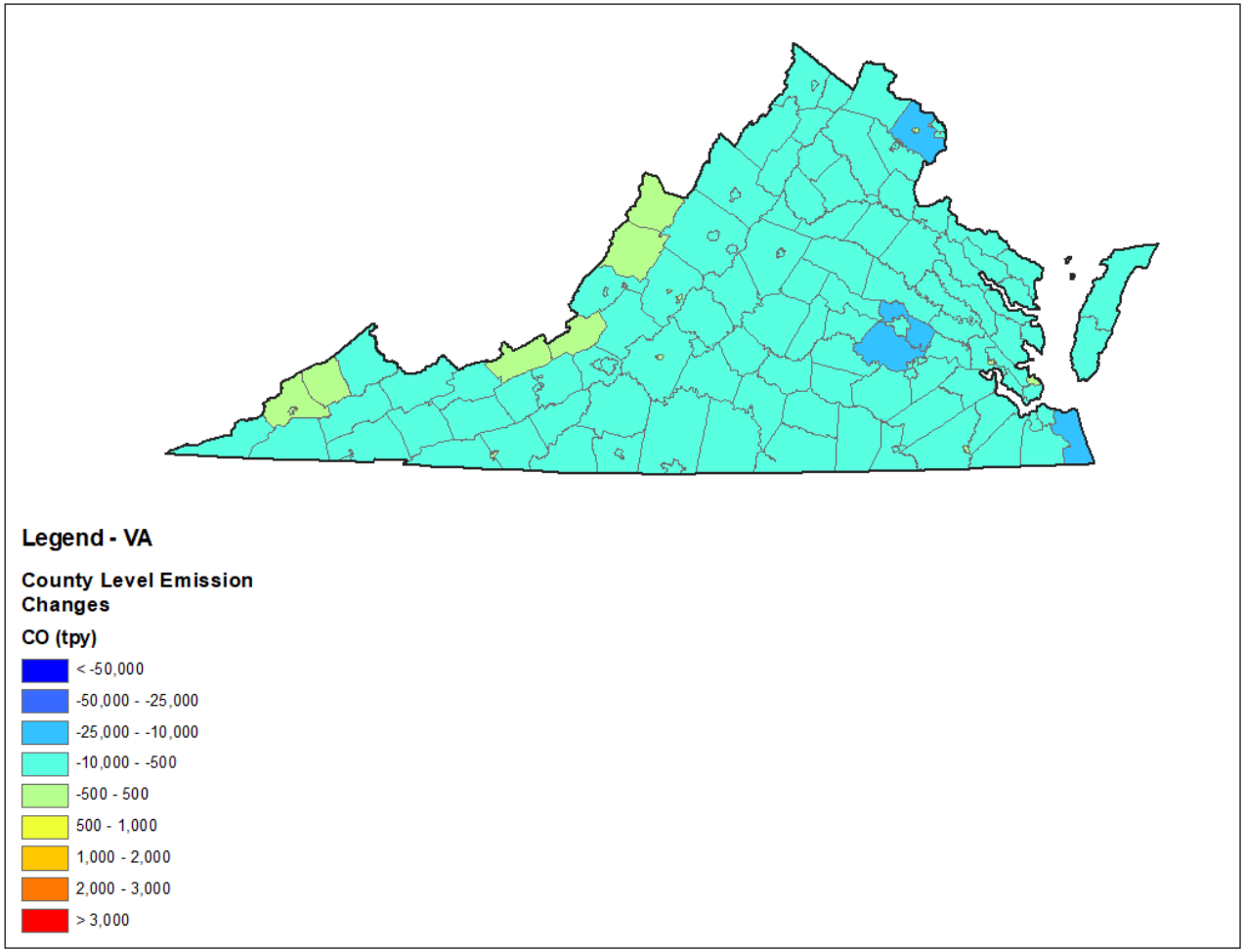

Figure F.9-1. Virginia County Level CO Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

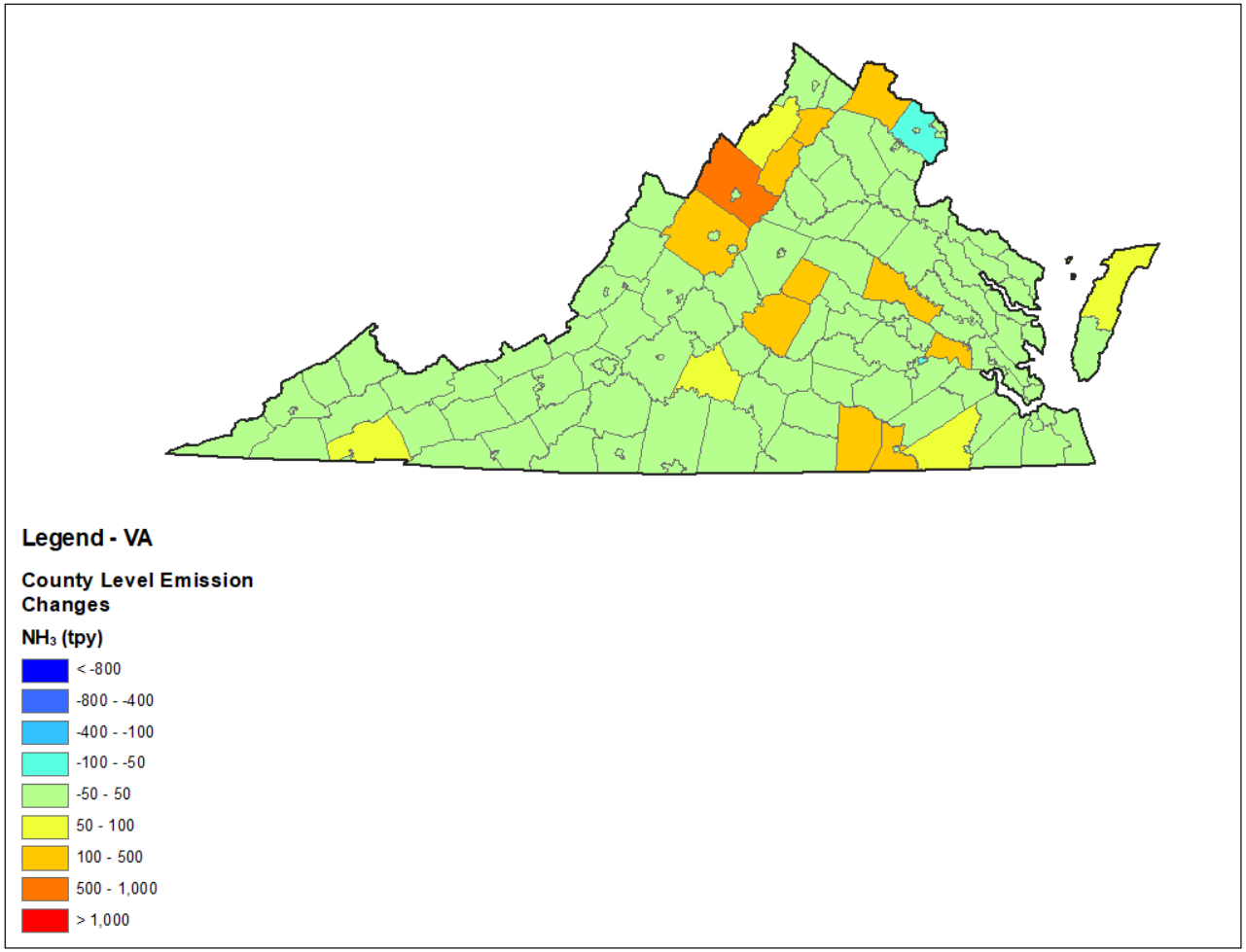

Figure F.9-2. Virginia County Level NH_3 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

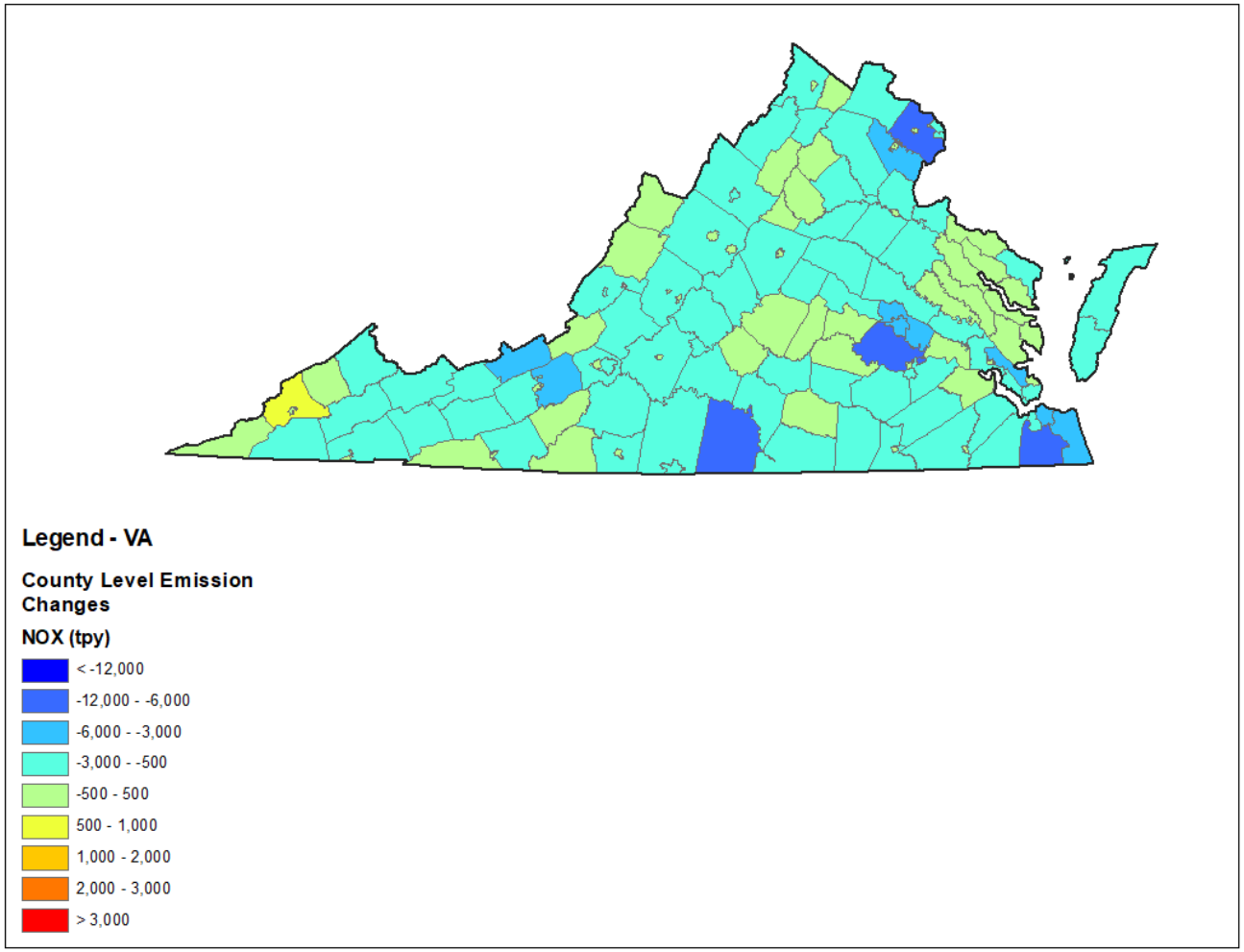

Figure F.9-3. Virginia County Level NO_x Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

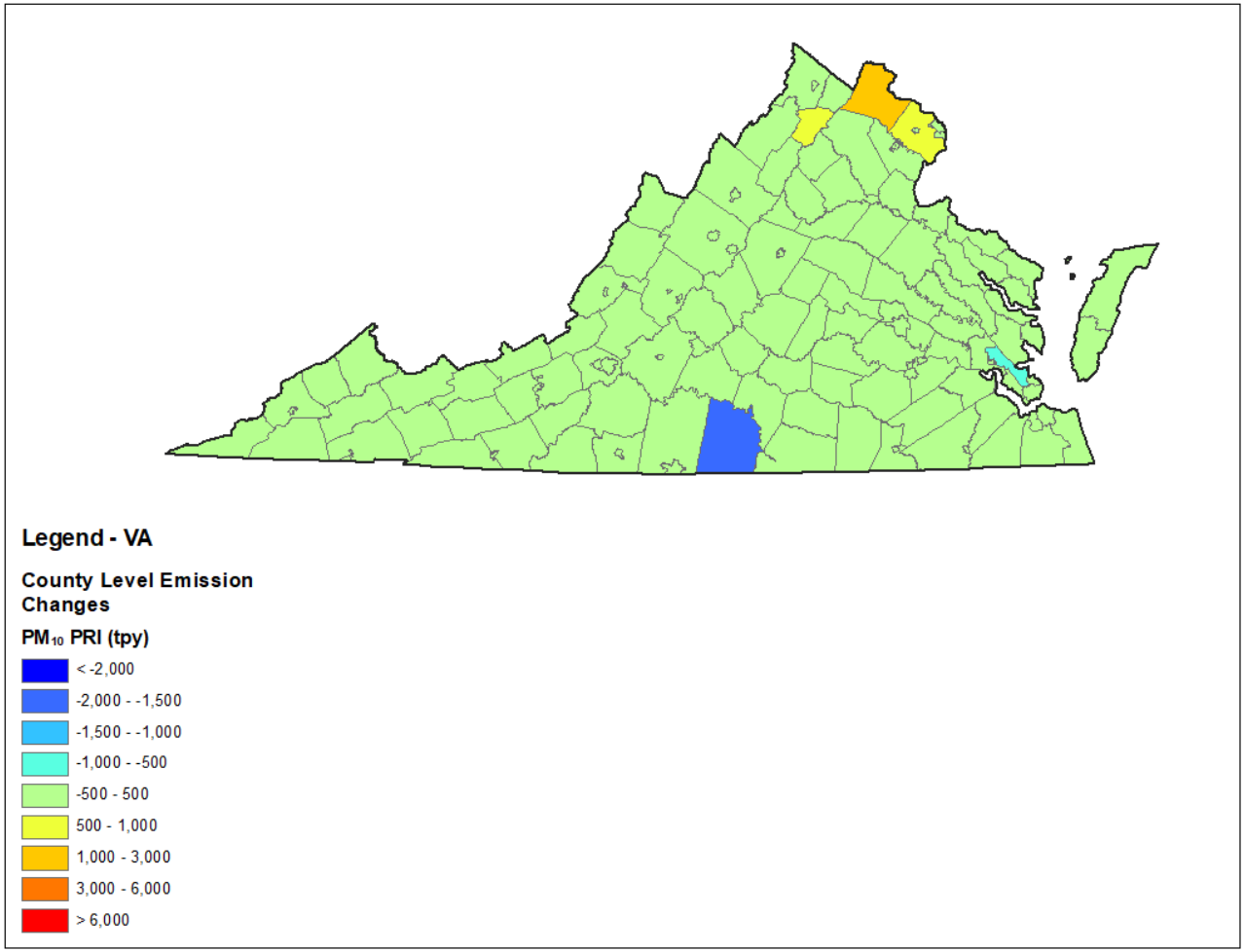

Figure F.9-4. Virginia County Level PM_{10}-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[94]

[94] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

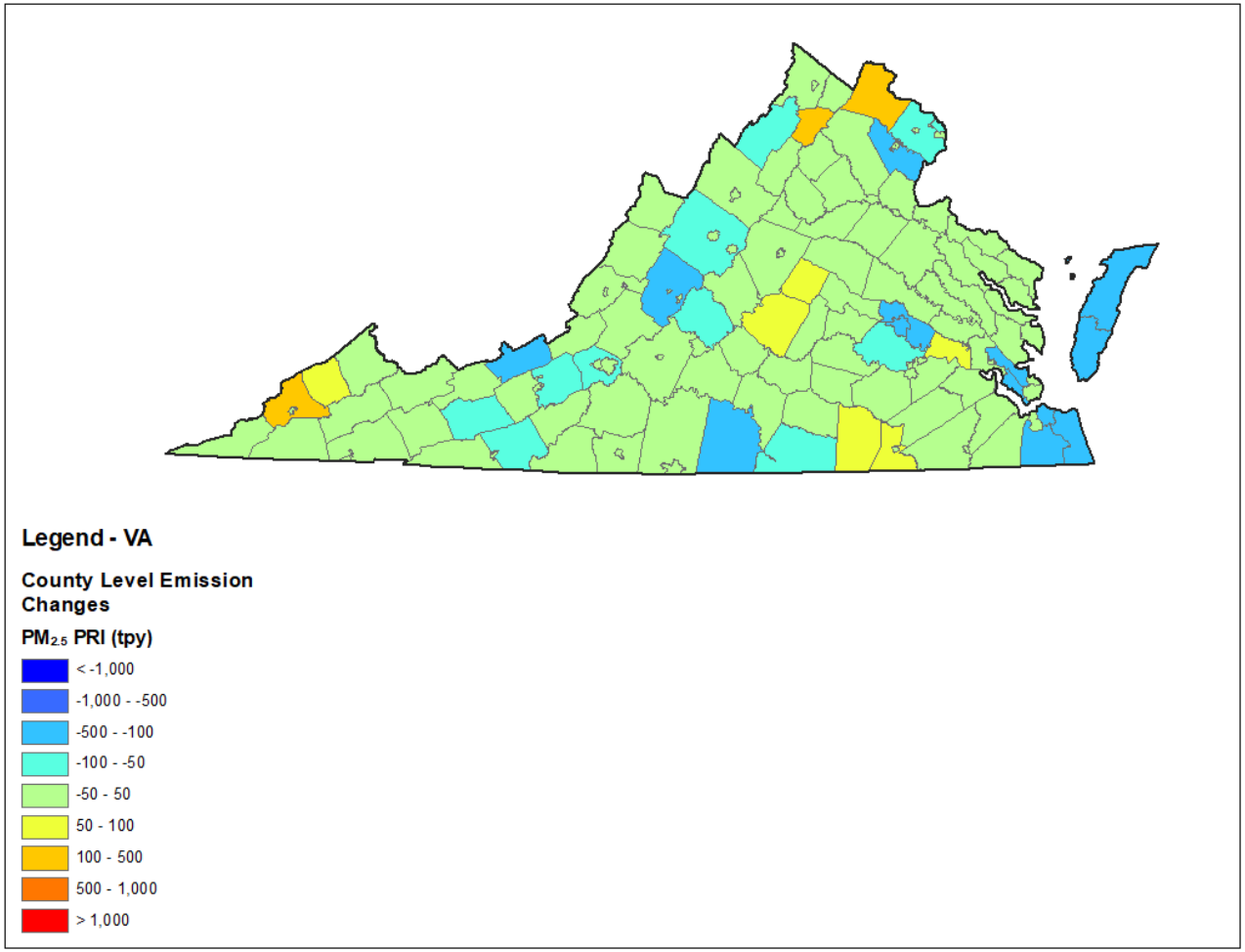

Figure F.9-5. Virginia County Level $PM_{2.5}$-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[95]

[95] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

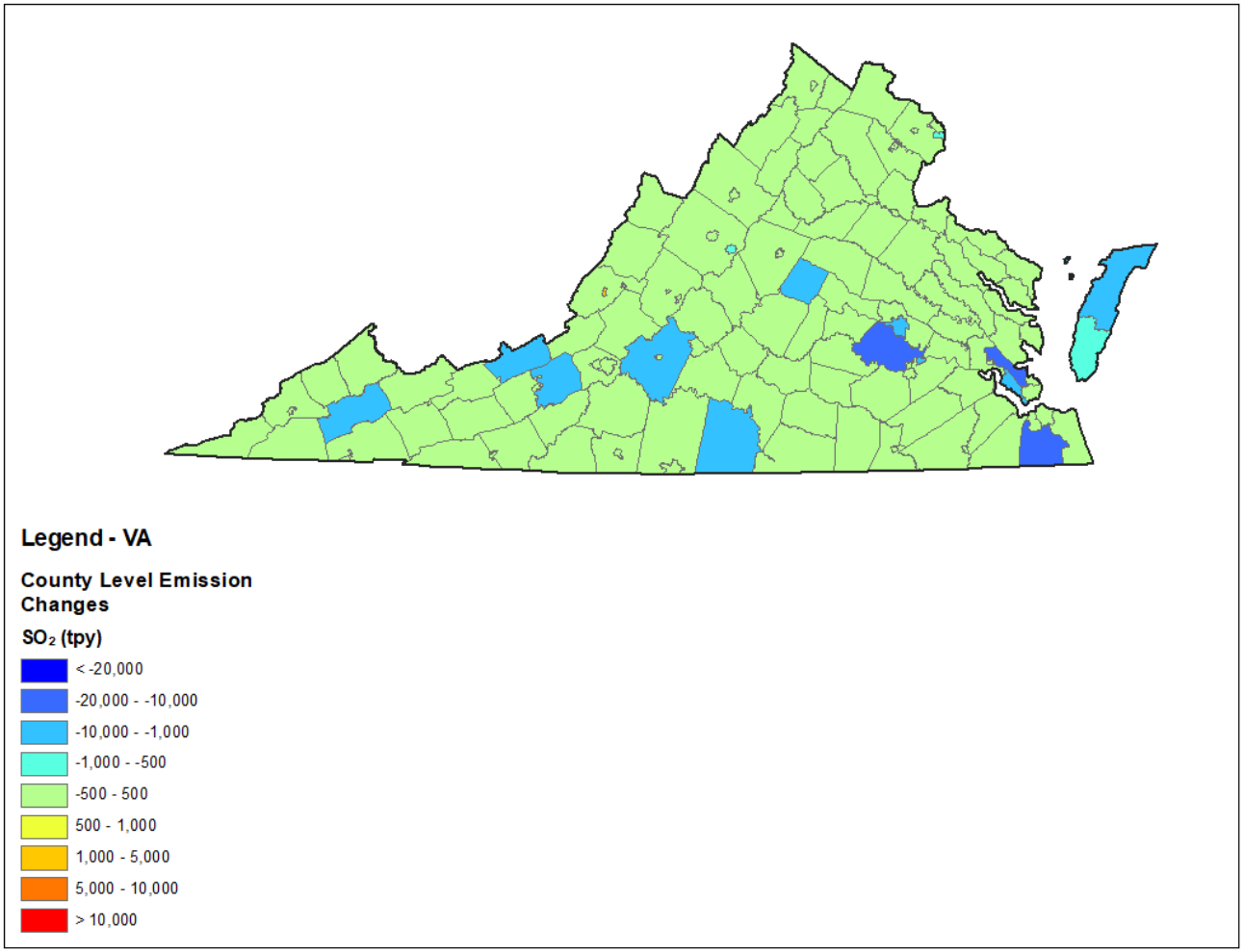

Figure F.9-6. Virginia County Level SO_2 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

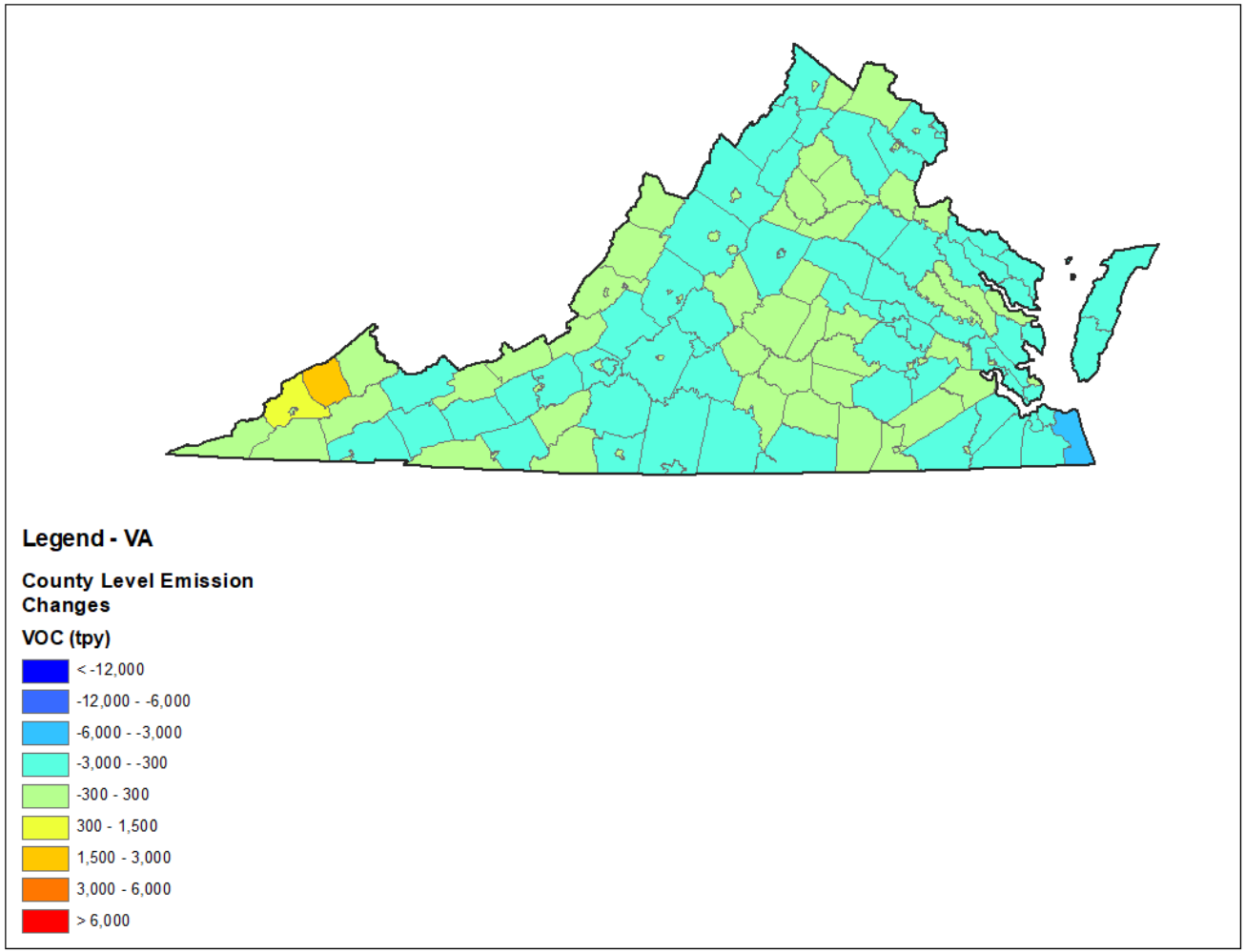

Figure F.9-7. Virginia County Level VOC Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

Appendix F-10. West Virginia County-Level Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory

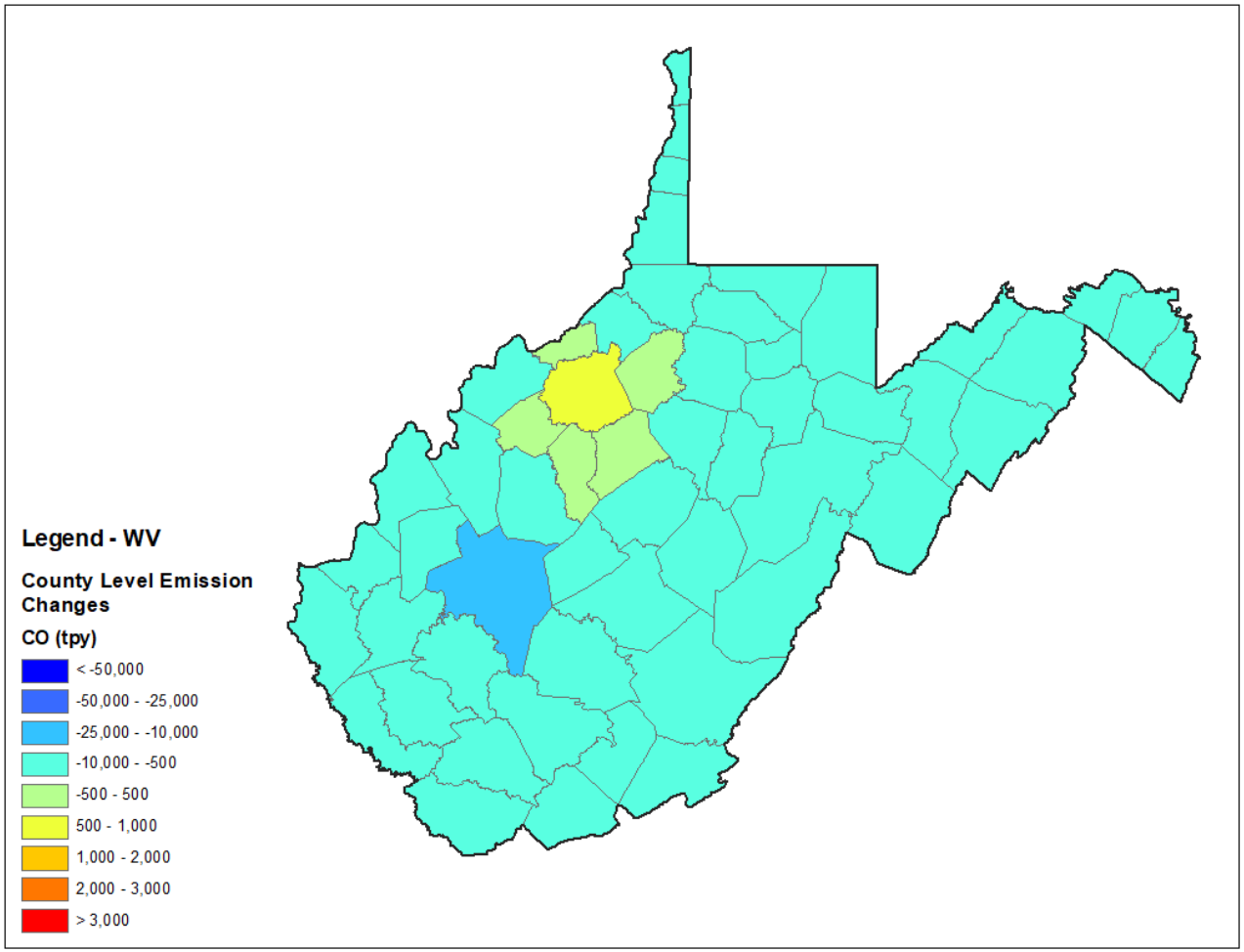

Figure F.10-1. West Virginia County Level CO Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

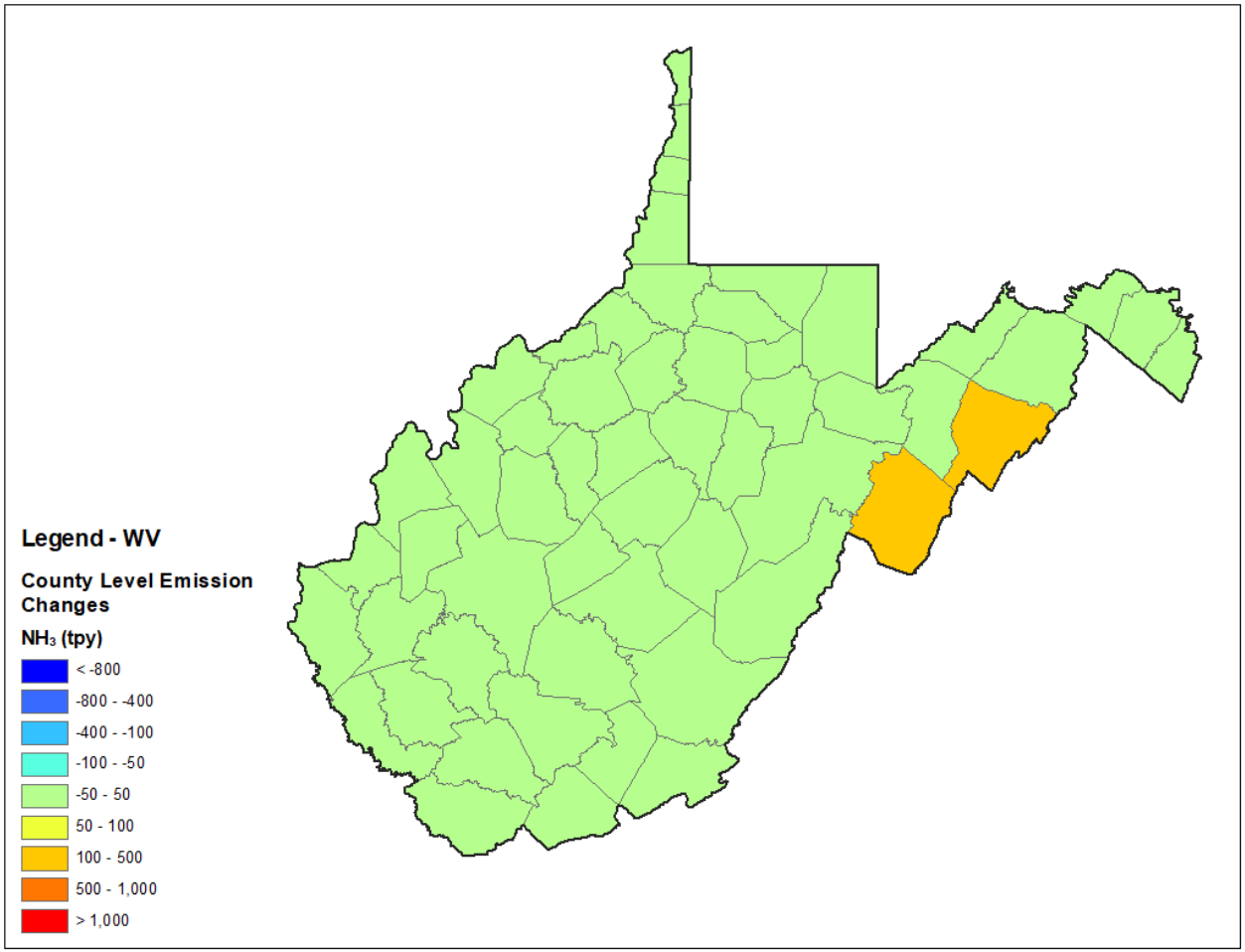

Figure F.10-2. West Virginia County Level NH_3 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

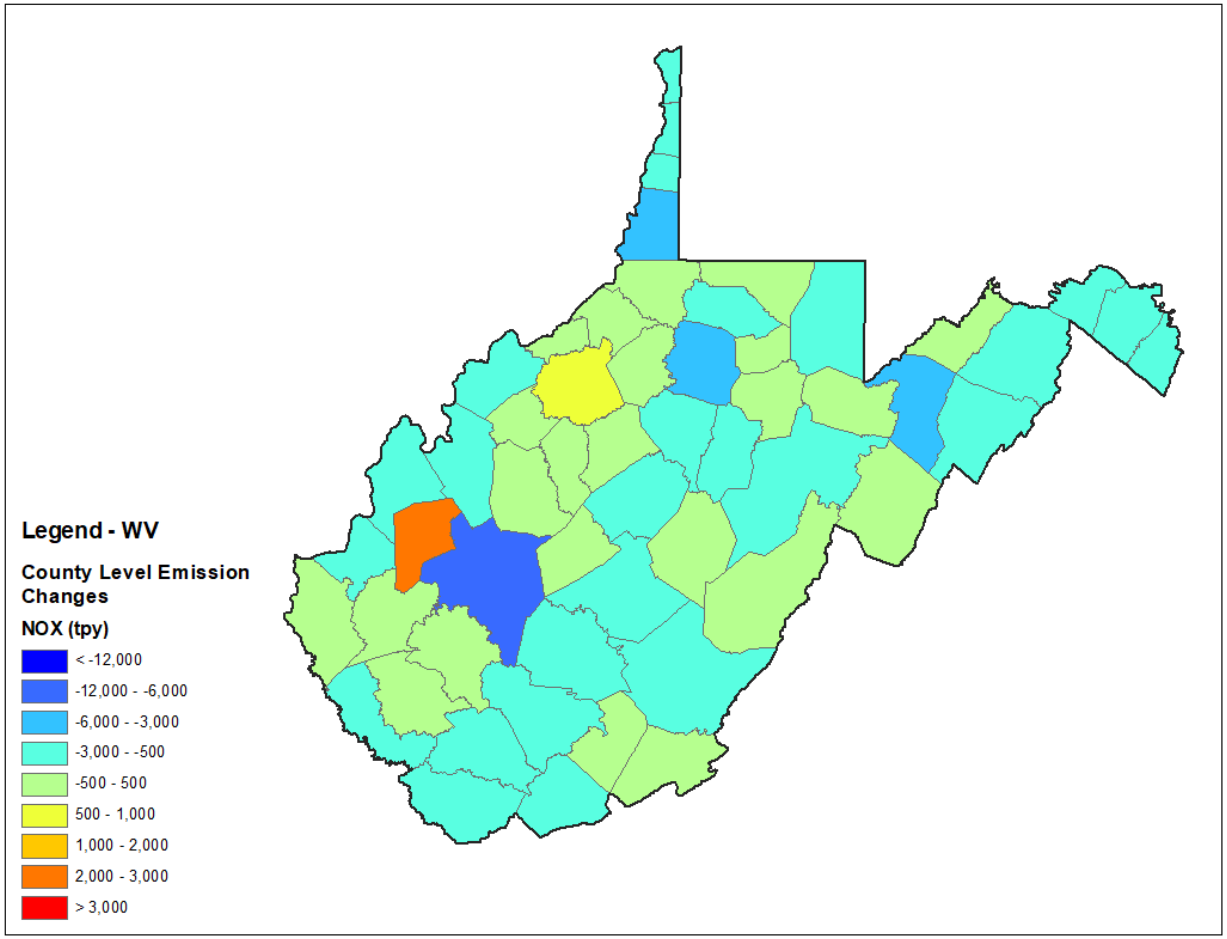

Figure F.10-3. West Virginia County Level NO_x Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

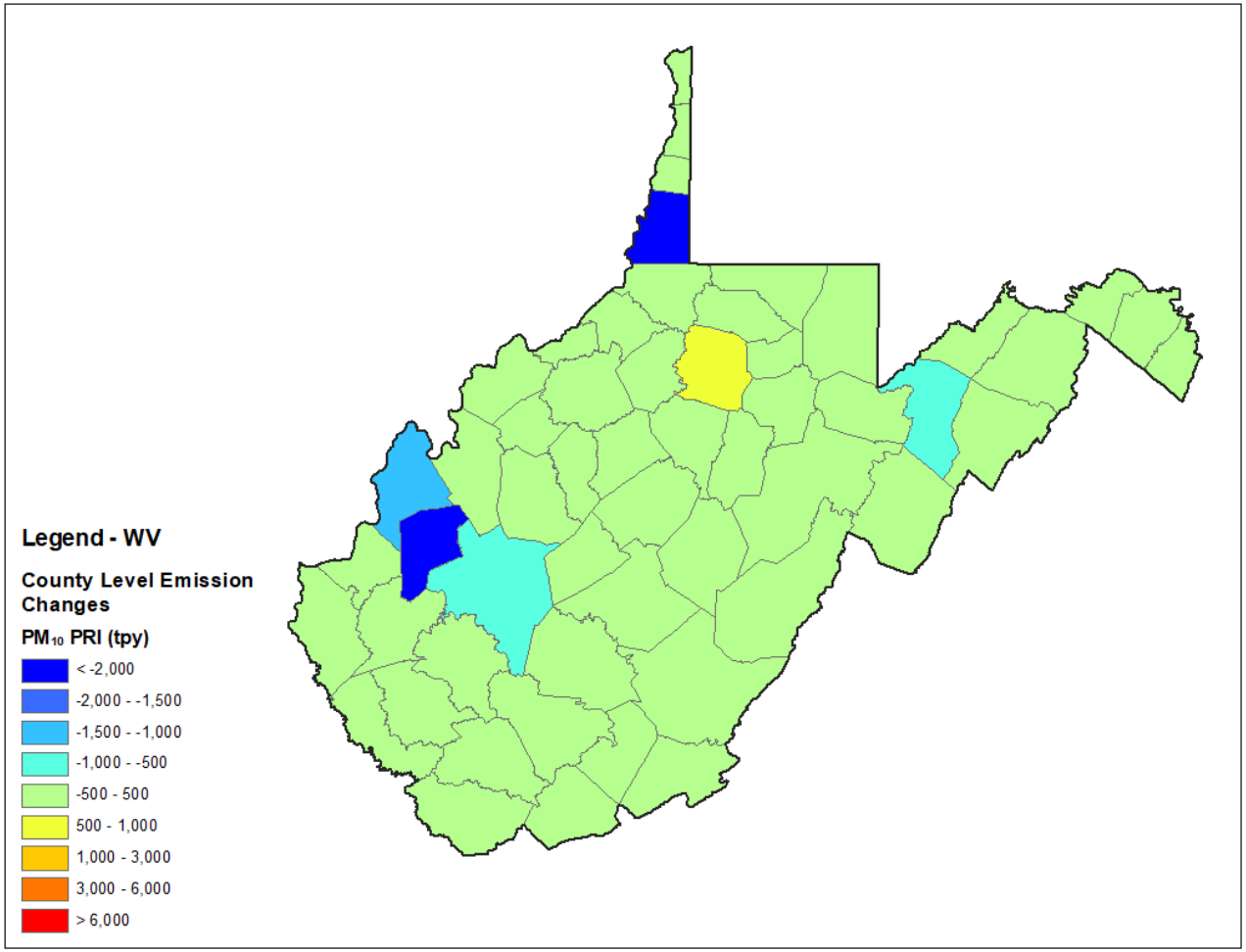

Figure F.10-4. West Virginia County Level PM_{10}-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[96]

[96] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

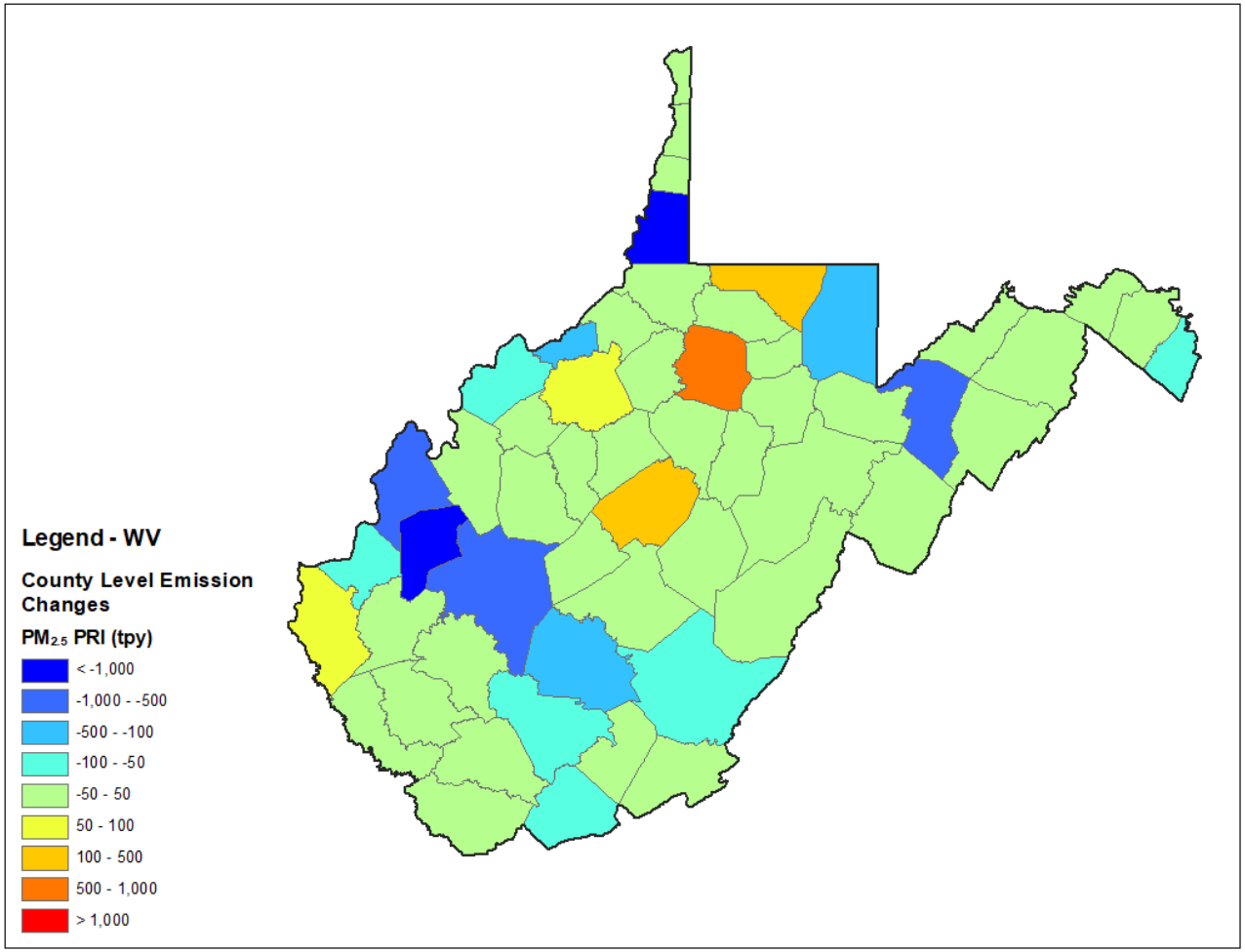

Figure F.10-5. West Virginia County Level $PM_{2.5}$-PRI Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)[97]

[97] Totals for PM_{10}-PRI and $PM_{2.5}$-PRI include the unadjusted PM_{10}-PRI and $PM_{2.5}$-PRI emissions for source categories included in the "afdust" sector. See Appendix C for the list of source categories and comparison of adjusted and unadjusted emissions by state.

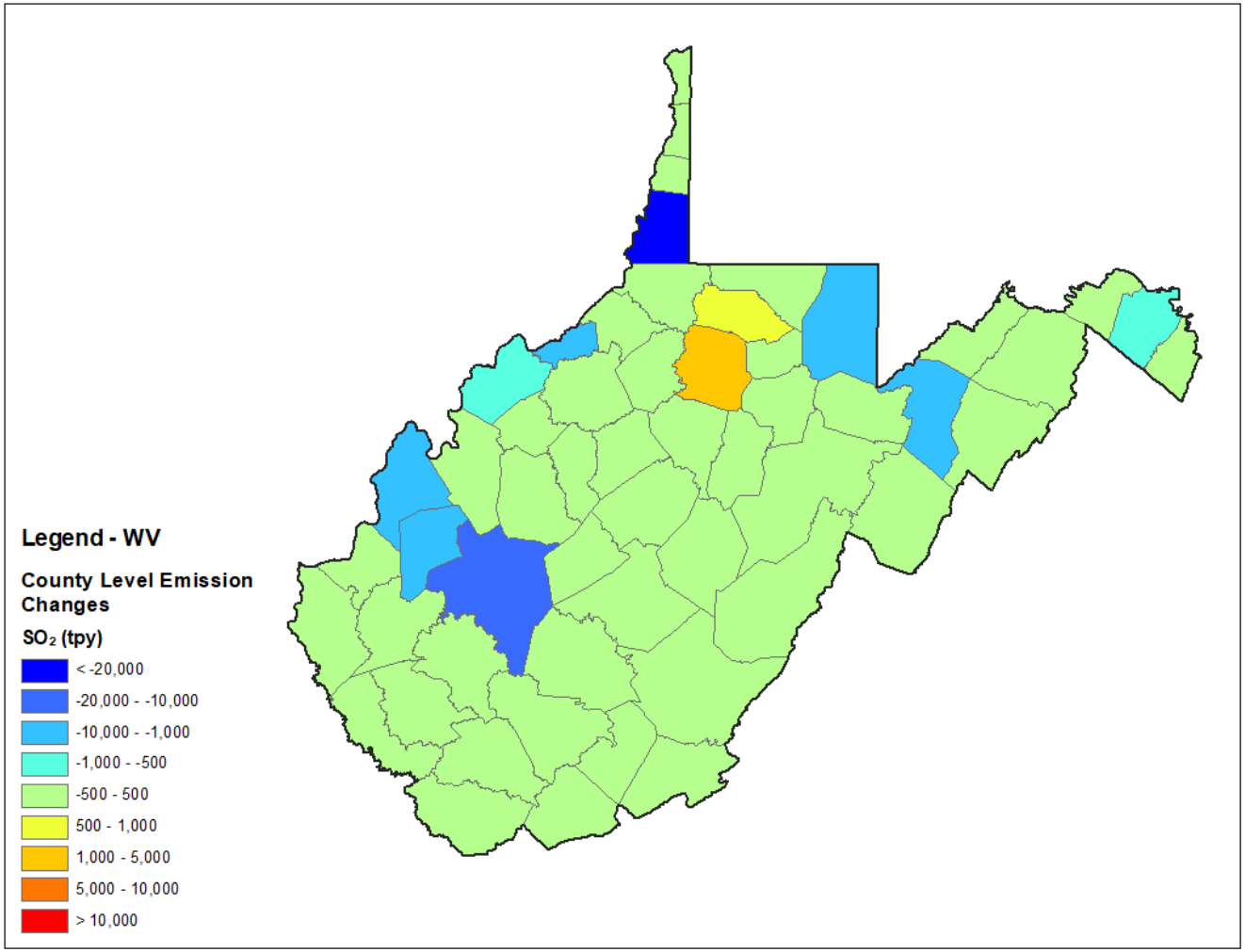

Figure F.10-6. West Virginia County Level SO_2 Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

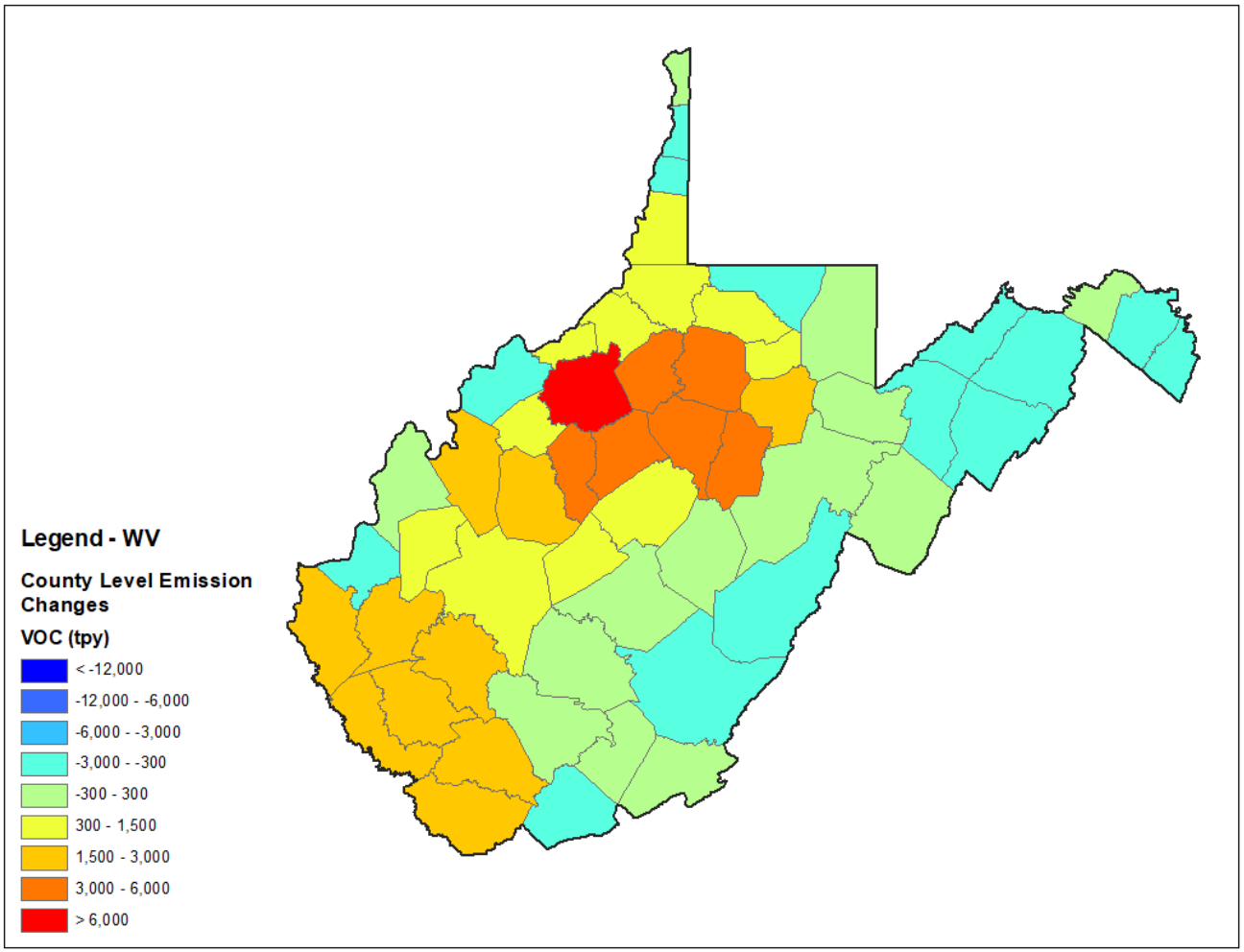

Figure F.10-7. West Virginia County Level VOC Emissions Changes from the EPA 2011 Base Year Inventory to the Revised 2028 Inventory (except Biogenic)

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Appendix B-2b

VISTAS II Task 3B - Conversion of the Task 2B 2028 Point Source Remodeling Files for Emissions Processing with SMOKE

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Conversion of the Task 2B 2028 Point Source Remodeling Files for Emissions Processing with SMOKE (Task 3B)

Prepared for:
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205 Corporate Center Dr., Suite D
Stockbridge, GA 30281-7383

Under Contract No. V-2018-03-01

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Final – October 12, 2020

Alpine Project Number: TS-527
ERG Project Number: 4133.00.006

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Appendix A Updated Point Source Emissions for Non-SESARM States in the VISTAS Modeling Domain
Appendix B Southeastern VISTAS II Regional Haze Project: Documentation of 2028 Mass Emissions Inventory for Small Electricity Generating Units (EGUs) for States not included in the VISTAS II Region

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Abbreviations/Acronym List

Alpine	Alpine Geophysics, LLC
CEM	Continuous Emissions Monitoring
CenRAP	Central Regional Air Planning
EGU	Electricity Generating Unit
EPA	United States Environmental Protection Agency
ERG	Eastern Research Group, Inc.
ERTAC	Eastern Regional Technical Advisory Committee
FF10	Flat File 2010
FIPS	Federal Information Processing System
FTP	File Transfer Protocol
GA	Georgia
GADNR	Georgia Department of Natural Resources
IPM	Integrated Planning Model
LADCO	Lake Michigan Air Directors Consortium
MANE-VU	Mid-Atlantic and Northeast Visibility Union
MARAMA	Mid-Atlantic Regional Air Management Association, Inc.
MMBTU/hr	Million British thermal units per hour
MW	Megawatts
NCDAQ	North Carolina Division of Air Quality
NO_x	Oxides of nitrogen
ORIS	Plant identifier issued by U.S. Department of Energy
QA/QC	Quality Assurance/Quality Control
RHR	Regional Haze Rule
RPO	Regional Planning Organization
SCC	Source Classification Code
SCR	Selective catalytic reduction
SESARM	Southeastern States Air Resource Managers, Inc.
SIPS	State Implementation Plans
SMOKE	Sparse Matrix Operator Kernel Emissions
SO_2	Sulfur dioxide
VISTAS	Visibility Improvement – State and Tribal Association of the Southeast
WRAP	Western Regional Air Partnership

1.0 INTRODUCTION

Southeastern States Air Resource Managers, Inc. (SESARM) has been designated by the United States Environmental Protection Agency (EPA) as the entity responsible for coordinating regional haze evaluations for the ten Southeastern states of Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia. The Eastern Band of Cherokee Indians and the Knox County, Tennessee local air pollution control agency are also participating agencies. These parties are collaborating through the Regional Planning Organization known as Visibility Improvement - State and Tribal Association of the Southeast (VISTAS) in the technical analyses and planning activities associated with visibility and related regional air quality issues. VISTAS' analyses support the VISTAS states in their responsibility to develop, adopt, and implement their State Implementation Plans (SIPs) for regional haze.

The state and local air pollution control agencies in the Southeast are mandated to protect human health and the environment from the impacts of air pollutants. They are responsible for air quality planning and management efforts including the evaluation, development, adoption, and implementation of strategies controlling and managing all criteria air pollutants including fine particles and ozone as well as regional haze. This project focused on regional haze and regional haze precursor emissions. Control of regional haze precursor emissions will have the additional benefit of reducing criteria pollutants as well.

The 1999 Regional Haze Rule (RHR) identified 18 Class I Federal areas (national parks greater than 6,000 acres and wilderness areas greater than 5,000 acres) in the VISTAS region. The 1999 RHR required states to define long-term strategies to improve visibility in Federal Class I national parks and wilderness areas. States were required to establish baseline visibility conditions for the period 2000-2004, natural visibility conditions in the absence of anthropogenic influences, and an expected rate of progress to reduce emissions and incrementally improve visibility to natural conditions by 2064. The original RHR required states to improve visibility on the 20% most impaired days and protect visibility on the 20% least impaired days.[1] The RHR requires states to evaluate progress toward visibility improvement goals every five years and submit revised SIPs every ten years.

[1] RHR summary data is available at: http://vista.cira.colostate.edu/Improve/rhr-summary-data/

This report documents the processing of 2028 mass emissions inventory data for input to photochemical grid modeling that were used to model the final 2028 visibility impacts (elv5) for each Class I Federal area. This report documents the steps taken by Alpine Geophysics, LLC (Alpine) in preparing SMOKE-ready point source input files from the SESARM adjusted 2028 Electricity Generating Unit (EGU) and non-EGU point source emissions data (2028elv4) provided to Alpine by Eastern Research Group, Inc. (ERG). ERG completed the point EGU and point non-EGU emissions data under Task 2 of VISTAS Contract No. V-2018-03-01, entitled "Southeast VISTAS II Regional Haze Analysis Project". Alpine prepared these datasets under ERG subcontract 4133.00.001/01.

1.1 Emissions Update

Since the completion of this emissions processing and subsequent modeling efforts (October 2019), SESARM concluded that the 2028 point electricity generating unit (EGU) and non-EGU emissions needed to be reviewed and updated for selected sources. These include data reviewed from:

- Point source emissions updates identified in the Area of Influence report;
- Updated EGU emissions developed by the Eastern Regional Technical Advisory Committee (ERTAC);
- EPA's 2028 point source emissions based on the 2016 modeling platform; and
- Additional facility emission updates after Particulate Source Apportionment Technology (PSAT) analysis from other regional planning organizations with states in the VISTAS modeling domain, such as the Central Regional Air Partnership (CenRAP); the Lake Michigan Air Directors Consortium (LADCO); the Mid-Atlantic and Northeast Visibility Union (MANE-VU); and the Western Regional Air Partnership (WRAP).

Specific revisions related to development of the 2028 emissions inventory updates are presented throughout the remainder of this report, and Appendix A. While specific updates to 2028 emissions for non-SESARM states within the VISTAS domain are described in this report, emissions updates related to the SESARM states were presented in the revised Task 2B report (September 2020).

2.0 EMISSIONS DATA

Under Task 3 of the VISTAS Contract, specifically Subtasks 3.1 (Create Photochemical Model Ready EGU Emission Files for 2028), 3.1.2 (Scale Hourly SMOKE Emissions for EGUs), and 3.2 (Create Photochemical Model Ready Non-EGU Point Source Emission Files for 2028), ERG tasked Alpine with preparing SMOKE-ready input files for processing point source emissions to support the 2028 regional haze future year modeling. For these tasks, Alpine created SESARM state inputs (based on ERG provided data), as well as non-SESARM state files to generate national modeling inventories for these categories consistent with the 2011 meteorology associated with the base year modeling platform.

For the June 2018 effort (original modeling), ERG directed Alpine to develop non-SESARM state non-EGU point source emissions files to compliment the SESARM-only file prepared by ERG. For this purpose, Alpine reviewed the EPA list of non-EGU point source emissions for SMOKE processing[2] to determine which files were necessary for review and extract non-SESARM state data. From these files, Alpine determined that the following files were needed to extract non-SESARM state data to fully represent non-EGU point sources consistent with EPA's 2028el modeling platform:

- 2023el_from_ptnonipm_2011NEIv2_POINT_20140913_revised_20150115_20sep2016_v2.csv
- 2023el_from_refueling_2011NEIv2_POINT_20140913_20sep2016_v1.csv
- 2023_MARAMA_Point_Offsets_2016_08_24_04oct2016_v1.csv
- Biodiesel_Plants_2018_ff10_11apr2013_v0.csv
- 2023el_from_ethanol_plants_2011NEIv2_POINT_20141123_20sep2016_v0.csv
- Illinois_WV_new_sources_NODA_29aug2016_v2.csv
- MARAMA_2028_ptnonipm_2011NEIv2_POINT_20140913_revised_20150115_mar_18nov2016_v3.csv
- MARAMA_2028el_refueling_2011NEIv2_POINT_20140913_18nov2016_v1.csv

[2] The "ptinv_ptnonipm_2028el_cb6v2_v6_11g.lst" and "ptinv_pt_oilgas_2028el_cb6v2_v6_11g.lst" were extracted from: ftp://ftp.epa.gov/EmisInventory/2011v6/v3platform/2028emissions/ 2028el_cb6v2_v6_11g_inputs_point.zip

- MARAMA_2028el_pt_oilgas_2011NEIv2_POINT_20140913_mar_21nov2016_v1.csv
- 2028el_pt_oilgas_2011NEIv2_POINT_20140913_02dec2016_v1.csv

These files were concatenated to develop a single non-EGU point source file of national coverage and to be consistent with the ERG-provided SESARM-only non-EGU point source files. From this single file, Alpine removed all records associated with SESARM state sources. The remaining file was reconfigured as a new FF10 formatted input file and is named "ff10_point_nonegu_nonsesarm_2028el.csv". Since these emissions inventory files were confirmed for use by EPA in their modeling platform, no additional QA/QC beyond removal of SESARM state records was conducted by Alpine.

For the EGUs, ERG directed Alpine to replace the 2028 EPA EGU emissions with the ERTACv2.7 emissions. The ERTAC tool includes EGUs that burn fossil fuel with ≥25 megawatts (MW) of generation capacity or ≥250 million British thermal units per hour (MMBtu/hr) of heat input and generate electricity for the power grid. EPA's Integrated Planning Model (IPM) forecast includes the same fossil fuel units as those included in ERTAC, plus small EGUs with <25 MW of generation capacity or <250 MMBtu/hr of heat input and may or may not produce electricity for the power grid. Therefore, it was necessary to develop a 2028 projection year inventory for the small EGUs that are included in IPM but not in ERTAC to include in the VISTAS II modeling platform to ensure complete accounting of emissions from small EGUs. Appendix B is the documentation for developing the small EGU inventory and the QA/QC steps conducted to develop the small EGU inventory.[3]

The small EGU FF10 files were finalized in early-November 2018,[4] and sent to Alpine for emissions processing. Processing concluded on December 9, 2018.

[3] Memorandum: "Southeastern VISTAS II Regional Haze Project: Documentation of 2028 Mass Emissions Inventory for Small Electricity Generating Units (EGUs) for States not included in the VISTAS II Region." Prepared by the North Carolina Division of Air Quality (NCDAQ). December 7, 2018.

[4] Final data files submitted to SESARM by NCDAQ on November 12, 2018.

March 2020 Emissions Update

As part of the emissions inventory update and for remodeling, SESARM directed ERG to develop the non-SESARM states point EGU and non-EGU emissions inventory files based on updated information. Specific updates include:

- Versions 16.0 and 16.1 of the ERTAC EGU emissions;[5]
- Select facility updates from the Area of Influence analysis;
- Select facility updates from the PSAT analysis; and the SESARM made the following decisions:
    - No point source changes to states outside the VISTAS modeling domain (e.g., Alaska, Arizona, California, Hawaii, Idaho, Nevada, Oregon, Utah, and Washington);
    - Replace the ERTACv2.7 EGU emissions for LADCO states (Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin) with ERTACv16.1 EGU emissions;
    - Replace the ERTACv2.7 EGU emissions for CenSARA, MANE-VU, and WRAP states in the VISTAS domain with ERTACv16.0 EGU emissions; and
    - Update select facilities based on AOI and PSAT analysis.

For the non-SESARM states, Table 2-1 and Table 2-2 show the original modeled and remodeled 2028 point source emissions, respectively, by Regional Planning Organization (RPO) and state. Table 2-3 provides a summary of non-SESARM emission changes by RPO and state. Table 2-4 provides a summary of emission changes by Data Source/Reason.

[5] Point source emission from Version 16 of the 2028 ERTAC Projection Tool were provided to R. Oommen/ERG from D. McLeod/VDEQ on March 11, 2028.

Table 2-1. Non-SESARM Original Modeled Point Sources Emissions

State	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
CENRAP RPO States							
Arkansas	49,574	1,284	74,310	11,138	7,236	87,523	22,725
Iowa	33,338	3,708	43,678	10,792	7,461	51,354	20,593
Kansas	35,809	1,953	42,974	9,678	6,153	30,410	16,010
Louisiana	124,663	6,726	159,627	54,385	46,204	141,044	57,861
Missouri	115,378	1,654	65,094	14,411	9,692	171,745	14,221
Nebraska	21,143	916	46,819	7,691	4,127	76,558	5,926
Oklahoma	81,621	6,385	116,107	11,745	8,048	49,539	47,308
Texas	289,440	7,715	355,488	54,951	41,141	404,777	119,950
CENRAP Total	**750,967**	**30,341**	**904,098**	**174,791**	**130,063**	**1,012,950**	**304,594**
LADCO RPO States							
Illinois	93,802	1,807	106,521	26,181	16,351	144,869	46,028
Indiana	316,427	1,278	138,482	30,952	19,686	187,959	36,681
Michigan	81,241	1,539	93,300	13,349	9,465	80,873	26,325
Minnesota	35,789	1,560	55,754	24,083	15,678	28,284	19,875
Ohio	266,094	4,240	107,621	38,210	31,442	172,147	30,894
Wisconsin	52,098	1,088	47,188	12,265	8,440	46,055	21,926
LADCO Total	**845,451**	**11,511**	**548,867**	**145,040**	**101,062**	**660,186**	**181,729**
MANE-VU RPO States (not including Virginia and West Virginia)							
Connecticut	3,649	399	4,864	442	351	497	938
Delaware	4,983	206	4,147	1,111	1,011	3,528	2,267
District of Columbia	465	0	554	39	38	21	71
Maine	14,568	570	11,688	2,899	2,248	2,499	3,409
Maryland	36,046	482	27,439	5,122	3,977	44,601	3,059
Massachusetts	14,136	545	13,399	1,639	1,391	1,928	3,623
New Hampshire	6,076	355	3,689	722	617	2,380	682
New Jersey	17,517	1,220	16,716	4,284	3,911	4,123	8,290
New York	75,736	2,102	52,537	8,409	6,188	29,915	11,168
Pennsylvania	110,660	2,056	107,212	31,666	23,507	180,371	26,036
Rhode Island	2,698	61	1,602	214	99	890	1,211
Vermont	2,511	21	730	235	163	127	492
MANE-VU Total	**289,045**	**8,017**	**244,576**	**56,782**	**43,499**	**270,880**	**61,247**
WRAP RPO States (in the VISTAS Domain)							
Colorado	73,644	468	88,225	18,969	9,339	18,236	92,210
Montana	11,492	90	23,782	8,670	4,006	20,170	5,084
New Mexico	30,231	455	70,477	4,828	3,102	26,597	7,025
North Dakota	17,758	6,102	51,241	5,815	4,254	54,978	3,913
South Dakota	4,648	76	13,427	871	825	1,194	3,253
Wyoming	72,505	576	115,668	35,046	15,646	60,946	28,254
WRAP Total	**210,278**	**7,767**	**362,820**	**74,199**	**37,173**	**182,122**	**139,739**
Totals	**2,095,741**	**57,636**	**2,060,360**	**450,813**	**311,797**	**2,126,139**	**687,309**

Table 2-2. Non-SESARM Remodeled Point Sources Emissions

State	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
CENRAP RPO States							
Arkansas	47,257	1,765	49,710	9,973	6,687	39,528	22,443
Iowa	33,509	3,833	39,573	9,868	6,110	42,524	20,554
Kansas	29,515	1,776	32,733	8,649	5,443	9,898	15,902
Louisiana	116,427	7,841	165,713	53,151	44,322	116,582	58,055
Missouri	103,442	1,660	62,692	12,533	7,752	137,402	14,036
Nebraska	24,435	1,047	28,911	6,359	2,842	52,637	5,805
Oklahoma	87,202	6,780	105,800	11,018	7,389	36,155	47,133
Texas	290,005	7,500	306,266	47,080	39,040	186,595	119,388
CENRAP Total	**731,792**	**32,202**	**791,398**	**158,630**	**119,586**	**621,321**	**303,315**
LADCO RPO States							
Illinois	91,480	2,663	104,208	22,866	14,177	116,578	46,287
Indiana	312,429	2,195	104,240	25,239	17,446	113,473	36,314
Michigan	80,716	1,737	85,269	13,760	9,819	67,781	26,258
Minnesota	34,480	1,845	56,167	22,992	15,546	28,636	19,887
Ohio	265,489	5,529	96,967	26,505	22,400	130,998	30,795
Wisconsin	54,199	2,576	44,494	11,100	6,043	40,705	22,090
LADCO Total	**838,794**	**16,545**	**491,345**	**122,463**	**85,431**	**498,172**	**181,631**
MANE-VU RPO States (not including Virginia and West Virginia)							
Connecticut	3,658	471	5,070	520	414	346	949
Delaware	4,779	148	3,401	763	665	2,472	2,233
District of Columbia	465	0	554	39	38	21	71
Maine	14,699	586	11,622	2,881	2,195	2,492	3,398
Maryland	37,901	584	25,141	5,674	4,049	27,168	3,076
Massachusetts	17,385	735	13,741	1,671	1,313	2,250	3,724
New Hampshire	5,836	340	2,827	637	608	1,373	692
New Jersey	17,563	2,056	16,703	4,888	4,095	3,618	8,189
New York	73,752	1,885	52,232	8,028	5,688	16,965	11,300
Pennsylvania	141,583	3,929	89,260	30,800	19,408	91,713	24,999
Rhode Island	3,367	28	1,712	249	138	895	1,220
Vermont	2,511	21	730	235	163	127	492
MANE-VU Total	**323,499**	**10,784**	**222,991**	**56,383**	**38,774**	**149,440**	**60,342**
WRAP RPO States (in the VISTAS Domain)							
Colorado	68,099	575	78,556	19,000	9,320	15,621	92,168
Montana	10,459	89	18,879	8,008	3,532	13,271	5,023
New Mexico	32,011	405	56,575	3,647	2,265	20,407	7,130
North Dakota	15,580	6,074	47,716	4,887	4,002	47,976	3,853
South Dakota	4,457	76	4,281	755	704	1,590	3,240
Wyoming	71,149	421	95,427	31,075	13,703	36,619	28,036
WRAP Total	**201,755**	**7,640**	**301,433**	**67,373**	**33,526**	**135,483**	**139,450**
Totals	**2,095,839**	**67,172**	**1,807,167**	**404,849**	**277,317**	**1,404,416**	**684,739**

Table 2-3. Non-SESARM Point Sources Emissions Adjustments for the Remodel

State	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
CENRAP RPO States							
Arkansas	-2,317	481	-24,601	-1,166	-549	-47,995	-282
Iowa	171	125	-4,105	-924	-1,351	-8,829	-40
Kansas	-6,294	-177	-10,241	-1,029	-711	-20,512	-109
Louisiana	-8,236	1,115	6,087	-1,235	-1,882	-24,461	194
Missouri	-11,936	6	-2,402	-1,878	-1,940	-34,343	-185
Nebraska	3,292	130	-17,909	-1,332	-1,285	-23,922	-121
Oklahoma	5,581	396	-10,306	-728	-659	-13,384	-175
Texas	564	-215	-49,222	-7,870	-2,100	-218,182	-562
CENRAP Total	**-19,175**	**1,861**	**-112,700**	**-16,161**	**-10,477**	**-391,629**	**-1,278**
LADCO RPO States							
Illinois	-2,321	856	-2,313	-3,316	-2,174	-28,291	259
Indiana	-3,998	918	-34,242	-5,713	-2,240	-74,486	-367
Michigan	-525	198	-8,031	411	354	-13,091	-66
Minnesota	-1,309	285	413	-1,091	-132	352	11
Ohio	-605	1,289	-10,655	-11,705	-9,043	-41,148	-99
Wisconsin	2,101	1,488	-2,694	-1,165	-2,397	-5,350	165
LADCO Total	**-6,657**	**5,034**	**-57,522**	**-22,578**	**-15,631**	**-162,015**	**-97**
MANE-VU RPO States (not including Virginia and West Virginia)							
Connecticut	10	72	206	78	63	-151	11
Delaware	-205	-57	-746	-348	-346	-1,057	-35
District of Columbia	0	0	0	0	0	0	0
Maine	131	16	-66	-18	-53	-8	-11
Maryland	1,855	102	-2,298	551	72	-17,433	16
Massachusetts	3,249	190	342	32	-77	323	101
New Hampshire	-240	-15	-862	-86	-8	-1,007	10
New Jersey	47	836	-13	603	185	-505	-101
New York	-1,984	-217	-305	-381	-500	-12,949	131
Pennsylvania	30,922	1,873	-17,952	-866	-4,099	-88,658	-1,038
Rhode Island	669	-33	110	36	39	6	9
Vermont	0	0	0	0	0	0	0
MANE-VU Total	**34,453**	**2,767**	**-21,585**	**-399**	**-4,725**	**-121,440**	**-905**
WRAP RPO States (in the VISTAS Domain)							
Colorado	-5,545	107	-9,668	31	-19	-2,615	-42
Montana	-1,032	-2	-4,904	-662	-474	-6,899	-61
New Mexico	1,780	-49	-13,903	-1,181	-837	-6,191	105
North Dakota	-2,178	-28	-3,525	-928	-252	-7,002	-60
South Dakota	-191	0	-9,146	-116	-121	396	-13
Wyoming	-1,356	-155	-20,241	-3,971	-1,943	-24,327	-218
WRAP Total	**-8,523**	**-127**	**-61,386**	**-6,826**	**-3,647**	**-46,639**	**-289**
Totals	**98**	**9,535**	**-253,193**	**-45,964**	**-34,479**	**-721,723**	**-2,570**

Table 2-4. Non-SESARM Point Source Adjustments by Data Source/Reason

Data Source / Reason	CO	NH_3	NO_x	PM_{10}-PRI	$PM_{2.5}$-PRI	SO_2	VOC
	tpy						
AOI Analysis	-168	2	-379	-4,954	-3,814	-13,250	-20
ERTAC 16.0	9,563	4,601	-173,595	-22,171	-18,616	-507,500	-2,175
ERTAC 16.1	-1,445	5,054	-22,764	-6,652	-4,764	-64,638	437
PSAT Update	-6,526	-74	-44,026	-11,671	-7,196	-115,318	-661
State Update	-1,327	-47	-12,428	-515	-90	-21,017	-151
Totals	**98**	**9,535**	**-253,193**	**-45,964**	**-34,479**	**-721,723**	**-2,570**

Appendix A presents point source-specific emissions updates for 2028 and the source for the updated emissions.

On March 31, 2020, ERG provided Alpine, via project File Transfer Protocol (FTP), with four emissions inventory files for use in this task:

- VISTAS_2028_FF10_EGU_20200331.zip – EGU emissions estimates for the 2028 regional base case for the SESARM states.
- VISTAS_2028_FF10_NON_EGU_20200331.zip – Non-EGU emissions estimates for the 2028 regional base case for the SESARM states.
- NON_VISTAS_2028_FF10_EGU_20200331.zip – EGU emissions estimates for the 2028 regional base case for the non-SESARM states in the VISTAS domain.
- NON_VISTAS_2028_FF10_NON_EGU_20200331.zip – Non-EGU emissions estimates for the 2028 regional base case for the non-SESARM states in the VISTAS domain.

These files replace the EGU and non-EGU source files for the SESARM and non-SESARM states in the VISTAS domain from the EPA 2028el modeling platform. No 2028 adjustments were made to the other sector files (e.g., nonpoint, nonroad, onroad, biogenic, etc.) used in modeling the future year.

Upon receipt of these files, Alpine first confirmed that the files were in the documented Flat File 2010 (FF10) format and that all states in the VISTAS domain region were represented in each file. As a second step, Alpine compared the emission files with the summary files by Federal Information Processing System (FIPS) code, source classification code (SCC), and

pollutant that were provided by ERG and confirmed that the annual emission totals of both files matched the summary file totals. A final pre-use quality assurance/quality control (QA/QC) step was to confirm that all required fields for modeling were populated and that all sources had latitude and longitude data within the boundaries of the SESARM state domain.

3.0 ANNUAL FILE PREPARATION

After the above noted initial QA/QC steps were conducted, Alpine prepared annual emissions inventory data for emissions modeling.

3.1 Non-EGU Point Sources

Since no issues were identified in Alpine's cursory QA/QC review of the "VISTAS_2028_FF10_NON_EGU" and the "NON_VISTAS_2028_FF10_NON_EGU" files provided by ERG, Alpine prepared a new FF10-formatted file with new header information indicating what emissions were included in the file and that it was to be used in the SESARM 2028 regional haze modeling analysis. The resulting file was prepared and is named "ff10_point_nonegu_2028_1apr2020". Alpine confirmed that emissions totals matched the provided emissions totals.

This non-EGU point source file was prepared with annual emissions and no additional temporal file preparation (daily or hourly input format) was conducted consistent with EPA's 2011el modeling configuration.

3.2 EGU Point Sources

Similar to the non-EGU cursory QA/QC, Alpine confirmed that all required fields for modeling were populated and that all sources had latitude and longitude data within the boundaries of the modeling domain and outside of SESARM states.

For ease of data management, processing, and resulting QA/QC, Alpine then concatenated the SESARM-only EGU file provided by ERG to the working file to create a single, national, annual emissions file for all EGU emission sources (both SESARM and non-SESARM states). The file is called "ff10_ptegu_remodel_2028_2apr2020.csv".

This file was then configured with new header information to indicate the national coverage of the inputs and documented to note the file's use in SESARM's 2028elv4 regional haze modeling.

June 2020 File Preparation Update

In June 2020, while reviewing the Benchmark #7 report associated with the remodeled 2028 inventories, it was discovered that the emissions associated with non-SESARM states, as well as limited emissions in Georgia, were not being passed from the emissions processing phase into the CAMx input files. Thorough investigation pointed in part to the inclusion of monthly emissions data in the ERTAC 16.0/16.1 derived emission files for non-SESARM sources and cross-reference (facility to boiler data) changes made between the ERTAC 2.7 data used in 2028v3 and the ERTAC 16.x data used in 2028v4. These differences in the files appeared to create a lookup conflict in the SMOKE emissions processor when continuous emissions monitoring (CEM)-based PTHOUR files were also associated with the annual and monthly emissions in the ERTAC input files.

Ultimately, work around processing steps were implemented that required the zeroing out of the monthly emissions from the EGU annual input file and further review and update to multiple unit-level cross-reference characteristics for non-SESARM facilities taken directly from the ERTAC model output. No annual emissions, stack characteristics, nor locational parameters were changed in this step, nor did any PTHOUR files generated for the modeling have to be modified for the 2028elv5 modeling.

This file was then configured with new header information to indicate the national coverage of the inputs and documented to note the file's use in SESARM's 2028elv5 regional haze modeling.

4.0 HOURLY SCALING – EGU POINT SOURCES ONLY

As outlined in subtask 3.1.2 of the work plan, the next step was to create hourly emission files consistent with the temporal distribution of EPA's 2011el modeling platform for EGUs that report CEM data to EPA. The main purpose of this step was to ensure emissions that were simulated in 2028 occur in the same timelines as the emissions were simulated in the 2011 modeling, preventing fabricated emissions increases or decreases between the two years simply as a result of the temporal profile. For example, Alpine wanted to ensure that a unit operating during hour 14 of June 12th in the 2011 simulation is also operating at a comparable level on hour 14 of June 12th in the 2028 simulation with the only difference being in the absolute level of emissions between the two years.

In order to accomplish this step, Alpine first obtained EPA's hourly distribution files of CEM-based EGU emissions from the 2011/2028el modeling platforms. These files present hourly emissions of oxides of nitrogen (NO_x) and sulfur dioxide (SO_2), as well as provide an hourly distribution of heat input for the annual episode simulated (e.g., the 2011 calendar year).

Using these files, Alpine generated an hourly-to-annual ratio of NO_x, SO_2, and heat input for each unit identified by EPA within the VISTAS_12 domain. Alpine used ratio preparation methods originally identified and applied for VISTAS in past regional haze studies.[6] These ratios were then matched to the new annual EGU file "ff10_ptegu_remodel_2028_2apr2020.csv" where the:

- NO_x ratios were used to scale annual NO_x emissions;
- SO_2 ratios were used to scale SO_2 emissions; and
- Heat input was used to scale all other pollutant emissions from annual to hourly distribution.

When the "EPA HOUR" files did not have associated NO_x or SO_2 ratios (because of missing or incomplete data), Alpine used heat input as the scalar for all pollutants.

[6] ftp://ftp.epa.gov/EmisInventory/ei_conference/EI14/session11/stella.pdf

For cases where ORIS facility and unit ID were not provided in either the SESARM EGU file or the non-SESARM ERTAC EGU file, no hourly emission distribution was calculated, and default temporal profiles were used in the emissions processing of these sources.

The sole exception to this procedure was the Scherer facility located in Georgia (GA). In 2011-2014, Plant Scherer installed selective catalytic reduction (SCR) NO_x controls on Units 1-4. These SCR controls are only required to be run from May 1 to September 30. GA Department of Natural Resources (GA DNR) provided episodic (January-March, April-September, and October-December) emission aggregates for each of four boilers at this facility, as presented in Table 4-1.

Table 4-1. Plant Scherer 2028 Seasonal NO_x Emissions at Units 1-4

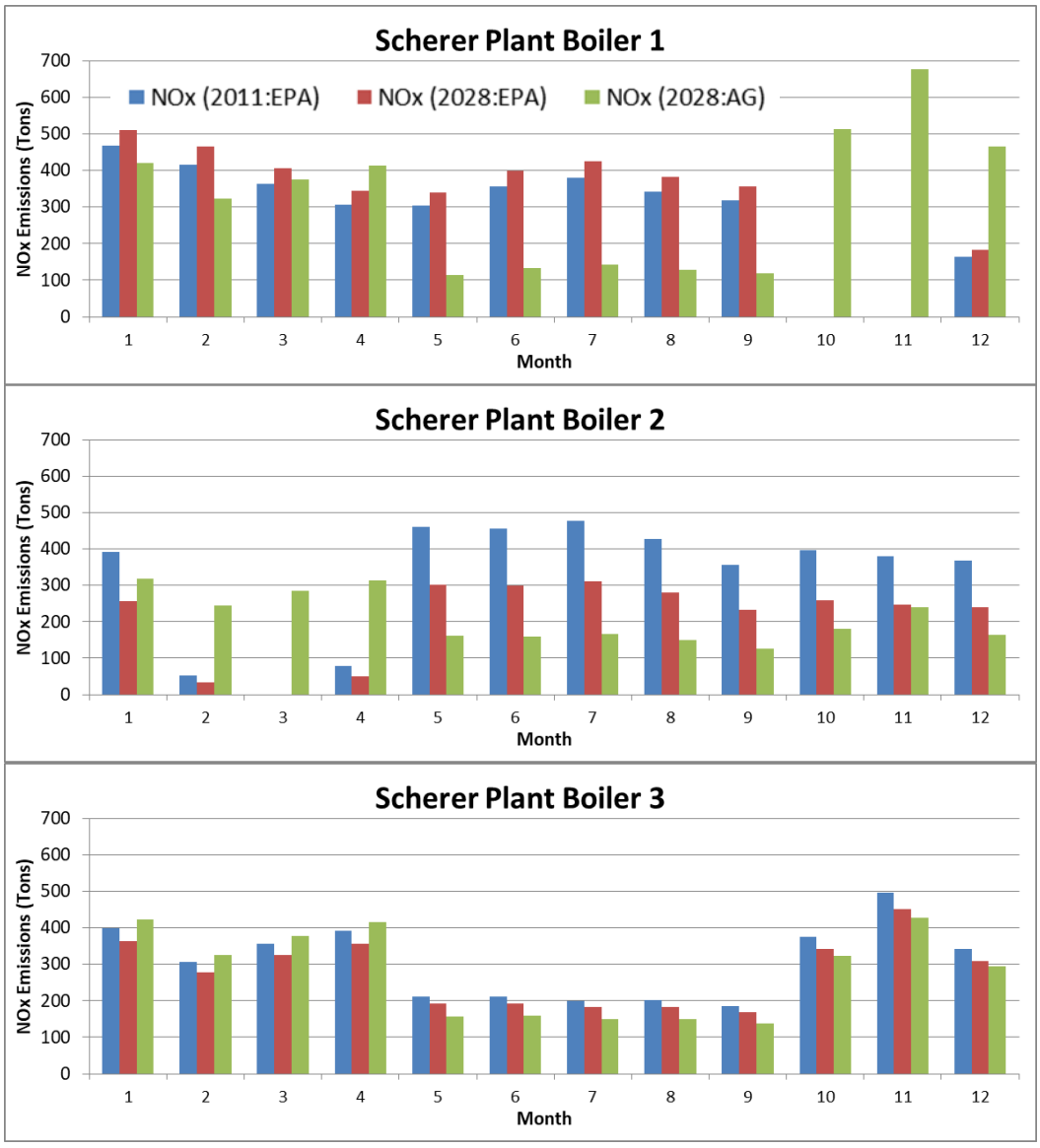
UNIT	Jan-April	May-Sept	Oct-Dec	TOTAL
1	1,529.6	640.0	1,654.4	3,824.0
2	1,161.5	765.2	585.9	2,512.6
3	1,542.9	753.1	1,046.0	3,342.0
4	945.1	781.0	1,342.6	3,068.7

Alpine used the following steps to integrate this profile data:

1. Step 1 – Alpine allocated the episodic emissions to months using a day in month per season ratio (e.g., 31 days in January per 90 days in Jan-Mar period or 31/90*episodic emissions) for each unit and pollutant provided.
2. Step 2 – Alpine prepared ratios of hourly distribution per month using EPA's CEM data profiles. These new hour-to-month ratios were then applied to the Scherer unit's monthly emissions to create month-specific hourly distribution of emissions. Since Units 1 and 2 demonstrated sporadic operations during certain months in meteorological year 2011, the hour-to-month ratios for Unit 3 were used to distribute emissions at these two units.
3. Step 3 – Alpine confirmed that the sum of the month-specific hourly distribution of emissions matched the annual emissions.

4. Step 4 – The file was then appended to the remaining hourly distribution files and monthly, hour specific inputs were prepared for the SMOKE processing step for all four units.

Figure 4-1 presents the original 2011 (blue), 2028 emissions with 2011 distribution (red), and resulting 2028 monthly distributions with the modified approach (green) detailed above.



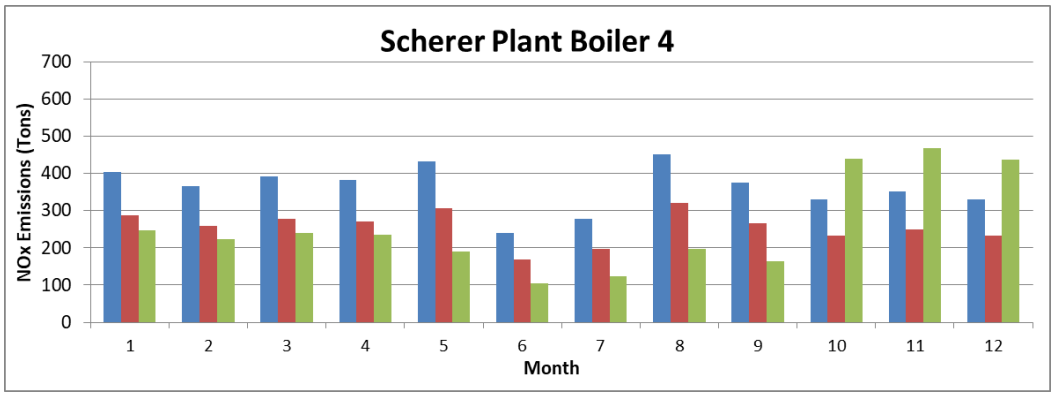


Figure 4-1. Scherer Unit-Level, Monthly NO_x Emissions Distribution by Month

5.0 QUALITY ASSURANCE OF PTHOUR FILES

As a final step, Alpine prepared summaries of the hourly files, by unit, month, and pollutant, and aggregated the twelve monthly emission files to generate a reconstituted annual emission summary by unit. These summaries were then compared back to the annual emission file and confirmation was made of the tonnage conservations from annual to hourly distribution. The resulting national, month-specific hourly files are called:

- pthour_remodel_2028_01_final.csv – January 2028 hourly emissions;
- pthour_remodel_2028_02_final.csv – February 2028 hourly emissions;
- pthour_remodel_2028_03_final.csv – March 2028 hourly emissions;
- pthour_remodel_2028_04_final.csv – April 2028 hourly emissions;
- pthour_remodel_2028_05_final.csv – May 2028 hourly emissions;
- pthour_remodel_2028_06_final.csv – June 2028 hourly emissions;
- pthour_remodel_2028_07_final.csv – July 2028 hourly emissions;
- pthour_remodel_2028_08_final.csv – August 2028 hourly emissions;
- pthour_remodel_2028_09_final.csv – September 2028 hourly emissions;
- pthour_remodel_2028_10_final.csv – October 2028 hourly emissions;
- pthour_remodel_2028_11_final.csv – November 2028 hourly emissions; and
- pthour_remodel_2028_12_final.csv – December 2028 hourly emissions

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Appendix A.

Updated Point Source Emissions for Non-SESARM States in the VISTAS Modeling Domain

(see APP_A_NON_SESARM_ORIG_REMODELED_FACILITY_EMISSION_UPD.xlsx)

To: Visibility Improvement - State and Tribal Association of the Southeast (VISTAS) Region Team

From: North Carolina Division of Air Quality (NCDAQ)

Date: December 7, 2018

Subject: Southeastern VISTAS II Regional Haze Project:
Documentation of 2028 Mass Emissions Inventory for Small Electricity Generating Units (EGUs) for States not included in the VISTAS II Region

Introduction

The VISTAS II regional haze modeling platform for 2028 started with U.S. Environmental Protection Agency's (EPA) 2028v6.3el modeling platform.[1] For EGUs, the 2028 emissions were projected from the base year 2011 using the Integrated Planning Model (IPM) that included the Clean Power Plan (CPP); however, EPA did not implement the CPP. Therefore, for the VISTAS II project, the Coordinating Committee (CC) and Technical Analysis Work Group (TAWG) agreed to replace the IPM forecast for 2028 with the 2028 emissions forecast produced by the Eastern Regional Technical Advisory Committee (ERTAC) EGU forecast tool (referred to as the 2028 ERTACv2.7 EGU inventory). The 2028 ERTACv2.7 EGU inventory was projected from a 2011 base year, geographically covers the continental United States, and excludes the CPP.

The ERTAC tool includes EGUs that burn fossil fuel with ≥25 megawatts (MW) of generation capacity or ≥250 million British thermal units per hour (MMBtu/hr) of heat input, and generate electricity for the power grid. IPM includes the same fossil fuel units as those included in ERTAC, plus small EGUs with <25 MW of generation capacity or <250 MMBtu/hr of heat input and may or may not produce electricity for the power grid. Therefore, it was necessary to develop a 2028 projection year inventory for the small EGUs that are included in IPM but not in ERTAC to include in the VISTAS II modeling platform to ensure complete accounting of emissions from small EGUs. See the attachment to this memorandum for additional information comparing EGU coverage by IPM versus the ERTAC forecast tool.

For the VISTAS II 2028 inventory, the following five files were developed for small EGUs:

- Revised Ozone Transport Commission (OTC)/Mid-Atlantic Regional Air Management Association, Inc. (MARAMA) file: The small EGU file developed by OTC/MARAMA for the OTC modeling platform was modified to remove the VISTAS states and double counting of some emissions sources included in the 2028 ERTACv2.7 inventory.[2]

[1] Technical Support Document (TSD), Updates to Emissions Inventories for the Version 6.3, 2011 Emissions Modeling Platform for the Year 2028, EPA, Office of Air and Radiation, Office of Air Quality Planning and Standards, Air Quality Assessment Division, October 2017, https://www.epa.gov/air-emissions-modeling/updates-2011-and-2028-emissions-version-63-technical-support-document.

[2] Obtained from Eric Zalewsky, New York State Department of Environmental Conservation (NYSDEC), and Susan McCusker, MARAMA via a MARAMA's Sharefile FTP site on September 13, 2018. File name = 2023_POINT_PTNONERTAC_IPM_29may2017_02jun2017_v0.csv.

- Small EGU Inventory for 14 Western States: Two files (one for summer and the other for winter emissions) that cover small EGUs in 14 western states not included in the OTC/MARAMA small EGU inventory file. The data in these files originate from EPA's 2023v6.3en modeling platform.
- Small EGUs in the Eastern and Mid-Western U.S. not included in the ERTACv2.7 and the OTC/MARAMA Small EGU Inventories: Two files (one for summer and the other for winter emissions) that cover units in the eastern and mid-western U.S. that appear in the EPA 2023v6.3en modeling platform and are anticipated to be operating in 2028, but are missing from 2028 ERTACv2.7 and the OTC/MARAMA small EGU files.

Note that for the 2023v6.3en EGU inventory, EPA applied an engineering analysis to develop future year 2023 emissions for EGUs that reported NOx and/or SO_2 continuous emissions monitoring (CEM) data to EPA. For EGUs not reporting CEM data to EPA, EPA relied on its IPM forecast projected from 2011. The small EGUs included in these files most likely represent a mixture of EGUs to which EPA applied its engineering analysis versus relying on its IPM forecast to prepare the 2023 inventory. See EPA's technical support document for "Additional Updates to Emissions Inventories for the Version 6.3, 2011 Emissions Modeling Platform for the Year 2023" for details.[3]

Table 1 identifies the small EGU emissions data files developed for the VISTAS II 2028 regional haze modeling platform and identifies the states covered by the files. The data for all 5 files originate from EPA's IPM forecast for 2023 that EPA used in its 2011/2023v6.3en modeling platform, which excludes the CPP. For the VISTAS II project, small EGU emissions were not projected from 2023 to 2028 because, in general, emissions associated with small EGUs are not expected to change significantly by 2028. In addition, time and resource constraints prohibited developing growth factors for these small EGUs. Therefore, 2023 emissions were assumed to be representative of 2028 emissions.

The remainder of this memorandum documents how the 2028 small EGU inventory was prepared for the three sets of files for the non-VISTAS states, including quality assurance (QA) review of the inventory. Note that for the VISTAS states, each state reviewed its EGU inventory and provided the contractor with direction on how to update its 2028 EGU inventory to exclude the CPP. The methodologies for the VISTAS states are documented in the Task 2 report from the VISTAS contractor.[4] The focus of this inventory effort is on the following pollutants: sulfur dioxide (SO_2), oxides of nitrogen (NOx), volatile organic compounds (VOC), primary particulate matter with an aerodynamic diameter $\leq$10 and $\leq$2.5 micrometers (PM10-PRI and PM2.5-PRI), ammonia (NH_3), and carbon monoxide (CO).

[3] Technical Support Document (TSD), Additional Updates to Emissions Inventories for the Version 6.3, 2011 Emissions Modeling Platform for the Year 2023, U.S. Environmental Protection Agency, Office of Air and Radiation, Office of Air Quality Planning and Standards, Air Quality Assessment Division, October 2017., https://www.epa.gov/sites/production/files/2017-11/documents/2011v6.3_2023en_update_emismod_tsd_oct2017.pdf

[4] Southeastern VISTAS II Regional Haze Analysis Project –Task 2 Emission Inventory Updates Report, Prepared for Southeastern States Air Resource Managers, Inc., 205 Corporate Center Drive, Suite D, Stockbridge, GA 30281-7383 under SESARM Contract No. V-2018-03-01, prepared by Eastern Research Group, Inc., 1600 Perimeter Park Drive, Suite 200, Morrisville, NC 27560, REVISED FINAL – August 28, 2018. The VISTAS states include AL, FL, GA, KY, MS, NC, SC, TN, VA, and WV. The Eastern Band of Cherokee Indians and the Knox County, Tennessee local air pollution control agency are also participating agencies in VISTAS.

Table 1. Small EGU Emissions Data Files Developed for the VISTAS II 2028 Regional Haze Modeling Platform

File Name	Description	Nature of Revisions
Revised OTC/MARAMA Small EGU Inventory		
nonERTAC_sources_outsideVISTAS _outsideWEST_20181008_ff10.csv	Contains small EGUs for the following 25 eastern and mid-western states: AR, CT, DE, IL, IN, IA, KS, LA, ME, MD, MA, MI, MN, MO, NE, NH, NJ, NY, OH, OK, PA, RI, TX, VT, and WI	Removed facilities and emission units that were identified in the 2028 ERTACv2.7 inventory. Removed data for VISTAS States (AL, FL, GA, KY, MS, NC, SC, TN, VA, and WV). Note that Florida was not included in the original file obtained from OTC/MARAMA.
Small EGU Inventory for Western States		
West_nonERTAC_egu_summer_ff10.csv[1]	Contains small EGUs for the following 14 western states: AZ, CA, CO, ID, KS, MT, NE, NV, NM, OR, SD, UT, WA, and WY. Note that ND did not contain any small EGUs.	These are new files created for the VISTAS II regional haze modeling platform.
West_nonERTAC_egu_winter_ff10.csv[2]		
Additional Small EGU Facilities Missing from the ERTACv2.7 and the OTC/MARAMA Small EGU Files		
Additional_2023en_sources_nonERTAC _egu_EASTUS_summer.csv[1]	Contains small EGUs for the following 19 states: AR, CT, IL, IN, IA, LA, ME, MD, MA, MI, MN, MO, NH, NJ, NY, OH, OK, PA, and TX.	These are new files created for the VISTAS II regional haze modeling platform.
Additional_2023en_sources_nonERTAC _egu_EASTUS_winter.csv[2]		

[1] The annual emissions column in this "summer" file reflects the sum of monthly emissions in the file for May through September.

[2] The annual emissions column in this "winter" file reflects the sum of monthly emissions in the file for January through April plus October through December.

Small EGU Inventory Developed for the Eastern U.S.

OTC/MARAMA jointly prepared a 2028 projection year inventory to support regional haze modeling.[5] For EGUs, OTC/MARAMA used the 2028 ERTACv2.7 forecast and developed an inventory for the small EGUs included in the IPM but not the ERTAC forecast. This inventory included small EGUs in the states covered by the OTC modeling domain and the states bordering the western and southern boundary (excluding FL) of the OTC modeling domain.

The NCDAQ revised the OTC/MARAMA small EGU file by first removing facilities located within VISTAS states (AL, GA, KY, MS, NC, SC, TN, VA, and WV) because the VISTAS states provided updated emissions to the contractor.[6]

[5] Ozone Transport Commission/Mid-Atlantic Northeastern Visibility Union 2011 Based Modeling Platform Support Document – October 2018, Project Manager: Joseph Jakuta, Contributors: Michael Ku, Joseph Jakuta, David Healy, Michael Woodman, Kurt Kebschull, Update, October 18, 2018. See page B-176 for identification of small EGU file names. https://otcair.org/MANEVU/Upload/Publication/Reports/OTC%20MANE-VU%202011%20Based%20Modeling%20Platform%20Support%20Document%20October%202018%20-%20Final.pdf.

[6] Note that Florida was not included in the original small EGU file obtained from OTC/MARAMA because FL is outside of the OTC modeling domain.

The NCDAQ then compared the location of facilities in the OTC/MARAMA small EGU file and the ERTACv2.7 file. The comparison involved a two-step process. First, facilities were mapped in ArcGIS to identify facilities with coordinates in the two files that were less than 2 miles apart. Then, facilities outside of this geographic overlap were checked via the facility_id, unit_id, rel_point_id, and process_id to identify any duplicate sources between the two files. This QA check identified two large-emitting facilities in TX, two in MI, and one in OH, plus several small-emitting facilities in other states that were duplicates and removed from the OTC/MARAMA small EGU file. Table 2 lists the facilities located in non-VISTAS states that were removed from the file OTC/MARAMA small EGU file. Table 3 provides a summary of annual emissions by non-VISTAS state contained in the revised OTC/MARAMA small EGU inventory for 2028.

Table 2. Facilities and Emissions Removed from the OTC/MARAMA Small EGU file in for Non-VISTAS States

Facility	State	Facility ID	SO_2	NOx	VOC	PM10-PRI	PM2.5-PRI	NH_3	CO
Associated Electric COOP Inc-Dell Pwr Pl	AR	10642211	0	3	0	0	0	0	5
Central Iowa Power COOP - Summit Lake	IA	3731711	0	43	0	1	1	1	10
Western Minnesota Municipal Power Agency	IA	9661311	0	4	0	0	0	0	2
Ameren Energy Generating Co	IL	2622911	0	12	1	2	2	0	9
Ameren Services	IL	9686711	0	21	5	5	5	0	44
Ameren UE	IL	1945711	0	5	2	2	2	0	19
City Water Light & Power	IL	4541611	0	0	0	0	0	0	0
Crete Energy Park	IL	4106911	0	2	0	1	1	0	3
Exelon Generation Co LLC	IL	9725911	0	3	0	1	1	0	1
Holland Energy LLC	IL	9698311	1	29	0	13	13	0	2
Lee Energy Facility	IL	5483011	0	1	0	0	0	0	1
NRG Rockford Energy Center	IL	9698111	0	10	0	1	1	0	2
Southern Illinois Power Coop	IL	8164511	0	4	0	0	0	0	0
CLECO Power LLC - Teche Power Station	LA	7204011	0	14	7	18	18	0	6
Louisiana Generating LLC - Big Cajun 1 Power Plant (Steam)	LA	5931611	0	1	0	0	0	0	0
Cadillac Renewable Energy Facility	MI	6180011	93	273	10	39	34	15	467
DTE - Electric Company Delray Power Plant	MI	7306011	0	5	0	1	1	0	1
Grayling Generating Station LTD PTNR	MI	4187811	19	308	6	16	16	0	566
Great River Energy - Cambridge	MN	6167711	0	23	1	0	0	0	11
Hutchinson Utilities Commission -Plant 2	MN	7626711	0	0	0	0	0	0	0

Facility	State	Facility ID	SO_2	NOx	VOC	PM10-PRI	PM2.5-PRI	NH_3	CO
LSP Cottage Grove Cogeneration Facility	MN	6785711	1	11	0	0	0	0	41
Xcel Energy - Riverside Generating Plant	MN	6393811	2	68	1	1	1	21	112
City Utilities of Springfield Missouri-John Twitty Energy Center	MO	7496411	0	2	0	0	0	0	1
City Utilities Of Springfield-N L McCartney Dist Generation	MO	7498011	0	8	0	0	0	0	7
Lon D Wright Power Plant	NE	7766111	0	0	0	0	0	0	0
Holtsville Gt Facility	NY	8452411	0	14	0	1	1	0	0
Ogdensburg Energy Facility	NY	7968011	0	10	1	1	1	0	8
Buckeye Power Greenville Station (0819070237)	OH	8257111	0	12	0	0	0	0	17
Smart Papers - Hamilton Mill	OH	7920911	558	108	1	16	10	0	43
Allen Fossil Plant	TN	5720111	0	7	0	0	0	0	0
E I. Dupont De Nemours & Co Inc	TN	6516311	0	52	2	3	3	0	8
Powell Valley Electric Cooperative, Inc.	TN	3787211	0	0	0	0	0	0	0
TVA Bull Run Fossil Plant	TN	6196011	0	0	0	9	3	0	0
TVA Cumberland Fossil Plant	TN	4979311	0	0	0	19	10	0	0
TVA Gleason Combustion Turbine Plant	TN	3428511	0	0	0	0	0	0	0
TVA Johnsonville Fossil Plant	TN	5720911	0	65	2	5	5	0	13
Bastrop Energy Center	TX	3981411	0	0	0	0	0	0	0
Channelview Cogeneration Facility	TX	4057511	18	314	27	146	146	88	167
Fayette Power Project	TX	4144811	2,196	396	4	70	38	43	125
Graham Steam Electric Station	TX	8532511	0	91	2	3	3	2	31
Handley Steam Electric Station	TX	4916711	0	12	2	3	3	0	2
Harrington Station Power Plant	TX	5745311	16,196	5,152	109	1,342	172	55	3,079
Jones Station Power Plant	TX	4030611	0	10	1	2	2	0	6
Laredo Power Station	TX	5023911	0	6	1	2	2	1	3
Leon Creek Plant	TX	3000111	0	12	0	4	4	0	15
Mountain Creek Steam Electric Station	TX	5729911	0	42	2	2	2	2	8
Mustang Electric Station	TX	5129311	0	3	1	1	1	0	2
Plant X Power Plant	TX	4946011	1	130	7	9	9	4	30
Sabine Plant	TX	5730811	4	998	33	46	46	0	145
Sand Hill Energy Center	TX	9071611	0	6	2	2	2	0	29
Silas Ray Power Plant	TX	6493311	0	8	0	0	0	0	1
South Texas Electric Coop	TX	5863011	1	19	3	9	9	5	22
SR Bertron Station	TX	4941311	1	126	5	7	7	3	11
Stryker Creek Electric Station	TX	5729511	1	110	6	8	8	5	34

Facility	State	Facility ID	SO_2	NOx	VOC	PM10-PRI	PM2.5-PRI	NH_3	CO
VH Braunig Plant	TX	5616511	0	15	2	4	4	9	7
WA Parish Electric Generating Station	TX	3968411	1	272	7	10	10	6	50
WI Public Service Corp - JP Pulliam Plant	WI	5295111	1	11	2	2	2	0	1
Wisconsin Public Service Corp - De Pere Energy Center	WI	7642611	0	15	0	0	0	0	1
Totals			**19,094**	**8,866**	**255**	**1,827**	**599**	**260**	**5,168**

Table 3. Revised OTC/MARAMA Small EGU Inventory: Summary of Annual Emissions by Non-VISTAS State

State	No. Facilities	SO_2	NOx	VOC	PM10-PRI	PM2.5-PRI	NH_3	CO
AR	10	0	118	1	3	3	0	31
CT	8	65	96	7	22	21	18	96
DE	2	1,317	411	5	94	89	1	18
IA	47	2,941	1,066	53	104	74	25	205
IL	23	20,892	4,480	59	696	409	1	1,015
IN	20	5,534	10,893	48	1,305	1,163	1	649
KS	5	6	39	0	1	1	0	10
LA	22	148	7,841	218	920	912	36	2,453
MA	21	765	4,473	78	93	83	135	928
MD	3	4	29	0	0	0	0	0
ME	21	677	2,777	91	87	83	20	3,810
MI	62	5,532	5,874	65	282	180	9	2,496
MN	43	4,565	8,433	222	756	481	398	2,758
MO	45	8,872	2,779	25	552	485	10	226
NE	10	1	4	10	1	0	0	1
NH	7	41	614	24	62	56	16	728
NJ	11	19	358	19	29	29	2	38
NY	59	731	5,542	92	198	136	64	1,351
OH	21	17,770	3,047	50	994	975	5	491
OK	8	0	4	0	7	7	0	1
PA	67	9,319	8,987	153	649	485	61	2,072
RI	1	0	1	0	0	0	0	0
TX	95	127	2,959	344	842	833	130	1,189
VT	2	3	332	21	3	2	16	1,376
WI	14	1,071	1,200	62	200	183	7	614
Totals	**627**	**80,400**	**72,357**	**1,647**	**7,900**	**6,690**	**955**	**22,556**

Small EGU Inventory for Western States in the Continental United States

For the non-VISTAS states, the OTC/MARAMA inventory excluded small EGUs in 14 western states (i.e., AZ, CA, CO, ID, KS, MT, NE, NM, NV, OR, SD, UT, WA, and WY). The OTC/MARAMA file included small EGUs; however, the NCDAQ identified a few small EGUs in NE and KS that were missing from the OTC/MARAMA small EGU file. The OTC/MARAMA did not include small EGUs in ND, and the NCDAQ confirmed that there were no small EGUs in ND.

To generate the small EGU files for the western states, first the NCDAQ generated a list of facilities from EPA's 2023v6.3en "ptegu" file that did not overlap within 2 miles with facilities in the 2028 ERTACv2.7 file.[7] Then these western state facilities/units were compared to facilities/units found in the revised OTC/MARAMA file and in the ERTACv2.7 file to check for duplicate sources with a matching facility_id, unit_id, rel_point_id, and process_id. Any duplicates were removed from the western small EGU files. Finally, a check for facility and unit closures was made for SO_2 sources with ≥100 tons per year. Any facilities or emission units that would be closed by 2028 were removed from the file. Table 4 provides a summary of annual emissions by non-VISTAS state contained in the western states small EGU inventory for 2028.

Table 4. Small EGU Inventory for Western States File: Summary of Annual Emissions by Non-VISTAS State

State	No. Facilities	SO_2	NOx	VOC	PM10-PRI	PM2.5-PRI	NH_3	CO
AZ	4	67	256	3	83	83	0	330
CA	78	2,198	5,795	433	948	816	770	13,558
CO	12	2,086	1,608	96	104	103	0	273
ID	4	93	1,299	185	134	118	0	4,139
KS	19	2	397	24	7	7	0	144
MT	3	3,129	1,360	16	84	75	0	34
NE	41	6	83	4	119	47	0	16
NM	4	0	1	0	1	1	0	2
NV	1	5	272	23	41	22	48	69
OR	9	606	2,177	111	508	421	46	2,280
SD	2	3	19	0	4	3	0	2
UT	10	1,559	876	22	54	45	11	155
WA	8	355	1,654	79	76	62	47	2,264
WY	1	0	6	1	4	4	2	10
Totals	**196**	**10,109**	**15,803**	**997**	**2,167**	**1,807**	**924**	**23,276**

Small EGUs in the Eastern and Mid-Western U.S. Missing from the ERTACv2.7 and the OTC/MARAMA Small EGU Inventory Files

For the non-VISTAS states, using ArcGIS, the NCDAQ identified sources in the IPM 2023en "ptegu" files that were not within 2 miles of any sources found in the 2028 ERTACv2.7 inventory file, revised OTC/MARAMA small EGU file, the western states small EGU file, or the non-EGU point source inventory. Sources with SO_2 emissions greater than 100 tons were checked to see if they would be shut down by 2028. This check identified one facility in IN (Duke Energy Gallagher) and one facility in MI (DTE Trenton Channel Power) that would be shut down by 2028. Therefore, these two facilities were removed from the small EGU inventory files. Table 5 provides a summary of annual emissions by non-VISTAS state contained in the additional sources small EGU inventory for 2028.

[7] The NCDAQ discovered a few facilities that had different names and/or facility IDs in EPA's 2023v6.3en "ptegu" file versus the ERTAC 2028 EGU file. As a result, the NCDAQ chose geographic screening within 2 miles as the primary step in creating the western non-ERTAC small EGU files.

Table 5. Small EGUs in the Eastern and Mid-Western U.S. not in ERTACv2.7 and OTC/MARAMA Small EGU Inventories: Summary of Annual Emissions by Non-VISTAS State

State	No. Facilities	SO_2	NOx	VOC	PM10-PRI	PM2.5-PRI	NH_3	CO
AR	1	87	315	1	48	27	0	6
CT	5	119	939	13	5	2	6	151
IA	5	1	91	1	2	2	2	10
IL	3	127	321	8	23	22	17	70
IN	6	30	248	36	76	71	80	333
LA	2	3,841	72	1	56	33	2	7
MA	3	0	0	0	0	0	0	0
MD	3	6	68	0	0	0	0	8
ME	1	353	507	65	13	6	3	985
MI	5	0	12	0	0	0	0	1
MN	5	0	41	0	1	1	1	4
MO	1	0	1	0	0	0	0	0
NH	5	23	476	58	95	73	86	1,777
NJ	8	41	866	6	30	24	5	104
NY	3	0	1	0	0	0	0	0
OH	5	23	207	31	64	60	68	281
OK	2	0	767	29	156	81	10	1,590
PA	7	3	54	0	1	1	0	2
TX	8	12	941	39	81	43	43	368
Totals	**78**	**4,666**	**5,927**	**288**	**651**	**446**	**323**	**5,697**

Quality Assurance

Each of the output files was compared to each other, and each file was also compared to the 2028 ERTACv2.7 file and the 2028v6.3el "ptnonipm" file. The comparison checked for any geographic overlap of less than 2 miles, and check for duplicate Facility ID and Unit ID entries. Any units that overlap or were duplicates were checked and removed. The following is a list of file comparisons:

- West_nonERTAC_egu_[summer/winter]_ff10.csv vs. ERTAC 2028, version 2.7
- West_nonERTAC_egu_[summer/winter]_ff10.csv vs. nonERTAC_sources_outsideVISTAS_outsideWEST_20181008_ff10.csv
- West_nonERTAC_egu_[summer/winter]_ff10.csv vs. 2023el_from_ptnonipm_2011NEIv2_POINT_20140913_revised_20150115_20sep2016_v2.csv
- nonERTAC_sources_outsideVISTAS_outsideWEST_20181008_ff10.csv vs. ERTAC 2028, version 2.7
- nonERTAC_sources_outsideVISTAS_outsideWEST_20181008_ff10.csv vs. 2023el_from_ptnonipm_2011NEIv2_POINT_20140913_revised_20150115_20sep2016_v2.csv
- West_nonERTAC_egu_[summer/winter]_ff10.csv vs. Additional_nonERTAC_EASTUS_[summer/winter]_ff10.csv

- Additional_nonERTAC_EASTUS_[summer/winter]_ff10.csv vs. nonERTAC_sources_outsideVISTAS_outsideWEST_20181008_ff10.csv
- Additional_nonERTAC_EASTUS_[summer/winter]_ff10.csv vs. ERTAC 2028, version 2.7
- Additional_nonERTAC_EASTUS_winter_ff10.csv vs. 2023el_from_ptnonipm_2011NEIv2_POINT_20140913_revised_20150115_20sep2016_v2.csv

Summary

Table 6 shows total annual emissions by non-VISTAS state for the small EGUs added to the VISTAS II inventory for 2028. In total, emissions were added for 37 states amounting to a total of 95,175 tons of SO_2; 94,087 tons of NOx; 51,529 tons of CO; 10,718 tons of PM10-PRI; 8,943 tons of PM2.5-PRI; 2,932 tons of VOC; and 2,202 tons of NH_3 annual emissions in 2028. Figure 1 provides a plot of the facilities added to the VISTAS II inventory for 2028.

Table 6. Small EGUs Emissions in the 5 Files: Total Annual Emissions by Non-VISTAS State for 2028

State	SO_2	NOx	VOC	PM10-PRI	PM2.5-PRI	NH_3	CO	No. Facilities		
								Table 3[1]	Table 4[1]	Table 5[1]
AR	87	433	2	51	30	0	37	10		1
AZ	67	256	3	83	83	0	330		4	
CA	2,198	5,795	433	948	816	770	13,558		78	
CO	2,086	1,608	96	104	103	0	273		12	
CT	184	1035	20	27	23	24	247	8		5
DE	1,317	411	5	94	89	1	18	2		
IA	2,942	1,157	54	106	76	27	215	47		5
ID	93	1,299	185	134	118	0	4,139		4	
IL	21,019	4,801	67	719	431	18	1,085	23		3
IN	5,564	11,141	84	1,381	1,234	81	982	20		6
KS	8	436	24	8	8	0	154	5	19	
LA	3,989	7,913	219	976	945	38	2,460	22		2
MA	765	4,473	78	93	83	135	928	21		3
MD	10	97	0	0	0	0	8	3		3
ME	1,030	3,284	156	100	89	23	4,795	21		1
MI	5,532	5,886	65	282	180	9	2,497	62		5
MN	4,565	8,474	222	757	482	399	2,762	43		5
MO	8,872	2,780	25	552	485	10	226	45		1
MT	3,129	1,360	16	84	75	0	34		3	
ND	0	0	0	0	0	0	0			
NE	7	87	14	120	47	0	17	10	41	
NH	64	1,090	82	157	129	102	2,505	7		5
NJ	60	1,224	25	59	53	7	142	11		8
NM	0	1	0	1	1	0	2		4	
NV	5	272	23	41	22	48	69		1	
NY	731	5,543	92	198	136	64	1,351	59		3
OH	17,793	3,254	81	1,058	1,035	73	772	21		5
OK	0	771	29	163	88	10	1,591	8		2
OR	606	2,177	111	508	421	46	2,280		9	
PA	9,322	9,041	153	650	486	61	2,074	67		7

State	SO_2	NOx	VOC	PM10-PRI	PM2.5-PRI	NH_3	CO	No. Facilities		
								Table 3[1]	Table 4[1]	Table 5[1]
RI	0	1	0	0	0	0	0	1		
SD	3	19	0	4	3	0	2		2	
TX	139	3,900	383	923	876	173	1,557	95		8
UT	1,559	876	22	54	45	11	155		10	
VT	3	332	21	3	2	16	1,376	2		
WA	355	1,654	79	76	62	47	2,264		8	
WI	1,071	1,200	62	200	183	7	614	14		
WY	0	6	1	4	4	2	10		1	
Totals	**95,175**	**94,087**	**2,932**	**10,718**	**8,943**	**2,202**	**51,529**	627	196	78

[1] These columns identify the number of the table in the memorandum from which emissions were summed in Table 5.

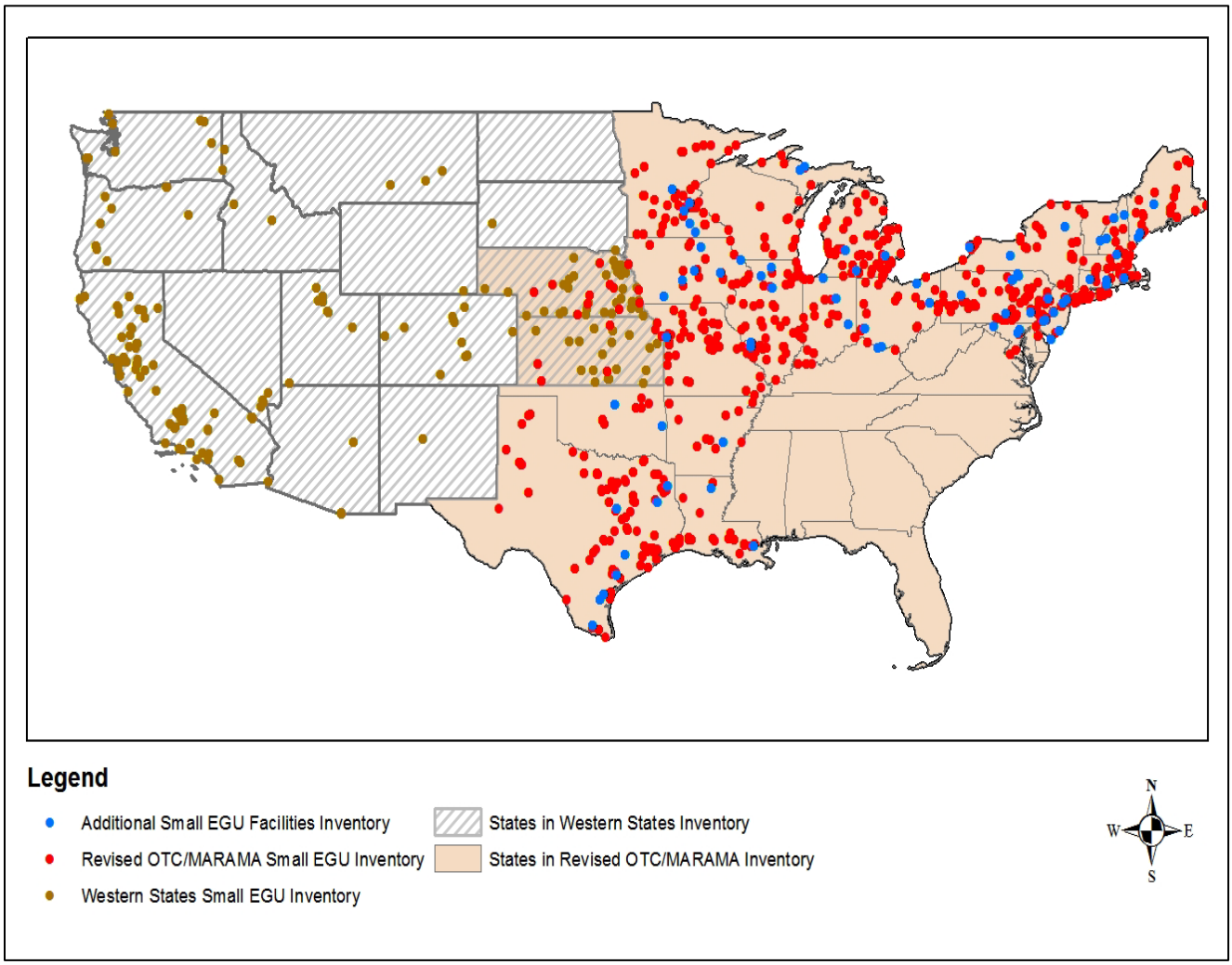


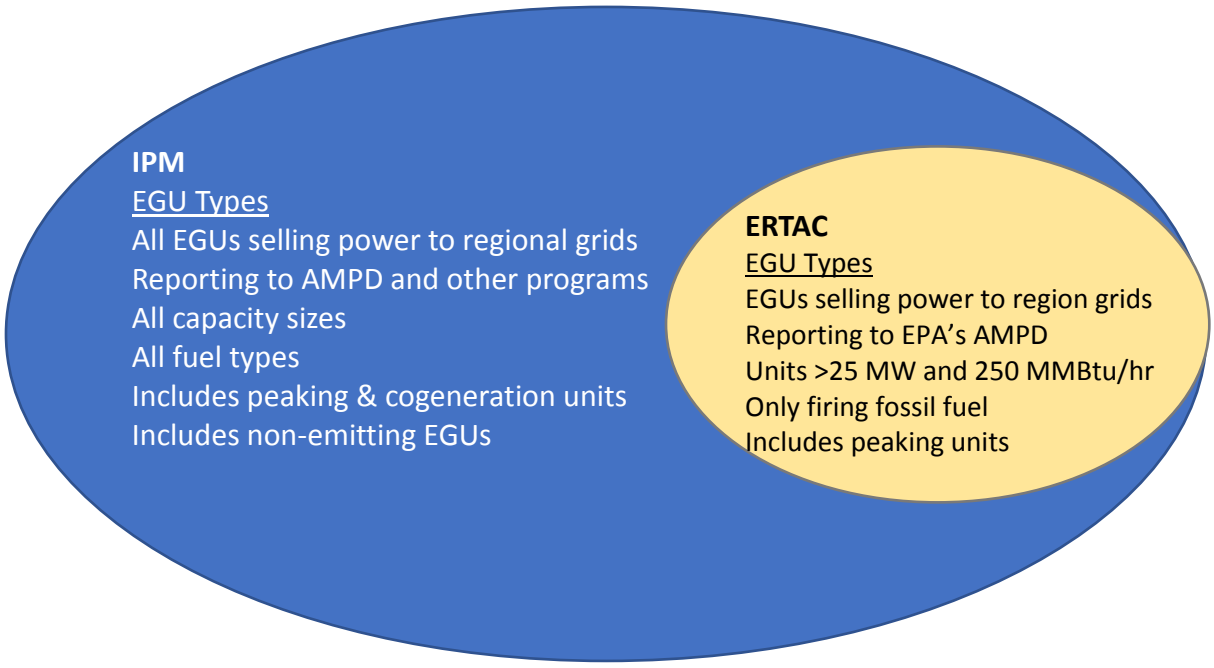
Figure 1. Plot of Small EGU Facilities Added to the VISTAS II Inventory for 2028

Attachment

Electricity Generating Unit (EGU) Coverage by the Integrated Planning Model (IPM) vs. the Eastern Regional Technical Advisory Committee (ERTAC) Forecast Tool

ERTAC developed a model to forecast air emissions from EGUs in the continental United States. The model utilizes hourly emissions monitoring data for EGUs subject to the reporting requirements of Volume 40 Part 75 of the Code of Federal Regulations (CFR) and that report to EPA's Air Markets Program Data (AMPD). The forecast tool only includes the AMPD units that 1) fire fossil fuels and 2) generate electricity for sale on regional power grids. The EGUs reporting to EPA's AMPD generally have capacities of ≥25 MW or heat inputs of ≥250 MMBtu/hr. It does not include units that generate both steam and electricity (cogeneration).

EPA's IPM is a least-cost model used to forecast electricity generation and the resulting air emissions for the United States. Both units reporting emissions to EPA's AMPD and those reporting emissions under different regulations are included. It includes all EGUs selling electricity to regional power grids, including small peaking power units <25 MW and cogeneration units. It also models generation from all source types, including fossil fuel and biomass EGUs, as well as non-emitting EGUs such as nuclear, hydropower, solar, wind and fuel cells. The ERTAC EGUs are a subset of the units contained in IPM.



Appendix B

Southeastern VISTAS II Regional Haze Project: Documentation of 2028 Mass Emissions Inventory for Small Electricity Generating Units (EGUs) for States not included in the VISTAS II Region

(see APP_B_Small_EGU_Emissions_Inventory_Documentation_120718.pdf)

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