Technical Support Document:

Chapter 27
Intended Round 3 Area Designations for the 2010 1-Hour SO$_2$ Primary National Ambient Air Quality Standard for New Hampshire

1. Summary

Pursuant to section 107(d) of the Clean Air Act (CAA), the U.S. Environmental Protection Agency (the EPA, we, or us) must designate areas as either "nonattainment," "attainment," or "unclassifiable" for the 2010 1-hour sulfur dioxide (SO$_2$) primary national ambient air quality standard (NAAQS) (2010 SO$_2$ NAAQS). The CAA defines a nonattainment area as an area that does not meet the NAAQS or that contributes to a nearby area that does not meet the NAAQS. An attainment area is defined by the CAA as any area that meets the NAAQS and does not contribute to a nearby area that does not meet the NAAQS. Unclassifiable areas are defined by the CAA as those that cannot be classified on the basis of available information as meeting or not meeting the NAAQS. In this action, the EPA has defined a nonattainment area as an area that the EPA has determined violates the 2010 SO$_2$ NAAQS or contributes to a violation in a nearby area, based on the most recent 3 years of air quality monitoring data, appropriate dispersion modeling analysis, and any other relevant information. An unclassifiable/attainment area is defined by the EPA as an area that either: (1) based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, the EPA has determined (i) meets the 2010 SO$_2$ NAAQS, and (ii) does not contribute to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS[1]. An unclassifiable area is defined by EPA as an area that either: (1) was required to be characterized by the state under 40 CFR 51.1203(c) or (d), has not been previously designated, and on the basis of available information cannot be classified as either: (i) meeting or not meeting the 2010 SO$_2$ NAAQS, or (ii) contributing or not contributing to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and EPA does have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.

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[1] The term "designated attainment area" is not used in this document because the EPA uses that term only to refer to a previous nonattainment area that has been redesignated to attainment as a result of the EPA's approval of a state-submitted maintenance plan.

This technical support document (TSD) addresses designations for all remaining undesignated areas in New Hampshire for the 2010 SO_2 NAAQS. In previous final actions, the EPA has issued designations for the 2010 SO_2 NAAQS for selected areas of the country.[2] The EPA is under a December 31, 2017, deadline to designate the areas addressed in this TSD as required by the U.S. District Court for the Northern District of California.[3] We are referring to the set of designations being finalized by the December 31, 2017, deadline as "Round 3" of the designations process for the 2010 SO_2 NAAQS. After the Round 3 designations are completed, the only remaining undesignated areas will be those where a state began timely operation of a new SO_2 monitoring network meeting EPA specifications referenced in EPA's SO_2 Data Requirements Rule (DRR). (80 FR 51052). The EPA is required to designate those remaining undesignated areas by December 31, 2020.

New Hampshire submitted its first recommendation regarding designations for the 2010 1-hour SO_2 NAAQS on July 6, 2011. In that recommendation, the state recommended that all areas of the state except for the Central New Hampshire area, which it recommended as nonattainment based on a monitored violation, be designated as unclassifiable. The state submitted updated recommendations for the rest of the state on December 23, 2016, based on modeling data. The state's updated recommendation was for attainment in Rockingham and Strafford Counties based on modeling and unclassifiable/attainment for all remaining undesignated areas. In our intended designations, we have considered all the submissions from the state, except where a recommendation in a later submission regarding a particular area indicates that it replaces an earlier recommendation for that area we have considered the recommendation in the later submission.

For the areas in New Hampshire that are part of the Round 3 designations process, Table 1 identifies the EPA's intended designations and the counties or portions of counties to which they would apply. It also lists New Hampshire's current recommendations. The EPA's final designation for these areas will be based on an assessment and characterization of air quality through ambient air quality data, air dispersion modeling, other evidence and supporting information, or a combination of the above.

Table 1. Summary of the EPA's Intended Designations and the Designation Recommendations by New Hampshire

Area/County	New Hampshire's Recommended Area Definition	New Hampshire's Recommended Designation	EPA's Intended Area Definition	EPA's Intended Designation
New Hampshire Seacoast Area	Rockingham County (p) Strafford County	Attainment	Same as State's Recommendation	Unclassifiable/ Attainment

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[2] A total of 94 areas throughout the U.S. were previously designated in actions published on August 5, 2013 (78 FR 47191), July 12, 2016 (81 FR 45039), and December 13, 2016 (81 FR 89870).
[3] *Sierra Club v. McCarthy*, No. 3-13-cv-3953 (SI) (N.D. Cal. Mar. 2, 2015).

Area/County	New Hampshire's Recommended Area Definition	New Hampshire's Recommended Designation	EPA's Intended Area Definition	EPA's Intended Designation
Remaining undesignated areas to be designated in this action*	Belknap County Carroll County Cheshire County Coos County Grafton County Hillsborough County (p) Merrimack County (p) Sullivan County	Unclassifiable/ Attainment	Same as State's Recommendation	Unclassifiable/ Attainment

* The EPA intends to designate the remaining undesignated counties (or portions of counties) in New Hampshire as "unclassifiable/attainment" as these areas were not required to be characterized by the state under the DRR and cannot be classified on the basis of available information as meeting or not meeting the NAAQS. These areas that we intend to designate as unclassifiable/attainment (those to which this row of this table is applicable) are identified more specifically in section 4 of this TSD.
† In this table, (p) stands for "partial".

There are no areas for which New Hampshire has elected to install and begin operation of a new, approved SO_2 monitoring network. The EPA is required to designate such areas, pursuant to a court ordered schedule, by December 31, 2020.

Areas that the EPA previously designated unclassifiable in Round 1 (*see* 78 FR 47191) and Round 2 (*see* 81 FR 45039 and 81 FR 89870) are not affected by the designations in Round 3 unless otherwise noted. Portions of Hillsborough, Merrimack, and Rockingham Counties were designated nonattainment in Round 1.

2. General Approach and Schedule

Updated designations guidance documents were issued by the EPA through a July 22, 2016, memorandum and a March 20, 2015, memorandum from Stephen D. Page, Director, U.S. EPA, Office of Air Quality Planning and Standards, to Air Division Directors, U.S. EPA Regions I-X. These memoranda supersede earlier designation guidance for the 2010 SO_2 NAAQS, issued on March 24, 2011, and identify factors that the EPA intends to evaluate in determining whether areas are in violation of the 2010 SO_2 NAAQS. The documents also contain the factors that the EPA intends to evaluate in determining the boundaries for designated areas. These factors include: 1) air quality characterization via ambient monitoring or dispersion modeling results; 2) emissions-related data; 3) meteorology; 4) geography and topography; and 5) jurisdictional boundaries.

To assist states and other interested parties in their efforts to characterize air quality through air dispersion modeling for sources that emit SO_2, the EPA released its most recent version of a

draft document titled, "SO₂ NAAQS Designations Modeling Technical Assistance Document" (Modeling TAD) in August 2016.[4]

Readers of this chapter of this TSD should refer to the additional general information for the EPA's Round 3 area designations in Chapter 1 (Background and History of the Intended Round 3 Area Designations for the 2010 1-Hour SO₂ Primary National Ambient Air Quality Standard) and Chapter 2 (Intended Round 3 Area Designations for the 2010 1-Hour SO₂ Primary National Ambient Air Quality Standard for States with Sources Not Required to be Characterized).

As specified by the March 2, 2015, court order, the EPA is required to designate by December 31, 2017, all "remaining undesignated areas in which, by January 1, 2017, states have not installed and begun operating a new SO₂ monitoring network meeting EPA specifications referenced in EPA's" SO₂ DRR. The EPA will therefore designate by December 31, 2017, areas of the country that are not, pursuant to the DRR, timely operating EPA-approved and valid monitoring networks. The areas to be designated by December 31, 2017, include one area associated with two sources in New Hampshire listed by the state under the DRR that the state has chosen to characterize using air dispersion modeling, and other areas not specifically required to be characterized by the DRR.

Because many of the intended designations have been informed by available modeling analyses, this preliminary TSD is structured based on the availability of such modeling information. There is a section (section 3) for the one area for which modeling information is available. The remaining to-be-designated areas are then addressed together in section 4.

The EPA does not plan to revise this TSD after consideration of state and public comment on our intended designation. A separate TSD will be prepared as necessary to document how we have addressed such comments in the final designations.

The following are definitions of important terms used in this document:
1) 2010 SO₂ NAAQS – The primary NAAQS for SO₂ promulgated in 2010. This NAAQS is 75 ppb, based on the 3-year average of the 99th percentile of the annual distribution of daily maximum 1-hour average concentrations. See 40 CFR 50.17.
2) Design Value - a statistic computed according to the data handling procedures of the NAAQS (in 40 CFR part 50 Appendix T) that, by comparison to the level of the NAAQS, indicates whether the area is violating the NAAQS.
3) Designated Nonattainment Area – an area that, based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, the EPA has determined either: (1) does not meet the 2010 SO₂ NAAQS, or (2) contributes to ambient air quality in a nearby area that does not meet the NAAQS.
4) Designated Unclassifiable/Attainment Area – an area that either: (1) based on available information including (but not limited to) appropriate modeling analyses and/or

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[2] https://www.epa.gov/sites/production/files/2016-06/documents/so2modelingtad.pdf. In addition to this TAD on modeling, the EPA also has released a technical assistance document addressing SO₂ monitoring network design, to advise states that have elected to install and begin operation of a new SO₂ monitoring network. See Draft SO₂ NAAQS Designations Source-Oriented Monitoring Technical Assistance Document, February 2016, https://www.epa.gov/sites/production/files/2016-06/documents/so2monitoringtad.pdf.

monitoring data, the EPA has determined (i) meets the 2010 SO_2 NAAQS, and (ii) does not contribute to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.

5) Designated Unclassifiable Area – an area that either: (1) was required to be characterized by the state under 40 CFR 51.1203(c) or (d), has not been previously designated, and on the basis of available information cannot be classified as either: (i) meeting or not meeting the 2010 SO_2 NAAQS, or (ii) contributing or not contributing to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.

6) Modeled Violation – a violation of the SO_2 NAAQS demonstrated by air dispersion modeling.

7) Recommended Attainment Area – an area that a state, territory, or tribe has recommended that the EPA designate as attainment.

8) Recommended Nonattainment Area – an area that a state, territory, or tribe has recommended that the EPA designate as nonattainment.

9) Recommended Unclassifiable Area – an area that a state, territory, or tribe has recommended that the EPA designate as unclassifiable.

10) Recommended Unclassifiable/Attainment Area – an area that a state, territory, or tribe has recommended that the EPA designate as unclassifiable/attainment.

11) Violating Monitor – an ambient air monitor meeting 40 CFR parts 50, 53, and 58 requirements whose valid design value exceeds 75 ppb, based on data analysis conducted in accordance with Appendix T of 40 CFR part 50.

12) We, our, and us – these refer to the EPA.

3. Technical Analysis for the New Hampshire Seacoast Area

3.1. Introduction

The EPA must designate the New Hampshire Seacoast area by December 31, 2017, because the area has not been previously designated and New Hampshire has not installed and begun timely operation of a new, approved SO_2 monitoring network to characterize air quality in the vicinity of any source in the New Hampshire Seacoast area. A small portion of Rockingham County is currently designated nonattainment for the 2010 1-hour SO_2 NAAQS as part of the Central New Hampshire SO_2 Nonattainment Area (i.e., the towns of Candia, Deerfield, and Northwood). This TSD only addresses the portion of Rockingham County outside of that existing nonattainment area and the entirety of Strafford County as described later in this section.

Rockingham County, New Hampshire, borders York County, Maine, to the west and Essex County, Massachusetts, to the north. Strafford County, New Hampshire, borders York County, Maine, to the west. This section will provide discussion to the extent to which information presented here relates to those bordering areas.

3.2. Air Quality Monitoring Data for the New Hampshire Seacoast Area

This factor considers the SO_2 air quality monitoring data in the New Hampshire Seacoast area. The state included monitoring data from the following monitors:

- Air Quality System (AQS) monitor 33-015-0014. This monitor is located on Peirce Island in Portsmouth, New Hampshire, in Rockingham County, and is about 3.9 km to the southeast of Schiller Station. Data collected at this monitor indicates that SO_2 levels have declined from 60 parts per billion (ppb; design value for 2004-2006) to 29 ppb (design value for 2013-2015). The state intended all available data collected at this monitor to support and corroborate air dispersion modeling results; the discussion of these modeled results follows immediately below.
- AQS monitor 33-015-0018. This monitor is located on Pillsbury Road in Londonderry, New Hampshire, in Rockingham County, and is located approximately 55 km to the southwest of Schiller Station. Representative air quality design values at this monitor are available from the 2011-2013 period (11 ppb) to the 2013-2015 period (5 ppb). The state intended all available data collected at this monitor to support and corroborate air dispersion modeling results; the discussion of these modeled results follows immediately below.
- AQS monitor 23-031-0009. In addition to the monitors discussed above, the state also discussed results from a special monitoring study conducted from October 24, 2014, to April 1, 2016, during which ambient SO_2 concentrations were collected at Sawgrass Lane in Eliot, Maine, located approximately 2.0 km to the northeast of Schiller Station. The monitor was placed to coincide with expected highest impacts from Schiller Station based on previous modeling. The Sawgrass Lane monitor was not in operation for long enough to develop a design value. During the Sawgrass Lane monitoring study, the

highest observed level was 37.7 ppb, and no hourly exceedances of the level of the standard were observed. The state did not rely on data from the Sawgrass Lane monitor to support or corroborate air dispersion modeling results.

The EPA notes that none of these monitors have been demonstrated to be in the location of expected maximum impacts from SO_2 sources in the New Hampshire Seacoast area. Additional information about the processing of background data from these monitors for use in air quality modeling is presented in a later section.

The EPA has confirmed that there are no additional data in the AQS that are relevant in either Rockingham or Strafford Counties. For reference, see the annual posted air quality Design Values for SO_2 posted at our Air Quality Design Values website, https://www.epa.gov/air-trends/air-quality-design-values.

3.3. Air Quality Modeling Analysis for the New Hampshire Seacoast Area Addressing Schiller Station and Newington Station

3.3.1. Introduction

This section presents all the available air quality modeling information for a portion of Rockingham County that includes Schiller Station and Newington Station, and extending into the entirety of Strafford County. (This area will often be referred to as "the New Hampshire Seacoast area" within this section). This area contains the following SO_2 sources, principally the sources around which New Hampshire is required by the DRR to characterize SO_2 air quality, or alternatively to establish an SO_2 emissions limitation of less than 2,000 tons per year:

- The Schiller Station facility (Schiller), in Portsmouth, New Hampshire, does not emit 2,000 tons or more annually, but was added to the SO_2 DRR Source list by agreement between the EPA and the state.
- The Newington Station facility (Newington), in Newington, New Hampshire, does not emit 2,000 tons or more annually, but was added to the SO_2 DRR Source list by agreement between the EPA and the state.

Because we have available results of air quality modeling in which these sources are modeled together, the area around this group of sources is being addressed in this section with consideration given to the impacts of all these sources.

In its submission, New Hampshire recommended that an area that includes the area surrounding the facilities, specifically remaining undesignated portions of Rockingham County and the entirety of Strafford County, be designated as attainment based in part on an assessment and characterization of air quality impacts from these facilities. This assessment and characterization was performed using air dispersion modeling software, i.e., AERMOD, analyzing currently allowable emissions for Newington and Schiller. After careful review of the state's assessment, supporting documentation, and all available data, the EPA intends to designate the areas as unclassifiable/attainment.

Our reasoning for this conclusion is explained in a later section, after all the available information is presented.

The area that the state has assessed via air quality modeling is located in southeastern Rockingham County, New Hampshire, and including Strafford County as well as the majority of York County, Maine, and portions of Essex County, Massachusetts.

As seen in Figure 1 below, Schiller is located adjacent to the Piscataqua River about 1.4 km to the northwest of the bridge connecting New Hampshire to Maine via Interstate 95 in Portsmouth, New Hampshire. Also pictured in Figure 1, Newington is also located adjacent to the Piscataqua River approximately 0.6 km to the northwest of Schiller.[5]

Figure 1 also indicates the state's recommended area for the attainment designation. The EPA's intended designation boundary for the New Hampshire Seacoast area is not shown in Figure 1, but is shown in a figure in the section below that summarizes our intended designation.

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[5] All other SO_2 emitters of 100 tpy or more (based on information in the 2014 NEI version 1) are shown in Figure 1. Additional sources of SO_2 not shown in Figure 1 are included as potentially interactive sources as discussed later in this section. If no sources not named previously are shown, there are no additional SO_2 emitters above this emission level in the vicinity of the named sources.

Figure 1. Map of the New Hampshire Seacoast Area Addressing Schiller and Newington
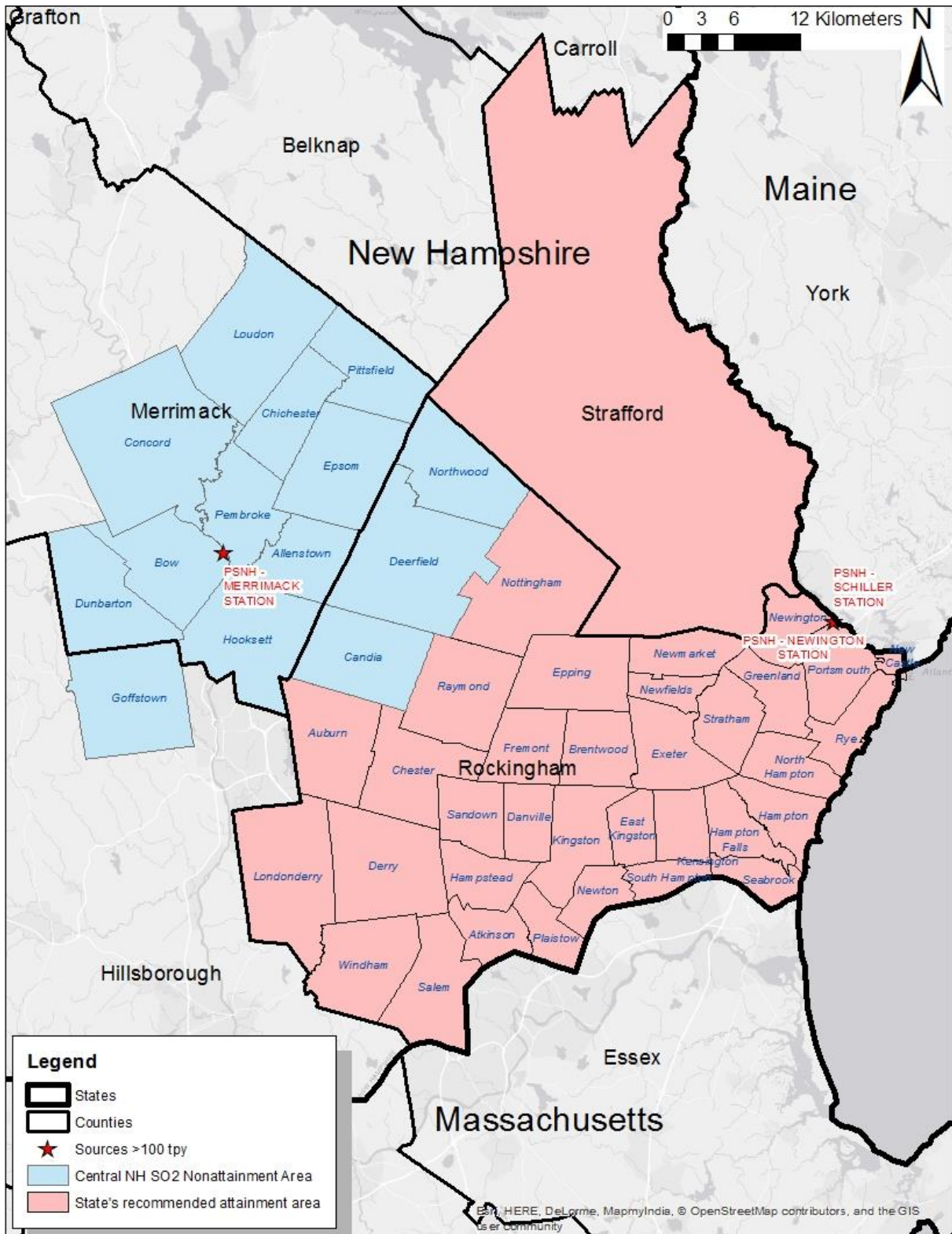
The source of this map image is Esri, used by EPA with Esri's permission.

The discussion and analysis that follows below will reference the Modeling TAD and the factors for evaluation contained in the EPA's July 22, 2016, guidance and March 20, 2015, guidance, as appropriate.

For this area, the EPA received and considered two modeling assessments from the state: one with the state's updated recommendation on December 23, 2016, and a revised modeling report on February 27, 2017. The original modeling submitted by the state included emissions from Schiller that were not consistent with the limits ultimately adopted for that facility; therefore, the December 23, 2016, modeling was not considered appropriate for making decisions regarding SO_2 designations. The EPA considers the revised modeling assessment dated February 27, 2017, to completely supersede the prior assessment because it includes updated emissions consistent with the permit limits at Schiller as well as updated model versions and options more consistent with EPA guidance.

3.4. Modeling Analysis Provided by the State

3.4.1. Model Selection and Modeling Components

The EPA's Modeling TAD notes that for area designations under the 2010 SO_2 NAAQS, the AERMOD modeling system should be used, unless use of an alternative model can be justified. The AERMOD modeling system contains the following components:
- AERMOD: the dispersion model
- AERMAP: the terrain processor for AERMOD
- AERMET: the meteorological data processor for AERMOD
- BPIPPRM: the building input processor
- AERMINUTE: a pre-processor to AERMET incorporating 1-minute automated surface observation system (ASOS) wind data
- AERSURFACE: the surface characteristics processor for AERMET
- AERSCREEN: a screening version of AERMOD

The state used the most recent version of AERMOD, i.e., version 16216r, with default options. The state did use the non-default ADJ_U* option in the AERMET preprocessor as described later. A discussion of the state's approach to the individual components is provided in the corresponding discussion that follows, as appropriate.

3.4.2. Modeling Parameter: Rural or Urban Dispersion

For any dispersion modeling exercise, the "urban" or "rural" determination of a source is important in determining the boundary layer characteristics that affect the model's prediction of downwind concentrations. For SO_2 modeling, the urban/rural determination is important because AERMOD invokes a 4-hour half-life for urban SO_2 sources. Section 6.3 of the Modeling TAD details the procedures used to determine if a source is urban or rural based on land use or population density.

For the purpose of performing the modeling for the area of analysis, the state ran the model in rural mode. The EPA agrees with the selection of the rural operating mode for this assessment

based on our visual inspection of aerial imagery of the area within 3km of each facility, as described in appendix W section 7.2.1.1. The aerial imagery is presented in Figure 2.

Figure 2. Map of Satellite Imagery around Schiller and Newington
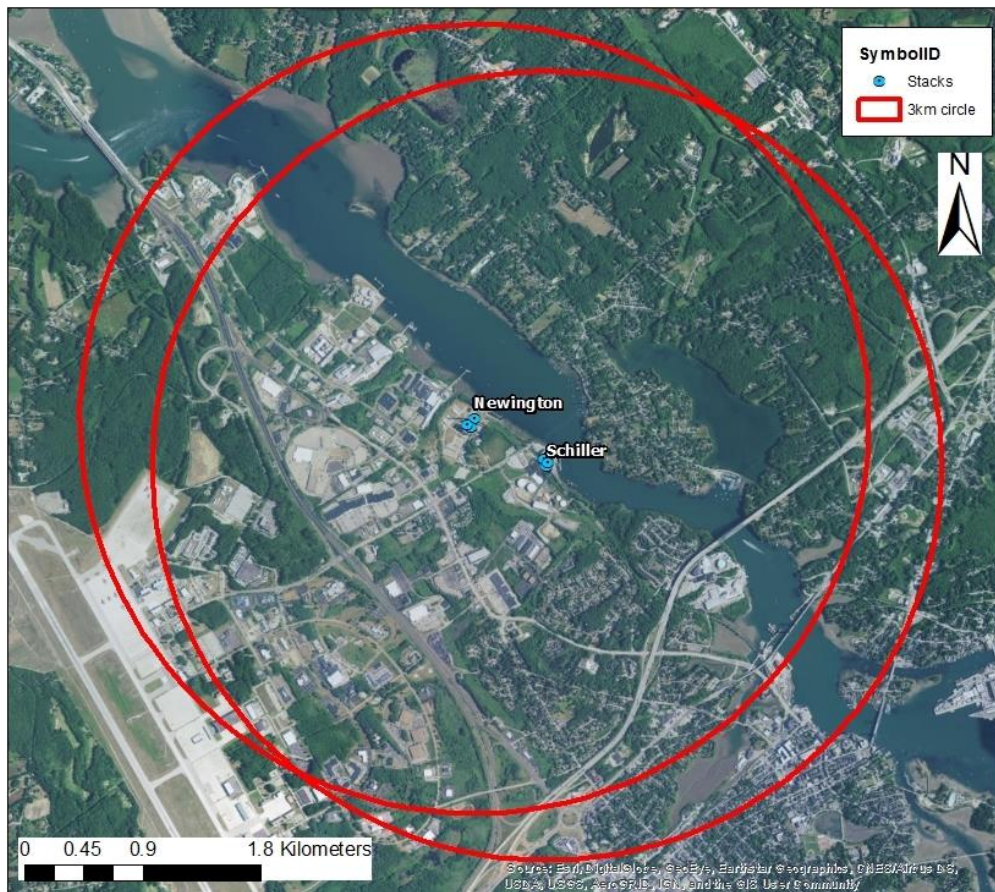
The source of this map image is Esri, used by EPA with Esri's permission.

3.4.3. Modeling Parameter: Area of Analysis (Receptor Grid)

The TAD recommends that the first step towards characterization of air quality in the area around a source or group of sources is to determine the extent of the area of analysis and the spacing of the receptor grid. Considerations presented in the Modeling TAD include but are not limited to: the location of the SO_2 emission sources or facilities considered for modeling; the extent of significant concentration gradients due to the influence of nearby sources; and sufficient receptor coverage and density to adequately capture and resolve the model predicted maximum SO_2 concentrations.

The sources of SO_2 emissions subject to the DRR in this area are described in the introduction to this section. For the New Hampshire Seacoast area, the state has included 32 other emitters (including multiple individual emission sources at each of six facilities) of SO_2 within 50 km of the midpoint of the Schiller and Newington facilities in any direction. The state determined that this was the appropriate distance to adequately characterize air quality through modeling to

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include the potential extent of any SO_2 NAAQS exceedances in the area of analysis and any potential impact on SO_2 air quality from other sources in nearby areas. In addition to Schiller and Newington, the other emitters of SO_2 included in the area of analysis are: Greenview Technologies, Essential Power Newington, National Gypsum, Turnkey Recycling, the University of New Hampshire, and Wheelabrator North Andover (Massachusetts). No other sources beyond 50 km were determined by the state to have the potential to cause concentration gradient impacts within the area of analysis. The EPA has reviewed sources in and near the area and did not identify any with the potential to cause a significant concentration gradient within the area; therefore, the EPA agrees that the sources identified by the state appropriately account for SO_2 impacts within the area.

The receptor grid for the area of analysis chosen by the state is comprised of the following:
- fence line receptors at 20-meter spacing for Schiller and Newington Stations;
- receptors within the fence lines of Schiller and Newington Stations to account for air pollutant levels on each facility's property resulting from pollutants not emitted by that facility[6];
- a Cartesian receptor grid with 50-meter spacing out to 1,500 meters from the midpoint of the Newington Unit 1 stack and the average of Schiller Unit 4 and Unit 6 stack coordinates (hereafter, "the midpoint");
- a Cartesian receptor grid with 100-meter spacing from 1,500 meters to 2,500 meters from the midpoint;
- a polar receptor grid with 250-meter spacing from 2.5 km to 10 km from the midpoint, excepting areas covered by the prior grid;
- a polar receptor grid with 500-meter spacing from 10 km to 50 km from the midpoint
- 20 additional discrete receptors at the following locations:
    o the locations of three monitors, specifically the Peirce Island monitor, the Sawgrass Lane monitor, and the Alden Lane monitor (which had been located on Alden Lane in Eliot, Maine, in 1999 for a previous study);
    o seven additional locations designed to capture the following: the expected (1) highest, (2) second highest, and (3) fourth highest 1-hour concentrations; the (4) maximum expected concentration in Maine, located near Mount Agamenticus in York County; the (5) highest and (6) second highest maximum locations in Eliot, Maine; and (7) a local maximum in New Hampshire;
    o ten additional receptors with the highest concentrations based on modeling conducted previously by the Sierra Club; and
- Cartesian grids of receptors covering an area of at least 1 km by 1 km with 100-meter spacing centered on each of the 20 additional receptors described above, excluding individual receptors located within the area already contained in either of the Cartesian grids previously discussed.

The receptor network contained 10,457 receptors, and the network covered nearly the entire area of Rockingham and Strafford Counties, New Hampshire, the southern half of York County, Maine, and the northern half of Essex County, Massachusetts.

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[6] Model results at these on-property receptors do not include the contribution of Schiller or Newington Stations to impacts within their own respective fence lines.

Figure 3, generated by the EPA, shows the state's entire chosen area of analysis surrounding the Schiller and Newington facilities, as well as the receptor grid for the area of analysis. Figure 4, also generated by the EPA, shows the locations of the 20 individual receptors, the Cartesian gridded receptors, the fence line receptors, and the receptors placed on the facility properties.

Consistent with the Modeling TAD, the state placed receptors for the purposes of this designation effort in locations that would be considered ambient air relative to each modeled facility, including other facilities' property with the exception of locations described in Section 4.2 of the Modeling TAD as not being feasible locations for placing a monitor. Each facility's own impacts are not considered at receptor locations within the facility's property from which the public is precluded by a fence or other physical barriers. But each facility's impacts on another facility's property is considered. The EPA agrees with this approach because it is consistent with longstanding EPA policy on treatment of ambient air because the public does not have access to the fenced-in portions of the two facilities. The state opted to apply a regular grid of receptors without excluding receptor locations over water bodies, though Section 4.2 of the Modeling TAD allows removal of receptors in such locations.

Figure 3. Area of Analysis for the New Hampshire Seacoast Area
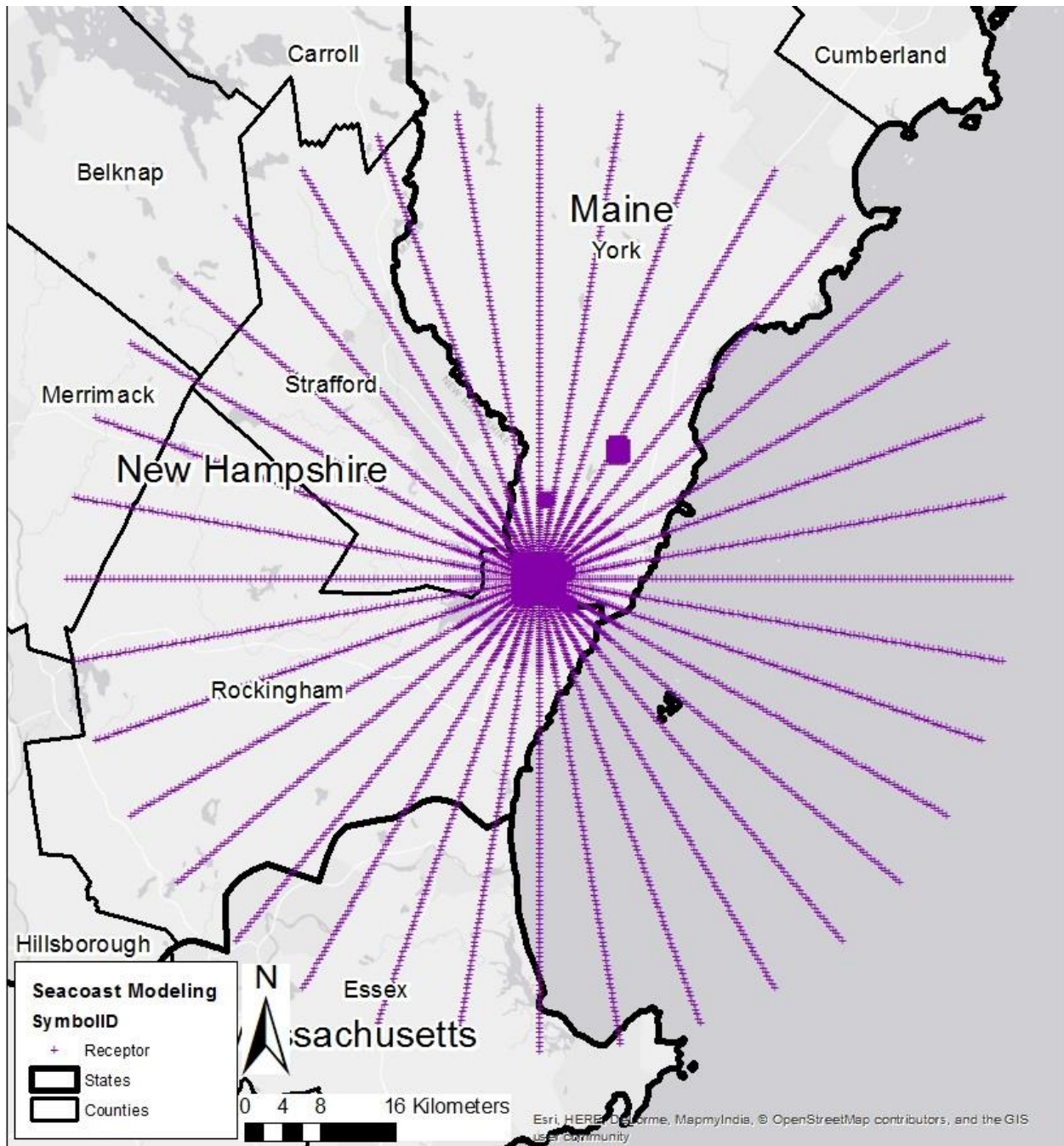
The source of this map image is Esri, used by EPA with Esri's permission.

Figure 4. Receptor Grid for the New Hampshire Seacoast Area
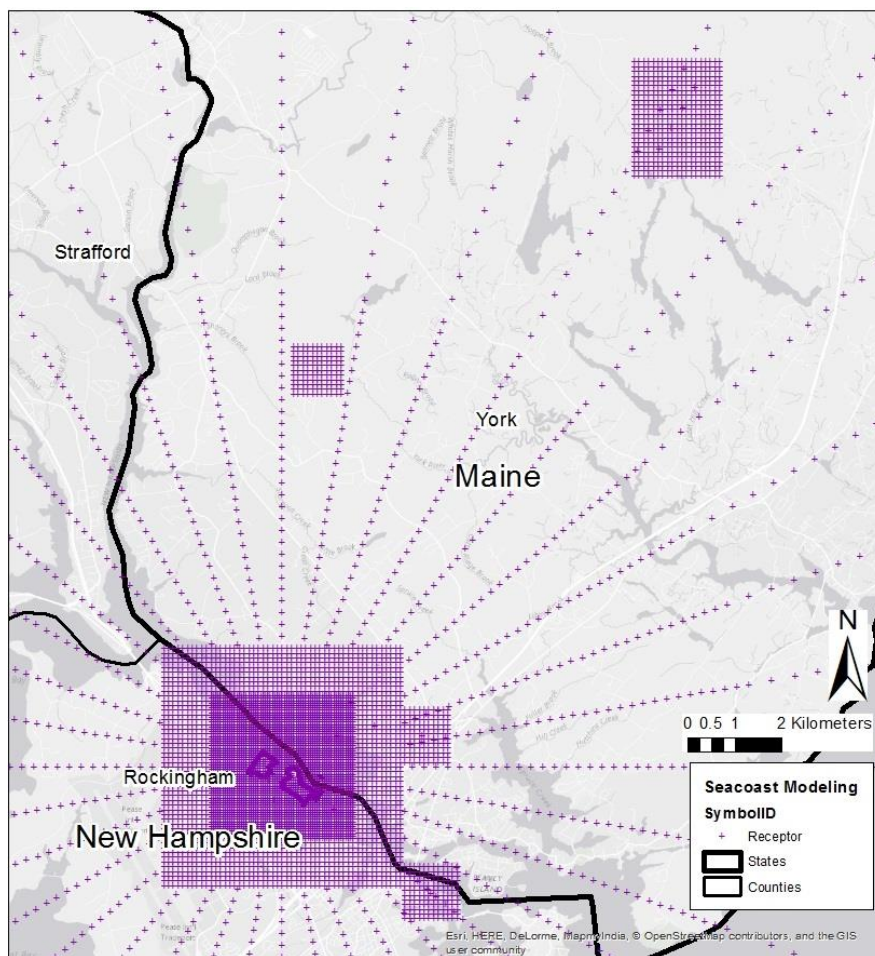
The source of this map image is Esri, used by EPA with Esri's permission.

The EPA finds that the modeling domain and placement of receptors are appropriate for adequately characterizing the New Hampshire Seacoast area. Specifically, though the polar receptor grids may not on their own provide for sufficient density of receptor placement at distances more than several kilometers to appropriately characterize air quality, we feel the additional high resolution Cartesian receptor grids at areas with expected high concentration based on previous modeling in conjunction with the polar grids, do provide for sufficient coverage to adequately characterize air quality in this area.

3.4.4. Modeling Parameter: Source Characterization

Section 6 of the Modeling TAD offers recommendations on source characterization including source types, use of accurate stack parameters, inclusion of building dimensions for building downwash (if warranted), and the use of actual stack heights with actual emissions or following GEP policy with allowable emissions.

The state explicitly modeled emission sources at Schiller and Newington Stations, which were required to be characterized for the DRR, as previously discussed.

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In addition to the DRR sources, the state also included Greenview Technologies in Rollinsford, New Hampshire (Strafford County); Essential Power Newington in Newington, New Hampshire (Rockingham County); National Gypsum in Portsmouth, New Hampshire (Rockingham County); Turnkey Recycling in Rochester, New Hampshire (Strafford County); the University of New Hampshire in Durham and Rochester, New Hampshire (Strafford County); and Wheelabrator in North Andover, Massachusetts (Essex County). These additional sources were included in the modeling as potentially interactive sources.

The state characterized the sources within the area of analysis in accordance with the best practices outlined in the Modeling TAD. Specifically, the state used actual stack heights in conjunction with actual emissions for all modeled sources except for the two DRR sources (i.e., Schiller and Newington) for which the state used GEP stack heights in conjunction with allowable emissions. The state also adequately characterized the source's building layout and location, as well as the stack parameters, e.g., exit temperature, exit velocity, location, and diameter. Where appropriate, the AERMOD component BPIPPRM was used to assist in addressing building downwash.

Based on comparisons between the modeling source characterization, including building and stack parameters, against publicly available information in permits and maps, the EPA concludes that the state appropriately characterized sources included in the modeling assessment.

3.4.5. Modeling Parameter: Emissions

The EPA's Modeling TAD notes that for the purpose of modeling to characterize air quality for use in designations, the recommended approach is to use the most recent 3 years of actual emissions data and concurrent meteorological data. However, the TAD also indicates that it would be acceptable to use allowable emissions for three or more years in the form of the most recently permitted (referred to as PTE or allowable) emissions rate that is federally enforceable and effective.

The EPA believes that continuous emissions monitoring systems (CEMS) data provide acceptable historical emissions information, when they are available. These data are available for many electric generating units. In the absence of CEMS data, the EPA's Modeling TAD highly encourages the use of AERMOD's hourly varying emissions keyword HOUREMIS, or through the use of AERMOD's variable emissions factors keyword EMISFACT. When choosing one of these methods, the EPA recommends using detailed throughput, operating schedules, and emissions information from the impacted source(s).

In certain instances, states and other interested parties may find that it is more advantageous or simpler to use PTE rates as part of their modeling runs. For example, for a facility that has recently adopted a new federally enforceable emissions limit or implemented other federally enforceable mechanisms and control technologies to limit SO_2 emissions to a level that indicates compliance with the NAAQS, the state may choose to model PTE rates. These new limits or conditions may be used in the application of AERMOD for the purposes of modeling for designations, even if the source has not been subject to these limits for the entirety of the most

recent 3 calendar years. In these cases, the Modeling TAD notes that a state should be able to find the necessary emissions information for designations-related modeling in the existing SO_2 emissions inventories used for permitting or SIP planning demonstrations. In the event that these short-term emissions are not readily available, they may be calculated using the methodology in Table 8-1 of Appendix W to 40 CFR Part 51 titled, "Guideline on Air Quality Models."

As previously noted, the state included Schiller, Newington, and six other emitters of SO_2 within 50 km in the area of analysis. For this area of analysis, the state has opted to use a hybrid approach, where emissions from the six other potentially interactive facilities are expressed as actual emissions, and those from the two listed DRR facilities are expressed as PTE rates. The facilities in the state's modeling analysis and their associated actual or PTE rates are summarized below.

For Greenview Technologies, Essential Power Newington, National Gypsum, Turnkey Recycling, and the University of New Hampshire, the state provided maximum actual monthly SO_2 emissions for the 4-year period between 2011 and 2014. The state assumed those monthly maximum emissions as the monthly emissions for each year in the analysis. Emissions were prepared in a manner consistent with the use of the EMISFACT MONTH keyword pair in AERMOD as described in Appendix C of the Modeling TAD. For Wheelabrator North Andover, the state used maximum annual emissions from the period between 2011 and 2014. Annual emissions used for each modeled source are provided in Table 2. A description of how the state obtained hourly emission rates is given below this table.

Table 2. Total Annual SO_2 Emissions Derived from Maximum Total Monthly Emissions Between 2011 – 2014 from Facilities in the Area of Analysis for the New Hampshire Seacoast Area

Source Name	SO_2 Emissions (tpy)
Essential Power Newington	8.3
Greenview Technologies	5.6
National Gypsum	16.5
Turnkey Recycling	71.2
University of New Hampshire	24.8
Wheelabrator North Andover	57.0*
Total Emissions from All Facilities in the Area of Analysis Modeled Based on Actual Emissions	183.4

* Emissions from Wheelabrator North Andover were based on maximum annual emissions from 2011 to 2014 rather than maximum total monthly emissions.

For each facility listed in Table 2, the hourly emissions data were calculated in a manner consistent with the method described in Appendix C of the Modeling TAD. The EPA notes the discrepancy between using a 5-year meteorological dataset and the 4-year period selected by the state for the potentially interactive sources. The EPA has no evidence to suggest that emissions

in 2010 from the listed facilities were higher than the levels included in the modeling. However, to affect the modeling, the monthly emissions at multiple sources would need to be higher for multiple months in 2010 when compared to the 2011-2014 period. This will be addressed further in the context of the modeling results.

For Newington and Schiller, the state provided PTE values. This information is summarized in Table 3. A description of how the state obtained hourly emission rates is given below this table.

Table 3. SO₂ Emissions based on PTE from Facilities in the Area of Analysis for the New Hampshire Seacoast Area

Facility Name	SO$_2$ Emissions (pounds per hour, based on PTE at 100% load)	SO$_2$ Emissions (tpy, based on PTE at 100% load)
Schiller	1,180	5,169
Unit 4	*552.0*	
Unit 5	*76.2*	
Unit 6	*552.0*	
Newington	4,597	20,134
Unit 1	*4,557*	
Auxiliary Boiler A	*19.8*	
Auxiliary Boiler B	*19.8*	
Total Emissions from Facilities in the Area of Analysis Modeled Based on PTE	5,777	25,304

For Newington, the PTE in tons per year was determined by the state based on limitations provided in the state's permit TP-0197 issued and effective and enforceable on December 22, 2016. The permit contains federally enforceable limits on fuel sulfur (1.0% in fuel oil for the main utility boiler and 0.2% for the fuel oil for the auxiliary boilers) and maximum design capacity. The EPA has confirmed that the emission rate used in the model for Newington matches the enforceable limits of fuel sulfur content contained in TP-0197.

For Schiller, on June 15, 2017, the state issued revised SO$_2$ emissions limits of 0.83 pounds per million British thermal units (MMBtu; lb/MMBtu) of heat input based on a boiler operating day[7] average for each Units 4 and 6 at Schiller Station in its revision of the TV-0053 Title V operating permit. These limits address the results of an analysis conducted in response to a July 28, 2015, EPA Order in response to Title V petition number VI-2014-4. An analysis submitted by the state demonstrates that the limit of 0.83 lb/MMBtu on a boiler operating day average for each of Schiller Units 4 and 6 is comparably stringent to a limit of 0.962 lb/MMBtu on a 1-hour average basis, which the state demonstrated in its modeling analysis, as described below, is the critical

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[7] In this context, as defined by enforceable conditions for Schiller Station in the June 15, 2017 Title V permit (TV-0053) for the facility, the term "boiler operating day" means a 24-hour period that begins at midnight and ends the following midnight during which any fuel is combusted at any time in the boiler. It is not necessary for the fuel to be combusted the entire 24-hour period.

emission value necessary to attain the NAAQs, along with the existing limit of 0.12 lb/MMBtu for Schiller Unit 5. The EPA has reviewed the state's comparable stringency analysis presented in its February 27, 2017, modeling submittal and concurs that the 0.83 lb/MMBtu emission limit on a boiler operating day basis is comparably stringent to the critical emission value of 0.962 lb/MMBtu on a 1-hour basis. The state calculated emission rates for each boiler by multiplying the maximum permitted design capacity by the fuel sulfur content. The state determined hourly emissions corresponding to this annual emission value by multiplying the hourly design capacity by the sulfur content. Emissions from Schiller and Newington were assumed to be at maximum permitted levels for the entire five-year modeling period. Each of the units at Schiller was also modeled at 50% and 75% load levels to determine whether lower operating levels may result in maximum SO_2 concentrations. The 100% load scenario was the controlling scenario hence why it's the only scenario shown here.

The state indicated in its recommendation that when the revised permits for Newington and Schiller became final, they would be sent to the EPA as a supplement to the state's designation letter and rationale. The revised permit with SO_2 emission limits for Newington has since been issued by the state on December 22, 2016. Similarly, the revised permit with SO_2 emissions limits for Schiller has since been issued by the state on June 15, 2017. The EPA believes that it is an appropriate option to designate according to the impacts of the emissions allowed by a federally enforceable emission limit. With regard to Schiller, the federally enforceable limits contained in the June 15, 2017, Title V permit are based on a federally enforceable provision (NH Rule 616) of New Hampshire's SIP and became effective and federally enforceable on June 15, 2017. Thus, the enforceability of the limits are authorized under the SIP provision.

Based on the available evidence, the EPA concurs with New Hampshire in its selections of emissions parameters and emissions rates for the sources using actual emissions for this modeling assessment. The EPA also concurs with New Hampshire's selection of allowable emission rates for Newington and Schiller as appropriate for this modeling assessment.

3.4.6. Modeling Parameter: Meteorology and Surface Characteristics

As noted in the Modeling TAD, at least the most recent 3 years of meteorological data (concurrent with the most recent 3 years of emissions data) should be used in designations efforts. The selection of data should be based on spatial and climatological (temporal) representativeness. The representativeness of the data is determined based on: 1) the proximity of the meteorological monitoring site to the area under consideration, 2) the complexity of terrain, 3) the exposure of the meteorological site, and 4) the period of time during which data are collected. Sources of meteorological data include National Weather Service (NWS) stations, site-specific or onsite data, and other sources such as universities, Federal Aviation Administration (FAA), and military stations.

For the area of analysis for the New Hampshire Seacoast area, the state selected the surface meteorology from Portsmouth International Airport at Pease (PSM), located approximately 3.8 km to the west southwest of Schiller, and coincident upper air observations from the NWS

station located in Gray, Maine, approximately 97 km to the north northeast of Schiller, as best representative of meteorological conditions within the area of analysis.

The state used AERSURFACE version 13016 using land cover data from the 1992 National Land Cover Dataset (NLCD), available through the Multi-Resolution Land Characteristics (MRLC) consortium, representative of the PSM site to estimate the surface characteristics (albedo, Bowen ration, and surface roughness, z_o) of the area of analysis. The state estimated z_o values for 12 spatial sectors out to the recommended radius of 1 km at a monthly temporal resolution for surface moisture conditions depending on the year. The state selected the surface moisture conditions for each year based on an analysis of the 30-year precipitation dataset collected at Eliot, Maine, by the US National Climatic Data Center. 2010 and 2011 were characterized as wet years, 2012 and 2014 as average years, and 2013 as a dry year.

In the figure below, generated by the EPA, the locations of the surface and upper air meteorological stations is shown relative to the area of analysis.

Figure 5. Area of Analysis and the Meteorological Stations in the New Hampshire Seacoast Area
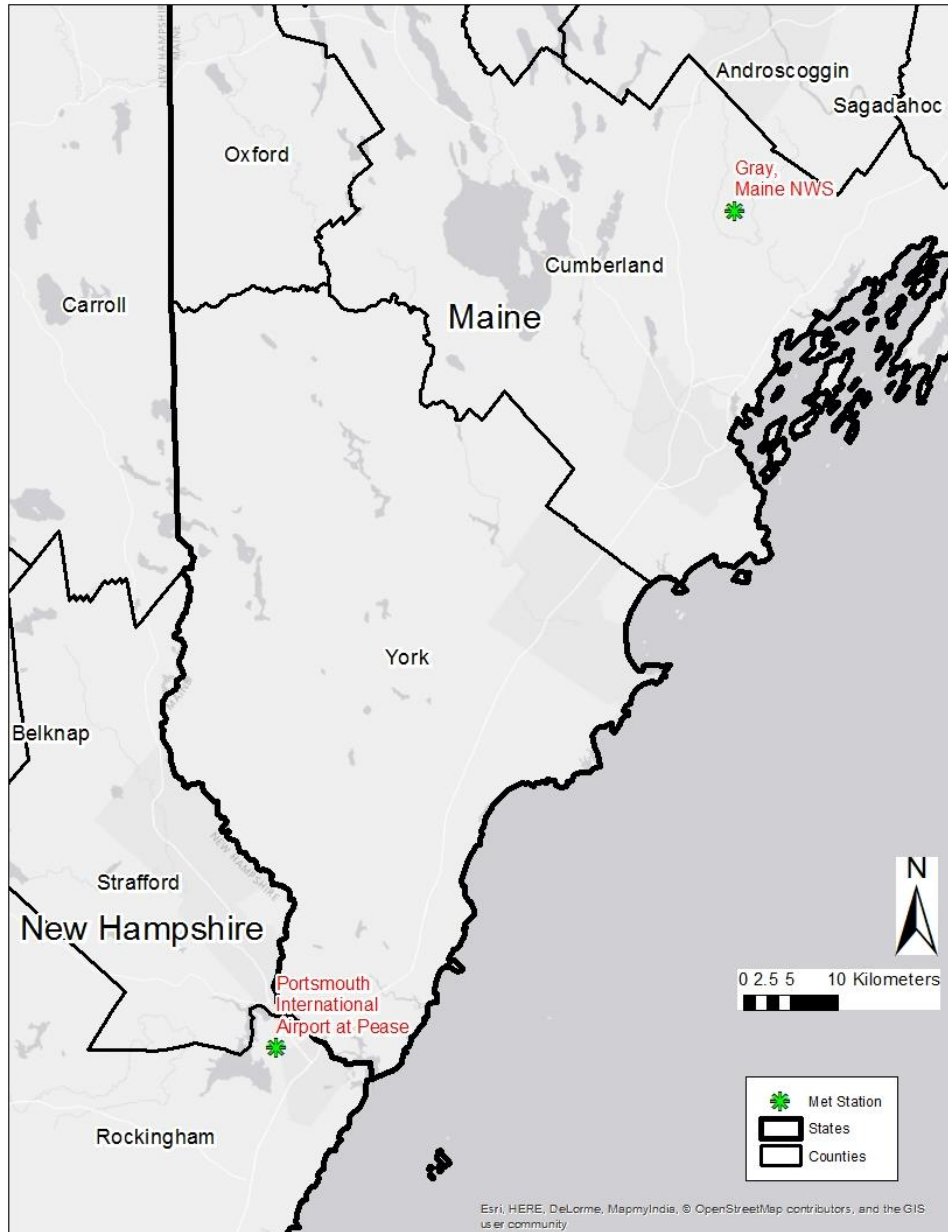
The source of this map image is Esri, used by EPA with Esri's permission.

As part of its recommendation, the state provided the 5-year surface wind rose for PSM. In Figure 6, the frequency and magnitude of wind speed and direction are defined in terms of from where the wind is blowing. The figure indicates a predominant western wind field during the 2010 to 2014 period; winds are from the northwest through southwest approximately 47% of the time based on the figure.

Figure 6. Portsmouth International Airport Cumulative Annual Wind Rose for Years 2010 – 2014
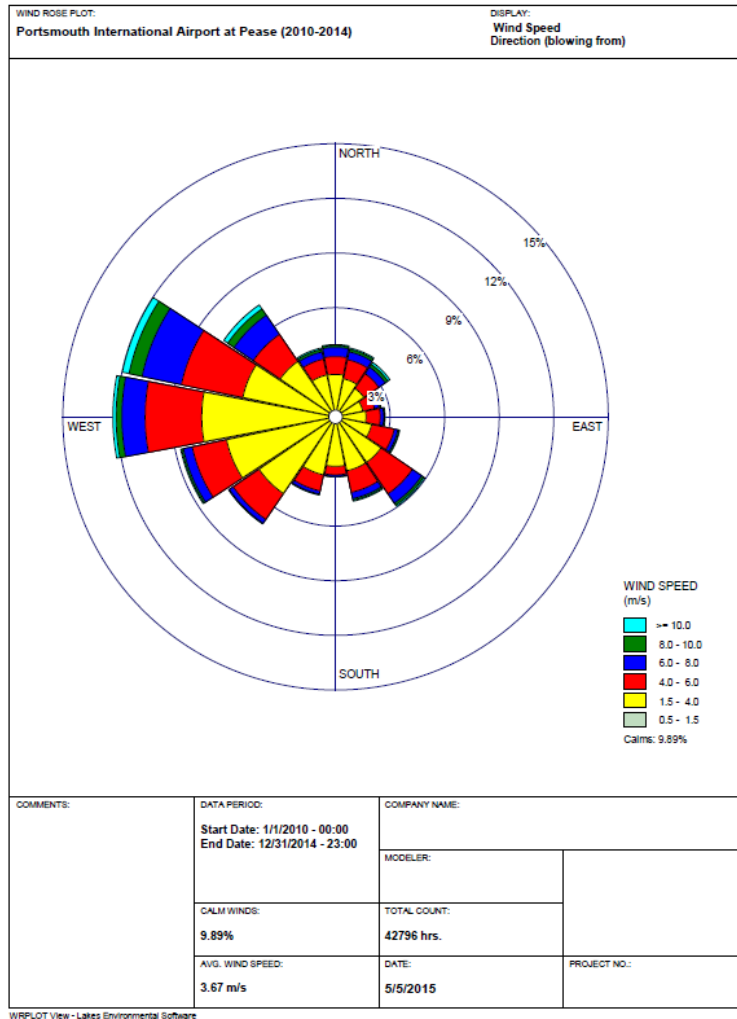
Meteorological data from the above surface and upper air NWS stations were used in generating AERMOD-ready files with the AERMET processor version 16216 with the non-default ADJ_U* option. The output meteorological data created by the AERMET processor are suitable for being applied with AERMOD input files for AERMOD modeling runs. The state followed the methodology and settings presented in the AERMET version 16216 User's Guide in processing raw meteorological data into an AERMOD-ready format, and used AERSURFACE to best represent surface characteristics.

On March 18, 2016, the state requested the use of the ADJ_U* option in AERMET (version 15181), which was at that time a non-regulatory beta option, for use in the Schiller/Newington modeling analysis for the state's DRR submittal and for the modeling to support the state's ongoing permitting process for Schiller and Newington. On May 2, 2016, the EPA Regional Office approved the use of the ADJ_U* option for the listed purposes. On December 20, 2016, the EPA issued a final rule revising Appendix W. Among the revisions to Appendix W is the inclusion of ADJ_U* as a regulatory option in the AERMET preprocessor. The EPA

subsequently released AERMOD version 16216r, which corrected a formulation error in the ADJ_U* code that leads to under-predictions in concentrations. The EPA then clarified that for current and future regulatory applications and compliance demonstrations, our recommendation was to use the current regulatory version, i.e., 16216r (see EPA's "Clarification on the AERMOD Modeling System Version for Use in SO_2 Implementation Efforts and Other Regulatory Actions" memorandum, March 8, 2017).

Hourly surface meteorological data records are read by AERMET, and include all the necessary elements for data processing. However, wind data taken at hourly intervals may not always portray wind conditions for the entire hour, which can be variable in nature. Hourly wind data may also be overly prone to indicate calm conditions, which are not modeled by AERMOD. At PSM, during the modeled period of 2010-2014, approximately 9.89% of the hours had calm conditions. In order to better represent actual wind conditions at the meteorological tower, wind data of 1-minute duration available from automatic surface observing system (ASOS) stations, but not at the PSM station, which is not ASOS, can be processed by a separate preprocessor, AERMINUTE. The state selected the PSM station for surface meteorological data through considering options with respect to four criteria: proximity, complexity of terrain, exposure of the meteorological monitoring site, and temporal representativeness. After considering each of these criteria, PSM was selected over the closest ASOS site, Skyhaven Airport in Rochester, New Hampshire, for application for this modeling assessment.

The EPA concludes from the information at hand that the meteorological data were selected and treated appropriately and are suitable for the current assessment. The EPA finds that the state's selection of PSM for surface wind data was appropriate and in accordance with our guidance. Specifically, the EPA concurs with the state's evaluation of proximity and complexity of terrain, factors which favor selection of PSM over Skyhaven Airport. Regarding exposure of the meteorological monitoring site and temporal representativeness, the EPA does not find a compelling basis for selecting either PSM over Skyhaven or vice-versa. Therefore, taken together, these factors suggest that PSM is the more representative meteorological data source. The surface meteorological station used in the development of meteorological inputs to AERMOD is located within the modeling domain, and is suitably representative of the meteorological conditions around the New Hampshire Seacoast area.

3.4.7. Modeling Parameter: Geography, Topography (Mountain Ranges or Other Air Basin Boundaries) and Terrain

The terrain in the area of analysis is best described as coastal, with areas of more complexity (i.e., increasingly mountainous) beyond approximately 15 km from the center of the area. Mount Agamenticus to the northeast is the nearest area of complex terrain to the domain center. Areas to the north through southwest become increasingly complex with distance from the seacoast area, particularly in the northwest. The northeastern through southern portion of the area are over the ocean (i.e., 0 elevation). To account for these terrain changes, the AERMAP terrain program version 11103 within AERMOD was used to specify terrain elevations for all the receptors. The source of the elevation data incorporated into the model is from the US Geological Survey's National Elevation Dataset at 10-meter (1/3-arc second) resolution.

Based on the submission, the EPA concludes the state's approach in specifying terrain elevations is appropriate.

3.4.8. Modeling Parameter: Background Concentrations of SO₂

The Modeling TAD offers two mechanisms for characterizing background concentrations of SO_2 that are ultimately added to the modeled design values: 1) a "tier 1" approach, based on a monitored design value, or 2) a temporally varying "tier 2" approach, based on the 99th percentile monitored concentrations by hour of day and season or month. For this area of analysis, the state used the tier 2 approach described in the Modeling TAD and in the EPA's March 1, 2011, memorandum, "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 Ambient Air Quality Standard." Specifically, the state relied on the following technique, as interpreted by the EPA, to develop a dataset with which to derive 99th percentile (by hour of day and season) values:

- Start with the 2012 to 2014 hourly SO_2 observations collected at the Peirce Island (AQS# 33-015-0014) and Londonderry (AQS# 33-015-0018) monitoring sites.
- Interpolate SO_2 concentrations at the Londonderry monitor for periods of missing data with duration of three hours or less.
- Fill missing wind data values at Peirce Island with those from PSM.
- Select the hourly SO_2 observation at the Londonderry monitor if either (1) the wind direction is from a 92-degree exclusion sector accounting for Schiller and Newington Station's influence on Peirce Island, or (2) wind data are missing at both Peirce Island and PSM, on the premise that the Peirce Island monitor may have been influenced by the sources.
- Interpolate SO_2 concentrations at the Peirce Island monitor for periods of missing data with duration of three hours or less and for which the hours interpolated between are valid hours with wind direction outside of the 92-degree exclusion sector.
- For all hours not using the Londonderry observations and not determined missing in the previous step, select the Peirce Island observation.

Using this approach, the state developed 96 individual values to represent 24-hourly values for each of four seasons, as presented in Table 4. The range of background values included in the state's modeling is from 4.45 to 11.68 ppb, equivalent to 11.7 to 30.6 when expressed in micrograms per cubic meter ($\mu g/m^3$)[8], with an average value of 7.18 ppb (18.8 $\mu g/m^3$).

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[8] The SO_2 NAAQS level is expressed in ppb but AERMOD gives results in $\mu g/m^3$. The conversion factor for SO_2 (at the standard conditions applied in the ambient SO_2 reference method) is 1 ppb = approximately 2.619 $\mu g/m^3$.

Table 4. SO$_2$ Background Concentrations in the New Hampshire Seacoast Area for 2012 – 2014 (ppb)

Hour	Season			
	Winter	**Spring**	**Summer**	**Fall**
1	8.68	9.16	5.20	6.80
2	8.20	9.59	5.14	6.78
3	10.03	9.16	4.62	7.15
4	10.55	7.85	4.53	7.32
5	10.20	8.28	5.06	7.24
6	9.68	7.85	5.14	8.11
7	11.68	9.24	5.23	8.37
8	11.16	10.20	7.59	8.81
9	10.46	9.33	6.02	8.28
10	10.99	6.15	5.75	8.89
11	10.64	7.67	5.58	6.04
12	11.07	6.71	5.06	6.19
13	9.68	5.84	5.06	5.32
14	9.16	5.32	4.71	5.06
15	8.02	8.28	5.23	4.71
16	8.28	4.62	4.62	4.97
17	7.67	4.97	4.45	4.88
18	7.85	4.88	4.88	5.23
19	8.37	6.36	4.71	6.89
20	9.50	5.75	4.53	6.89
21	9.16	5.41	4.97	7.06
22	8.54	7.50	5.41	7.32
23	7.93	7.59	5.49	7.32
24	8.46	8.81	4.66	7.69

The EPA believes the background values, as presented in Table 4, used for the assessment of the New Hampshire Seacoast area are appropriate, based on the data and reasoning provided by the state, because the state's approach is consistent with the tier 2 described in the Modeling TAD and in the EPA's March 1, 2011, memorandum.

3.4.9. Summary of Modeling Inputs and Results

The AERMOD modeling input parameters for the New Hampshire Seacoast area of analysis are summarized below in Table 5.

Table 5. Summary of AERMOD Modeling Input Parameters for the Area of Analysis for the New Hampshire Seacoast Area

Input Parameter	Value
AERMOD Version	16216r (ADJ_U* option)
Dispersion Characteristics	Rural
Modeled Sources	8
Modeled Stacks	34
Modeled Structures	53
Modeled Fencelines	2
Total receptors	10,457
Emissions Type	Hybrid (some actuals and some PTE)
Emissions Years	2011-2014
Meteorology Years	2010-2014
NWS Station for Surface Meteorology	Portsmouth International Airport (PSM)
NWS Station Upper Air Meteorology	Gray, Maine
NWS Station for Calculating Surface Characteristics	Portsmouth International Airport (PSM)
Methodology for Calculating Background SO_2 Concentration	Tier 2 approach utilizing 96 seasonal-hourly pairs derived from observations at Peirce Island (AQS# 33-015-0014) and Londonderry (AQS# 33-015-0018)
Calculated Background SO_2 Concentration	Range: 4.45 to 11.68 ppb

The results presented below in Table 6 show the magnitude and geographic location of the highest predicted modeled concentration based on the input parameters.
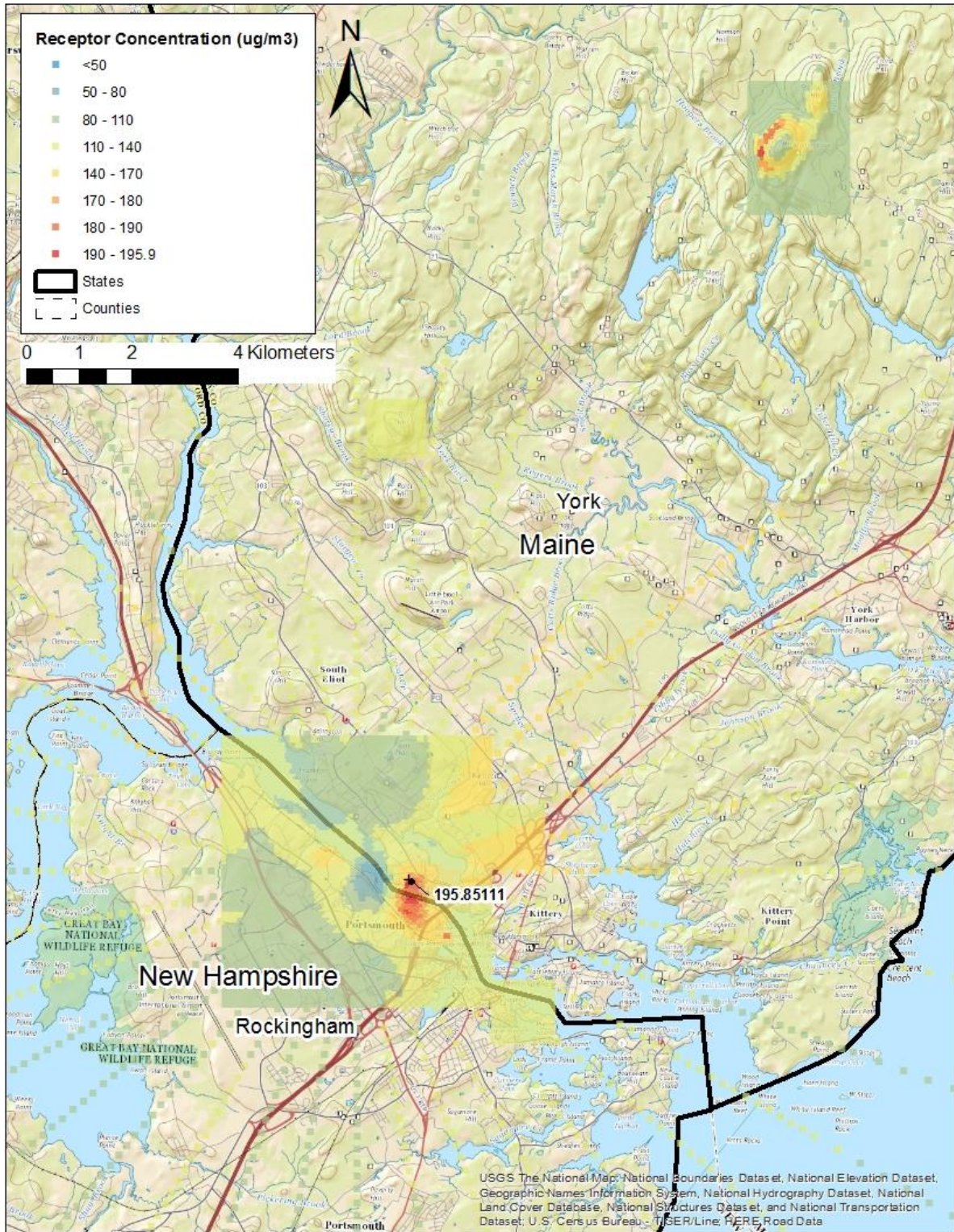
Table 6. Maximum Predicted 99th Percentile Daily Maximum 1-Hour SO₂ Concentrations Averaged Over Five Years for the Area of Analysis for the New Hampshire Seacoast Area

Averaging Period	Data Period	Receptor Location [UTM zone 19]		99th percentile daily maximum 1-hour SO₂ Concentration (μg/m³)	
		UTM/X (meters)	UTM/Y (meters)	Modeled concentration (including background)	NAAQS Level
99th Percentile 1-Hour Average	2010-2014	355555.8	4773180	195.9	196.4*

*Equivalent to the 2010 SO₂ NAAQS of 75 ppb using a 2.619 μg/m³ conversion factor

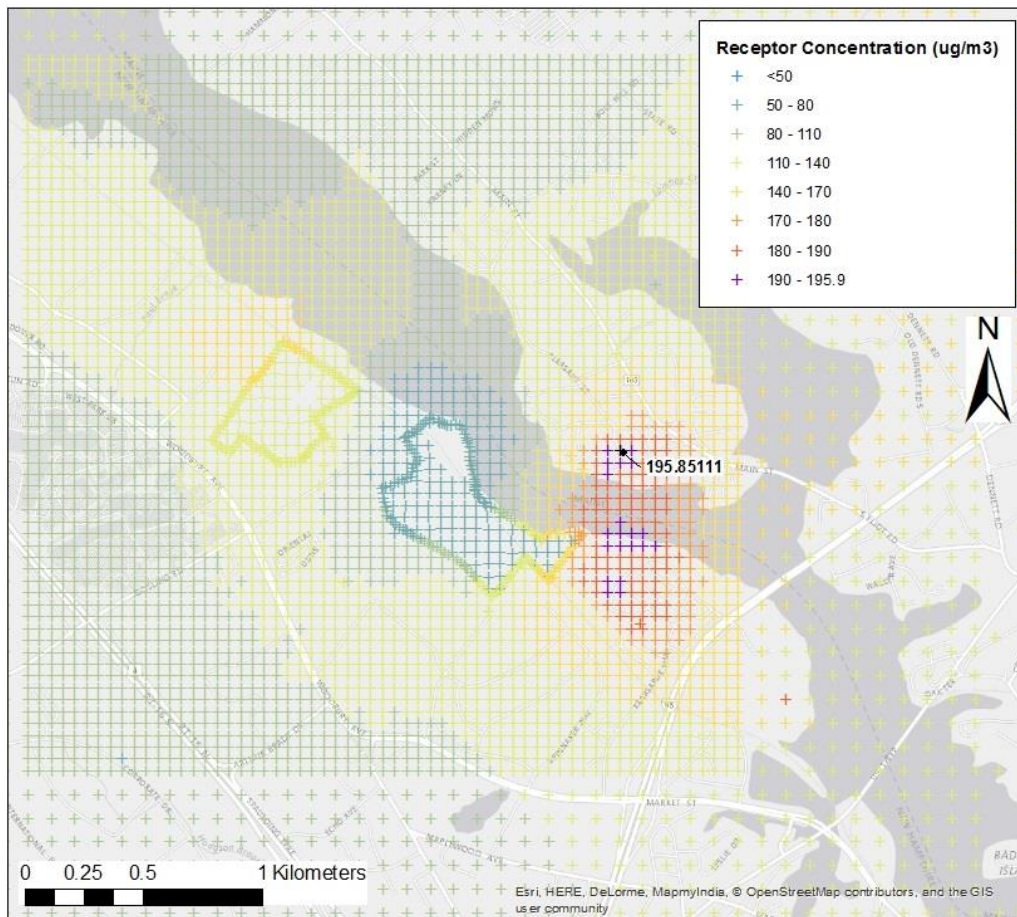The state's modeling indicates that the highest predicted 99th percentile daily maximum 1-hour concentration within the chosen modeling domain is 195.9 μg/m³, equivalent to 74.8 ppb. This modeled concentration included the background concentration of SO₂, and is based on a mixture of actual and PTE emissions from the facilities. Figure 7 below was developed by the EPA based on model files provided by the state in February 2017, and indicates that the predicted value occurred in a populated area of South Eliot, Maine, just across the Piscataqua River from Schiller. The highest receptor is among a cluster of similarly high receptors just to the east of Schiller and spanning areas of Portsmouth, New Hampshire, and Eliot, Maine. A cluster of high receptors is also noticeable in Figure 7 at Mount Agamenticus, approximately 16 km to the northeast of the sources, though the highest receptor is not located in that area. Figure 8, similarly developed by the EPA using the same data, shows this area of receptors. The state's receptor grid is also shown in Figure 8.

Figure 7. Predicted 99ᵗʰ Percentile Daily Maximum 1-Hour SO₂ Concentrations Averaged Over Five Years for the Area of Analysis for the New Hampshire Seacoast Area

The source of this map image is Esri, used by EPA with Esri's permission.

Figure 8. Closer View of the Predicted 99th Percentile Daily Maximum 1-Hour SO$_2$ Concentrations Averaged Over Five Years for the Area of Analysis for the New Hampshire Seacoast Area

The source of this map image is Esri, used by EPA with Esri's permission.

The modeling submitted by the state does not indicate that the 1-hour SO$_2$ NAAQS is violated at the receptor with the highest modeled concentration.

3.4.10. The EPA's Assessment of the Modeling Information Provided by the State

As discussed in the previous sections, the state's modeling submittal contain components that require additional discussion and consideration. The state used the most recent version of AERMOD with regulatory options, and the EPA concurs with the state's selection of modeling components, including rural operating mode; modeling domain and receptor placement; source characterization, including building and stack parameters; meteorological data and surface parameters; terrain elevations; and background concentrations.

As mentioned earlier, the EPA has identified one potential issue in the state's selection of emissions to characterize sources in the area of analysis. Specifically, the state has developed

monthly emission profiles for potentially interactive sources based on maximum monthly emissions for the 4-year period between 2011 and 2014. That is, the state developed a composite annual emission profile for each source based on the highest emissions total in January for 2011 through 2014, and likewise for each other month. This 4-year period is not consistent with the 5-year meteorological dataset used by the state in its modeling analysis. Specifically, 2010 emissions would be required for the meteorological and emissions datasets to match up entirely. The state's method for representing emissions from the potentially interactive sources is to use the maximum monthly emissions from 2011-2014 as representative of monthly emissions for each year in the analysis. The composite annual emissions are equal to or higher than the highest individual year emissions for the 2011-2014 period, and as shown in Table 2, none of the sources modeled in this manner have composite annual emissions of 100 tons or greater. The highest annual actual emissions are 57 tons, from Wheelabrator North Andover, whereas the highest annual modeled (derived from maximum monthly) emissions are 71.2 tons, from Turnkey Recycling. The EPA believes that because the state modeled with emissions that are equal to or higher than actual emissions from these smaller, potentially contributing sources for 2011-2014, and because the EPA has no information indicating that 2010 emissions were dramatically higher for these sources, there is sufficient conservatism in the modeled emissions to override the potential for undercounting emissions from 2010 from these smaller, potentially contributing sources.

In summation, the EPA finds that modeling submitted by the state to be appropriate for use in the designations process for the 2010 1-hour SO_2 NAAQS.

3.5. Jurisdictional Boundaries in the New Hampshire Seacoast Area

Existing jurisdictional boundaries are considered for the purpose of informing the EPA's designation action for the New Hampshire Seacoast area. Our goal is to base designations on clearly defined legal boundaries, and to have these boundaries align with existing administrative boundaries when reasonable.

In its December 2016 updated recommendation for selecting a designation area, the state recommended an attainment designation for all areas of Rockingham County not previously designated, as well as the entirety of Strafford County, based on the modeling analysis described in the previous section.

3.6. The EPA's Assessment of the Available Information for the New Hampshire Seacoast Area

The EPA has considered all available information for the New Hampshire Seacoast area, including the revised modeling assessment provided by the state on February 27, 2017. The original modeling submitted by the state included emissions from Schiller that were not consistent with the limits ultimately adopted for that facility; therefore, the December 23, 2016, modeling was not considered appropriate for making decisions regarding SO_2 designations. The

EPA considers the revised modeling assessment dated February 27, 2017, to completely supersede the prior assessment because it includes updated emissions consistent with the permit limits at Schiller as well as updated model versions and options more consistent with EPA guidance. Ambient air monitoring data collected at the at the Peirce Island monitor, the Londonderry monitor, and the temporary Sawgrass Lane monitor indicate levels below the level of the NAAQS, though the monitors have either not been shown to be in areas of expected maximum concentration or were not operated long enough to generate a valid design value.

Based on the information at hand, the EPA concludes that the state's modeling analysis provides an appropriate basis on which to determine the attainment status of the area and that a violation of the 2010 SO_2 will not occur based on allowable emissions at the DRR sources in the area.

The EPA intends to designate an area established based on the modeling supplied by the state. This area includes all previously undesignated areas within Rockingham County, defined as the following municipalities: Atkinson, Auburn, Brentwood, Chester, Danville, Derry, East Kingston, Epping, Exeter, Fremont, Greenland, Hampstead, Hampton, Hampton Falls, Kensington, Kingston, Londonderry, New Castle, Newfields, Newington, Newmarket, Newton, North Hampton, Nottingham, Plainstow, Portsmouth, Raymond, Rye, Salem, Sandown, Seabrook, South Hampton, Stratham, and Windham. The EPA also intends to separately designate the entirety of Strafford County, New Hampshire, based on the state's modeling analysis.

The state's modeling analysis included sources in Rockingham and Strafford Counties, New Hampshire, as well as one source in Essex County, Massachusetts. The state's modeling domain was centered on the state's DRR sources, Schiller and Newington in Rockingham County, and included the entirety of Strafford County, New Hampshire, and the southern half of York County, Maine.

The modeling assessed by the EPA for the New Hampshire Seacoast area does not indicate a violation of the NAAQS in neighboring areas not addressed in this TSD, namely Essex County, Massachusetts, and York County, Maine. The Central New Hampshire area, which is adjacent to the New Hampshire Seacoast area, has been designated by the EPA as nonattainment for the 1-hour SO_2 NAAQS. The EPA has determined that there are no sources in the New Hampshire Seacoast area that currently contribute to nonattainment in the Central New Hampshire area or vice versa. The analysis used as the basis for the Round 1 designation did not find that any sources in the New Hampshire Seacoast contributed to the Central New Hampshire nonattainment area.

The EPA believes that our intended unclassifiable/attainment areas, bounded by the jurisdictional boundaries of all previously undesignated municipalities in Rockingham County, New Hampshire (namely: Atkinson, Auburn, Brentwood, Chester, Danville, Derry, East Kingston, Epping, Exeter, Fremont, Greenland, Hampstead, Hampton, Hampton Falls, Kensington, Kingston, Londonderry, New Castle, Newfields, Newington, Newmarket, Newton, North

Hampton, Nottingham, Plainstow, Portsmouth, Raymond, Rye, Salem, Sandown, Seabrook, South Hampton, Stratham, and Windham), and separately bounded by the jurisdictional boundaries of Strafford County, will have clearly defined legal boundaries, and we intend to find these boundaries to be a suitable basis for defining our intended unclassifiable/attainment areas.

3.7. Other Information Relevant to the Designations for the New Hampshire Seacoast Area

The EPA also received modeling for this area from Sierra Club on July 24, 2014. This modeling included scenarios with either historic hourly emissions (through March 2013) or previously allowable emission rates of 2.4 lb/MMBtu for Schiller Units 4 and 6. Neither scenario in the Sierra Club modeling reflects current conditions. First, the historic actual emissions do not reflect operation of the dry sorbent injection systems installed in 2016 for Units 4 and 6 for the control of SO_2 and other pollutants. Second, the state's June 15, 2017 revised Title V operating permit (TV-0053) for Schiller includes updated federally enforceable limits of 0.83 lb/MMBtu for Units 4 and 6 on a boiler operating day basis, as required by NH Rule 616 (see section 3.4.5 above), as well as recently revised allowable emissions rates at nearby Newington Station. The updated limits for Schiller Units 4 and 6 are 65% lower than the previously allowable emission rates used in the Sierra Club modeling. The modeling submitted by the state on February 27, 2017 includes emissions from Schiller Units 4 and 6 that are comparably stringent to the emission limits revised on June 15, 2017 and does not indicate that the 1-hour SO_2 NAAQS is violated at the receptor with the highest modeled concentration, as indicated in section 3.4.9. Therefore, because neither the actual nor allowable emission rates included in the Sierra Club modeling reflect current conditions for Schiller, and because New Hampshire's February 27, 2017 modeling assessment is appropriate for use in the current designations process, as described in section 3.4.10, the EPA will not rely on the Sierra Club modeling for the current designations process.

3.8. Summary of Our Intended Designation for the New Hampshire Seacoast Area

After careful evaluation of the state's recommendation and supporting information, as well as all available relevant information, the EPA intends to designate the New Hampshire Seacoast area as unclassifiable/attainment for the 2010 SO_2 NAAQS because, based on available information including (but not limited to) appropriate modeling analyses and/or monitoring data, EPA has determined the area (i) meets the 2010 SO_2 NAAQS, and (ii) does not contribute to ambient air quality in a nearby area that does not meet the NAAQS; or (2) was not required to be characterized under 40 CFR 51.1203(c) or (d) and EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.

Specifically, the boundaries are separately comprised of the boundaries of Strafford County and of the boundaries of the following municipalities within Rockingham County: Atkinson, Auburn, Brentwood, Chester, Danville, Derry, East Kingston, Epping, Exeter, Fremont, Greenland,

Hampstead, Hampton, Hampton Falls, Kensington, Kingston, Londonderry, New Castle, Newfields, Newington, Newmarket, Newton, North Hampton, Nottingham, Plainstow, Portsmouth, Raymond, Rye, Salem, Sandown, Seabrook, South Hampton, Stratham, and Windham.

Figure 9 shows the boundary of these intended designated areas.

Figure 9. Boundary of the Intended New Hampshire Seacoast Unclassifiable/Attainment Area
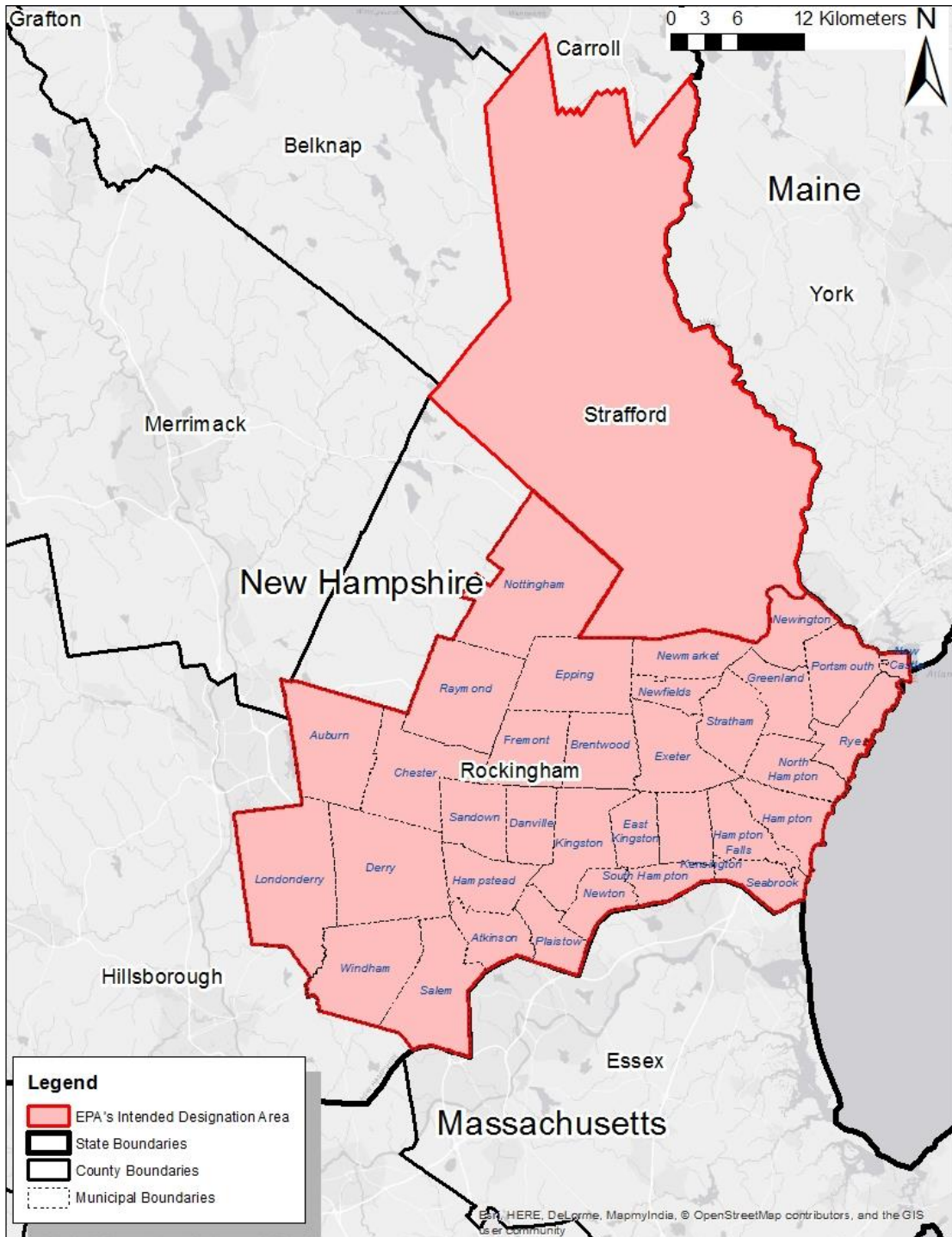
The source of this map image is Esri, used by EPA with Esri's permission.

At this time, our intended designations for the state only apply to this area and the other areas presented in this technical support document.

4. Technical Analysis for All Other Previously Undesignated Areas in New Hampshire

4.1. Introduction

The state has not timely installed and begun operation of a new, approved SO_2 monitoring network meeting EPA specifications referenced in the EPA's SO_2 DRR for any sources of SO_2 emissions in the counties and portions of counties identified in Table 7. Accordingly, the EPA must designate these counties or portions of counties by December 31, 2017. At this time, there are no air quality modeling results available to the EPA for these counties and portions of counties. In addition, there is no air quality monitoring data that indicate any violation of the 1-hour SO_2 NAAQS. The EPA is designating the counties and portions of counties in Table 7 in the state as "unclassifiable/attainment" since these counties were not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS.

Table 7. Counties and Portions of Counties that the EPA Intends to Designate Unclassifiable/Attainment

County or Partial County (p)	New Hampshire's Recommended Area Definition	New Hampshire's Recommended Designation	EPA's Intended Area Definition	EPA's Intended Designation
Belknap	Entire county	Unclassifiable/Attainment	Same as State's	Unclassifiable/Attainment
Carroll	Entire county	Unclassifiable/Attainment	Same as State's	Unclassifiable/Attainment
Cheshire	Entire county	Unclassifiable/Attainment	Same as State's	Unclassifiable/Attainment
Coos	Entire county	Unclassifiable/Attainment	Same as State's	Unclassifiable/Attainment
Grafton	Entire county	Unclassifiable/Attainment	Same as State's	Unclassifiable/Attainment
Hillsborough (p)	Amherst, Antrim, Bedford, Bennington, Brookline, Deering, Francestown, Greenfield,	Unclassifiable/Attainment	Same as State's	Unclassifiable/Attainment

County or Partial County (p)	New Hampshire's Recommended Area Definition	New Hampshire's Recommended Designation	EPA's Intended Area Definition	EPA's Intended Designation
	Greenville, Hancock, Hillsborough, Hollis, Hudson, Litchfield, Lyndeborough, Manchester, Mason, Merrimack, Milford, Mont Vernon, Nashua, New Boston, New Ipswich, Pelham, Peterborough, Sharon, Temple, Weare, Wilton, Windsor			
Merrimack (p)	Andover, Boscawen, Bradford, Canterbury, Danbury, Franklin, Henniker, Hill, Hopkinton, New London, Newbury, Northfield, Salisbury, Sutton, Warner, Webster, and Wilmot	Unclassifiable/Attainment	Same as State's	Unclassifiable/ Attainment
Sullivan	Entire county	Unclassifiable/Attainment	Same as State's	Unclassifiable/ Attainment

Table 7 also summarizes New Hampshire's recommendations for these areas. Specifically, the state recommended that the entirety of Belknap, Carroll, Cheshire, Coos, Grafton, and Sullivan

Counties, and the remaining undesignated portions of Hillsborough and Merrimack Counties, be designated as unclassifiable/attainment based on active or historic monitoring that shows that the NAAQS is or was being met, or a lack of monitoring altogether, coupled with a lack of large (i.e., 2,000 tpy or greater) emission sources and declining county-wide annual emissions trends. After careful review of the state's assessment, supporting documentation, and all available data, the EPA intends to agree with the state's recommendation and intends to designate the areas as unclassifiable/attainment. Figure 10 shows the locations of these areas within New Hampshire.

Figure 10. The EPA's Intended Unclassifiable/Attainment Designations for Counties in New Hampshire
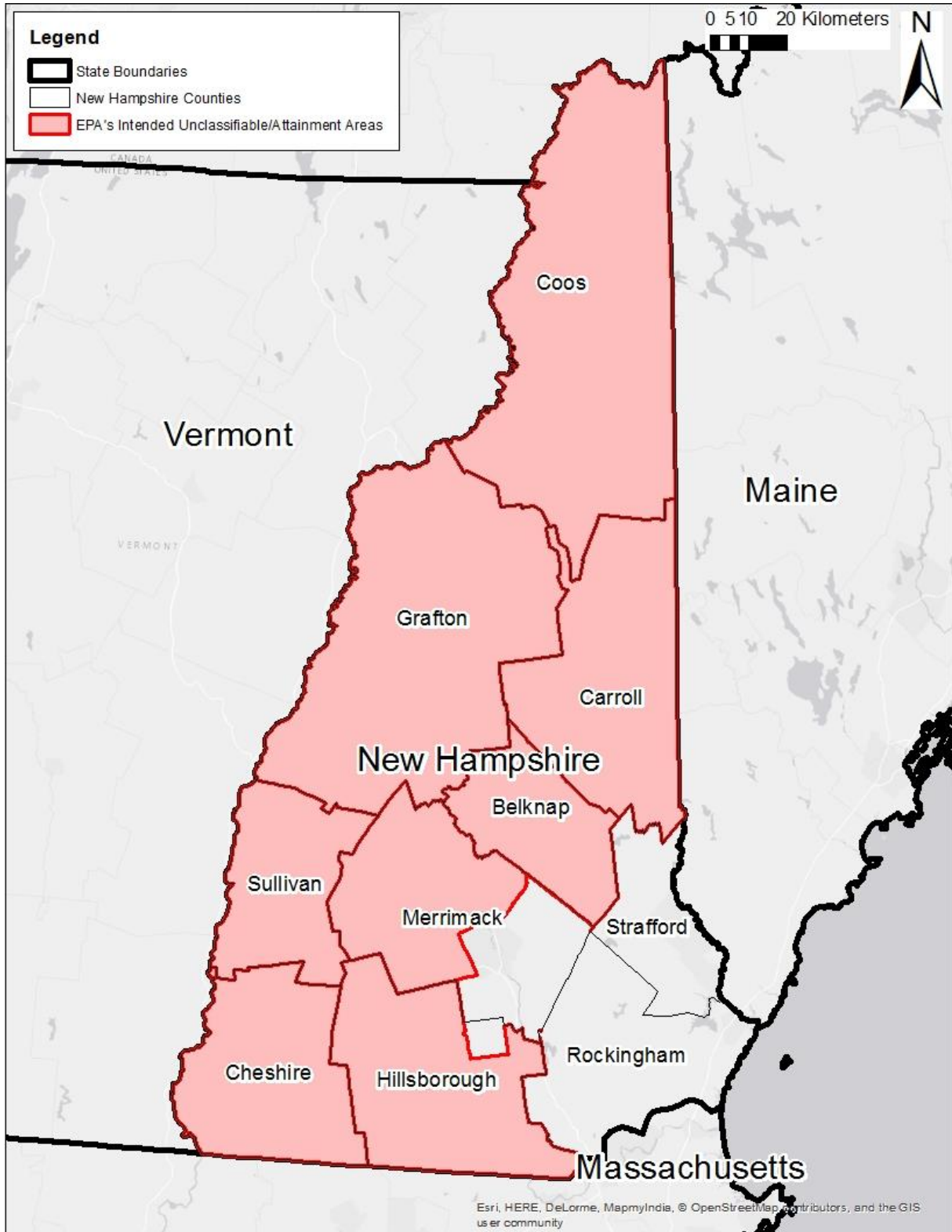
The source of this map image is Esri, used by EPA with Esri's permission.

As discussed in Section 1, there are no areas for which New Hampshire has elected to install and begin timely operation of a new, approved SO$_2$ monitoring network, and are required to be designated by December 31, 2020. Counties previously designated in Round 1 (*See* 78 *Federal Register* 4719) and Round 2 (*See* 81 *Federal Register* 45039) will remain unchanged unless otherwise noted. One area in New Hampshire, specifically the Central New Hampshire Area, was previously designated nonattainment in Round 1. No areas in New Hampshire were previously designated in Round 2.

4.2. Air Quality Monitoring Data for All Other Previously Undesignated Areas in New Hampshire

AQS monitor 33-011-5001 located at Miller State Park in Peterborough, Hillsborough County has sufficient valid data for 2014-2016 and the design value (3 ppb) indicates that there was no violation of the 2010 SO$_2$ NAAQS at the monitoring site in that period, but the EPA does not have information that this monitor is located in maximum concentration for its area.

For reference, see the annual posted air quality Design Values for SO$_2$ posted at our Air Quality Design Values website, https://www.epa.gov/air-trends/air-quality-design-values.

4.3. Jurisdictional Boundaries in All Other Previously Undesignated Areas in New Hampshire

Existing jurisdictional boundaries are considered for the purpose of informing the EPA's designation action for all other previously undesignated areas in New Hampshire. Our goal is to base designations on clearly defined legal boundaries, and to have these boundaries align with existing administrative boundaries when reasonable.

The state indicated county boundaries for its recommended areas for Belknap, Carroll, Cheshire, Coos, Grafton, and Sullivan Counties. For the recommended portions of Hillsborough and Merrimack Counties, the state recommended areas based on defined municipal boundaries for all areas not previously designated in the Central New Hampshire nonattainment area.

4.4. The EPA's Assessment of the Available Information for All Other Previously Undesignated Areas in New Hampshire

These counties were not required to be characterized under 40 CFR 51.1203(c) or (d) and the EPA does not have available information including (but not limited to) appropriate modeling analyses and/or monitoring data that suggests that the area may (i) not be meeting the NAAQS, or (ii) contribute to ambient air quality in a nearby area that does not meet the NAAQS. These counties therefore meet the definition of an "unclassifiable/attainment" area for this action.

Our intended unclassifiable/attainment areas, bounded by the county boundaries for Belknap, Carroll, Cheshire, Coos, Grafton, and Sullivan Counties, and municipal boundaries for the portions of Hillsborough and Merrimack Counties listed in Table 7, will have clearly defined legal boundaries, and we intend to find these boundaries to be a suitable basis for defining our intended unclassifiable/attainment areas.

Strafford County and the previously undesignated portion of Hillsborough County, which the EPA intends to designate as unclassifiable/attainment, border the New Hampshire Seacoast Area (see section 3 of this TSD).

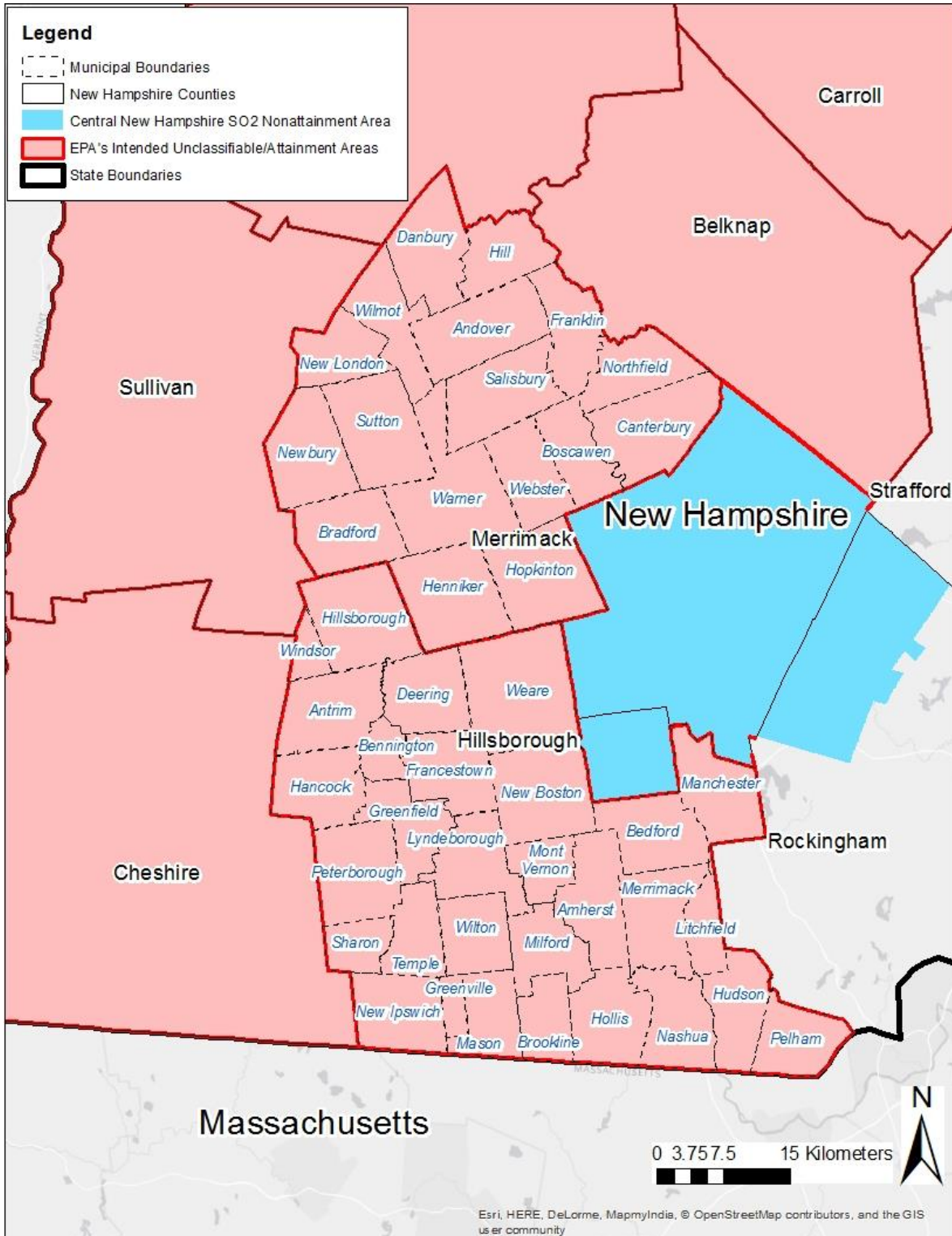## 4.5. Summary of Our Intended Designation for All Other Previously Undesignated Areas in New Hampshire

After careful evaluation of the state's recommendation and supporting information, as well as all available relevant information, the EPA intends to designate all other previously undesignated areas in New Hampshire as unclassifiable/attainment for the 2010 SO_2 NAAQS. Specifically, the boundaries are comprised of the county boundaries of Belknap, Carroll, Cheshire, Coos, Grafton, Strafford, and Sullivan Counties, and the municipal boundaries for previously undesignated areas of Hillsborough and Merrimack Counties. Figure 10 shows the location of these areas within New Hampshire.

For Belknap, Carroll, Cheshire, Coos, Grafton, Strafford, and Sullivan Counties, the boundary of the unclassifiable/attainment area is the county boundary. For Hillsborough and Merrimack Counties, the boundary of the unclassifiable/attainment area is the municipal boundaries for previously undesignated areas, specifically those listed in Table 7. The boundaries for the EPA's intended unclassifiable/attainment area within Hillsborough and Merrimack Counties are shown in Figure 11.

At this time, our intended designations for the state only apply to these areas and the New Hampshire Seacoast area presented in Section 3. Following the completion of these Round 3 designations, there will be no remaining undesignated areas in New Hampshire.

Figure 11. Boundary of the Intended Unclassifiable/Attainment Area in Hillsborough and Merrimack Counties, New Hampshire

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