JOHN H. LYNCH
Governor

State of New Hampshire
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Telephone (603) 271-2121
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March 12, 2009

Mr. Ira W. Leighton
Acting Regional Administrator
U.S. Environmental Protection Agency, Region I
One Congress Street, (Suite 1100-RAA)
Boston, MA 02114-2023

Re: Designation of Nonattainment Areas Under the 8-Hour Ozone Standard (2008)

Dear Mr. Leighton:

As required by the Clean Air Act ("CAA" or "Act") and the Transportation Equity Act for the 21st Century ("TEA-21"), I hereby submit boundaries for areas of New Hampshire which either do not currently attain the 2008 revised 8-hour National Ambient Air Quality Standard ("NAAQS") for ground level ozone or may exacerbate 8-hour ozone violations in downwind areas.

In its December 4, 2008 memorandum from Robert J. Meyers, the U.S. Environmental Protection Agency ("EPA") proposed the use of the most recent Core Based Statistical Areas ("CBSAs") or Combined Statistical Areas ("CSAs" - which includes two or more CBSA's) as presumptive 8-hour ozone nonattainment area boundaries. While the intent of designating areas as nonattainment large enough to capture both the areas that violate the standard and the sources that cause the violations is ideal, applying the concept in the real world is often complicated and can be non-cost effective. Statistical areas are socioeconomic boundaries that are not defined based on air pollution patterns. In fact, application of EPA's presumptive boundaries would extend New Hampshire's nonattainment into highly rural counties that are not only well below the new ozone standard, but are also downwind of the locations in need to cleaner air. Further, the New Hampshire Department of Transportation and the state's Regional Planning Commissions have expressed concerns about needing to expand their programs to meet nonattainment conformity requirements into these rural areas at significant cost while only producing minimal benefits at best. While clean air is very important, we need to make sure our financial investments to meet clean air goals are applied wisely and achieve the needed results. For these reasons I have asked my staff to develop alternative boundaries more consistent with science and common sense.

The boundaries recommended today were developed in consultation with EPA Region I and are consistent with the flexibility allowed in the guidance and conform with the Clean Air Act Section 107(d)(1)(A). These provisions require states to consider population, population density, projected growth, existing air quality, prevailing meteorology, and metropolitan planning organization boundaries. New Hampshire also considered a more important ozone determinant – geographic emission density – to ensure the inclusion of areas with significant emissions. Beyond this, New Hampshire voluntarily examined airflow trajectories during periods of high ozone in neighboring states to ensure New Hampshire's culpability, if any, is considered in the state's proposed boundaries.

The EPA presumptive boundary creates a single multi-state nonattainment area, including Massachusetts and Rhode Island. New Hampshire finds it inappropriate to be designated as part of such a single multi-state nonattainment area that includes Barnstable, Bristol, Norfolk, and Plymouth counties in southeastern Massachusetts because these counties are in a fundamentally different airshed, affected by transport from urban corridor to the southwest, after crossing the stable conditions of Long Island Sound. Because New Hampshire is further removed from these sources and the pollution has to cross less stable terrain, we expect our nonattainment areas to meet clean air goals before Southeastern Massachusetts and Rhode Island.

Rather than linking New Hampshire with Massachusetts and Rhode Island into a single nonattainment area, I propose that my environmental staff coordinate with staff from our neighboring states and EPA Region I, to ensure reasonable and consistent nonattainment classifications, analyses, and implementation plans across the region. This would meet EPA's need for consistency among the states while not putting New Hampshire at risk should our upwind neighbors not reach clean air goals in time. New Hampshire will also continue to work regionally and nationally to develop additional air pollution programs.

I submit this 8-hour ozone nonattainment area designation within New Hampshire as part of a regionally coordinated effort to reduce air pollution throughout the Northeast. A map of the proposed New Hampshire nonattainment area boundaries for the 8-hour ozone NAAQS can be found in Figure 1 below. Greater detail regarding New Hampshire's boundary determinations is provided in the accompanying Technical Attachment (Attachment B).

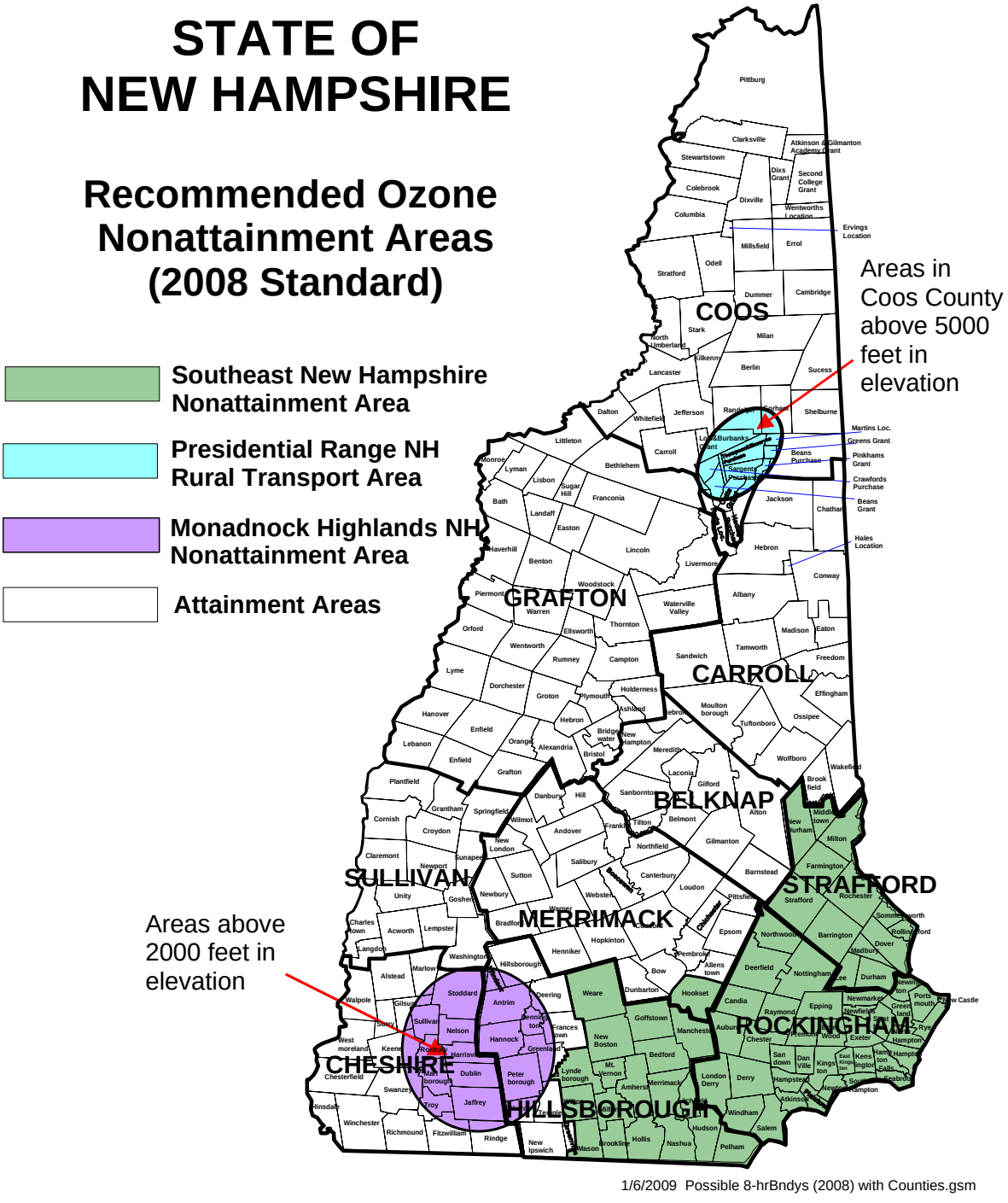
Thank you for your consideration of my recommendations. As stated before, while my recommendations do vary from the EPA presumptive CBSA/CSA boundaries, they follow EPA's published guidance in establishing alternatives. I expect that EPA would provide my staff with similar scientific analyses and anticipated air quality benefits should you choose to make any alterations to my proposal. If you have any questions regarding this determination, please contact Thomas Burack, Commissioner of the Department of Environmental Services at (603) 271-2958.

Sincerely,

John H. Lynch
Governor

Attachments
cc: Thomas Burack, DES
Robert Scott, DES
Jeffrey Underhill, DES
Arthur Marin, NESCAUM
Anna Garcia, OTC

FIGURE 1. Proposed Areas of Nonattainment for 8-Hour Ozone NAAQS in New Hampshire (2008 NAAQS)



ATTACHMENT A

Comments Received Regarding New Hampshire's 8-Hour Ozone Nonattainment Area Boundaries

New Hampshire DOT
Department of Transportation

THE STATE OF NEW HAMPSHIRE
DEPARTMENT OF TRANSPORTATION

GEORGE N. CAMPBELL, JR.
COMMISSIONER

JEFF BRILLHART, P.E.
ASSISTANT COMMISSIONER

February 25, 2009

Tom Burack
Commissioner
NH Department of Environmental Services
PO Box 95
Concord, NH 03302-0095

Subject: Redesignation of 8-Hour Ozone Nonattainment Boundaries

Dear Commissioner Burack:

We appreciate the opportunity to comment on your proposal, pursuant to the Clean Air Act, for redesignation of the Southeast NH 8-Hour Ozone Nonattainment Area. Based on information provided thus far through meetings and conference calls with DES and DOT staff, we encourage limiting any expansion of the nonattainment boundary to the confines of Hillsborough, Rockingham, and Strafford Counties. Within that geographic area, please also carefully weigh the potential positive impacts versus the negative for each municipality, particularly those that are rural and removed from any urbanized area.

Minimizing the expansion to include only areas that could benefit from designation will not only diminish the need for significant additional resources to be dedicated to Conformity, but will also instill faith that designation is based on meaningful science and not arbitrary political or geographic boundaries. For those same reasons, we strongly discourage any expansion to include a connection with adjacent states.

We look forward to working with you and your staff further as the redesignation process continues. If you have any questions or would like to discuss redesignation further please do not hesitate to contact me. Your staff may wish to contact Steve Dubois or Nicholas Alexander at 271-3344.

Sincerely,

George N. Campbell
Commissioner

cc: David J. Brillhart, NHDOT
Bill Watson, NHDOT /email
Interagency Consultation Partners /email

S:\ANALYSIS\CLEANAIR\Boundary_Designation\ltr_DOT-comments-DES-Proposal.DOC

JOHN O. MORTON BUILDING • 7 HAZEN DRIVE • P.O. BOX 483 • CONCORD, NEW HAMPSHIRE 03302-0483
TELEPHONE: 603-271-3734 • FAX: 603-271-3914 • TDD: RELAY NH 1-800-735-2964 • INTERNET: WWW.NHDOT.COM

Memorandum

To: Bill Watson, Administrator
Planning & Community Assistance

From: Nicholas Alexander, Transportation Planning Specialist
Planning & Community Assistance

Regarding: NHDES Proposal for Redesignation of Ozone Nonattainment Boundaries

Date: February 18, 2009

In 2008 the US EPA promulgated a new, more stringent standard for the air pollutant ozone. The New Hampshire Department of Environmental Services (DES) recently presented information on how that new standard may change the nonattainment boundaries in NH. The attached map shows the existing nonattainment area shaded in green. We have been invited to comment on the information submitted by DES thus far. The process moving forward is that DES will submit a proposal to the Governor's Office for consideration. That proposal or an alternative, after being endorsed by the Governor, must be forwarded to EPA on or before March 12, 2009. At this time DES is still developing the proposal they intend to submit to the Governor's Office. They are leaning toward a submittal similar to Scenario #1 below, but have recently committed to reevaluating the expansion into western Hillsborough County.

Any expansion of the nonattainment area would require additional coordination with various jurisdictions and agencies as well as expanded transportation modeling. In additional, any future environmental documents for projects in these new areas, particularly of EIS or EA level, would need to specifically address Conformity. The costs associated with that type of work, as recently demonstrated in the Salem-Manchester I-93 project, can be substantial.

DES Scenario #1: Expansion to include all of Hillsborough, Rockingham & Strafford Counties

- Classifies 30 additional municipalities as nonattainment; 52 are currently nonattainment;
- 120 planned DOT projects over the next 5 years in those 30 municipalities would need to be reviewed and could be impacted by Conformity;
- 2 additional planning commissions, Central and Southwest, would need to become involved in Conformity;
- Transportation models would need to be expanded or developed to include the expansion;
- Estimated 15 additional DOT staff days/year, $50k-$100k for model development as well as additional annual expenses for operation and maintenance ($10-$15k/year).

DES Scenario #2: Expansion to include all of Hillsborough, Rockingham, Strafford, Belknap & Merrimack Counties with a possible connection to eastern Massachusetts and Rhode Island

- Classifies 67 additional municipalities as nonattainment, 52 are currently nonattainment;
- 320 planned DOT projects over the next 5 years in those 67 municipalities would need to be reviewed and could be impacted by Conformity;
- 3 additional planning commissions, Central, Southwest, and Lakes Region, would need to become involved in Conformity;
- Transportation models would need to be developed to cover the expansion;
- Estimated 30-50 additional DOT staff days/year, $150k-$250k for model development as well as additional annual expenses for operation and maintenance ($30-$50k/year).

A significant number of the municipalities affected by either proposal are very rural in nature with scarce transportation infrastructure, no transit accessibility, and limited commercial development. While requiring significant investments of time and resources, imposing conformity on municipalities of that type would have virtually no impact on the air quality of the region.

DES has welcomed comments from the Department prior to their submittal to the Governor as well as to accompany the State's submittal to EPA. Please let me know how you would like to proceed and if you have any questions.

LAKES REGION PLANNING COMMISSION

103 Main Street, Suite #3
Meredith, NH 03253
tel 603-279-8171
fax 603-279-0200
www.lakesrpc.org

February 18, 2009

Mr. Jeff Underhill, Chief Scientist
NH Department of Environmental Services
Air Resources Division
P. O. Box 95
Concord, NH 03302

Dear Jeff:

The following is the Lakes Region Planning Commission's response to your request for comments on the proposed New Hampshire ozone non-attainment boundary. For many years, EPA has designated LRPC communities with attainment status. Based on one of the options recently put forth by the Environmental Protection Agency, it appears that several LRPC communities located within Belknap and Merrimack counties may now qualify as non-attainment areas. Before we can make a fully informed decision about attainment or non-attainment status for the region, it would be prudent for us to become aware of the process and information used to identify those communities that were selected or highlighted by the EPA as non-attainment communities.

In a larger context, we believe that attainment status is much preferred and warranted based on the data we have seen, absent specific scientific data that would prove otherwise. We would hope that the NH Department of Environmental Services and the NH Department of Transportation will take these factors into consideration and will consult with the LRPC prior to putting forth any suggestions to the federal government or the Governor that would place the communities in the LRPC area in non-attainment status.

Feel free to contact me if you have any questions.

Sincerely,

Kimon Koulet
Executive Director

Cc: Chris Skoglund, NHDES Energy & Transportation Analyst

Southwest Region Planning Commission
20 Central Square, Second Floor Keene, NH 03431 603-357-0557 FAX 357-7440

March 2, 2009

Jeff Underhill, Chief Scientist
Atmospheric Science & Analysis
NHDES Air Resources Division
29 Hazen Drive, PO Box 95
Concord, NH 03302-0095

Dear Mr. Underhill:

Please accept this letter as input to the review of alternatives to expand the 8-hour ozone non-attainment area that have been recently put forward. The Southwest Region Planning Commission (SWRPC) serves 35 towns including 11 towns in the western portion of Hillsborough County. Among the alternatives being considered is the expansion of the non-attainment area to include these 11 towns. Concerns with this alternative include the following:

- As you know, ozone non-attainment areas are typically associated with urban development. The 11 towns comprising western Hillsborough County are rural in nearly every aspect with an average population of just over 2,000 and possessing traditional village districts along with rural residential, agricultural and forested landscapes. Most of these towns do not even have roadway intersections that warrant traffic signals.
- Ozone non-attainment designation may result in additional regulatory requirements that could have the effect of putting these rural towns at a competitive disadvantage in attracting economic development activity such as businesses and manufacturing. In addition, existing activity may be limited or discouraged from expanding.
- Ozone non-attainment designation will require air quality conformity analysis when considering infrastructure projects. As you are aware, conformity analysis and associated modeling is complex and costly. Although this is appropriate science as applied in urban settings, it would appear inefficient in these rural communities. Furthermore, any meaningful difference this analysis will make in reducing ozone levels is difficult to envision calling into question the value of conducting such analysis for these rural towns.
- From a process standpoint, the review time allocated for considering the various ozone non-attainment alternatives is constrained, representing just a few weeks time. SWRPC has not had sufficient time to adequately assess the true impact of expanding the ozone non-attainment area to the eastern one-third of our planning district, nor have we had the opportunity to inform our municipal members and engage their participation in the review process in any meaningful way. When considering the potential implications of ozone non-attainment designation such as indicated in the comments above, sufficient time for public review and input is an important component of the process.

At the time of this writing, I understand that the NH Department of Environmental Services is not proposing the ozone non-attainment expansion alternative that would extend throughout the western Hillsborough County towns, opting instead to recommend a Monadnock Highlands non-attainment area

which would apply to certain areas in excess of 2,000 feet of elevation. This Monadnock Highlands designation seems to be more in keeping with the probable cause of higher ozone readings measured in areas of higher elevation through the transport of such ozone from farther-off urban areas. We are in the process of understanding the extent of area impacted as well as the implications of this Monadnock Highlands designation on these areas. It is interesting to note, for example, that the majority of the area subject to the Highlands designation based upon how it is depicted on the map falls within Cheshire County rather than Hillsborough. However, suffice it to say that we are appreciative that you have listened to and responded to the concerns we have raised including those mentioned above.

Thank you for this opportunity to provide comment and for your consideration of our input. If you have any questions, please feel free to contact me directly.

Sincerely,

Tim Murphy
Executive Director

TPM/rb

United States Department of Agriculture **Forest Service** **White Mountain National Forest**
719 N. Main Street
Laconia, NH 03246
Comm: (603) 528-8721
TTY: (603) 528-8722

File Code: 2580
Date: March 9, 2009

Jeffrey Underhill, Ph.D.
Chief Scientist, Air Resources Division
New Hampshire Department of Environmental Services
29 Hazen Drive, P.O. Box 95
Concord, NH 03302-0095

Dear Mr. Underhill:

The White Mountain National Forest appreciates the opportunity to review the proposed new non-attainment area boundaries for the revised 8-hour ozone standard. As you are aware, the Forest Service is interested in maintaining or improving air quality within our area of responsibility and working closely with the States and other partners to accomplish this important National goal. It is my understanding that you are proposing the summits of the Presidential Range above 5000 feet as Rural Transport Areas based on the available data that shows these fragile environments most exposed to pollution transport winds.

We support your non-attainment recommendation as a reasonable approach to focus on the sources of pollution most effecting air quality in this area of New Hampshire. Your recommendation is consistent with our ongoing acid rain research and air quality monitoring conducted on the National Forest.

Please let me know if we can be of further assistance.

Sincerely,

/s/ Thomas G. Wagner
THOMAS G. WAGNER
Forest Supervisor

Thomas R. Doane, U.S. Forest Service
Ralph Perron, U.S. Forest Service
Ann Acheson, U.S. Forest Service
Peter W. Lahm, U.S. Forest Service
Robert Scott, NH DES

ATTACHMENT B

TECHNICAL ATTACHMENT
Rationale for New Hampshire's 8-Hour Ozone Nonattainment Area Boundaries

Rationale for New Hampshire's 8-Hour Ozone Nonattainment Area Boundaries

The recommendations contained in this letter are fully compliant with Section 107(d)(1)(A) of the Clean Air Act ("CAA") which defines a nonattainment area as any area that (1) does not meet the ozone National Ambient Air Quality Standard ("NAAQS"), or (2) contributes to ambient ozone violations in a nearby area. These boundaries exercise the flexibility allowed in the guidance, considering: population, population density, projected growth, existing air quality, prevailing meteorology, and metropolitan planning organization boundaries. In addition, geographic emission densities and airflow trajectories were also considered. Table B1 contains the most recent 3-years of quality assured monitoring data for ozone in New Hampshire. These monitors are marked in Figure B1 along with the recommended nonattainment area boundaries.

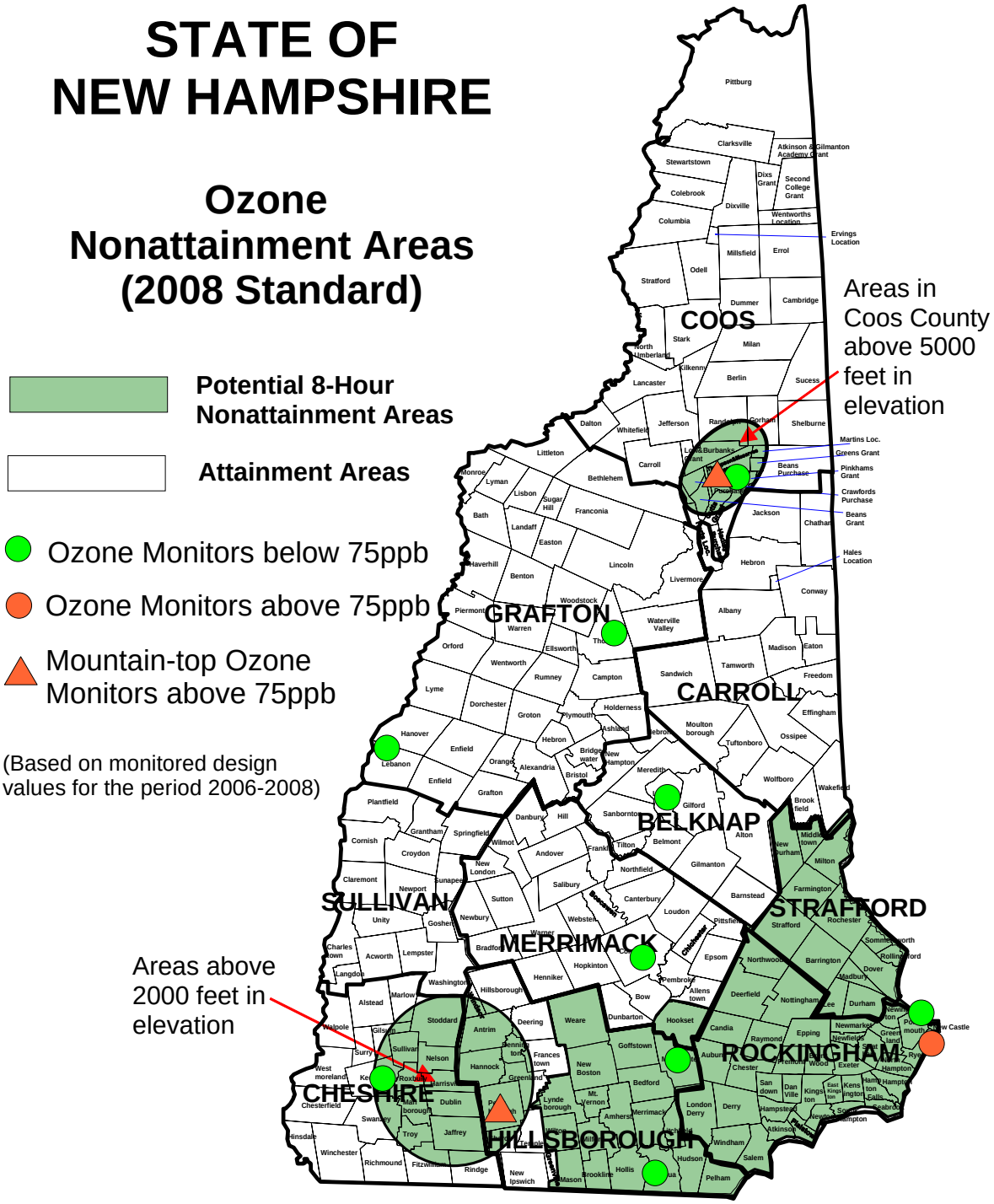
According to the New Hampshire recommendation, there will be three separate nonattainment areas in the state, the largest of which is the southeastern New Hampshire area that encompasses the state's largest cities and areas of population growth. The second area considers the highlands in the Monadnock region of southwestern New Hampshire, where mountaintop monitored ozone levels have exceeded the ozone standard, but the monitored ozone levels at lower elevations do not. The third area represents the remote mountains surrounding Mt. Washington in the northern portion of the state. This high elevation monitor is far removed from population centers and well above the overnight inversion layers, making it a good choice as a Rural Transport Area. More discussion for each of the three areas can be found below.

TABLE B1. 2006 – 2008 8-Hour Ozone Design Values by Monitor, in parts-per-billion (ppb)

Location	Monitor ID	2006-08 Design Value	2006 4th Max	2007 4th Max	2008 4th Max
Southeast NH Area					
Manchester	330110020	68	68	74	64
Nashua	330111011	73	73	**81**	67
Portsmouth	330150014	73	73	**78**	69
Rye	330150016	**79**	**76**	**86**	**75**
Monadnock Highlands					
Miller State Park	330115001	**78**	**78**	**81**	**76**
Presidential Range					
Mt. Washington Summit	330074001	**76**	69	**85**	**75**
Camp Dodge	330074002	61	59	61	65
Attainment Areas					
Claremont	330190003	68	64	**76**	66
Concord	330131007	70	69	74	67
Keene	330050007	69	67	73	68
Laconia	330012004	70	67	**75**	70
Lebanon	330090010	67	63	72	68

Values in bold exceed the 8-hour ozone NAAQS threshold of 75 parts per billion.

FIGURE B1. Proposed Areas of Nonattainment for 8-Hour Ozone NAAQS in New Hampshire (2008 NAAQS)



As requested in EPA's guidance (and consistent with how designations are identified in Part 81 of the Code of Federal Regulations), attainment/nonattainment information is provided in Table B2. This information, along with digitized longitude and latitude coordinates for mapping purposes, and electronic versions of this data and associated maps will be provided.

TABLE B2. Proposed Designations of Areas of 8-Hour Ozone NAAQS Nonattainment in New Hampshire

NEW HAMPSHIRE – OZONE (8-HOUR STANDARD)

Designated Area	Designation Type	Classification Type
Southeast New Hampshire Nonattainment Area:	Nonattainment	TBD*
Hillsborough County:		
Includes only the following towns:		
Amherst	Nonattainment	TBD*
Bedford	Nonattainment	TBD*
Brookline	Nonattainment	TBD*
Goffstown	Nonattainment	TBD*
Hollis	Nonattainment	TBD*
Hudson	Nonattainment	TBD*
Litchfield	Nonattainment	TBD*
Lyndeborough	Nonattainment	TBD*
Manchester	Nonattainment	TBD*
Mason	Nonattainment	TBD*
Merrimack	Nonattainment	TBD*
Milford	Nonattainment	TBD*
Mt. Vernon	Nonattainment	TBD*
Nashua	Nonattainment	TBD*
New Boston	Nonattainment	TBD*
Pelham	Nonattainment	TBD*
Weare	Nonattainment	TBD*
Wilton	Nonattainment	TBD*
Merrimack County:		
Includes only the following towns:		
Hooksett	Nonattainment	TBD*
Rockingham County:	Nonattainment	TBD*
Strafford County:	Nonattainment	TBD*

* - Classification of the Southeast New Hampshire Nonattainment Area will be determined in coordination with classification efforts for Massachusetts and Rhode Island.

TABLE B2. Proposed Designations of Areas of 8-Hour Ozone NAAQS Nonattainment in New Hampshire (continued)

NEW HAMPSHIRE – OZONE (8-HOUR STANDARD)

Designated Area	Designation Type	Classification Type
Presidential Range NH Rural Transport Area:	Nonattainment	Rural Transport
Includes only the following areas Above 5000 feet elevation (msl):		
Coos County:		
Boot Spur	Nonattainment	Rural Transport
Mt. Adams	Nonattainment	Rural Transport
Mt. Clay	Nonattainment	Rural Transport
Mt. Jefferson	Nonattainment	Rural Transport
Mt. Madison	Nonattainment	Rural Transport
Mt. Monroe	Nonattainment	Rural Transport
Mt. Quincy Adams	Nonattainment	Rural Transport
Mt. Washington	Nonattainment	Rural Transport
Monadnock Highlands NH Nonattainment Area:	Nonattainment	Marginal
Includes only the following areas Above 2000 feet elevation (msl):		
Cheshire County:		
Bald Mountain	Nonattainment	Marginal
Fletcher Mountain	Nonattainment	Marginal
Hodgeman Hill	Nonattainment	Marginal
Hubbard Mountain	Nonattainment	Marginal
Jackson Hill	Nonattainment	Marginal
Mt. Monadnock	Nonattainment	Marginal
Osgood Hill	Nonattainment	Marginal
Pitcher Mountain	Nonattainment	Marginal
Hillsborough County:		
Burton Peak	Nonattainment	Marginal
Crotched Mountain	Nonattainment	Marginal
Holt Peak	Nonattainment	Marginal
North Pack Monadnock Mtn	Nonattainment	Marginal
Pack Monadnock Mtn	Nonattainment	Marginal
Rest of State	Attainment	

Evaluation of the Degree of Nonattainment in New Hampshire

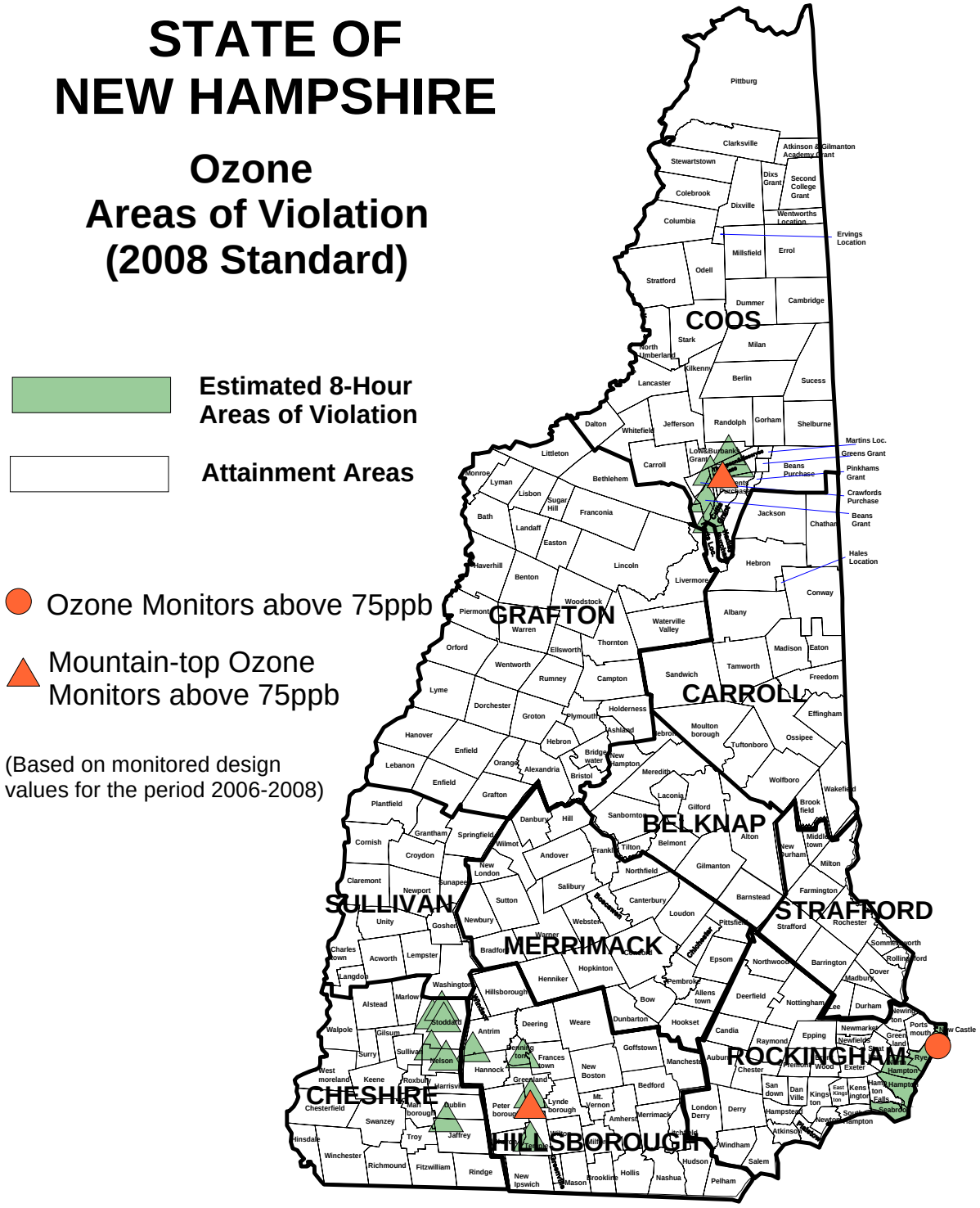
The recommended boundaries for the Southeast New Hampshire Nonattainment Area were developed in consultation with EPA Region I and are consistent with the flexibility allowed in the guidance. EPA Region I specifically requested justification for not being fully inclusive of the Boston-Worcester-Manchester CSA boundaries and why the state seeks to designate its nonattainment areas separately from the Massachusetts and Rhode Island portions of the CSA. The explanation that follows is consistent with the nine factors specified in Section 107(d)(1)(A) and the Ozone Transport Region provisions of the Clean Air Act, and considers benefits likely to be achieved for the requirements.

Nine Factors for Evaluating Designation Boundaries

1. Air Quality data
2. Emissions data
3. Population density and degree of urbanization
4. Traffic and commuting patterns
5. Growth rates and patterns
6. Meteorology and transport patterns
7. Geography and topography
8. Jurisdictional boundaries (counties, existing nonattainment area boundaries, MPOs, etc.)
9. Level of control of emission sources

New Hampshire's analyses started with the identification of areas within the State that are actually in violation of the 8-hour ozone standard (see figure B2 below). After examining the attainment status with updated monitoring data for the period 2006 through 2008, only the Rye monitor at Odiorne Point State Park violates the standard for regular population based monitors (Table B1). Because of the coastal effect driving Ordiorne Point ozone levels higher than nearby Portsmouth, NHDES concludes that all towns bordering the Atlantic coast are also likely in violation of the new ozone standard. In addition, mountain-top monitors at Miller State Park (Pack Monadnock Mountain), and Mt. Washington also exceed the NAAQS, but represent mountain highlands and transport layers rather than population exposure. Each of these mountain areas had violations extrapolated to similar terrain in the immediate areas. It makes sense to separate the highlands from the core Southeast New Hampshire nonattainment area because they represent differing patterns of influence and this allows the state to reach further into adjoining counties on a scientifically sound basis.

FIGURE B2. Areas of Violation of the 8-Hour Ozone NAAQS in New Hampshire



1. Southeast New Hampshire Nonattainment Area Discussion

As a starting point in defining the core Southeast New Hampshire nonattainment area, New Hampshire started with EPA guidance. In its December 4, 2008 memorandum from Robert J. Meyers, the U.S. Environmental Protection Agency ("EPA") proposed the use of the most recent Core Based Statistical Areas ("CBSAs") or Combined Statistical Areas ("CSAs" - which includes two or more CBSA's) as presumptive 8-hour ozone nonattainment area boundaries. While the intent of designating areas as nonattainment large enough to capture both the areas that violate the standard and the sources that cause the violations is ideal, applying the concept in the real world is often complicated. CBSAs and CSAs are defined by socio-economic patterns proximate to urban centers rather than by factors which determine air quality, but they are attractive for nonattainment area boundaries because they are predefined political boundaries that represent urban proximity. Application of CBSAs/CSAs work well in regions of the country where transport of the offending pollutant doesn't pass from region to region as it does in the Northeast U.S. Because the wind can easily direct pollutants outside of the metropolitan area boundaries, the use of CBSAs/CSAs to derive nonattainment area boundaries can result in a designation that is too small on the upwind side and too large on the downwind side.

In fact, the presumptive norm would extend the New Hampshire portion into very rural downwind counties where pollution control programs could only produce very small reductions whose benefits would blow with the wind away from the areas that need the benefit. Further, The New Hampshire Department of Transportation and the state's Regional Planning Commissions have expressed concerns about needing to expand their programs at significant cost while only producing minimal benefits at best. New Hampshire Department of Transportation estimates that it would cost them upwards of $0.25 million to establish the modeling ability to add the required conformity analyses to the full extent of the CSA, with annual costs of up to $50,000. These additional costs come at a time of great financial distress. Further, the Department of Transportation has advised us that the vast majority of the towns to be added to fill out the full county presumptive boundary are extremely rural and represent only a tiny fraction of the emissions of the previously defined 8-hour nonattainment area.

In the interest of forming better consistency between past 1-hour ozone Serious nonattainment areas with present 8-hour ozone boundaries, NHDES feels it is appropriate to ensure both areas are fully inclusive of and maximize the ability of the states Metropolitan Planning Organizations ("MPO's") to contribute to modeling for conformity. All towns from the Boston CSA that are excluded in this recommendation fall outside of the New Hampshire MPOs and would require new accommodations for planning and modeling for conformity determinations (Figure B4). In addition, the towns excluded from the designation have significantly lower nitrogen oxides ("NOx") emission densities than those areas contained within the recommended boundaries (Figure B5). As a result, the area proposed for designation captures the vast majority of the state's emissions, and much of those emission areas not falling within the boundaries lie on the downwind edge of the CSA and have ozone design values safely below the NAAQS (Table B3).

The boundaries are however fully inclusive of previously designated 8-hour ozone nonattainment areas and areas formerly classified as serious nonattainment for 1-hour ozone standard (Figure B3). Because of the low-levels of emissions in the towns that fall within the CSA boundaries but do not fall within our proposed nonattainment area boundaries, we expect negligible additional benefit towards improved air quality in the region if these towns were to be

included within the nonattainment area. Further, these areas are primarily located on the downwind edge of the region exceeding the ozone standard and are unlikely to contribute to exceedances in the area. Including these towns would provide administrative completeness with the presumptive norm, but would come at a cost to the communities and to the state with virtually zero additional benefit.

Merrimack Station, the state's largest single source emitter of NOx, resides in the town of Bow, which has been excluded from the New Hampshire recommended nonattainment area. The power plant in that town is already maximally controlled for oxides of nitrogen ("NOx") through the use of selective catalytic reduction on both of its boilers (as part of the NOx Budget Rule in an approved State Implementation Plan ("SIP") revision) and has electrostatic precipitators ("ESPs") to control particle emissions. By state law, the facility is required to install a wet scrubber system for sulfur dioxide and mercury emission reductions and have it operational by 2013. The plant is also required to fulfill OTR and MANE-VU requirements. There is no additional benefit to including the power plant within the designated area.

In New Hampshire, local pollution controls are important to prevent air quality degradation, however the greatest success in recent years in reducing ozone has come from super-regional and national air pollution control programs. Programs such as the federal NOx SIP Call for power plants and the Low Emission Vehicle program for automobiles has been unprecedented in the air quality benefits they provided and there is room to take these programs further. It should be clearly noted that regardless of boundary designations, all portions of New Hampshire will continue to operate under Ozone Transport Region requirements, Ozone Transport Commission emission control strategies, state-wide permitting and offset requirements, state-wide Onboard Diagnostic requirements for mobile sources, and state-wide Stage 1 requirements. In addition, all of Hillsborough, Merrimack, Rockingham, and Strafford Counties will continue to have reformulated gasoline and Stage 2 requirements.

EPA's guidance indicates that the rationale for the presumptive CSA or CBSA boundary is the need to consider emission controls over a larger area due to the pervasive nature of ozone and the transport of ozone and its precursors. However, this important goal is met if all contributing areas within a CSA are designated as a non-attainment area, with the same ozone classification,[1] even if they are not within the same non-attainment area. Rhode Island and eastern Massachusetts are likely to be classified by EPA at the same level based on the severity of their ozone violations. New Hampshire's ozone concentrations will likely allow the state to designate its nonattainment area in a less severe classification than eastern Massachusetts. However, New Hampshire intends to request that EPA classify its Southeastern New Hampshire non-attainment area at the same level as designated for eastern Massachusetts. Thus, eastern Massachusetts, Rhode Island and southern portions of New Hampshire would be subject to Clean Air Act control requirements commensurate with their uniform classification.

New Hampshire is strongly committed to working with other states within the Ozone Transport Region to address air quality on a regional basis. The Ozone Transport Commission member states are engaged in an ongoing regional attainment planning process for the 2008 ozone standard. That process includes coordinated development of emissions inventories, joint

[1] Ozone non-attainment areas are classified based on the level of severity of their ozone problem. The Clean Air Act requires certain emission control measures based on classifications. Southeastern New Hampshire, Eastern MA and Rhode Island are "moderate" non-attainment areas under the 1997 standard. EPA will issue classifications for non-attainment areas under the 2008 ozone standard in 2010.

ozone attainment modeling, and the development of recommended control strategies for all states within the OTC. New Hampshire, Massachusetts, and Rhode Island are actively engaged in this OTC planning process. Thus, the coordinated planning efforts that would be one of the advantages of a three-state non-attainment area are already in place. In addition, New Hampshire Massachusetts, and Rhode Island intend to further consult with each other, and with Region 1 EPA staff, to identify any additional State Implementation Plans and attainment issues on which the three states may be able to coordinate.

The Clean Air Act and SIPs are designed to be implemented on a state-by-state basis. Each state must prepare its own SIP and conduct public hearings on proposed SIP revisions and adopt controls through its own regulatory process. Thus, state jurisdictional issues support single-state SIPs, unless there is a good rationale for a multi-state area.

A single multi-state SIP would be administratively more complex for each of the three states and require the commitment of additional staff resources. This is particularly true in New Hampshire because, in addition to the Southeast New Hampshire non-attainment areas, the state is also proposing two other areas that will need to be addressed. Preparing one State Implementation Plan that covers all pertinent New Hampshire non-attainment areas will require less staff time than preparing one SIP for New Hampshire only areas and a separate multi-state SIP for Southeastern New Hampshire. Under present budgetary constraints, the use of limited staff resources is an important consideration.

FIGURE B3. Proposed Areas of Nonattainment for 8-Hour Ozone NAAQS Compared to CMSA and Existing 1-Hour Ozone Serious Nonattainment Area Boundaries in New Hampshire

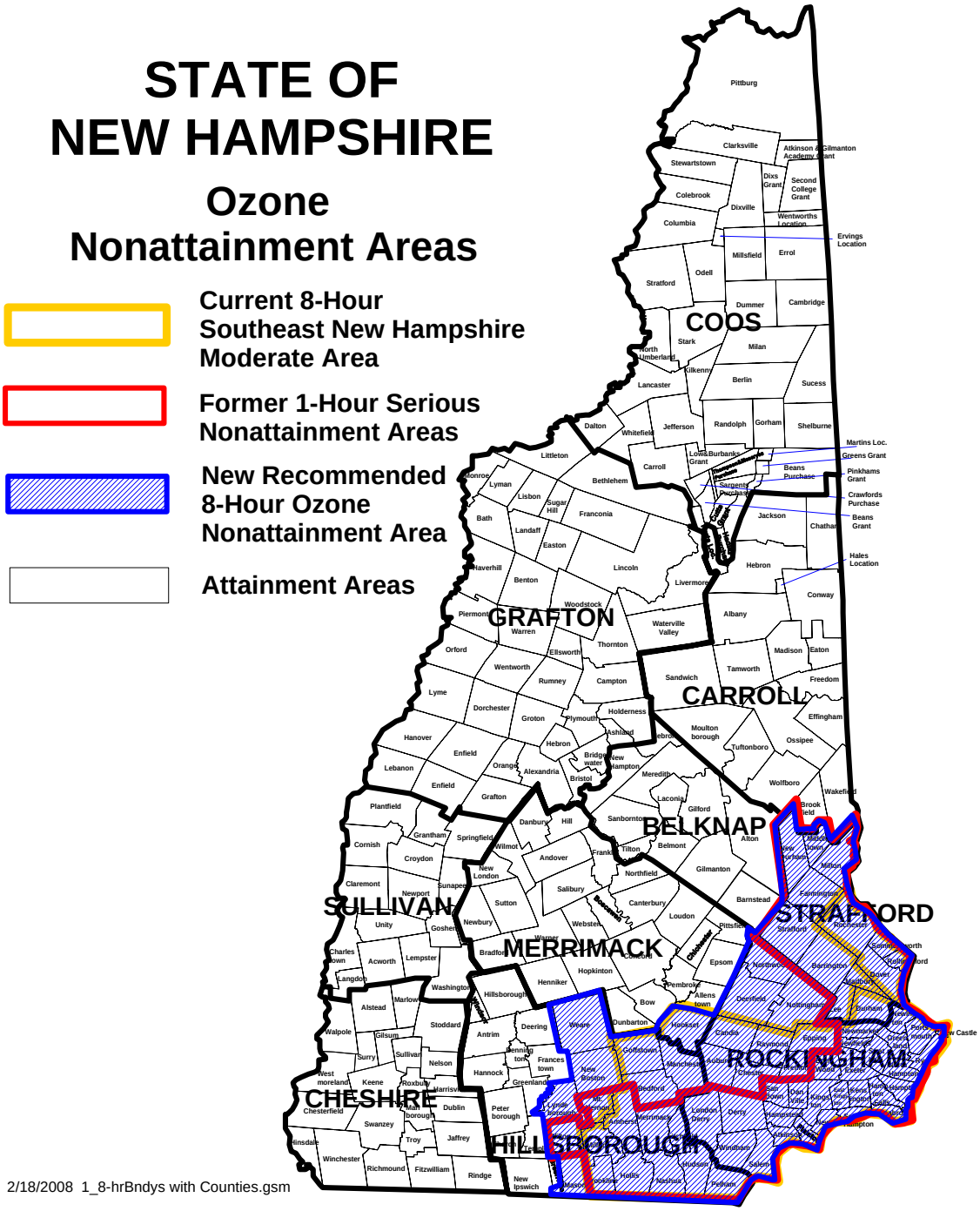


FIGURE B4. Map of New Hampshire Metropolitan Planning Organizations and Regional Planning Commissions

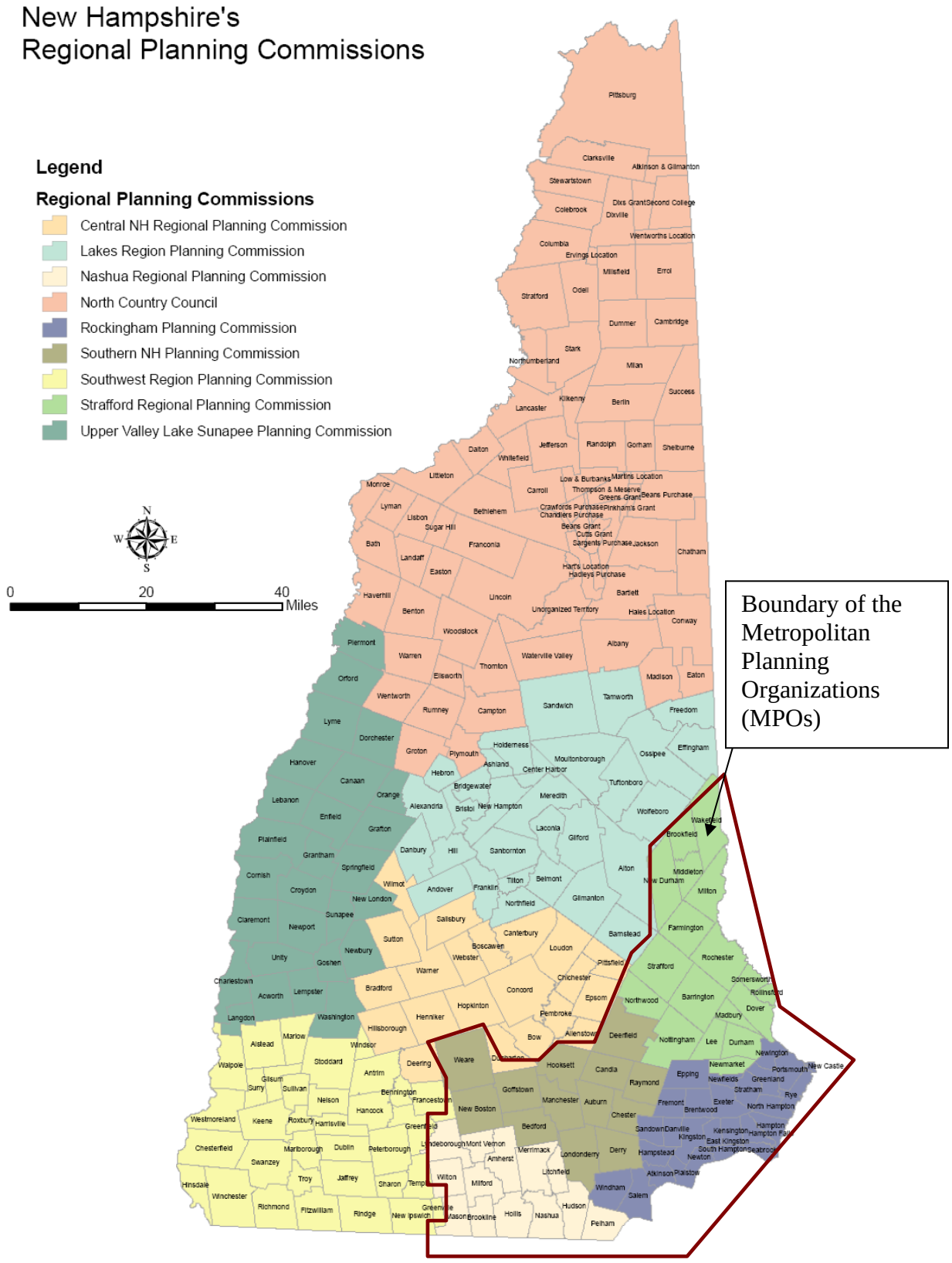
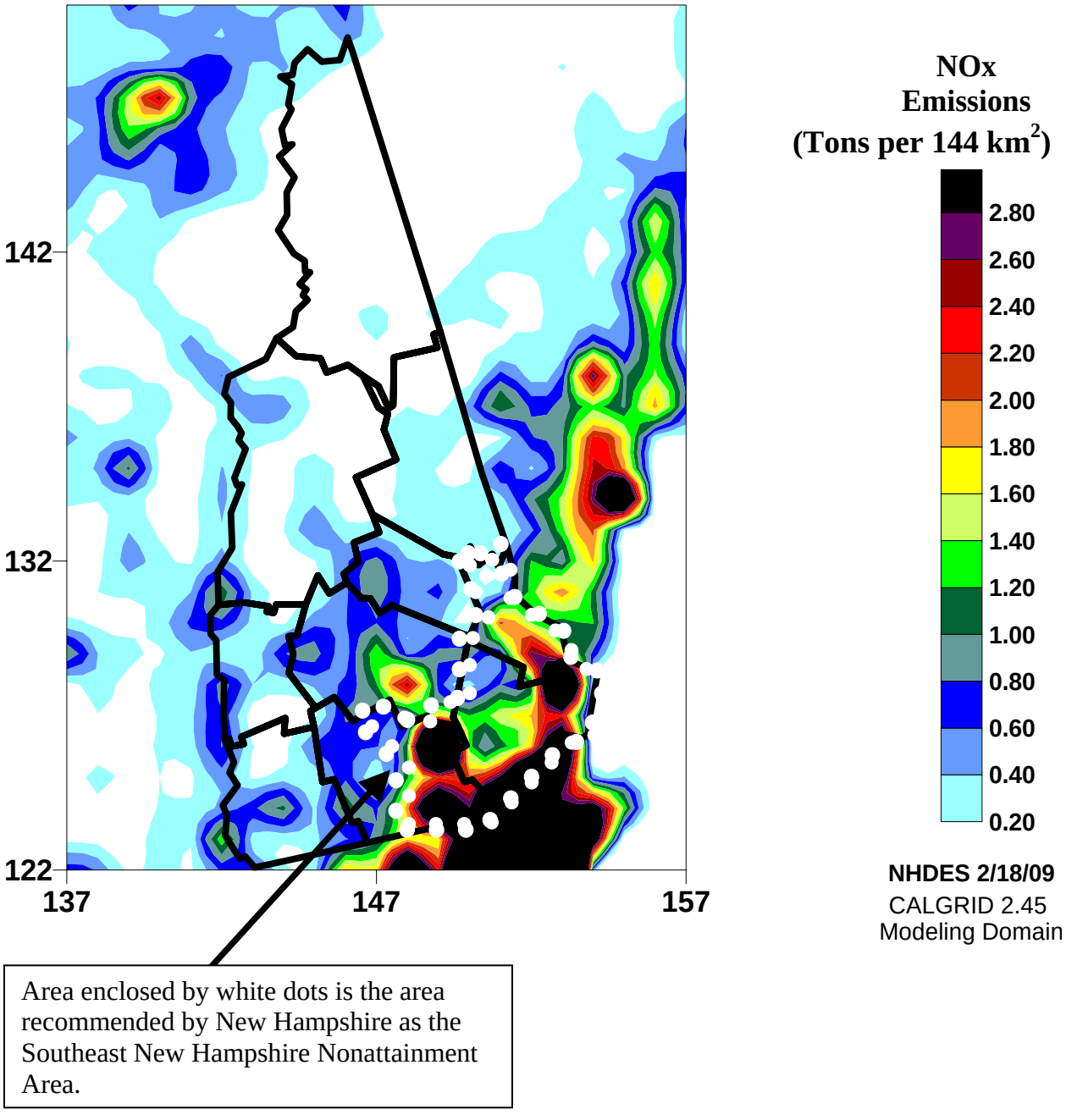


FIGURE B5. New Hampshire-NOx Emission Density

Total Area Source and Mobile NOx Emissions
2002 Base Case
August 12, 2002



Relative geographic emission density estimates are based on modeling inventories for the OTC Photochemical Modeling Domain for 8-hour ozone modeling initiative.

TABLE B3. Towns in the New Hampshire Portion of the CBA that are Not Included in the Recommended New Hampshire Area of Influence

County Town	2007 Census Pop.	2000 Census Pop.	Growth Rate (%/yr)	2007 Pop. Density (#/sqmi)	Ozone DV (ppb) nearest monitor	Notes**
State Totals	**1,312,256**	**1,235,786**	**0.92**	**137.4**	--	--
Belknap County Totals	**61,048**	**56,325**	**1.2**	**152**	70	**All portions subject to State-wide permitting and offset requirements, OTR Requirements, OTC Controls, OBD and Stage 1**
Alton	5,070	4,503	1.8	80	70	Remote and downwind, low population density, low emissions
Barnstead	4,567	3,886	2.5	109	70	Remote and downwind, low population density, low emissions
Belmont	7,161	6,720	0.9	234	70	Remote and downwind, low population density, low emissions
Center Harbor	1,104	997	1.5	82	70	Remote and downwind, low population density, low emissions
Gilford	7,397	6,803	1.2	190	70	Remote and downwind, low population density, low emissions
Gilmanton	3,513	3,055	2.1	62	70	Remote and downwind, low population density, low emissions
Laconia	16,950	16,411	0.5	835	70	Remote and downwind
Meredith	6,616	5,942	1.6	165	70	Remote and downwind, low population density, low emissions
New Hampton	2,228	1,950	2.0	61	70	Remote and downwind, low population density, low emissions
Sanbornton	2,869	2,591	1.5	60	70	Remote and downwind, low population density, low emissions
Tilton	3,573	3,467	0.4	313	70	Remote and downwind, low population density, low emissions

TABLE B3. Towns in the New Hampshire Portion of the CBA that are Not Included in the Recommended New Hampshire Area of Influence (continued)

County Town	2007 Census Pop.	2000 Census Pop.	Growth Rate (%/yr)	2007 Pop. Density (#/sqmi)	Ozone DV (ppb) nearest monitor	Notes**
State Totals	**1,312,256**	**1,235,786**	**0.92**	**137.4**	--	--
Hillsborough County Totals	***402,302***	***380,841***	***0.8***	***457***	**--**	**All portions subject to State-wide permitting and offset requirements, OTR Requirements, OTC Controls, OBD, RFG, and Stage 1&2**
Antrim	2,619	2,449	1.0	79	69	Remote, low population density, low emissions
Bennington	1,475	1,401	0.8	133	69	Remote, low population density, low emissions
Deering	2,048	1,875	1.3	66	70	Remote, low population density, low emissions
Francestown	1,579	1,480	1.0	52	68	Remote, low population density, low emissions
Greenfield	1,770	1,664	0.9	69	69	Remote, low population density, low emissions
Greenville	2,188	2,224	-0.2	645	73	Low population and emissions. No growth.
Hancock	1,805	1,739	0.5	60	69	Remote, low population density, low emissions
Hillsborough	5,522	4,925	1.7	128	69	Remote, low population density, low emissions
New Ipswich	5,190	4,289	3.0	159	69	Remote, low population density, low emissions
Peterborough	6,140	5,883	0.6	157	69	Remote, low population density, low emissions
Sharon	366	360	0.2	25	69	Remote, low population density, low emissions
Temple	1,560	1,297	2.9	67	69	Remote, low population density, low emissions
Windsor	233	204	2.0	28	69	Remote, low population density, low emissions

TABLE B3. Towns in the New Hampshire Portion of the CBA that are Not Included in the Recommended New Hampshire Area of Influence (continued)

County Town	2007 Census Pop.	2000 Census Pop.	Growth Rate (%/yr)	2007 Pop. Density (#/sqmi)	Ozone DV (ppb) nearest monitor	Notes**
State Totals	**1,312,256**	**1,235,786**	**0.92**	**137.4**	--	--
Merrimack County Totals	***148,274***	***136,225***	***1.3***	***160***	--	**All portions subject to State-wide permitting and offset requirements, OTR Requirements, OTC Controls, OBD, RFG, and Stage 1&2**
Allenstown	4,943	4,843	0.3	241	68	Low population density, low emissions, low growth
Andover	2,226	2,109	0.8	55	70	Low population density, low emissions
Boscawen	3,958	3,672	1.1	160	70	Low population density, low emissions
Bow	8,051	7,138	1.8	287	70	Low population density, Power Plant well controlled with SCR, ESP, and soon to add scrubber.
Bradford	1,524	1,454	0.7	43	68	Remote and downwind, low population density, low emissions
Canterbury	2,312	1,979	2.4	53	70	Remote and downwind, low population density, low emissions
Chichester	2,528	2,236	1.9	120	70	Remote, low population density, low emissions
Concord	42,392	40,687	0.6	659	70	Remote, low to moderate population density, low emissions
Danbury	1,150	1,071	1.1	31	70	Remote and downwind, low population density, low emissions
Dunbarton	2,610	2,226	2.5	84	70	Remote, low population density, low emissions
Epsom	4,567	4,021	1.9	134	70	Remote, low population density, low emissions
Franklin	8,735	8,405	0.6	316	70	Remote and downwind, low to moderate population density, low emissions
Henniker	5,063	4,433	2.0	118	70	Remote, low population density, low emissions
Hill	1,103	992	1.6	41	70	Remote and downwind, low population density, low emissions
Hopkinton	5,616	5,399	0.6	130	70	Remote, low population density, low emissions
Loudon	5,137	4,481	2.1	110	70	Remote, low population density, low emissions

County **Town**	**2007 Census Pop.**	**2000 Census Pop.**	**Growth Rate (%/yr)**	**2007 Pop. Density (#/sqmi)**	**Ozone DV (ppb) nearest monitor**	**Notes****
State Totals	**1,312,256**	**1,235,786**	**0.92**	**137.4**	--	--
Merrimack County Totals	***148,274***	***136,225***	***1.3***	***160***	--	**All portions subject to State-wide permitting and offset requirements, OTR Requirements, OTC Controls, OBD, RFG, and Stage 1&2**
Newbury	2,076	1,702	3.1	58	68	Remote and downwind, low population density, low emissions
New London	4,478	4,116	1.3	199	68	Remote and downwind, low population density, low emissions
Northfield	5,144	4,548	1.9	179	70	Remote and downwind, low population density, low emissions
Pembroke	7,353	6,897	0.9	323	70	Remote, low population density, low emissions
Pittsfield	4,375	3,931	1.6	175	70	Remote and downwind, low population density, low emissions
Salisbury	1,278	1,137	1.8	32	70	Remote and downwind, low population density, low emissions
Sutton	1,826	1,544	2.6	43	68	Remote and downwind, low population density, low emissions
Warner	2,962	2,760	1.0	53	70	Remote and downwind, low population density, low emissions
Webster	1,856	1,579	2.5	67	70	Remote and downwind, low population density, low emissions
Wilmot	1,336	1,144	2.4	45	68	Remote and downwind, low population density, low emissions

Areas of Influence

In accordance with EPA guidance, New Hampshire has investigated the influence of New Hampshire emissions on nonattainment areas within and beyond the state's borders. As discussed above, the County of Belknap, towns in the western portion of Hillsborough County, and all towns in Merrimack County except for Hooksett were excluded from the CSA presumptive norm because of the highly rural nature of most of the towns and because of their very low emission densities. Further, the counties at the northern edge of the CSA presumptive norm (Belknap and Merrimack) lie on the downwind edge of the CSA. The vast majority of the ozone episodes in the CSA have winds from the west or southwest. For these northern counties to have any effect on ozone violations to their south, there would need to be a north wind, something almost always associated with clean air in the region. This section examines the airflows during periods of actual ozone episodes throughout the region.

New Hampshire performed back-trajectory analyses for all of the 8-hour ozone exceedances for the proposed New Hampshire nonattainment areas as well as for other nonattainment monitors in southeastern Massachusetts and Rhode Island. The analysis included ozone data for each hour that ozone levels were equal to or greater than 75 ppb at a monitoring site for all 8-hour ozone exceedances recorded at sites in Massachusetts, Rhode Island, and New Hampshire that are likely to be in nonattainment. The National Oceanic and Atmospheric Administration (NOAA)'s Air Resources Laboratory HYSPLIT (HYbrid Single-Particle Lagrangian Integrated Trajectory) is a computer model used to create and map trajectories. The model uses gridded meteorological data. For more information about HYSPLIT please refer to the following document: Description of the HYSPLIT 4 Modeling System by Draxler and Hess (http://www.arl.noaa.gov/documents/reports/arl-224.pdf).

These trajectory plots are a composite of all episodes during 2006-2008 and use a color-coding scheme that uses red to show low level trajectories that are most likely to pick up local emissions, yellow shows trajectories with some potential to pick up local emissions, and green and blue with are at altitudes too high to pick up local emissions and are possibly transporting emissions from areas further upwind. For most trajectories shown here, the Canadian fires of May 24-25, 2007 were removed from the data set as exceptional events. For exceedance days in New Hampshire, every hour that exceeded 75ppb was run individually. For Massachusetts and Rhode Island trajectories, only one trajectory was run for each exceedance day. All trajectories produced by NHDES go back 72 hours before the measured value exceeding 75ppb.

Because of the fundamentally different airsheds and the lack of influence the New Hampshire nonattainment areas have on southeastern Massachusetts and Rhode Island during ozone events (and vice versa), it would be inappropriate to require New Hampshire to link it's nonattainment area to these other states. The three states have expressed their preference to be designated individually and have agreed to meet periodically with each other and with EPA Region I to coordinate analyses and SIP efforts.

Figure B6 shows that trajectories generally do not cross New Hampshire and those that do cross at low elevation, do so across the southeast corner of the state – well within the proposed nonattainment area. All areas within the proposed New Hampshire nonattainment area demonstrate some Boston influence, but there is a greater influence from the Northeast Urban Corridor. It is interesting to note that there is very little influence, if any at all, from Rhode Island to New Hampshire during these events.

Figure B7 shows that trajectories from Miller State Park (Pack Monadnock) generally do not cross New Hampshire, but instead approach the monitor from across nearby state lines to the south and west. Trajectories indicate an extremely strong influence from the full length of the Northeast Urban Corridor and influences on occasion from the Metro Boston area and from the industrial Midwest. Trajectories for Mt. Washington on the other hand have a much stronger influence from the industrial Midwest as well as a strong influence from the Northeast Urban Corridor. Some trajectories for Mt. Washington pass through the central and southern portion of New Hampshire (areas proposed for nonattainment designation) and then make a sharp turn over northern Massachusetts and on to the Northeast Urban Corridor.

Figure B8 shows that overall, the trajectories for areas to the north of downtown Boston are similar to those of southeastern New Hampshire except that the Massachusetts areas have a bit more Midwest influence. Any trajectories passing over New Hampshire, do so in the southeastern corner. Still, the Northeast Urban Corridor is probably the dominant influence during these episodes. Again, there is relatively little influence from Rhode Island emissions at these monitors. Since the many New Hampshire trajectories pass over this region and some of the Massachusetts trajectories pass over the southeastern corner of New Hampshire, it can be concluded the two areas are of similar airsheds.

Figure B9 shows that trajectories for areas south, southeast, and southwest of Boston exhibit some very fundamental differences compared to those from the northern areas. These monitors show very little Boston influence and a strong influence from the southern portion of the Northeast Urban Corridor. None of the trajectories from south of Boston pass over New Hampshire at a low elevation. Since the many New Hampshire trajectories pass over this region but none of the southeastern Massachusetts trajectories pass over the southeastern corner of New Hampshire, it can be concluded that while this area can contribute to New Hampshire's ozone exceedances, New Hampshire does not contribute to exceedances in southeastern Massachusetts. Thus these two areas are of different airsheds.

Figure B10 shows that trajectories for Rhode Island are very similar to those of Southeastern Massachusetts, having a strong influence from the southern portion of the Northeast Urban Corridor. None of the trajectories pass over New Hampshire or urban Boston at low elevations. Clearly upon close inspection, Rhode Island and New Hampshire are of fundamentally different airsheds. New Hampshire has a high degree of metro New York City and Philadelphia influence, while trajectories to Rhode Island tend to travel further over the stable influence of the ocean waters to areas further south in the corridor. By passing over the water, ozone has less interaction with ozone reducing vegetation and chemically reactive new emissions, and stays concentrated in a relatively thin vertical layer. Transporting ozone is more likely to stay intact at elevated concentrations by traveling over the water.

Trajectory analyses were also conducted by the State of Maine for monitors in their state that exceed the ozone NAAQS. The trajectory methodology used by the Maine Department of Environmental Protection ("MEDEP") was similar to that used by NHDES, except back trajectories only went back in time 24 hours from the monitored value exceeding 75ppb. Trajectories for Kennebunkport and Acadia, Maine (Figure B11) have low elevation crossings of the southeastern portion of New Hampshire and some higher elevation crossings of the western portion of the state. Several trajectories crossing the northern portion of the state are associated with the Canadian forest fires exceptional event of May 24 and 25, 2007. In verbal communication, MEDEP concurred with NHDES that the southeastern corner of New Hampshire was the most likely portion of the state to contribute to ozone exceedances in the state of Maine and felt that the New Hampshire proposed boundaries were likely to meet their needs.

FIGURE B6. Back Trajectories for 8-Hour Exceedance Days for Southeastern New Hampshire Locations (2006-2008)

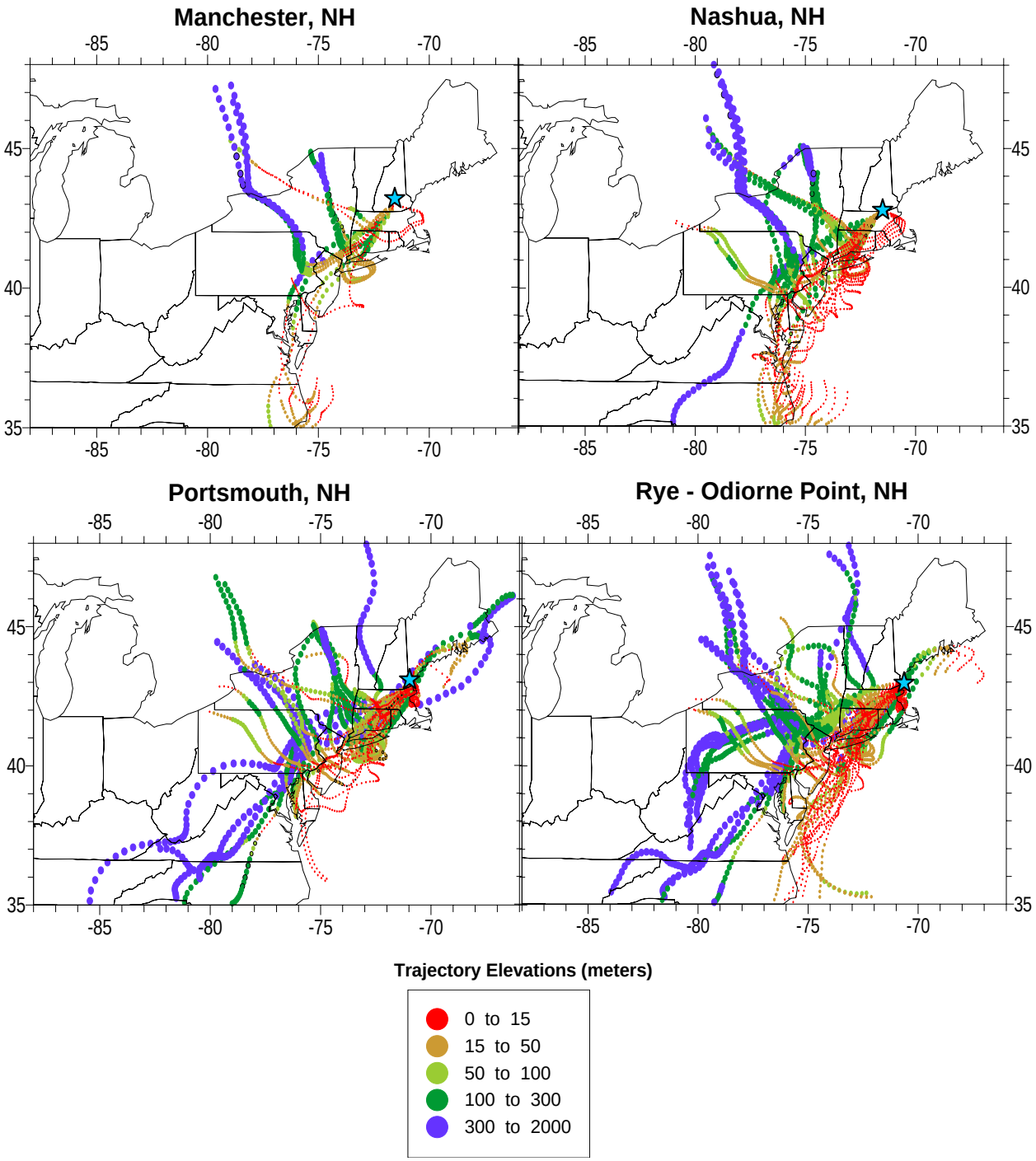
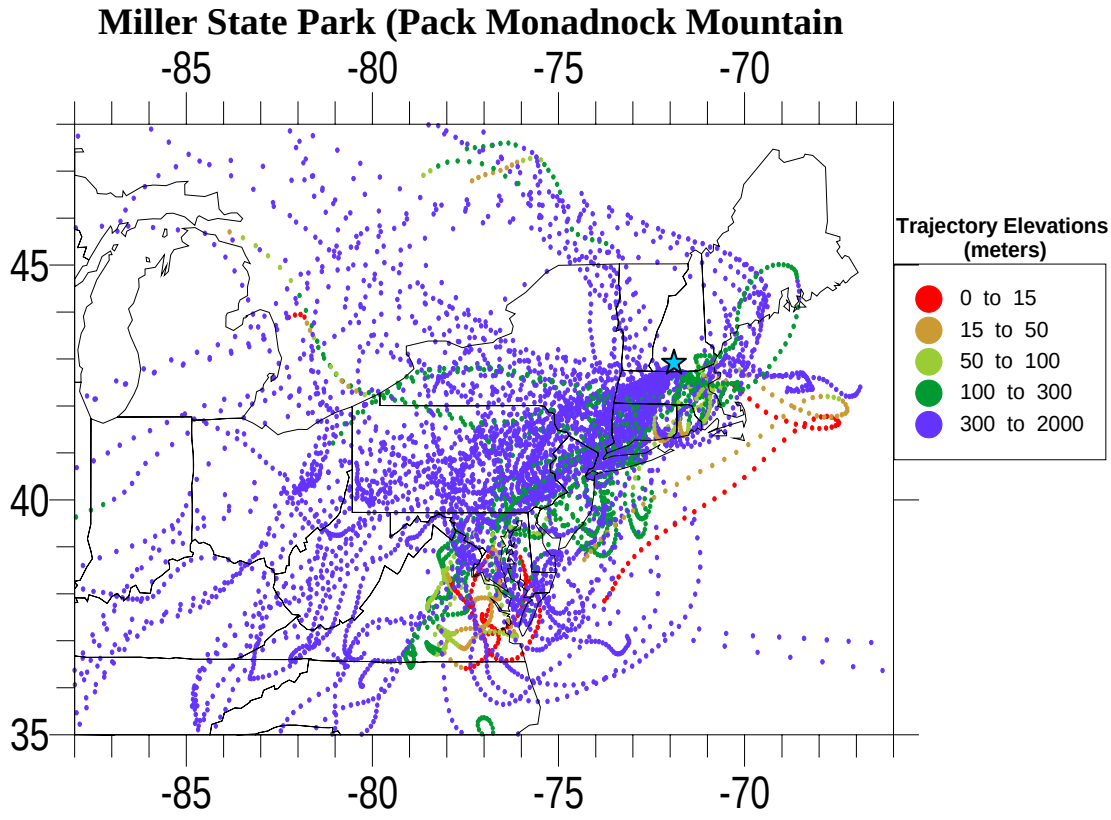


FIGURE B7. Back Trajectories for 8-Hour Exceedance Days for Mountainous New Hampshire Locations (2006-2008)



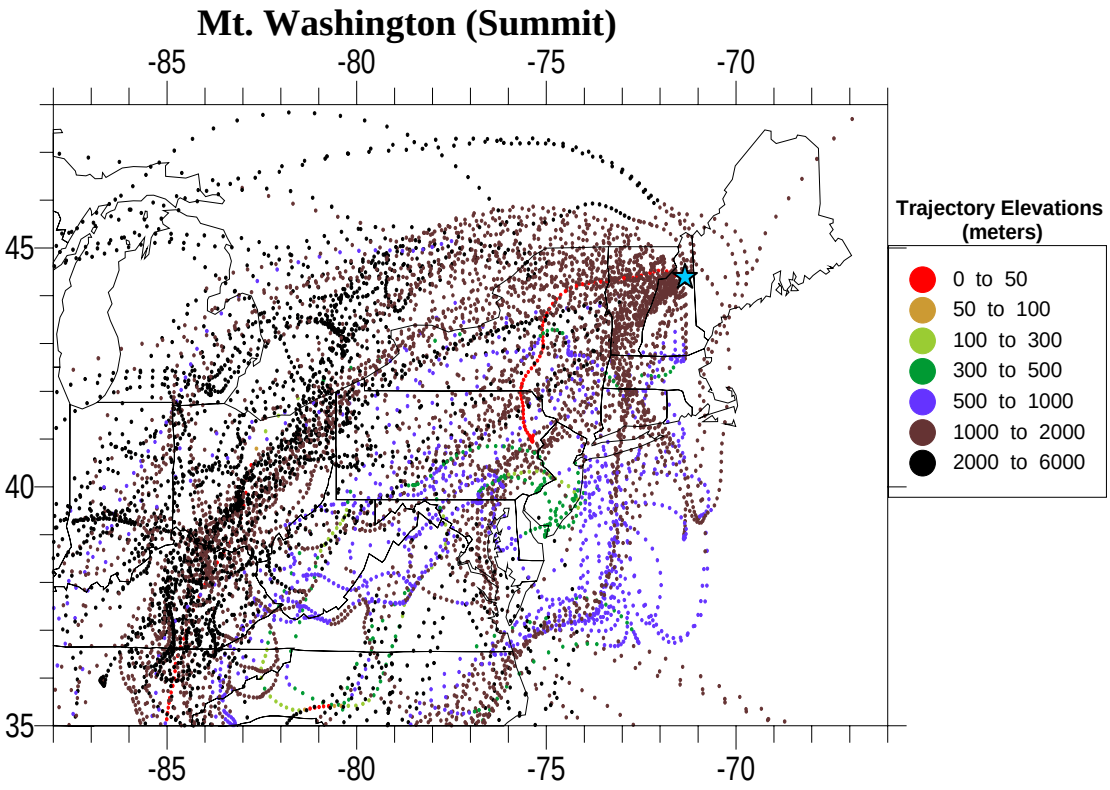


FIGURE B8. Back Trajectories for 8-Hour Exceedance Days for Northeastern Massachusetts Locations (2006-2008)

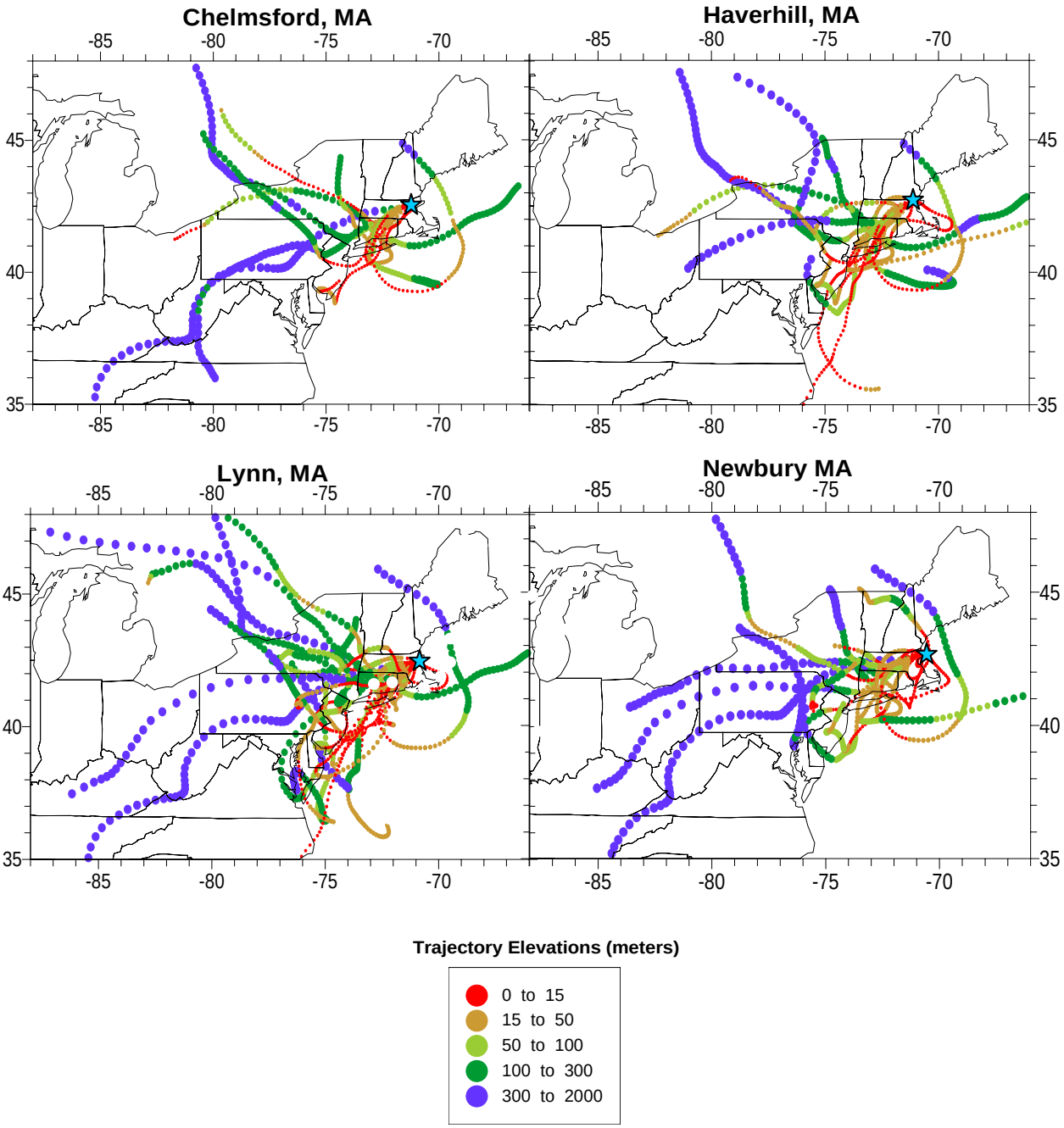


FIGURE B9. Back Trajectories for 8-Hour Exceedance Days for Southeastern Massachusetts Locations (2006-2008)

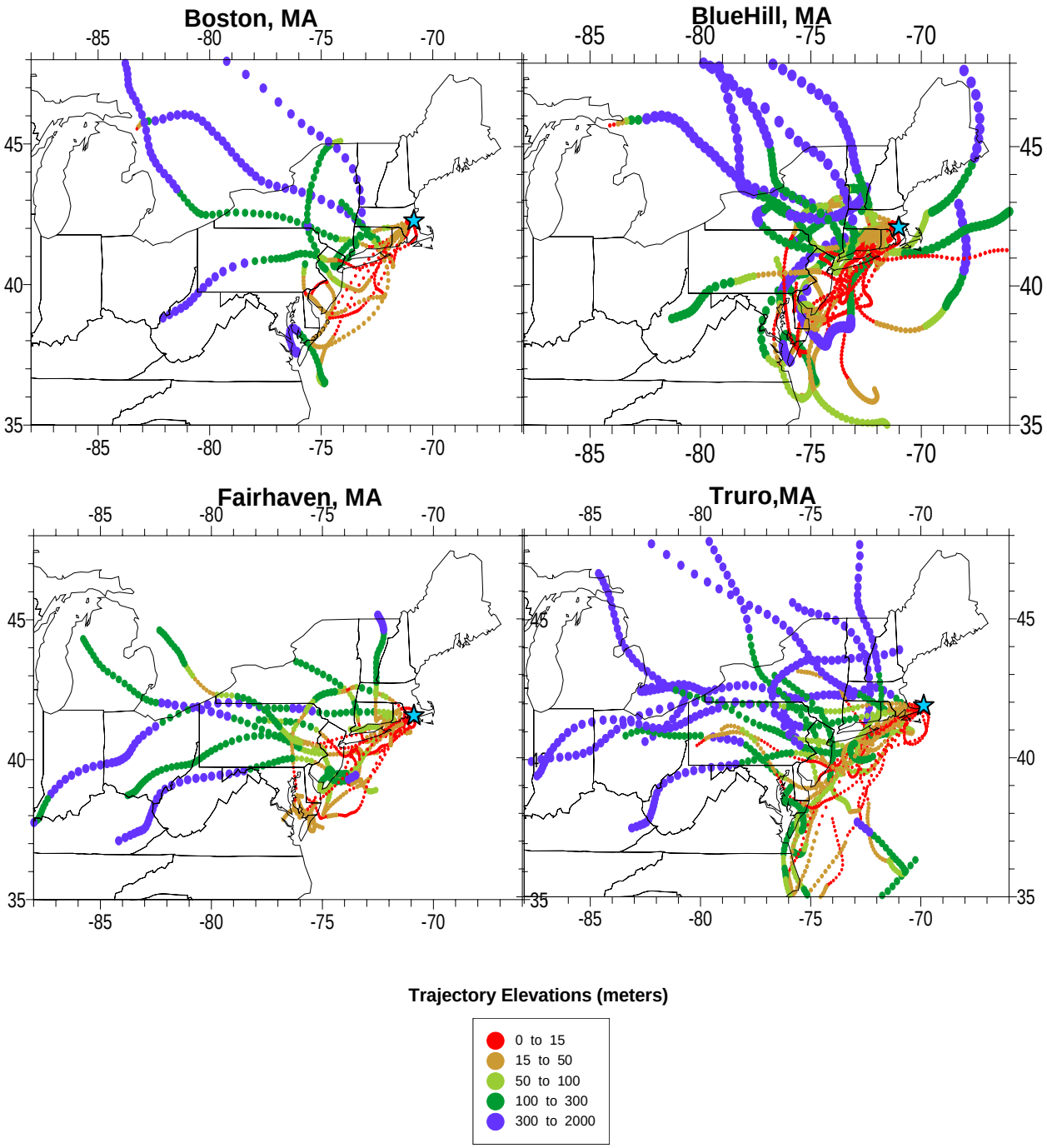


FIGURE B10. Back Trajectories for 8-Hour Exceedance Days for Rhode Island Locations (2006-2008)

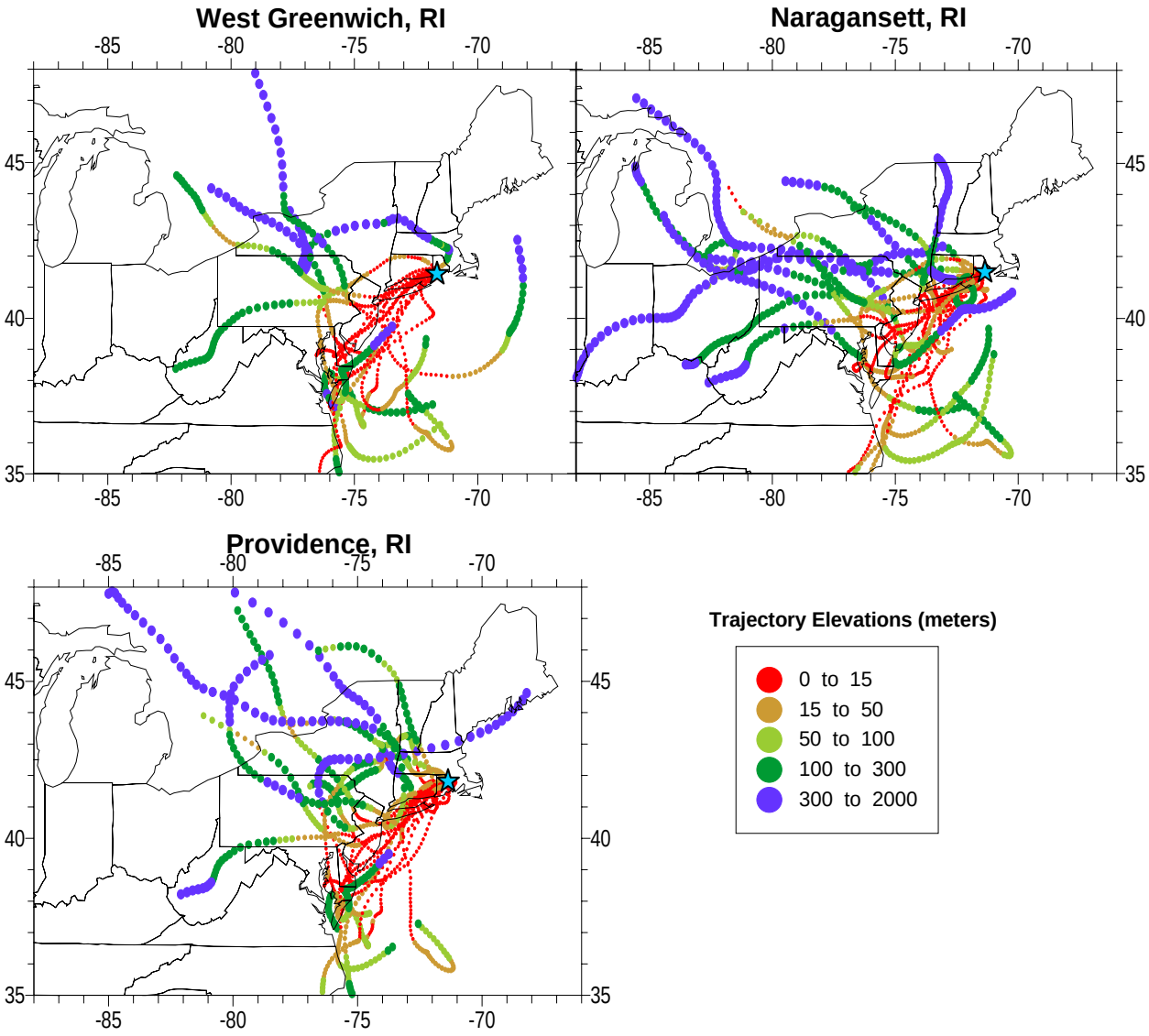
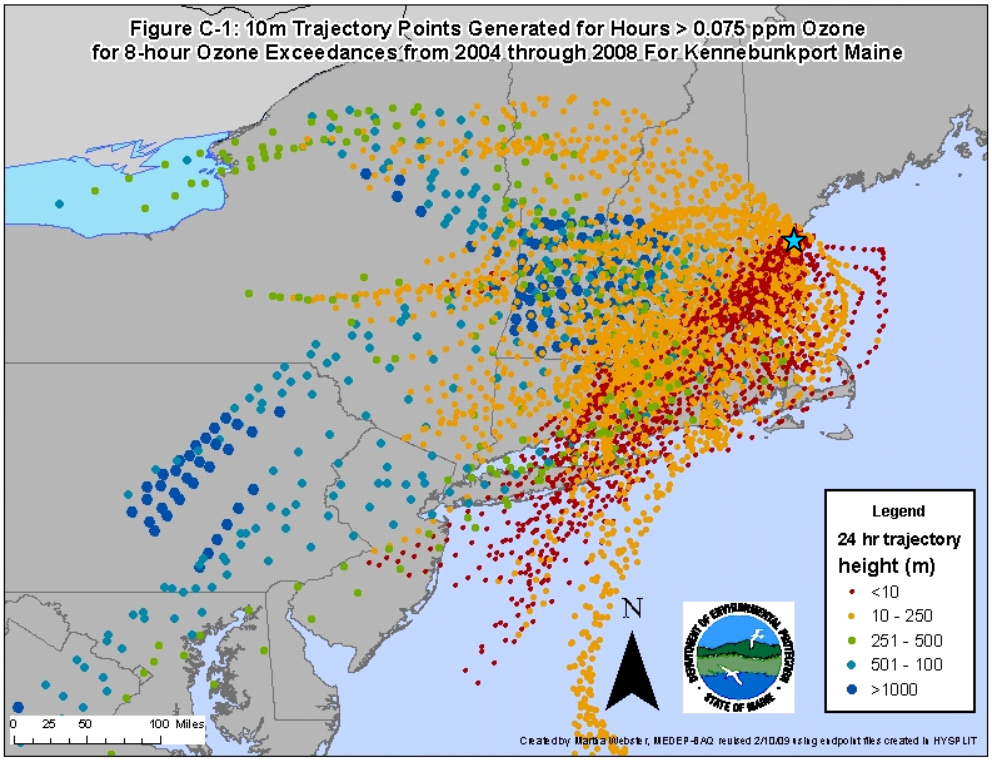
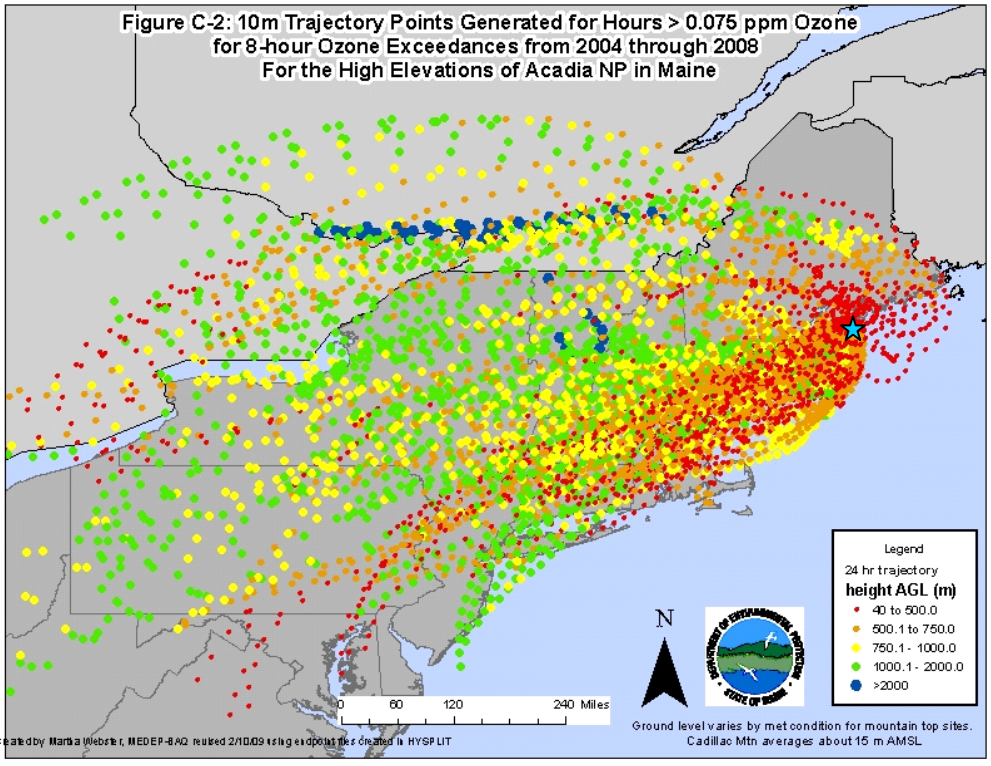


FIGURE B11. Back Trajectories for 8-Hour Exceedance Days for Southern Maine Locations (Kennebunkport and Acadia NP) (2004-2008)





Graphics provided by MEDEP

2. Presidential Range NH Nonattainment Area Discussion

The Presidential Mountain Range in Northern New Hampshire is a unique and well studied area that experiences higher than expected ozone levels for an area so remote from anthropogenic pollution sources. The Presidential Range is a cluster of mountains in Coos County that stand higher than just about everything else in the region. At 6,288 feet in elevation, Mt. Washington is the tallest mountain peak in the Presidential Range and in the entire Northeastern United States. The Presidential Range stands at the crossroads of the atmospheric jetstreams, bringing hurricane force winds and snow to these mountains nearly every month of the year. Winds have been measured at well over 200 miles per hour at the summit of Mt. Washington. So unique is this area that a science observatory was built to better understand it. From the summit, you can see into Vermont, Maine, Massachusetts, and Quebec Canada. With all the grand views of forests and mountains, there are no views of cities or smokestacks. The pollution measured here rides on the winds from places far off. For this reason, **New Hampshire recommends (pending final 2007-2009 data) that the Presidential Range NH Nonattainment area be declared as a Rural Transport Area.** This nonattainment area proposal consists of all mountain peaks in the Presidential range at an elevation of 5000 feet and above.

The proposed Presidential Range Rural Transport Area includes only the following areas above 5000 feet elevation (mean sea level):

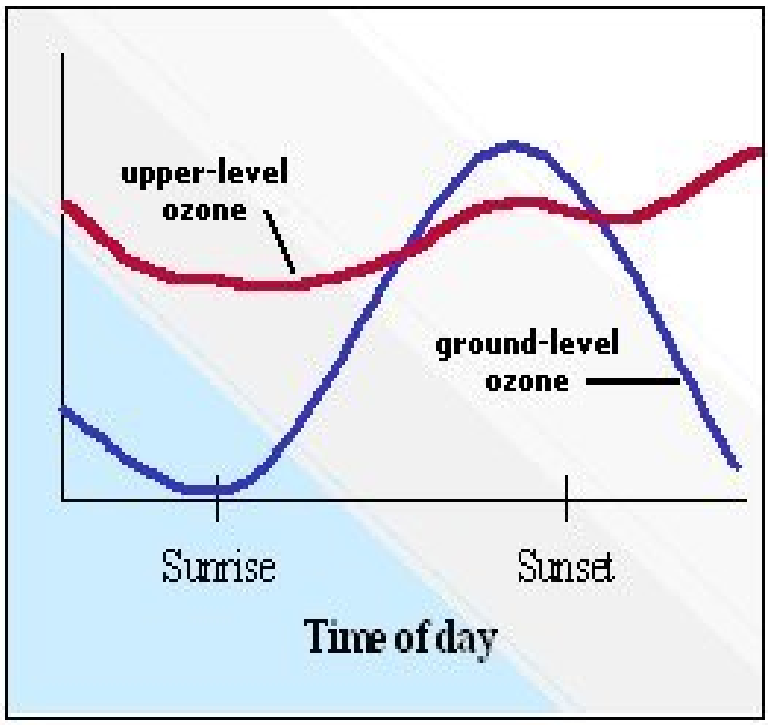
Coos County:

- Boot Spur
- Mt. Adams
- Mt. Clay
- Mt. Jefferson
- Mt. Madison
- Mt. Monroe
- Mt. Quincy Adams
- Mt. Washington

The 2006-2008 8-hour ozone design value for Mt. Washington at 76 parts per billion is only slightly over the NAAQS. It is possible that once 2009 data are final that this nonattainment designation will not be necessary and thus the proposal should be retracted.

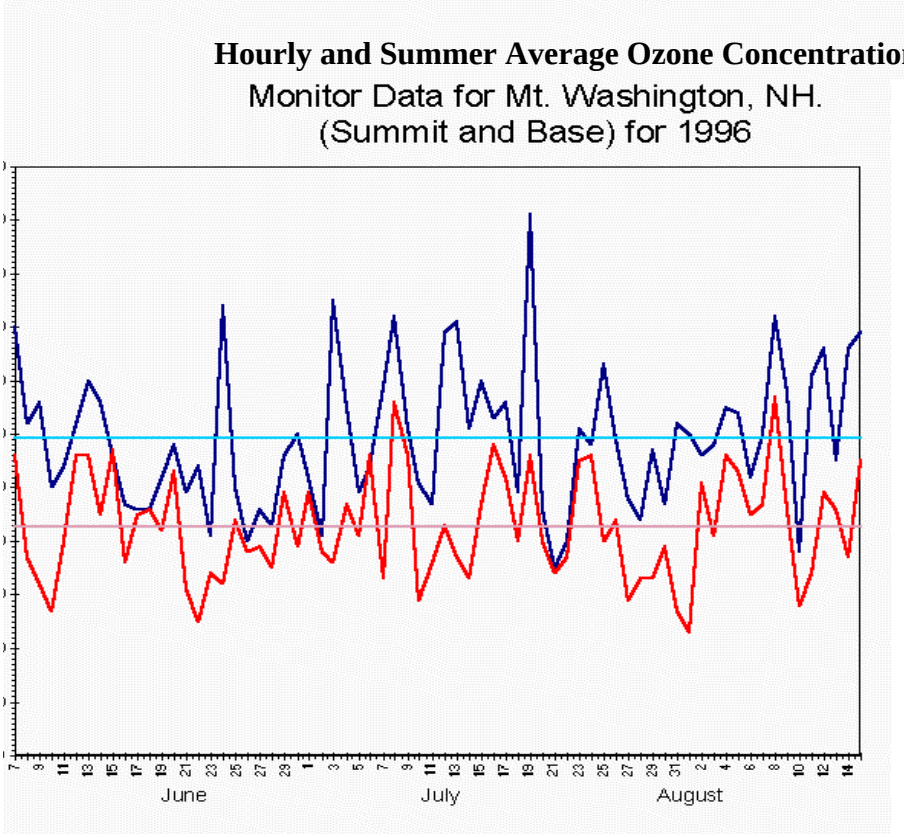
While most monitors exhibit a somewhat typical diurnal cycle to ozone values showing maximum levels during the late afternoon or evening, the levels at the summit of Mt. Washington are defiant of this pattern and are nearly flat all day long, sometimes at moderate or worse air quality (figure B12). In fact summit concentrations dip just a little bit at the time that ozone at the base of the mountain begins to rise. This occurs when a thermal inversion, which usually lies between the base and the summit in the morning, begins to lift and break up, allowing the pollution from above to mix down into the cleaner air below. Because this region is completely dominated by transport, ozone levels near the summits where transport mechanisms work best, are usually higher than found at the base of the mountain (figure B13). Being well removed from metropolitan areas and from other ozone nonattainment areas, this region meets the criterion for a Rural Transport Area designation.

Figure B12 Typical Day/Night Ozone Cycle at Ground Level and Aloft



Solar ultraviolet energy helps to create ozone which is present in high quantities late in the day. At night, there is no ultraviolet sunlight to create ozone and ground level objects and gases act to remove ozone, resulting in the curve in blue, which represents ozone at ground level. Ozone at higher elevations, conversely, is often not depleted at night and may remain at elevated concentrations throughout the day (red curve).

Figure B13 Comparison of Ozone Concentrations at the Base and Summit of Mt. Washington



Relative comparison of mountaintop (elev. 6288 feet) ozone with mountain base (elev. around 2000 feet) hourly ozone. Often the ozone is higher in concentration at the summit (blue line) due to pollution transport from distant sources. Many times the ozone at the base (red line) is driven by upward mixing from the upper transport layers during the day.

Source: NHDES (Data: AMC)

The elevation at which thermal inversions set-up in the mountains is somewhat variable. They are often found at low elevations during the winter and higher during the summer. The elevation of thermal inversions also changes throughout the day, starting at lower elevations and rising as the ground below warms up. Because of this, it is very difficult to set a single elevation cut off to indicate where on the mountains nonattainment exists. Because the thermal inversion heavily influences where the transport layer above is cut off from the ground level below, its location is important to determining areas that potentially maintain ozone concentrations above the NAAQS for 8-hours or more.

Conceptually, the setup is complicated and a conclusion can not be reached by just looking at a single snapshot of measurements where an instantaneous maximum is measured. As the thermal inversion rises and falls in elevation, the point of maximum ozone moves along with it. Elevations below this maximum ozone point see a quick drop off in ozone with decreasing elevation, however the ozone drop off at elevations above the peak is about 3 times more gradual. Because of this and the daily wagging of the maximum peak up and down the mountain sides, longer term maximum ozone averages reside at elevations close to the high elevation that the ozone peak reaches for the day. Thus, if the ozone peak varies between 3000 and 5000 feet in elevation, sustained 8-hour averages will typically be higher at 5000 feet than at 3000 feet.

The concept of wind fields around mountains is also important to consider when attempting to understand where maximum ozone is likely to occur. When a wind field encounters a mountain, the flow responds to the terrain by lifting the airflow to get over the terrain and to split the airflow around the terrain if a route exists that offers less resistance to lifting it further. Both the lift and wrap mechanisms usually result in faster wind speeds. As is commonly accounted for in air pollution dispersion modeling, a plume of pollution approaching elevated terrain has its maximum impact on the mountain at elevations above the stable plume height. The same thing occurs as the transport plume of pollution meets elevated terrain. Just how much higher depends on a number of factors including wind speed. The higher the wind speed, the more the lifting. For this reason, aircraft measurements and atmospheric soundings away from mountain areas will often produce data that suggests altitudes for ozone peaks that will be somewhat lower in elevation than actually measured on the mountain side. Typically in the Northeast, the transport layer can be found between 2500 and 3500 feet, but as the terrain rises, so does the elevation of impact.

Another contributing factor to the proposed designation of 5000 foot and above in the Presidential Range as a Rural Transport Area, is the fact that the mountain ridge averages between 4500 and 5200 feet in elevation. Air pollution plumes approaching the range will lift up the mountain ridge to this point and then be able to wrap around the peaks. Because of this, maximum ozone for this region may be at a lower elevation rather than at the summit of Mt. Washington on most days of the year. The airmass is also pulled downward on the leeward side of the ridge.

There are very little data collected specifically for Mt. Washington and the Presidential Range, thus one needs to be cautious in drawing conclusions on the full applicability of thresholds derived from limited datasets. Single snapshot observations only reflect on the conditions of the moment while critical transport mechanisms can vary by the hour or even minutes in some cases. Actual measurements have been provided to NHDES and are discussed below:

Figure B14 shows measurements from a University of Maryland flyby on August 13, 2002 during studies for regional haze. As is typical for the area, a morning inversion sets up at a fairly low elevation of around 2000 to 3300 feet, trapping relatively clean air below it. The peak of the transport layer sets up just above the inversion at about 3500 feet. As the day's warming progresses, the inversion lifts in elevation and levels-out allowing some ozone from the transport layer above to begin spilling down to the ground. As this occurs, the transport layer lifts along with the point of maximum ozone to higher elevations.

Figure B14 Aircraft fly-by of Mt. Washington for 09:19 – 09:43 am on August 13, 2002 (University of Maryland)

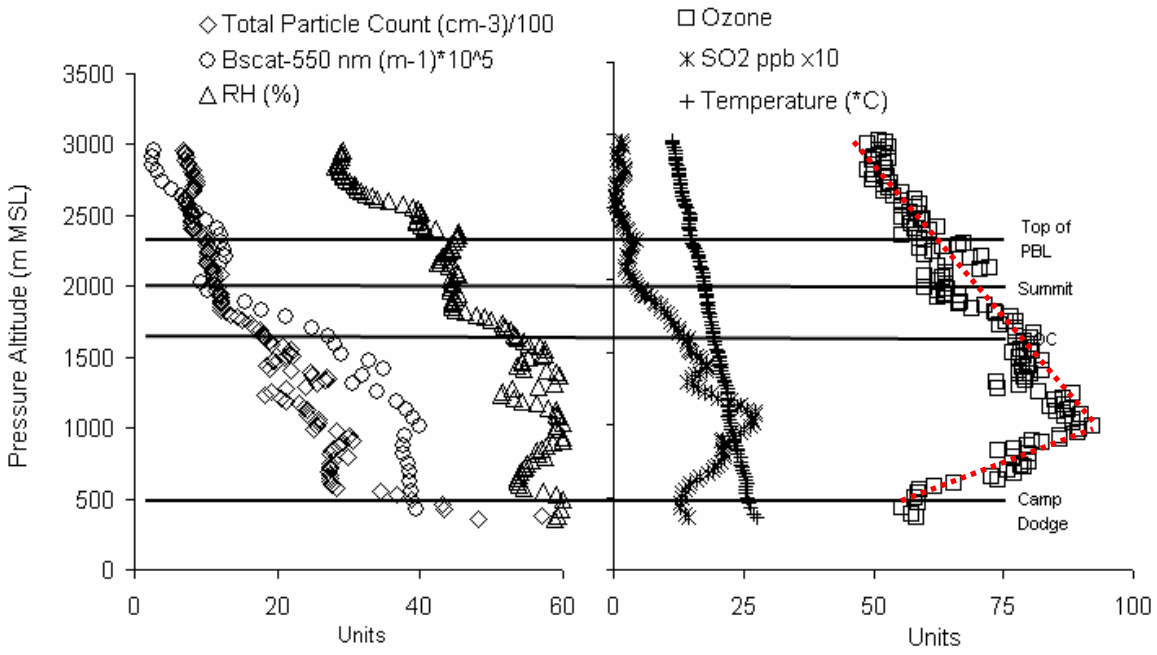
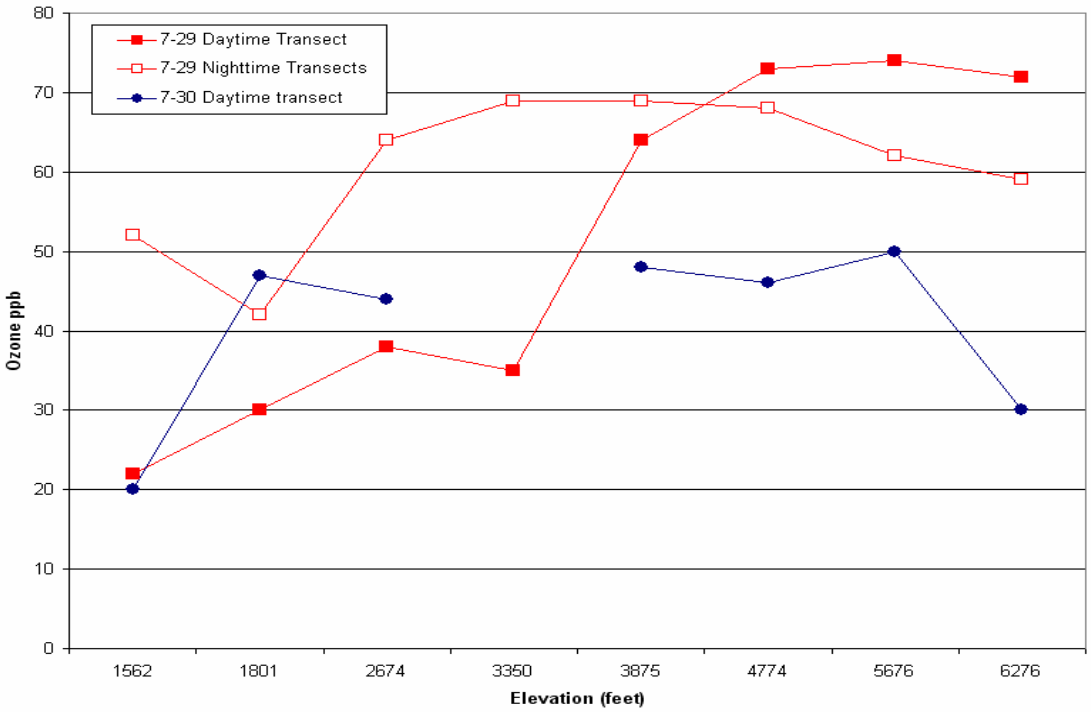


Figure B15 below, shows how this might look at ground level on the mountain. According to Figure B15, elevated ozone values are measured down to elevations of 2674 feet during the early morning hours of July 29 of 1993. However, later in the day, that level lifts to between 4774 feet and 5676 feet in elevation (nearly identical with the elevations estimated by NHDES based on the physics of the flows around the local terrain). Once averaged over an extended period (similar to the 8-hour NAAQS), maximum sustained ozone levels occur close to the 4774 foot in elevation mark on the mountain during this event.

While each event differs and these two snapshots provide only limited data, they fit the NHDES model. It would of course be more helpful to have more extensive data with enhanced interim elevation and temporal data, but it is almost immaterial as to what specific elevation threshold is applied for nonattainment designation. Whether it should be higher or lower is less important than the designation of a reasonable representative area as nonattainment that has an actual monitor to track its progress. Other than Mt. Washington, none of the candidate mountains have emission sources to control and the sources that drive the ozone violations are not anywhere nearby.

Figure B15 Appalachian Mountain Club Auto Road Transect Study for July 29-30, 1993



(Ground-based measurements – AMC 1993)

3. Monadnock Highlands NH Nonattainment Area Discussion

The Monadnock Highland region in Southwestern New Hampshire is another unique region with elevated measured ozone levels. This region of the state contains several mountains that rise on the western fringe of where the northeastern ozone plume typically enters the state from the southwest. This southwest to northeast mountain range helps to channel the transport flow northeastward toward the Southeast New Hampshire nonattainment area discussed above. At 2288 feet in elevation, Pack Monadnock Mountain lies on the eastern edge of this range and happens to be located toward the middle of the transport flow. The mountain also stands at the northern end of the low-level jet that forms overnight, transporting air pollution at relatively high velocities from along the urban corridor that extends from Boston to New York City, Philadelphia, Baltimore, Washington, and from as far away as North Carolina. The monitoring equipment on this mountain was placed here as a special purpose monitor to capture the air quality entering the state so that air pollution transport could be better researched and understood.

Several similarly sized mountains lie very nearby to the north and south. These mountains are included in the nonattainment designation because of size and proximity. Just to the west lies Mt. Monadnock, the most heavily hiked mountain in the northeast U.S. This mountain stands about 1000 feet taller than Pack Monadnock and despite being further west it has also been included in this designation because of its higher altitude. To be conservative, several other mountain peaks to the north of Mt. Monadnock are also included in the designation due to their similar size to Pack Monadnock despite the growing distance between the transport corridor and the terrain's location. While more high terrain lies further to the north and west, a reasonable cut-off is created at the Cheshire County line as this boundary is already far enough off the transport corridor that NAAQS exceedances are not expected there. Historic data collected at a former monitoring site on the summit of Mt. Sunapee in Sullivan County supports this determination.

Elevation cut-offs for this region are conceptually the same as for the Presidential Range, however this region lies largely below the transport layer, thus increasing elevation produces increasing ozone, provided the location is appropriate to capture the transport plume. As described before, ozone concentrations below the transport layer drop off rapidly, so there can be a sharp decline in ozone as elevation decreases. Should there be substantial local emissions surrounding these mountains, ground level ozone would work its way upward during the afternoon hours, dominating the effect of transport from above. However, the Monadnock region is sparsely populated and devoid of major air pollution sources, thus is heavily dominated by the transport layer down-mixing effect. As stated before, the transport layer in the Northeast usually sets up between 2500 and 3500 feet and rises with terrain. Since the terrain through much of the Monadnock highlands is below this level, down mixing from the transport layer becomes a dominant factor. Therefore, applying a gradient factor of 1 part per billion per 55 vertical feet[2] from the monitor station at 2288 feet from 78 parts per billion to 75 parts per billion produced an estimated elevation of 2124 feet. To simplify the threshold, we propose to round it down to 2000 feet for the purposes of defining nonattainment in the Monadnock Highlands.

[2] Gradient factor may vary but the factor applied here has basis as being consistent with recently observed aircraft measurements in the Northeast (including data posted in Figure B11 above).

For designation purposes all terrain above 2000 feet in elevation in Cheshire and western Hillsborough Counties should be designated as marginal nonattainment. This includes:

The proposed Monadnock Highlands Nonattainment Area includes only the following areas above 2000 feet elevation (msl):

Cheshire:
- Bald Mountain
- Fletcher Mountain
- Hodgeman Hill
- Hubbard Mountain
- Jackson Hill
- Mt. Monadnock
- Osgood Hill
- Pitcher Mountain

Hillsborough:
- Burton Peak
- Crotched Mountain
- Holt Peak
- North Pack Monadnock Mtn
- Pack Monadnock Mtn