STATE OF MAINE
OFFICE OF THE GOVERNOR
1 STATE HOUSE STATION
AUGUSTA, MAINE
04333-0001

OEP
01-0300160

JOHN ELIAS BALDACCI
GOVERNOR

July 15, 2003

Mr. Robert W. Varney
Regional Administrator
U.S. Environmental Protection Agency
One Congress Street
Boston, Mass. 02114-2023

RE: Designation of Nonattainment Areas under the 8-Hour Ozone Standard

Dear Mr. Varney:

I am pleased to submit Maine's proposed attainment/nonattainment area designations under the 8-hr. ozone standard. We have prepared our proposal within the context of Maine's full support of the 8-hr. standard. It is Maine's position that the 8-hr. standard is appropriately protective of public health and the environment. In fact, in 1999, we initiated a legislative effort requiring that the State's ozone health advisories be based on that standard.

As recommended by your agency, we have reviewed the State's 2000 to 2002 monitoring data (including the preliminary 2003 data) and used that data for the foundation of this proposal. We have also analyzed the ten factors suggested in your agency's designation guidance, such as: jurisdictional boundaries; geography/topography; meteorology and pollution transport; population density and population change; degree of urbanization; traffic congestion and commuting patterns; location and magnitude of emission sources; level of control of regional emission sources; and regional emission sources.

A map of Maine's proposed attainment/nonattainment area can be found in our attached technical support document. The proposed nonattainment area can be best described as extending two towns inland along the coast from the NH border to Camden, plus all of the towns in the greater Portland metropolitan area. In addition, we propose to include the majority of islands in Knox, Waldo, and Hancock counties as well as a strip of towns along the coast south of Castine to Schoodic Point. The rest of Maine is proposed to be designated as attainment.

Maine's proposal, to use the best science and analyses to date to define the nonattainment areas, reflects the *uniqueness of Maine's ozone problem.* As the ozone plume travels long distances over the Gulf of Maine, it remains relatively stable. Once the plume is transported to interior areas, it ozone concentrations are significantly degraded. In addition, the analyzed data clearly shows we are impacted by overwhelming transport, as the most significant areas of influence on our monitored non-attainment sites are, in fact, outside state lines.

I have asked James Brooks, director of the Bureau of Air Quality, to be available (207-287-7044) to answer any questions you may have regarding Maine's submission. At this time, I also reserve the right to amend this proposal at the end of the 2003 ozone season, to base our proposal on the most current quality assure monitoring data available.

Sincerely,

John Elias Baldacci
Governor

Attachment

Cc: Senator Olympia Snowe
Senator Susan Collins
Representative Tom Allen
Representative Michael Michaud
Mike Kenyon, U.S. EPA Region 1
Senator John Martin
Representative Ted Koffman
Ken Colburn, NESCAUM
Commissioner Dawn Gallagher, Maine DEP
James Brooks, Maine DEP

TECHNICAL SUPPORT DOCUMENT

State of Maine Recommendations for 8-Hour Ozone Attainment / Nonattainment Designations

1. INTRODUCTION

The State of Maine recommends towns and cities along the coast, from Kittery to Winter Harbor, to be designated as nonattainment for the 8-hour ozone National Ambient Air Quality Standard (NAAQS). The recommendation includes two distinct areas along the southwest coast and mid-coast of Maine. The Southwest Coast nonattainment area is recommended to include only those towns/cities in York, Cumberland, Androscoggin and Sagadahoc Counties that are in the Portland Metropolitan Statistical Area (MSA), Boston-Worcester-Lawrence Consolidated Metropolitan Statistical Area (CMSA) and significantly influence ozone levels in areas that violate the 8-hour Ozone NAAQS. The Mid-Coast nonattainment area is recommended to include only those towns/cities along or near the coast of Lincoln, Knox, Waldo and Hancock counties and the State of Maine recommends that this area be considered a rural transport area. This document summarizes technical analyses used to formulate those decisions. The recommendations contained in this document meet requirements of Section 107(d) of the Clean Air Act (CAA). Requirements of Section 107(d)(4)(A)(iv-v) of the CAA were also met to justify having non-attainment areas that do not include all towns/cities in a county.

2. RATIONALE FOR NONATTAINMENT AREA BOUNDARIES

The State of Maine is recommending nonattainment areas to be less than an entire county and less than current 1-hour Ozone NAAQS nonattainment areas. The following subsections contain analyses of factors suggested in Section 107(d)(4)(A)(v)[1] of the CAA and EPA guidance [2], which can be used to justify recommending smaller than presumptive guidance nonattainment areas. Factors that will be analyzed include:

Monitored 8-hour average ozone concentration data
Jurisdictional boundaries
Geography/topography
Meteorology and pollution transport
Population density and projected population change
Degree of urbanization (commercial and industrial development)
Traffic congestion and commuting patterns

[1] "In making such finding, the Governor and the Administrator shall consider factors such as population density, traffic congestion, commercial development, industrial development, meteorological conditions, and pollution transport. "

[2] Memorandum of March 28, 2000, from John S. Seitz, "Boundary Guidance on Air Quality Designations for the 8-Hour Ozone National Ambient Air Quality Standards (NAAQS or Standard)

Location and magnitude of emission sources
Level of control of regional emission sources
Regional emission reductions

a. Monitored 8-Hour Average Ozone Concentration Data

The latest available three-year quality assured data set for Maine is 2000-2002. Because EPA will be basing the final designation determinations on the future 2001-2003 data set, recommendations in this document should not be considered the State of Maine's final recommendation. The State of Maine will submit, if necessary, final recommendations after the 2003 ozone season data have been quality assured.

Table B-1 summarizes historical (1991-2002) 8-hour ozone design values, 4th high 8-hour ozone concentrations and preliminary (as of July 5, 2003) 2001-2003 8-hour ozone design values in Maine. The latest quality assured data shows that Kennebunkport, Cape Elizabeth, and Cadillac Mountain monitoring sites have 2000-2002 8-hour ozone design values violating the 8-hour ozone NAAQS. Preliminary data from the 2003 ozone season shows that Kittery, Kennebunkport, Cape Elizabeth, Port Clyde, McFarland Hill and Cadillac Mountian monitoring sites already have achieved 2001-2003 8-hour ozone design values violating the 8-hour ozone NAAQS. Historical data also indicates that Appledore Island, Phippsburg/Reid State Park, and Isle au Haut monitoring areas are also violating the 8-hour ozone NAAQS. As determined by historical and preliminary 2003 monitoring data, the Holden, Gardiner, Hollis/West Buxton monitoring sites and all other sites in Maine are attaining the 8-hour ozone NAAQS.

A threshold analysis was completed (see Table B-2 and Figure A-1) to determine the 4th high 8-hour ozone concentration needed in 2003 that will result in a 2001-2003 8-hour ozone design value to be in violation of the 8-hour ozone NAAQS for inland monitoring sites. Four exceedances of this threshold value are needed during the 2003 ozone season to reach a violation of the 8-hour ozone NAAQS. Depending on the severity of the 2003 ozone season, only the Holden and Gardiner monitoring sites have the potential to reach their respective threshold value four times. As of July 5, 2003, the Holden and Gardiner monitoring sites have only exceeded their respective threshold value once this season. Therefore, from historical, current, and projected 8-hour ozone monitoring information, areas currently in violation of the 8-hour ozone NAAQS include the Maine coastline from Appledore Island to Acadia National Park.

b. Jurisdictional Boundaries

Data shows that Maine's ozone problem lies primarily along coastal portions of the state extending from the southwest coast to the Acadia National Park area. Section 107(d)(4)(A)(iv) of the CAA states that "…an ozone nonattainment area located within a metropolitan statistical area or consolidated metropolitan statistical area classified as serious, severe, or extreme, (have boundaries classified) by operation of law to include the entire metropolitan statistical area or consolidated metropolitan statistical area." Monitored 8-hour ozone design values (see Figure A-1) clearly show that the State of Maine's recommended nonattainment areas should not be placed in a classification

higher than marginal. Therefore, the State of Maine does not believe that the 8-hour ozone nonattainment area should include the presumptive MSA/CMSA boundaries or an entire county. The State of Maine is recommending that the entire Portland MSA and Maine's portion of the Boston-Worcester-Lawrence CMSA be included in the Southwest Coast nonattainment area. For all other towns/cities in a county, the State of Maine is recommending that only those towns/cities that are in violation or contribute to a violation of the 8-hour ozone NAAQS be included in the nonattainment area. Specifically, those towns are located along or near the coastline in York, Cumberland, Sagadahoc, Androscoggin, Knox, Lincoln, Waldo, and Hancock counties.

c. Meteorology/Geography/Topography/Transport

How Does the Land-Sea Breeze Affect Ozone Concentrations? How Does Ozone React Over Open Ocean Waters?

Ozone air quality monitors within Maine confirm the presence and significance of transported ozone and its precursors. The significant gradient of 8-hour ozone design values (see Figure A-1) between inland and coastal monitors suggests there must be something causing elevated ozone levels along the coast of Maine. Maximum ozone concentrations along the coast almost always follow a sequential pattern, with the most southerly sites monitoring daily ozone maximums in the mid- to late- afternoon, and downwind sites experiencing maximum readings later in the day and into the evening hours (see Table B-3).

Flow patterns associated with elevated ozone events in the northeast as analyzed in NARSTO-NE studies during the 1990's, are shown in Figure A-2. Upper airflow from the west combined with southwest flow at the surface (no air stagnation) transport ozone precursors and ozone along the I-95 corridor out into the Gulf of Maine to coastal areas of Maine.

Wind roses were created for five monitoring sites that had nearby Maine Department of Environmental Protection wind direction monitoring data. Wind direction monitoring data at the same site used for ozone monitoring was used to create the wind roses for the Cape Elizabeth, Cadillac Mountain and McFarland Hill sites. Augusta DEP wind direction monitoring data was used to create the wind rose for the Gardiner ozone monitoring site. Bangor DEP wind direction monitoring data was used to create the wind rose for the Holden ozone monitoring site. Wind roses were created for only those hours where monitored 1-hour ozone concentrations were greater than 64ppb and 84ppb during the 2000-2002 Ozone Seasons.

The resulting wind direction frequency distributions, as shown in Figure A-3, confirm the NARSTO-NE findings. The predominant wind directions during elevated ozone hours at the Cape Elizabeth and Acadia National Park monitoring sites were from the south-southwest paralleling the coastline with many hours showing flow from the Gulf of Maine. Predominant wind directions during elevated ozone hours inland are from the south up the Kennebec River to the Gardiner monitoring site and up the Penobscot River to the Holden monitoring site. At the Gardiner site there is a secondary peak from the north suggesting return flow of elevated ozone levels as the seabreeze turns into a land breeze.

Current research[3] suggests that the marine/continental boundary layer dynamics is primarily responsible for elevated ozone levels along the coastline of Maine and New Hampshire. It is well known that the marine boundary layer (~500m) is shallower than the continental boundary layer (~2-3km) primarily due to the lack of surface heating of the ocean surface. One would think that a seabreeze would transport "clean" air off the coastline to the coastal and inland monitoring sites. That statement would be true if there were no sources emitting pollutants into the marine boundary layer. However, for high ozone events along Maine's coastline, ozone and ozone precursors are being transported from the I-95 corridor (Mid-Atlantic to Southern Maine) into the Gulf of Maine's "shallow" marine boundary layer. Ozone and ozone precursors get scavenged or are deposited over water at a much slower rate than over land, where vegetation and fresh emission sources are more prevalent. Thus elevated ozone levels can be transported for long distances in the Gulf of Maine.

When the "polluted" marine boundary layer reaches the southwestern Maine coastline, monitors along the immediate coastline record high ozone levels. As this air mass moves further inland ozone levels start to drop off quickly due to surface deposition on vegetation, NO_x scavenging and an increasing depth of the boundary layer due to solar heating of the land surface. Figure A-4 confirms this result as the average ozone levels during elevated ozone hours average 6-20 ppb higher at Cape Elizabeth and Kennebunkport than at the Hollis or West Buxton monitoring sites which are located 21.3 kilometers and 25.8 kilometers from the coastline respectively. These facts lead to the conclusion that the 8-hour ozone NAAQS violation area and area of influence should not extend very far inland along the Maine coastline.

How Does Elevation Affect Ozone Concentrations?

NARE 1993[4] observations and analysis show that it is unusual for surface air to take a long overwater trajectory without being lofted. If this is the case, the number of high ozone concentration events should be higher at downeast elevated monitoring sites than the number of events that occur at downeast coastline sites. Figure A-5 confirms this result as the average ozone levels during elevated ozone hours average 20-25 ppb higher at the top of Cadillac Mountain (466m AMSL) than at the Seawall (4m AMSL) or Schoodic Point (15m AMSL) monitoring sites. In addition, Cadillac Mountain ozone levels during elevated ozone hours average 4-9 ppb higher at the top of Cadillac Mountain than at the McFarland Hill (150m AMSL) monitoring site. Currently, as shown in Table B-1 only the McFarland Hill and Cadillac Mountain monitoring site preliminary 2001-2003 8-hour ozone design values are violating the 8-hour ozone NAAQS along the coast downeast of Port Clyde. These facts lead to the conclusion that only elevated terrain along the downeast Maine coastline near Acadia National Park currently should be considered in violation of the 8-hour ozone NAAQS. Therefore, the State of Maine is recommending that only island and coastal towns in Waldo and Hancock counties along with coastal and near coastal towns in Lincoln and Knox counties be included in the Mid-Coast nonattainment area.

d. Population Density and Projected Population Change

[3] NOAA/CIRES/AIRMAP/MAINE DEP/PLYMOUTH STATE COLLEGE draft report from the NEAQS 2002 study "Coastal Boundary Layer Influence on Pollutant Transport in New England"

[4] Buhr, M., and coauthors, 1996: Trace gas and aerosol measurements using aircraft data from the North Atlantic Regional Experiment (NARE 1993). *J. Geophys. Res.,* **101**, 29,013-29,027.

Census data for the year 2000 from the U.S. Census Bureau and 2000-2010 projected population change data from Maine, New Hampshire and Massachusetts Planning Offices were used to analyze population and projected population change for towns in Maine, southern New Hampshire and eastern Massachusetts. Figure A-6 shows the population in all towns that are in or nearby the recommended nonattainment areas in Maine. Figure A-7 shows the population density of towns/cities in York, Cumberland and Sagadahoc counties. Figure A-8 shows the 2000-2010 projected population change in all towns/cities that are in or nearby the recommended nonattainment areas in Maine. Figure A-9 shows the 2000-2010 population change density of towns in York, Cumberland and Sagadahoc counties.

A regional comparison of population data (see Table B-4) shows that the population density in southern Maine is clearly much less than the population density in nearby out-of-state areas that also contribute to ozone precursor and ozone levels in Maine. The total 1999 MSA/CMSA population in southwestern Maine is only 5.0% of the population in nearby states in the 1999 Boston-Worcester-Lawrence CMSA. The total 2003 MSA/CMSA population in southwest Maine (York, Cumberland, Sagadahoc and Androscoggin counties) is only 9.4% of population in nearby states in the Boston-Worcester-Manchester MA-NH CMSA. The projected population change from 2000 to 2010 in the Boston-Worcester-Lawrence CMSA is greater (141%) than the projected population in the Portland MSA and is 58% of the 2003 Portland-Lewiston-South Portland CMSA 2000 population.

The recommended nonattainment areas in Maine do not include all the towns/cities in coastal counties. Figures A-6, A-7 and A-8 clearly show the population in Maine is concentrated along coastal towns/cities in those counties. The recommended nonattainment areas include between 85% and 100% of the population in York, Cumberland, Sagadahoc, Lincoln and Knox counties.

In summary, the population analysis clearly shows that the recommended 8-hour ozone nonattainment areas in Maine do not need to be expanded to include entire counties along the coast of Maine, if population is the only factor determining nonattainment expansion.

e. Degree of Urbanization

The degree of urbanization was analyzed using the latest land cover data in the Maine GIS system. Figure A-10 and Figure A-11 show that the land cover is primarily rural both inside and outside of the recommended nonattainment areas in Maine. To compare the degree of urbanization inside and outside of the recommended Southwest Coast nonattainment area, the following urban weighted normalization scheme was used:

Normalized land cover for a town/city =

$$100*[3*A_x + 2*B_x + C_x)/(3*A_y + 2*B_y + C_y)]$$

where;

A = Urban/industrial land cover percentage in the town/city
B = Densely populated land cover percentage in the town/city
C = Sparsely populated land cover percentage in the town/city
D = Natural land cover percentage in the town/city
$_x$ = town/city that is being analyzed

$_y$ = town with the highest degree of urbanization

Results as shown in Figure A-12, clearly show that areas outside of the recommended Southwest Coast nonattainment area in York, Cumberland and Sagadahoc counties are much less urbanized than towns/cities inside the recommended nonattainment area.

f. Traffic Congestion and Commuting Patterns

Data supplied by Maine Department of Transportation (MEDOT) was used to analyze traffic congestion and commuting patterns in the Bangor MSA and counties along the southwest and mid-coast of Maine. Vehicle miles traveled (VMT) per square mile was the parameter chosen to plot in Figure A-13. Figure A-13 shows that traffic congestion is relatively worse along the immediate coastal towns in southwestern Maine than further inland with another relatively congested area in the center of the Bangor MSA. Number of commuters was the parameter chosen to plot in Figure A-14 to again show there are many more commuters in towns along the immediate coastal towns than inland.

g. Location and Magnitude of Emission Sources

EPA's emission inventory snapshot[5] for the year 1999, based on draft Version 3 of the 1999 National Emission Inventory (NEI) was used to compare NO_x and VOC county level emissions in Maine to levels in southern New Hampshire and eastern Massachusetts. The largest sources of emissions, as shown in Figure A-15 and Figure A-16, are located in eastern Massachusetts, southeastern New Hampshire and Cumberland County in southern Maine.

License allowed potential to emit NO_x and VOC point source data, from Maine DEP Licensing Division, was used in Figure A-17. This data clearly shows point source emissions to be very small in towns outside of the recommended nonattainment areas. This data also shows most of Maine's major sources of NO_x and VOC emissions are upwind, not downwind, of the Kittery, Kennebunkport and Cape Elizabeth monitoring sites. Nearby upwind major point source contributors of ozone precursors into Maine's recommended 8-hour ozone nonattainment area include;

Salem Station along the northeast coast of Massachusetts,
PSNH Schiller Station in coastal New Hampshire,
Newington Station in coastal New Hampshire and
Merrimack Station in southern interior New Hampshire.

The PSNH Schiller Station has been shown, by NHDES air quality modeling analyses, to be currently violating NAAQS.

[5] EPA Guidance Memorandum of June 9, 2003, from Tom Helms, Joe Praise and Phil Lorang, "Emissions Data Usage in the Determination of Boundaries of Nonattainment for 8-hr Ozone and PM2.5"

The emissions analyses clearly show that 8-hour ozone nonattainment areas in Maine do not need to be expanded into other towns in Maine beyond the recommended nonattainment areas if NOx and VOC emissions are the only factors determining nonattainment area expansion.

h. Six Factor Analysis

There are six factors that can be quantified to determine a town/city relative impact to a nearby nonattainment area. These factors include population density, projected population change, degree of urbanization (commercial and industrial development), traffic congestion (VMT/mi._), commuting patterns (number of commuters), and location and magnitude of NO_x and VOC emission sources.

Ranges of values for each of the six factors were normalized from 0 – 100 and for each town/city in or near the recommended nonattainment areas, normalized values were added together to obtain a six factor relative impact value. Results of this analysis are shown in Table B-5 and Figure A-18. The highest rated town outside of the recommended Southwest Coast nonattainment area had a six factor relative impact value of only 47.1 out of a possible 600 with the highest individual normalized factor of 30.7 due to projected population change but only a factor of 3.7 for 2000 population. It is clear from this analysis that Maine's potential area of influence in York, Cumberland and Sagadahoc counties does not contribute significantly to nearby recommended nonattainment areas in those counties. Those areas outside the recommended nonattainment areas are primarily rural with no significant concentration of commercial development, industrial development, population density or traffic congestion.

The highest rated town inside of the recommended Mid-Coast nonattainment area had a six factor relative impact value of only 86.8 with the highest individual normalized factor of 37.9 due to population change with a factor of only 11.3 for 2000 population. This analysis clearly shows recommended Mid-Coast nonattainment area high ozone levels are influenced more from transport, meteorology and topography/geography factors than local population, emissions and land use related factors.

i. Level of Control of Regional Emission Sources/Regional Emission Reductions

The Massachusetts Department of Environmental Protection (MADEP) submitted a modeling analysis to the EPA in December 1997. This included modeling results of the July 8, 1988 ozone episode, which "zeroed out" or eliminated all of Maine's anthropogenic NOx and VOC emissions (see Figure A-19). The maximum benefit was a reduction in ozone concentrations of 5.91 ppb northeast of Portland. Similar modeling results for "zeroed out" anthropogenic emissions for New Hampshire and Massachusetts (see Figure A-20 and Figure A-21) showed a reduction in ozone levels of 10.51 ppb and 64.31 ppb, respectively. In addition, modeling results in Figure A-22 show that doubling NOx and VOC emission in the Maine Turnpike region do not substantially impact ozone levels within the State.

Two control strategies which would reduce Maine's NOx and VOC emissions to a level 25% less than 1999 controls were also modeled by MADEP. Results of the two control strategies for four

historical high ozone episodes are summarized in Table B-6. This modeling demonstration shows that attainment could not be achieved in the southern counties of York, Cumberland, and Sagadahoc without substantial emission reductions in upwind areas.

3. RECOMMENDED NONATTAINMENT AREAS IN MAINE

The recommended nonattainment areas as shown in Figure A-23 meet all Clean Air Act requirements for nonattainment designations. Table B-7 contains a list of the towns and cities in the recommended nonattainment areas in the State of Maine based on historical and preliminary 2001-2003 data and the current scientific knowledge of ozone formation and transport. Nonattainment expansion within and upwind of Maine to include towns/cities bordering the recommended nonattainment areas is not justified based primarily upon unique ozone transport mechanisms into and through Maine, meteorology, relatively low population/emission density, geography/topography and regional analyses contained in this document. Therefore, the State of Maine recommends that these nonattainment areas be considered as two separate areas not connected to the New Hampshire or Massachusetts nonattainment areas.

EPA has suggested that Maine's recommended Southwest Coast 8-hour ozone NAAQS nonattainment area should be no smaller than the current 1-hour Ozone NAAQS. The State of Maine disagrees with that suggestion mainly because the size of nonattainment area should not be dependent on the size of a totally different NAAQS nonattainment area. The Southwest Coast nonattainment area does include all towns/cities in the Portland MSA and all Maine towns/cities in the Boston-Worcester-Lawrence CMSA. The Southwest Coast nonattainment area in Maine should be classified under Subpart II as a marginal nonattainment area if the 2001-2003 8-hour ozone design value is no more than 5% over the marginal/moderate classification cutoff. The primary reason for this classification is that EPA modeling of current and proposed national controls shows that area to be in attainment of the 8-hour ozone NAAQS by 2007.

The recommended Mid-Coast nonattainment area at this time should be considered a rural transport Subpart 1 nonattainment area. The Mid-Coast nonattainment area 'does not include and is not adjacent'[6] (multi-town buffer zone) to any part of the Bangor MSA as shown in Figure A-23. The Bangor MSA is not upwind or adjacent to the proposed nonattainment area. Sources of VOC and NO_x emissions (see Figure A-15 and Figure A-16) within the area 'do not make a significant contribution to ozone concentrations measured in the area or in other areas'[6]. Therefore, the recommended Mid-Coast nonattainment area meets requirements of 182(h)(of subpart 2) to be a rural transport area.

These recommendations are to be considered preliminary because they are not based on quality assured 2001-2003 data. When the final quality assured 2001-2003 data is available, The State of Maine will review and submit, if necessary, the final recommendation of 8-hour ozone NAAQS nonattainment area designations.

[6] CAA 182(h)(of subpart 2)

APPENDIX A

Figure A-1: 2001-2003 8-hr Ozone Design Values w/2003 Thresholds

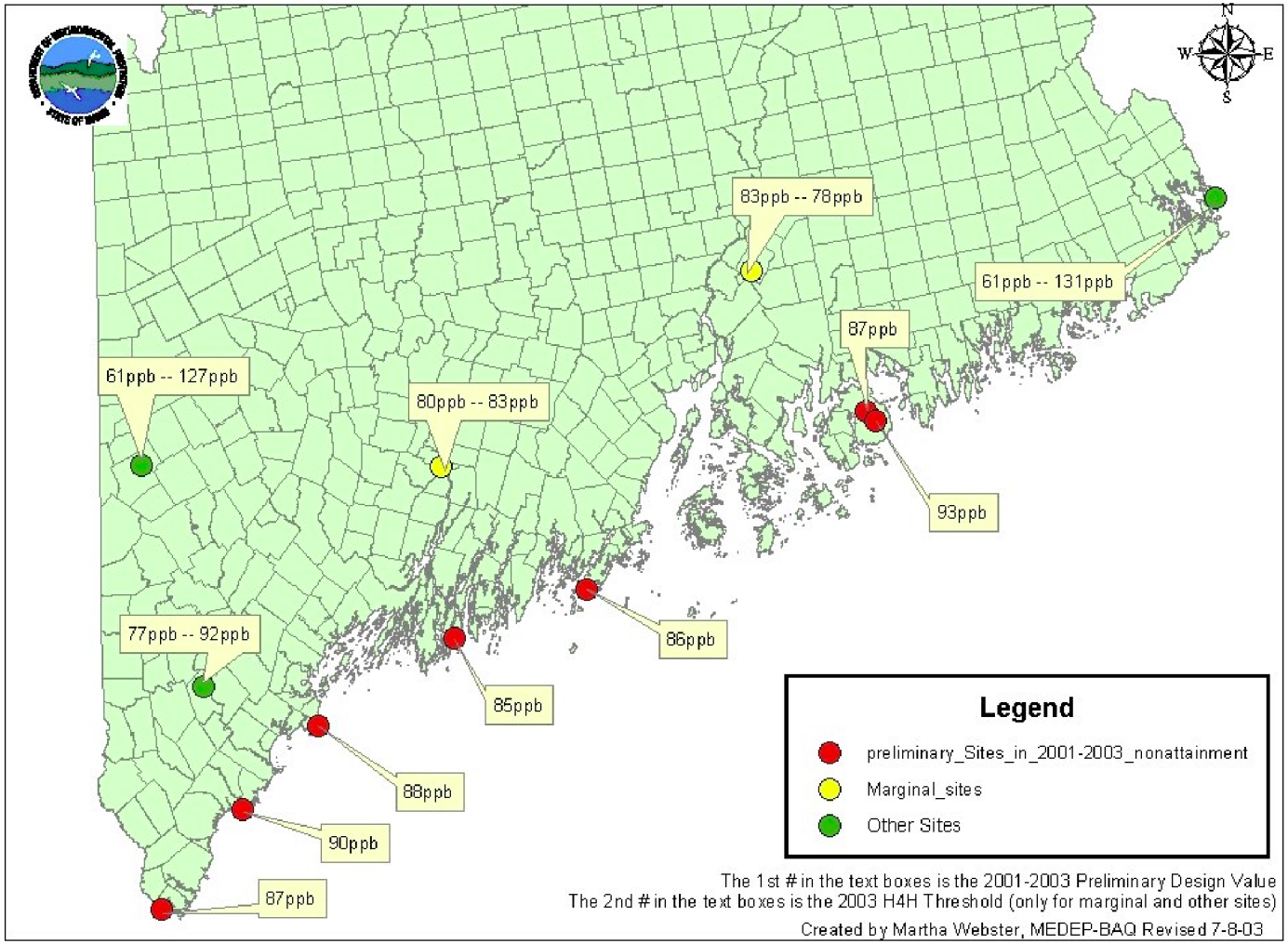


Figure A-2: NARSTO-Northeast Transport Regimes

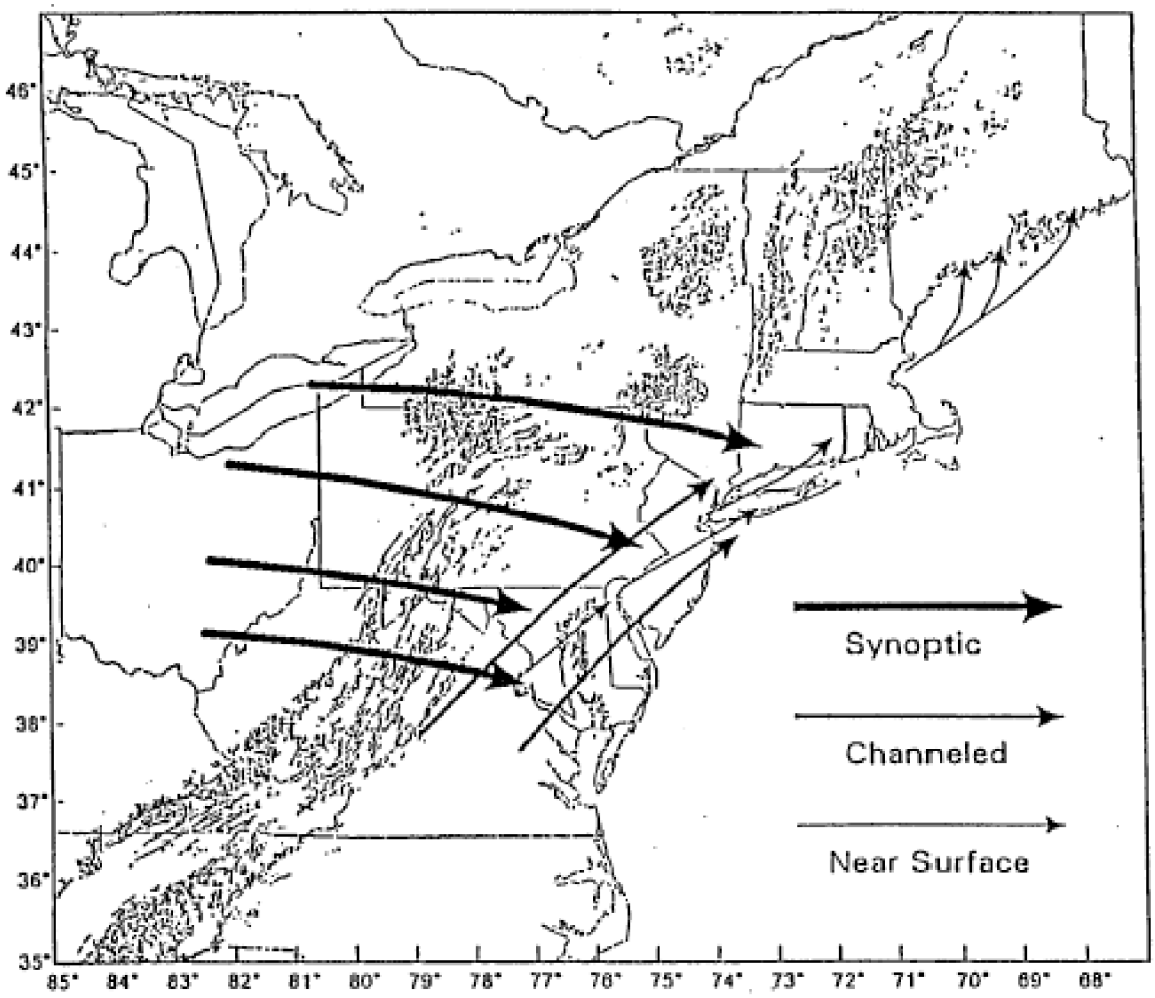


Figure A-3: 2000-2002 High Ozone Events Wind Rose Analysis

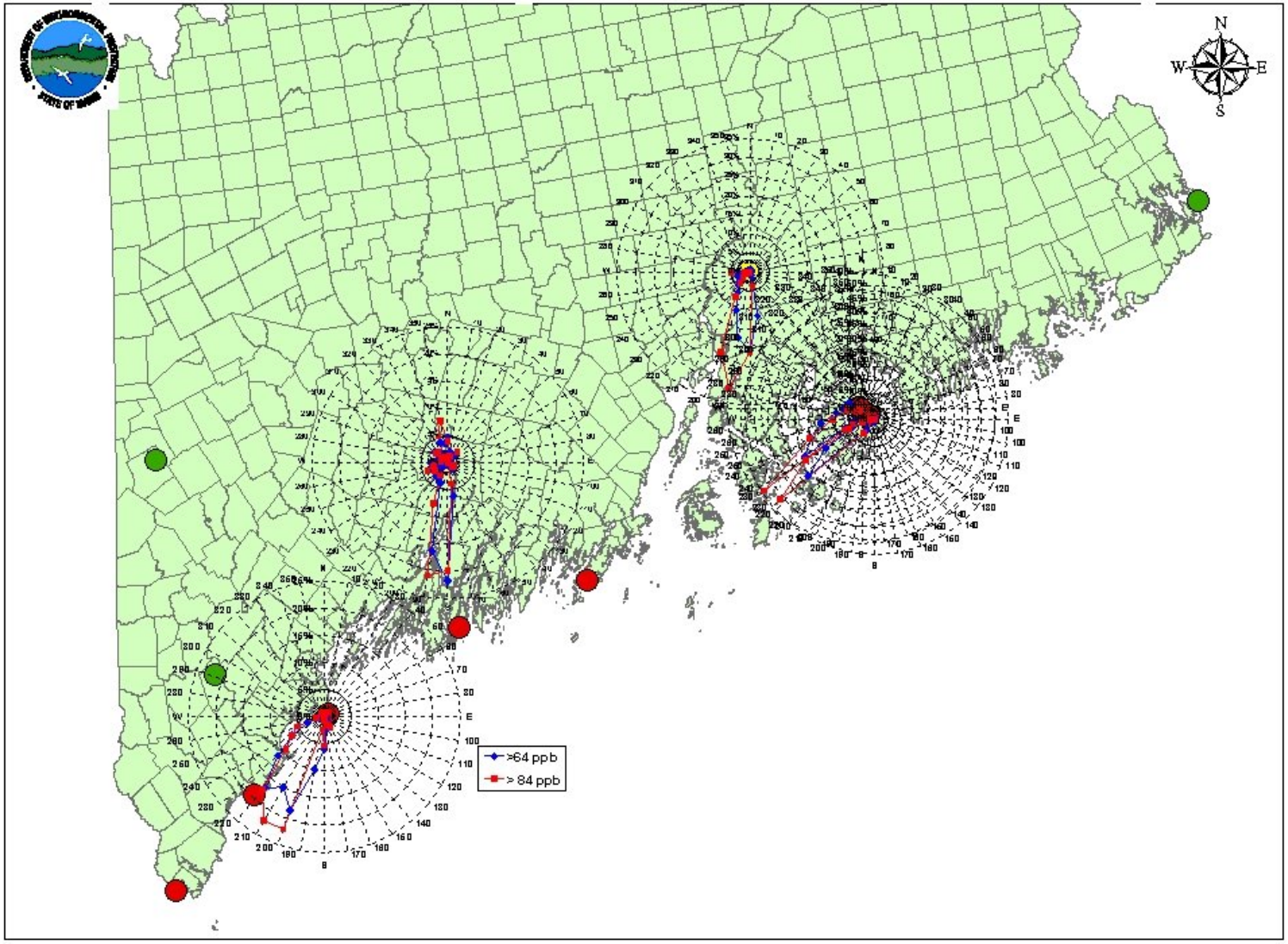


Figure A-4: SW Maine Coast vs. Inland Monitor Results

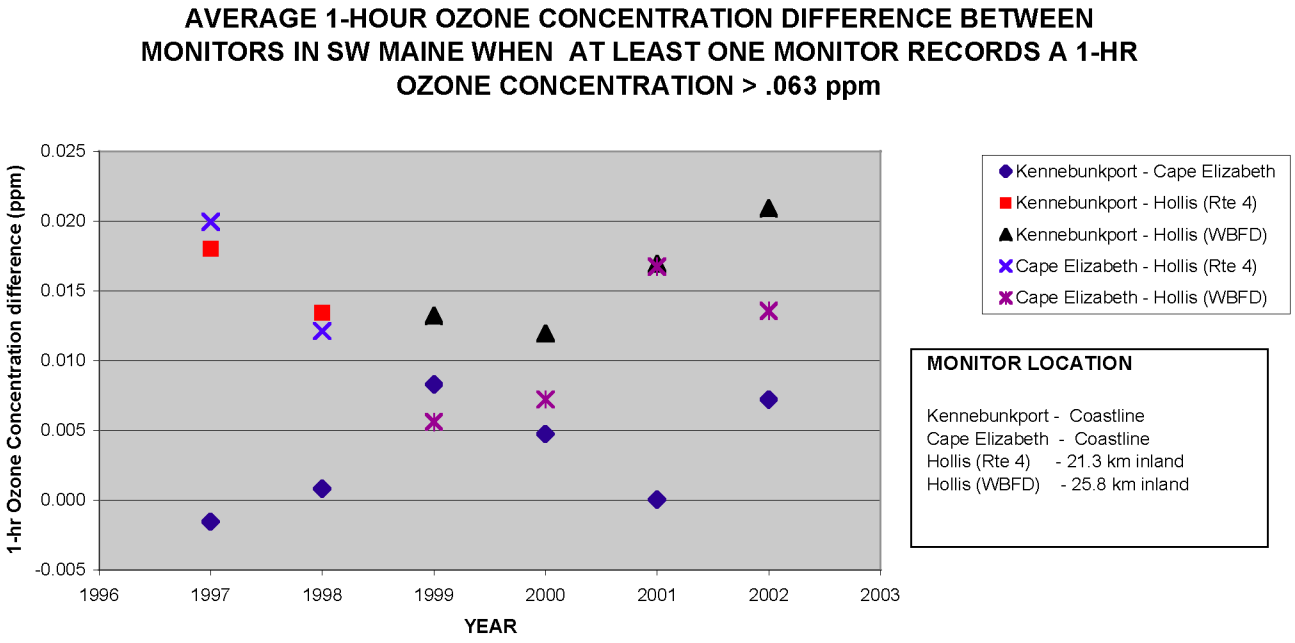


Figure A-5: Acadia National Park Elevation Results Analysis

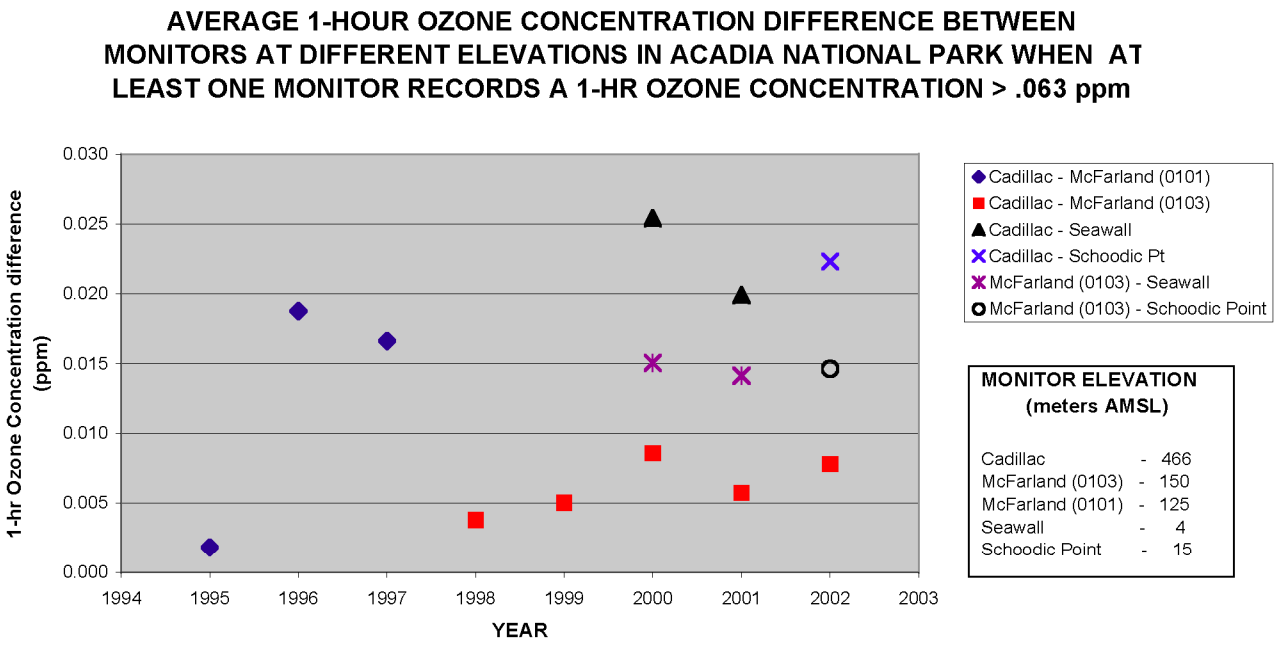


Figure A-7 Population per Square Mile

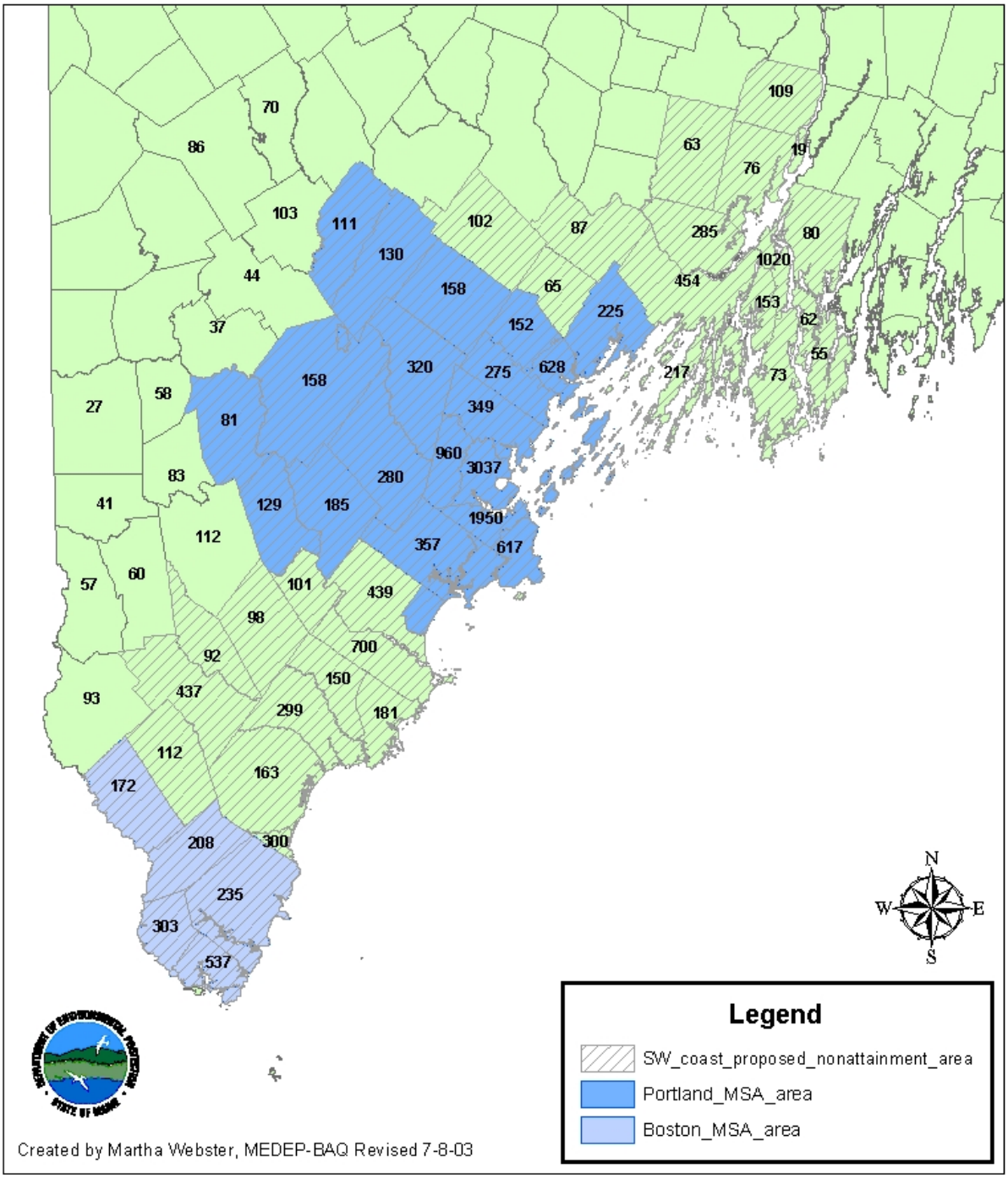


Figure A-8: MA, NH & ME 2000 to 2010 Projected Population Change

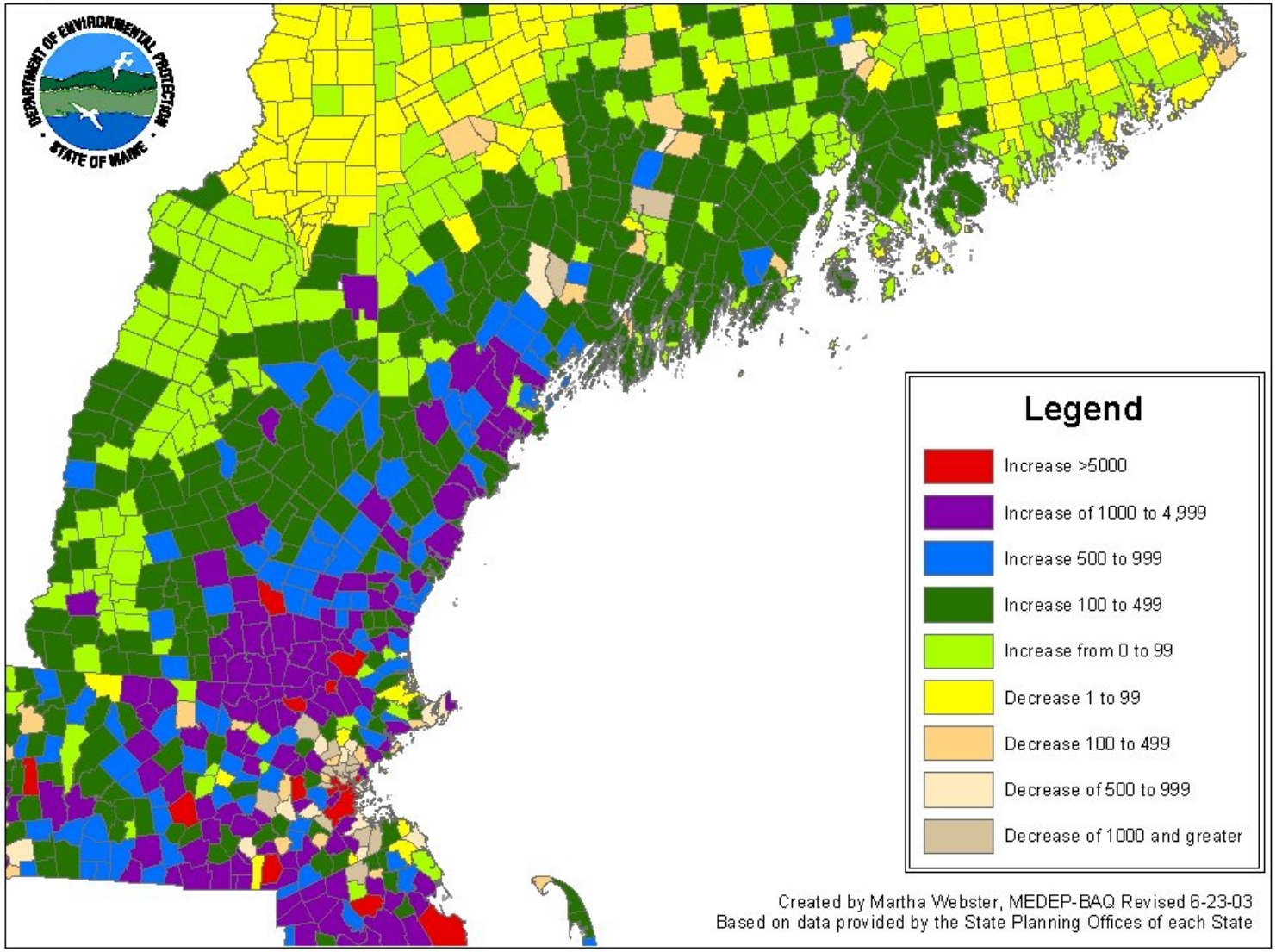


Figure A-9:
2000 to 2010 Population Change per Square Mile

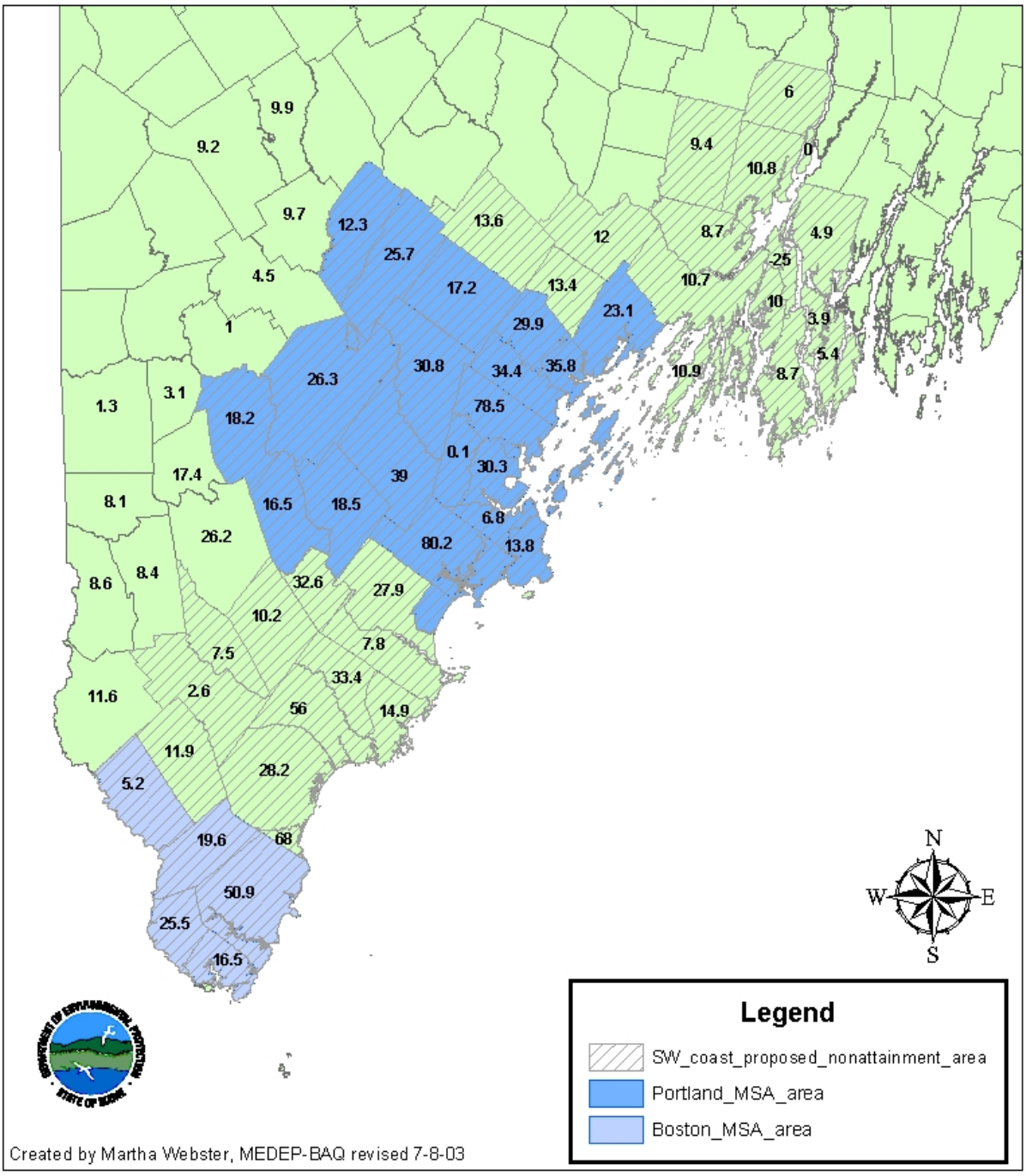
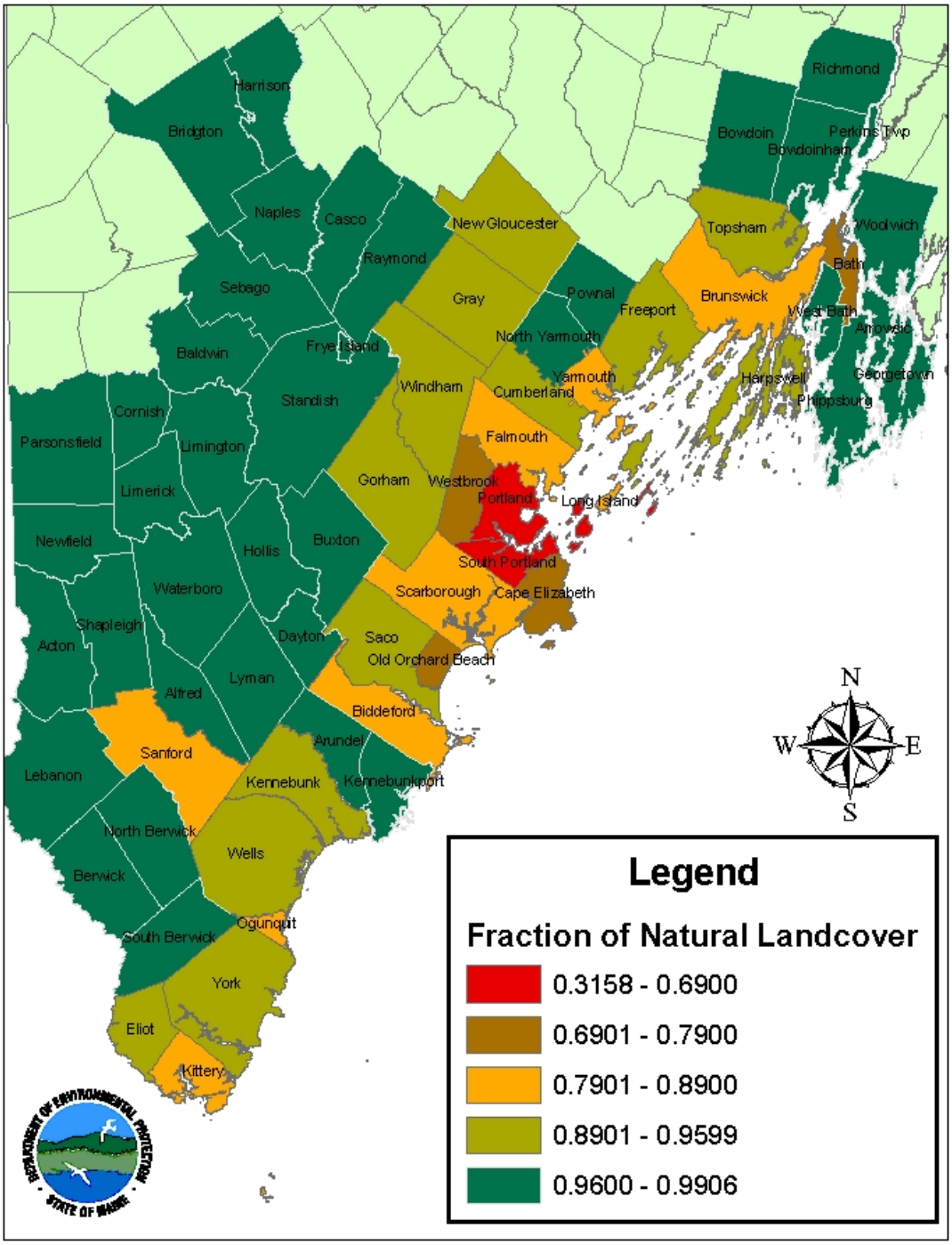
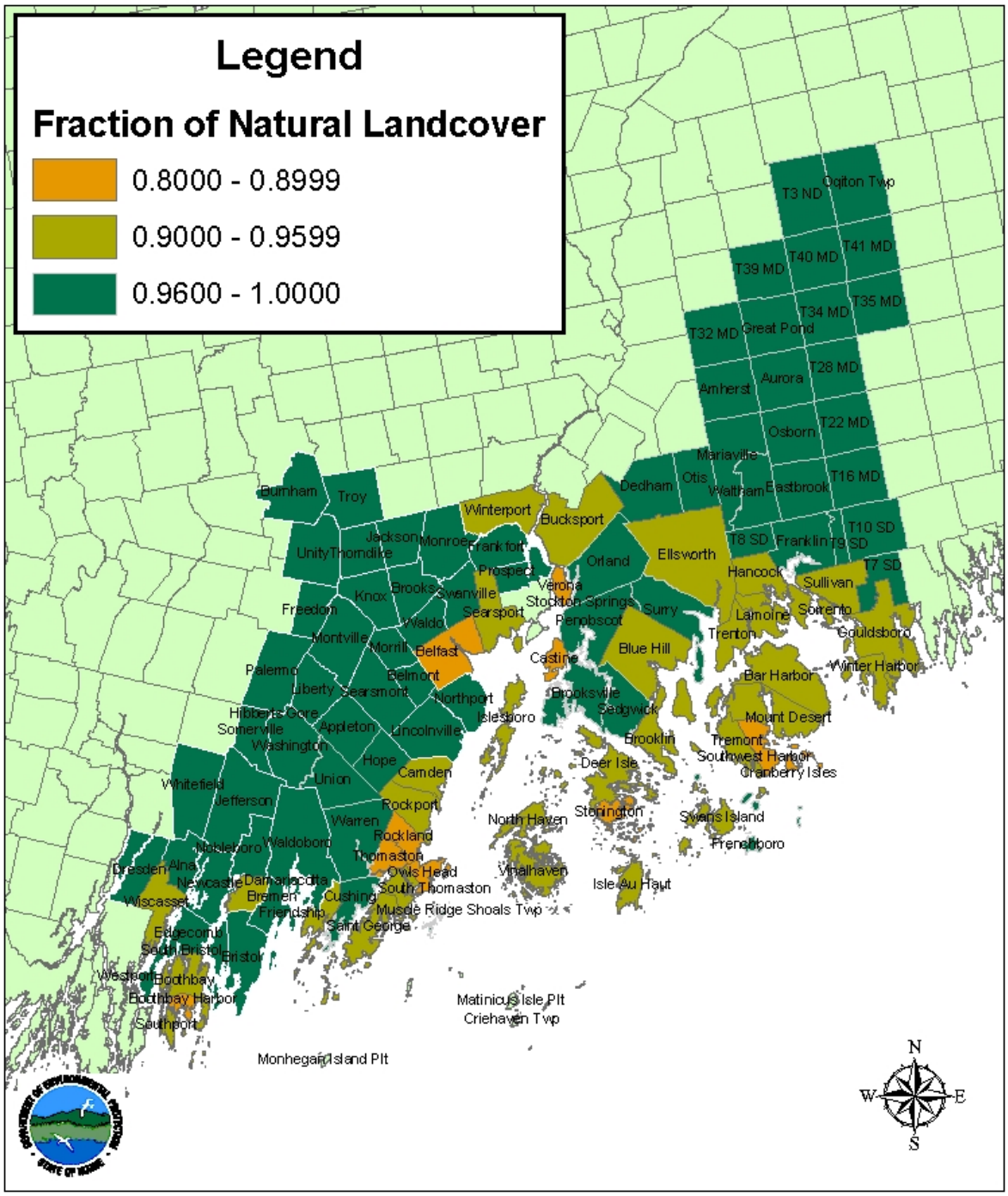


Figure A-10: Southwest Maine Landcover Analysis



Created by Martha Webster, MEDEP-BAQ Revised 6/23/03

Figure A-11: Mid-Coast Landcover Analysis



Created by Martha Webster, MEDEP_BAQ Revised 7-8-03

Figure A-12: Normalized Land Cover

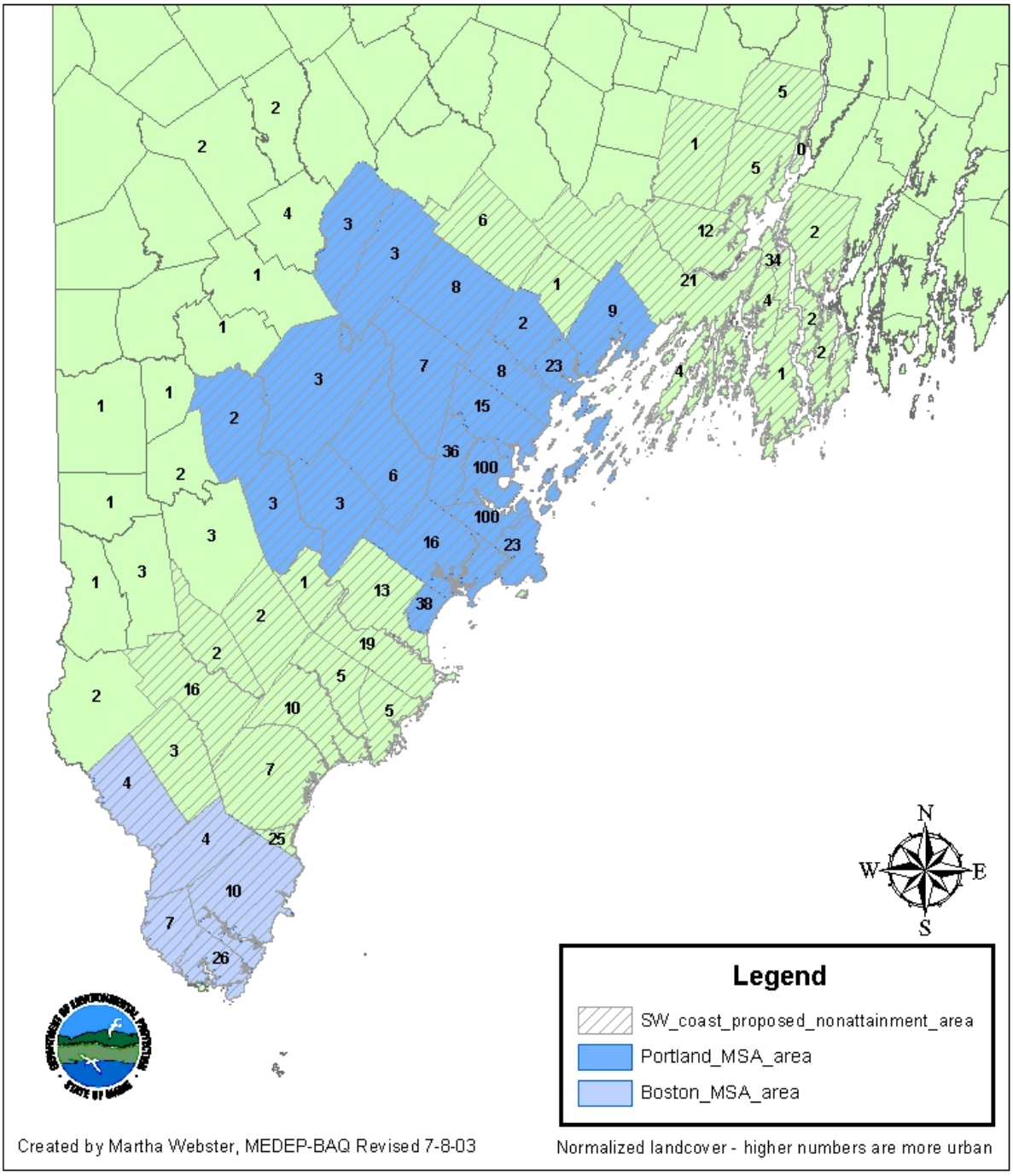


Figure A-13: Vehicle Miles Traveled per Square Mile

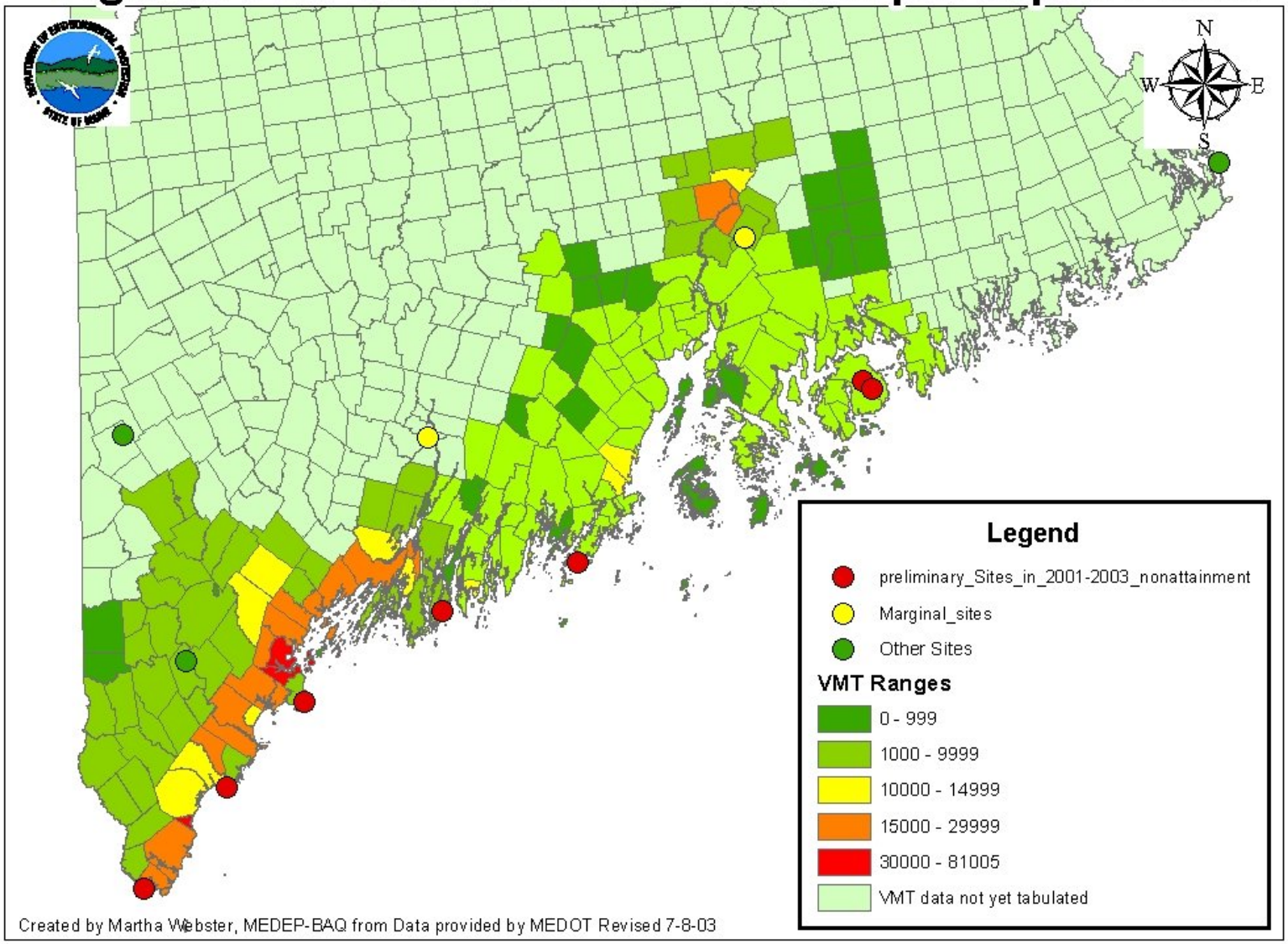


Figure A-14: Commuters per Town

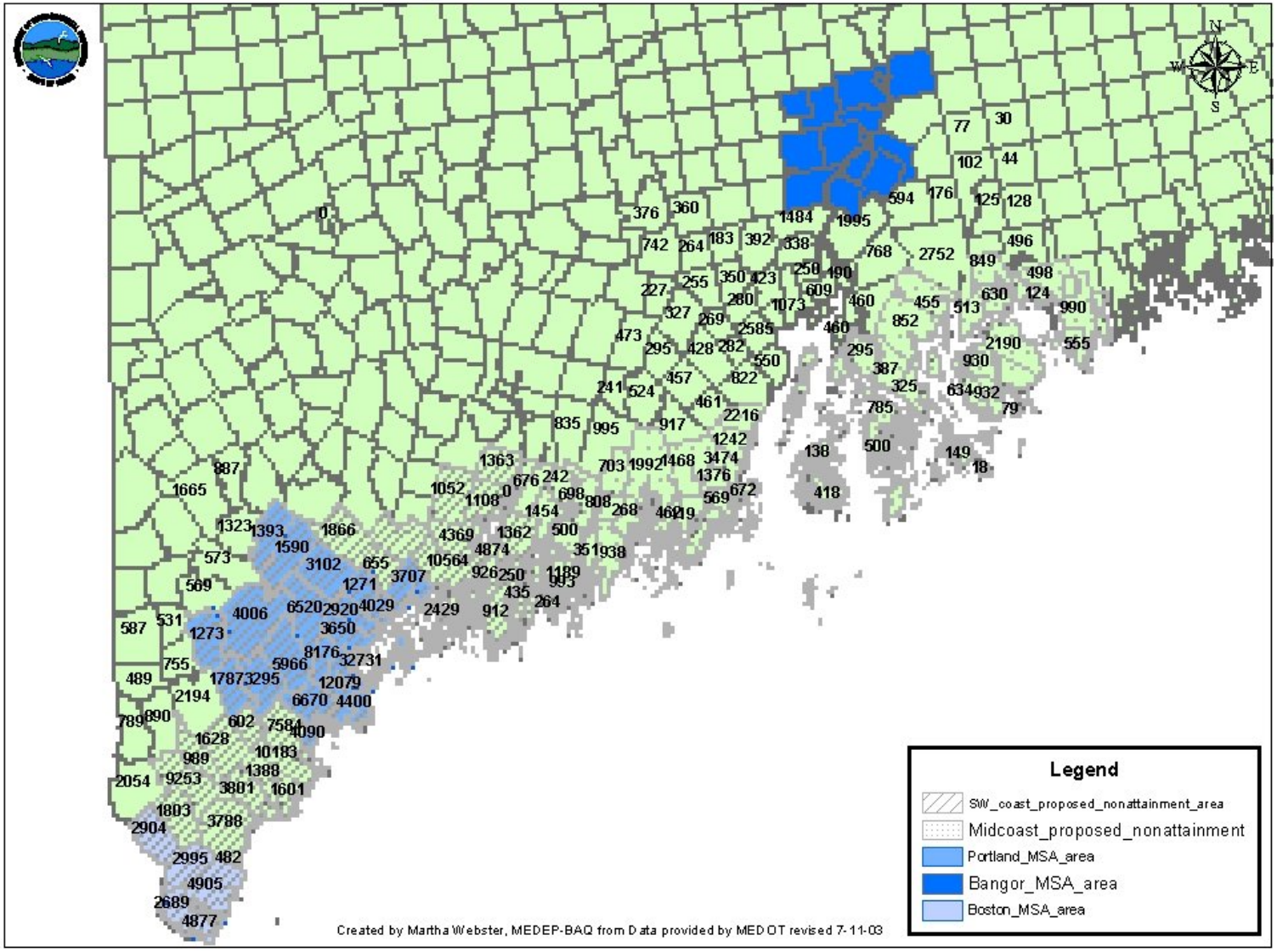


Figure A-15: 1999 (v3) NEI Annual Total NOx Emissions (tpy)

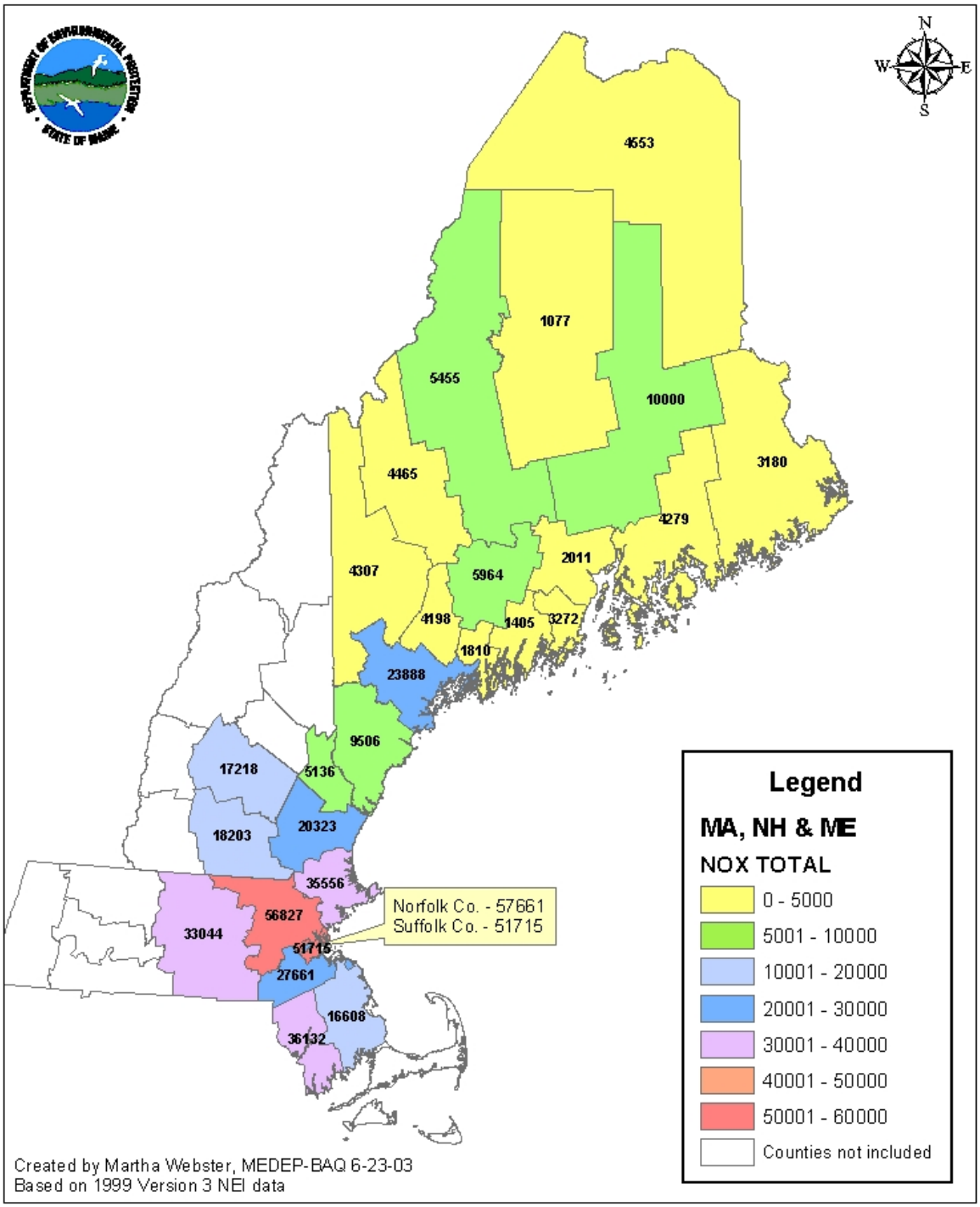


Figure A-16: 1999 (v3) NEI Annual Total VOC Emissions (tpy)

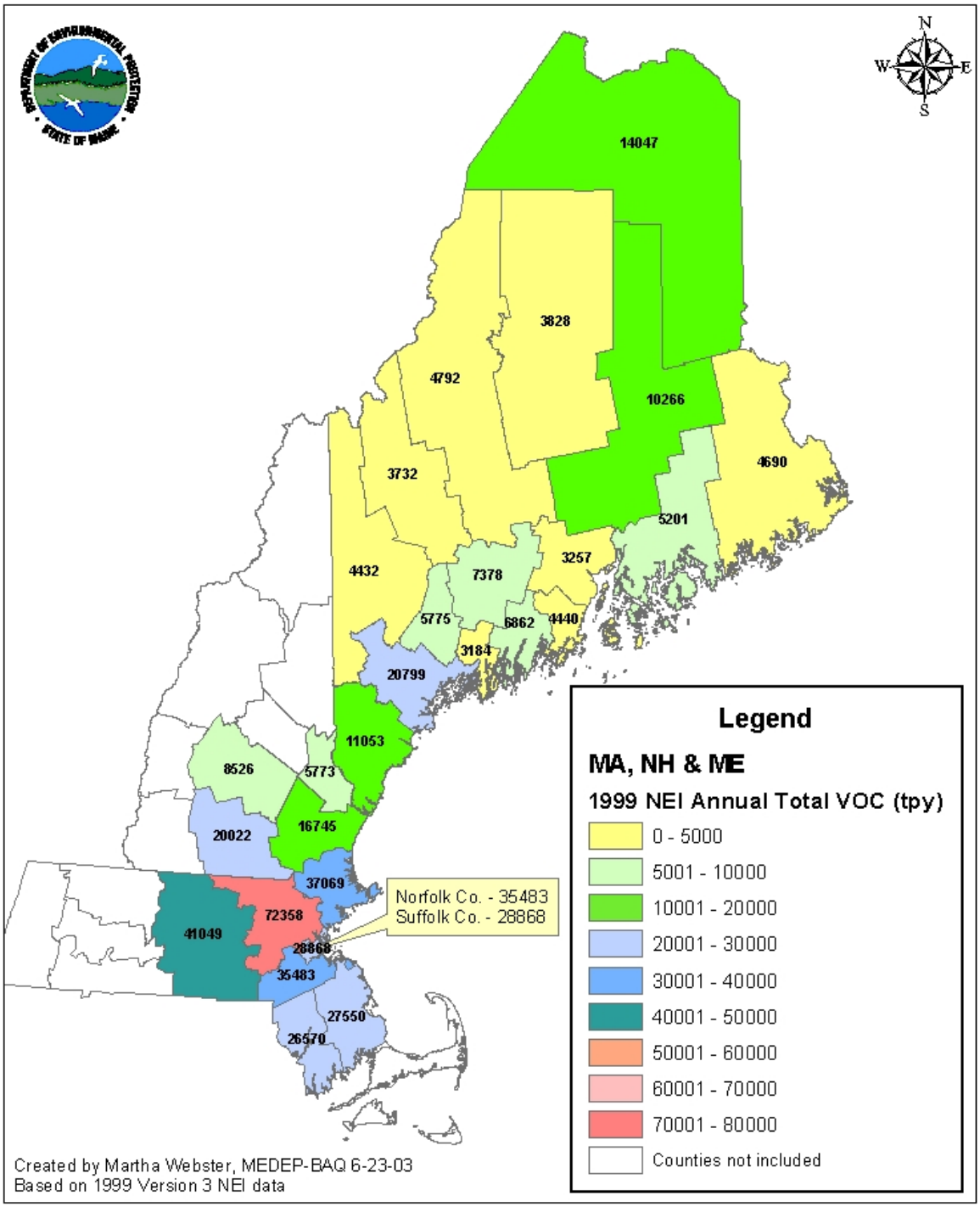


Figure A-17:
Total NOx & VOC Point Source PTE Emissions (tpy)

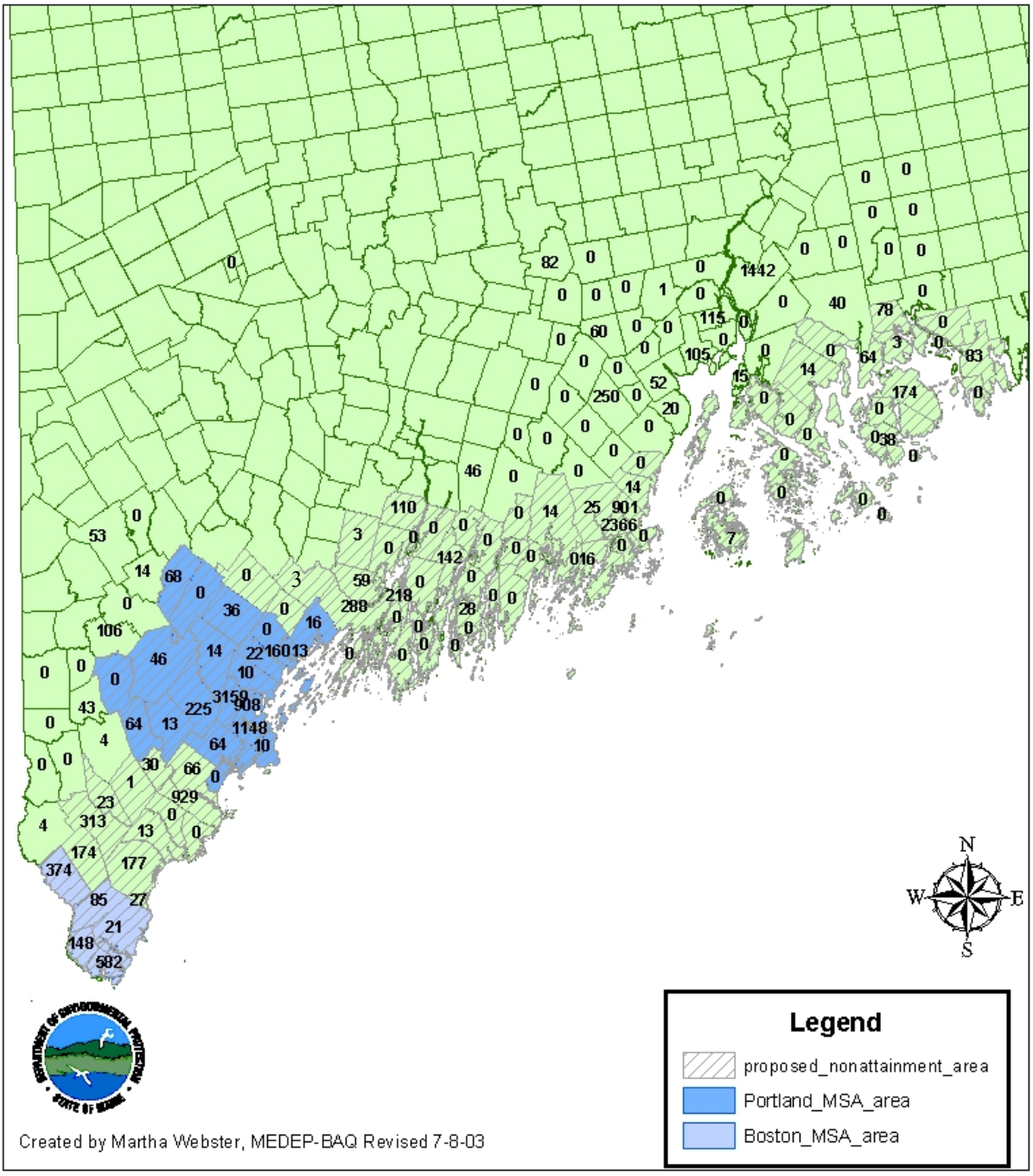


Figure A-18:
Six Category Normalized Values

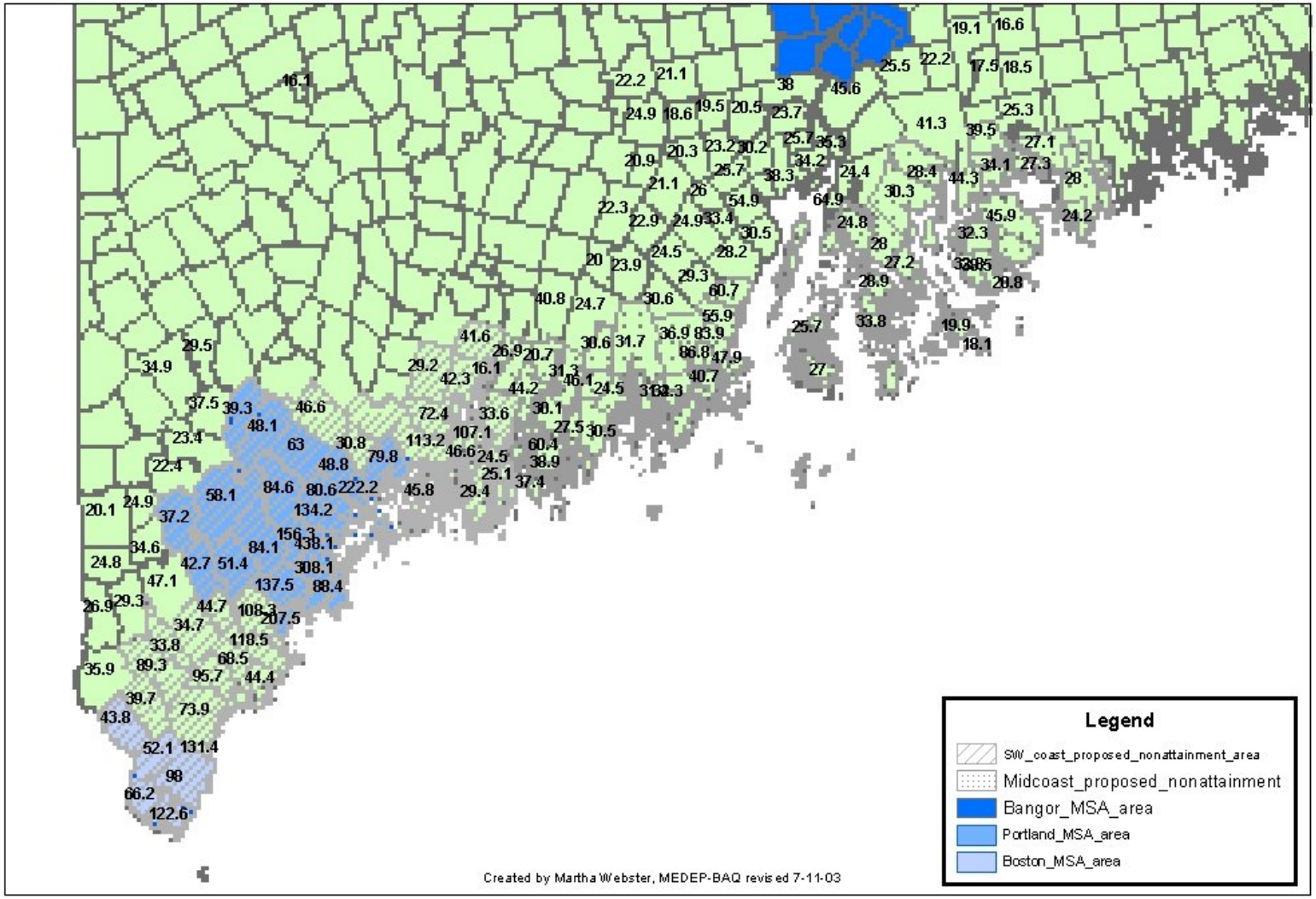


Figure A-19: ME Zero-Out Modeling Results

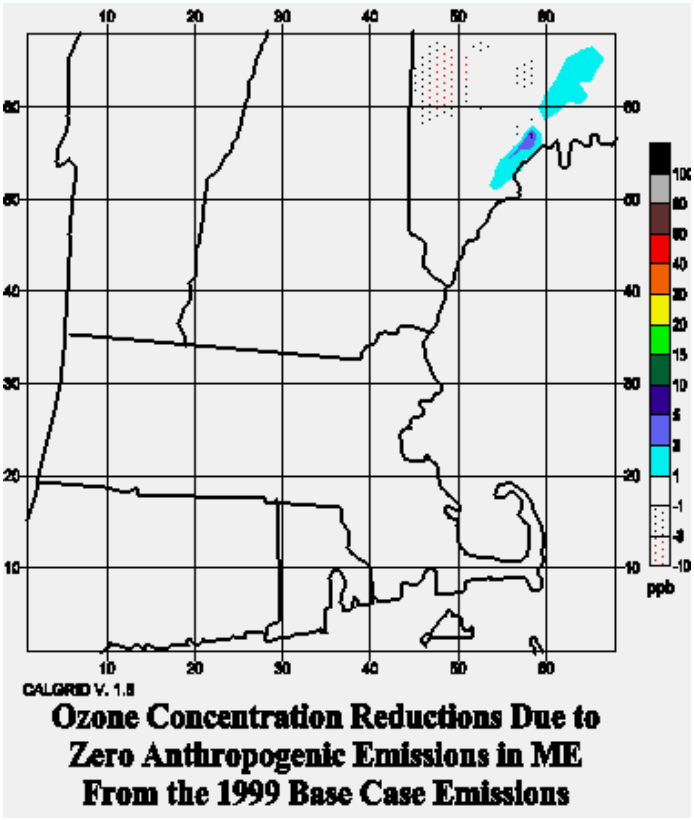


Figure A-20: NH Zero-Out Modeling Results

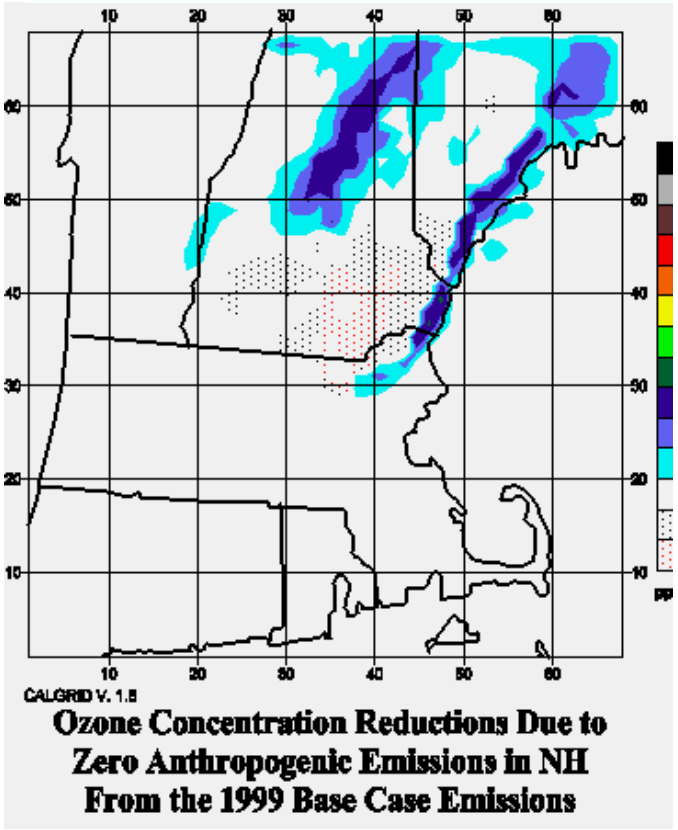


Figure A-21: MA Zero-Out Modeling Results

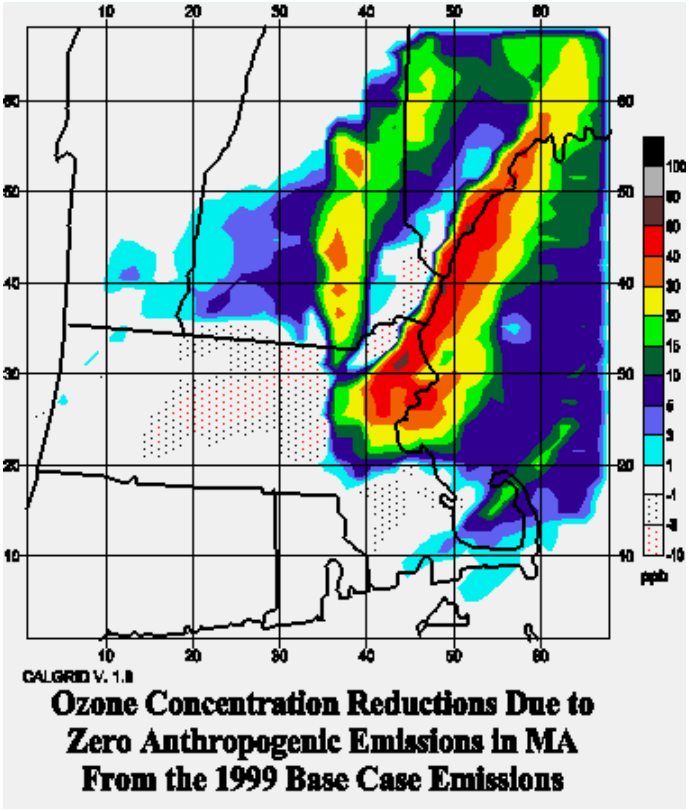


Figure A-22: ME Turnpike VOC and NOx Doubling Emissions Modeling Results

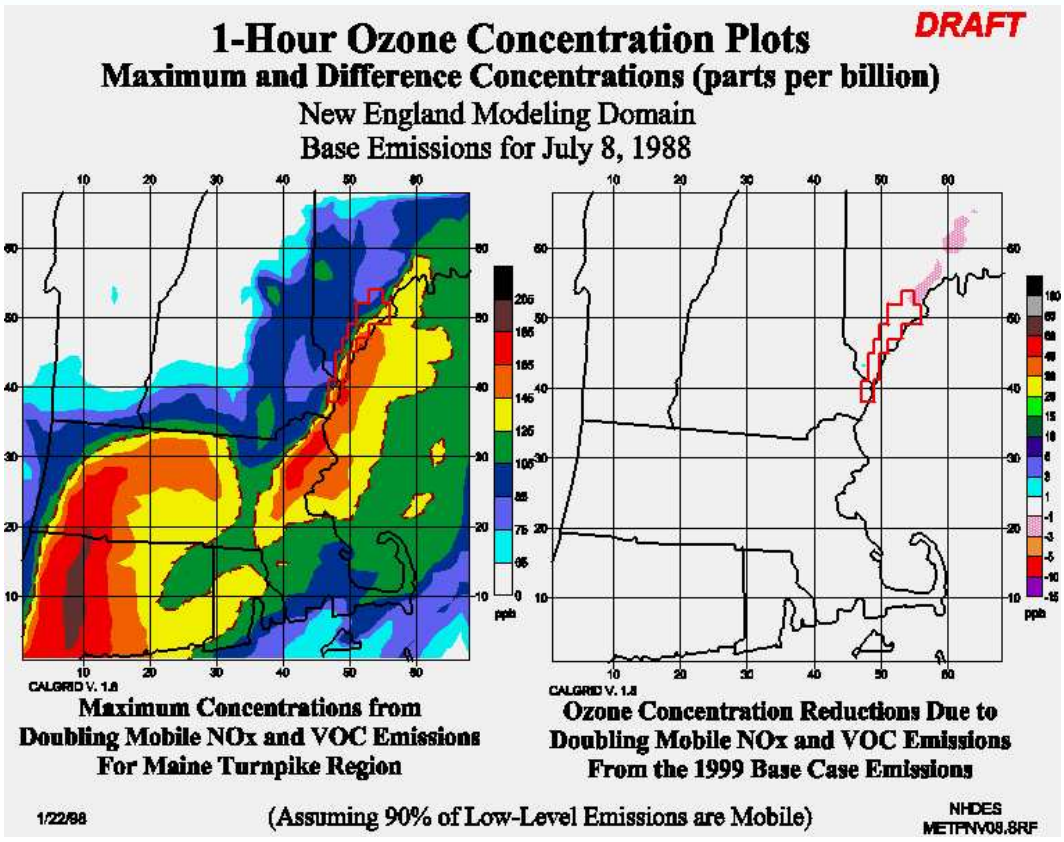
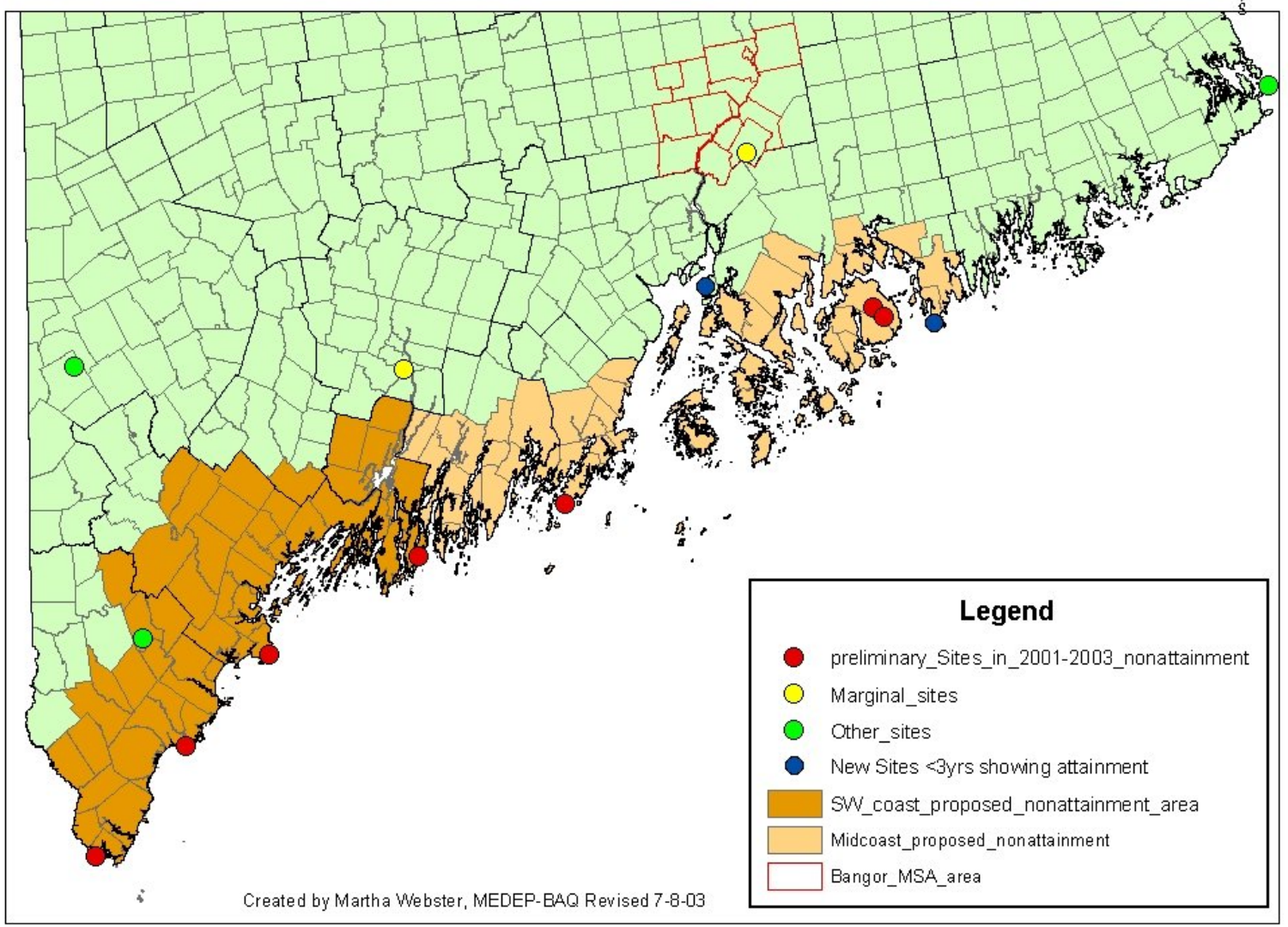


Figure A-23 Recommended 8-hr Ozone Nonattainment Areas



APPENDIX B

Table B-1: Historical (1991-2002) Analysis of 8-hr Ozone Data in Maine

Monitor	Monitoring Year(s)	Maximum Historical DESIGN VALUE (ppb)	Maximum 4th High Concentration (ppb)	1997-1999 DESIGN VALUE (ppb)	2000-2002 DESIGN VALUE (ppb)	2001-2003 DESIGN VALUE[1] (ppb)
YORK COUNTY						
Kittery	1995-2002	**88** ('97-99)	**94** (2002)	**88**	84	**87**
Kennebunkport	1991-2002	**102** ('91-'93)	**111** (1991)	**92**	**90**	**90**
Appledore Island	1991-1992	*	**88**^ (1991)	*	*	*
Hollis/West Buxton	1997-2002	76 ('97-'99)	83 (2002)	76	73^^	77
CUMBERLAND COUNTY						
Cape Elizabeth	1991-2002	**98** ('91-'93)	**109** (1991)	**89**	**86**	**88**
Portland	1995	*	76 (1995)	*	*	*
SAGADAHOC COUNTY						
Phippsburg	1993-2000	**95** ('95-97)	**99** (1995)	**92**	*	*
Reid State Park	2002	*	**96** (2002)	*	*	*
KENNEBEC COUNTY						
Gardiner	1991-2002	81 ('91-'93)	**88** (2002)	77	78	80
ANDROSCOGGIN COUNTY						
None	*	*	*	*	*	*
LINCOLN COUNTY						
None	*	*	*	*	*	*
KNOX COUNTY						
Port Clyde	1991-2002	**97** ('91-'93)	**113** (1991)	82	83	**86**
Isle Au Haut	1991-1994	**94** ('91-'93)	**96** ('91 and '92)	*	*	*
HANCOCK COUNTY						
McFarland Hill	1991-2002	**87** ('01-'03)	**95** (1991)	**85**	84	**87**
Cadillac Mountain	1995-2002	**93** ('00-'02 and '01-'03)	**101** (2001)	**89**	**93**	**93**
Dedham	1991-1992	*	81 (1991)	*	*	*
Mt Desert Rock Lighthouse	1992	*	72^ (1992)	*	*	*
Seawall	2000-2001	*	**85** (2001)	*	*	*
Castine	2001-2002	*	82 (2002)	*	*	*
Schoodic Point	2002	*	74^ (2002)	*	*	*
WALDO COUNTY						
None	*	*	*	*	*	*
PENOBSCOT COUNTY						
Holden	1993-2002	83 ('01-'03)	**89** (2002)	75	79^^	83
Howland	1992-2002	71 ('97-'99)	73 (1999)	73	67^^	67
Costigan	1991-1992	*	69 (1992)	*	*	*
WASHINGTON COUNTY						
Jonesport	1991-1995	79 ('91-'93)	**89** (1991)	*	*	*
Roosevelt Campobello	1995-2002	64 ('96-'98)	70 (1996)	62	60	61
AROOSTOOK COUNTY						
Ashland	1991-2002	74 ('91-'93)	78 (1992)	65	66	66
FRANKLIN COUNTY						
None	*	*	*	*	*	*
SOMERSET COUNTY						
Skowhegan	1991-1996	74 ('91-'93)	76 (1993)	*	*	*
OXFORD COUNTY						
North Lovell	1992-2002	67^^ ('92-'94)	74^ (1992)	59	60	61

PISCATAQUIS COUNTY						
Dover-Foxcroft	1998-2001	65 ('98-'00)	68 (2001)	*	*	*
Greenville	1993-1996	64 ('94-'96)	73 (1995)	*	*	*

1 Based on preliminary data through July 5, 2003
* No Data Available
^ Ozone Season data recovery rate < 75%
^^ 3-year data recovery rate < 90%

Table B-2: 2003 8-hr Ozone Attainment/Non Attainment Threshold Analysis

Monitor	Monitoring Years	Threshold 4th High 2003 Concentration (ppb)	Range of 1991-2002 4th High Concentrations (ppb)	1991-2002 Threshold Achievement Rate	1998-2002 Threshold Achievement Rate	Number of Times Threshold reached in 2003*
Holden	1993-2002	78	61 – 89	50%	60%	1
Gardiner	1991-2002	83	63 – 86	33%	40%	1
Hollis/West Buxton	1997-2002	92	66 - 83	0%	0%	0
North Lovell	1992-2002	127	54 - 74	0%	0%	0
Roosevelt Campobello	1995-2002	131	56 – 70	0%	0%	0

* Based on preliminary data through July 5, 2003

Table B-3: August 13-14, 2002 1-hour Ozone Concentrations (ppb)

GMT	19Z	20Z	21Z	22Z	23Z	00Z	01Z	02Z	03Z
EST	3 pm	4 pm	5 pm	6 pm	7 pm	8 pm	9 pm	10 pm	11 pm
8/13/2002									
COASTAL SITES									
Kittery	**128**	119	107	96	73	57	36	12	3
Kennebunkport	119	119	**128**	115	105	107	90	91	66
Cape Elizabeth	100	107	105	107	**119**	112	92	78	58
Reid State Park	80	91	104	104	**107**	104	101	99	92
Port Clyde	57	59	65	70	71	76	76	78	**80**
Castine	90	**109**	102	98	92	73	72	64	59
ANP Cadillac Mtn	79	78	81	90	101	102	**118**	110	116
ANP McFarland Hill	77	75	81	87	92	100	117	**119**	113
Roosevelt-Campobello	**38**	36	36	34	34	29	33	31	29
INLAND SITES									
West Buxton	**102**	99	85	67	45	27	28	28	21
North Lovell	**60**	50	29	31	33	34	28	27	24
Gardiner	89	**94**	85	87	89	91	76	68	55
Holden	78	76	79	85	87	85	91	97	**105**
Howland*	56	**57**	47	41	42	34	29	29	28
Ashland*	50	55	59	**59**	56	54	51	47	32
RESEARCH SITE									
Scotia Prince Ferry	89	**114**	94	50	89	110	90	74	76
GMT	19Z	20Z	21Z	22Z	23Z	00Z	01Z	02Z	03Z
EST	3 pm	4 pm	5 pm	6 pm	7 pm	8 pm	9 pm	10 pm	11 pm
8/14/2002									
COASTAL SITES									
Kittery	**149**	140	105	89	95	86	80	77	70
Kennebunkport	131	**136**	132	105	98	97	86	76	72

Cape Elizabeth	110	120	**125**	109	91	84	78	74	63
Reid State Park	90	101	114	**123**	102	91	83	78	75
Port Clyde	87	90	102	**118**	117	99	86	76	73
Castine	80	76	76	81	85	92	**100**	93	81
ANP Cadillac Mtn	79	75	76	81	81	85	115	**127**	112
ANP McFarland Hill	77	73	73	73	83	87	**115**	108	89
Roosevelt-Campobello	**74**	70	64	63	56	63	60	55	44
INLAND SITES									
West Buxton	92	96	111	**121**	118	102	84	64	42
North Lovell	**55**	46	36	39	40	43	34	27	22
Gardiner	**92**	77	74	69	71	77	86	86	67
Holden	75	76	73	72	73	74	76	88	**111**
Howland*	65	67	64	64	**67**	63	59	52	50
Ashland*	64	65	63	**66**	57	52	43	41	40
RESEARCH SITE									
Scotia Prince Ferry	96	123	**127**	102	91	92	76	65	62

*Data have not been QA'd

Table B-4: 2000 Census Population and 2000-2010 Estimated Growth Rates

AREA	COUNTY/STATE/TOWN /CITY	2000 Population	Estimated 2010 Population	2000-2010 Population Growth
STATE OF MAINE POPULATION STATISTICS				
Androscoggin	All towns/cities	104094	103742	-352 (-0.3%)
Cumberland	All towns/cities	266138	286028	19890 (7.5%)
Hancock	All towns/cities	51944	56635	4691 (9.0%)
Knox	All towns/cities	39716	42773	3057 (7.7%)
Lincoln	All towns/cities	33684	36518	2834 (8.4%)
Sagadahoc	All towns/cities	35315	36999	1684 (4.8%)
Waldo	All towns/cities	36394	39553	3159 (8.7%)
York	All towns/cities	187253	206430	19177 (10.2%)
OTHER COUNTIES	All towns/cities	515761	521439	5678 (1.1%)
MAINE	**ALL COUNTIES**	**1270299**	**1330117**	**59818 (4.7%)**
NEARBY 1999 MSA/CMSA POPULATION STATISTICS				
BOSTON-WORCESTER-LAWRENCE MA,CT,NH,ME CMSA (1999)				
Total CMSA CT	Connecticut	8878	8990	112 (1.3%)
Total CMSA MA	Massachusetts	4995287	5241297	246010 (4.9%)
Total CMSA NH	New Hampshire	741768	835122	93354 (12.6%)
Total CMSA ME	York County, ME	45073	50284	5211 (11.6%)
Total CMSA	ALL STATES	5791006	6135693	344689 (6.0%)
PORTLAND MSA (1999)				
York/Cumberland	All towns/cities in MSA	243996	263927	19931 (8.2%)
NEARBY 2003 MSA/CMSA POPULATION ONLY STATISTICS				
BOSTON-WORCESTER-MANCHESTER, MA-NH CMSA (2003)				
TOTAL CMSA	All MA/NH towns/cities in CMSA	5715698	na	na

PORTLAND-LEWISTON-SOUTH PORTLAND CMSA (2003)				
York/Cumberland/ Sagadahoc/Androscoggin	ME towns/cities in CMSA	591361	na	na
RECOMMENDED SOUTHWEST COAST NONATTAINMENT AREA				
York County	Towns/cities in NA	164997 (88%)	180553	15556 (9.4%)
Cumberland County	Towns/cities in NA	252907 (95%)	271452	18545 (7.3%)
Sagadahoc County	Towns/cities in NA	35315 (100%)	36999	1684 (4.8%)
Androscoggin County	Towns/cities in NA	3390 (3%)	3841	451 (13.3%)
TOTAL SW Coast NA	**Towns/cities in NA**	**456609**	**492845**	**36236 (7.9%)**
RECOMMENDED MID-COAST NONATTAINMENT AREA				
Lincoln County	Towns/cities in NA	28504 (86%)	30774	2240 (7.9%)
Knox County	Towns/cities in NA	33563 (85%)	35887	2324 (6.9%)
Hancock County	Towns/cities in NA	29805 (58%)	32423	2618 (8.8%)
Waldo County	Towns/cities in NA	604 (2%)	635	31 (5.1%)
TOTAL Mid-Coast NA	**Towns/cities in NA**	**92476**	**99689**	**7213 (7.8%)**

na = not applicable

Table B-5: Six-Factor Analysis for SW Maine

Town	Number of Commuters	2001 VMT/mi	NOx PTE + VOC PTE	Land Use	2000 Population / mi	Population Change/ mi	6-Category Total	Location*
	Normalized	*Normalized*	*Normalized*	*Normalized*	*Normalized*	*Normalized*	*Normalized*	
Portland	100.0	100.0	5.7	99.3	100.0	33.1	438.1	SWNA
South Portland	36.9	80.8	7.2	100.0	64.2	19.0	308.1	SWNA
Yarmouth	12.3	30.4	100.0	22.4	20.7	36.4	222.2	SWNA
Old Orchard Beach	12.5	17.6	0.0	38.2	39.2	100.0	207.5	SWNA
Westbrook	25.0	29.4	19.7	35.6	31.6	15.0	156.3	SWNA
Scarborough	20.4	26.0	0.4	15.9	11.7	63.1	137.5	SWNA
Falmouth	11.2	34.6	0.1	14.9	11.5	62.0	134.2	SWNA
Ogunquit	1.5	39.5	0.2	24.6	9.9	55.8	131.4	SWNA
Kittery	14.9	35.9	3.6	25.6	17.7	24.9	122.6	SWNA
Biddeford	31.1	19.8	5.8	19.1	23.0	19.7	118.5	SWNA
Brunswick	32.3	22.1	1.8	20.7	14.9	21.4	113.2	SWNA
Saco	23.2	25.6	0.4	12.9	14.4	31.7	108.3	SWNA
Bath	14.9	23.0	1.4	34.2	33.6	0.0	107.1	SWNA
York	15.0	19.8	0.1	9.8	7.7	45.5	98.0	SWNA
Kennebunk	11.6	16.1	0.1	9.6	9.8	48.6	95.7	SWNA
Sanford	28.3	12.3	2.0	15.9	14.4	16.5	89.3	SWNA
Cape Elizabeth	13.4	8.3	0.1	23.0	20.3	23.3	88.4	SWNA
Thomaston	**4.2**	**11.7**	**0.1**	**21.5**	**11.3**	**37.9**	**86.8**	**MCNA**
Windham	19.9	13.2	0.1	7.4	10.5	33.5	84.6	SWNA
Gorham	18.2	11.3	1.4	5.7	9.2	38.4	84.1	SWNA
Rockland	**10.6**	**15.7**	**0.0**	**31.6**	**19.4**	**6.5**	**83.9**	**MCNA**
Cumberland	8.9	19.3	0.1	7.5	9.1	35.6	80.6	SWNA
Freeport	11.3	22.7	0.1	9.4	7.4	28.9	79.8	SWNA
Wells	11.6	16.9	1.1	7.0	5.4	31.9	73.9	SWNA
Topsham	13.3	16.9	0.4	12.1	9.4	20.2	72.4	SWNA
Arundel	4.2	19.6	0.0	4.7	4.9	35.0	68.5	SWNA

Eliot	8.2	9.5	0.9	7.4	10.0	30.3	66.2	SWNA
Castine	**1.4**	**3.6**	**0.1**	**13.2**	**5.7**	40.9	64.9	**4**
Gray	9.5	14.7	0.2	8.0	5.2	25.3	63.0	SWNA
Camden	6.8	9.3	0.0	11.0	9.5	24.3	60.7	MCNA
Boothbay Harbor	3.0	13.4	0.2	15.2	13.3	15.2	60.4	MCNA
Standish	12.2	7.0	0.3	2.6	5.2	30.7	58.1	SWNA
Rockport	3.8	13.1	0.1	11.2	4.9	22.8	55.9	MCNA
Belfast	**7.9**	**9.3**	**0.1**	**14.6**	**6.2**	16.8	54.9	**4**
South Berwick	9.2	5.1	0.5	3.8	6.9	26.7	52.1	SWNA
Buxton	10.1	6.2	0.1	2.9	6.1	26.1	51.4	SWNA
North Yarmouth	3.9	4.6	0.0	2.3	5.0	32.9	48.8	SWNA
Raymond	4.9	5.2	0.0	3.4	4.3	30.4	48.1	SWNA
Owls Head	2.1	4.2	0.0	18.7	5.9	17.1	47.9	MCNA
Waterboro	**6.7**	**3.4**	**0.0**	**2.6**	**3.7**	30.7	47.1	**2**
New Gloucester	5.7	8.2	0.0	6.2	3.4	23.2	46.6	SWNA
West Bath	2.8	13.3	0.0	4.4	5.0	21.0	46.6	SWNA
Damariscotta	2.5	9.9	0.0	5.7	5.4	22.7	46.1	MCNA
Bar Harbor	6.7	8.5	1.1	5.7	3.8	20.1	45.9	MCNA
Harpswell	7.4	5.5	0.0	4.2	7.2	21.5	45.8	SWNA
Bucksport	6.1	3.7	10.4	6.0	3.1	16.2	45.6	4
Dayton	1.8	3.7	0.2	1.2	3.3	34.5	44.7	SWNA
Kennebunkport	4.9	4.5	0.0	5.1	5.9	24.0	44.4	SWNA
Trenton	1.6	7.8	0.0	8.4	2.5	24.1	44.3	MCNA
Wiscasset	4.4	8.5	0.0	7.0	4.8	19.4	44.2	MCNA
Berwick	8.9	5.1	2.3	3.7	5.7	18.1	43.8	SWNA
Hollis	5.5	4.6	0.4	3.2	4.2	24.9	42.7	SWNA
Bowdoinham	3.4	10.0	0.0	5.0	2.5	21.5	42.3	SWNA
Richmond	4.2	9.3	0.7	5.3	3.6	18.6	41.6	SWNA
Ellsworth	8.4	6.7	0.3	5.9	2.7	17.3	41.3	4
Whitefield	2.6	1.8	14.6	1.2	1.6	19.0	40.8	4
South Thomaston	1.7	5.8	0.0	6.3	4.3	22.6	40.7	MCNA
North Berwick	5.5	4.2	1.1	3.1	3.7	22.1	39.7	SWNA
Hancock	2.6	5.7	0.5	7.6	2.4	20.7	39.5	MCNA
Casco	4.3	5.1	0.4	3.5	3.7	22.4	39.3	SWNA
Boothbay	3.6	5.3	0.2	3.6	4.4	21.9	38.9	MCNA
Southwest Harbor	2.8	5.7	0.0	8.9	4.8	16.3	38.5	MCNA
Searsport	3.3	5.1	0.0	10.3	3.1	16.6	38.3	4
Winterport	4.5	3.3	0.0	5.4	3.3	21.4	38.0	4
Naples	4.0	4.9	0.1	4.3	3.4	20.8	37.5	2
St. George	2.9	2.9	0.0	7.5	3.3	20.8	37.5	MCNA
Southport	0.8	2.6	0.0	4.3	4.2	25.5	37.4	MCNA
Limington	3.9	2.7	0.0	2.1	2.7	25.9	37.2	SWNA
Warren	4.5	4.4	0.1	3.7	2.7	21.5	36.9	MCNA
Lebanon	6.3	2.7	0.0	1.9	3.1	22.0	35.9	2
Verona	0.6	4.5	0.0	10.0	2.8	17.4	35.3	4
Bridgton	5.1	3.9	0.3	2.2	2.8	20.5	34.9	2
Lyman	5.0	3.8	0.0	1.5	3.2	21.1	34.7	SWNA
Limerick	2.3	2.3	0.3	1.6	2.7	25.4	34.6	2
Cushing	1.3	1.6	0.1	4.5	2.3	24.6	34.3	MCNA
Stockton Springs	1.9	5.0	0.0	7.7	2.5	17.2	34.2	4

Lamoine	1.9	2.6	0.0	7.7	2.8	19.1	34.1	MCNA
Stonington	1.5	3.3	0.0	14.8	3.9	10.3	33.8	MCNA
Alfred	3.0	6.1	0.1	2.0	3.0	19.5	33.8	SWNA
Woolwich	4.2	6.8	0.0	2.1	2.6	17.9	33.6	SWNA
Belmont	0.9	3.4	0.0	4.7	2.0	22.4	33.4	4
Tremont	1.9	2.0	0.0	4.3	3.0	21.5	32.8	MCNA
Mount Desert	2.8	5.2	0.0	4.9	1.9	17.5	32.3	MCNA
Waldoboro	6.1	3.5	0.0	3.3	2.3	16.5	31.7	MCNA
Newcastle	2.1	5.6	0.0	2.1	2.0	19.5	31.3	MCNA
Friendship	1.4	1.1	0.0	7.1	2.8	18.8	31.2	MCNA
Long Island	0.0	0.2	0.0	11.4	4.4	15.0	31.0	SWNA
Pownal	2.0	2.1	0.0	1.5	2.1	23.0	30.8	SWNA
Nobleboro	2.1	4.7	0.0	1.7	2.8	19.3	30.6	MCNA
Union	2.8	3.8	0.0	3.3	2.3	18.5	30.6	4
Bristol	2.9	2.8	0.0	2.6	2.5	19.7	30.5	MCNA
Northport	1.7	4.5	0.0	4.5	1.9	17.9	30.5	4
Blue Hill	2.6	2.2	0.1	4.6	1.3	19.5	30.3	MCNA
Swanville	1.3	1.8	0.0	3.7	2.3	21.2	30.2	4
Edgecomb	1.5	6.8	0.0	1.3	2.0	18.4	30.1	MCNA
Orland	2.3	3.4	0.0	4.2	1.5	18.2	29.7	4
Harrison	2.7	2.1	0.0	1.5	2.3	20.9	29.5	2
Phippsburg	2.8	2.5	0.0	1.5	2.4	20.2	29.4	SWNA
Shapleigh	2.7	1.7	0.0	2.9	2.0	20.0	29.3	2
Hope	1.4	2.4	0.0	2.1	2.0	21.4	29.3	4
Bowdoin	3.2	2.2	0.0	1.0	2.1	20.6	29.2	SWNA
Deer Isle	2.4	2.7	0.0	5.8	2.1	15.9	28.9	MCNA
Westport	1.0	1.2	0.0	2.0	2.8	21.8	28.8	MCNA
Surry	1.4	1.9	0.0	3.5	1.2	20.4	28.4	MCNA
Lincolnville	2.5	2.8	0.0	3.2	1.8	18.0	28.2	4
Gouldsboro	3.0	2.2	0.0	5.4	1.4	16.0	28.0	MCNA
Sedgwick	1.2	2.4	0.0	4.9	1.3	18.2	28.0	MCNA
South Bristol	1.1	2.9	0.0	2.4	2.2	18.9	27.5	MCNA
Sorrento	0.4	2.1	0.0	6.0	2.4	16.3	27.3	MCNA
Brooklin	1.0	1.3	0.0	6.1	1.5	17.3	27.2	MCNA
Sullivan	1.5	2.8	0.0	4.9	1.5	16.4	27.1	MCNA
Vinalhaven	1.3	0.8	0.3	5.5	1.6	17.6	27.0	MCNA
Dresden	2.1	2.6	0.0	1.2	1.8	19.3	26.9	MCNA
Acton	2.4	1.3	0.0	1.1	1.9	20.2	26.9	2
Morrill	0.8	1.7	0.0	2.6	1.5	19.3	26.0	4
Waldo	0.9	2.1	0.0	2.9	1.2	18.6	25.7	4
North Haven	0.4	0.3	0.0	6.6	1.1	17.3	25.7	MCNA
Monhegan plantation	0.1	0.0	0.0	0.0	2.9	22.7	25.7	MCNA
Prospect	0.8	3.0	0.0	3.7	1.2	17.0	25.7	4
Dedham	1.8	3.5	0.0	1.3	1.2	17.7	25.5	4
Franklin	1.5	1.7	0.0	2.7	1.2	18.1	25.3	4
Islesboro	0.6	1.2	0.0	5.7	1.4	16.3	25.2	MCNA
Georgetown	1.3	1.7	0.0	2.0	1.8	18.2	25.1	SWNA
Searsmont	1.3	1.7	0.0	2.5	1.0	18.4	24.9	4
Cornish	1.6	3.2	0.0	1.3	1.9	16.9	24.9	2

Unity	2.3	2.1	0.0	1.6	1.6	17.3	24.9	4
Brooksville	0.9	0.9	0.0	3.9	1.0	18.0	24.8	MCNA
Newfield	1.5	1.0	0.0	1.1	1.4	19.9	24.8	2
Jefferson	3.0	1.9	0.0	0.9	1.5	17.4	24.7	4
Appleton	1.4	1.0	0.0	3.2	1.3	17.7	24.5	4
Arrowsic	0.8	2.8	0.0	1.6	2.0	17.3	24.5	SWNA
Bremen	0.8	1.3	0.0	0.8	1.6	20.0	24.5	MCNA
Penobscot	1.4	1.6	0.0	2.9	1.1	17.5	24.4	4
Winter Harbor	1.7	2.0	0.0	6.5	2.3	11.7	24.2	MCNA
Washington	1.6	2.1	0.0	1.4	1.2	17.6	23.9	4
Frankfort	1.0	2.2	0.0	3.0	1.4	16.0	23.7	4
Sebago	1.8	1.4	0.0	1.1	1.4	17.7	23.4	2
Brooks	1.1	1.4	0.0	2.1	1.4	17.2	23.2	4
Liberty	0.9	2.1	0.0	1.4	1.2	17.4	22.9	4
Baldwin	1.7	2.1	0.7	1.1	1.2	15.6	22.4	2
Palermo	1.4	1.5	0.0	1.0	1.0	17.3	22.3	4
Otis	0.5	0.5	0.0	0.6	0.7	19.9	22.2	4
Burnham	1.1	1.4	0.0	1.2	1.0	17.5	22.2	4
Isle au Haut	0.0	0.2	0.0	3.8	0.2	17.5	21.8	MCNA
Troy	1.1	1.1	0.0	0.6	0.9	17.4	21.1	4
Montville	1.0	1.2	0.0	0.8	0.8	17.3	21.1	4
Freedom	0.7	1.1	0.0	0.7	1.0	17.4	20.9	4
Cranberry Isles	0.2	0.1	0.0	8.2	1.3	10.8	20.8	MCNA
Alna	0.7	1.1	0.0	0.5	1.1	17.2	20.7	MCNA
Monroe	1.2	0.7	0.0	1.7	0.7	16.2	20.5	4
Knox	0.8	1.8	0.0	1.0	0.8	15.9	20.3	4
Frye Island	0.0	0.0	0.0	5.3	0.0	15.0	20.2	SWNA
Parsonsfield	1.8	0.7	0.0	0.9	0.9	15.8	20.1	2
Somerville	0.7	1.2	0.0	0.5	0.8	16.9	20.0	MCNA
Swans Island	0.5	0.2	0.0	4.1	0.8	14.4	19.9	MCNA
Jackson	0.6	0.6	0.0	0.7	0.7	17.0	19.5	4
Mariaville	0.3	0.3	0.0	0.5	0.4	17.7	19.1	4
Thorndike	0.8	0.9	0.0	0.8	0.9	15.2	18.6	4
Eastbrook	0.4	0.2	0.0	1.2	0.4	16.4	18.5	4
Frenchboro	0.1	0.0	0.0	2.4	0.3	15.4	18.1	MCNA
Amherst	0.2	1.2	0.0	0.6	0.2	15.5	17.7	4
Aurora	0.1	1.1	0.0	0.5	0.1	15.7	17.5	4
Waltham	0.4	0.5	0.0	0.6	0.3	15.6	17.5	4
Osborn	0.1	0.2	0.0	1.2	0.1	15.1	16.6	4
Great Pond	0.1	0.0	0.0	1.0	0.0	15.0	16.1	4
Perkins Twp (Alexander,Swan Isl)	0.0	0.2	0.0	0.4	0.6	15.0	16.1	SWNA
Hibberts gore	0.0	0.1	0.0	0.0	0.0	15.0	15.1	4
Criehaven UT	0.0	0.0	0.0	0.0	0.0	15.0	15.0	MCNA
Matinicus Isle plantation	0.1	0.1	0.0	0.0	1.0	11.6	12.9	MCNA

* SWNA = Southwest coast proposed nonattainment area; MCNA = Mid-coast proposed nonattainment area; 2 = York, Cumberland or Sagadahoc county proposed attainment area; 4 = Lincoln, Knox, Waldo and Hancock county proposed attainment area

Table B-6: Maximum Modeled (MADEP Modeling Analysis) Improvement at Any Grid Cell in Maine's Modeling Domain

	CONTROL STRATEGIES	
EPISODE DATE	25% Reduction in Maine's NO_x Emissions beyond 1999 Controls	25% Reduction in Maine's VOC Emissions beyond 1999 Controls
August 15, 1987	4.16 ppb	1.54 ppb
August 16, 1987	2.22 ppb	0.17 ppb
August 17, 1987	1.55 ppb	0.16 ppb
July 8, 1988	0.87 ppb	0.04 ppb

Table B-7: Recommended Designations of 8-Hour Ozone NAAQS Nonattainment Areas in Maine

Designated Area	Designation Type (2001-2003 data)	Classification Type
SOUTHERN MAINE COAST:		
York County:		
Includes only the following towns/cities:		
Alfred	Nonattainment	
Arundel	Nonattainment	
Berwick	Nonattainment	
Biddeford	Nonattainment	
Buxton	Nonattainment	
Dayton	Nonattainment	
Elliot	Nonattainment	
Hollis	Nonattainment	
Kennebunk	Nonattainment	
Kennebunkport	Nonattainment	
Kittery	Nonattainment	
Limington	Nonattainment	
Lyman	Nonattainment	
North Berwick	Nonattainment	
Ogunquit	Nonattainment	
Old Orchard Beach	Nonattainment	
Saco	Nonattainment	
Sanford	Nonattainment	
South Berwick	Nonattainment	
Wells	Nonattainment	
York	Nonattainment	
Cumberland County:		
Includes only the following towns/cities:		
Brunswick	Nonattainment	
Cape Elizabeth	Nonattainment	
Casco	Nonattainment	
Cumberland	Nonattainment	
Falmouth	Nonattainment	
Freeport	Nonattainment	
Frye Island	Nonattainment	
Gorham	Nonattainment	
Gray	Nonattainment	
Harpswell	Nonattainment	
Long Island	Nonattainment	
New Gloucester	Nonattainment	

North Yarmouth	Nonattainment	
Portland	Nonattainment	
Pownal	Nonattainment	
Raymond	Nonattainment	
Scarborough	Nonattainment	
South Portland	Nonattainment	
Standish	Nonattainment	
Westbrook	Nonattainment	
Windham	Nonattainment	
Yarmouth	Nonattainment	
Sagadahoc County:		
All towns/cities	Nonattainment	
Androscoggin County		
Includes only the following town:		
Durham	Nonattainment	
CENTRAL MAINE COAST (rural transport)		
Hancock County:		
Includes only the following towns/cities:		
Bar Harbor	Nonattainment	
Blue Hill	Nonattainment	
Brooklin	Nonattainment	
Brooksville	Nonattainment	
Cranberry Isles	Nonattainment	
Deer Isle	Nonattainment	
Frenchboro	Nonattainment	
Gouldsboro	Nonattainment	
Hancock	Nonattainment	
Lamoine	Nonattainment	
Mount Desert	Nonattainment	
Sedgwick	Nonattainment	
Sorrento	Nonattainment	
Southwest Harbor	Nonattainment	
Stonington	Nonattainment	
Sullivan	Nonattainment	
Surry	Nonattainment	
Swans Island	Nonattainment	
Tremont	Nonattainment	
Trenton	Nonattainment	
Winter Harbor	Nonattainment	
Waldo County		
Includes only the following town:		
Islesboro	Nonattainment	
Knox County:		
Includes only the following towns/cities:		
Camden	Nonattainment	
Criehaven	Nonattainment	
Cushing	Nonattainment	
Friendship	Nonattainment	
Isle au Haut	Nonattainment	

Matinicus Isle	Nonattainment	
Muscle Ridge Shoals	Nonattainment	
North Haven	Nonattainment	
Owls Head	Nonattainment	
Rockland	Nonattainment	
Rockport	Nonattainment	
St. George	Nonattainment	
South Thomaston	Nonattainment	
Thomaston	Nonattainment	
Vinalhaven	Nonattainment	
Warren	Nonattainment	
Lincoln County:		
Includes only the following towns/cities:		
Alna	Nonattainment	
Boothbay	Nonattainment	
Boothbay Harbor	Nonattainment	
Bremen	Nonattainment	
Bristol	Nonattainment	
Damariscotta	Nonattainment	
Dresden	Nonattainment	
Edgecomb	Nonattainment	
Monhegan	Nonattainment	
Newcastle	Nonattainment	
Nobleboro	Nonattainment	
South Bristol	Nonattainment	
Southport	Nonattainment	
Waldoboro	Nonattainment	
Westport	Nonattainment	
Wiscasset	Nonattainment	
All Other Towns in Maine	Attainment	