



JOHN ELIAS BALDACCI

GOVERNOR

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

April 2, 2009

Mr. Ira W. Leighton
Acting Regional Administrator
EPA Region I
1 Congress Street, (Suite 1100-RAA)
Boston, MA 02114-2023

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

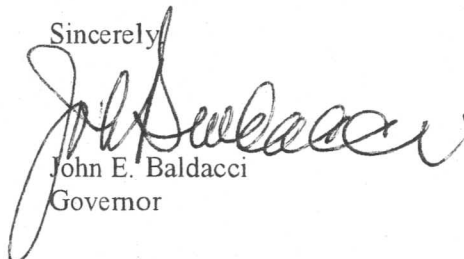
Dear Acting Regional Administrator Leighton:

I am submitting Maine's proposed designations under the revised 8-hour Ozone National Ambient Air Quality Standard (NAAQS) in response to the requirement set forth in your December 30, 2008 letter. Section 107(d)(1) of the Clean Air Act (CAA) provides up to one year after adoption of new or revised NAAQS for states to submit recommendations identifying areas that violate or contribute to nearby violations of the revised NAAQS. Consistent with CAA 107(d)(1) and EPA guidance, the State of Maine recommends that towns and cities along the coast, from Kittery to Winter Harbor, to be designated as nonattainment for the revised 8-hour ozone National Ambient Air Quality Standard (NAAQS). The recommendation includes two distinct areas along the southwest coast and mid-coast of Maine. These areas are the same areas recently redesignated to attainment of the 1997 8-hour ozone NAAQS and are currently 175 maintenance areas. The remainder of Maine should be designated attainment with respect to the revised 8-hour Ozone NAAQS. A map of Maine's proposed attainment/nonattainment areas can be found in Appendix A of the attachments.

As described more fully in the enclosed technical support document, measured design values for the three-year period ending in 2008 indicate that violations of the 75 ppb 8-hour Ozone standard in Maine are limited to only one coastal site in York County and one high elevation site on the Summit of Cadillac Mountain in Acadia National Park. Due to the prevailing meteorology/transport patterns, the vast majority of high Ozone event days occur due to long range transport as Maine is in the tailpipe area of the Ozone Transport Region. Emissions from the proposed attainment areas in Maine contribute very little to the violating monitors.

Thank you for your consideration of these recommendations. I have asked the Department of Environmental Protection 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 8-hour ozone nonattainment designation areas.

Sincerely,



John E. Baldacci
Governor

Attachments

cc: Congressional Delegation
Dave Conroy, U.S. EPA Region 1
Arthur Marin, NESCAUM
Commissioner David Littell, Maine DEP
James Brooks, Maine DEP



TECHNICAL SUPPORT DOCUMENT

State of Maine Recommendations for the Attainment/Nonattainment Designations for the 2008 Revised 8-hour Ozone NAAQS

1. INTRODUCTION

The State of Maine recommends that 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. These areas are the same areas recently redesignated to attainment of the 1997 8-hour ozone NAAQS and are currently 175 maintenance areas. Appendix A contains a map (Figure A-1) and a table (Table A-1) listing towns and cities in the recommended nonattainment areas. This document summarizes technical analyses used to formulate those decisions. The recommendations contained herein meet requirements of Section 107(d) of the Clean Air Act (CAA). Requirements of Section 107(d)(4)(A)(iv and v) of the CAA were met to justify non-attainment areas that do not include all towns/cities in a county or Combined Statistical Area (CSA).

2. RATIONALE FOR NONATTAINMENT AREA BOUNDARIES

The State of Maine is recommending nonattainment areas smaller than an entire county or Combined Statistical Area (CSA). The following subsections contain analyses of factors suggested in Section 107 (d) (4) (A) (v)¹ of the CAA and EPA guidance², which can be used to justify recommending smaller than presumptive guidance nonattainment areas. These factors are:

- Air Quality Data
- Jurisdictional Boundaries
- Geography/topography
- Meteorology (weather/transport patterns)
- Population Density and Degree of Urbanization
- Growth Rates and Patterns
- Traffic and Commuting Patterns
- Emissions Data
- Level of Control of Emission Sources

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 December 4, 2008, from Robert J. Meyers, "Area Designations for the 2008 Revised Ozone NAAQS."

a. Monitored 8-Hour Average Ozone Concentration Data

Appendix B contains an analysis of 1997-2008 ozone data in Maine. Table B-1 and Figure B-3 show only the Kennebunkport and the Summit of Cadillac Mountain monitoring sites have 2006-08 8-hour ozone design values violating the revised 8-hour ozone NAAQS. Table B-3 and Figure B-1 show a significant drop in ozone levels in Maine starting in 2003. This drop was primarily due to upwind regional controls implemented for the NO_x SIP Call (see Section 2(f) for more details). Because of significant regional control implementation after 2002 we need only look at 2003-2008 data to determine which sites in Maine have the potential to violate the revised 8-hour ozone NAAQS. Table B-3 shows that there are currently fewer monitors violating the revised NAAQS than those monitoring violations of 1997 NAAQS using 2001-03 design values. This data supports the recommendation to have no larger a nonattainment area than what EPA designated in 2004.

Table B-2 and Figure B-2 show that it is very probable for all but the Summit of Cadillac Mountain monitoring site to attain the standard after the 2009 ozone season. For the Kennebunkport site, the 2009 4th high 8-hour ozone threshold concentration is greater than the standard with only two (2) out of the past six (6) ozone seasons reaching that threshold concentration. In addition, the Kennebunkport monitoring site was in attainment during the previous two three-year design Value periods (2004-06 and 2005-07). The Cape Elizabeth and Durham monitoring sites were the only other sites in Maine that reached the respective 2009 4th high 8-hour ozone threshold concentration during the past six (6) ozone seasons. One of those ozone seasons was 2007 when smoke from fires in Southeastern United States probably caused elevated ozone levels in the region. The threshold analysis again supports the recommendation to have no larger a nonattainment area than what EPA designated in 2004.

b. Jurisdictional Boundaries

Data shows that Maine's ozone problem is currently confined to two locations: Coastal York County and elevated terrain in Acadia National Park. Monitored 8-hour ozone design values (see Appendix B) clearly show that the recommended Maine Southwest Coast Nonattainment Area should not be placed in a classification higher than marginal and that the Maine Mid-Coast Nonattainment Area should be considered a marginal or rural transport area. Therefore, the State of Maine does not believe that the 8-hour ozone nonattainment areas should include the presumptive MSA/CMSA boundaries or an entire county as indicated by Section 107 (d) (4) (A) (iv) of the CAA³.

The State of Maine is recommending that only towns/cities in the 175 maintenance area be included in the Maine Southwest Coast and Maine Mid-Coast Nonattainment Areas. This recommendation addresses National Park Service concerns the Maine Mid-Coast Nonattainment Area contains all of Acadia National Park and surrounding towns.

³ "... 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."

c. Geography, Topography, Meteorology and Transport Patterns

Maine is geographically located downwind of major metropolitan areas in the Northeast and other major sources of ozone precursors both in the Northeast and Mid-West. Therefore, Maine relies on regional pollution controls aimed at reducing the emissions of ozone's precursors, namely nitrogen oxides (NO_x) and volatile organic carbon (VOC), to reduce ozone levels in the state.

Maine also has many miles of coastline bordering the Gulf of Maine. Data from long-term ozone monitors in the state have clearly demonstrated that summertime ozone is highest along the coast and drops off, sometimes dramatically, within a short distance of the coastline. The Gulf of Maine is a large body of water enabling efficient transport of ozone and its precursors from southern New England to the Maine coast.

The mid-coast region of Maine includes hills and mountains. High elevations are vulnerable to long range ozone transport because winds at this level travel faster and further than at lower levels. Additionally, there is a lack of ozone sinks/scavenging available at higher elevations thus ozone concentration remains high long after the sun has set contributing to recorded levels of ozone that exceed the 8-hour ozone NAAQS.

Meteorology plays a role in ozone levels in Maine because winds transport ozone and its precursors while sunshine favors ozone buildup. In Maine, long hot sunny days do not automatically mean ozone levels will be high. If the winds do not transport ozone, and its precursors, into the state ozone levels will not exceed the NAAQS. Therefore, it is important to analyze how winds bring ozone to Maine.

MEDEP-BAQ Air Quality Meteorologists conducted a trajectory analysis of ozone exceedances from the 2004 through 2008 ozone seasons. The analysis included each hour that ozone levels were equal to or greater than 75 ppb at a monitoring site for every day that an 8-hour ozone exceedance was recorded at sites in Maine and New Hampshire that are likely to be nonattainment.

The maps in Appendix C visually depict thousands of trajectory points allowing the viewer to readily identify the transport patterns which result in high levels of ozone in Maine and New Hampshire. This analysis demonstrates that ozone and its precursors are transported to Maine from outside the state through the recommended nonattainment area region and that Maine does not contribute to ozone exceedances in other states.

d. Population Density, Degree of Urbanization, Growth Rates and Patterns

Population is displayed by town in Figures D-1 and D-2 as reported by the 2000 census for the southwest coast and mid-coast regions respectively. This data was calculated by town from the 2000 Census Block data layer in ARCMAP by summing the population from the census blocks within that town.

An important consideration is how population has changed over time and how it is expected to change in the near future. Figure D-3 presents the population change from the 1990 to 2000 census and also the projected population change through 2006 by county. The data sources for this information are noted on the graph. Each of the counties within the proposed nonattainment areas has shown a population increase between the two censuses and also project continued growth.

Population density by town is calculated as population per square mile and presented in Figures D-4 and D-5 for the southwest coast and mid-coast regions respectively. The degree of urbanization, which is represented by the fraction of natural land use by town and shown in Figures D-6 and D-7, is another factor in the analysis. This factor is calculated in ARCMAP from the land cover data layer. A high percentage of natural land cover is indicative of little urbanized area within that town.

Both the population density and the fraction of natural land cover maps clearly show that much of Maine is more rural than urbanized. Even near Maine's largest city, Portland, the degree of urbanization drops significantly and is spotty beyond the towns immediately bordering the city.

Since Maine's ozone exceedances are primarily due to transport from outside of Maine, population, growth, density and degree of urbanization have a minimal impact on Maine's ozone exceedances and therefore nonattainment boundaries. However, the Maine Southwest Coast Nonattainment Area does include the most highly and densely populated towns (76.4% of the 2006 population estimate of the four county Consolidated Statistical Area and 36.1% of the 2006 state population estimate)) with the lowest fraction of natural land cover within the four county Consolidated Statistical Area. Population (only 7.3% of the 2006 state population estimate), population density and degree of urbanization are significantly lower in the mid-coast region than in the southwest corner of Maine.

e. Traffic and Commuting Patterns

The Maine Department of Transportation provided data for the areas likely to be designated as nonattainment. Two types of maps were created from this data. The first is the summer vehicle miles traveled (VMT) by town in Figures D-8 and D-9 for the southwest coast and mid-coast regions of the state respectively. Summer VMT is an important statistic to consider due to two important facts: ozone is a summertime pollutant and Maine is a popular tourist destination during the summer months. Figure D-8 demonstrates that VMT is highest along the I-95/Route 1 corridor, the city of Portland and for coastal communities favored by tourists. The proposed nonattainment area includes all coastal communities and most of the I-95/Route 1 corridor in this part of the state which are most favored by tourists. As shown in Figure D-9, VMT in the mid-coast region is significantly less than that for the southwest corner of Maine. Towns favored by tourists and those that encompass the only roadway to Acadia National Park have higher VMT than other towns in the region. In this region all areas have demonstrated compliance with the 8-hour ozone NAAQS except high elevations which experience ozone exceedances as a consequence of rural transport.

A second set of maps were created to depict commuting patterns within these two regions in Figures D-10 and D-11. These maps display the total number of commuters, the number of in-town commuters and the number of out-of-town commuters working in the southwest coast and mid-coast regions of the state. The Maine Southwest Coast Nonattainment area encompasses towns with the highest total number of commuters in York and Cumberland counties. The total number of commuters by town is significantly lower in the mid-coast region than in the southwestern corner of Maine and the high elevations do not include major roadways. Local commuting patterns do not impact the Maine Mid-Coast Nonattainment Area because ozone exceedances are due to rural transport high above ground level.

f. Emissions Data and Level of Control of Emission Sources

A five year average of emissions of NO₂ and VOC in tons per year was calculated by town based on point source emissions data provided by the Bureau's Emissions Inventory section. This data is displayed in Figures D-12 and D-13 for the Maine Southwest Coast Nonattainment Area and the Maine Mid-Coast Nonattainment Area respectively. Many of the highest point source emissions are included in the recommended nonattainment areas.

Past regional control of emissions, including those from Ozone Transport Commission (OTC) control programs and especially from the 2003-07 NO_x SIP Call implementation, were key to move Maine into attainment of both the revoked 1-hour ozone NAAQS and the 1997 8-hour ozone NAAQS. In September of 1994, OTC adopted a memorandum of understanding to achieve regional reductions of NO_x in three phases, beginning with the installation of reasonably available control technology (RACT). Phase II and III of the program (the "NO_x Budget Program") was modeled on the cap and trade principle, and established a de facto 0.15 lbs/mmBtu NO_x emission rate for participating electric generating units and large industrial boilers. By the beginning of 2003, the 10 participating jurisdictions had reduced their emissions more than 50 percent from 1990 baseline levels. Meanwhile, in 1998, EPA had issued a regulation to reduce the regional transport of ground level ozone. This rule, the NO_x SIP Call, required 22-states and the District of Columbia to reduce ozone season emission of NO_x. Compliance with the NO_x SIP call began on May 1, 2003 for the OTC states⁴, and on May 31, 2004 for states outside the Ozone Transport Region (OTR). Although the NO_x SIP Call provided states with the flexibility of designing their own programs to meet their NO_x reduction requirements, all affected states have chosen to participate in a regional cap and trade program. While Maine was not included in the NO_x SIP call, this rule has had a significant effect on transported NO_x and ozone, reducing upwind NO_x emissions from 819,000 tons in 2003 to 593,000 tons in 2004⁵.

Figures B-1 and B-2 in Appendix B clearly show results of those control strategies. Continued implementation of regional control programs will again be key to future attainment of the revised 8-hour ozone NAAQS in the OTR of which coastal Maine is in the tailpipe.

⁴ The NO_x SIP Call superseded Phase III of the OTC NO_x Budget Program.

⁵ For comparison, NO_x Budget Program sources in the 22-states NO_x SIP Call region emitted 1,222,000 tons during the 2000 ozone season.

3. RECOMMENDED NONATTAINMENT AREAS IN MAINE

All Clean Air Act requirements for nonattainment designation are met by the recommended nonattainment area boundaries for the Maine Southwest Coast Nonattainment Area, as shown in Figure A-1, and the Maine Mid-Coast Nonattainment Area, as shown in Figure A-2.

EPA believes that “the Core Based Statistical Area (CBSA) or a Combined Statistical Area (CSA) (which includes 2 or more adjacent CBSA’s) associated with the violating monitor(s) serve as the starting point or “presumptive” boundary for evaluating the geographic boundaries of an ozone nonattainment area.”⁶ Nevertheless, the analyses contained in this document and conducted according to Section 107 (d) (4) (A) (iv and v) of the CAA demonstrate that the Maine Southwest Coast nonattainment area should be only along the coast in the four county Portland-Lewiston CSA and no larger than the existing 175 maintenance area.

EPA recommends that “Where a violating monitor is not located in a CBSA or CSA . . . the boundary of the county containing the monitor serve as the starting point for considering the extent of the nonattainment area.”⁷ The Mid-Coast High Elevation Nonattainment Area does not include any CBSA or CSA. However, the analyses contained in this document, which meet the CAA requirements, demonstrate that the Maine Mid-Coast Nonattainment Area should only be along the coast and no larger than the existing 175 maintenance area.

Nonattainment expansion within and upwind of Maine is not justified based primarily upon unique ozone transport mechanisms into and through Maine, meteorology, relatively low population/emission density, geography/topography and ozone 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.

These recommendations are to be considered preliminary because the 2009 season has not yet begun. It is possible that when the 2009 season is over, the Maine Southwest Coast Nonattainment area could be classified as attainment. When final quality assured 2007-2009 data is available, the State of Maine will review and submit, if necessary, final recommendations for 8-hour ozone NAAQS nonattainment area designations.

^{6, 7} Memorandum of December 4, 2008, from Robert J. Meyers, “Area Designations for the 2008 Revised Ozone NAAQS.”

APPENDIX A
MAINE'S NONATTAINMENT DESIGNATION
RECOMMENDATIONS

Figure A-1 Recommended 8-HR OZONE NAAQS NONATTAINMENT AREAS

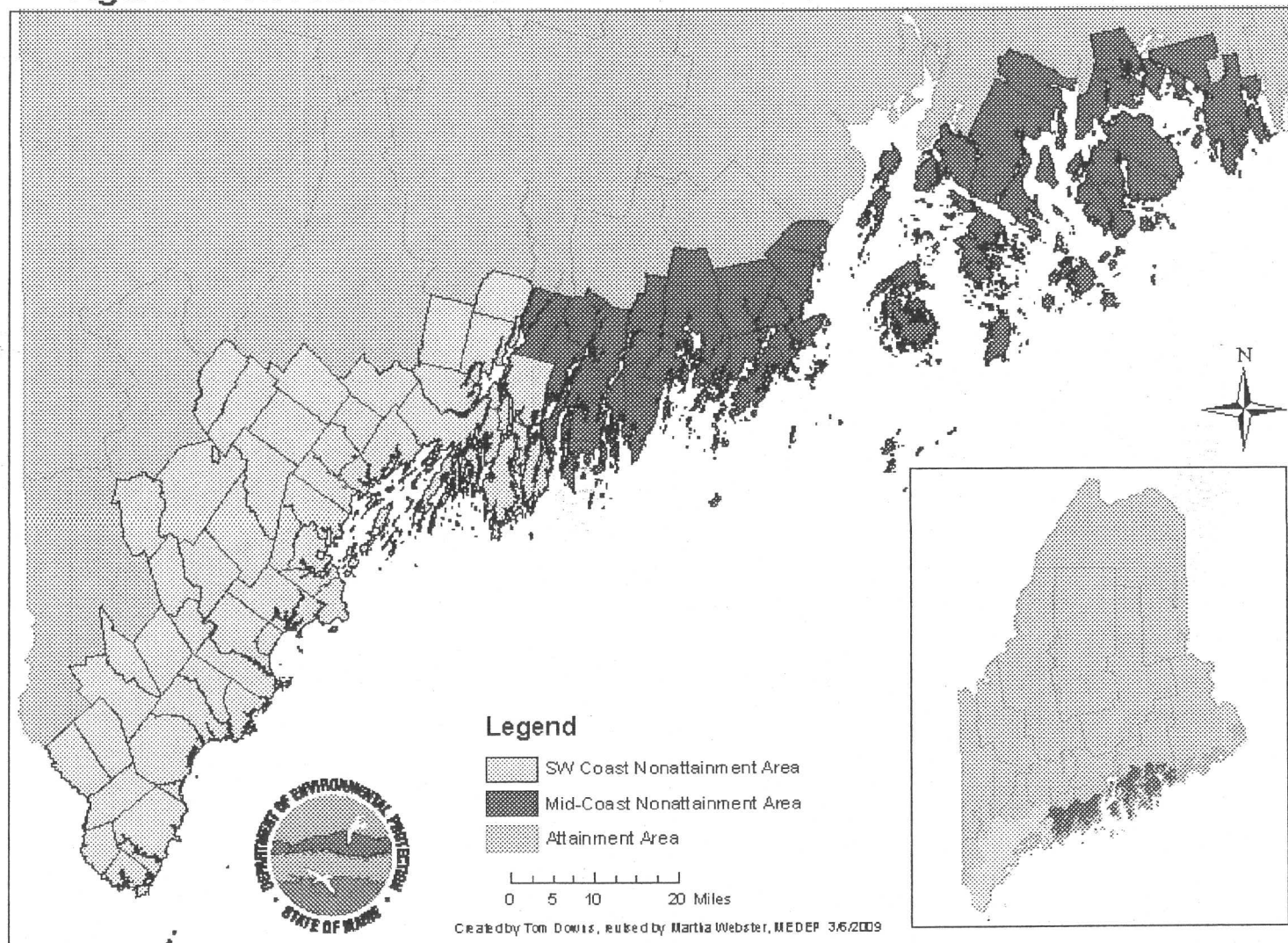


Table A-1: Recommended 8-hr Ozone NAAQS Nonattainment Areas in Maine

| Designated Area | Designation Type (2006-2008 data) | Classification Type |
|---|---|--------------------------------|
| <u>MAINE SOUTHWEST COAST:</u> | | |
| Androscoggin County Includes only the following town: Durham | Nonattainment | |
| Cumberland County: Includes only the following towns/cities: Brunswick Cape Elizabeth Casco Chebeague Island Cumberland Falmouth Freeport Frye Island Gorham Gray Harpwell Long Island New Gloucester North Yarmouth Portland Pownal Raymond Scarborough South Portland Standish Westbrook Windham Yarmouth | Nonattainment | |
| Sagadahoc County: All towns/cities | Nonattainment | |

Table A-1 (cont.): Recommended 8-hr Ozone NAAQS Nonattainment Areas in Maine

| Designated Area | Designation Type (2006-2008 data) | Classification Type |
|--|--|--------------------------------|
| <u>MAINE SOUTHWEST COAST (cont):</u> | | |
| 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 | |
| <u>MAINE MID-COAST</u> | | |
| 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 Island Plt | Nonattainment | |
| Newcastle | Nonattainment | |
| Nobleboro | Nonattainment | |
| South Bristol | Nonattainment | |
| Southport | Nonattainment | |
| Waldoboro | Nonattainment | |
| Westport Island | Nonattainment | |
| Wiscasset | Nonattainment | |

Table A-1 (cont.): Recommended 8-hr Ozone NAAQS Nonattainment Areas in Maine

| Designated Area | Designation Type (2006-2008 data) | Classification Type |
|--|--|--------------------------------|
| <u>MAINE MID-COAST (cont.)</u> | | |
| 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 | |
| Knox County: | | |
| Includes only the following towns/cities: | | |
| Camden | Nonattainment | |
| Criehaven Twp | Nonattainment | |
| Cushing | Nonattainment | |
| Friendship | Nonattainment | |
| Isle au Haut | Nonattainment | |
| Matinicus Isle Plt | Nonattainment | |
| Muscle Ridge Shoals Twp | Nonattainment | |
| North Haven | Nonattainment | |
| Owls Head | Nonattainment | |
| Rockland | Nonattainment | |
| Rockport | Nonattainment | |
| St. George | Nonattainment | |
| South Thomaston | Nonattainment | |
| Thomaston | Nonattainment | |
| Vinalhaven | Nonattainment | |
| Warren | Nonattainment | |

Table A-1 (cont.): Recommended 8-hr Ozone NAAQS Nonattainment Areas in Maine

| Designated Area | Designation Type (2006-2008 data) | Classification Type |
|---|--|---------------------|
| <p><u>MAINE MID-COAST (cont.)</u></p> <p>Waldo County Includes only the following town: Islesboro</p> <p>All Other Towns in Maine</p> | <p>Nonattainment</p> <p>Attainment</p> | |

APPENDIX B

OZONE DATA ANALYSIS

CONTENTS

Table B-1: Historical (1997-2008) Analysis of 8-hr Ozone Data in Maine

| Monitor | Monitoring Year(s) | MAX Pre-NOx SIP Call ('97-02) DESIGN VALUE (ppb) | MAX NOx SIP Call ('03-08) DESIGN VALUE (ppb) | 2005-07 DESIGN VALUE (ppb) | 2006-08 DESIGN VALUE (ppb) | # of NOx SIP Call years the 2009 4 th high threshold [#] was reached |
|--|--------------------|--|--|----------------------------|----------------------------|--|
| PORTLAND-LEWISTON COMBINED STATISTICAL AREA | | | | | | |
| YORK COUNTY | | | | | | |
| Kittery | 1997-07 | 88 ('97-99) | 72 ('05-07) | 72 | * | * |
| Kennebunkport | 1997-08 | 92 ('97-99) | 76 ('06-08) | 75 [^] | 76 | 2 |
| Hollis/West Buxton | 1997-08 | 76 ('97-'99) | 75 ('05-07) | 75 | 70 | 0 |
| CUMBERLAND COUNTY | | | | | | |
| Cape Elizabeth | 1997-'08 | 89 ('97-99) | 75 ('05-07) | 75 | 74 | 1 |
| Portland | 2003-06, '08 | * | 61 ('03-05) | * | * | 1 |
| SAGadahoc COUNTY | | | | | | |
| Phippsburg | 1997-00 | 92 ('97-99) | * | * | * | * |
| Reid State Park | 2002-07 | 79 ('02-04) | 70 ('04-06) | 70 [^] | | |
| ANDROSCOGGIN COUNTY | | | | | | |
| Durham | 2006-08 | * | 72 [^] ('06-08) | * | 72 [^] | 1 |
| MID-COAST REGION | | | | | | |
| HANCOCK COUNTY (high elevation) | | | | | | |
| Cadillac Mountain (1560 ft) | 1995-08 | 94 ('01-03) | 83 ('05-07) | 83 | 80 | 6 |
| HANCOCK COUNTY | | | | | | |
| McFarland Hill (420 ft) | 1991-08 | 87 ('01-03) | 74 ('03-05) ('05-07) | 74 | 72 | 1 |
| Castine | 2001-07 | 75 ('02-04) | 69 ('05-07) | 69 | * | * |
| KNOX COUNTY | | | | | | |
| Port Clyde | 1991-08 | 87 ('01-03) | 77 ('03-05) | 76 | 71 | 0 |
| LINCOLN and WALDO COUNTIES | | | | | | |
| None | * | * | * | * | * | * |
| ATTAINMENT AREA COUNTIES | | | | | | |
| KENNEBEC COUNTY | | | | | | |
| Gardiner | 1997-08 | 80 ('01-'03) | 71 ('05-07) | 71 | 70 | 0 |
| PENOBSCOT COUNTY | | | | | | |
| Holden (895 ft) | 1997-08 | 83 ('01-'03) | 68 ('03-05) ('05-07) | 68 | 66 | 0 |
| Howland (CASTNET) | 1997-08 | 71 ('97-'99) | 64 ('05-07) | 64 | 62 | 0 |
| Penobscot (TRIBE) | 2006-08 | * | 65 ^{^^} ('06-08) | * | 65 ^{^^} | 0 |
| WASHINGTON COUNTY | | | | | | |
| Jonesport | 2005-08 | * | 66 ('05-07) | 66 | 64 | 0 |
| Sipayik (TRIBE) | 2004-08 | * | 57 ('05-07) | 57 | 56 | 0 |
| Roosevelt Campobello | 1997-05 | 62 ('97-99) | 54 ('03-05) | * | * | * |
| AROOSTOOK COUNTY | | | | | | |
| MICMAC (TRIBE) | 2006-08 | * | 57 ('06-08) | * | 57 | 0 |
| Ashland (CASTNET) | 1991-08 | 65 ('97-99) ('00-02) | 61 ('05-07) | 61 | 60 | 0 |
| OXFORD COUNTY | | | | | | |
| North Lovell | 1992-08 | 62 ('01-'03) | 63 [^] ('05-07) | 63 | 62 | 0 |
| PISCATAQUIS COUNTY | | | | | | |
| Dover-Foxcroft | 1999-01 | 65 ('98-'00) | * | * | * | * |
| FRANKLIN and SOMERSET COUNTIES | | | | | | |
| None | * | * | * | * | * | * |

2009 4th high threshold – 4th highest 8-hr Ozone concentration in 2009 resulting in a 2007-09 Design Value of 76 ppb

* No Data Available

[^] 3-year data recovery rate < 90%

^{^^} Preliminary data

Table B-2: 2009 8-hr Ozone Attainment/Non Attainment Threshold Analysis

| Monitor | 2009 Threshold 4 th High Concentration # (ppb) | Range of 1997- 02 4 th High Concentrations (ppb) | # years Threshold Achieved from 1997 to 2002 | Range of 2003-08 4 th High Concentrations (ppb) | # years Threshold Achieved from 2003 to 2008 | # of Daily Maximum 8-hr Concentrations reaching Threshold in 2008 |
|------------------|--|--|---|--|--|--|
| Cadillac Mt | 68 | 78 - 101 | 6 | 74 - 86 | 6 | 10 |
| McFarland Hill | 81 | 70 - 92 | 4 | 64 - 83 | 1 (2007) | 0 |
| Kennebunkport | 77 | 73 - 101 | 5 | 71 - 78 | 2 (2006-07) | 2 |
| Cape Elizabeth | 76 | 67 - 103 | 5 | 68 - 83 | 1 (2007) | 1 |
| Durham (2007-08) | 77 | * | * | 70 - 81 | 1 (2007) | 1 |

2009 4th high threshold – 4th highest 8-hr Ozone concentration in 2009 resulting in a 2007-09 Design Value of 76 ppb

Table B-3: Design Value Comparison (2004 Designation vs. 2009 Designation)

| SITE NAME | 2001-2003 Design Value (ppb) | 2006-2008 Design Value (ppb) | Design Value change (ppb) |
|--|---------------------------------|---------------------------------|------------------------------|
| PORTLAND-LEWISTON COMBINED STATISTICAL AREA | | | |
| Kittery | <u>88</u> | *** | *** |
| Kennebunkport | <u>91</u> | <u>76</u> | -16 |
| Hollis/West Buxton | *** | 70 | *** |
| Cape Elizabeth | <u>88</u> | 74 | -14 |
| Durham | *** | 72 [^] | *** |
| LINCOLN-KNOX-WALDO-HANCOCK COUNTIES | | | |
| Cadillac Mountain (1560 ft) | <u>94</u> | <u>80</u> | -14 |
| McFarland Hill (420 ft) | <u>87</u> | 72 | -15 |
| Port Clyde | <u>87</u> | 71 | -16 |
| ATTAINMENT COUNTIES | | | |
| Gardiner | 80 | 70 | -10 |
| Holden | 83 | 66 | -17 |
| North Lovell | 62 | 62 | 0 |
| Jonesport | *** | 64 | *** |
| Howland | 68 | 62 | -5 |
| Ashland | 64 | 60 | -4 |
| Roosevelt Campobello | 61 | *** | *** |
| Penobscot (TRIBE) | *** | 65 ^{^^} | *** |
| Sipayik (TRIBE) | *** | 56 | *** |
| MICMAC (Tribe) | *** | 57 | *** |

*** No Valid Data Available

^{^^} Preliminary data

FIGURE B-1: MAINE 8-HOUR OZONE DESIGN VALUE TRENDS

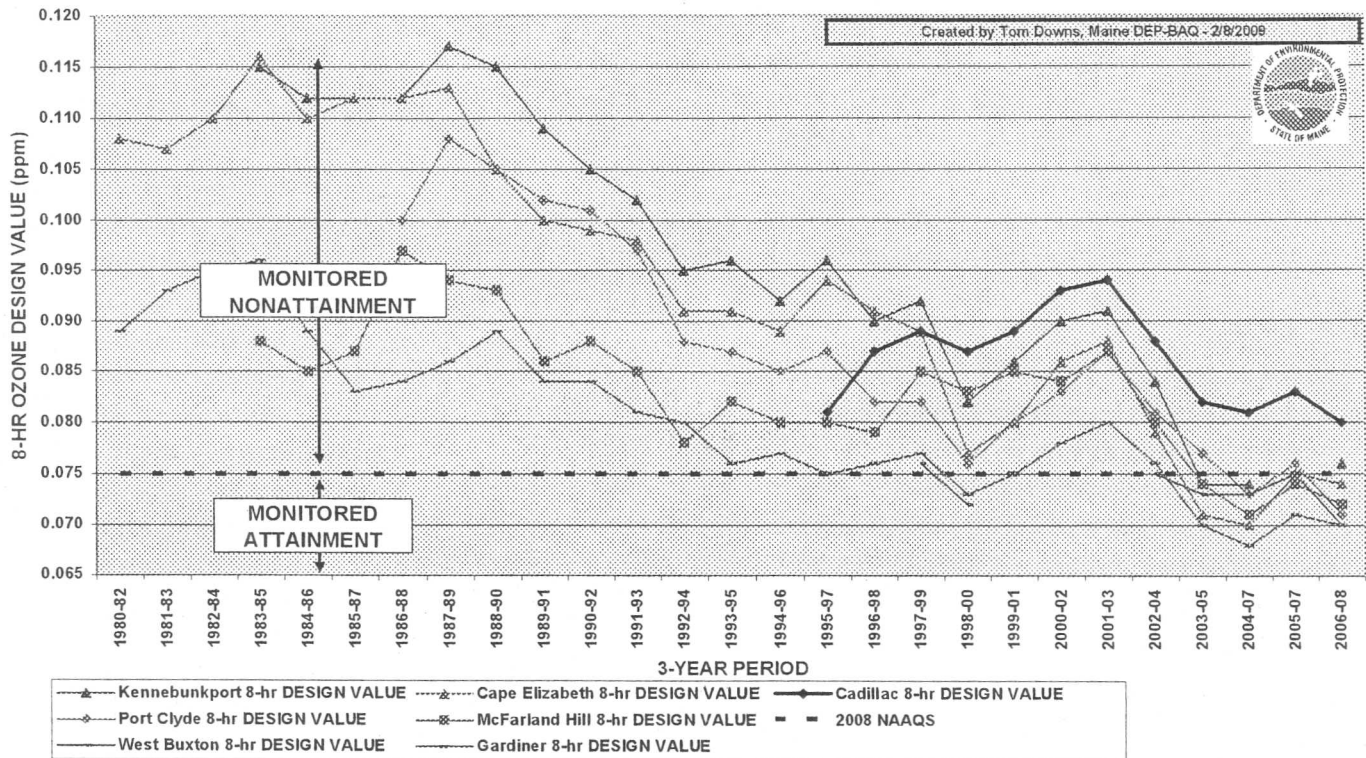


FIGURE B-2: POTENTIAL 2007-2009 ATTAINMENT OF THE 8-HOUR OZONE NAAQS IN MAINE?

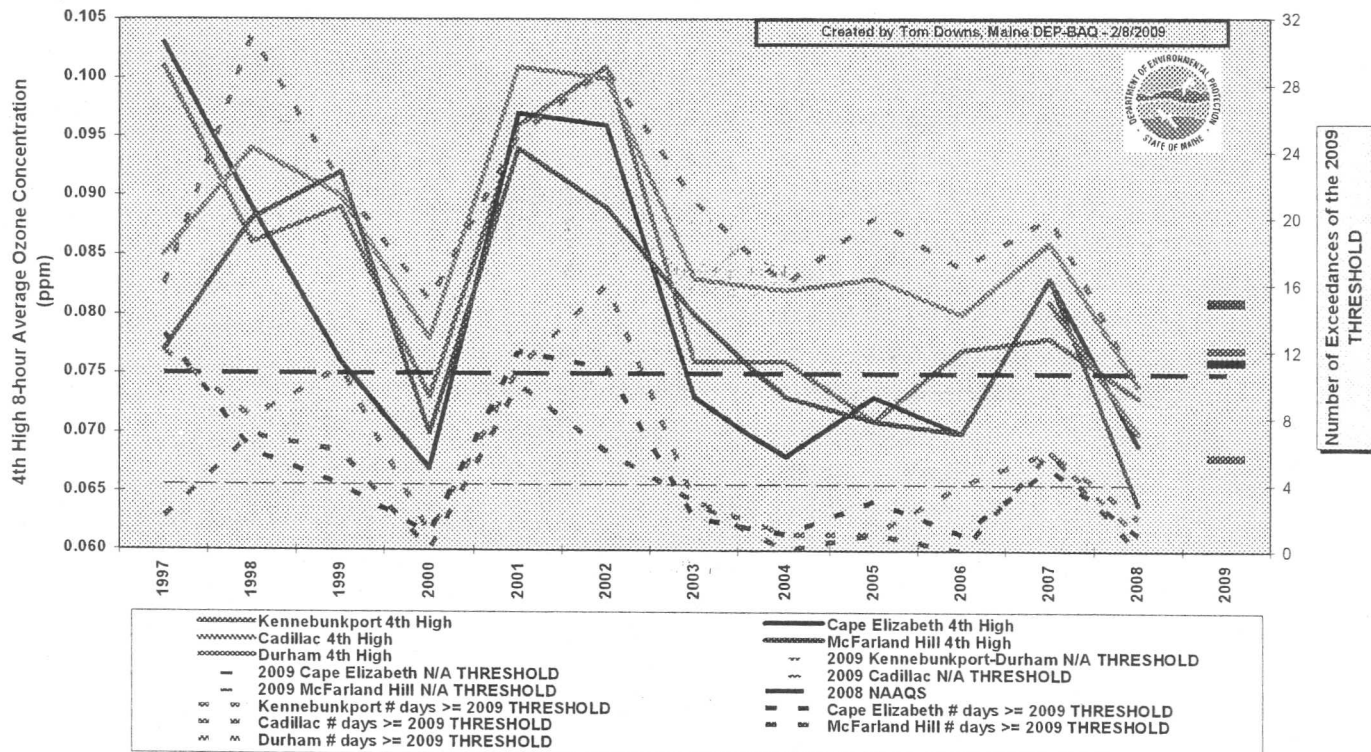
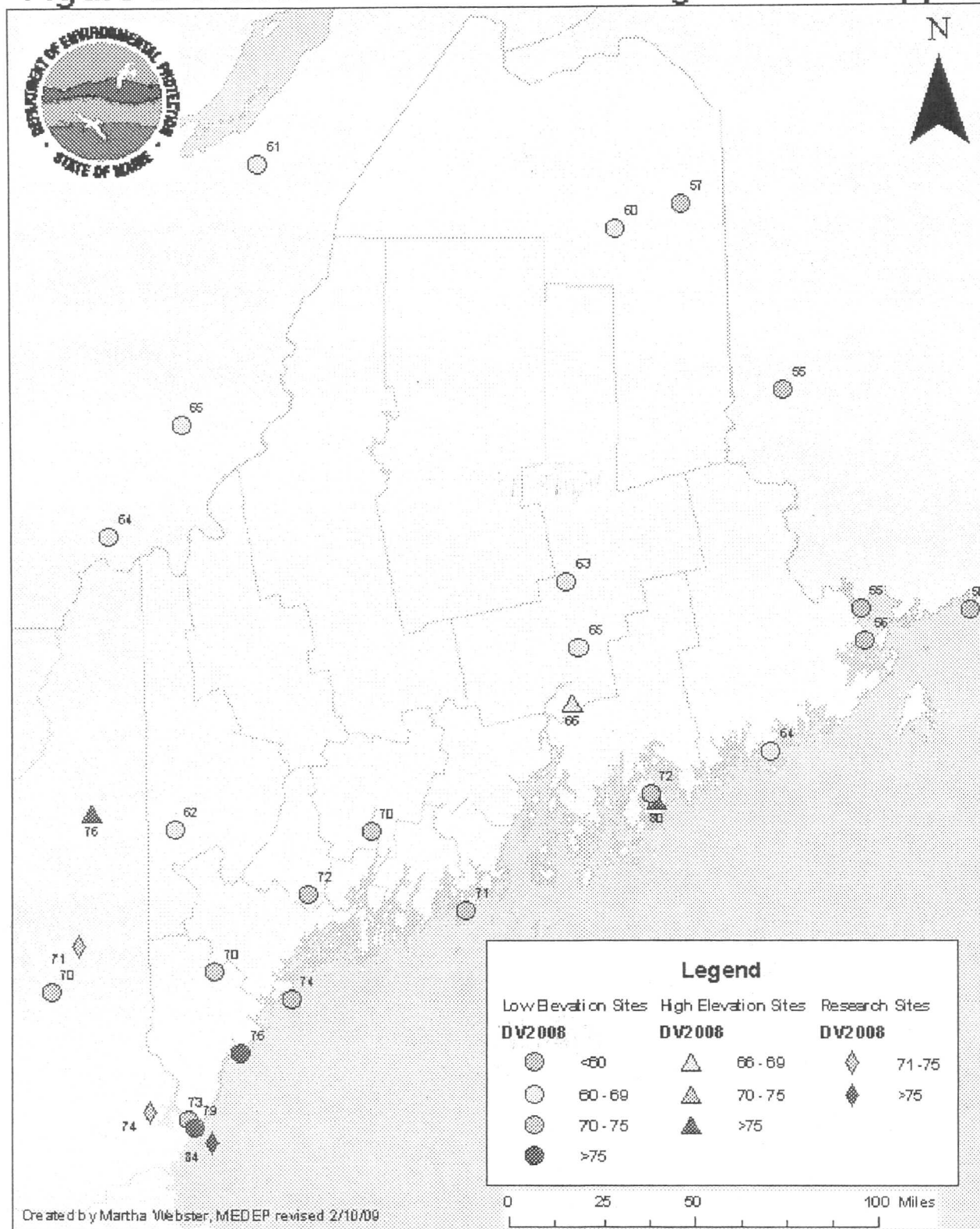


Figure B-3: 2006 - 08 8hr Ozone Design Values in ppb



APPENDIX C

TRAJECTORY ANALYSES

A trajectory is a three dimensional representation of the path an air parcel followed based on forecast or archived meteorological data. A back trajectory is the path the parcel took to reach a specific point in time and space.

MEDEP-BAQ Air Quality Meteorologists conducted a trajectory analysis of ozone exceedances from the 2004 through 2008 ozone seasons. The analysis included each hour that ozone levels were equal to or greater than 75 ppb at a monitoring site for every day that an 8-hour ozone exceedance was recorded at sites in Maine and New Hampshire that are likely to be 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>).

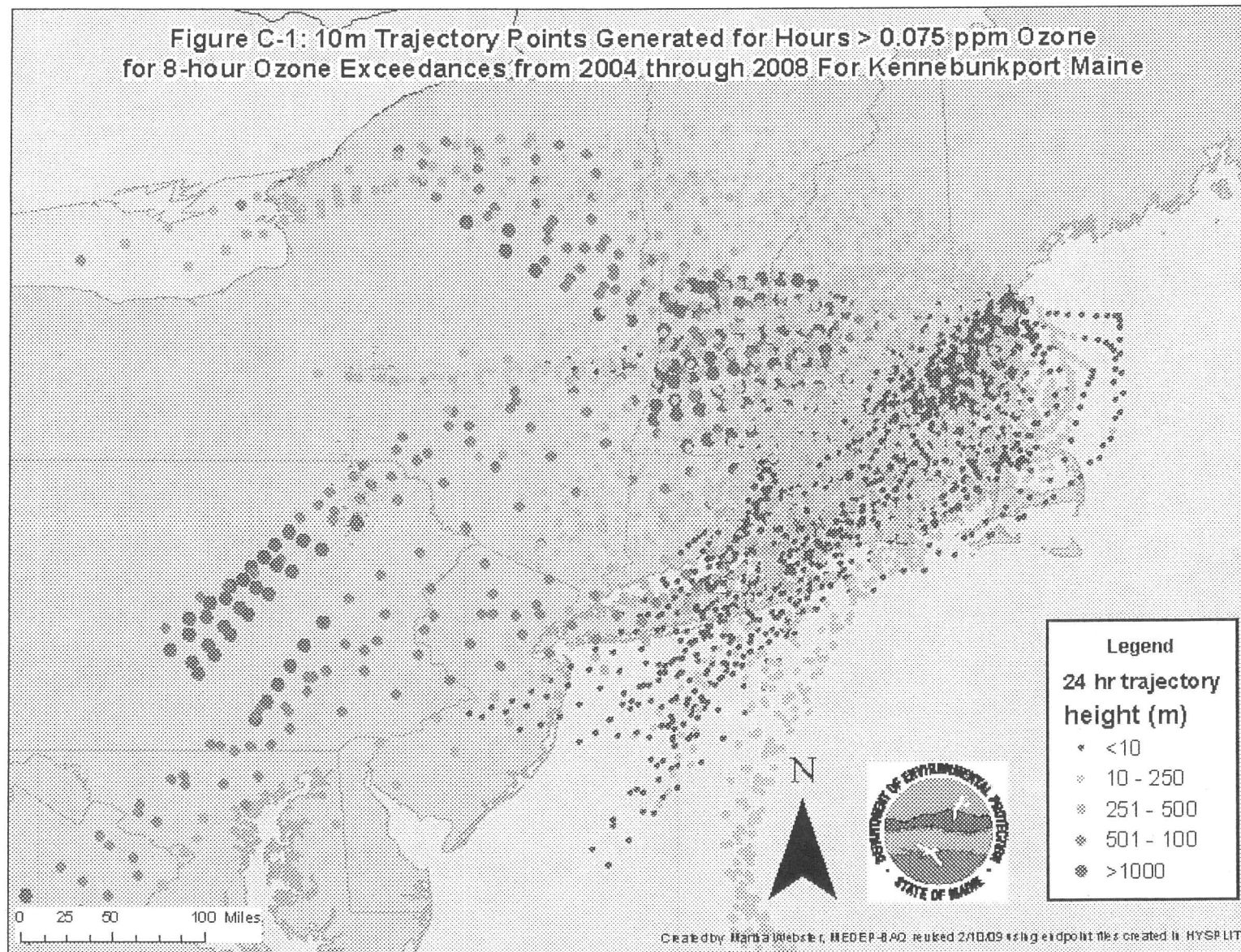
HYSPLIT is available for use online and also on a local computer (PC). MEDEP-BAQ staff meteorologists used the online version to create the trajectories included in this analysis. The time of the ozone value was converted from Eastern Standard Time (EST) to Universal Time Code (UTC) by adding 5 hours. Archived EDAS meteorological (MET) data at 40 km was used because this data set had the best resolution and had an excellent data recovery rate. The model was set to include vertical velocity and create 24-hour back trajectories from 10 meters (m) above ground level (AGL) at each coastal site and at mountain top height for the high elevation sites. In the case of the mountain top trajectories, the value of the height in meters above mean sea level (AMSL) was used to allow the model to determine the height above ground level (which is based on the average terrain height in that 40 km grid and the difference between the station pressure and sea level pressure). Therefore, ground level for the mountain top sites varies for each date, however the average height for the area around Mt Washington is around 600 meters and for the area around Cadillac Mountain is around 15 meters. The mountain top sites were run in this manner since this is the 'best science' for finding the most appropriate trajectories for these locations.

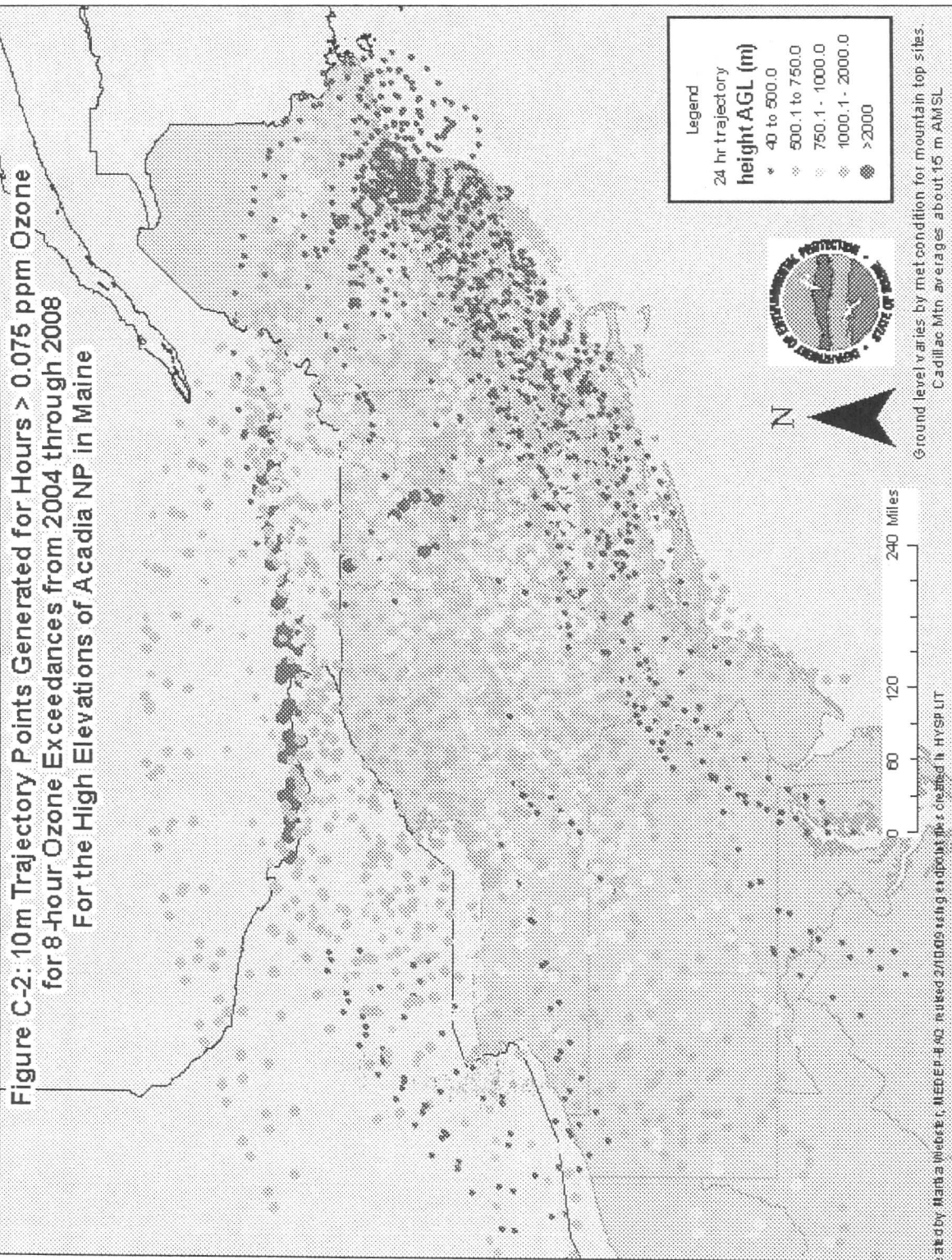
For each run, the HYSPLIT model generates both a graphical presentation of the trajectories and a text file. The text file contains information about the hourly endpoints along each trajectory path including the location in time and space. Hundreds of endpoint text files were subsequently loaded into an Access database, which was then mapped in ARCMAP, a geographical mapping tool used within the department.

DISCUSSION OF TRAJECTORIES

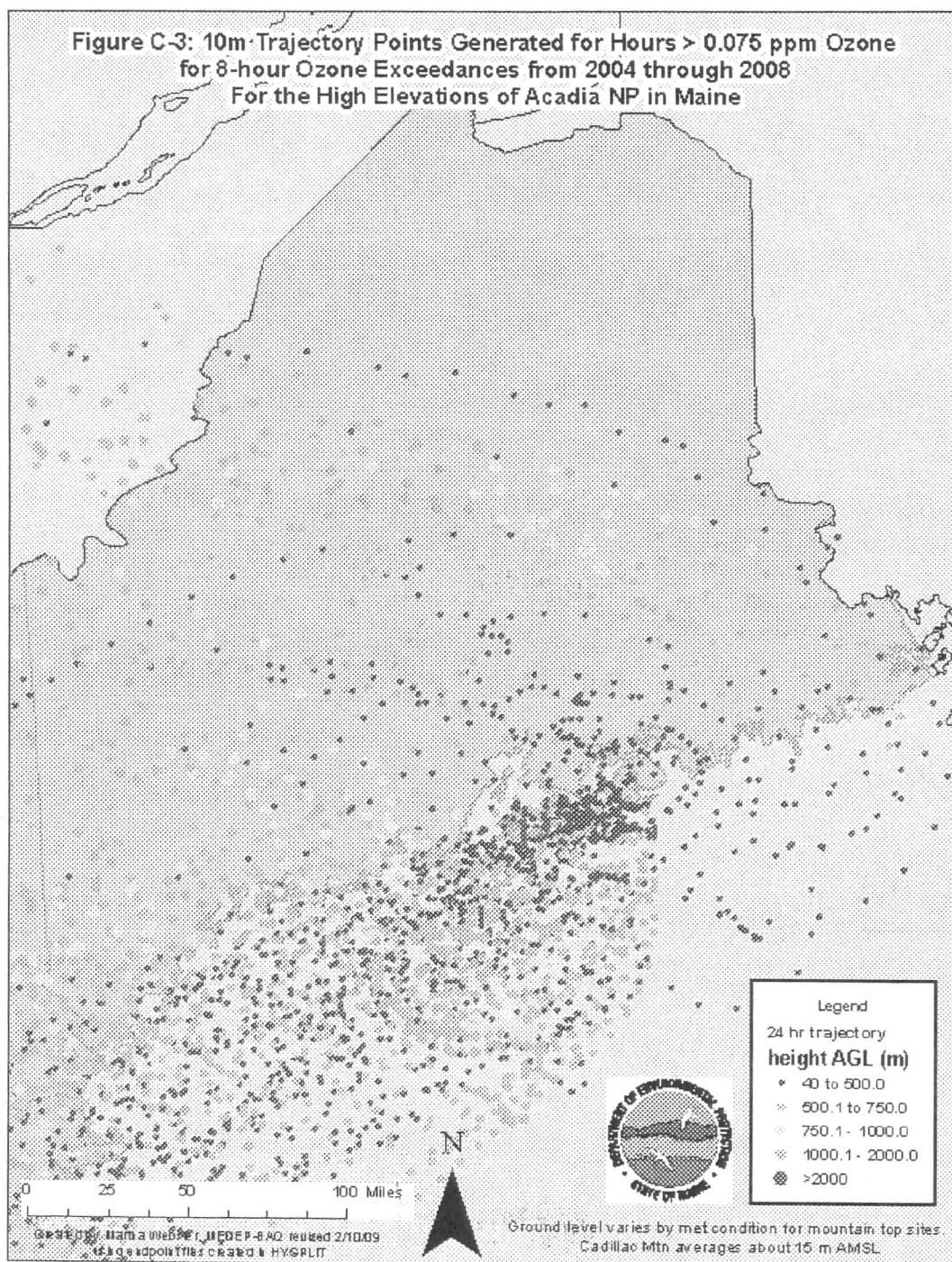
Figure C-1 displays the trajectories for ozone exceedances at Kennebunkport, Maine by height AGL. It is clear that Maine does not contribute to the exceedances at this site since few trajectories pass over any part of Maine and those that do are descending air masses with ozone created elsewhere. The bulk of the trajectories pass over southern New England and the Gulf of Maine.

Figure C-1: 10m Trajectory Points Generated for Hours > 0.075 ppm Ozone
for 8-hour Ozone Exceedances from 2004 through 2008 For Kennebunkport Maine

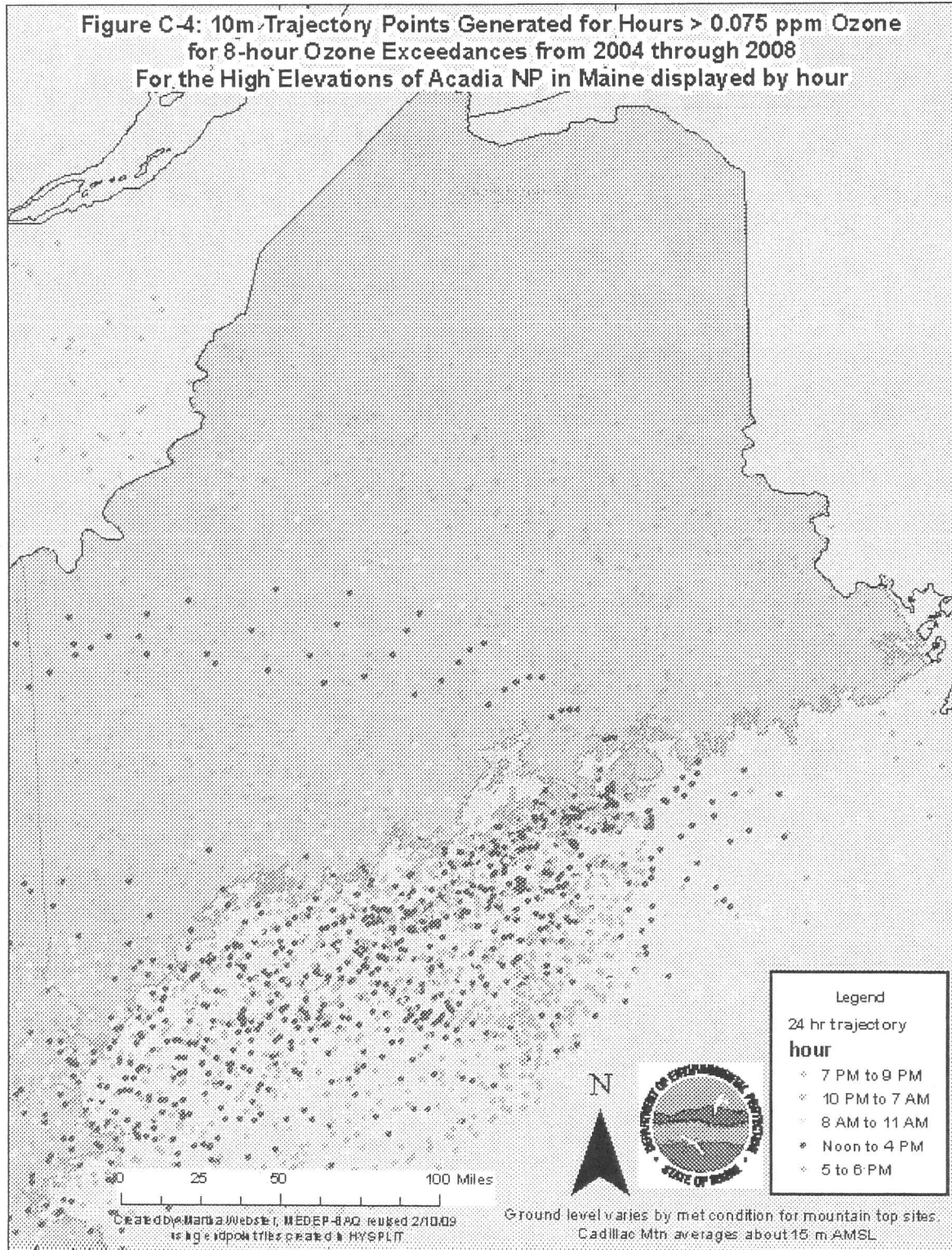




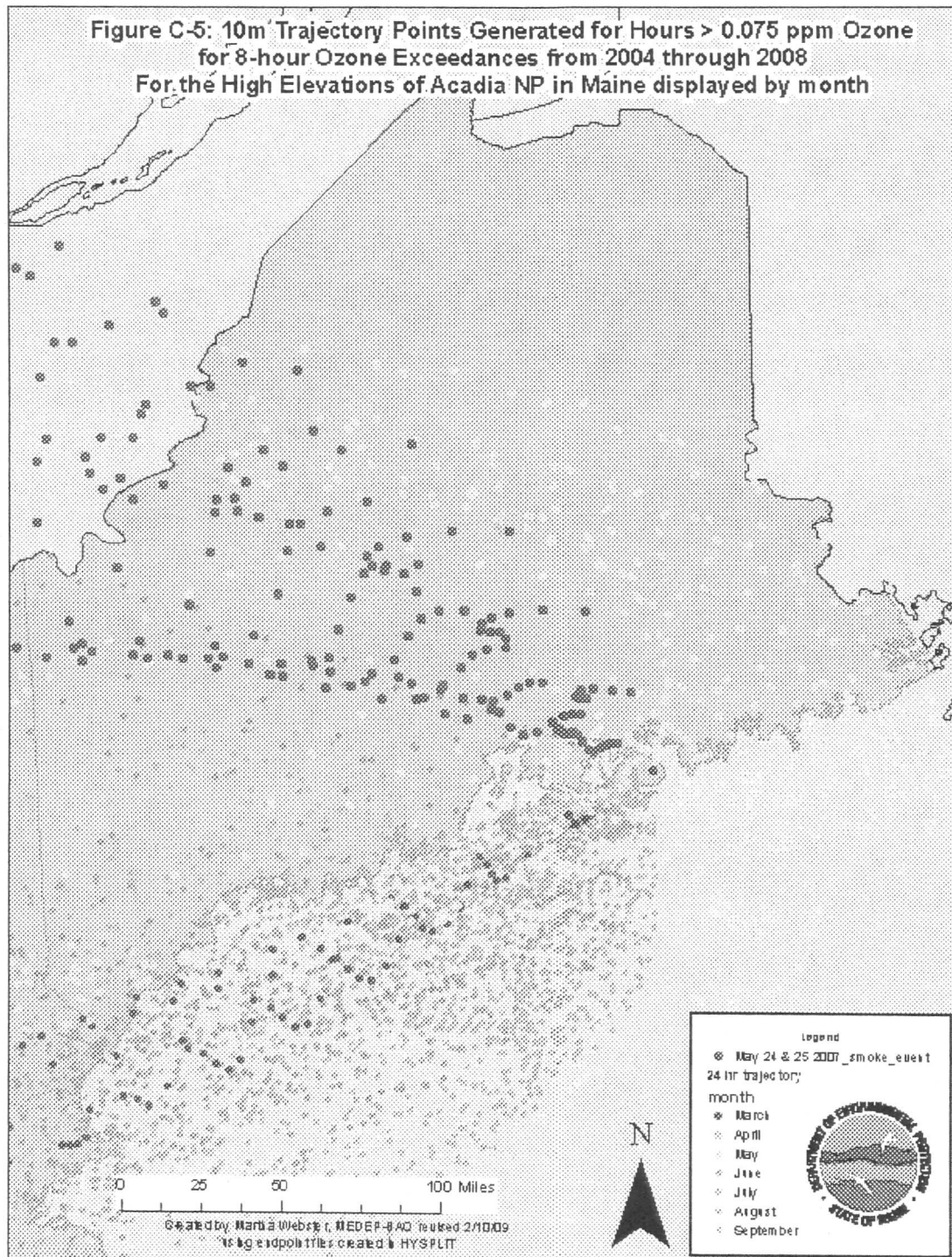
Figures C-2, C-3, C-4 and C-5 demonstrate the trajectories for ozone exceedances at Cadillac Mountain in Acadia National Park. Figure C-2 presents the full scope of 24-hour back trajectories for Cadillac Mountain by height AGL. The majority of trajectories pass over southern New England and the Gulf of Maine. However, some trajectories do pass over the State of Maine as further delineated in Figure C-3. Many of these are visually depicted as descending air masses, yet some are not.

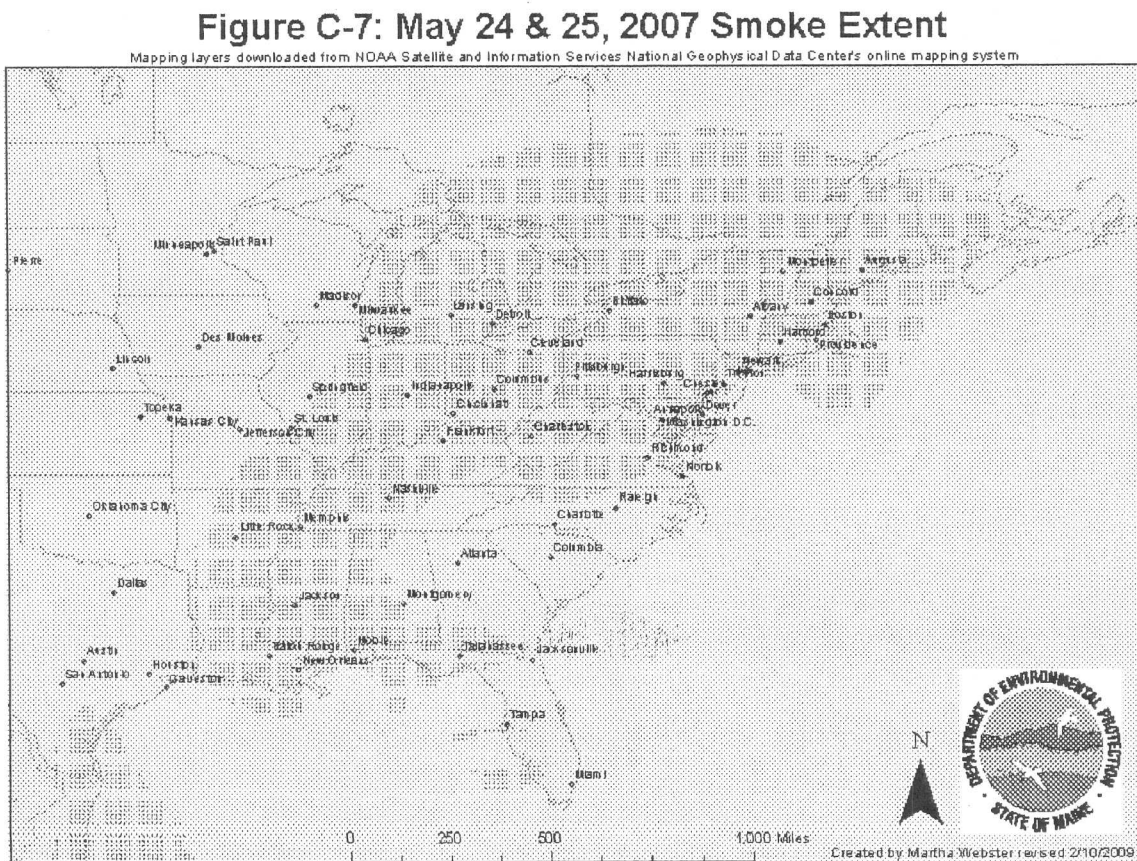
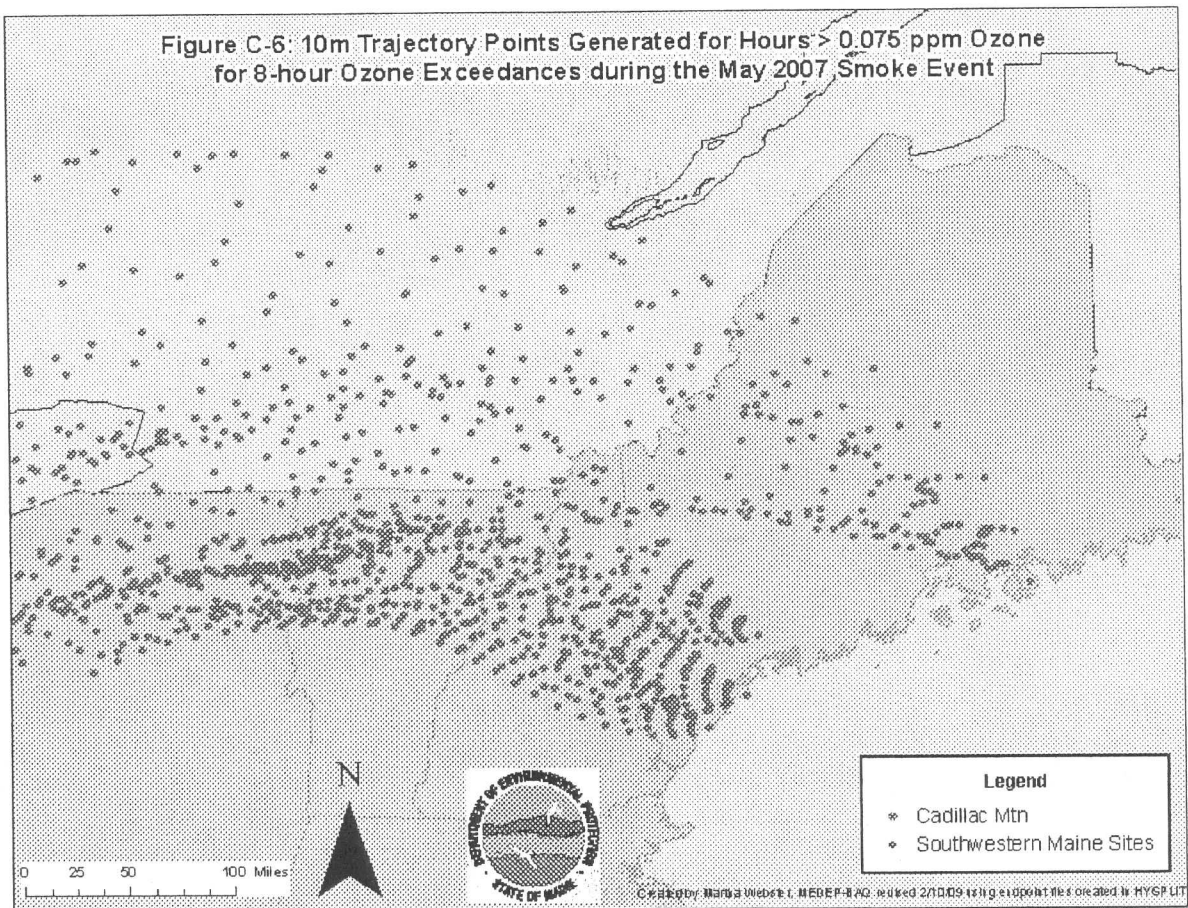


Therefore, it is important to focus on Maine and view Cadillac Mountain's trajectories by time of day in Figure C-4. Green dots represent overnight transport. Red dots are during the peak hours of ozone production. Yellow and orange represent the transitions between peak production and overnight transport and vice versa. Most of the trajectories that pass over Maine do so outside of the peak ozone production time bringing ozone, which was produced elsewhere, to Cadillac Mountain.

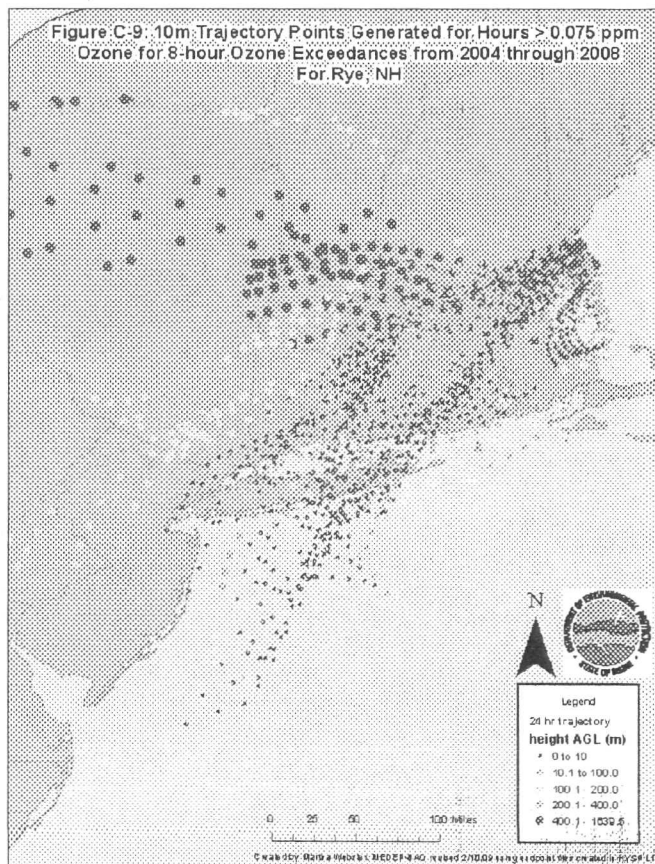
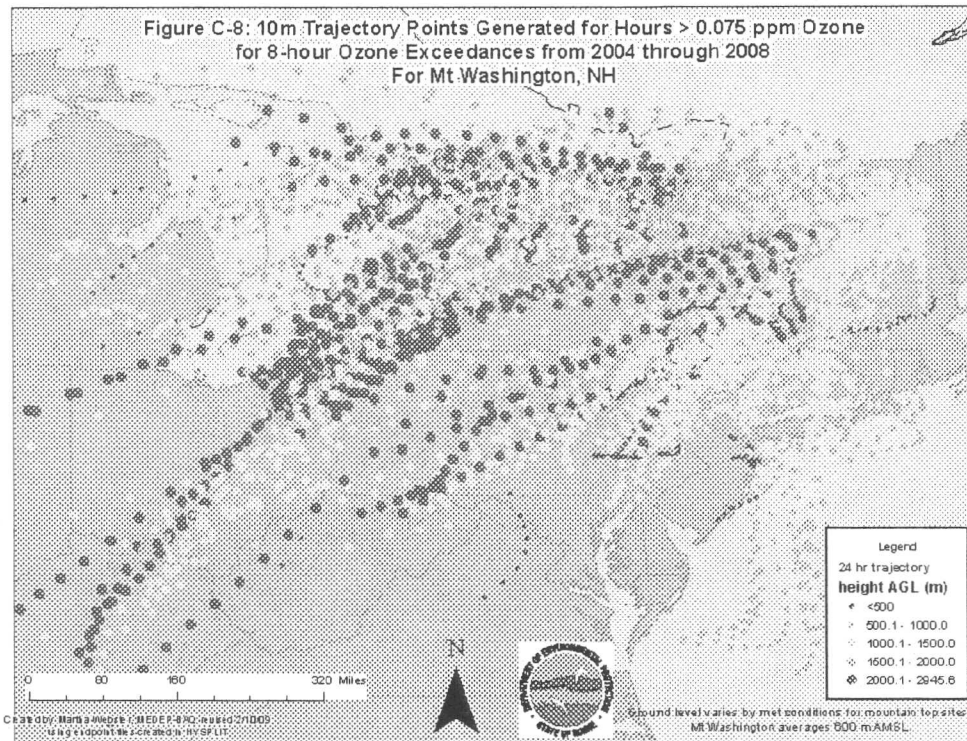


To further analyze Cadillac's ozone transport, the trajectories are depicted by month and the May 24 & 25 2007 smoke event in Figure C-5. The trajectories that passed over Maine during peak ozone production hours, as shown in Figure C-4, occurred during the May 2007 regional smoke event further demonstrating that Maine does not contribute to ozone exceedances at Cadillac Mountain. Other Maine sites also experienced high ozone levels during this event as presented in Figure C-6. The smoke originated from fires in Georgia and on these dates covered much of the eastern U.S. as displayed in Figure C-7. This data has not been marked as an exceptional event for Cadillac Mountain, because eliminating this event does not change the 8-hr Ozone design value.





Another important consideration is whether or not Maine contributes to ozone exceedances in nearby states. Figures C-8 and C-9 display trajectories for Mt. Washington and Rye, NH respectively. Not a single trajectory passed over Maine on its way to either of these locations during high ozone events. Thus, Maine does not contribute to ozone exceedances in other states.



APPENDIX A
MAINE'S NONATTAINMENT DESIGNATION
RECOMMENDATIONS

Figure A-1 Recommended 8-HR OZONE NAAQS NONATTAINMENT AREAS

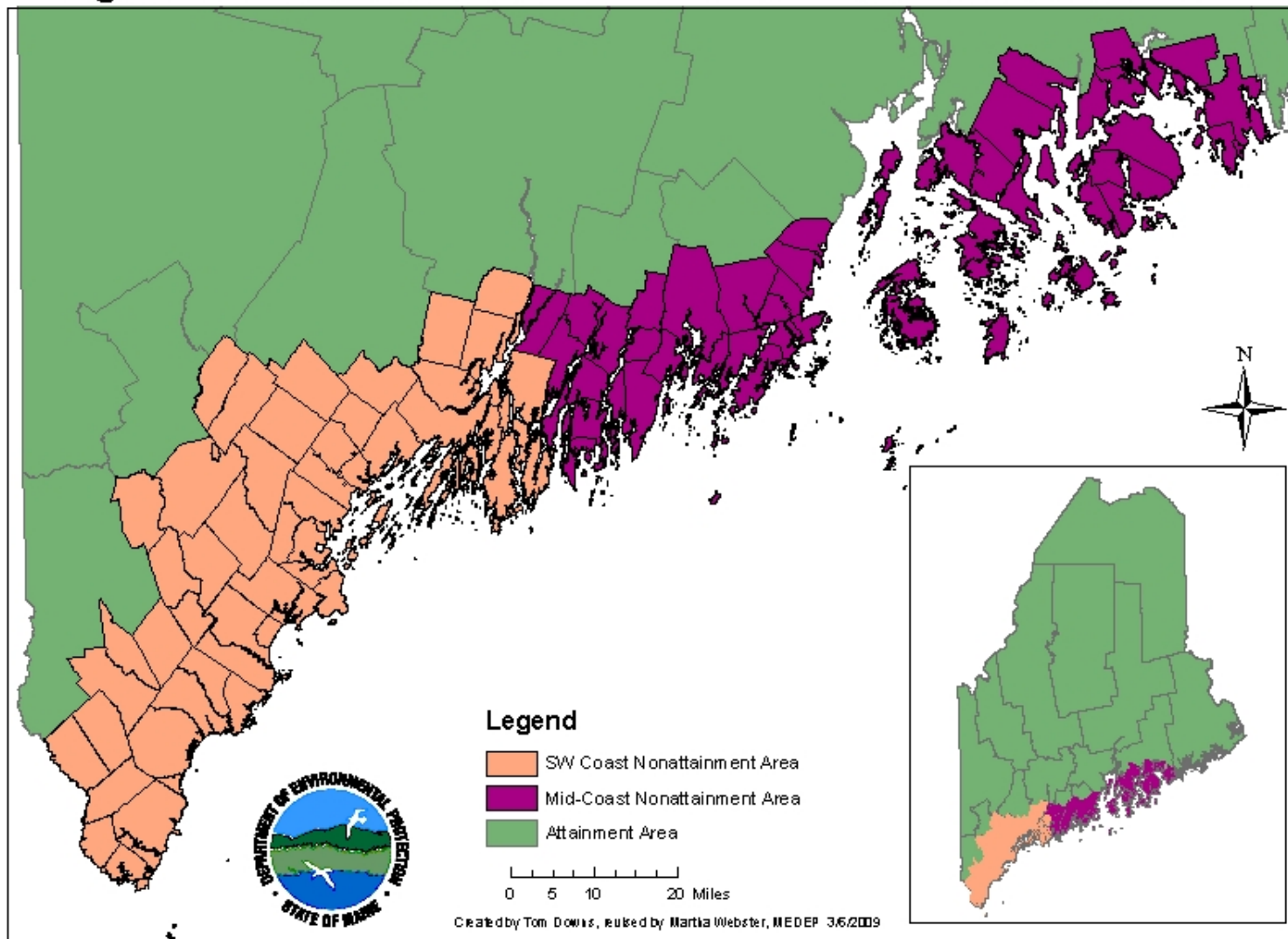


Table A-1: Recommended 8-hr Ozone NAAQS Nonattainment Areas in Maine

| Designated Area | Designation Type (2006-2008 data) | Classification Type |
|---|---|--------------------------------|
| <u>MAINE SOUTHWEST COAST:</u> | | |
| Androscoggin County Includes only the following town: Durham | Nonattainment | |
| Cumberland County: Includes only the following towns/cities: Brunswick Cape Elizabeth Casco Chebeague Island Cumberland Falmouth Freeport Frye Island Gorham Gray Harpwell Long Island New Gloucester North Yarmouth Portland Pownal Raymond Scarborough South Portland Standish Westbrook Windham Yarmouth | Nonattainment | |
| Sagadahoc County: All towns/cities | Nonattainment | |

Table A-1 (cont.): Recommended 8-hr Ozone NAAQS Nonattainment Areas in Maine

| Designated Area | Designation Type (2006-2008 data) | Classification Type |
|--|--|--------------------------------|
| <u>MAINE SOUTHWEST COAST (cont):</u> | | |
| 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 | |
| <u>MAINE MID-COAST</u> | | |
| 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 Island Plt | Nonattainment | |
| Newcastle | Nonattainment | |
| Nobleboro | Nonattainment | |
| South Bristol | Nonattainment | |
| Southport | Nonattainment | |
| Waldoboro | Nonattainment | |
| Westport Island | Nonattainment | |
| Wiscasset | Nonattainment | |

Table A-1 (cont.): Recommended 8-hr Ozone NAAQS Nonattainment Areas in Maine

| Designated Area | Designation Type (2006-2008 data) | Classification Type |
|--|--|--------------------------------|
| <u>MAINE MID-COAST (cont.)</u> | | |
| 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 | |
| Knox County: | | |
| Includes only the following towns/cities: | | |
| Camden | Nonattainment | |
| Criehaven Twp | Nonattainment | |
| Cushing | Nonattainment | |
| Friendship | Nonattainment | |
| Isle au Haut | Nonattainment | |
| Matinicus Isle Plt | Nonattainment | |
| Muscle Ridge Shoals Twp | Nonattainment | |
| North Haven | Nonattainment | |
| Owls Head | Nonattainment | |
| Rockland | Nonattainment | |
| Rockport | Nonattainment | |
| St. George | Nonattainment | |
| South Thomaston | Nonattainment | |
| Thomaston | Nonattainment | |
| Vinalhaven | Nonattainment | |
| Warren | Nonattainment | |

Table A-1 (cont.): Recommended 8-hr Ozone NAAQS Nonattainment Areas in Maine

| Designated Area | Designation Type (2006-2008 data) | Classification Type |
|---|--|---------------------|
| <p><u>MAINE MID-COAST (cont.)</u></p> <p>Waldo County Includes only the following town: Islesboro</p> <p>All Other Towns in Maine</p> | <p>Nonattainment</p> <p>Attainment</p> | |

APPENDIX B

OZONE DATA ANALYSIS

Table B-1: Historical (1997-2008) Analysis of 8-hr Ozone Data in Maine

| Monitor | Monitoring Year(s) | MAX Pre-NOx SIP Call ('97-02) DESIGN VALUE (ppb) | MAX NOx SIP Call ('03-08) DESIGN VALUE (ppb) | 2005-07 DESIGN VALUE (ppb) | 2006-08 DESIGN VALUE (ppb) | # of NOx SIP Call years the 2009 4 th high threshold [#] was reached |
|--|--------------------|--|--|----------------------------|----------------------------|--|
| PORTLAND-LEWISTON COMBINED STATISTICAL AREA | | | | | | |
| YORK COUNTY | | | | | | |
| Kittery | 1997-07 | 88 ('97-99) | 72 ('05-07) | 72 | * | * |
| Kennebunkport | 1997-08 | 92 ('97-99) | 76 ('06-08) | 75 [^] | 76 | 2 |
| Hollis/West Buxton | 1997-08 | 76 ('97-'99) | 75 ('05-07) | 75 | 70 | 0 |
| CUMBERLAND COUNTY | | | | | | |
| Cape Elizabeth | 1997-'08 | 89 ('97-99) | 75 ('05-07) | 75 | 74 | 1 |
| Portland | 2003-06, '08 | * | 61 ('03-05) | * | * | 1 |
| SAGADAHOC COUNTY | | | | | | |
| Phippsburg | 1997-00 | 92 ('97-99) | * | * | * | * |
| Reid State Park | 2002-07 | 79 ('02-04) | 70 ('04-06) | 70 [^] | | |
| ANDROSCOGGIN COUNTY | | | | | | |
| Durham | 2006-08 | * | 72 [^] ('06-08) | * | 72 [^] | 1 |
| MID-COAST REGION | | | | | | |
| HANCOCK COUNTY (high elevation) | | | | | | |
| Cadillac Mountain (1560 ft) | 1995-08 | 94 ('01-03) | 83 ('05-07) | 83 | 80 | 6 |
| HANCOCK COUNTY | | | | | | |
| McFarland Hill (420 ft) | 1991-08 | 87 ('01-03) | 74 ('03-05) ('05-07) | 74 | 72 | 1 |
| Castine | 2001-07 | 75 ('02-04) | 69 ('05-07) | 69 | * | * |
| KNOX COUNTY | | | | | | |
| Port Clyde | 1991-08 | 87 ('01-03) | 77 ('03-05) | 76 | 71 | 0 |
| LINCOLN and WALDO COUNTIES | | | | | | |
| None | * | * | * | * | * | * |
| ATTAINMENT AREA COUNTIES | | | | | | |
| KENNEBEC COUNTY | | | | | | |
| Gardiner | 1997-08 | 80 ('01-'03) | 71 ('05-07) | 71 | 70 | 0 |
| PENOBSCOT COUNTY | | | | | | |
| Holden (895 ft) | 1997-08 | 83 ('01-'03) | 68 ('03-05) ('05-07) | 68 | 66 | 0 |
| Howland (CASTNET) | 1997-08 | 71 ('97-'99) | 64 ('05-07) | 64 | 62 | 0 |
| Penobscot (TRIBE) | 2006-08 | * | 65 ^{^^} ('06-08) | * | 65 ^{^^} | 0 |
| WASHINGTON COUNTY | | | | | | |
| Jonesport | 2005-08 | * | 66 ('05-07) | 66 | 64 | 0 |
| Sipayik (TRIBE) | 2004-08 | * | 57 ('05-07) | 57 | 56 | 0 |
| Roosevelt Campobello | 1997-05 | 62 ('97-99) | 54 ('03-05) | * | * | * |
| AROOSTOOK COUNTY | | | | | | |
| MICMAC (TRIBE) | 2006-08 | * | 57 ('06-08) | * | 57 | 0 |
| Ashland (CASTNET) | 1991-08 | 65 ('97-99) ('00-02) | 61 ('05-07) | 61 | 60 | 0 |
| OXFORD COUNTY | | | | | | |
| North Lovell | 1992-08 | 62 ('01-'03) | 63 [^] ('05-07) | 63 | 62 | 0 |
| PISCATAQUIS COUNTY | | | | | | |
| Dover-Foxcroft | 1999-01 | 65 ('98-'00) | * | * | * | * |
| FRANKLIN and SOMERSET COUNTIES | | | | | | |
| None | * | * | * | * | * | * |

2009 4th high threshold – 4th highest 8-hr Ozone concentration in 2009 resulting in a 2007-09 Design Value of 76 ppb

* No Data Available

[^] 3-year data recovery rate < 90%

^{^^} Preliminary data

Table B-2: 2009 8-hr Ozone Attainment/Non Attainment Threshold Analysis

| Monitor | 2009 Threshold 4 th High Concentration # (ppb) | Range of 1997- 02 4 th High Concentrations (ppb) | # years Threshold Achieved from 1997 to 2002 | Range of 2003-08 4 th High Concentrations (ppb) | # years Threshold Achieved from 2003 to 2008 | # of Daily Maximum 8-hr Concentrations reaching Threshold in 2008 |
|------------------|--|--|---|--|--|--|
| Cadillac Mt | 68 | 78 – 101 | 6 | 74 - 86 | 6 | 10 |
| McFarland Hill | 81 | 70 – 92 | 4 | 64 - 83 | 1 (2007) | 0 |
| Kennebunkport | 77 | 73 - 101 | 5 | 71 - 78 | 2 (2006-07) | 2 |
| Cape Elizabeth | 76 | 67 - 103 | 5 | 68 - 83 | 1 (2007) | 1 |
| Durham (2007-08) | 77 | * | * | 70 - 81 | 1 (2007) | 1 |

2009 4th high threshold – 4th highest 8-hr Ozone concentration in 2009 resulting in a 2007-09 Design Value of 76 ppb

Table B-3: Design Value Comparison (2004 Designation vs. 2009 Designation)

| SITE NAME | 2001-2003 Design Value (ppb) | 2006-2008 Design Value (ppb) | Design Value change (ppb) |
|--|---------------------------------|---------------------------------|------------------------------|
| PORTLAND-LEWISTON COMBINED STATISTICAL AREA | | | |
| Kittery | <u>88</u> | *** | *** |
| Kennebunkport | <u>91</u> | <u>76</u> | -16 |
| Hollis/West Buxton | *** | 70 | *** |
| Cape Elizabeth | <u>88</u> | 74 | -14 |
| Durham | *** | 72 [^] | *** |
| LINCOLN-KNOX-WALDO-HANCOCK COUNTIES | | | |
| Cadillac Mountain (1560 ft) | <u>94</u> | <u>80</u> | -14 |
| McFarland Hill (420 ft) | <u>87</u> | 72 | -15 |
| Port Clyde | <u>87</u> | 71 | -16 |
| ATTAINMENT COUNTIES | | | |
| Gardiner | 80 | 70 | -10 |
| Holden | 83 | 66 | -17 |
| North Lovell | 62 | 62 | 0 |
| Jonesport | *** | 64 | *** |
| Howland | 68 | 62 | -5 |
| Ashland | 64 | 60 | -4 |
| Roosevelt Campobello | 61 | *** | *** |
| Penobscot (TRIBE) | *** | 65 ^{^^} | *** |
| Sipayik (TRIBE) | *** | 56 | *** |
| MICMAC (Tribe) | *** | 57 | *** |

*** No Valid Data Available

^{^^} Preliminary data

FIGURE B-1: MAINE 8-HOUR OZONE DESIGN VALUE TRENDS

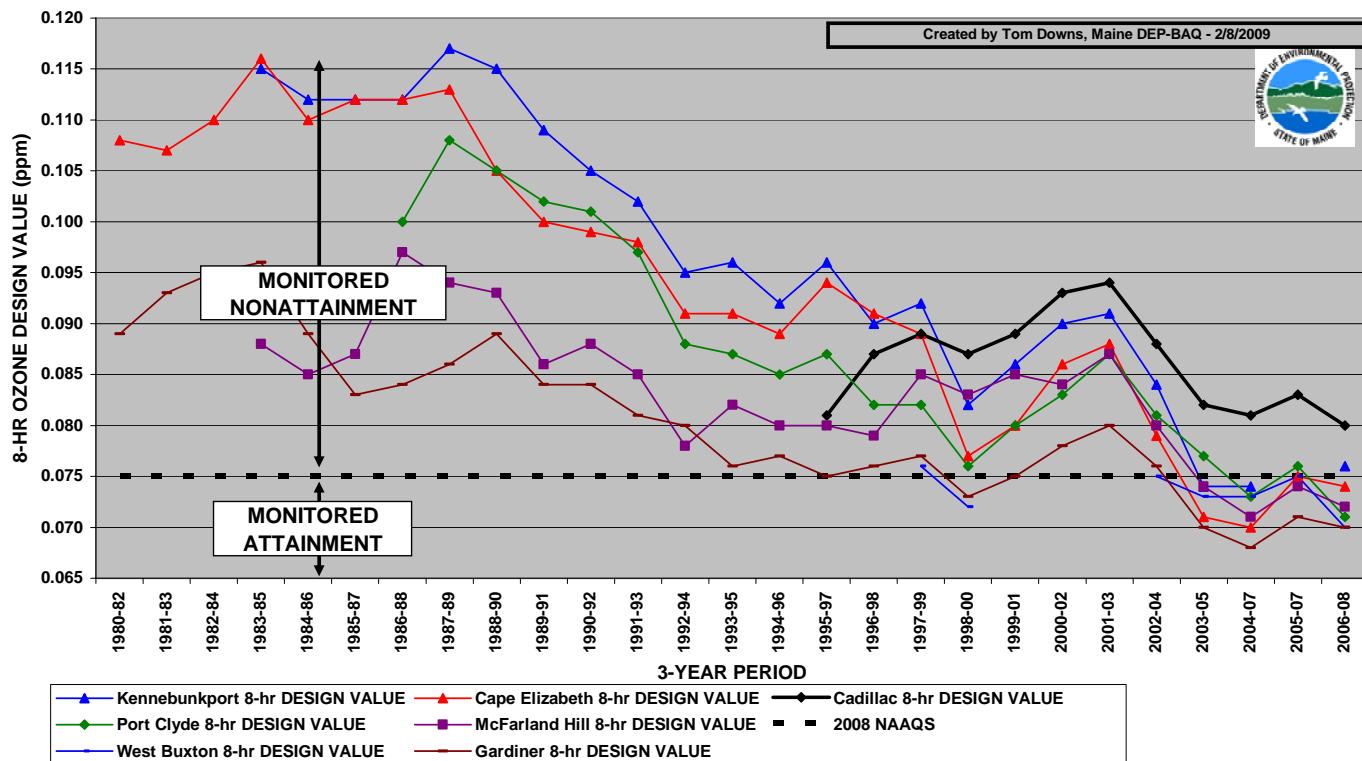


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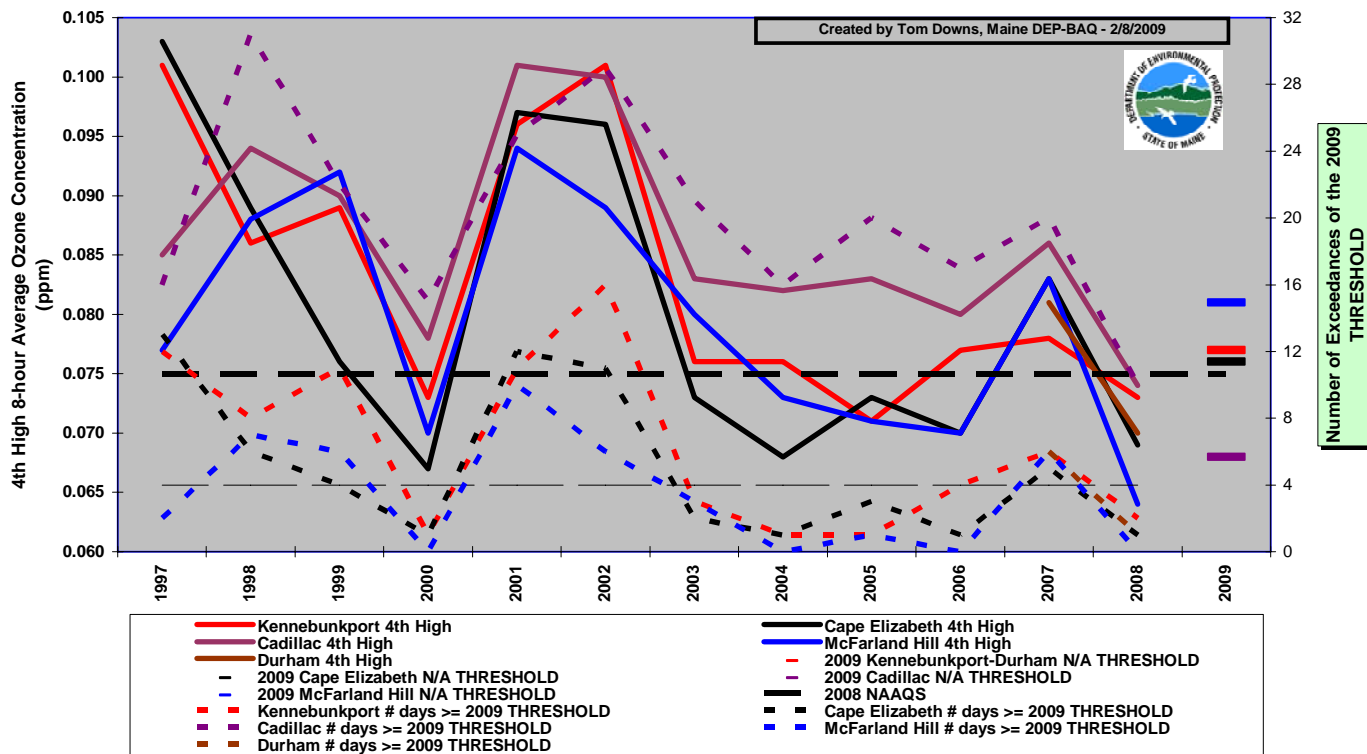
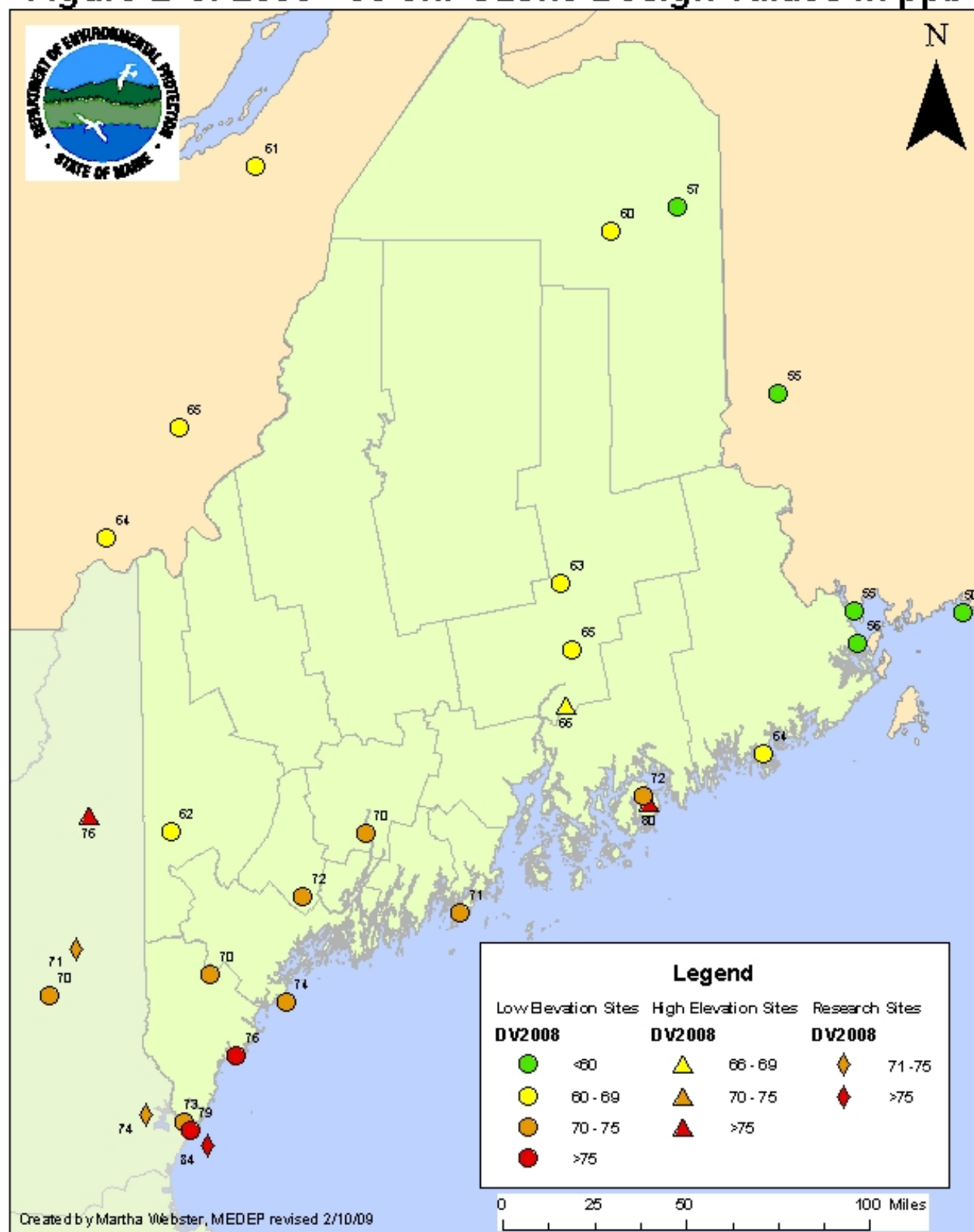


Figure B-3: 2006 - 08 8hr Ozone Design Values in ppb



APPENDIX C

TRAJECTORY ANALYSES

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MEDEP-BAQ Air Quality Meteorologists conducted a trajectory analysis of ozone exceedances from the 2004 through 2008 ozone seasons. The analysis included each hour that ozone levels were equal to or greater than 75 ppb at a monitoring site for every day that an 8-hour ozone exceedance was recorded at sites in Maine and New Hampshire that are likely to be nonattainment.

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For each run, the HYSPLIT model generates both a graphical presentation of the trajectories and a text file. The text file contains information about the hourly endpoints along each trajectory path including the location in time and space. Hundreds of endpoint text files were subsequently loaded into an Access database, which was then mapped in ARCMAP, a geographical mapping tool used within the department.

DISCUSSION OF TRAJECTORIES

Figure C-1 displays the trajectories for ozone exceedances at Kennebunkport, Maine by height AGL. It is clear that Maine does not contribute to the exceedances at this site since few trajectories pass over any part of Maine and those that do are descending air masses with ozone created elsewhere. The bulk of the trajectories pass over southern New England and the Gulf of Maine.

Figure C-1: 10m Trajectory Points Generated for Hours > 0.075 ppm Ozone
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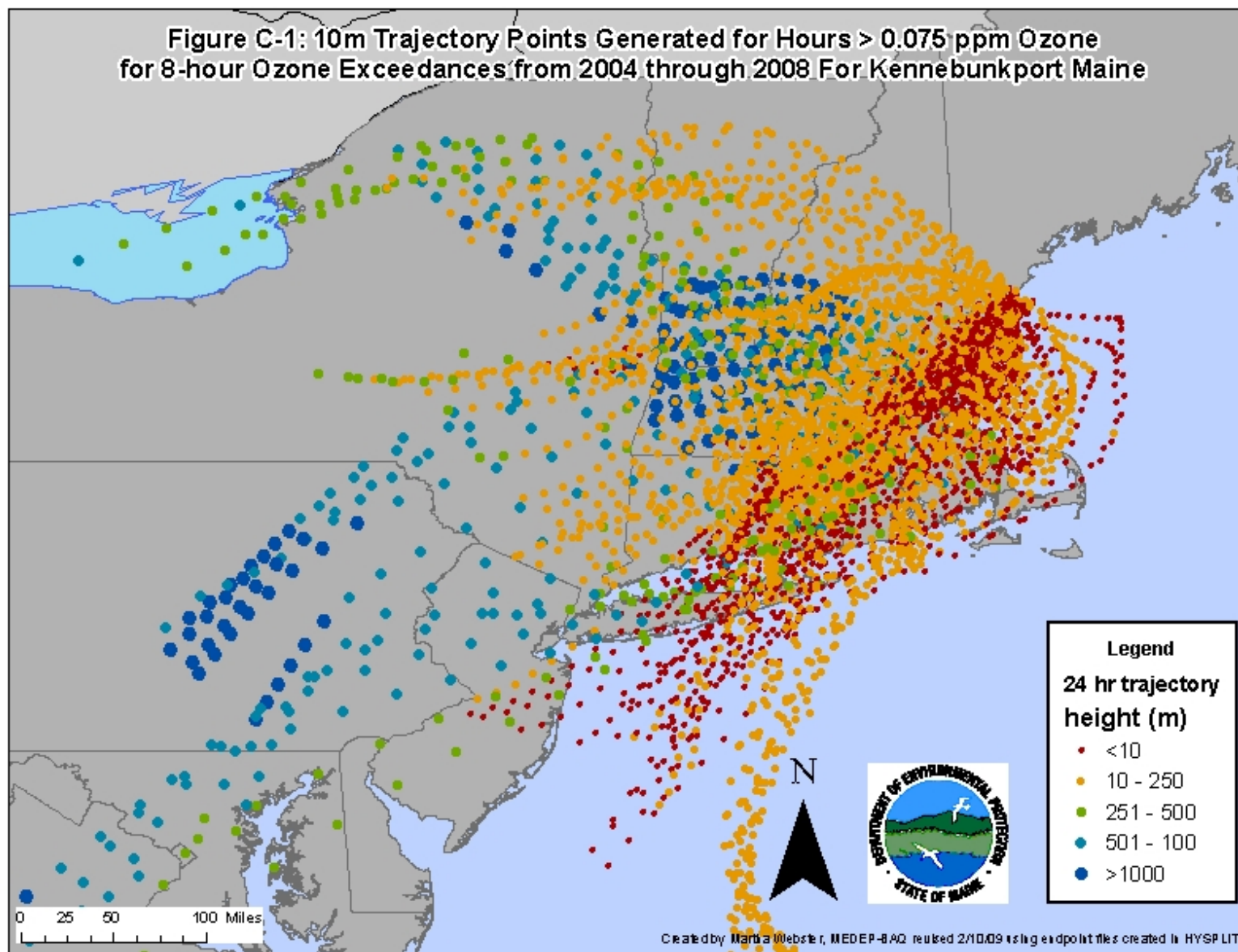
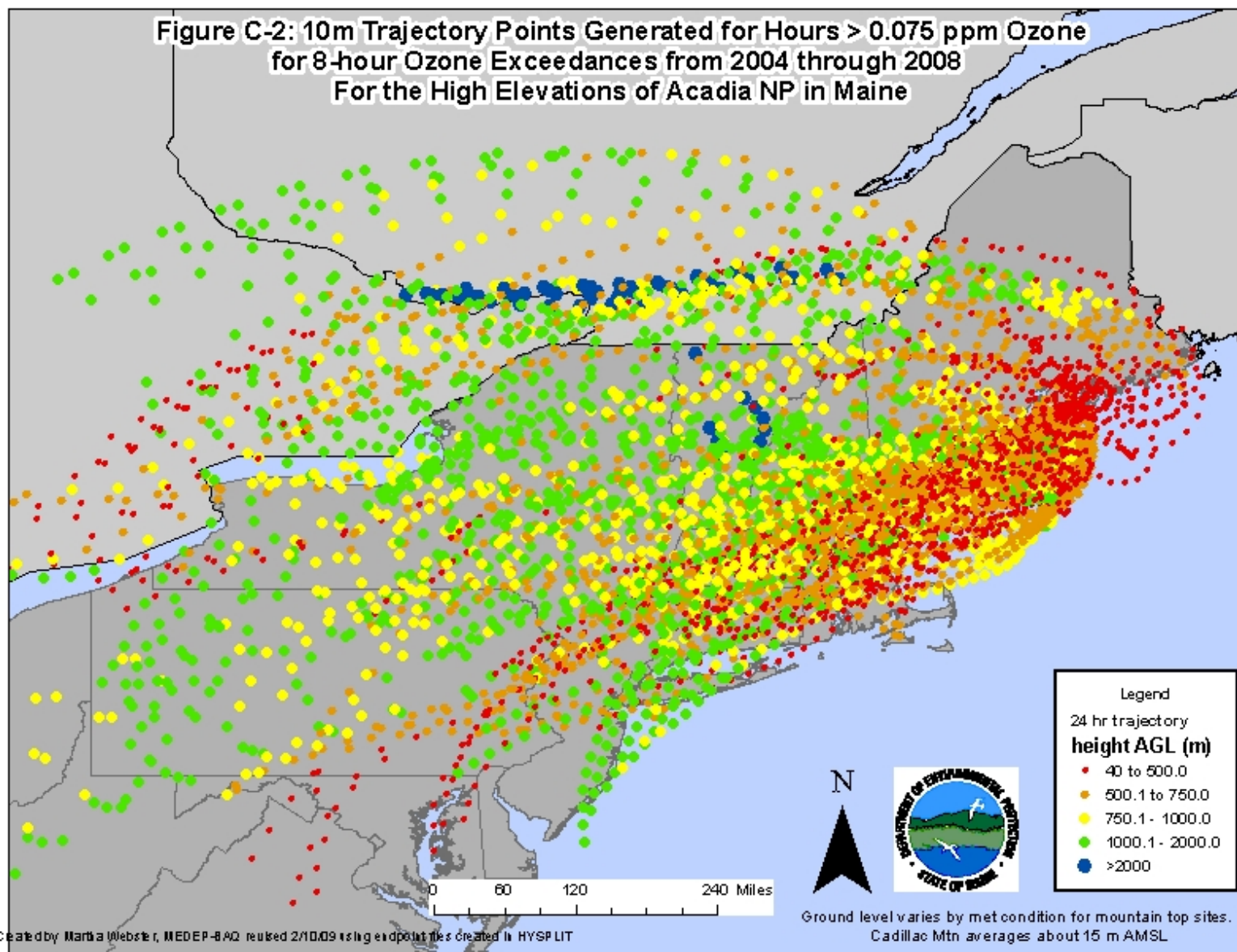
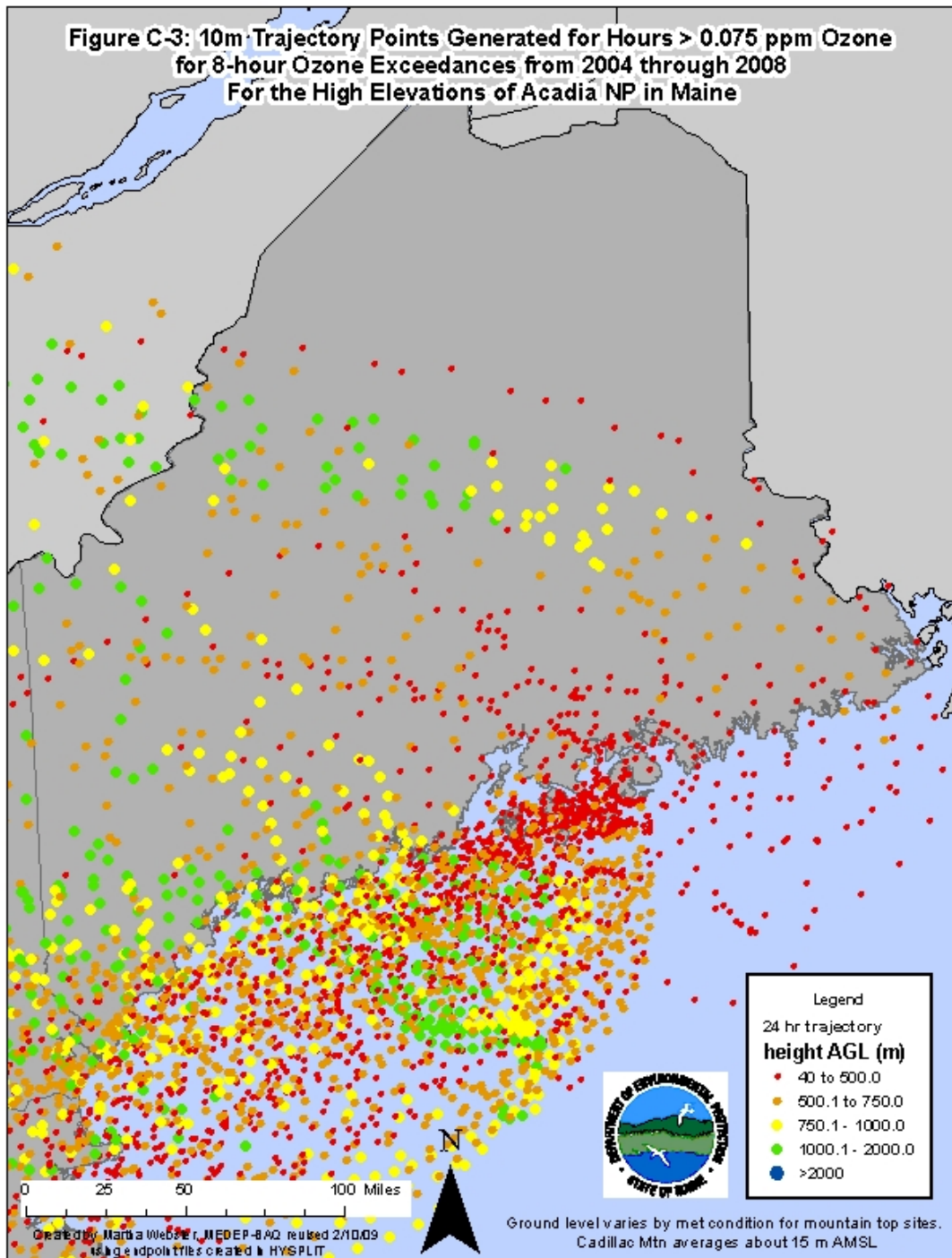


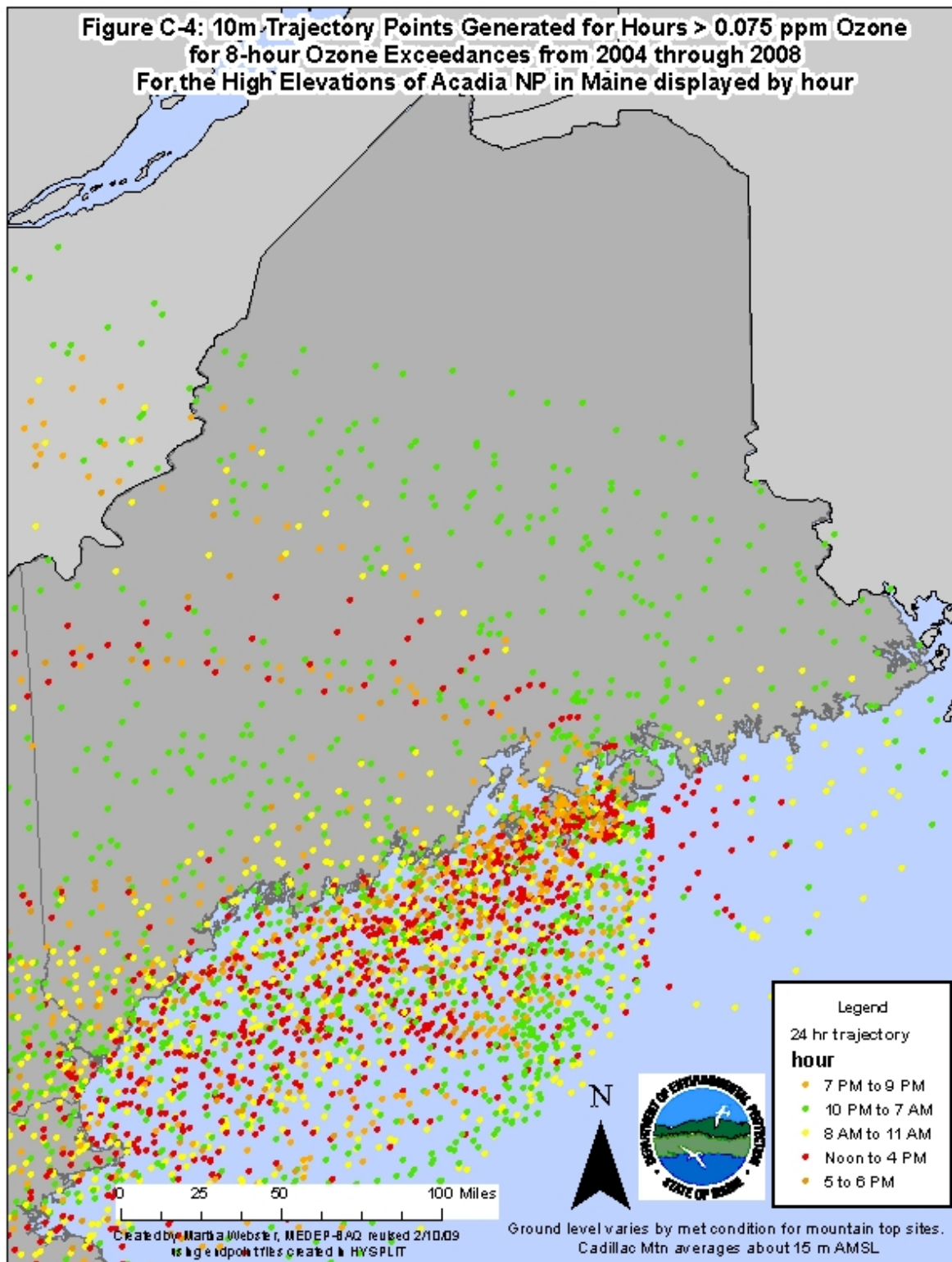
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For the High Elevations of Acadia NP in Maine



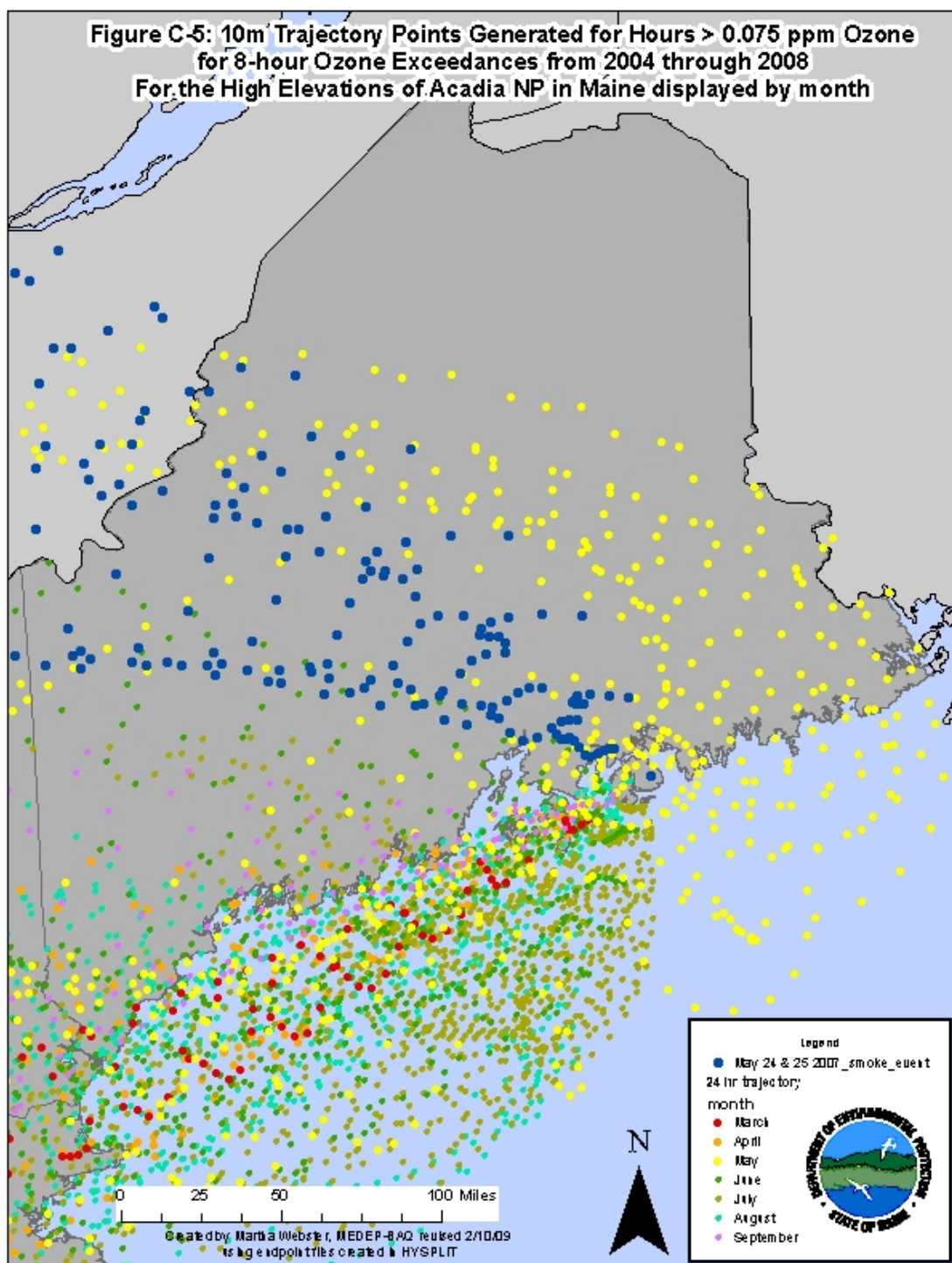
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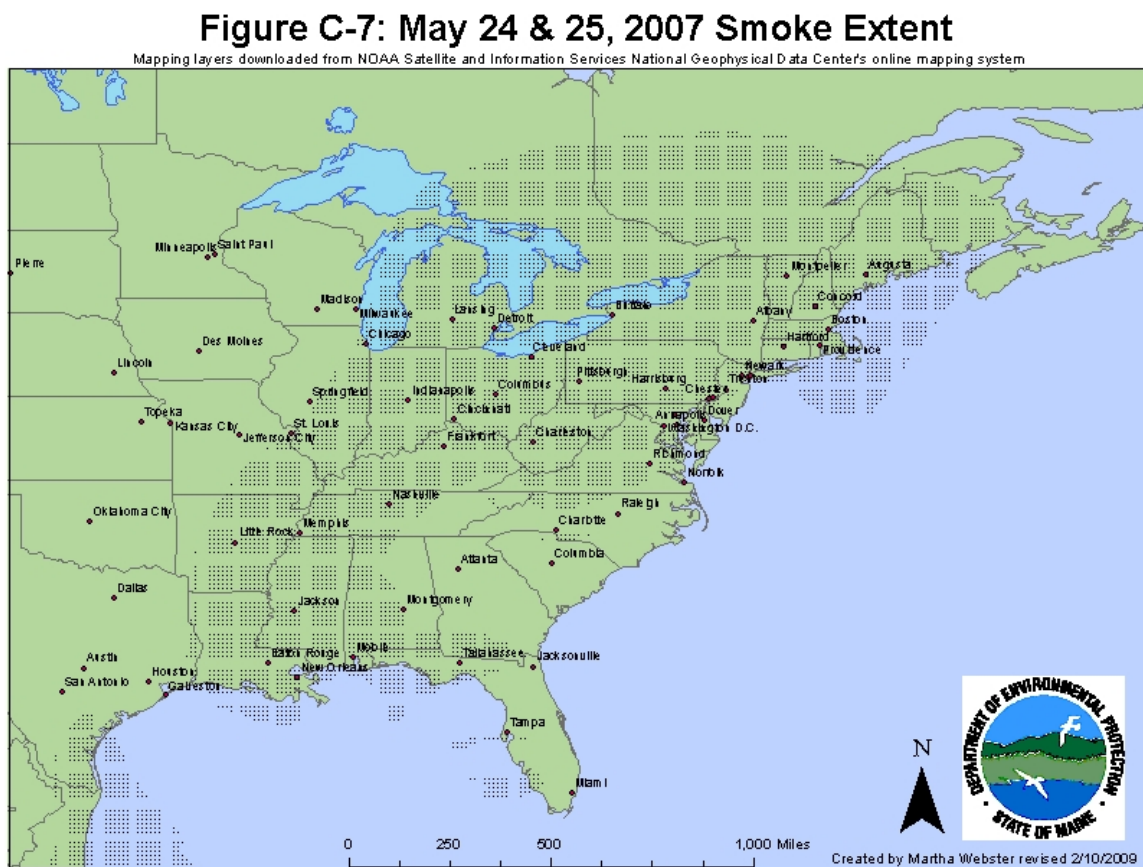
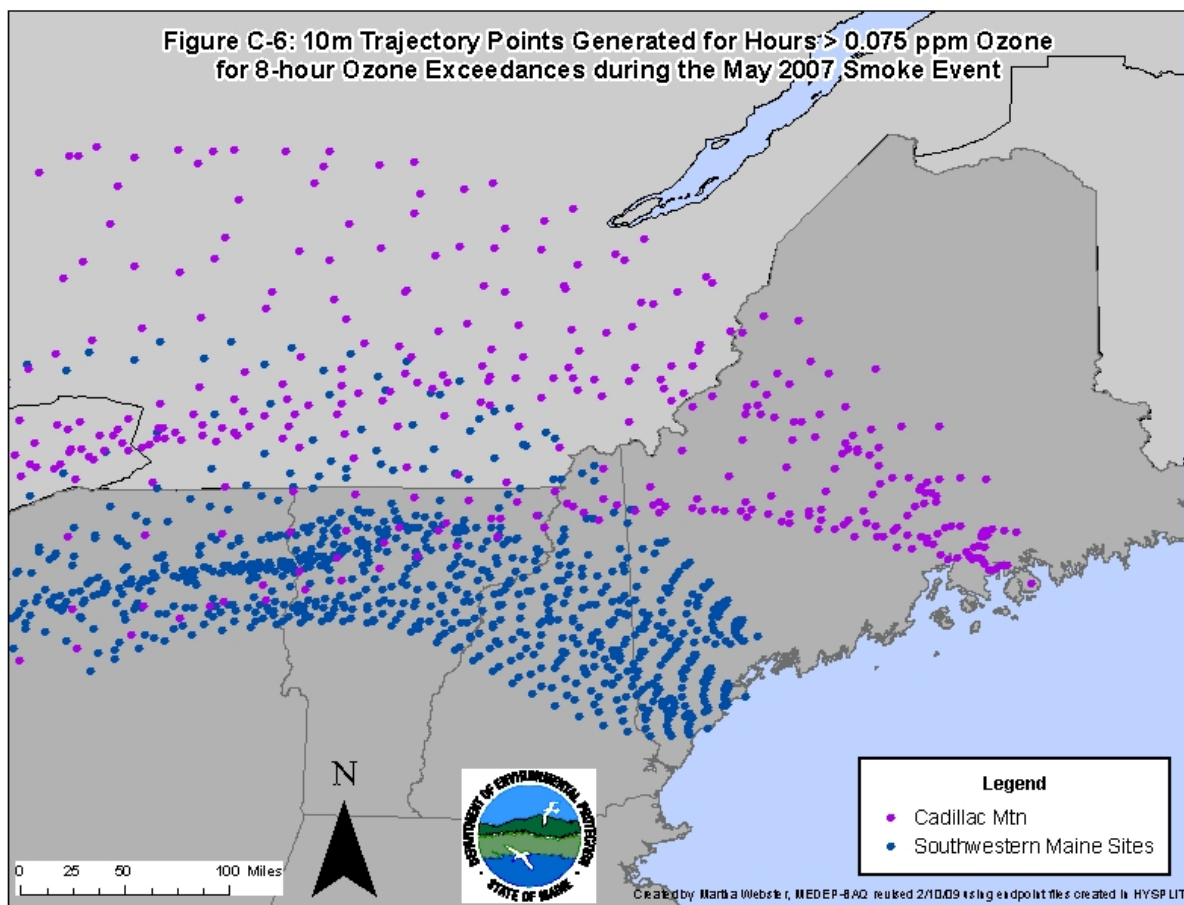


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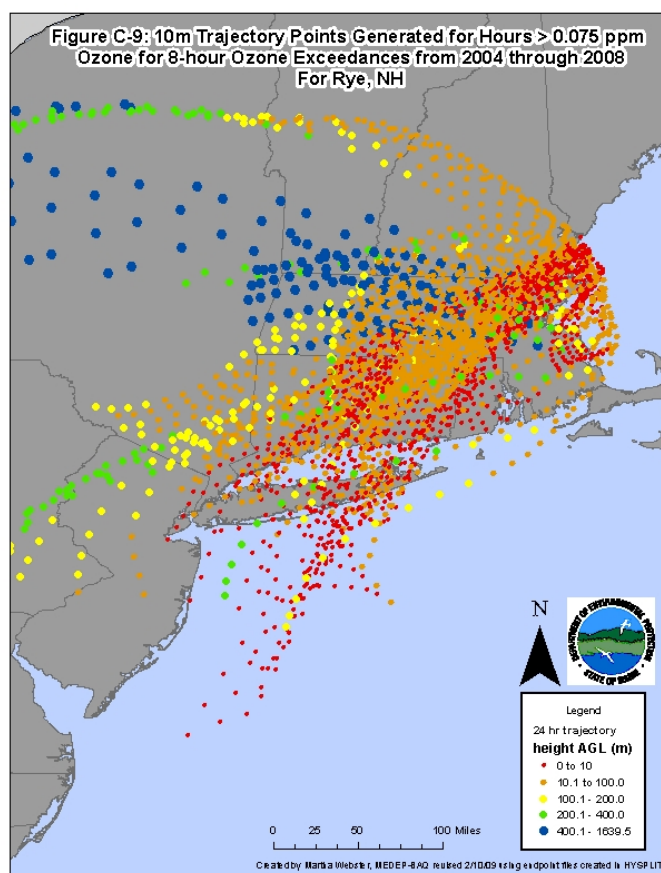
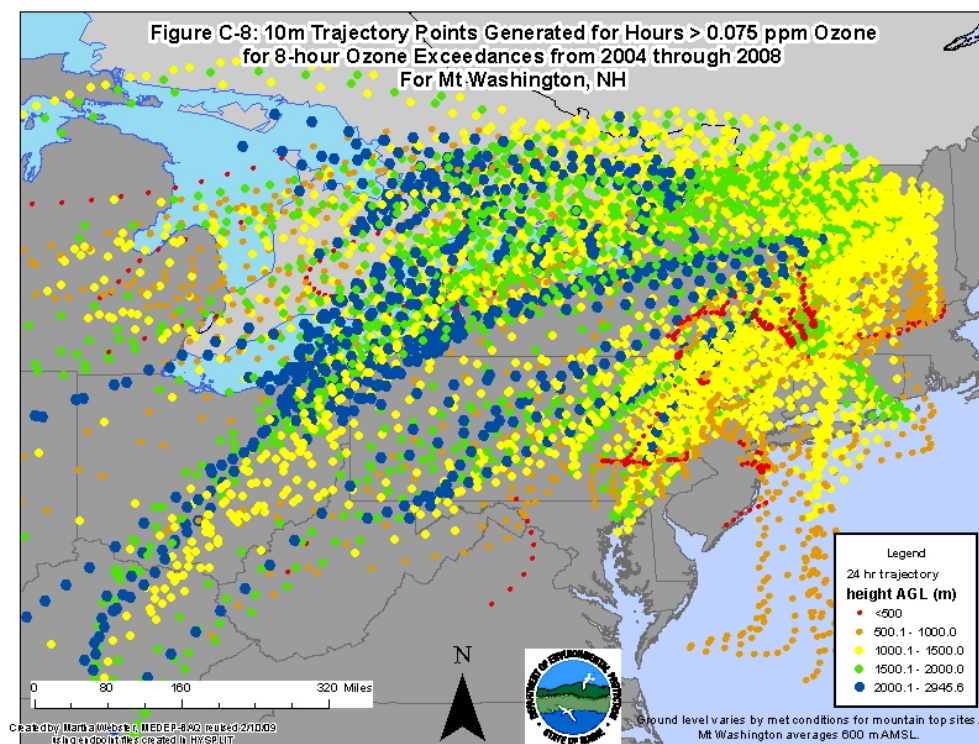


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APPENDIX D
POPULATION/GROWTH/COMMUTING
/EMISSIONS ANALYSES

**Figure D-1: Southwestern Maine Population
by Town from 2000 Census**

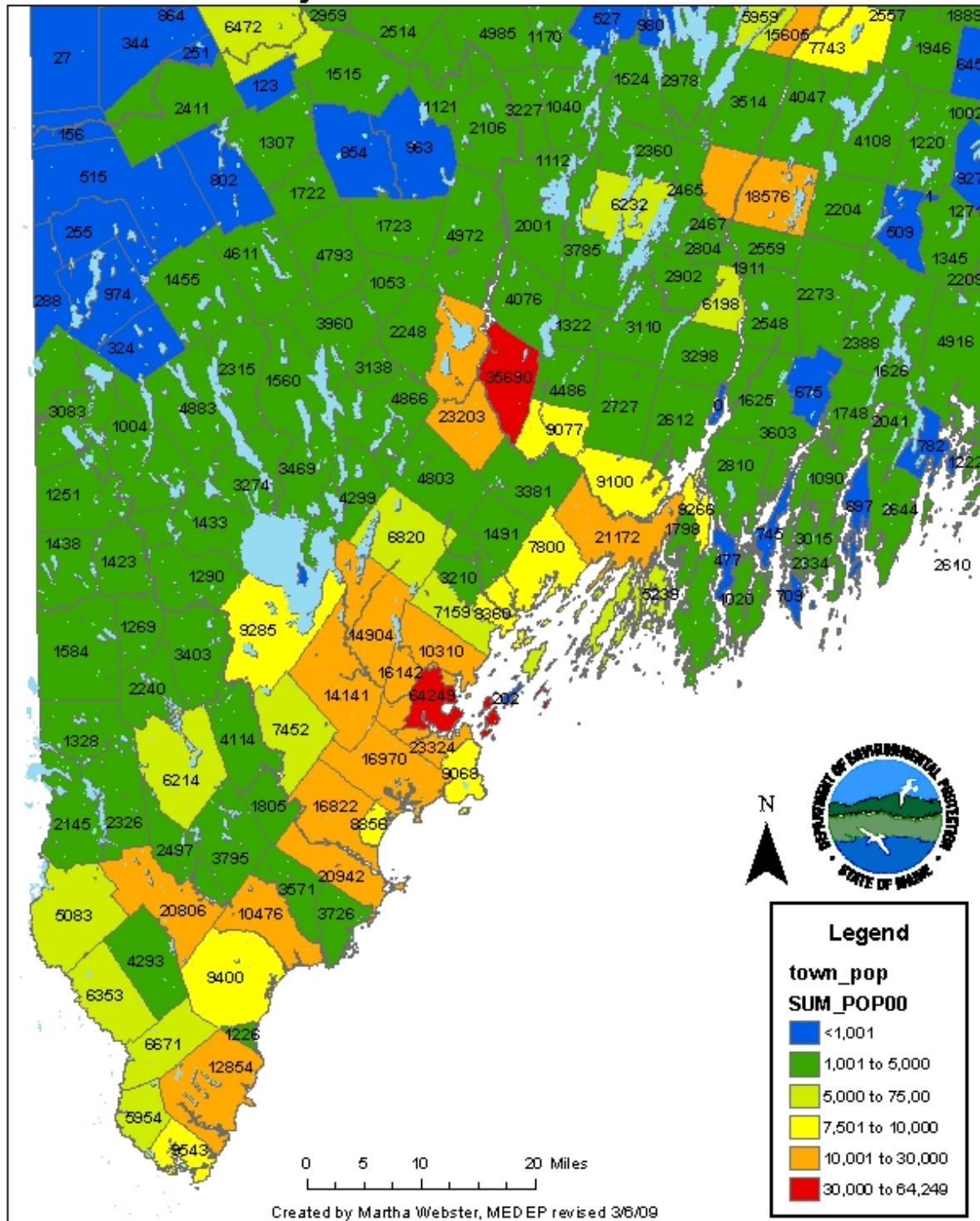


Figure D-2: Mid-Coast Maine Population by Town from 2000 Census

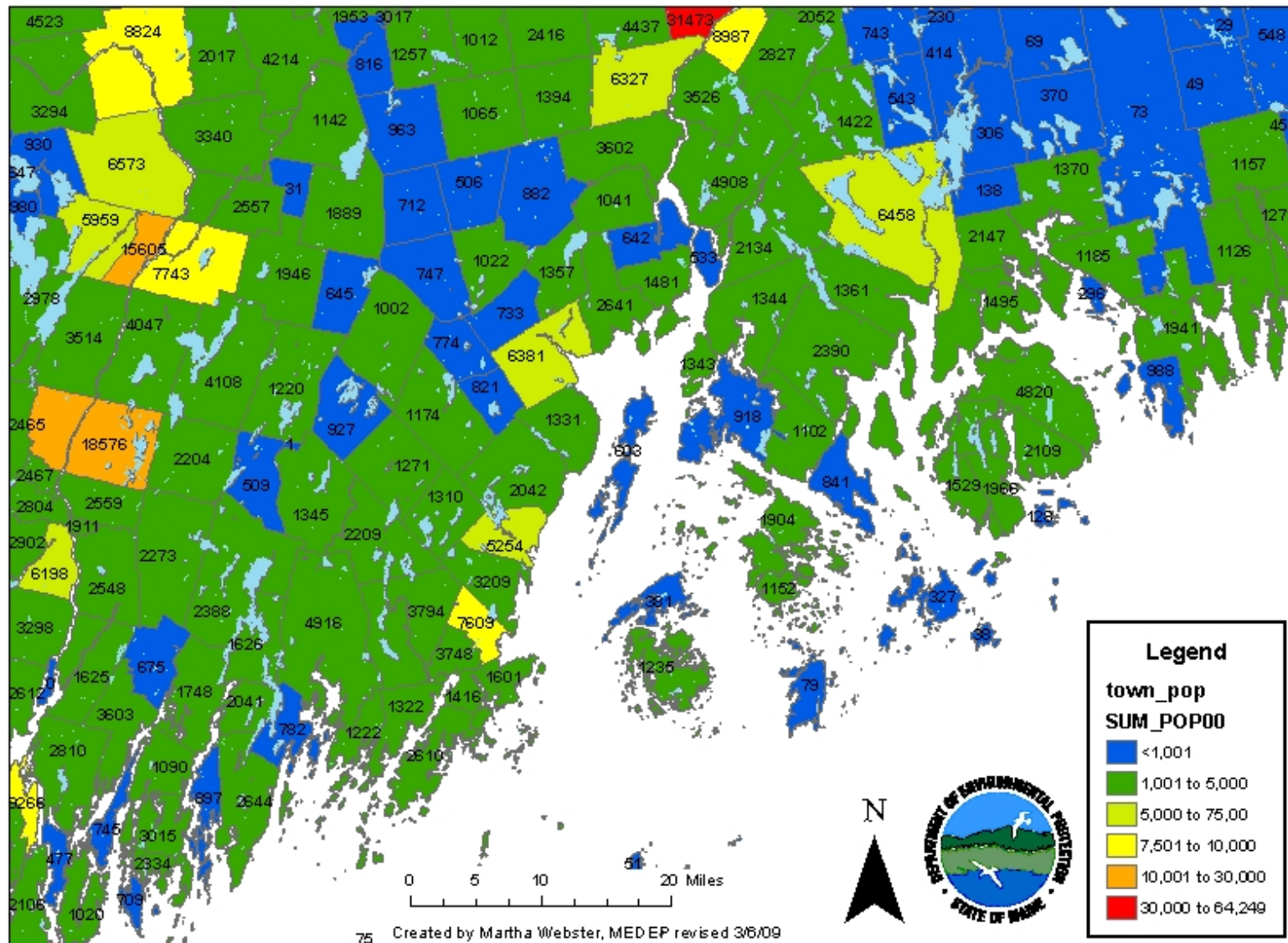


Figure D-3: Population Change 2000 - 1990 by County

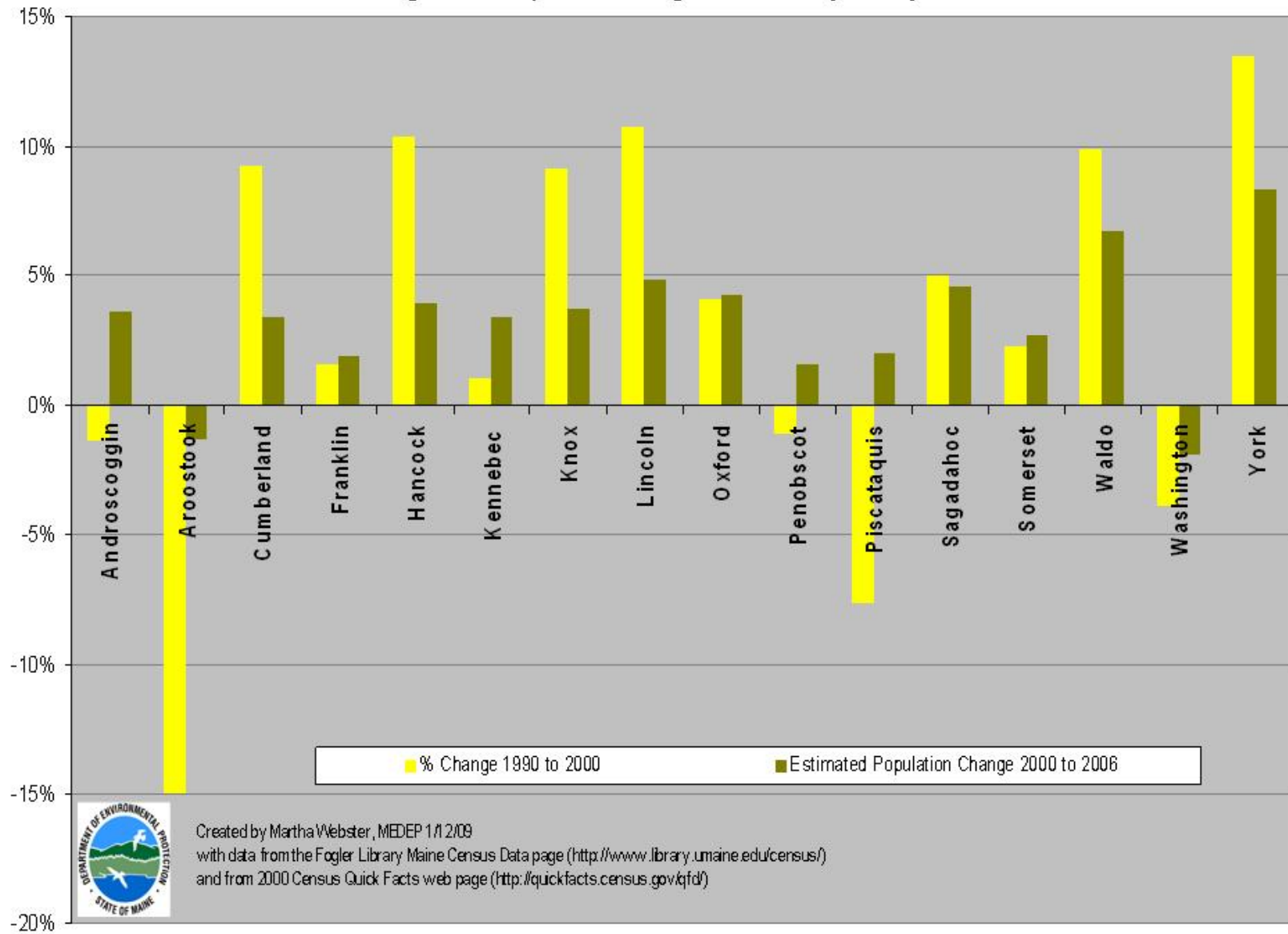


Figure D-4: Southwestern Maine Population per Square Mile

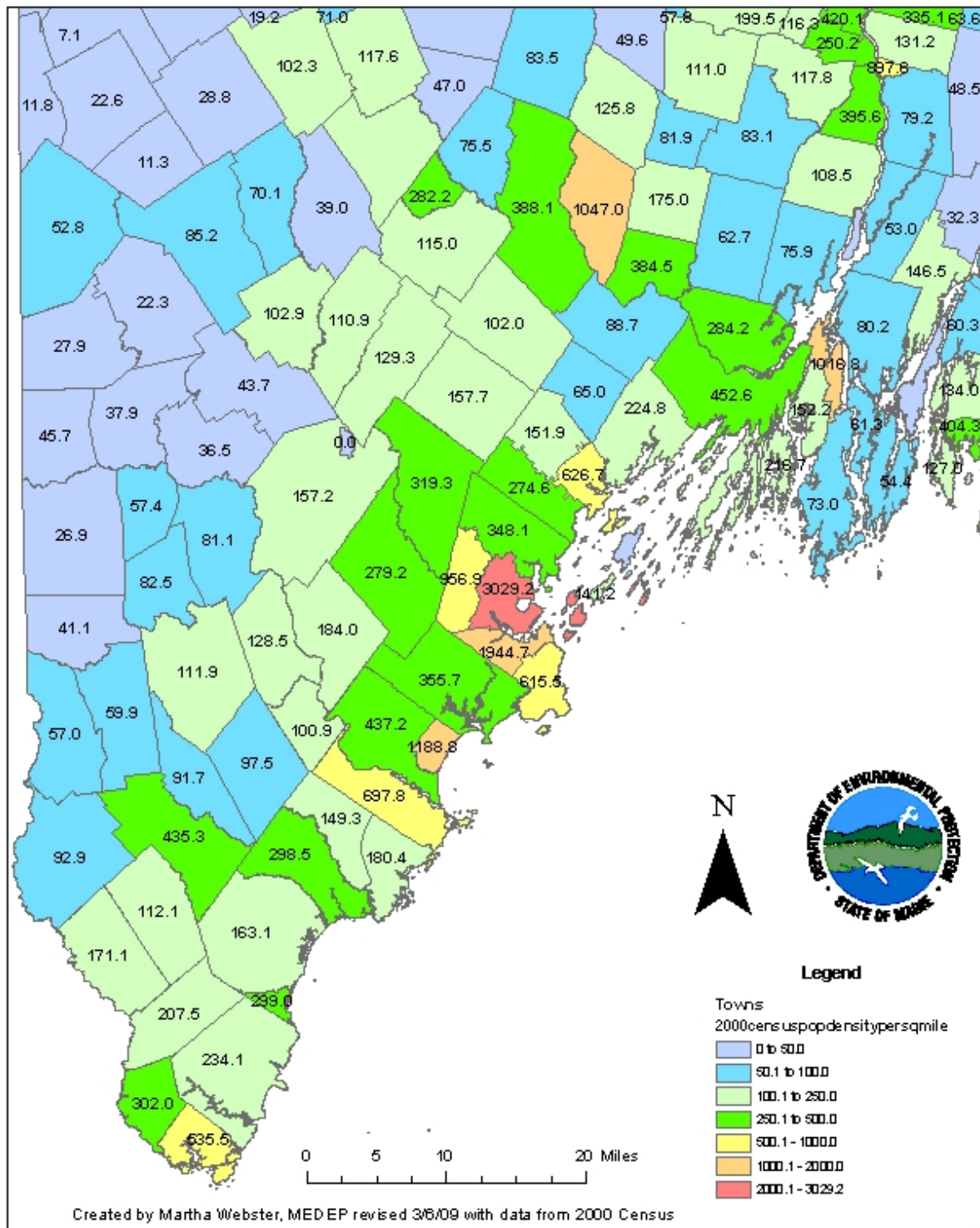


Figure D-5: Mid-Coast Maine Population per Square Mile

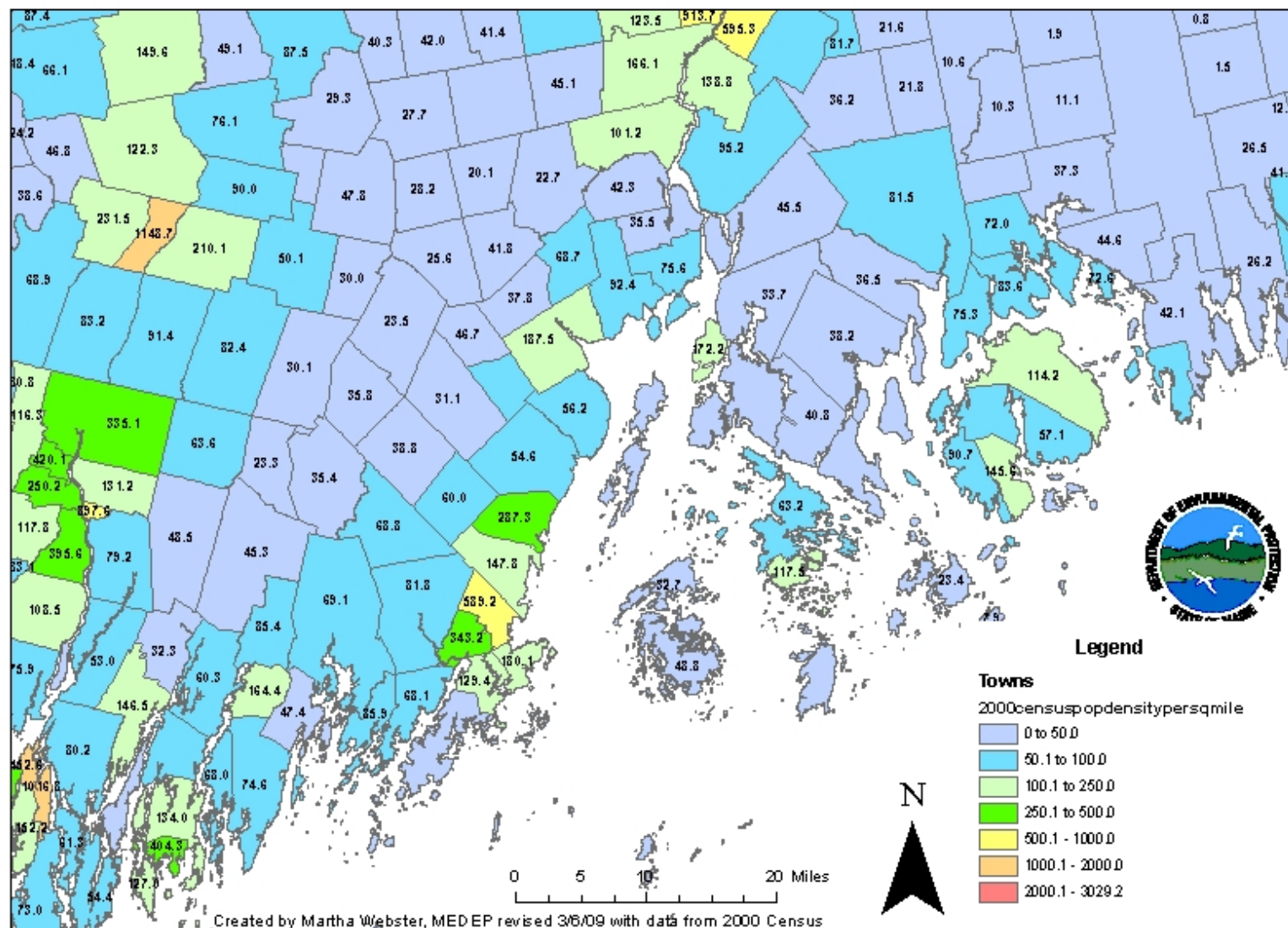


Figure D-6: Southwest Maine Landcover Analysis

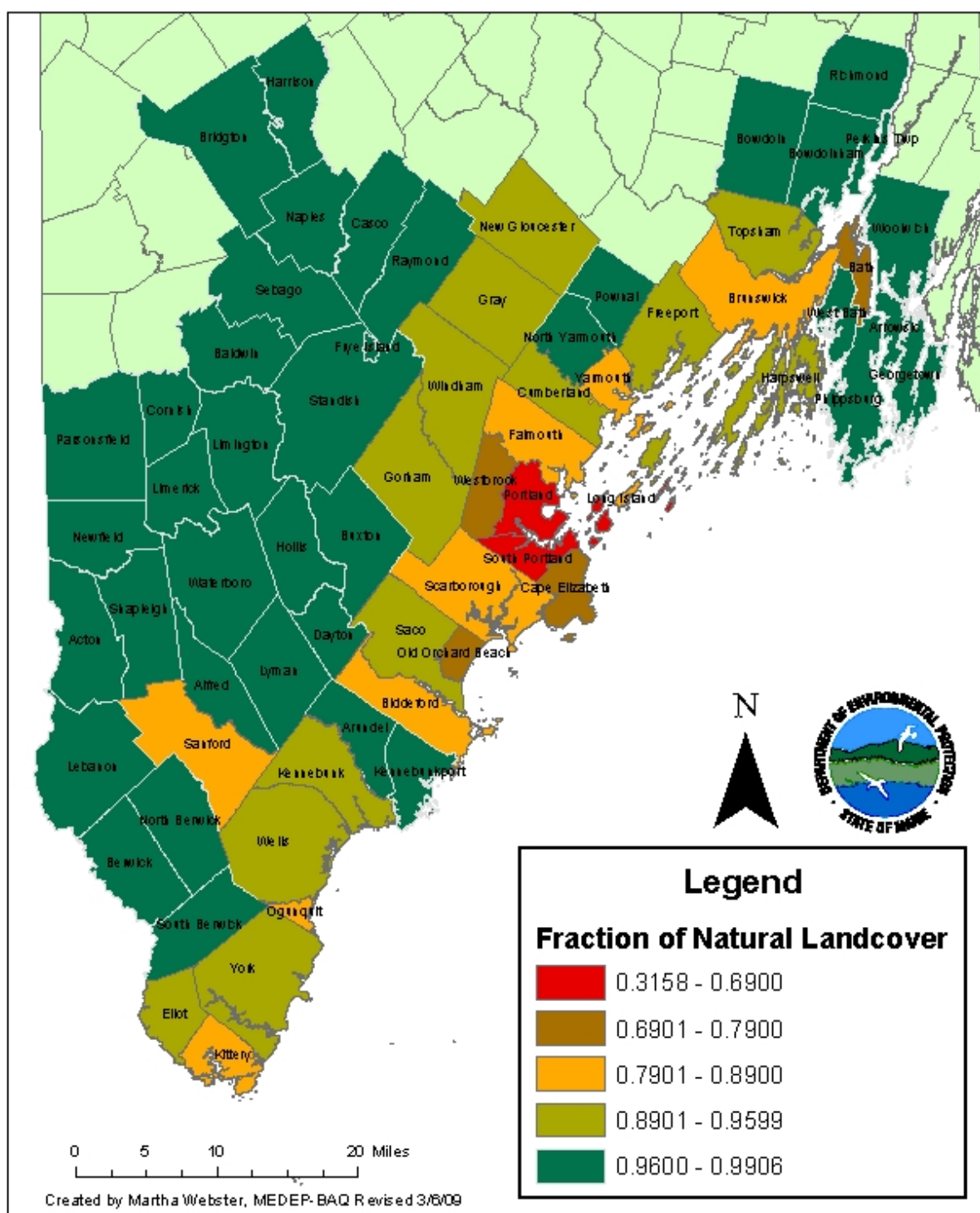


Figure D-7: Mid-Coast Landcover Analysis

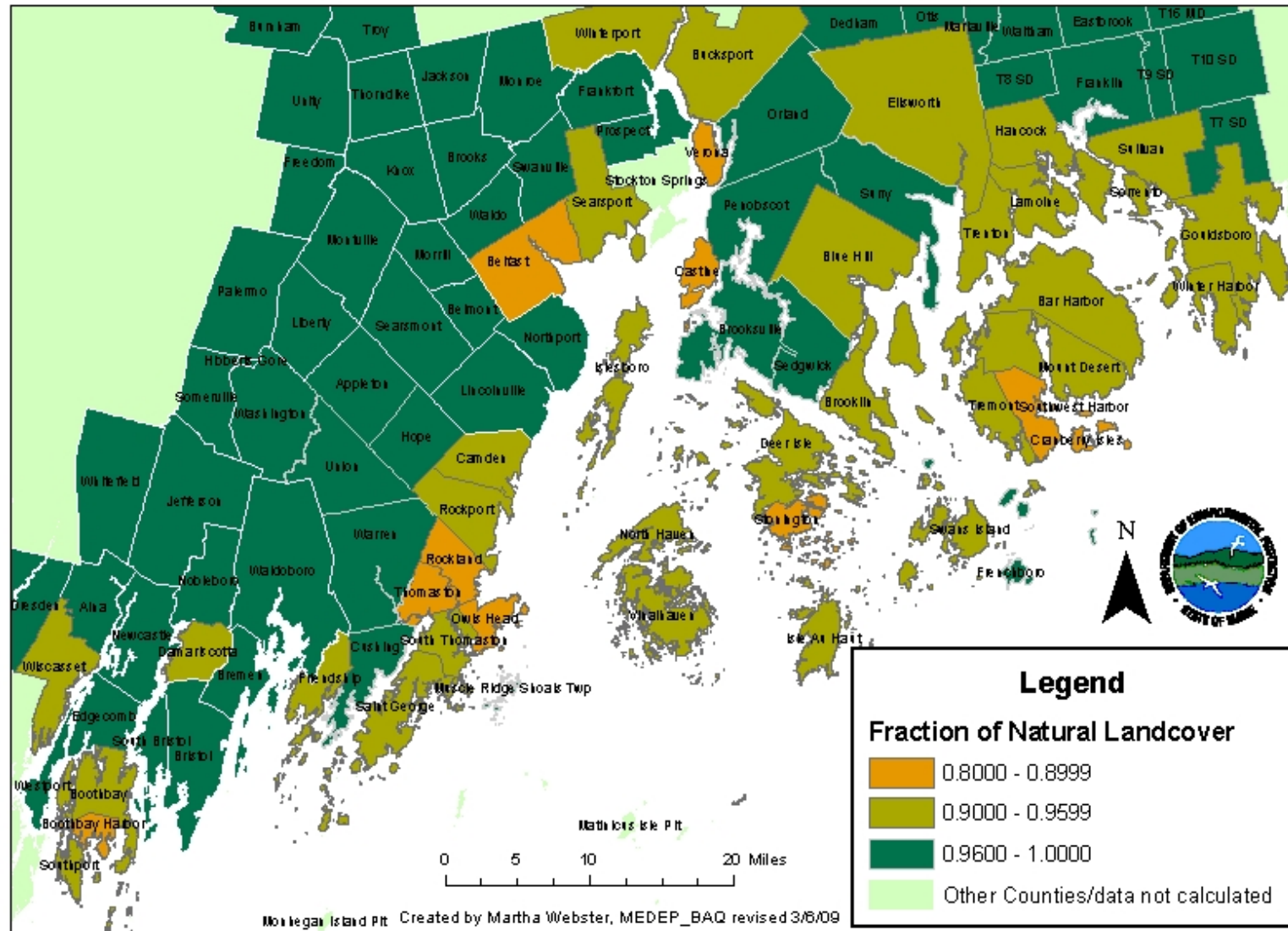
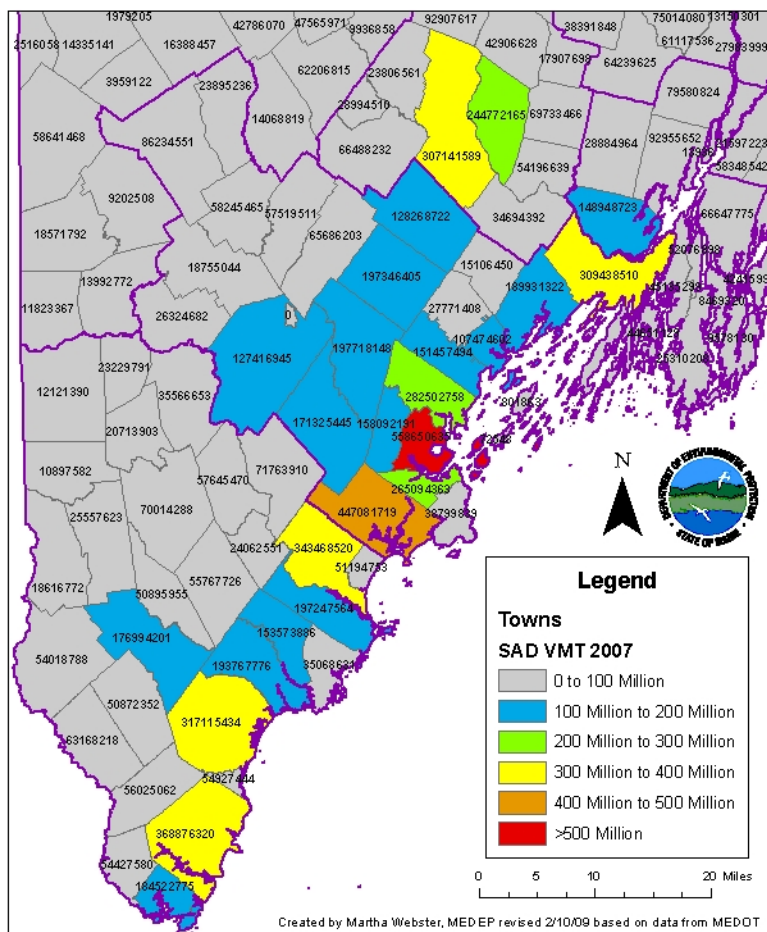
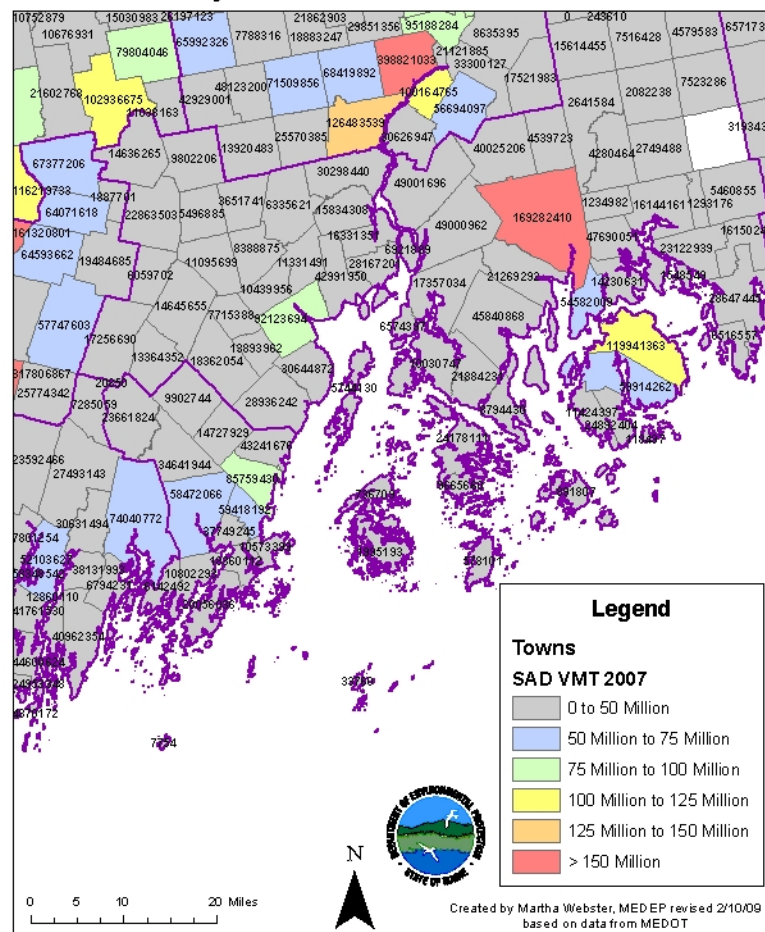


Figure D-8: Summer Average Daily Vehicle Miles Traveled by Town in Southwestern Maine



D-9: Summer Average Daily Vehicle Miles Traveled by Town in Mid-Coast Maine



**Figure D-10: Commuting Patterns by Town
in Southwestern Maine**

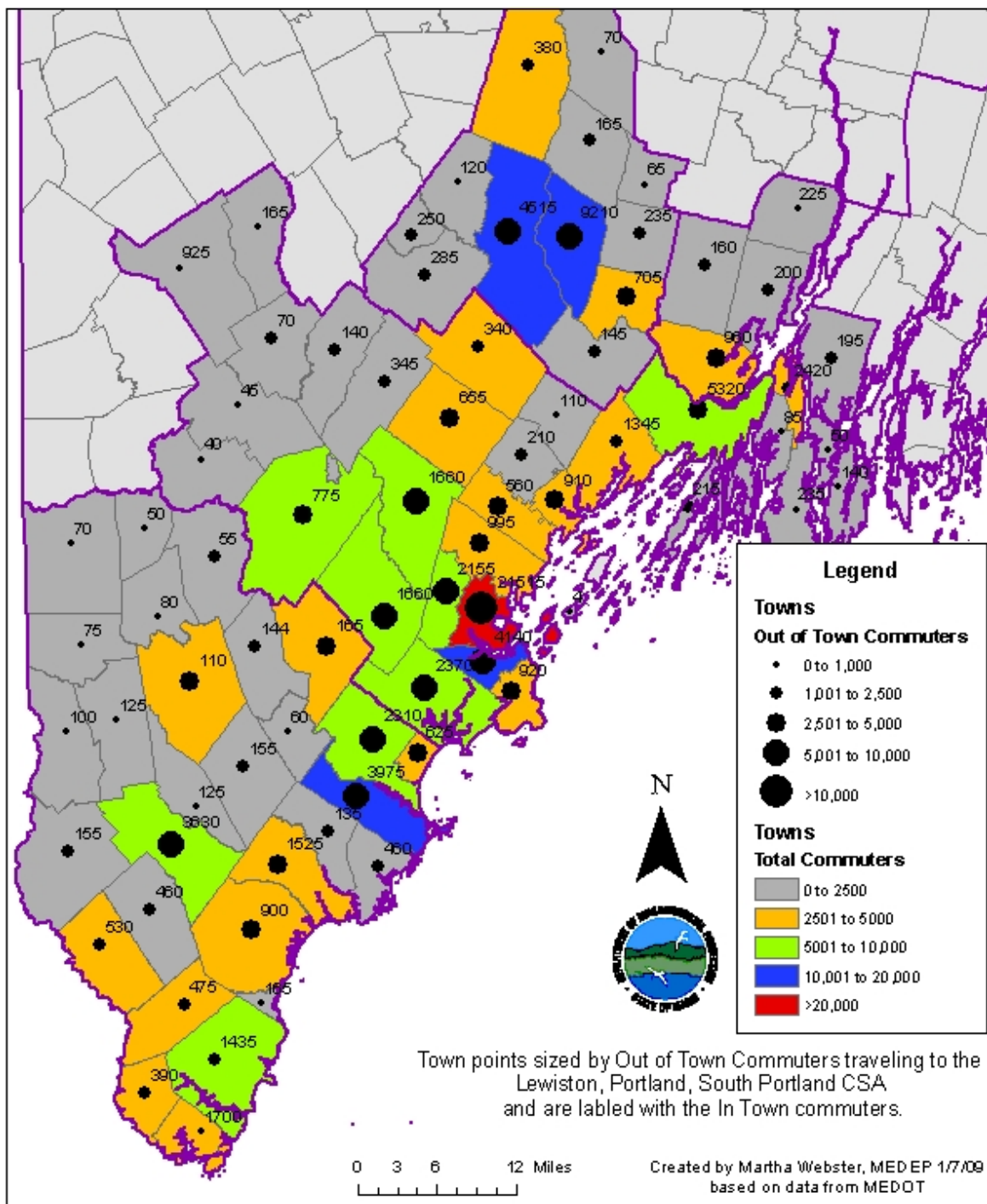


Figure D-11: Commuting Patterns by Town in Mid-Coast Maine

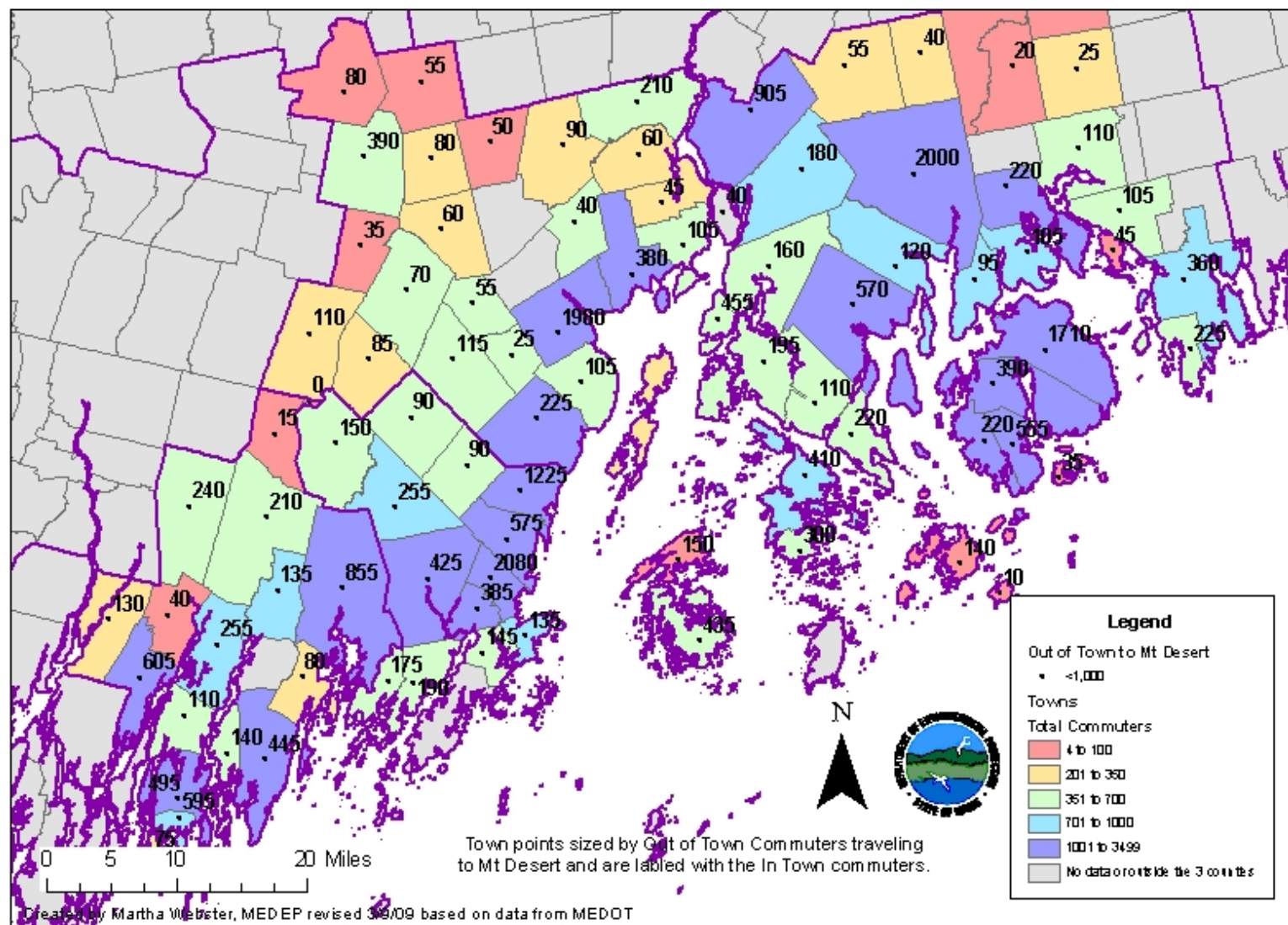


Figure D-12: Southwestern Maine NO2 and VOC Emissions

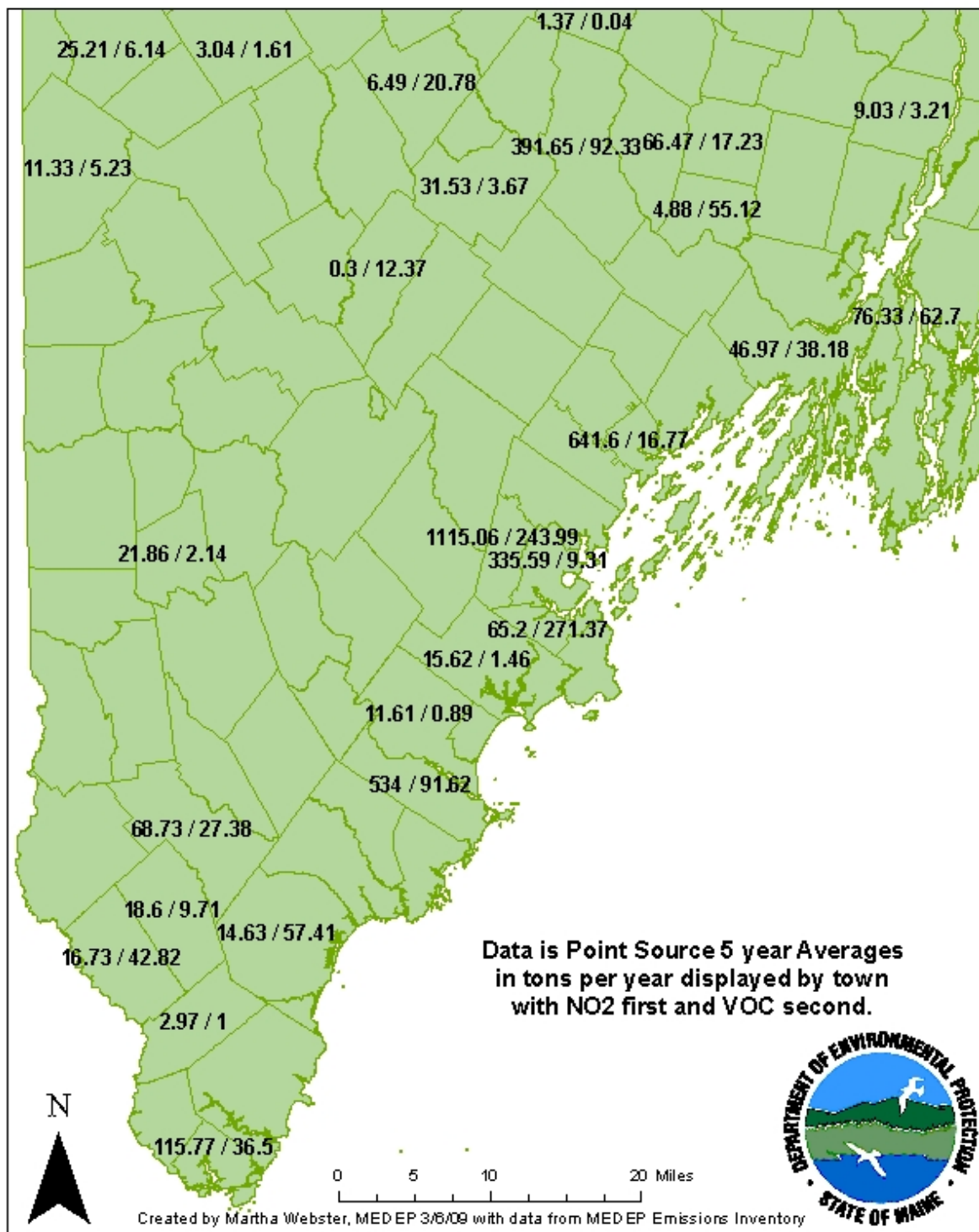


Figure D-13: Mid-Coast Maine NO2 and VOC Emissions

