

Idle Free Corridors: Northeast States Experience

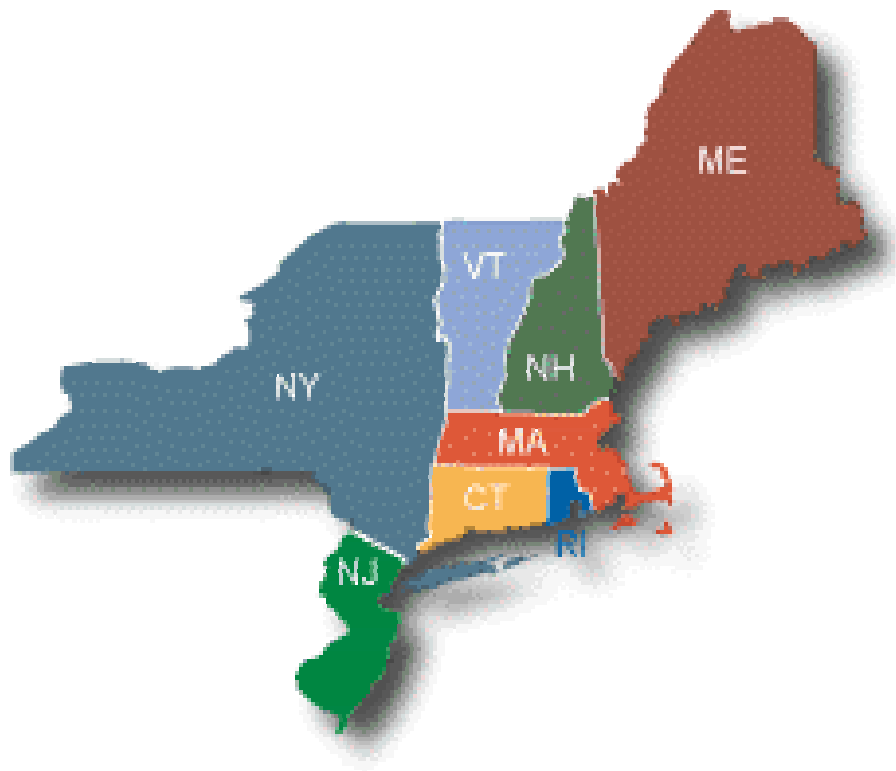
EPA Region 2 Implementation Meeting

April 14, 2004

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NESCAUM



NESCAUM Background



- The Northeast States for Coordinated Air Use Management
- A nonprofit organization founded in 1967 to assist the New and c policy progr



Presentation Outline

- **Section I: Long Duration Idling and its Impact Upon the Northeast States**
 - Transportation and Idling Statistics, Air Quality, Public Health
- **Section II: Relevant Northeast States Project Experience**
 - New York State, New Jersey
- **Section III: Overview of NESCAUM Interstate 95 Corridor Analysis**
 - Interactive Mapping
 - Truck Stop Evaluation and Ranking

Section I: Transportation and Idling Statistics

- **Transportation to, from, within, and through I-95 Corridor States accounted for 37.5% of all shipments in U.S. in 1997, or \$2.6 Trillion.**
- **Represents a total of 350 Billion ton-miles shipped, at an average distance of 142 miles per shipment.**
- **Over 2.75 Million light heavy and heavy trucks (Class 7 and 8) operating on US Interstate highway system.**

Source: U.S. Department of Transportation, Bureau of Transportation Statistics. *National Transportation Statistics Annual Report*. October, 2003.



Transportation and Idling Statistics (continued)

- The ATA's TMC (Technology Maintenance Council) estimates that one additional hour of idling per vehicle per day results in:
 - Equivalent of 64,000 miles in engine wear and tear annually.
 - 500 gallons of wasted fuel.
 - \$0.07 per hour in Increased maintenance.
 - \$0.70 per hour in Decreased tire Overhaul.



Transportation and Idling Statistics (continued)

- **A Class 8, long haul driver will typically idle for up to 10 consecutive hours , on average, during extended layover periods while:**
 - Awaiting Dispatch
 - Loading or Unloading
 - Fulfilling Federal HOS requirements
- **As an industry trucking wastes gallons of diesel annually, according to the U.S. Department of Energy.**



Transportation and Idling Statistics (continued)

- **Class 7 and 8 vehicles have a life expectancy of over 25 years, on average, nationwide. Long haul rigs, by contrast, typically undergo a major engine overhaul or replacement at the 500,000 mile mark.**
- **Northeast States typically have a surplus of available parking spaces with slow parking demand growth (< 1.5% annually). Southeast States (NC, SC, GA, FL) have a parking surplus but show very high annual parking demand growth (>3.5%).**



Corridor Snapshot: State of Virginia

- **A January, 2003 research report by U.S. DOT Center for Transportation studies found:**

“Along I-95, the maximum demand for parking exceeded the number of available parking spaces at most truck stops by 10 to 20 percent. On average, the maximum areas along I-95 exceeded the number of spaces by about 27%.”

Source: **University of Virginia – Center for Transportation**
the Demand for Commercial Truck Parking in
Virginia. January 2003. Research Report No. UVA-



Transportation and Idling Statistics (final)

- **In the Northeast, higher prevalence of long duration idling due to:**
 - High traffic volume / Corridor congestion.
 - Unexpected Delays or Downtime (HOS violations).
 - Seasonal weather conditions.
- **Increased likelihood of collateral human and natural environment**
 - Dense regional population.
 - High demand for parking spaces.
 - Age of TS facilities & proximity to corridors.
 - Inadequate supply and illegal truck parking.



Section I: Regional Air Quality

- In 2001, transportation vehicles and vessels accounted for the following percent annual contribution to the nation's pollution levels :
 - 66% of carbon monoxide (CO)
 - 47% of nitrogen oxides (NOx)
 - 35% of Volatile organic compou
 - 5% of particulate (PM)
 - 4% of sulfur dioxide (SO2)
 - 6% of ammonia

Source: U.S. Department of Transportation, Bureau of T
2001.



Regional Air Quality (continued)

- From a Northeast States perspective, engine out exhaust emissions from Class 8 heavy duty diesel vehicles adversely impact regional air quality.
- Contribution of PM and NOx from mobile sources introduces additional stresses to non-attainment and/or designation areas already experiencing exceedances.
- In large urban centers, such as New York emissions account for 85 to 90 percent load present in ambient air.



Regional Air Quality (continued)

- EPA, in January 2004 guidance, determined NO_x and PM emission factors of 135 g/hr and 3.68 g/hr, respectively, for vehicles within state's mobile source inventory.
- In the Northeast, then, opportunity to apply diesel emission reductions within state implementation planning and transportation conformity process.
- Further, commercial viability of TSE as for diesel trucks strengthens anti-idling and softens the blow of future compliance enforcement actions by presenting a re compromising situations (temperature



Corridor Snapshot: Summary of Member state idling regulations

	<u>Yes</u>	<u>None</u>
3 Minutes	CT NYC NJ	ME RI VT
5 Minutes	NH MA MD NY state	



Section I: Public Health Perspective

- **Characterizing the health effects of diesel emission exposure is important for diesel risk reduction program development and better understanding of human health risks.**
- **New CARB finding that “per mile OC from a HHDDT in congested times higher than that of a HDDT transit mode and 1.9 times higher.”**



Public Health Perspective (continued)

- **Is this Significant? Perhaps. Why?**
 - Traditional exposure assessment/cancer risk models assume that the OC/EC ratio is identical in traffic or in driving.
 - Therefore, if OC dominates carcinogenic and toxic effects of PM, human health risk increases 1x order of magnitude under traffic conditions.
 - From policy perspective, may influence locating of truck stops, traffic planning

Source: Norbeck et al. *Emission Rates of Elemental and Organic Carbon from In* Environmental Science and Technolog



Section II: Relevant State Experience

Hunts Point Cooperative Market - Bronx, NY

**DeWitt and Chittenango Service Plazas,
New York State Thruway - Syr**

**Travel Centers of America (TA
Paulsboro, NJ**



Hunts Point Cooperative Market

- 28 Bay advanced truck stop electrification (ATE) facility at commercial facility.
- Co-funded by Clean Air Communities, IdleAire, and the New York Power Authority (~ \$500,000 total).
- Installed, maintained, staffed and operated by IdleAire Technologies.
- System activated in November, 2002



Hunts Point (continued)

- **Positives**

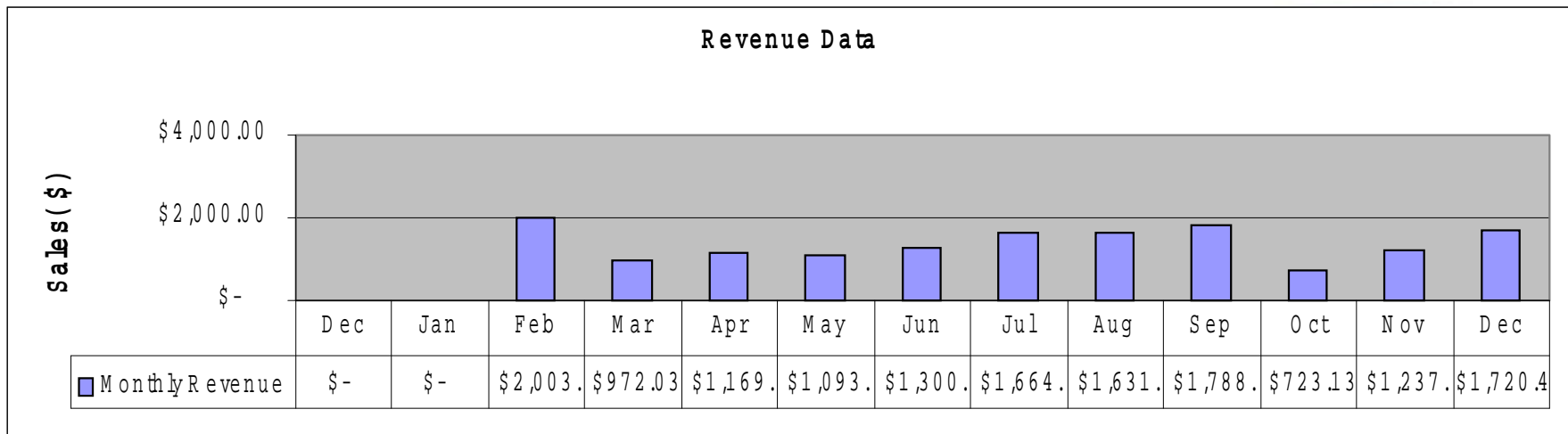
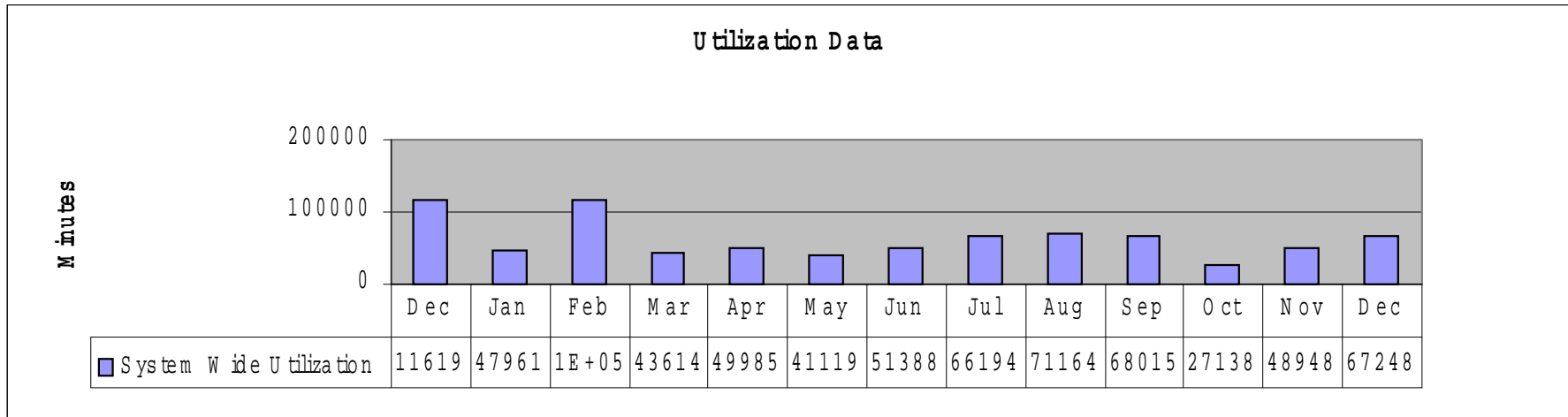
- No operational problems
- Employs Bronx residents
- Real emissions reductions achieved
- Driver acceptance strong

- **Negatives**

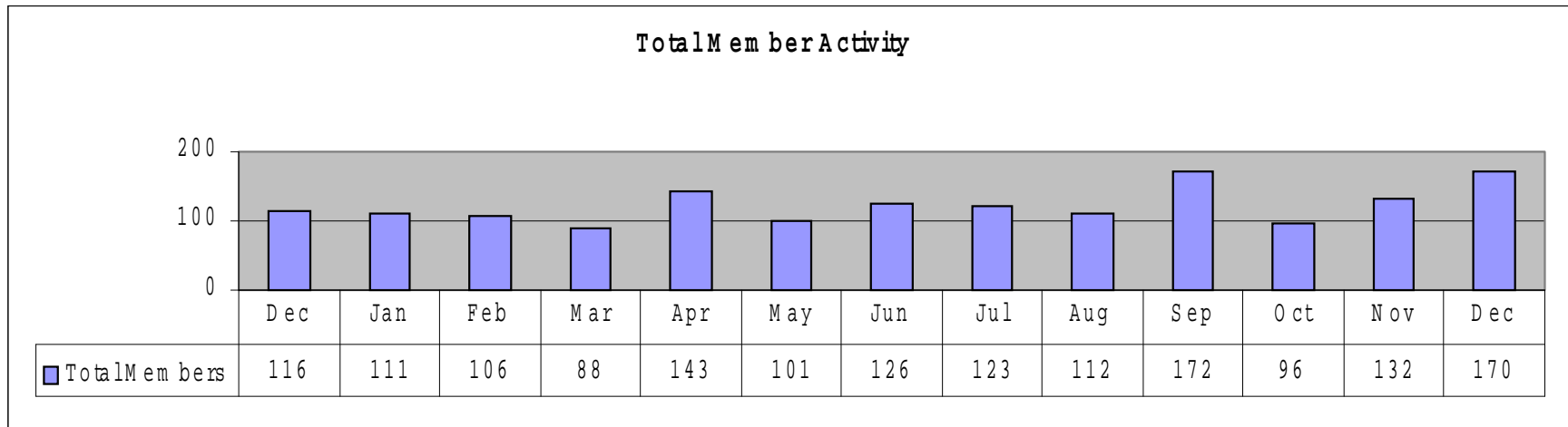
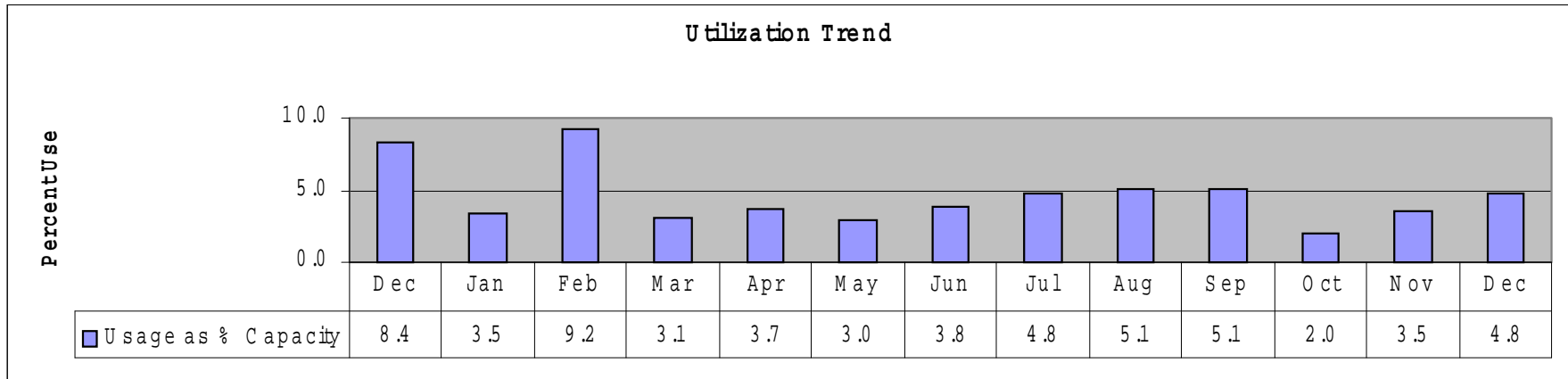
- Low resident truck population within market confines
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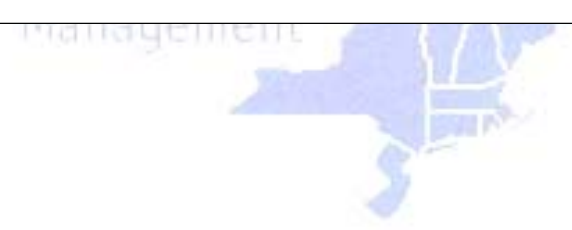
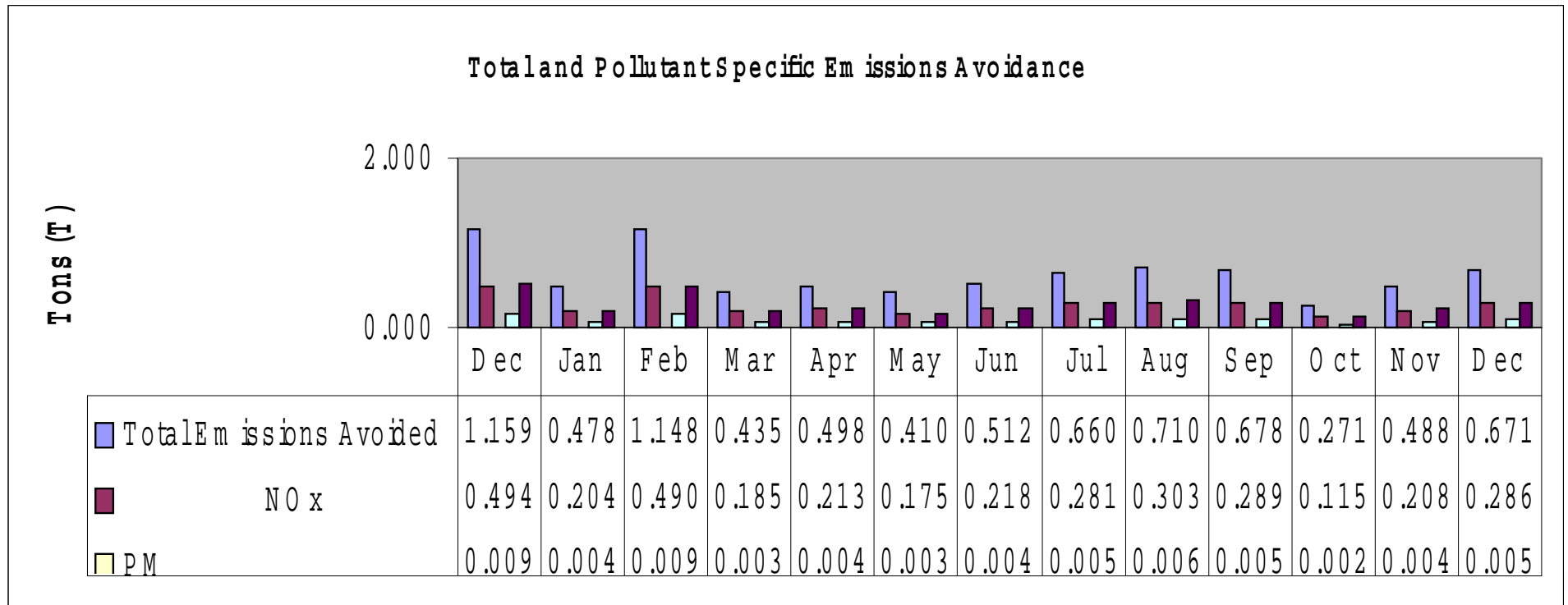
Hunts Point Data Analysis (1)



Hunts Point Data Analysis (2)



Hunts Point Data Analysis (3)



NYSTA - Syracuse, NY

- NESCAUM case study of two TSE locations along I-90 East/West in greater Syracuse, NY area.
- Designed study to characterize spatial and temporal variability of mobile source aerosol using Aethalometers to measure black carbon soot concentrations (light absorption through a quartz filter).
- Truck stop 'signature' not statistically background, a state park maintenance did experience episodic spikes during and lawn mover maintenance.



Syracuse (continued)

- **Antares Group sub-contracted to manage field work, data analysis component for NESCAUM.**
- **Issued driver marketing survey to 212 drivers between July 2002 and January 2003.**
 - 192 of 197 respondents would
 - 138 drivers recorded layovers k hours.
 - Most drivers indicated they idle rpm range.



Paulsboro, NJ

- **NJDEP consent order with NJ violator stipulating \$1.0 M environmentally beneficial project (SEP) using TSE technology.**
- **100 truck parking space electrification. IdleAire, NESCAUM, and NJDEP partners. 2 phase installation starting in May, 2004.**
- **NESCAUM to study environmental economic, operator benefits of web based software application system data. Coordinated education effort.**
- **Sister project (75 spaces) in Bo**



Section III: Overview of NESCAUM I-95 Corridor Analysis

- Assembled NESCAUM Work Group in late 2002 to begin explore ways to expedite TSE implementation along I-95 corridor.
- Developed truck stop evaluation database format using existing demographic, and economic data to analyze, and rank truck stop locations to a set of prescribed selection criteria.



I-95 Corridor Analysis (continued)

Selection criteria:

- Site density
- Usage
- Growth
- Critical Mass
- Public Health Index
- Regulatory Impetus



Criteria Weighting Factors / Sensitivity

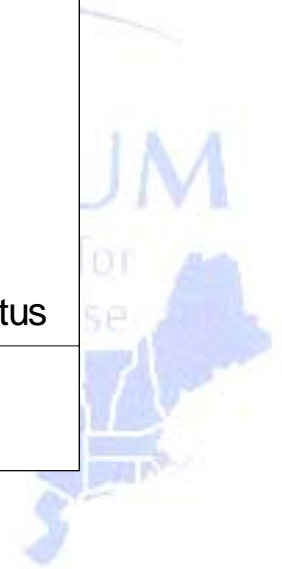
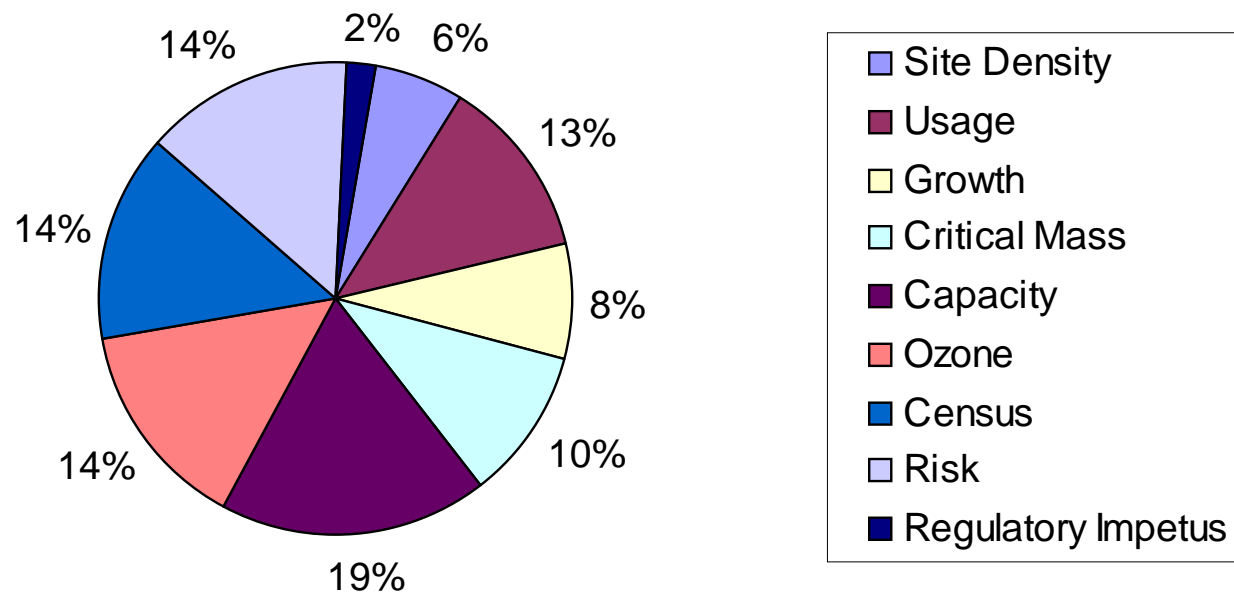
<u>CriteriaName</u>	<u>ScoringRange</u>		<u>%Total</u>
	<u>Mn</u>	<u>Max</u>	
SteDensity	1	3	6.13%
Usage	0.63	6.16	12.58%
Growth	0.5	3.8	7.76%
Critical Mass	0	5	10.21%
Capacity	0	9	18.38%
Ozone	1	7	14.30%
Census	1	7	14.30%
Risk	1	7	14.30%
Regulatory Impetus	0	1	2.04%

**Maximum
Achievable Score= 48.96
(? all categories)**



Criteria Contribution to Overall Truck Stop Ranking

TSE Selection Criteria: Percent contribution to overall ranking, by category



Corridor Analysis (continued)

- The evaluation matrix allows the user to sort any of the criteria specific or ranking and ordering categories (such as Parking capacity, or St



Corridor Analysis (Part II)

- Developed a series of web-based interactive maps that plot each truck stop location with background ozone attainment levels, population density figures, and county utility provider information.
- Truck stop specific evaluation and ranking data is accessible by mouse activating stop symbols on the map series.
- The map series and evaluation n (password protected version) is the NESCAUM web-site.



District of Columbia - Delaware - Maryland

Legend

- City
- Interstate Route
- Counties along I-95

I-95 Truck Stop Parking Capacity

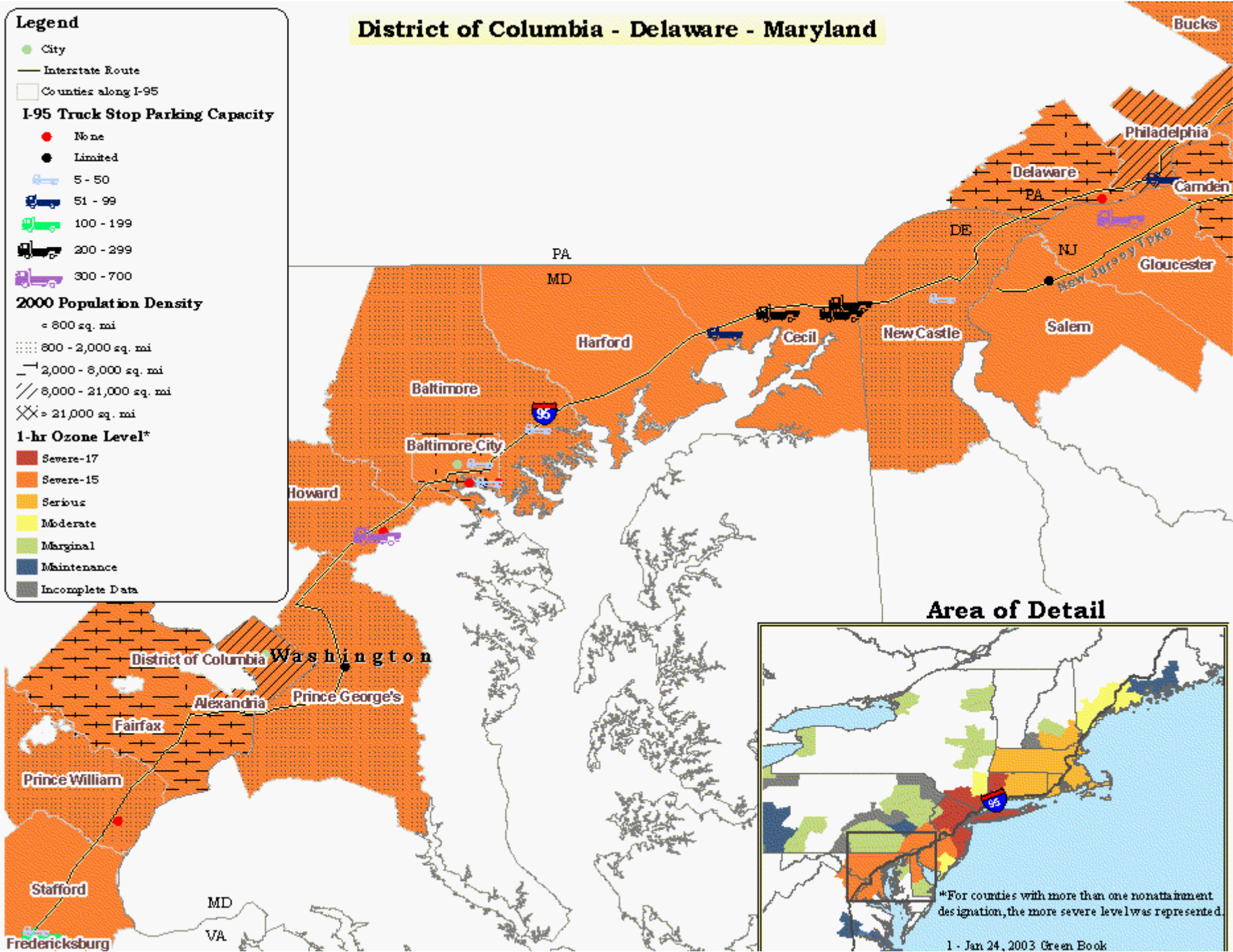
- None
- Limited
- 5 - 50
- 51 - 99
- 100 - 199
- 200 - 299
- 300 - 700

2000 Population Density

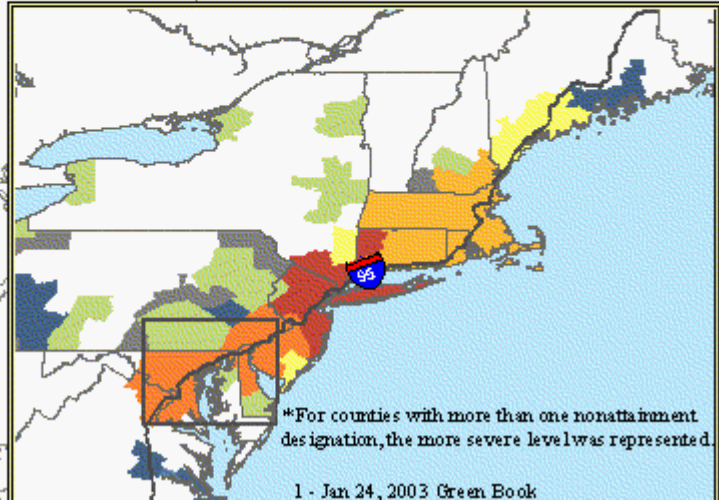
- = 800 sq. mi
- 800 - 2,000 sq. mi
- 2,000 - 8,000 sq. mi
- 8,000 - 21,000 sq. mi
- > 21,000 sq. mi

1-hr Ozone Level*

- Severe-17
- Severe-15
- Serious
- Moderate
- Marginal
- Maintenance
- Incomplete Data



Area of Detail



*For counties with more than one nonattainment designation, the more severe level was represented.

New York - New Jersey - Connecticut

Legend

- City
- Interstate Route
- Counties along I-95

I-95 Truck Stop Parking Capacity

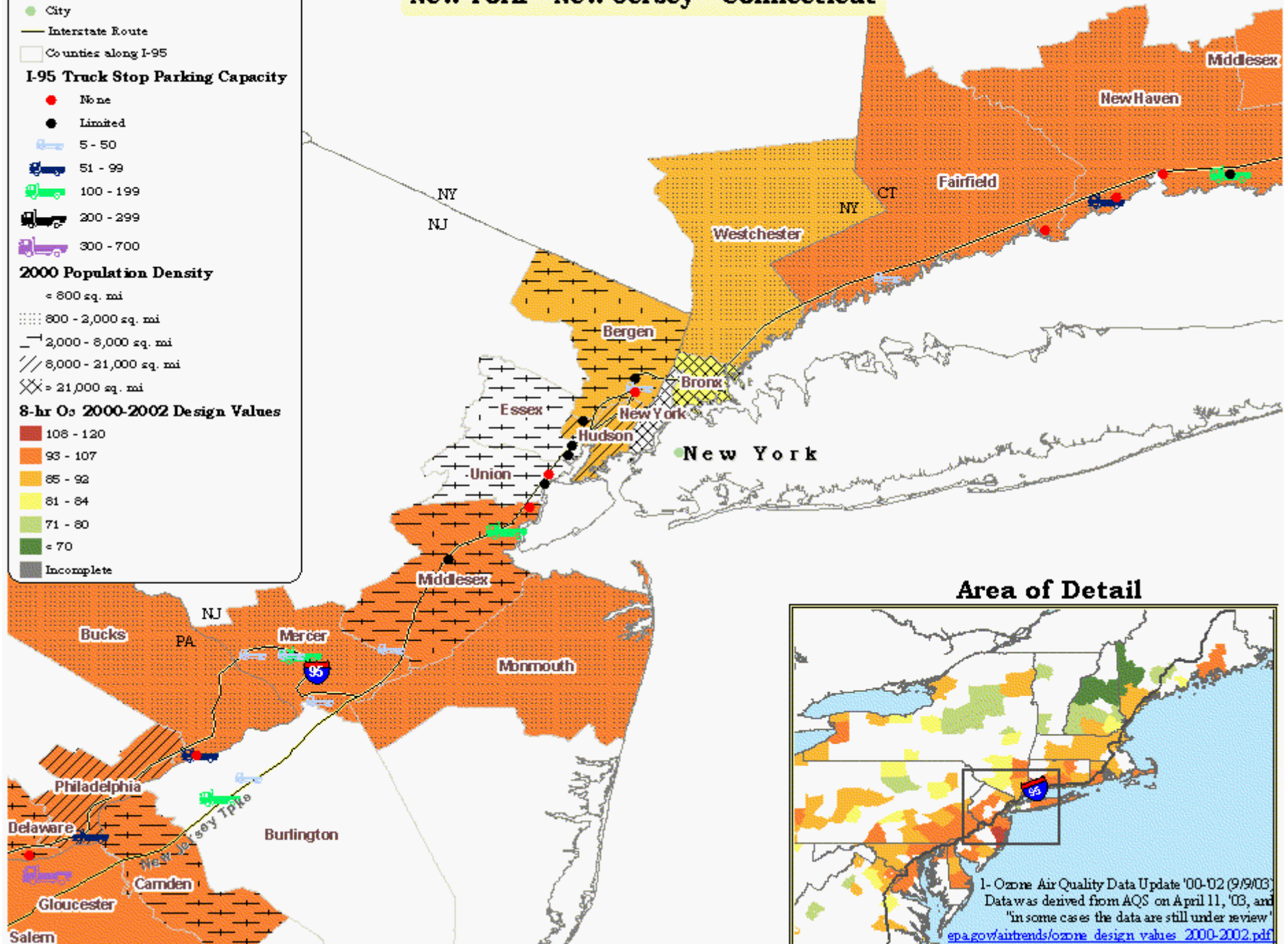
- None
- Limited
- 5 - 50
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- 200 - 299
- 300 - 700

2000 Population Density

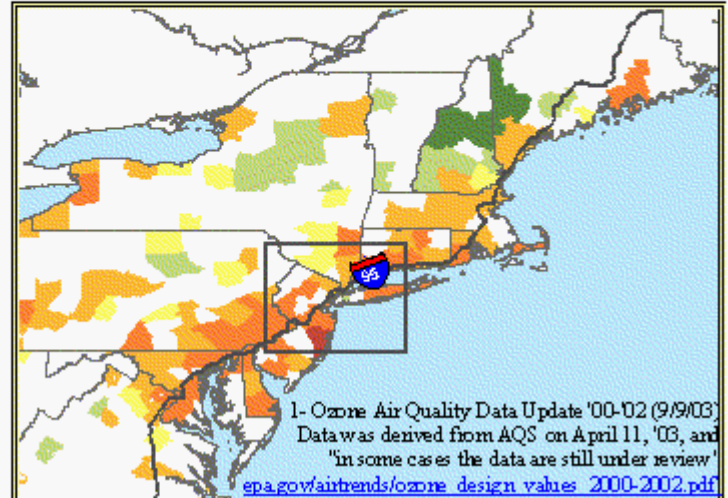
- < 600 sq. mi
- 600 - 2,000 sq. mi
- 2,000 - 8,000 sq. mi
- 8,000 - 21,000 sq. mi
- > 21,000 sq. mi

8-hr O₃ 2000-2002 Design Values

- 108 - 120
- 93 - 107
- 85 - 92
- 81 - 84
- 71 - 80
- < 70
- Incomplete



Area of Detail



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