

Public Hearing: Area Designations for Ozone



*Presentation to the
Colorado Air Quality Control Commission*

February 19, 2009

Revised 8-Hour Ozone NAAQS

- EPA revised the 8-hour national ambient air quality standard for Ozone in March of 2008
- 8-hour standard was made more stringent:
 - From 0.08 ppm to 0.075 ppm
- Effective date: March 12, 2008
- States required to submit recommendations for area designations by March 12, 2009

Topics Addressed at Hearing

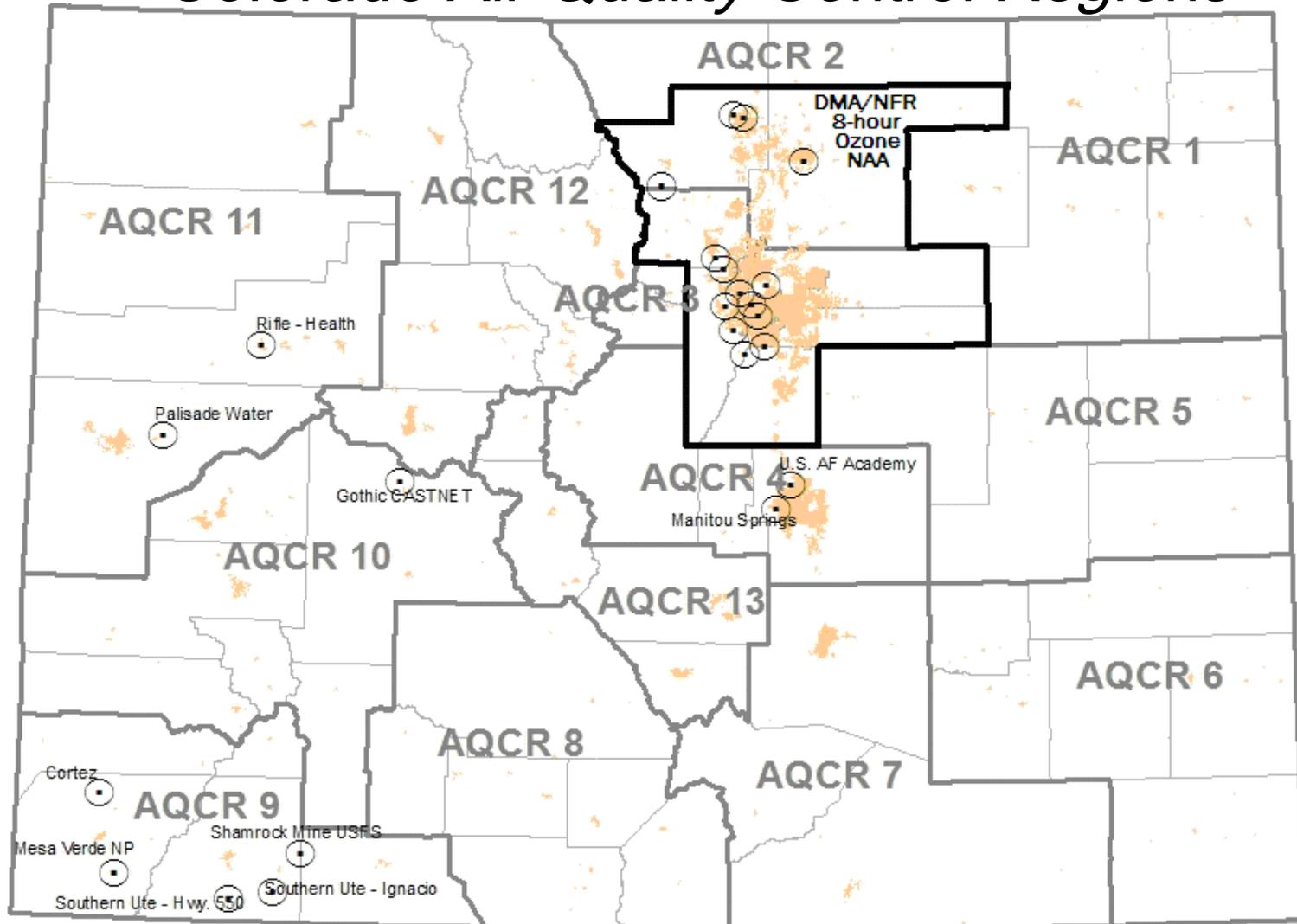
- Statewide Ozone Monitoring Data
- Air Quality Control Regions (AQCR)
- Recommended Ozone Designations for Most of the State
- Recommended Front Range and SW Colorado Designations
 - Discuss new 9-factor analysis for DMA/NFR Non-Attainment Area
 - Review 9-factor analysis for SW Colorado

Ozone Data From Monitors Operated Year-Round in Colorado

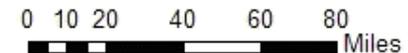
4th Maximum 8-Hour Ozone Values and 3-Year Averages

Site Name	AQS#	2005	2006	2007	2008*	3-Year Average 2005-2007	3-Year Average 2006-2008*	2009 Highest Allowable 4th Max.
		[ppm]	[ppm]	[ppm]	[ppm]	[ppm]	[ppm]	[ppm]
CDPHE-APCD Sites								
Welby	08-001-3001	0.073	0.069	0.070	0.076	0.070	0.071	0.081
Highland	08-005-0002	0.080	0.081	0.075	n/a	0.078	n/a	n/a
S. Boulder Ck.	08-013-0011	0.076	0.082	0.085	0.076	0.081	0.081	0.066
CAMP	08-031-0002	0.051	0.062	0.057	n/a	0.056	n/a	n/a
Carriage	08-031-0014	0.074	0.072	0.076	0.072	0.074	0.073	0.079
Denver Animal	08-031-0025	n/a	n/a	n/a	0.070	n/a	n/a	n/a
Chatfield Park	08-035-0004	0.084	0.086	0.082	0.080	0.084	0.082	0.065
Co. Spg.-Acad.	08-041-0013	0.077	0.072	0.072	0.070	0.073	0.071	0.085
Manitou Spgs.	08-041-0016	0.075	0.076	0.072	0.072	0.074	0.073	0.083
Rifle	08-045-0012	n/a	n/a	n/a	0.066	n/a	n/a	n/a
Arvada	08-059-0002	0.078	0.082	0.079	0.074	0.079	0.078	0.074
Welch	05-059-0005	0.064	0.081	0.080	0.073	0.075	0.078	0.074
Rocky Flats - N	08-059-0006	0.077	0.090	0.090	0.079	0.085	0.086	0.058
NREL	08-059-0011	0.079	0.083	0.085	0.076	0.082	0.081	0.066
Ft. Collins - West	08-069-0011	n/a	0.087	0.085	0.076	n/a	0.082	0.066
Ft. Collins - CSU	08-069-1004	0.076	0.078	0.069	0.066	0.074	0.071	0.092
Palisade	08-077-0020	n/a	n/a	n/a	0.070	n/a	n/a	n/a
Cortez	08-083-0006	n/a	n/a	n/a	0.064	n/a	n/a	n/a
Weld Co. Twr.	08-123-0009	0.078	0.082	0.074	0.073	0.078	0.076	0.080
Other Agency Sites								
Gothic	08-051-????	0.069	0.070	0.065	0.066	0.068	0.067	0.096
SUIT - Ignacio	08-067-7001	n/a	n/a	n/a	0.067	n/a	n/a	n/a
SUIT - Hwy. 550	08-067-7003	0.066	0.063	0.071	0.067	0.066	0.067	0.089
USFS - Shamrock	08-067-????	0.075	0.074	0.069	0.069	0.072	0.070	0.089
Rocky Mtn. NP	08-069-0007	0.075	0.076	0.078	0.076	0.076	0.076	0.073
Mesa Verde NP	08-083-0101	0.076	0.074	0.070	0.069	0.073	0.071	0.088
Notes:		3-year averages above the 0.075 ppm Ozone NAAQS						
		Ozone monitors located in the existing 9-County Ozone Non-Attainment Area						
		* Data values through October 2008						

Colorado Air Quality Control Regions



Legend



Recommended AQCR Designations

COUNTY	AQCR	Recommended Designations for revised 8-Hour Ozone NAAQS
WELD (Southern Portion)	NAA	Non-Attainment
LARIMER (Southern Portion)	NAA	Non-Attainment
ADAMS	NAA	Non-Attainment
JEFFERSON	NAA	Non-Attainment
DENVER	NAA	Non-Attainment
BOULDER	NAA	Non-Attainment
ARAPAHOE	NAA	Non-Attainment
DOUGLAS	NAA	Non-Attainment
BROOMFIELD	NAA	Non-Attainment
MORGAN	1	Attainment/Unclassifiable
LOGAN	1	Attainment/Unclassifiable
YUMA	1	Attainment/Unclassifiable
WASHINGTON	1	Attainment/Unclassifiable
SEDGWICK	1	Attainment/Unclassifiable
PHILLIPS	1	Attainment/Unclassifiable
WELD (Northern Portion)	2	Attainment/Unclassifiable
LARIMER (Northern Portion)	2	Attainment/Unclassifiable
CLEAR CREEK	3	Attainment/Unclassifiable
GILPIN	3	Attainment/Unclassifiable
EL PASO	4	Attainment/Unclassifiable
TELLER	4	Attainment/Unclassifiable
PARK	4	Attainment/Unclassifiable
ELBERT	5	Attainment/Unclassifiable
CHEYENNE	5	Attainment/Unclassifiable
KIT CARSON	5	Attainment/Unclassifiable
LINCOLN	5	Attainment/Unclassifiable
PROWERS	6	Attainment/Unclassifiable
BACA	6	Attainment/Unclassifiable
OTERO	6	Attainment/Unclassifiable
BENT	6	Attainment/Unclassifiable
KIOWA	6	Attainment/Unclassifiable
CROWLEY	6	Attainment/Unclassifiable

COUNTY	AQCR	Recommended Designations for revised 8-Hour Ozone NAAQS
PUEBLO	7	Attainment/Unclassifiable
LAS ANIMAS	7	Attainment/Unclassifiable
HUERFANO	7	Attainment/Unclassifiable
COSTILLA	8	Attainment/Unclassifiable
CONEJOS	8	Attainment/Unclassifiable
RIO GRANDE	8	Attainment/Unclassifiable
MINERAL	8	Attainment/Unclassifiable
ALAMOSA	8	Attainment/Unclassifiable
SAGUACHE	8	Attainment/Unclassifiable
LA PLATA (excluding Tribal lands)	9	Attainment/Unclassifiable
MONTEZUMA (excluding Tribal lands)	9	Attainment/Unclassifiable
ARCHULETA (excluding Tribal lands)	9	Attainment/Unclassifiable
SAN JUAN	9	Attainment/Unclassifiable
DOLORES	9	Attainment/Unclassifiable
MONTROSE	10	Attainment/Unclassifiable
DELTA	10	Attainment/Unclassifiable
SAN MIGUEL	10	Attainment/Unclassifiable
GUNNISON	10	Attainment/Unclassifiable
OURAY	10	Attainment/Unclassifiable
HINSDALE	10	Attainment/Unclassifiable
GARFIELD	11	Attainment/Unclassifiable
MOFFAT	11	Attainment/Unclassifiable
MESA	11	Attainment/Unclassifiable
RIO BLANCO	11	Attainment/Unclassifiable
ROUTT	12	Attainment/Unclassifiable
EAGLE	12	Attainment/Unclassifiable
SUMMIT	12	Attainment/Unclassifiable
GRAND	12	Attainment/Unclassifiable
PITKIN	12	Attainment/Unclassifiable
JACKSON	12	Attainment/Unclassifiable
FREMONT	13	Attainment/Unclassifiable
CHAFFEE	13	Attainment/Unclassifiable
LAKE	13	Attainment/Unclassifiable
CUSTER	13	Attainment/Unclassifiable

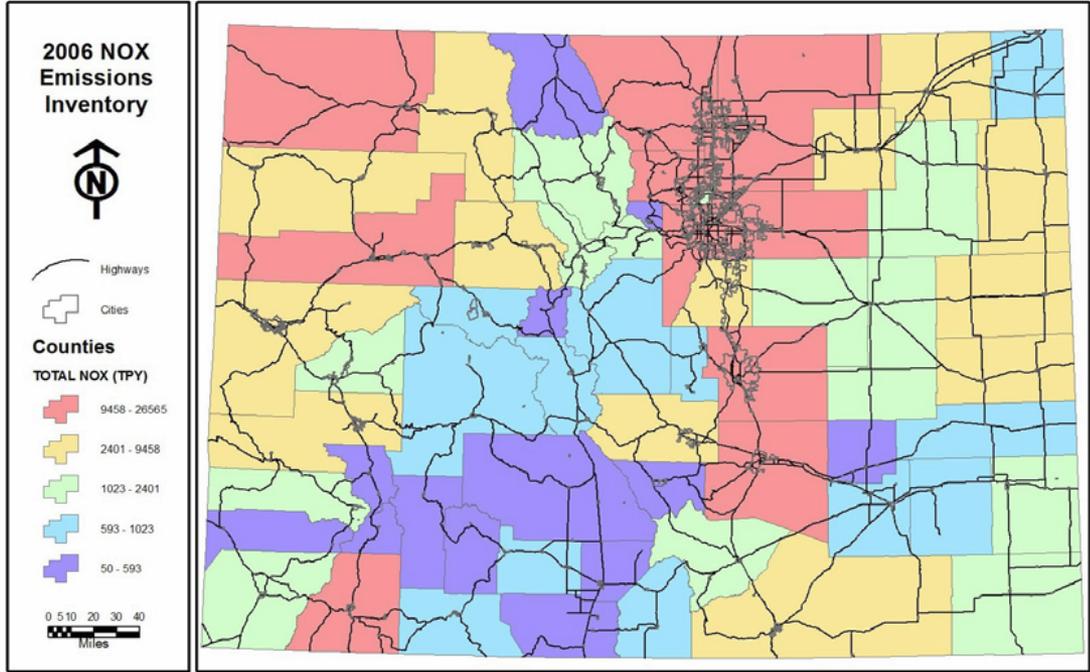
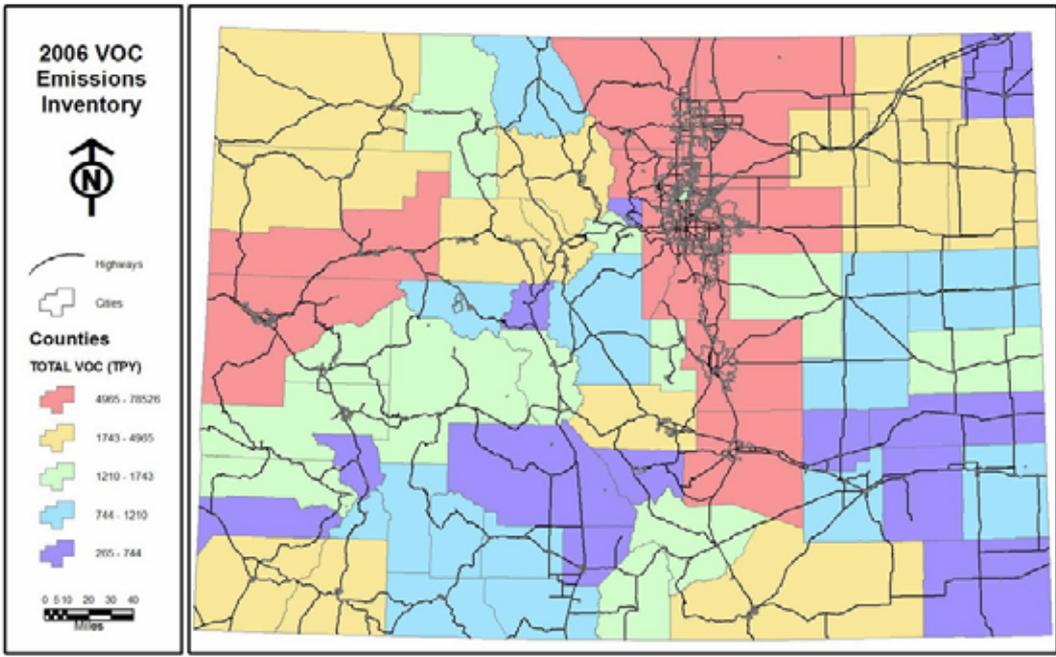
Basis for Recommendations for Most of the State

- Most of the State should be designated as attainment/unclassifiable due to:
 - Monitoring data which indicates attainment
 - AQCR 4 (Colorado Springs region)
 - AQCR 9 (SW Colorado)
 - AQCR 11 (NW Colorado);
 - Lower emission levels that are anticipated to not jeopardize the standard
 - AQCRs 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13; and/or
 - Lower population density that does not generate emissions that jeopardize the standard
 - AQCRs 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13.

Basis for Recommendations for Most of the State

- Comparative approach
 - Monitoring indicates attainment in AQCR 4, which contains the Colorado Springs region:
 - It is presumed that other AQCRs lacking monitoring with equivalent or fewer emissions and human activities should similarly trend below the 8-hour standard
 - Example for AQCR 1:

COUNTY	AQCR	Population [July 2007]	Total 2006 NOx [tpy]	Total 2006 VOC [tpy]	Total Precursors	Precursor Rank
LOGAN	1	21,879	2,956	2,586	5,543	23
MORGAN	1	28,573	7,794	2,270	10,065	17
PHILLIPS	1	4,601	618	265	884	60
SEDGWICK	1	2,509	876	276	1,153	54
WASHINGTON	1	4,833	2,078	4,965	7,043	20
YUMA	1	9,973	4,935	4,909	9,844	18
		72,368	19,258	15,273	34,531	
<i>Percent of El Paso County:</i>		12%			76%	



Front Range and SW Colorado Recommendations

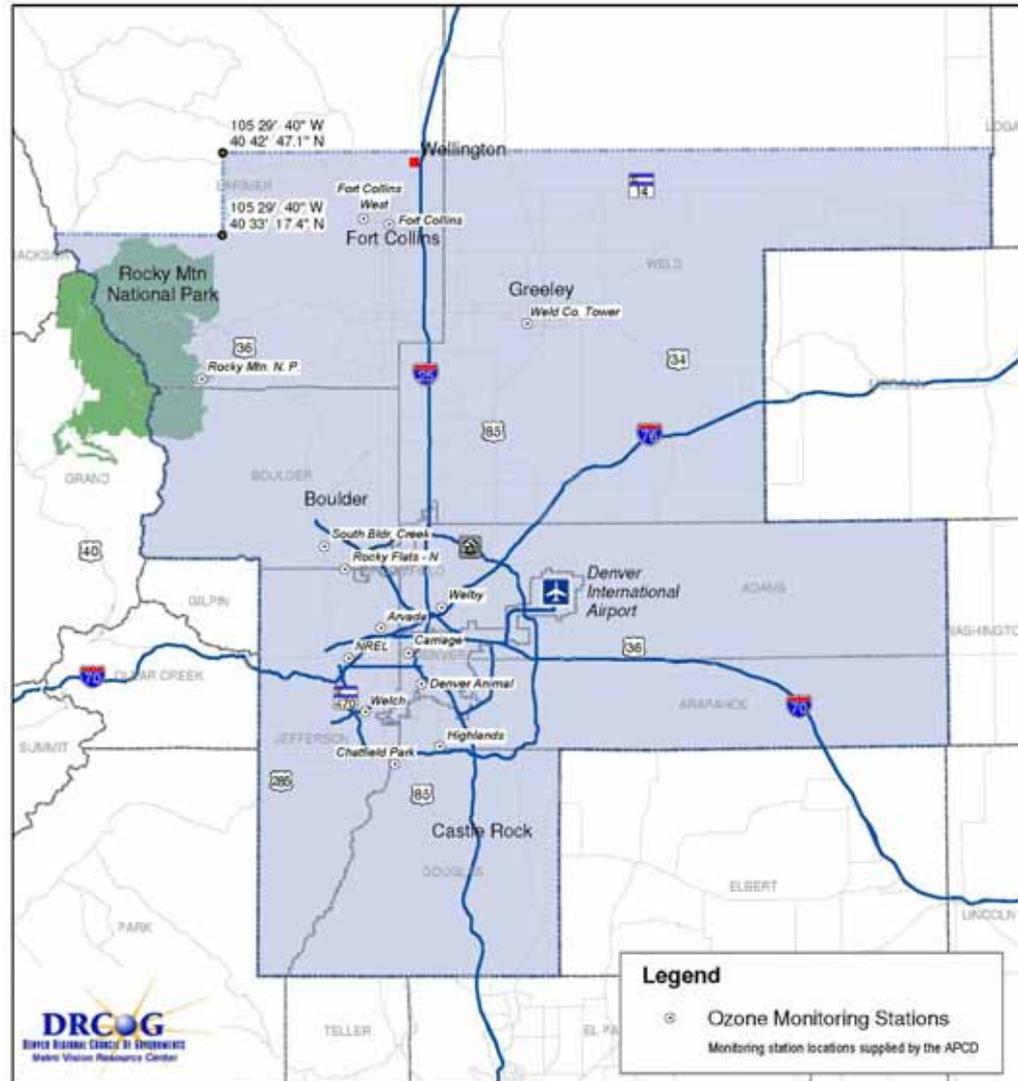
- Front Range Region:
 - EPA indicated that a 9-factor analysis for DMA/NFR NAA would be needed to demonstrate whether the existing boundary is appropriate for the revised ozone standard
 - Revised TSD includes a 9-factor analysis for the DMA/NFR NAA – supports the existing boundary
- SW Colorado
 - A 9-factor analysis was prepared for southwestern Colorado which demonstrates that the region should be designated as attainment/unclassifiable

9-Factors Considered in Making Non-Attainment Recommendations

Although EPA formalized the 9-factors in recent guidance, the Division has used the below factors in past NAA evaluations

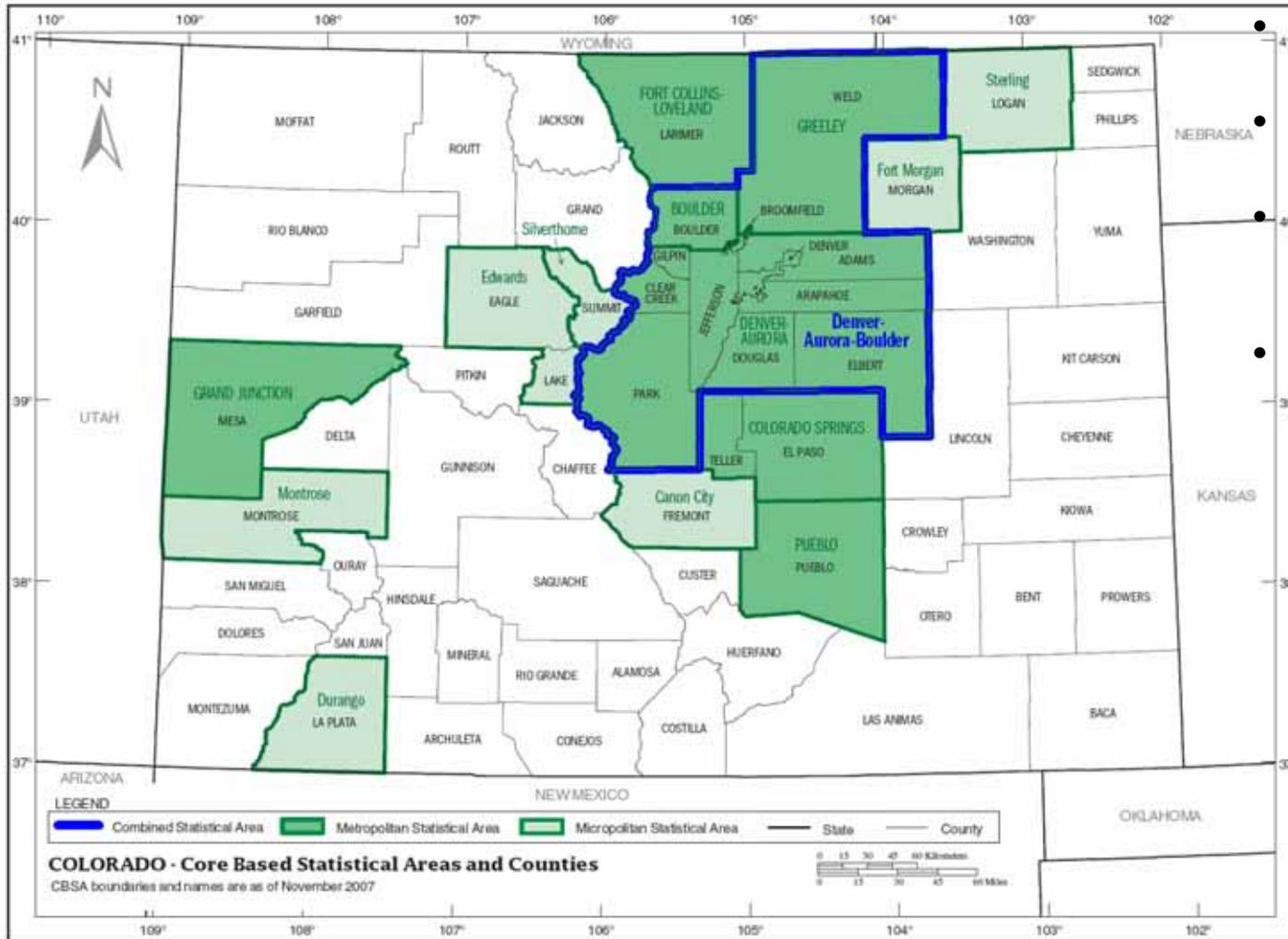
- Air quality data
- Emissions data
- Population density and degree of urbanization
- Traffic and commuting patterns
- Growth rates and patterns
- Meteorology
- Geography/topography
- Jurisdictional boundaries
- Level of control of emission sources

9-Factor Analysis for Nine-County Non-Attainment Area



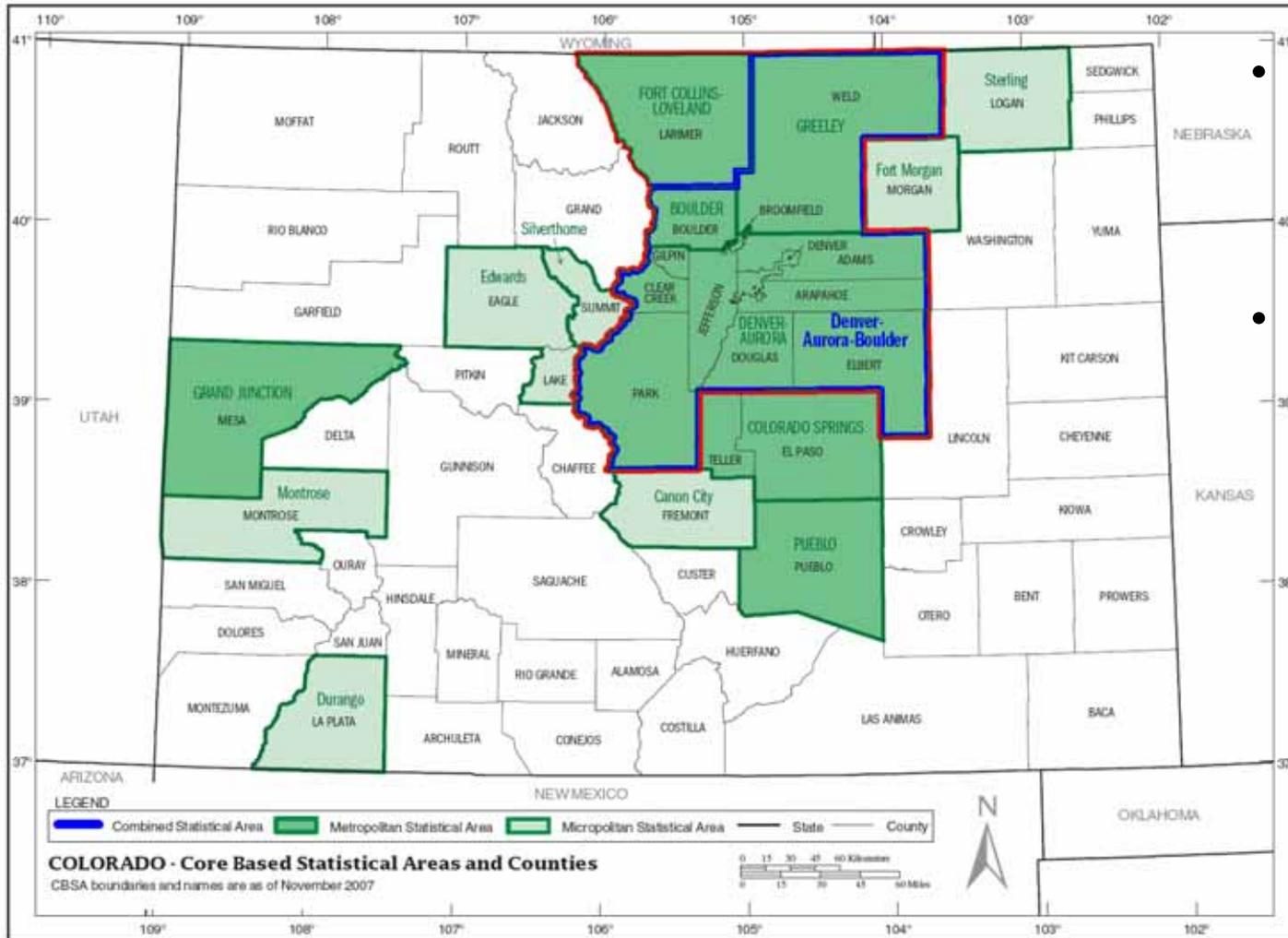
Denver-Boulder-Greeley-Fort Collins, Colorado
Eight-Hour Ozone Control Area

US Census Bureau 2007 Core Based Statistical Areas



- CBSAs are based on population
- Metropolitan – >50,000 people
- Micropolitan – >10,000 but <50,000 people
- Combined Statistical Area (CSA) boundary (in blue)
 - Consolidates CBSAs that have high degree of social and economic integration with the core as measured by commuting ties

EPA Starting Point for Evaluating 8-hour NAA Boundary



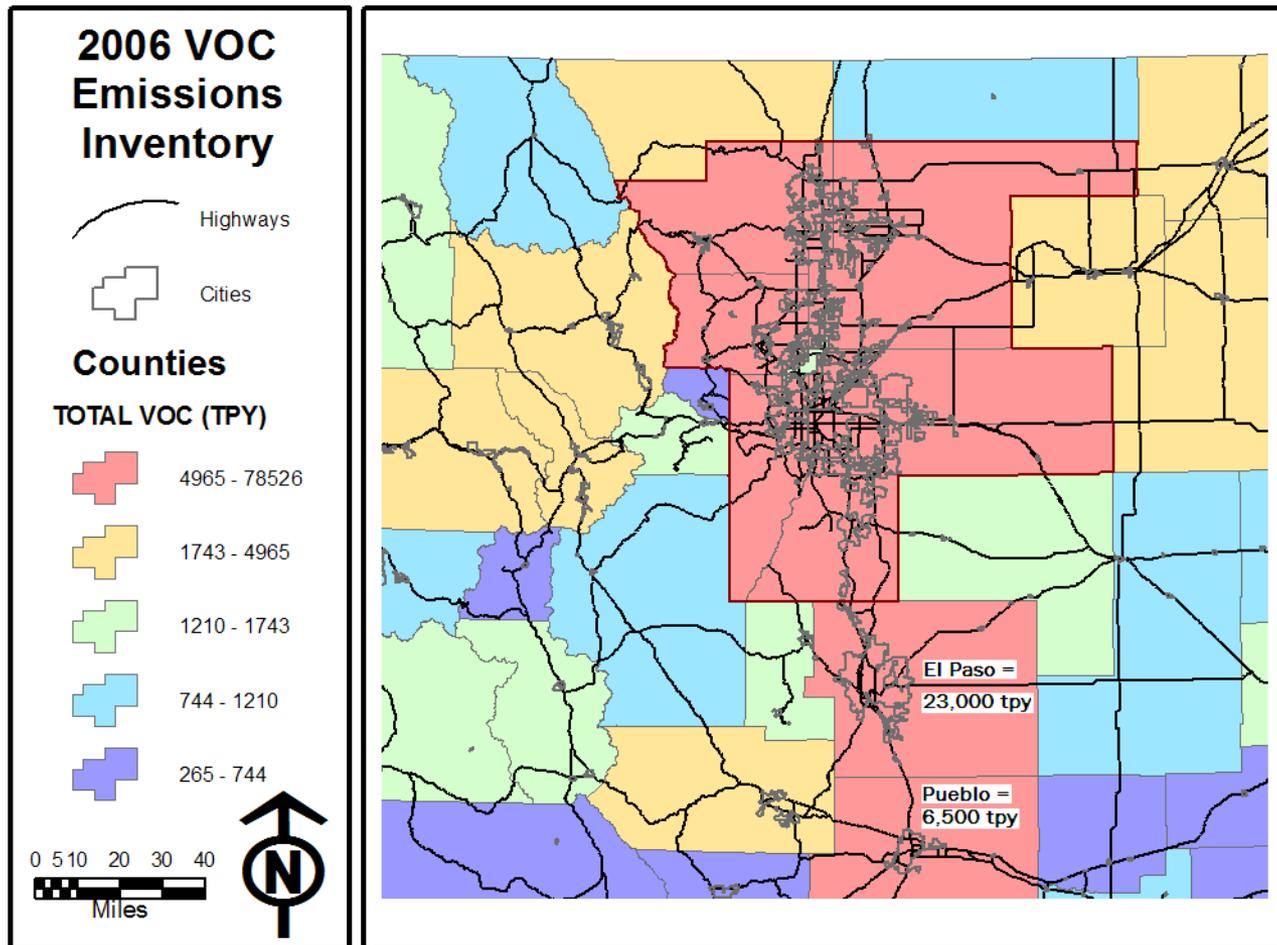
- 8-hour NAA (highlighted in red) suggested by EPA Guidance
- Two CBSAs have violating monitors that serve as the starting point for evaluating the NAA boundary
 - FTCW monitor in Larimer Co.
 - Number of monitors in Denver Metro Area

Air Quality Data

- Monitoring data supports the recommended nonattainment designation for the current 8-hour ozone nonattainment area.

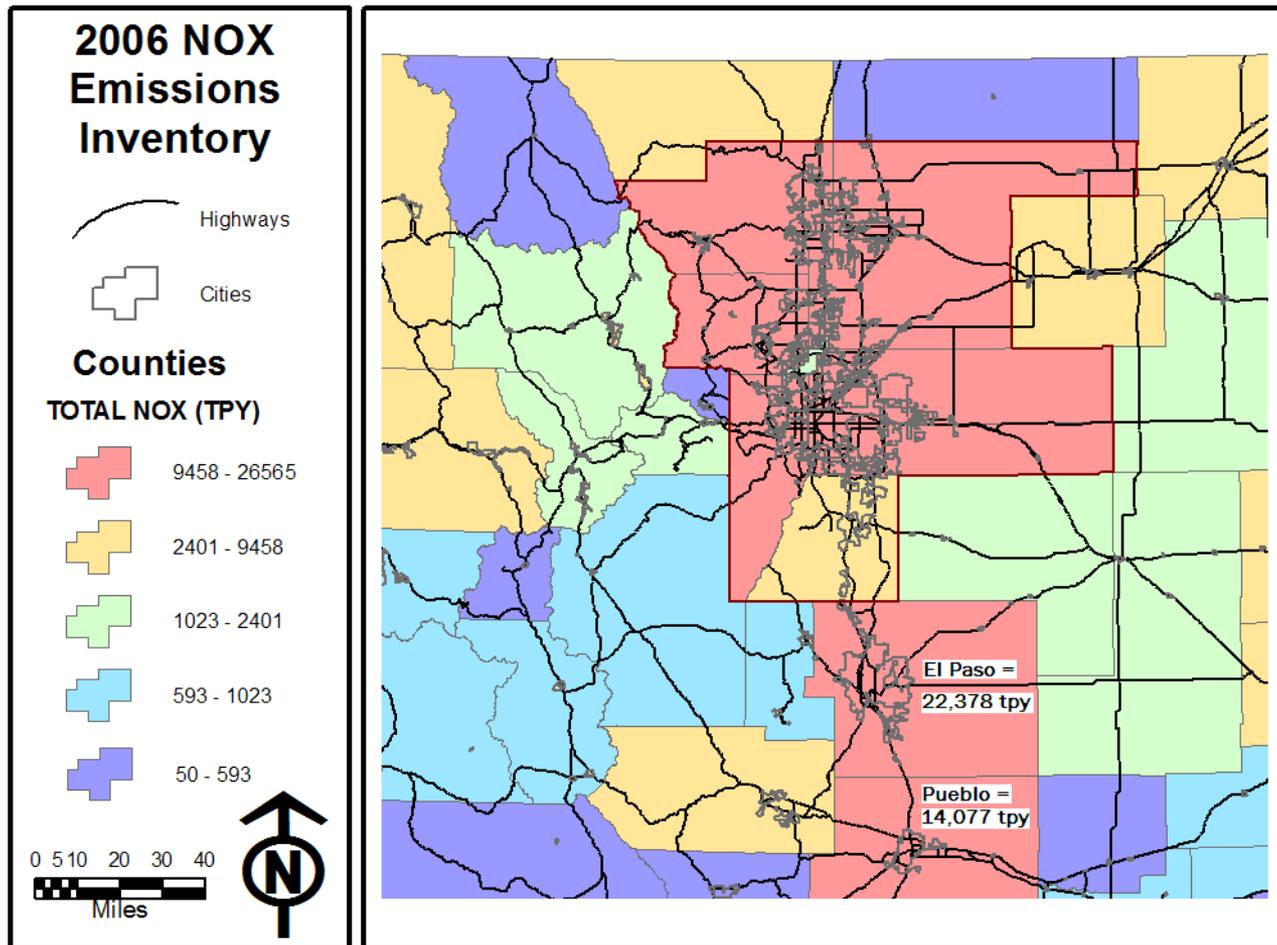
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Other Agency Sites								
Rocky Mtn. NP	08-069-0007	0.075	0.076	0.078	0.076	0.076	0.076	0.073
Notes:		3-year averages above the 0.075 ppm Ozone NAAQS						
		Ozone monitors located in the existing 9-County Ozone Non-Attainment Area						
		* Data values through October 2008						

Ozone Precursor Emissions Data



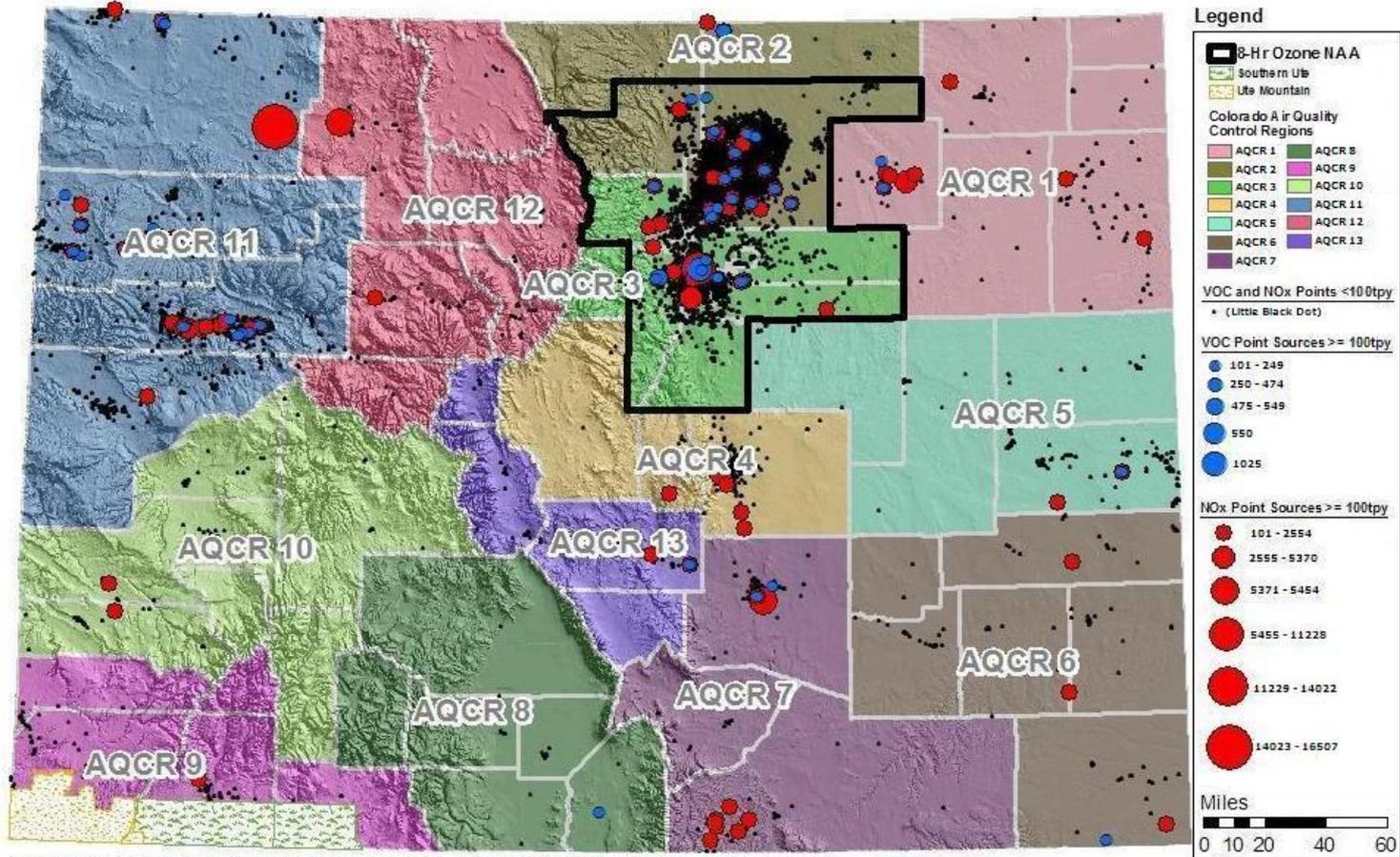
- VOC emissions outside of the current 8-hour ozone NAA
 - Substantially less than the emissions within the current NAA boundary
 - Supports the recommended boundary that is consistent with the current 8-hour ozone NAA

Ozone Precursor Emissions Data



- NOx emissions outside of the current 8-hour ozone NAA
 - Substantially less than the emissions within the current NAA boundary
 - Supports the recommended boundary that is consistent with the current 8-hour ozone NAA

VOC and NOx Stationary Point Sources - Colorado - 2008

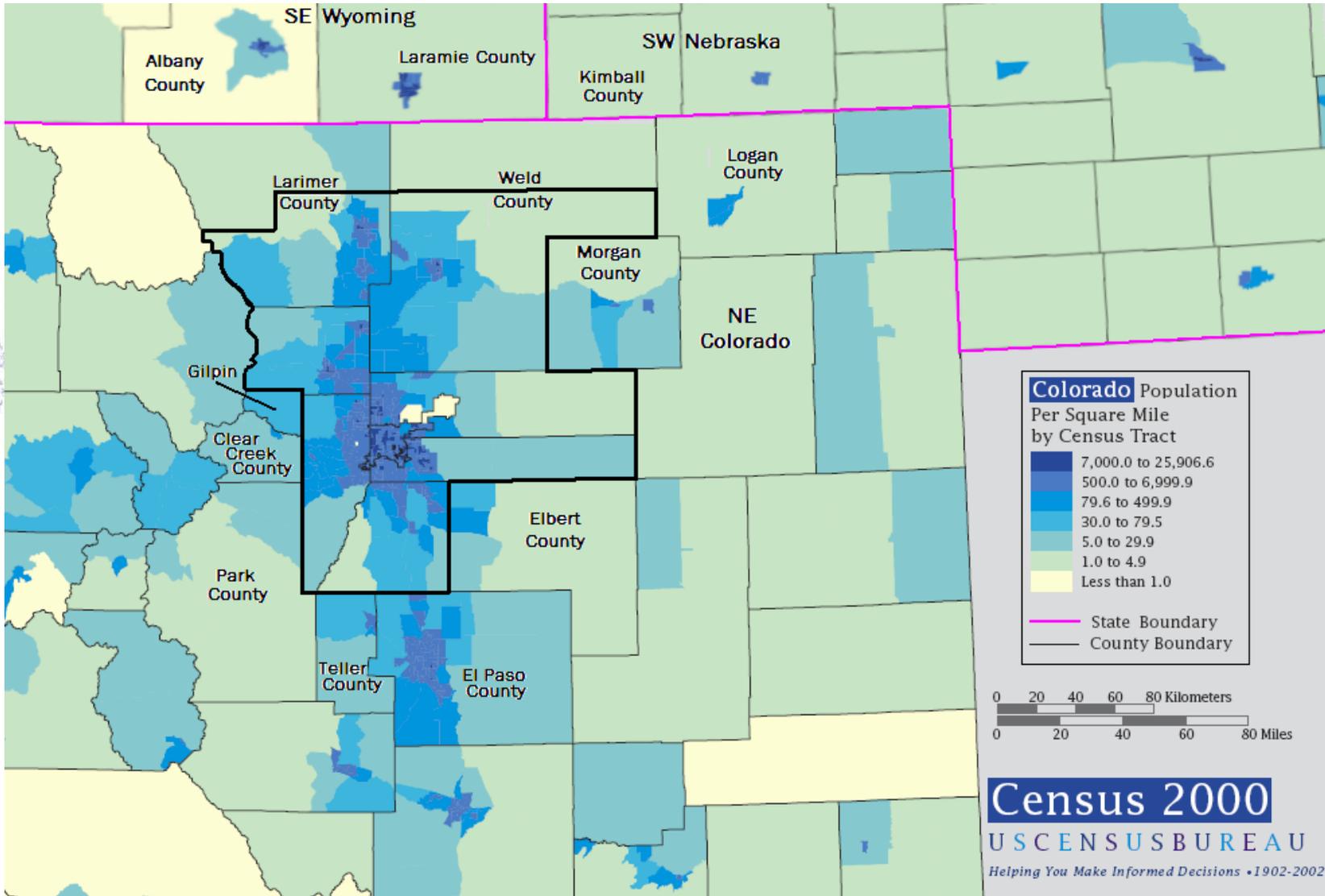


Colorado Department of Public Health and Environment - Air Pollution Control Division - February 2009

Population Density, Degree of Urbanization, Growth Rates and Patterns

- The region's population density/degree of urbanization information illustrates that the urbanization is concentrated within the current 8-hour ozone NAA boundaries.
- The vast majority of increased population and urbanization will occur within the current 8-hour ozone NAA boundary.
- Urbanization rapidly diminishes beyond the central portion of the current NAA.
- Population in the surrounding counties is low by comparison, and the human landscape is rural with small pockets of development.
- The population/urbanization information supports the recommended nonattainment designation for the current 8-hour ozone nonattainment area.

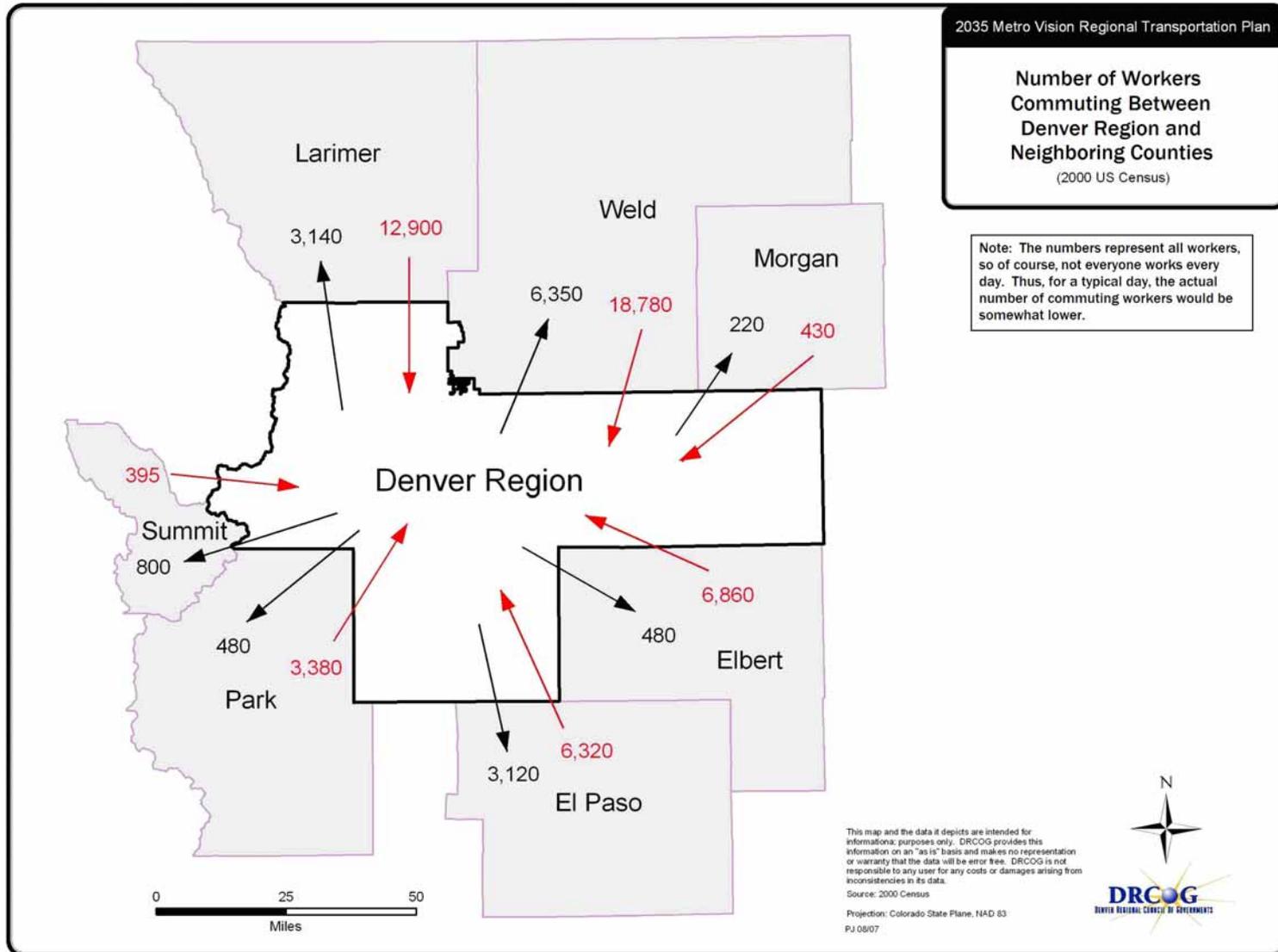
NE Colorado Population Density



Traffic and Commuting Patterns

- The region's traffic and commuting patterns illustrate that vast majority of vehicle trips occur within the current 8-hour ozone NAA boundary.
- Average daily traffic rapidly diminishes beyond the core area of the current NAA.
- Commuting information also indicates that work trips into the region are minimal when compared to traffic volumes that exist in the recommended NAA.
- Vehicular traffic in the surrounding counties is low by comparison.
- The traffic and commuting information supports the recommended nonattainment designation for the current 8-hour ozone nonattainment area.

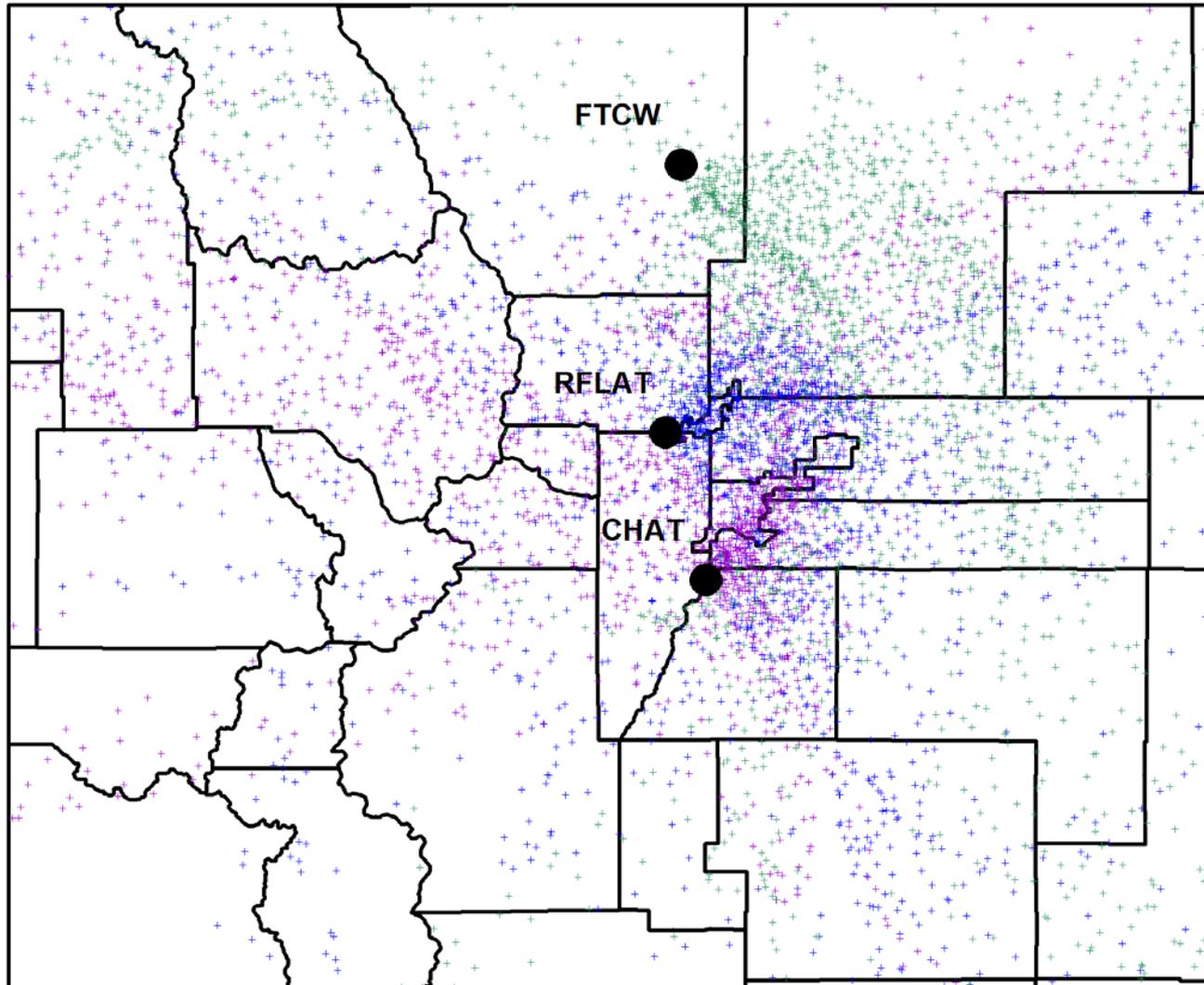
Number of Workers Commuting



Meteorology Geography/Topography

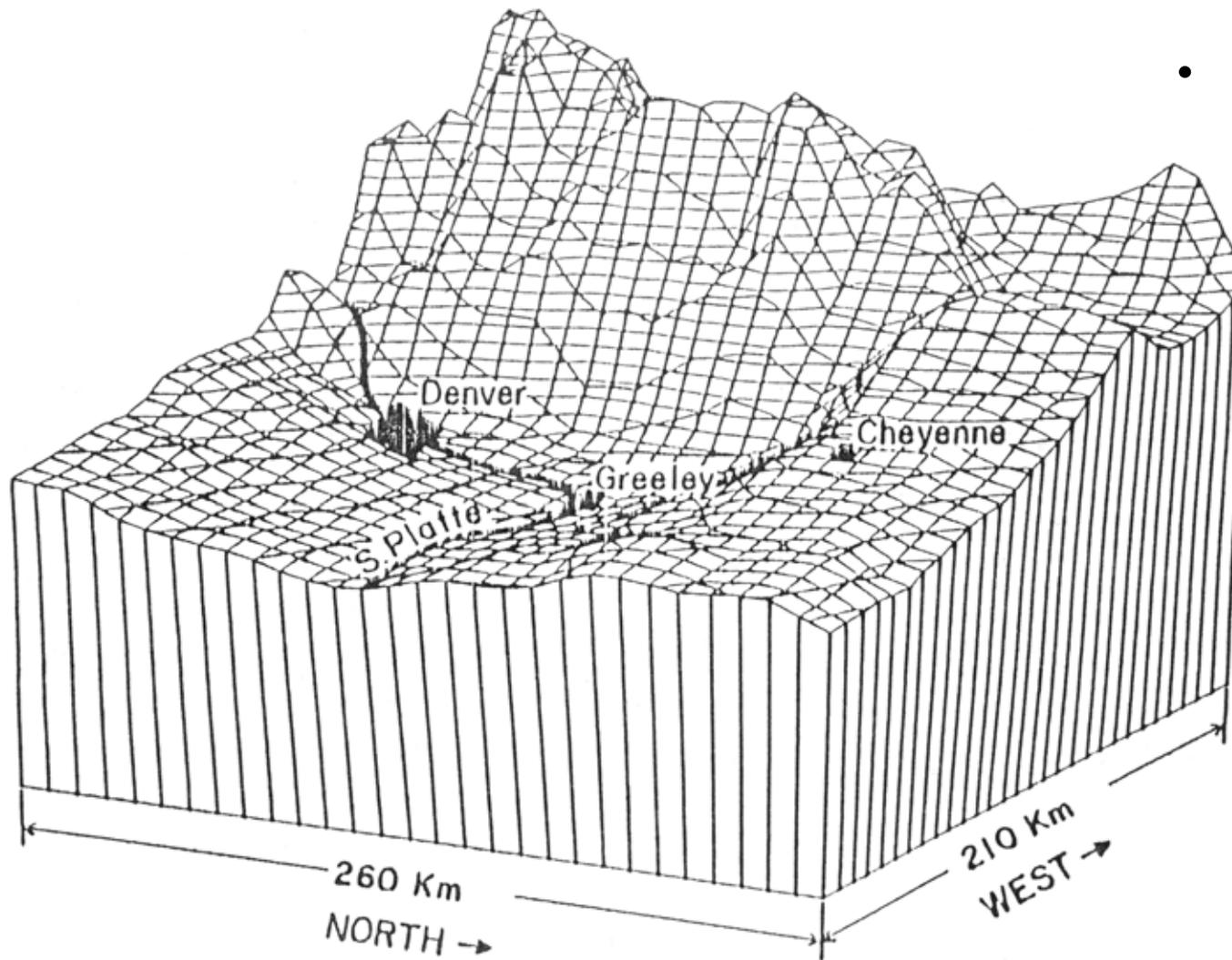
- The Division has thoroughly evaluated the region's meteorology over the years and has concluded that the airshed for the region is encompassed by the current 8-hour NAA.
- Upslope flow from the lower elevation regions through the urbanized and industrialized regions of the air shed dominates on high ozone days.
- The region's east-facing open bowl topography and meteorological information indicates that the current 8-hour ozone NAA boundary is appropriate for the recommended ozone NAA.

Back Trajectories for Maximum Ozone Concentration Days



- 24-hour back trajectory points for each hour in each 8-hour period for 12 max ozone days in years 2006-2008
- Fort Collins West
- Green +
- Rocky Flats
- Blue +
- Chatfield
- Purple +
- Trajectories indicate that high ozone meteorology predominantly transports emissions generated within the NAA

Topography of Denver Basin



- East facing open bowl topography that is bounded by:
 - Cheyenne Ridge to the North
 - Mountains to the West
 - Palmer Divide to the South

Level of Emissions Control

State Control Measures

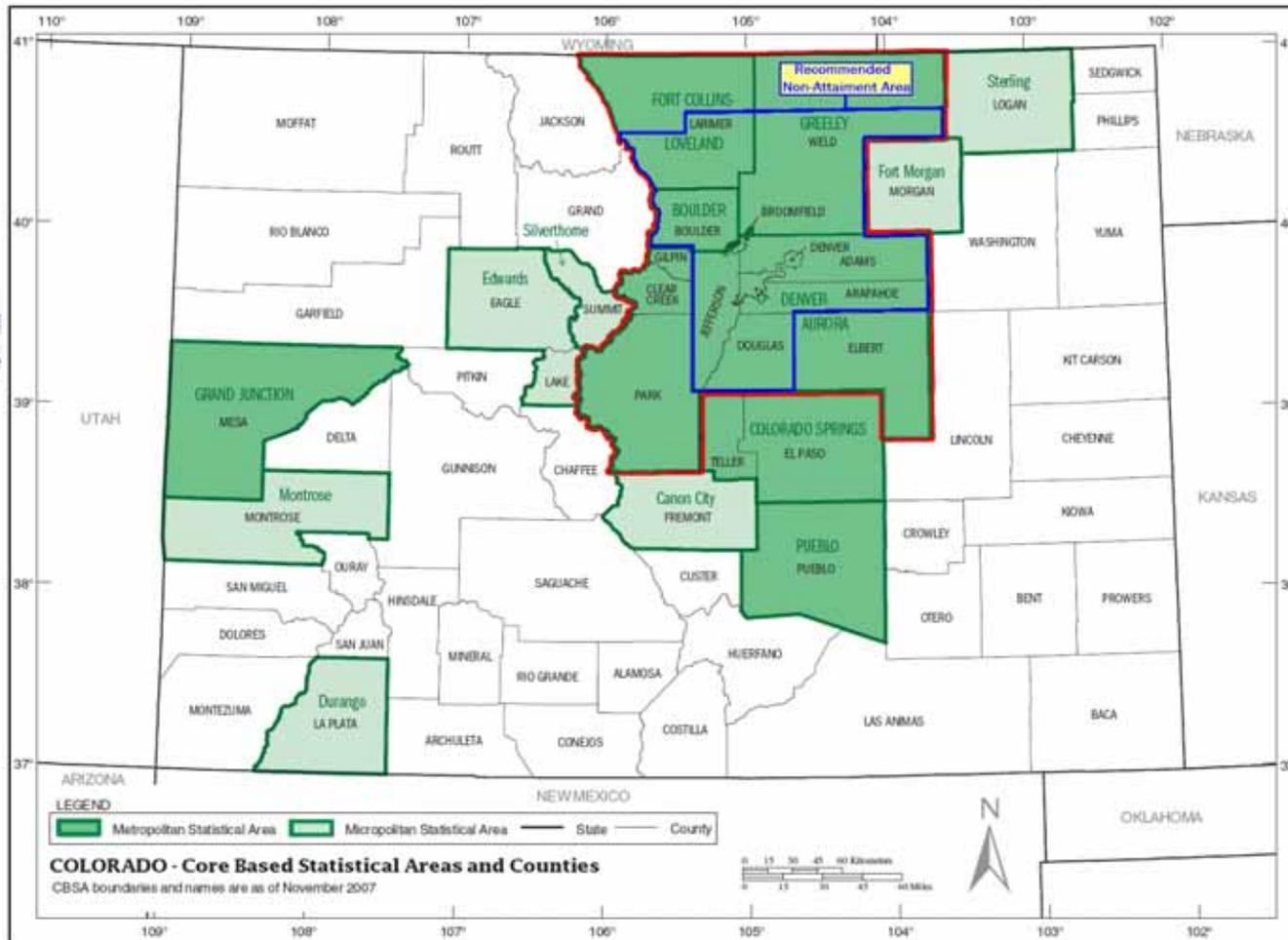
- o Recent Ozone Implementation Plan (NO_x, VOC)
 - o Tank Controls
 - o Pneumatic controls
 - o O&G engine controls
- o Recent Oil & Gas Conservation Commission Rulemaking (VOC)
- o Gasoline-fueled vehicle I/M (CO, NO_x, VOC)
- o State permitting requirements - NSPS, RACT/BACT/MACT & PSD (NO_x, VOC)
- o BART regulations (NO_x)
- o Repair your air program (NO_x, VOC)
- o Summertime low RVP gasoline (VOC)
- o Energy portfolio standards (NO_x)
- o State tax credits for hybrids/alternative fuels use (NO_x, VOC)
- o Comanche, Arapaho, Cameo reductions (NO_x)

Federal Control Measures

- o Off-road engine standards (NO_x)
- o Diesel-fueled engine standards - TIER I, II & III (NO_x)
- o Gasoline-fueled engine standards -TIER I & II (NO_x)
- o Small engine standards (NO_x)
- o Alternative fuels programs (NO_x, VOC)
- o Federal tax credits for hybrids & alternative fuels use (NO_x, VOC)
- o NO_x SIP Call (NO_x)
- o CAIR program ? (NO_x)

These measures should greatly assist in further progress towards eventual attainment of the 2008 8-hour ozone standard.

Recommended 8-hour NAA Boundary Using the 9-Factors

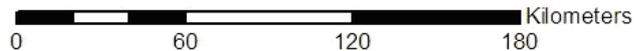
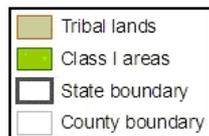
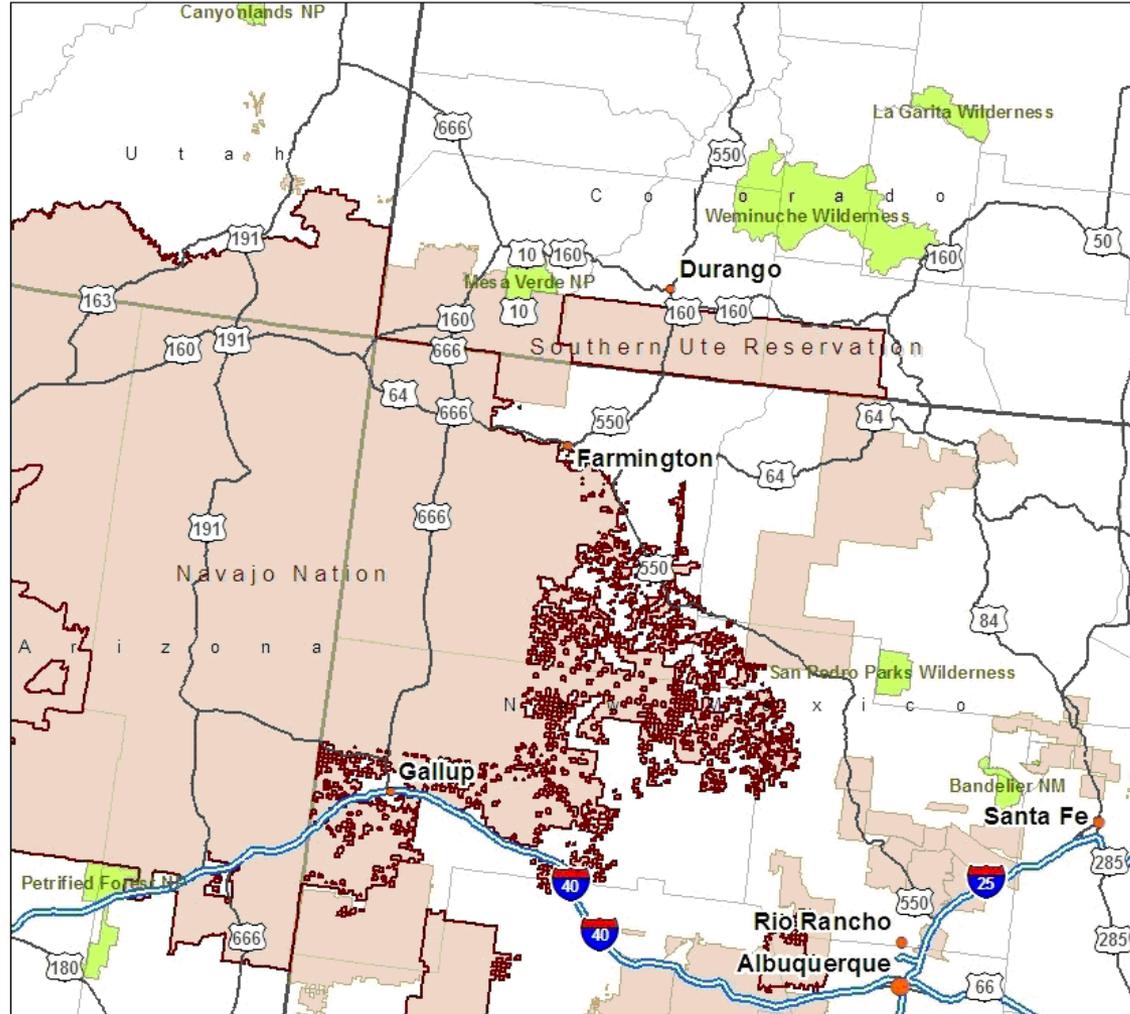


- Counties excluded from the starting point for evaluating the NAA boundary
 - Gilpin
 - Clear Creek
 - Park
 - Elbert
 - Northern portions of Larimer & Weld

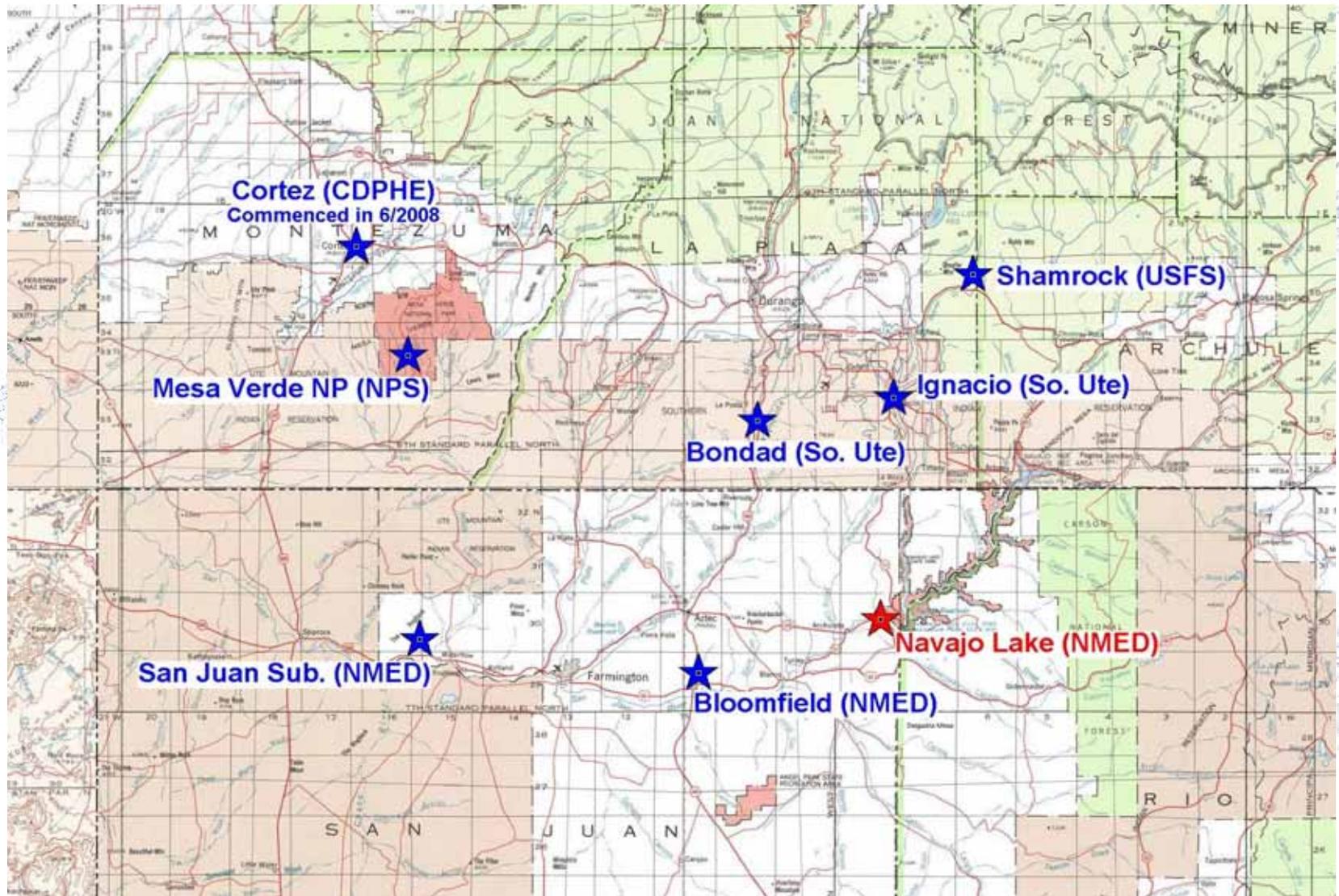
Basis for Excluding Selected Counties

- Gilpin County (Central City)
 - Population small (~5,200) or 34 people/sq mile
 - Very low precursor emissions (~461 tpy NOx & 309 tpy VOC)
 - Passive ozone monitoring in 2007 indicated lower ozone levels
- Clear Creek County (Idaho Springs – Georgetown)
 - Population small (~9,400) or 24 people/sq mile
 - Low precursor emissions (~1,768 tpy NOx & 1,448 tpy VOC)
 - Passive ozone monitoring in 2007 indicated lower ozone levels
- Park County (Fairplay – Bailey)
 - Population small (~17,000) or 8 people/sq mile
 - Low precursor emissions (~670 tpy NOx & 1,210 tpy VOC)
- Elbert County (Elizabeth – Kiowa)
 - Population small (~23,100) or 12 people/sq mile
 - Low precursor emissions (~1,439 tpy NOx & 1,291 tpy VOC)
- Northern Portion of Larimer County (Virginia Dale – Livermore)
 - Population small (~13,836) or 9 people/sq mile
 - Low precursor emissions (~2,936 tpy NOx & 2,968 tpy VOC)
- Northern Portion of Weld County (Rockport – Grover)
 - Population small (~2,934) or 2 people/ sq mile
 - Low precursor emissions (~279 tpy NOx & 864 tpy VOC)

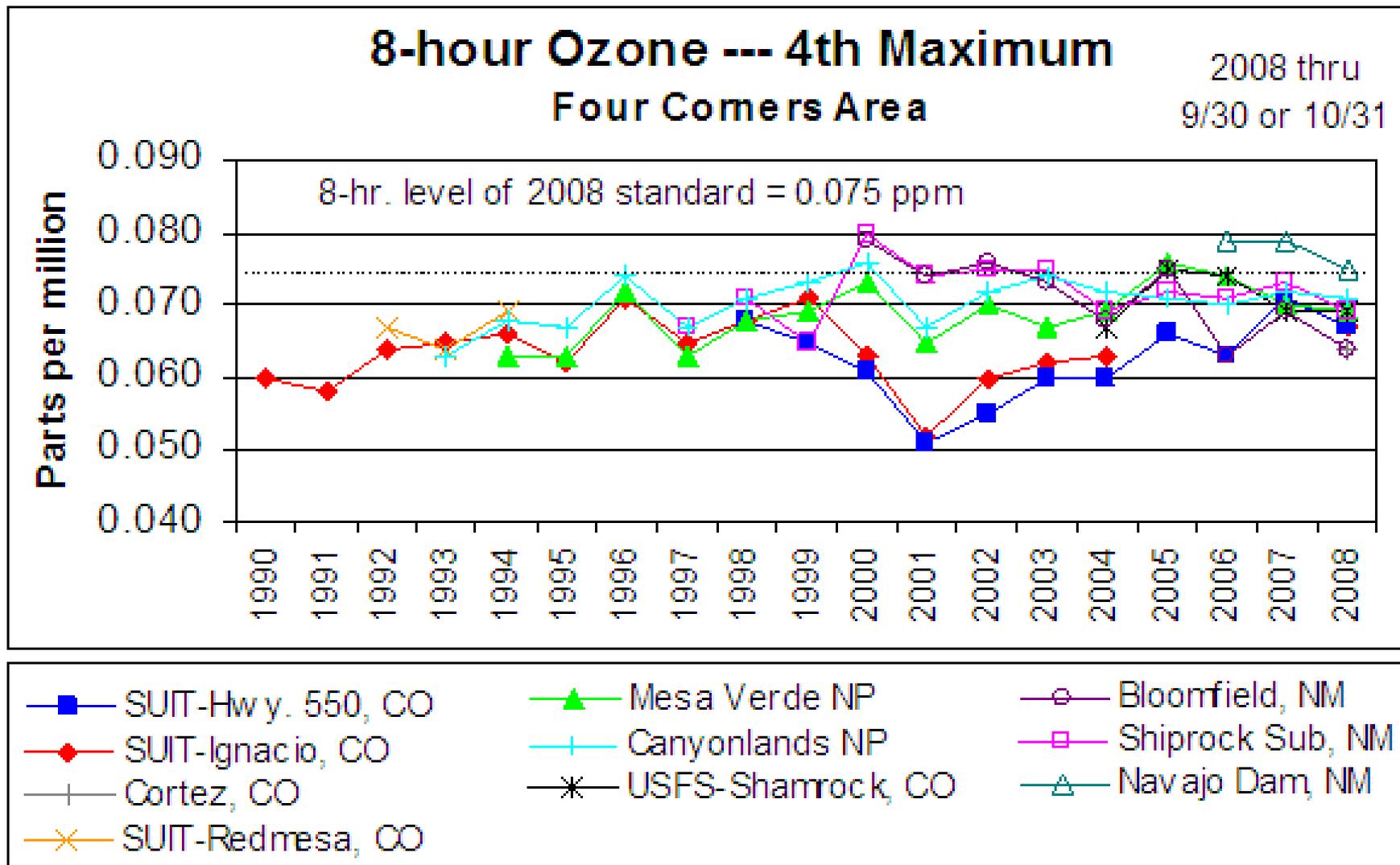
9-Factor Analysis for SW Colorado



Ozone Monitoring Sites



Ozone Monitoring Data



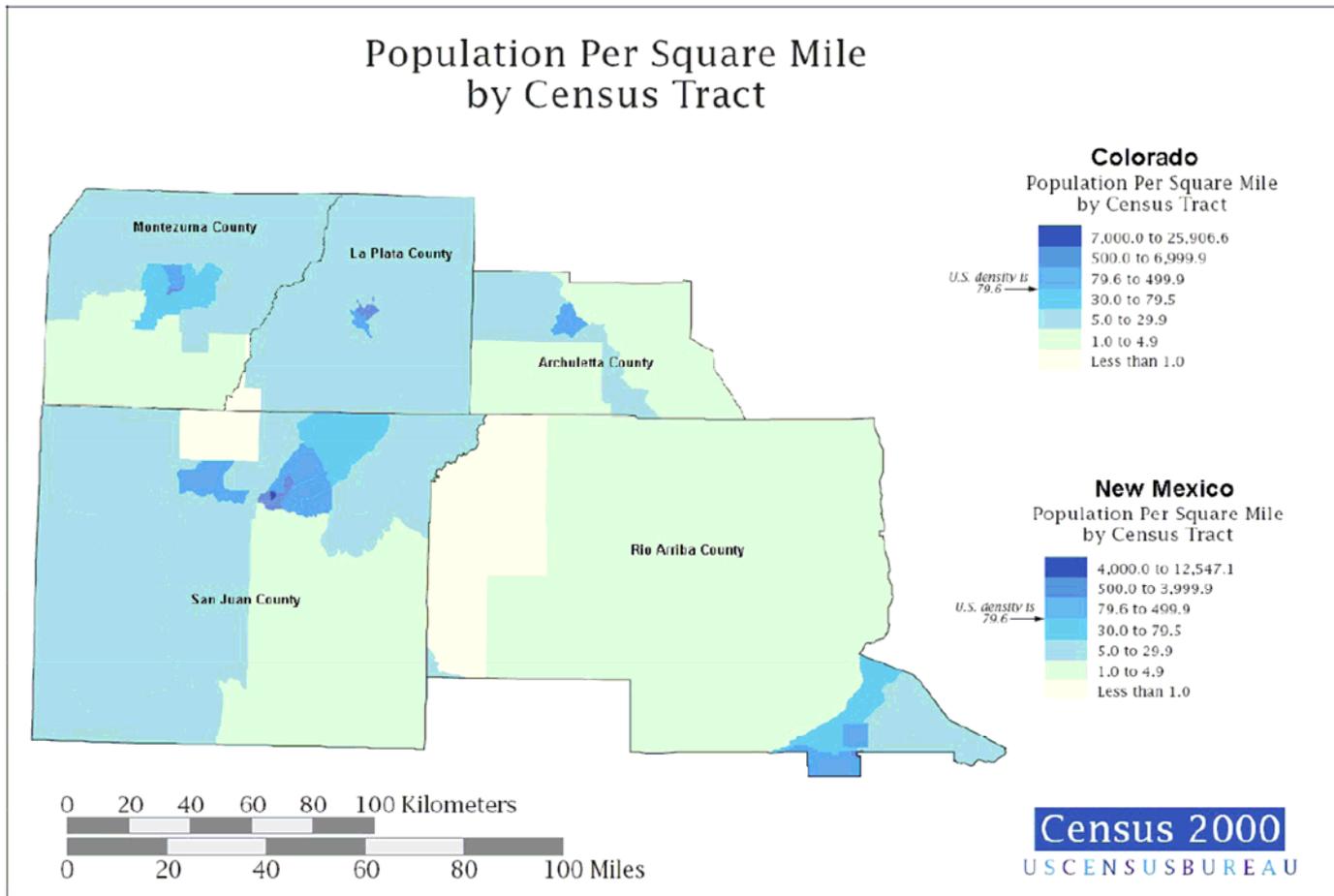
Ozone Monitoring Data

4 th Maximum 8-Hour Ozone Values and 3-Year Averages							
Site Name	AQS#	Year				3-Year Average 2005-2007 (ppm)	3-Year Average 2006-2008* (ppm)
		2005 (ppm)	2006 (ppm)	2007 (ppm)	2008 (ppm)		
Southern Ute Tribe - Ignacio	08-067-7001	(Void)	(Void)	(Void)	0.067	n/a	n/a
Southern Ute Tribe - Hwy. 550 / Bondad	08-067-7003	0.066	0.063	0.071	0.067	0.066	0.067
Mesa Verde Nat'l Park	08-083-0101	0.076	0.074	0.070	0.069	0.073	0.071
Cortez	08-083-0006	---	---	---	0.064	n/a	n/a
USFS - Shamrock Mine	08-067-????	0.075	0.074	0.069	0.069	0.072	0.070
NM - Shiprock Substation	35-045-1005	0.072	0.071	0.073	0.069	0.072	0.071
NM - Bloomfield	35-045-0009	0.075	0.063	0.069	0.064	0.069	0.065
NM - Navajo Lake	35-045-0018	---	0.079	0.079	0.075	n/a	0.077

* Note: Data are through October 2008.

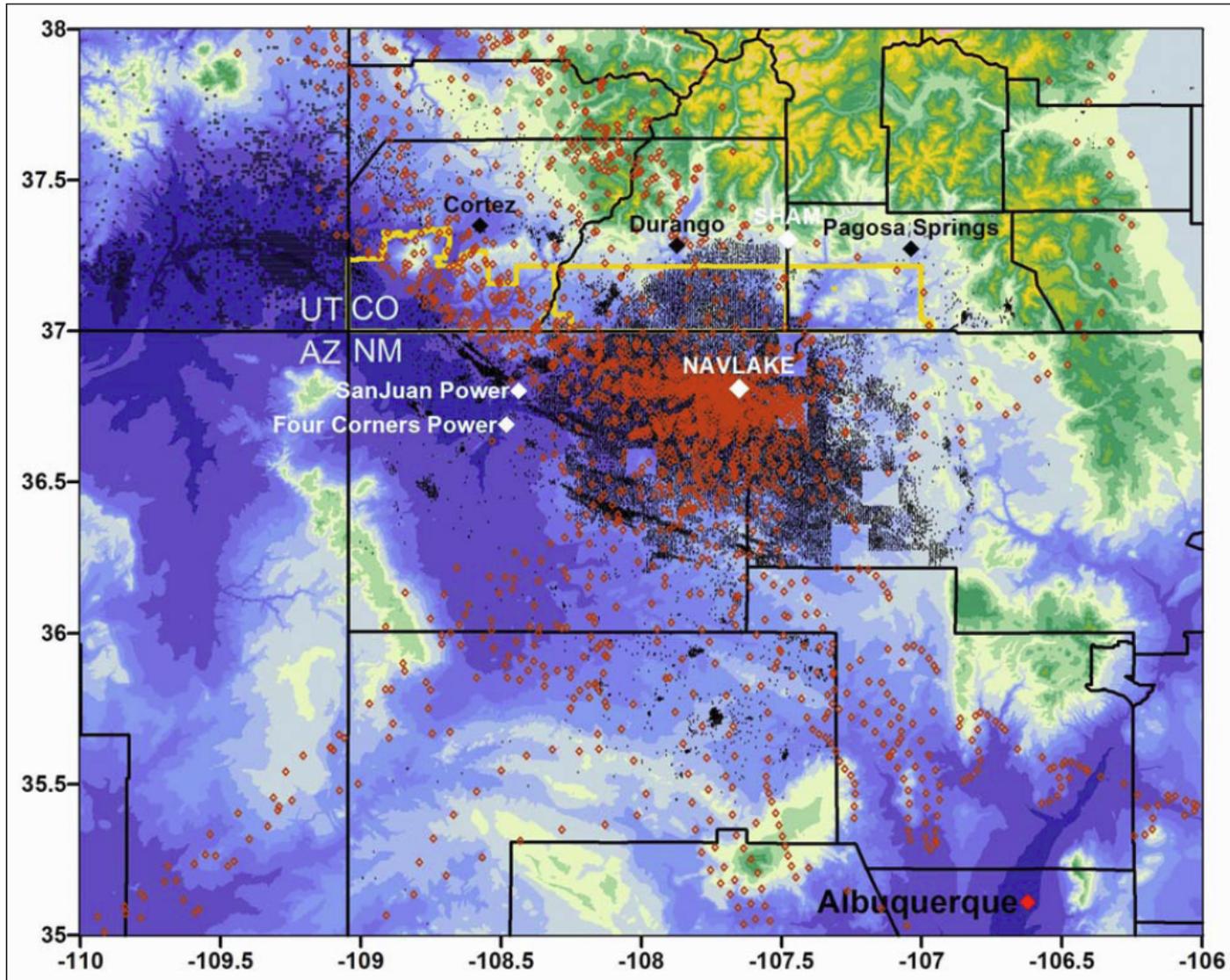
- Three SW Colorado monitors below standard

SW Colorado Population Density & Traffic



- Average population density is very low
- Road network limited and daily traffic volumes are low

HYSPLIT 24-hour back trajectory points for the Navajo Lake monitor



- Orange dots indicate location of back trajectories for 13 high days in 2006-2008
- Black dots indicate location of oil wells
- Higher density of orange dots indicate more common locations of air parcels contributing to high ozone days

Statewide O&G Emission Controls

- RICE Engine Standards Equivalent to federal NSPS for NO_x, VOC and CO on New or Modified engines over 500 HP after July 1, 2007
- RICE Engine Standards Equivalent to federal NSPS for NO_x, VOC and CO on New or Modified engines between 100 to 500 HP after January 1, 2008
- 90% control requirement on all Glycol Dehydrators with VOC emissions ≥ 15 tpy after May 1, 2008.
- 95% control requirement on all Condensate Tanks with VOC emissions ≥ 20 tpy after May 1, 2008
- Retrofit control requirement (up to \$5000 per combined ton of NO_x & VOC reduced) on all existing RICE over 500 HP after July 1, 2010
- To be implemented: Colorado Oil and Gas Conservation Commission rules (from House Bill 1341)

SW Colorado 9-Factor Conclusions

- Tribal lands are specifically excluded from the designation recommendation
 - Southern Ute Indian Tribe, as well as the Ute Mountain Ute Indian Tribe will provide recommendations for their respective tribal lands
- Ozone monitoring in Colorado shows attainment of the 2008 Ozone NAAQS
- Emissions data for ozone precursors indicate that Colorado emissions relate in a peripheral way
- Oil/gas emissions sources in Colorado are already well controlled, and tighter controls are being implemented, based on recent actions by the AQCC and COGCC
- Back-trajectory analyses show significant residence times for air parcels over ozone precursor source areas within New Mexico
- Population density, expected population growth and traffic volumes in Colorado are lower than in northwest New Mexico
- NW NM violated at on site - 77 ppb – and should be able to control local emissions and come back into attainment

Questions and Comments

