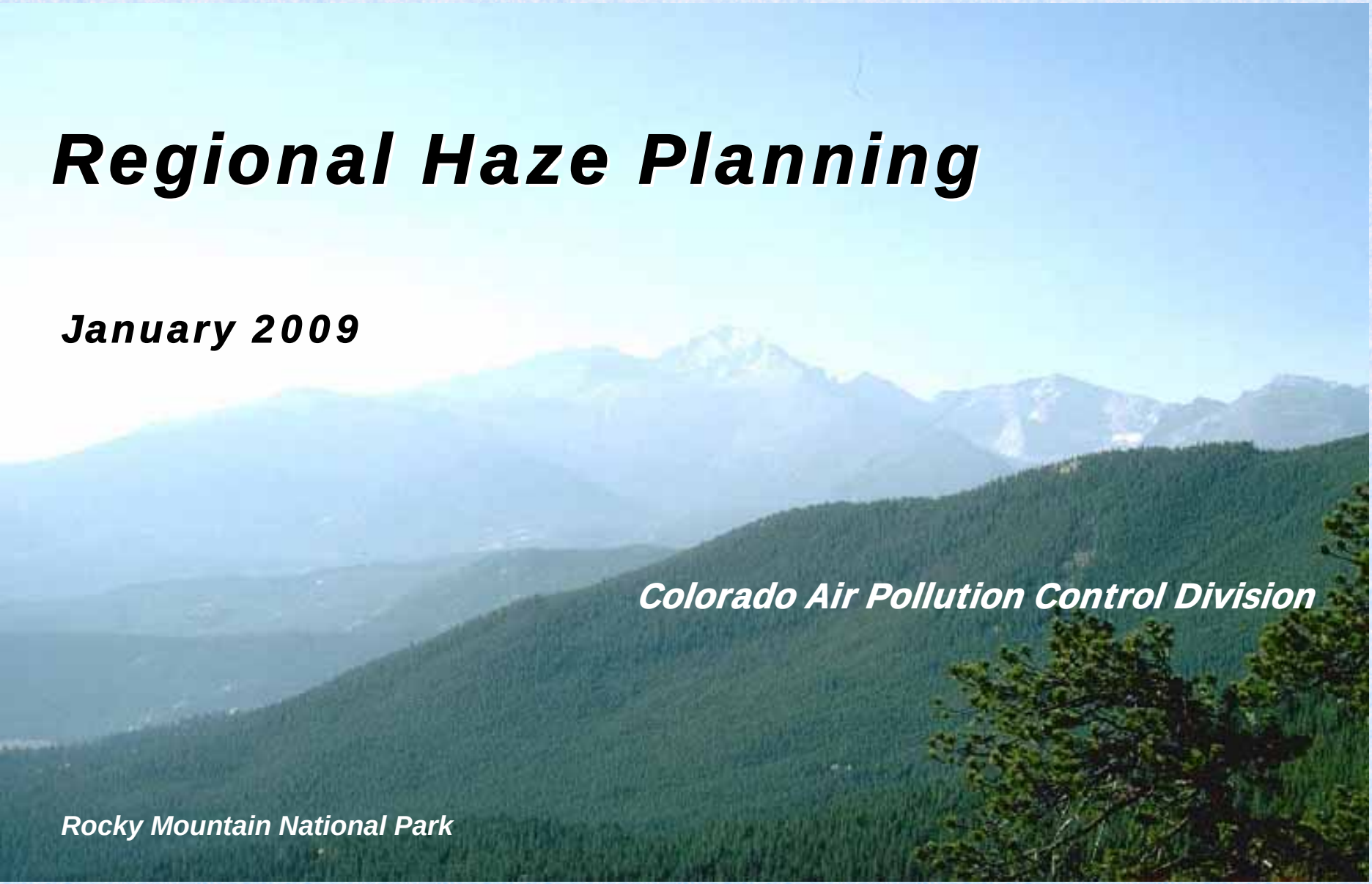


Regional Haze Planning

January 2009

Colorado Air Pollution Control Division

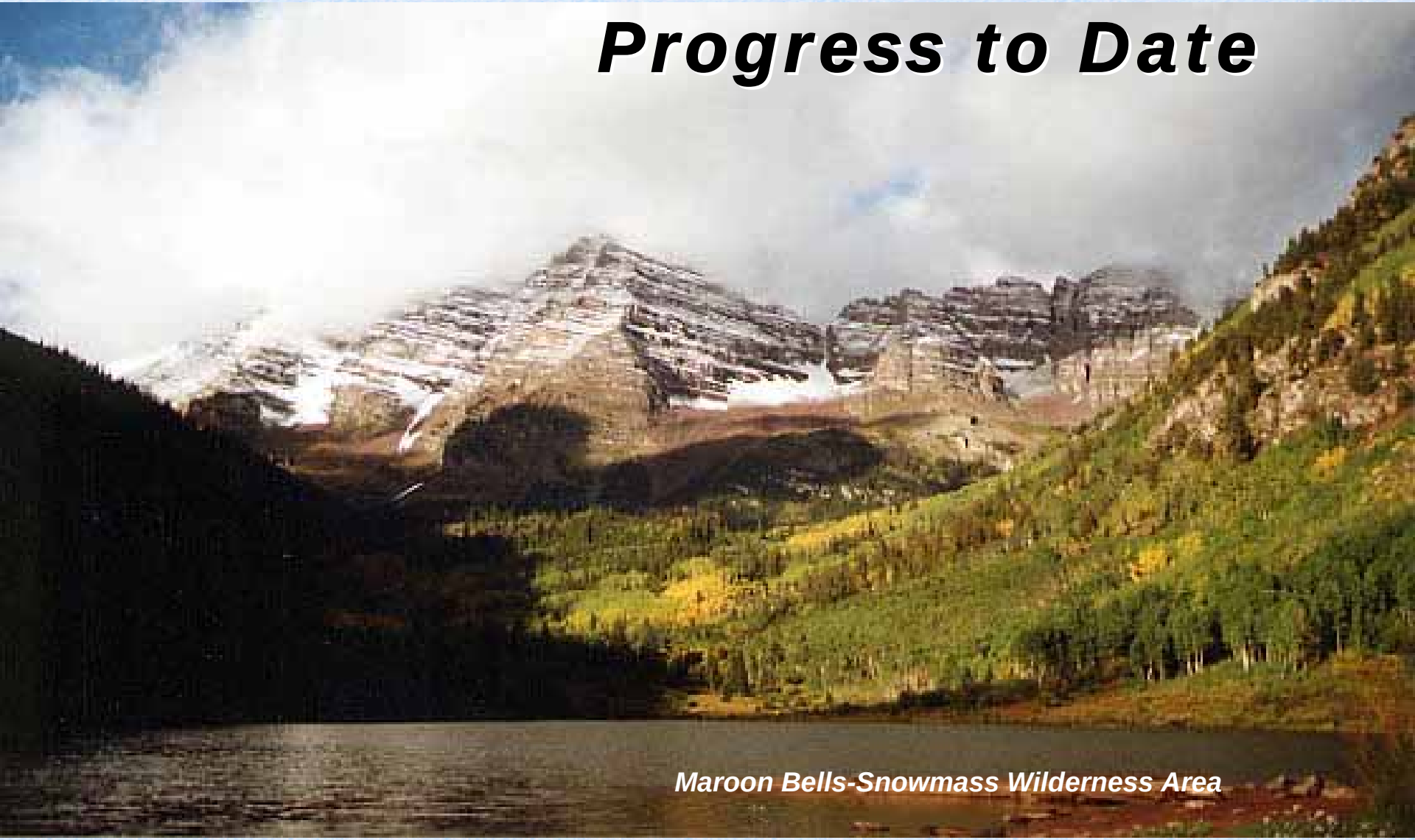
Rocky Mountain National Park

Overview

- Progress to Date
- Upcoming Efforts

Mount Zirkel Wilderness Area

Progress to Date



Maroon Bells-Snowmass Wilderness Area

Division and Commission Actions

- Developed/adopted a rule for BART in 2006
- Assessed BART sources
- Conducted significant stakeholder outreach and consultation
- BART requirements and a partial Regional Haze plan adopted in 2007
- Reasonable Progress stakeholder work and additional BART determinations made in 2008

Achievements: BART NOx and SO2 Reductions

- Expected NOx Reductions: ~7,000 - 10,000 tons per year
- Expected SO2 Reductions: ~17,000 tons per year
- Timing: implemented after EPA approval of RH SIP
- Reductions from several sources are in close proximity to Park
- These reductions will have a positive benefit for RH, ozone and RMNP

Black Canyon of the Gunnison National Park

Additional NOx Reductions

- **Shutdown of Arapahoe Units 3&4 and Cameo Units 1&2**
  - **Expected NOx Reductions: ~ 3,590 tons per year**
- **Retrofit of Existing Natural Gas-Fired Reciprocating Internal Combustion Engines (RICE) ≥500 HP Statewide**
  - **Expected NOx Reduction: ~ 5,800 tons per year**
- **North Front Range I/M Program**
  - **Expected NOx Reductions: ~ 390 tons per year**
- **Denver I/M cut points tightening, high emitter program**
  - **Expected NOx Reductions: ~ 1,095 tons per year**
- **Statewide phase-in of federal motor vehicle standards through fleet turnover**
  - **Expected NOx Reductions (by 2018):**
    - **On-road: 60,396 tons per year (82%)**
    - **Off-road: 13,527 tons per year (18%)**

Total 2018 Projected NOx Reductions

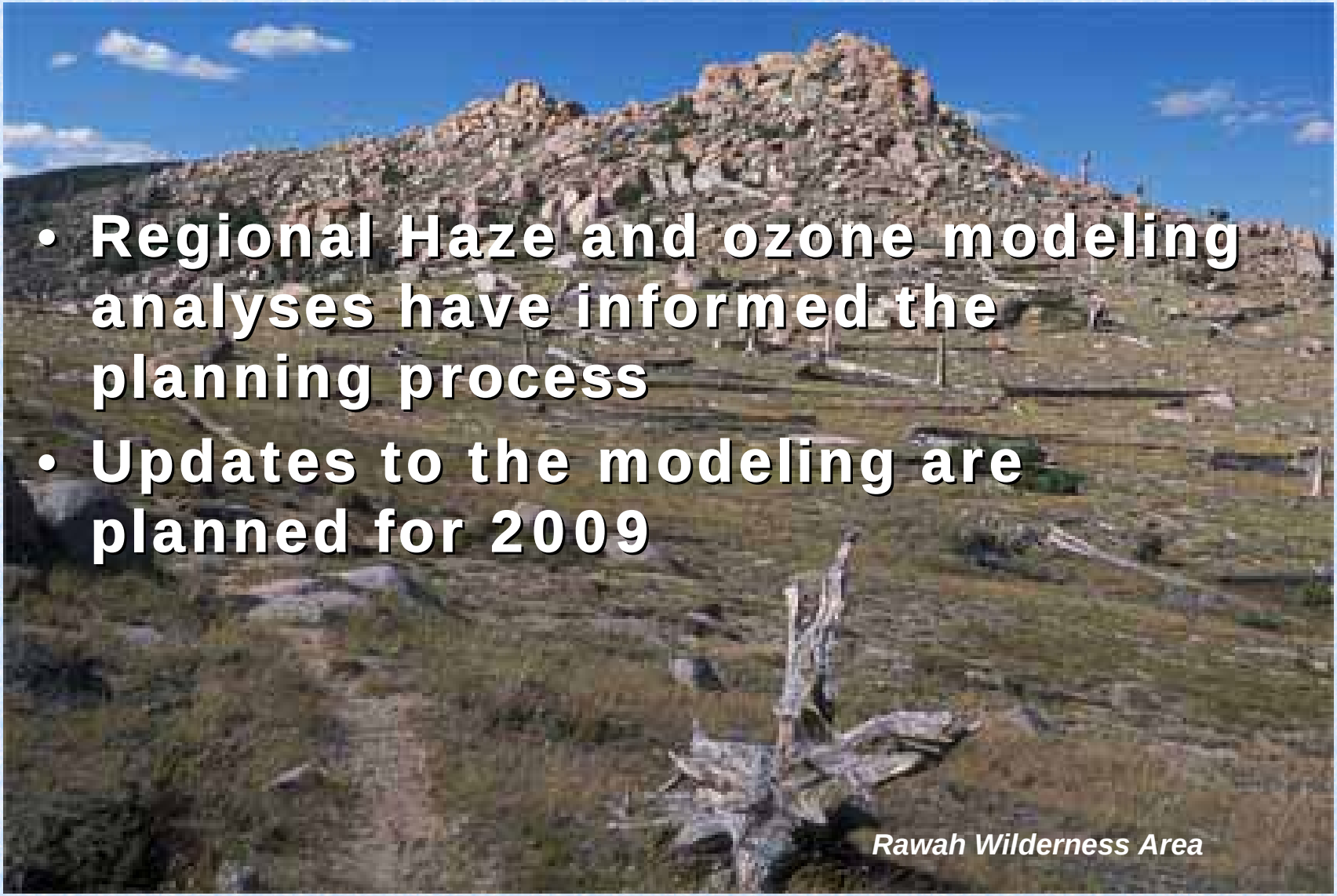
Statewide Reduction Strategies	Estimated NOx Reduction [TPY]
BART (by 2018)	6,177
Shutdown of Arapahoe 3&4, Cameo 1&2 (~2011 to 2013)	3,590
Proposed Retrofit RICE >500 HP (~2010)	5,800
Proposed North Front Range I&M (~ 2012)	390
Denver I/M Cutpoint Tightening & High Emitter (2010)	1,095
Phase-In of Federal On/Off Road Vehicle Standards (2008 to 2018)	74,000
Total:	91,052

Additional SO2 Reductions

- Significant SO2 reductions have occurred at most large facilities in the State
  - ~40,000 tpy between 2002 and 2018
- By 2018, Colorado C1A's are close to or are meeting uniform rates of progress for sulfates
- After BART and the closures of the PSCo facilities, there is one remaining uncontrolled facility in the State
  - Nixon EGU south of Colorado Springs
  - ~4,000 tpy
- Other facilities may also be evaluated to determine if current SO2 control can be improved

Upcoming Efforts

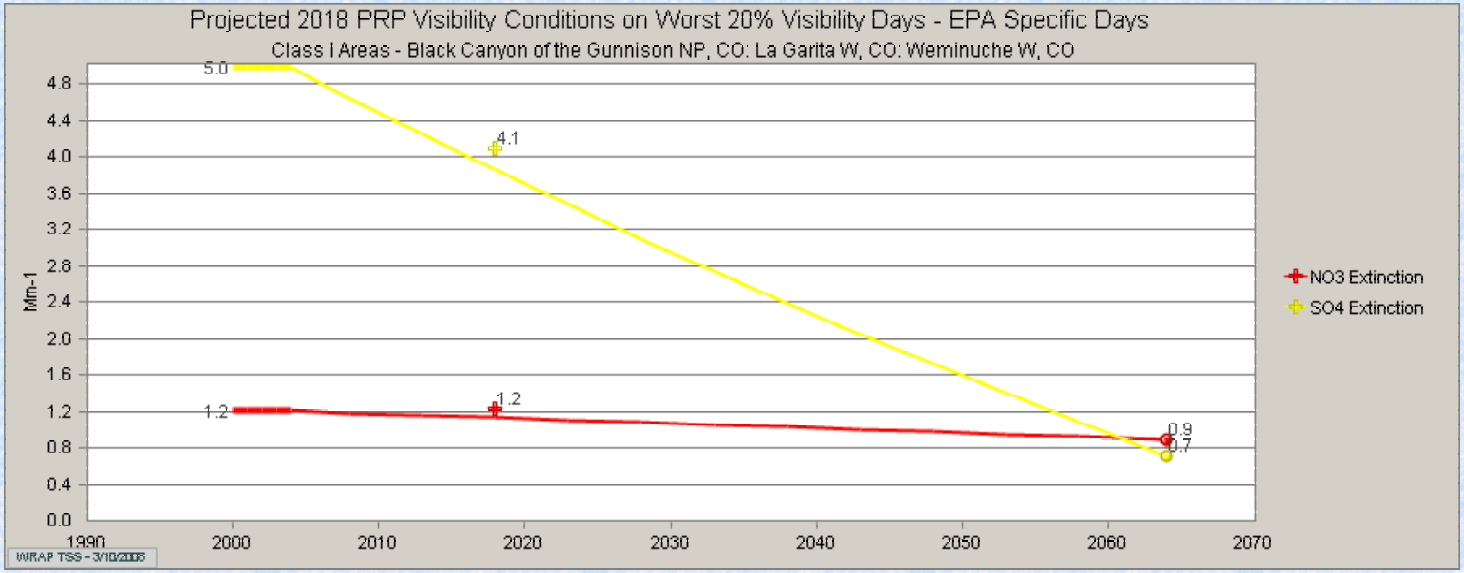
Modeling Analyses for Regional Haze and Ozone



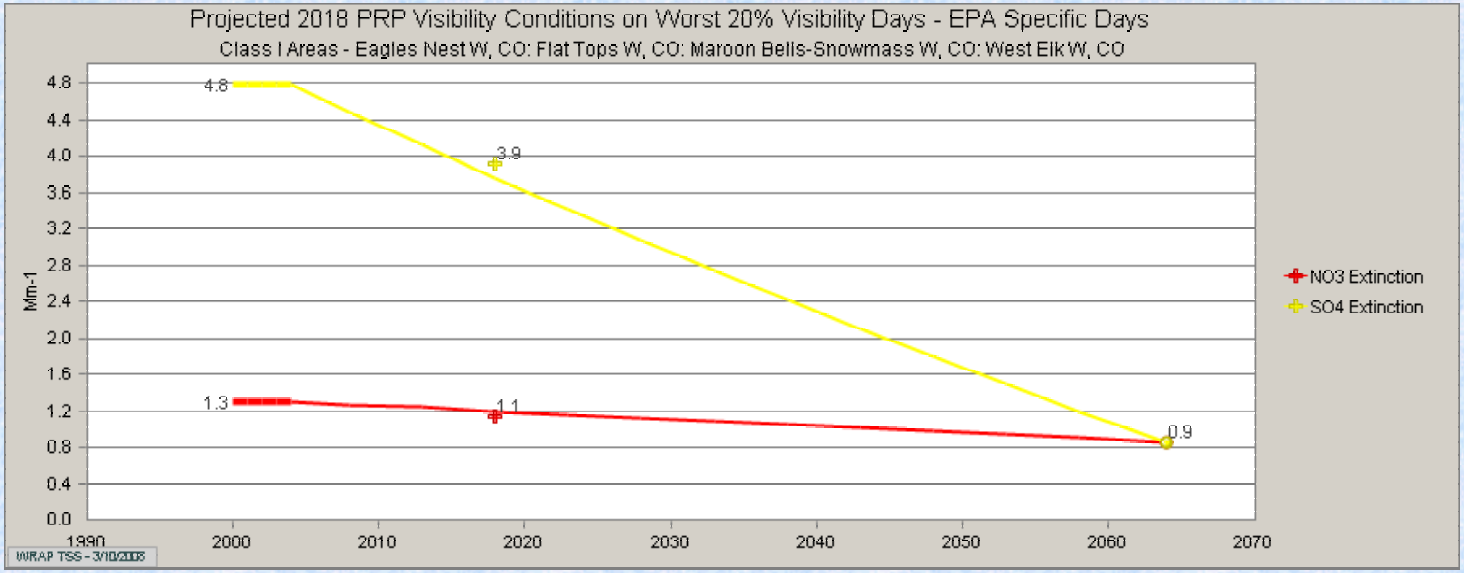
- Regional Haze and ozone modeling analyses have informed the planning process
- Updates to the modeling are planned for 2009

Visibility Modeling Compared to Sulfate & Nitrate Glideslopes

- WEMI

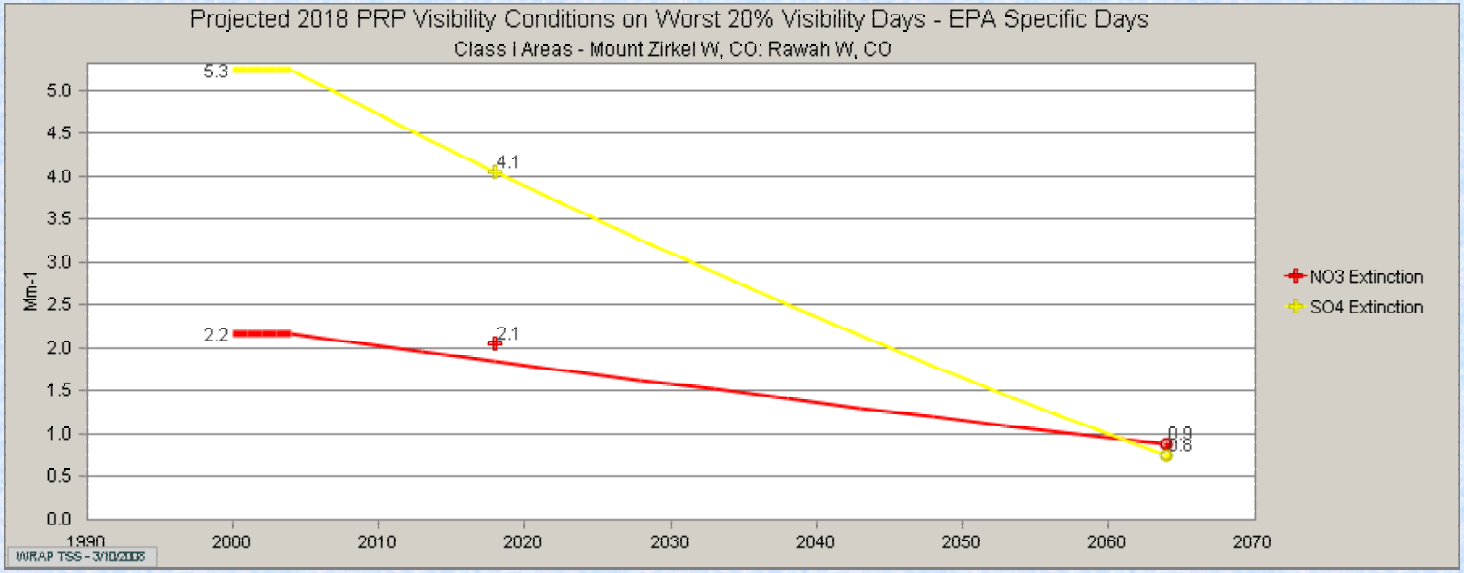


- WHRI

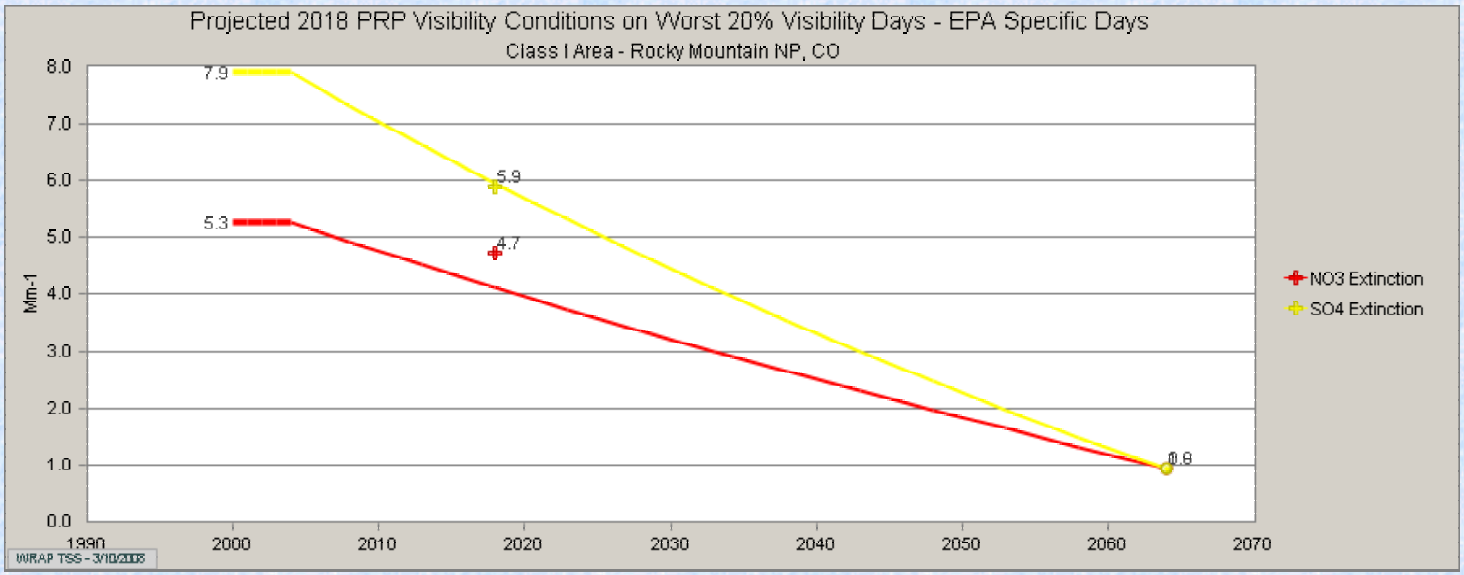


Visibility Modeling Compared to Sulfate & Nitrate Glideslopes

- MOZI

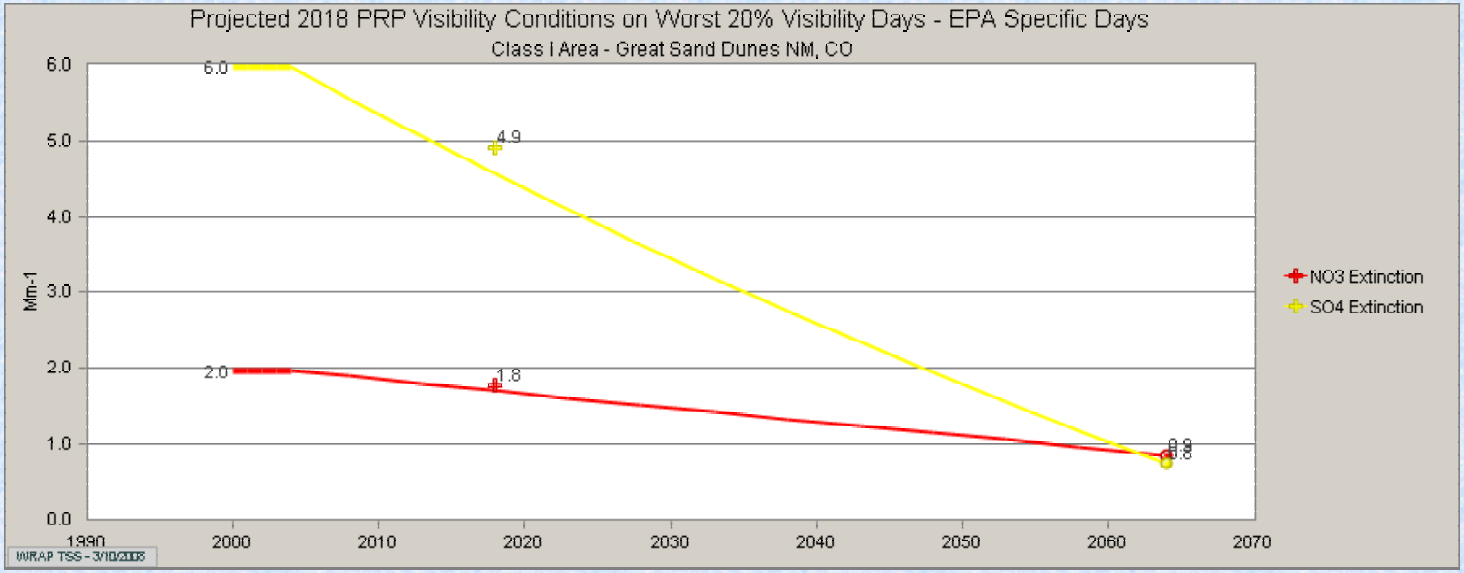


- ROMO

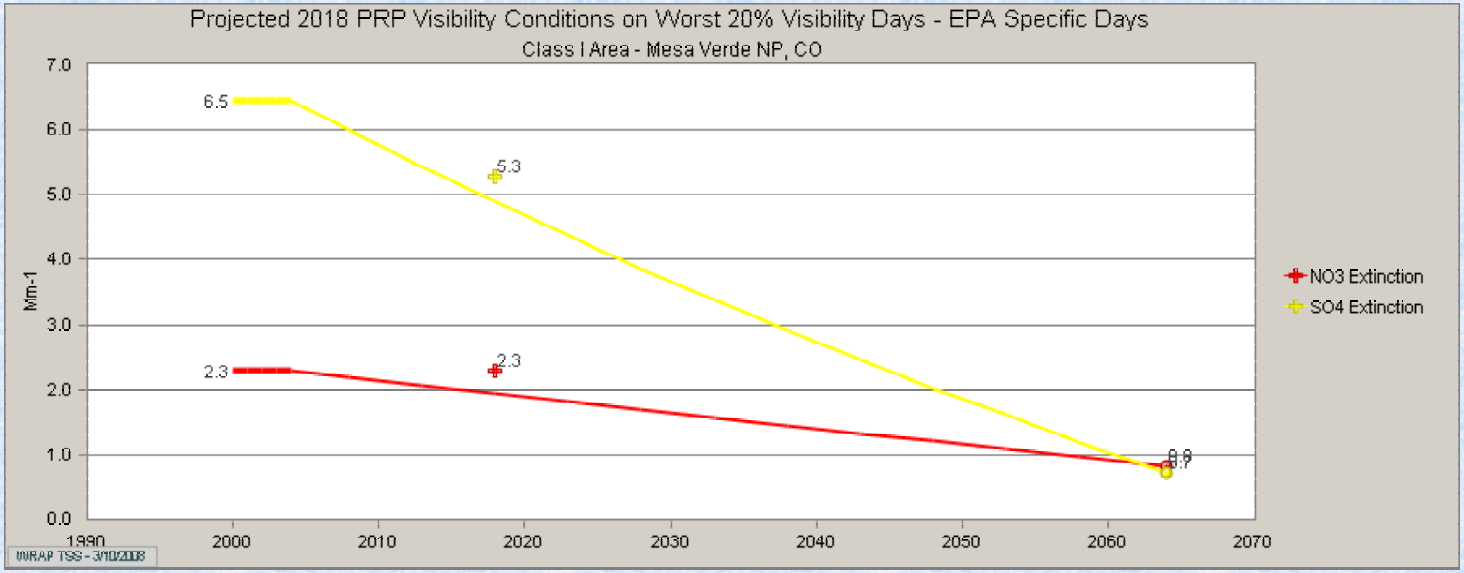


Visibility Modeling Compared to Sulfate & Nitrate Glideslopes

- GRSA



- MEVE



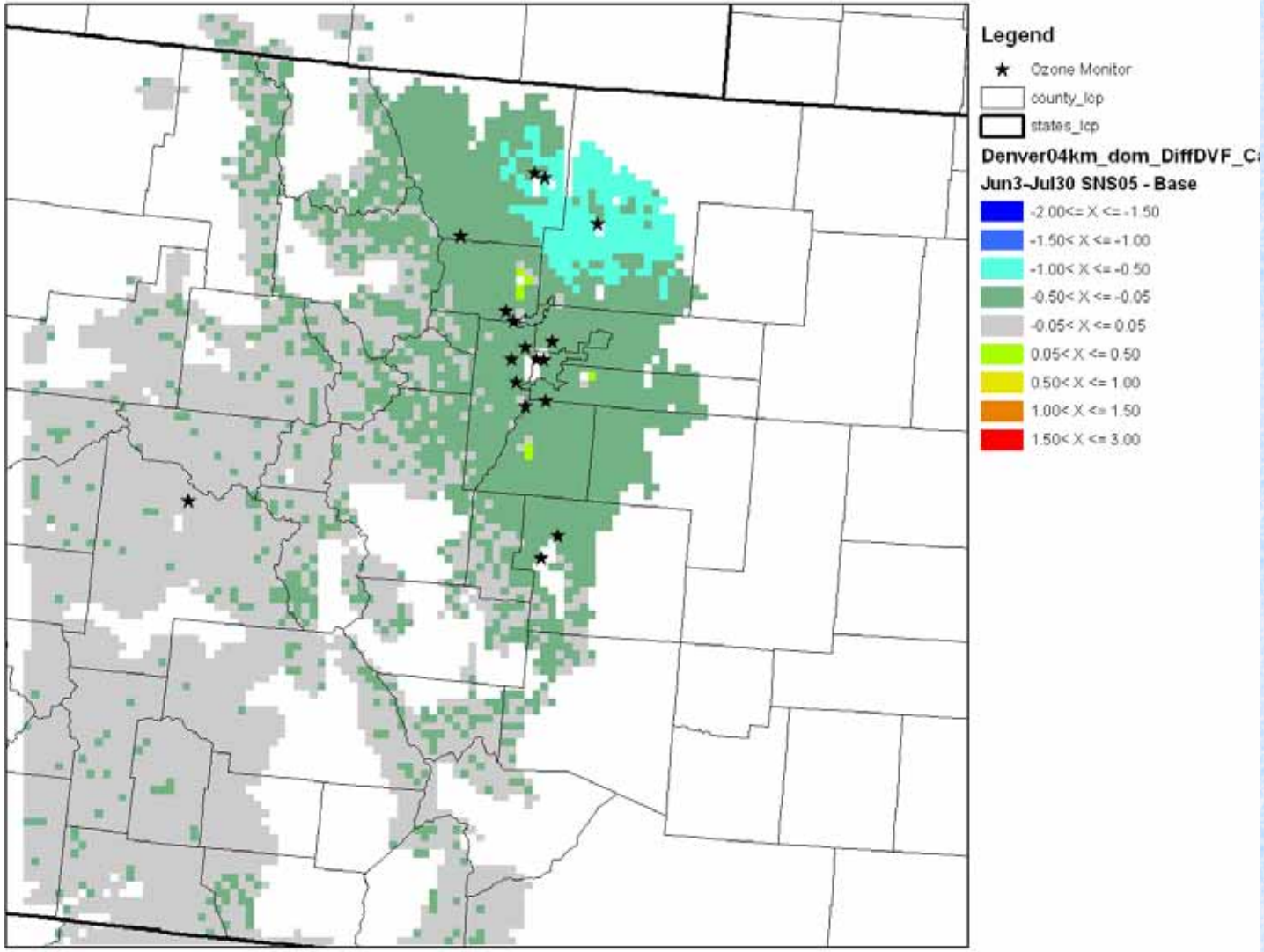
NOx Modeling for Ozone

- NOx reductions appear to be generally beneficial for both ozone and RH throughout the State

- NOx reductions can result in localized ozone increases
  - The ozone impacts from NOx reductions must be carefully evaluated and considered

Mesa Verde National Park

Ozone Sensitivity Modeling for 2010



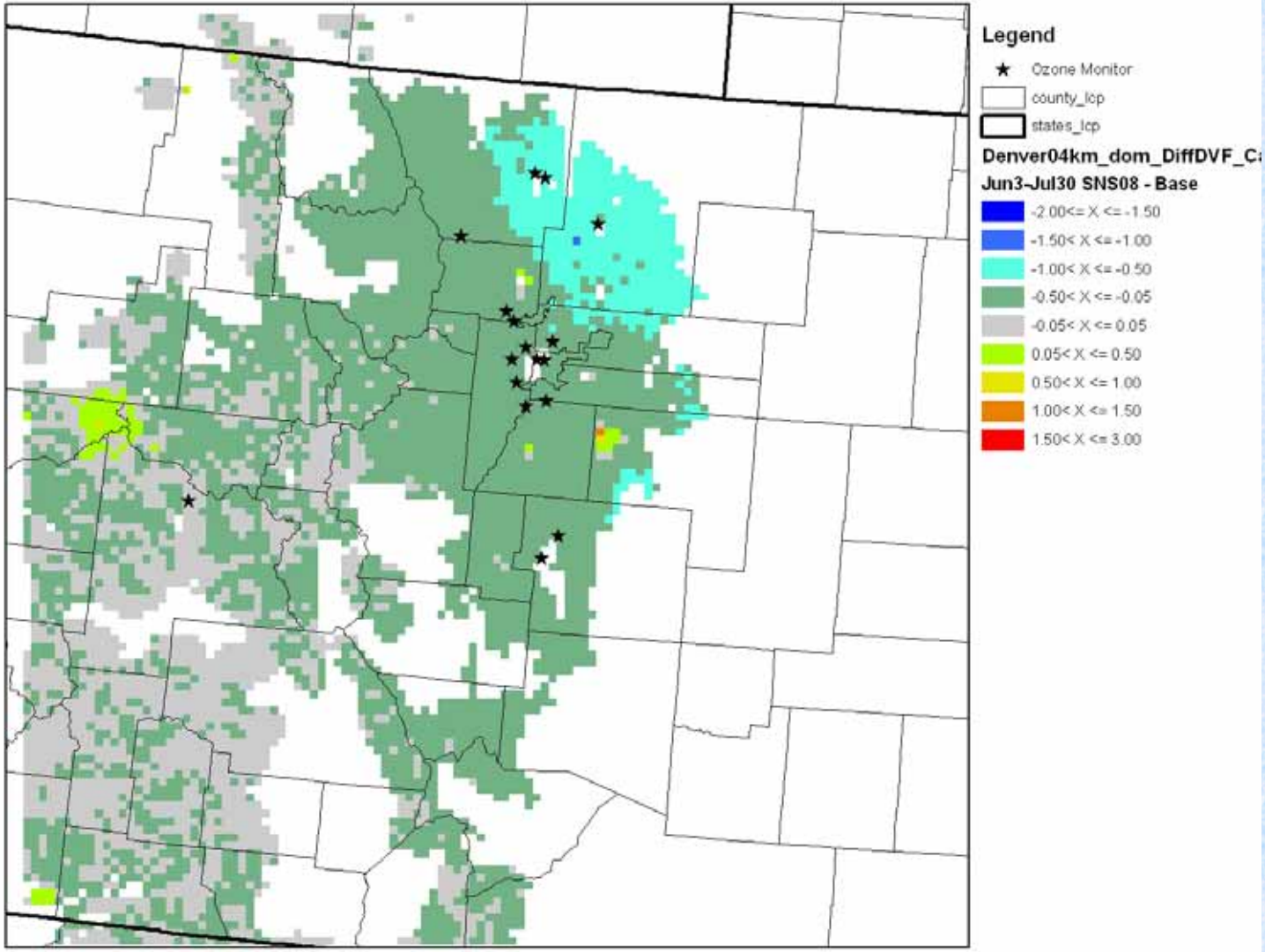
20% NOx Reduction from Point and O&G in the NAA

- **Ozone reductions occur throughout most of the NAA and especially Weld County. However, ozone may increase near large point source**

Statewide 4-km Grid
- **Max increase 0.3 ppb**
- **Max decrease 0.8 ppb**

- **Rocky Flats North DV decreases by 0.2 ppb.**
- **Fort Collins West DV decreases by 0.5 ppb.**

Ozone Sensitivity Modeling for 2010



20% Statewide NOx Reduction from Point and O&G Sources

- **Small ozone reductions occur throughout the NAA.**
- **Ozone Dis-benefit near large point sources**
- **Decent benefit at RFN and FTCW**

Statewide 4-km Grid
- **Max increase 1.1 ppb**
- **Max decrease 1.0 ppb**

- **Rocky Flats North DV decreases by 0.2 ppb.**
- **Fort Collins West DV decreases by 0.6 ppb.**

Reasonable Progress Process

- Goal: Establish a Reasonable Progress Goal for each Colorado Class I area
  - Evaluate significant sources/source categories for reasonable emission reduction controls using 4 factors:
    - Cost of compliance, time needed, energy and non-air impacts, and useful life of facilities
  - NOx reductions that benefit both RH and ozone, along with RMNP nitrogen deposition, will be explored throughout 2009
  - Document visibility improvement at each Class I area as a result of all state/regional controls

Great Sand Dunes National Park & Preserve

How Much Visibility Improvement Can We Expect From The RP Process?

- Focus for RP is SO2 and NOx reductions
- Reducing SO2 and NOx in Colorado will help but won't solve the visibility problems
  - Removing all Colorado SO2 & NOx emissions yields, at most, ~1 deciview of improvement
    - Greatest improvement at RMNP, much less at other C1A's
    - Transport into Colorado is important

RP Eligible Stationary Sources

Potential Sources Identified for Reasonable Progress Process			
2018 PRP Emission Inventory - Criteria Thresholds (Revised):		SO2 > 380 tpy	NOx > 1,546 tpy
	Source	SO2 [tpy]	NOx [tpy]
1	PUBLIC SERVICE CO CHEROKEE PLT	6,964	10,315
2	PUBLIC SERVICE CO COMANCHE PLT	6,478	7,138
3	COLORADO SPRINGS UTILITIES - NIXON PLT	4,073	2,331
4	TRI STATE GENERATION CRAIG	3,940	16,799
5	PUBLIC SERVICE CO - ARAPAHOE	3,119	3,340
6	PUBLIC SERVICE CO CAMEO PLT	3,070	1,409
7	COLORADO SPRINGS UTILITIES-DRAKE PLT	2,971	4,508
8	PUBLIC SERVICE CO HAYDEN PLT	2,898	7,307
9	TRIGEN - COLORADO ENERGY CORPORATION	2,624	1,185
10	SUNCOR ENERGY - DENVER REFINERY	2,253	524
11	PUBLIC SERVICE CO PAWNEE PLT	2,225	3,942
12	TRI STATE GENERATION NUCLA	1,325	1,753
13	AQUILA, INC. - W.N. CLARK STATION	1,322	1,090
14	PLATTE RIVER POWER AUTHORITY - RAWHIDE	927	3,912
15	PUBLIC SERVICE CO - VALMONT	879	2,279
16	ROCKY MOUNTAIN BOTTLE CO	542	524
17	HOLCIM (US) INC. PORTLAND PLANT	393	1,859
18	CEMEX, INC. - LYONS CEMENT PLANT	84	2,903
	Highlighted Totals:	46,002	68,385

Schedule of Activities

- NOx emission control discussions will kick-off on January 21st
- Sources to submit controls assessments in late January - technologies, costs, feasibility
  - Review will occur in Feb / March
- Modeling work has commenced and will be discussed with stakeholders in early February
  - Regional Haze by the WRAP; ozone by the RAQC / APCD
  - Fuels assessment will also begin with the ozone modeling

Weminuche Wilderness Area

Next Steps

- Division is evaluating and formulating an approach for advancing emission controls that benefit ozone, RH and RMNP
  - Rigorous ozone modeling will inform critical benefits and directions
  - Source control evaluations will inform benefits, feasibility and costs
  - Combined, this data will inform future steps and a proposal
- When fully developed, we will discuss proposal(s) in future Commission meetings and with stakeholders
  - Key to any Department proposal is a quality, well informed strategy so that a proposal is complimentary and consistent for ozone, RH and RMNP

West Elk Wilderness Area

Questions/Comments