



Air Quality Profile of Arizona

October 20, 2008

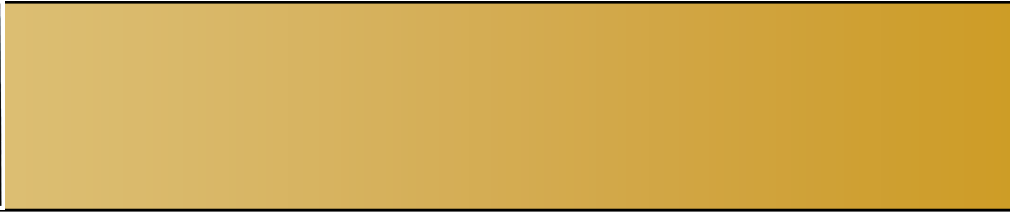
National Association of Clean Air Administrators

Nancy Wrona, Director

Air Quality Division



Arizona
The Grand Canyon State







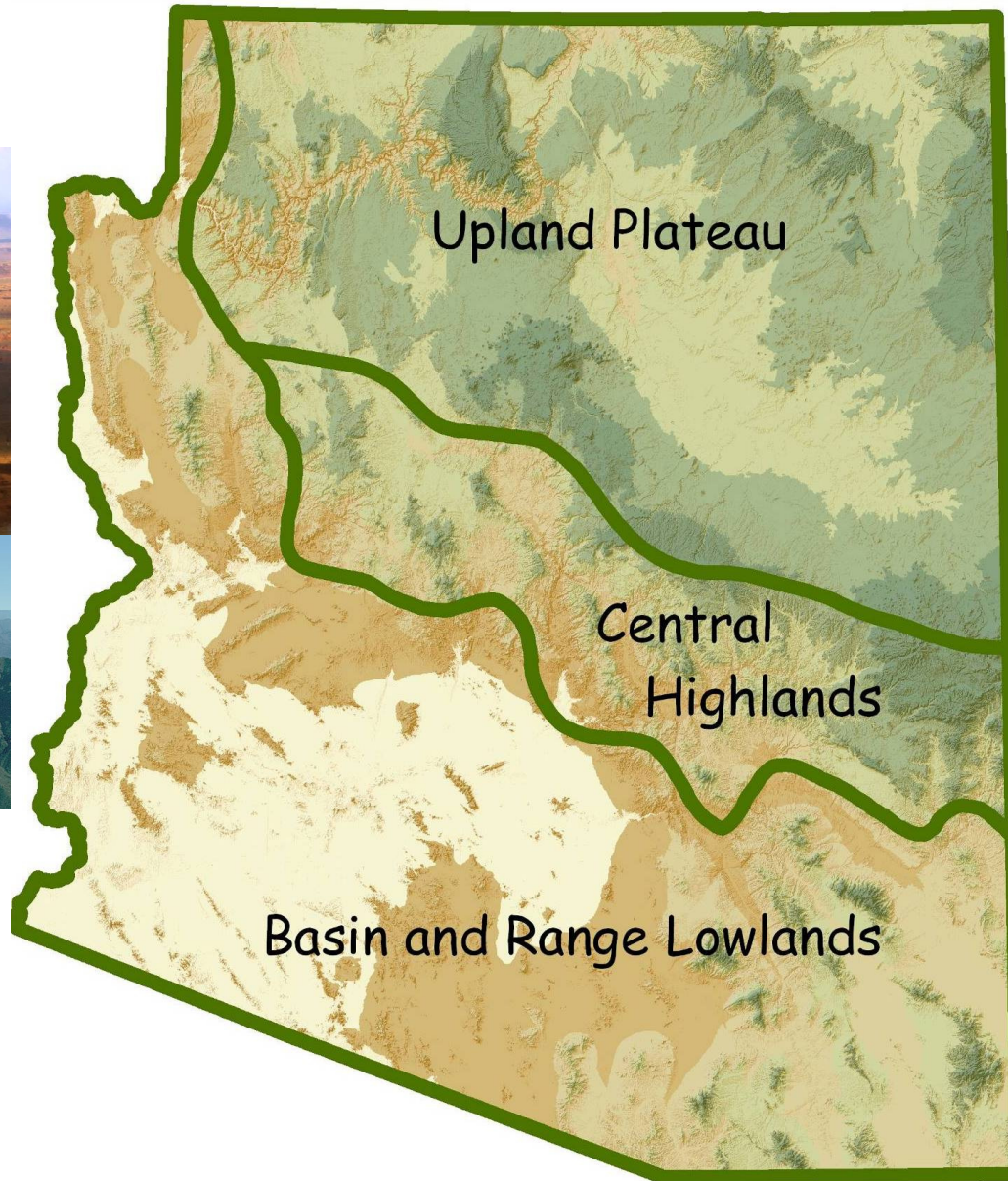
Arizona Land Ar

- 72,725,760 acres
- 113,634 sq. mi.





Provinces





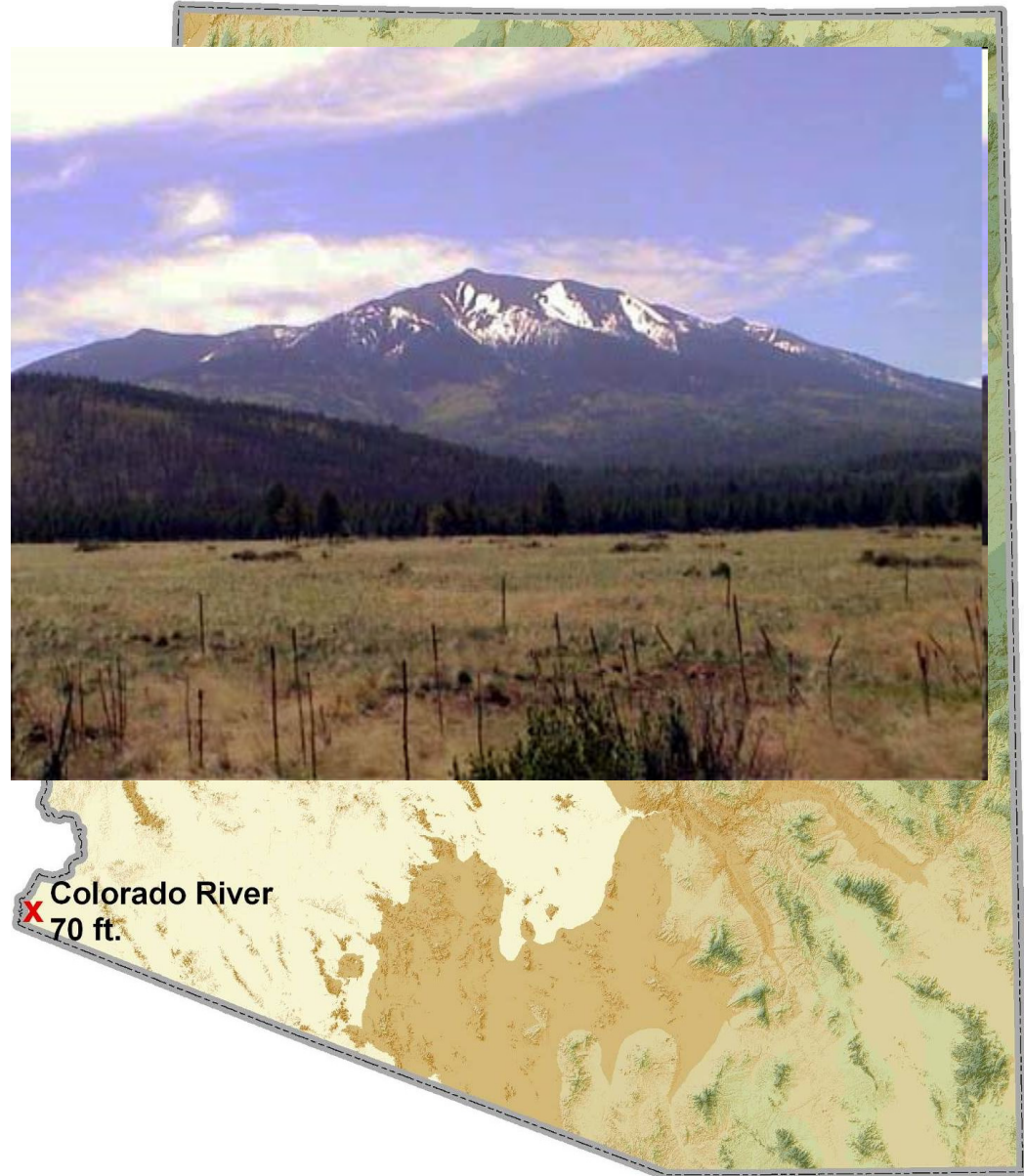
Topography

📍 Highest Point

📍 Humphrey's
Peak 12,633
ft.

📍 Lowest Point

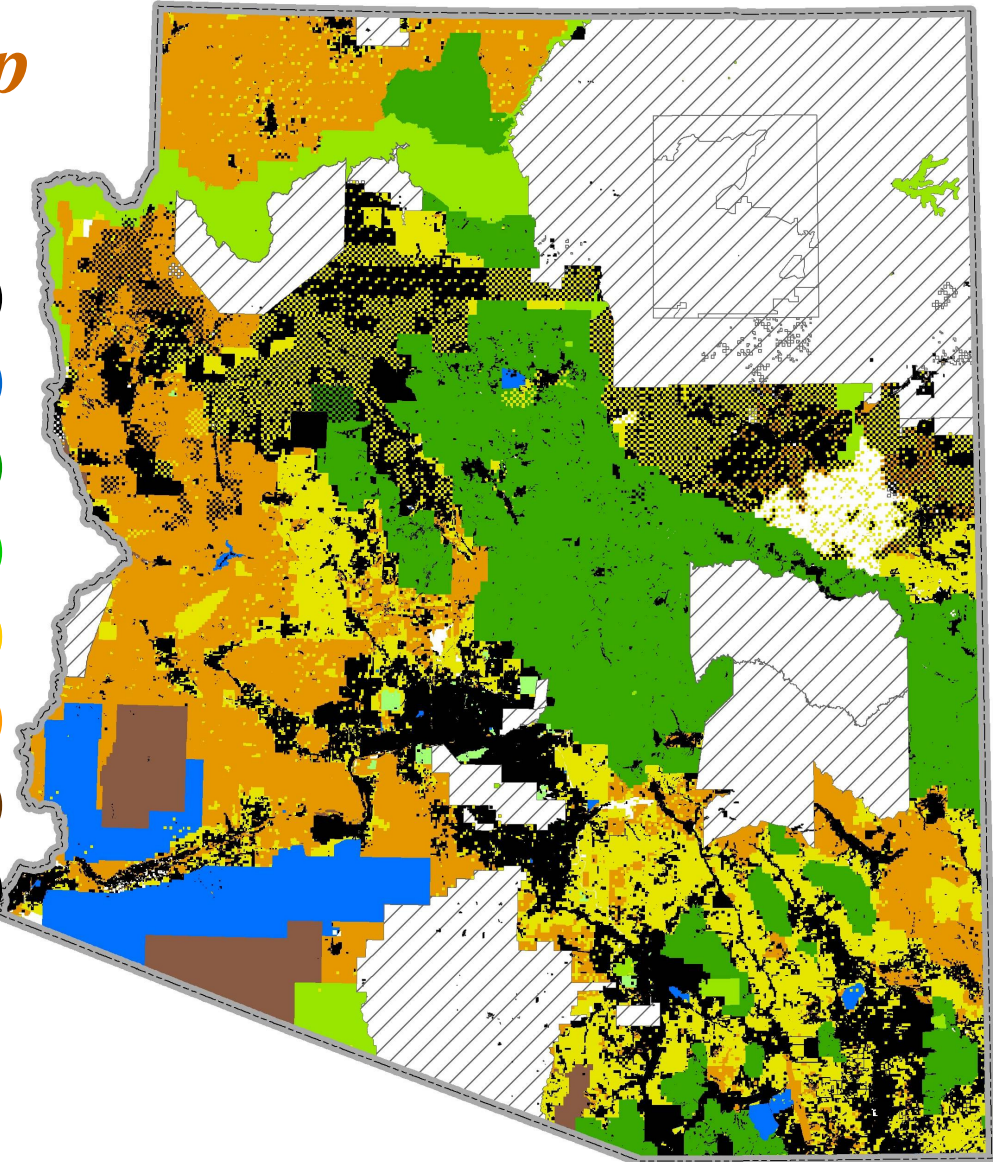
📍 Colorado
River 70 ft.





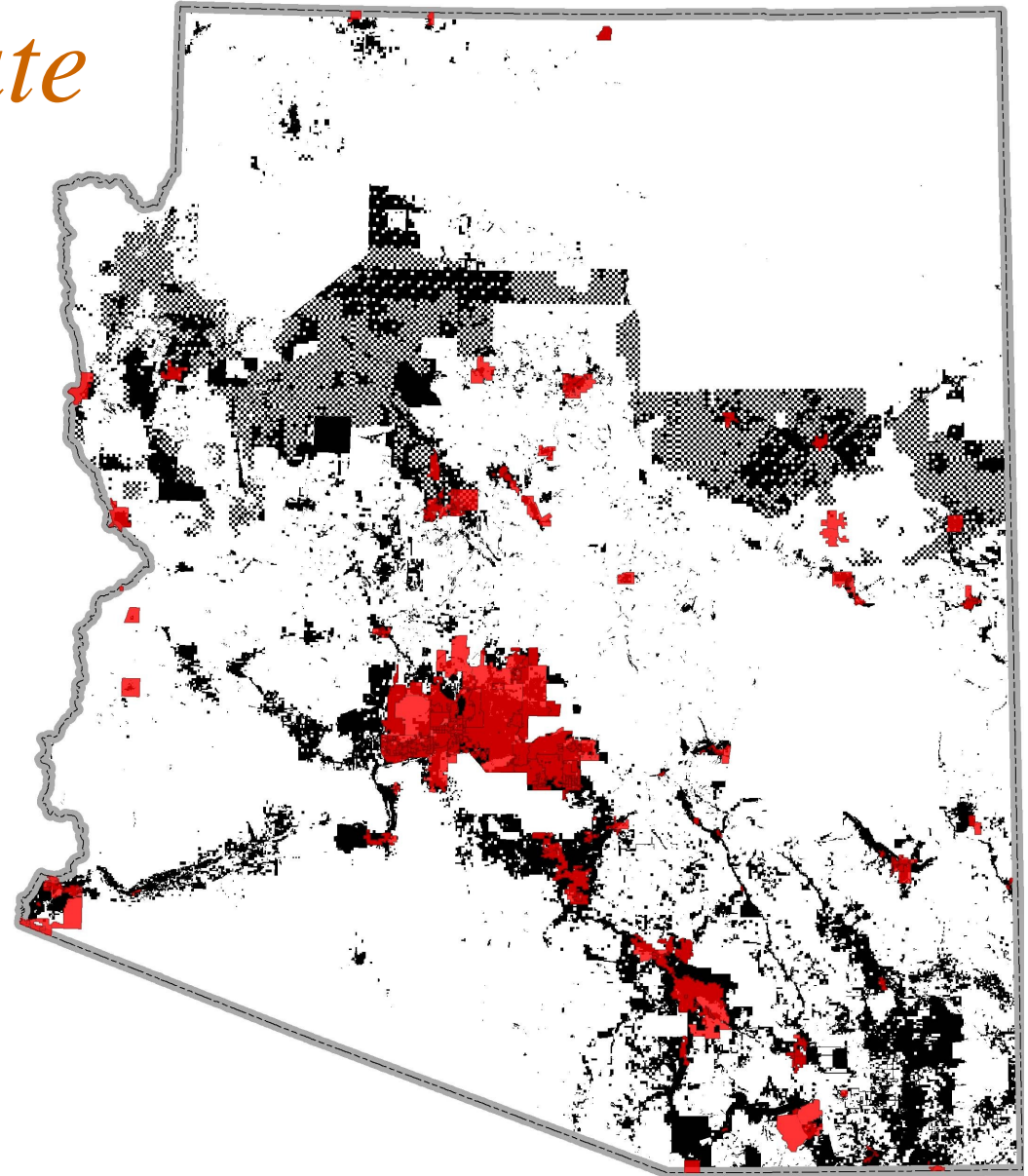
Arizona Land Ownership Categories (sq. miles)

Indian Res. (hatched)	31,410 (28%)
Military	4,458 (4%)
National Forests	17,430 (15%)
Parks	4,238 (4%)
State Trust	14,538 (13%)
BLM	18,935 (17%)
US Fish & Wildlife	2,679 (2%)
Private	19,132 (17%)





Cities and Private Lands



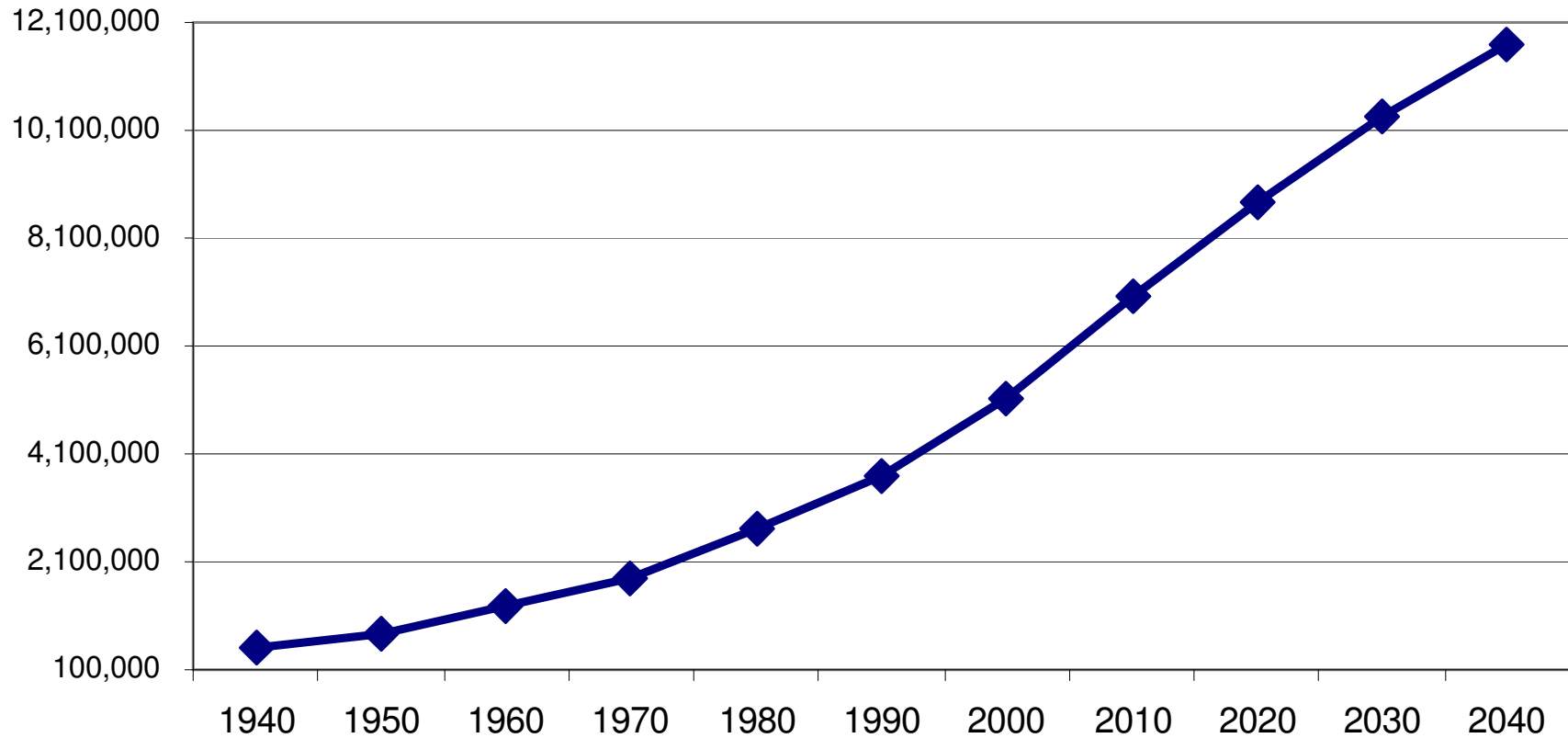


Arizona is a growth state

- At least 76% of the population is within the Phoenix and Tucson metro areas
 - Maricopa Co. (Phoenix) 60%
 - Pima Co. (Tucson) 16%
 - Pinal Co. (Phoenix/Tucson corridor) 4% in 2000 census, BUT
 - The current estimated population of Pinal County has grown over 80% since then



Arizona Census 1940 thru 2000 and Projected Population through 2040





And that's our great challenge

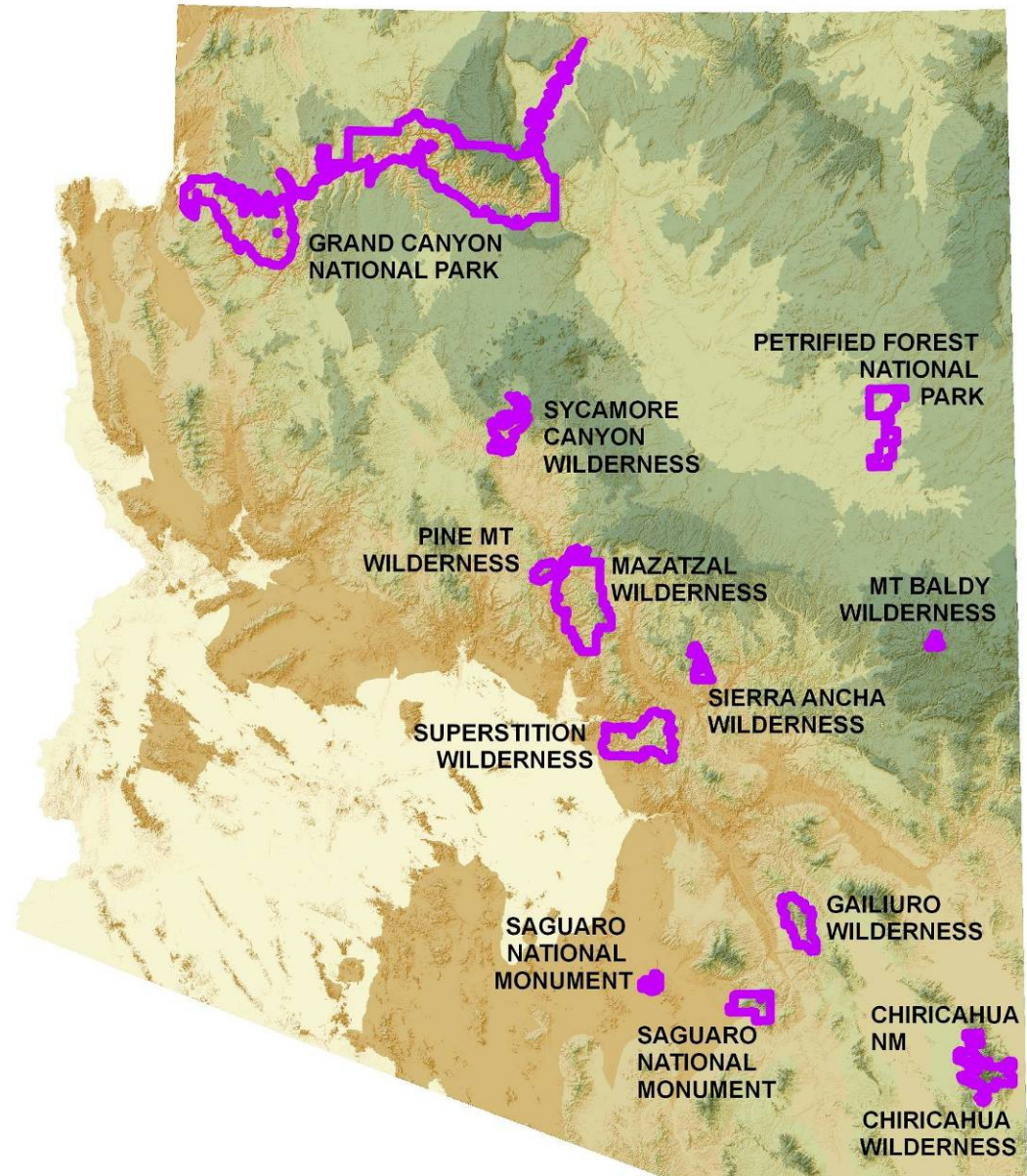
- Traffic has grown 14% faster than population
- Maintaining urban quality of life
 - Air and water quality; water quantity
 - Mobility and transportation
 - Open space and amenities
 - Urban heat island mitigation
- Preservation of existing natural areas
 - Transport of urban emissions
 - Impacts of encroachment
 - Additional use pressures



Arizona Class I Areas and Visibility Monitoring Network

- | | |
|-----------------------------------|-------------------------------|
| 1. Hance | 10. Queen Valley Water Tank |
| 2. Indian Garden | 11. East Unit Research Center |
| 3. Petrified Forest | 12. West Unit Well Site |
| 4. Greer Water Treatment Plant | 13. NM Entrance Station |
| 5. Camp Raymond | 14. Muleshoe Ranch |
| 6. Ike's Backbone | 15. Hillside |
| 7. Humboldt Mountain | 16. Organ Pipe Cactus NM |
| 8. Pleasant Valley Ranger Station | 17. Meadview |
| 9. Tonto National Monument | |

- | | |
|---|--|
|  Federal Class I Areas |  Class I Area Sites |
|  Arizona Cities |  Background Sites |
|  Organ Pipe Cactus NM |  Site Number |
|  Indian Lands | |
|  Major Freeways | |



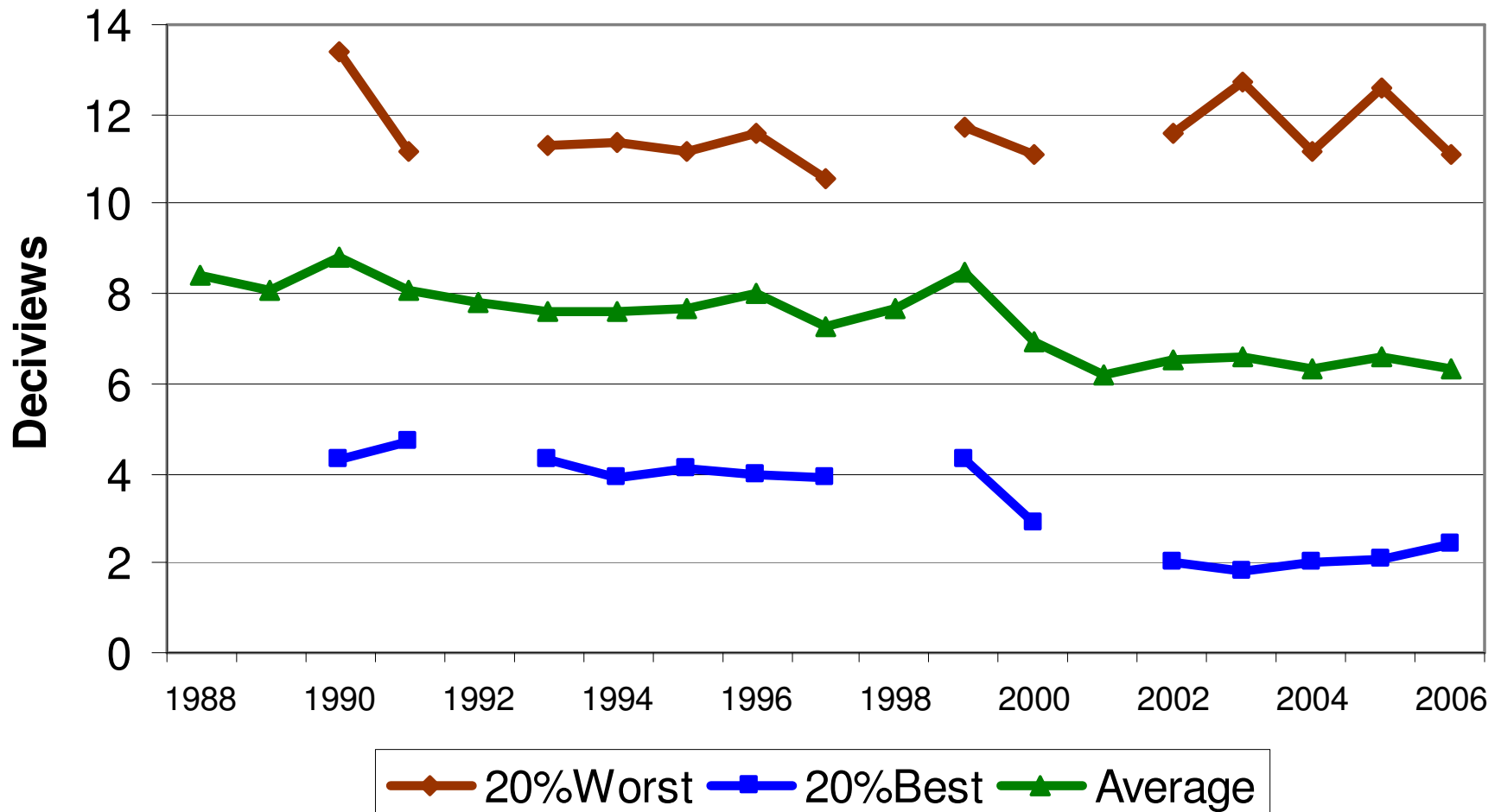


Regional Haze Progress

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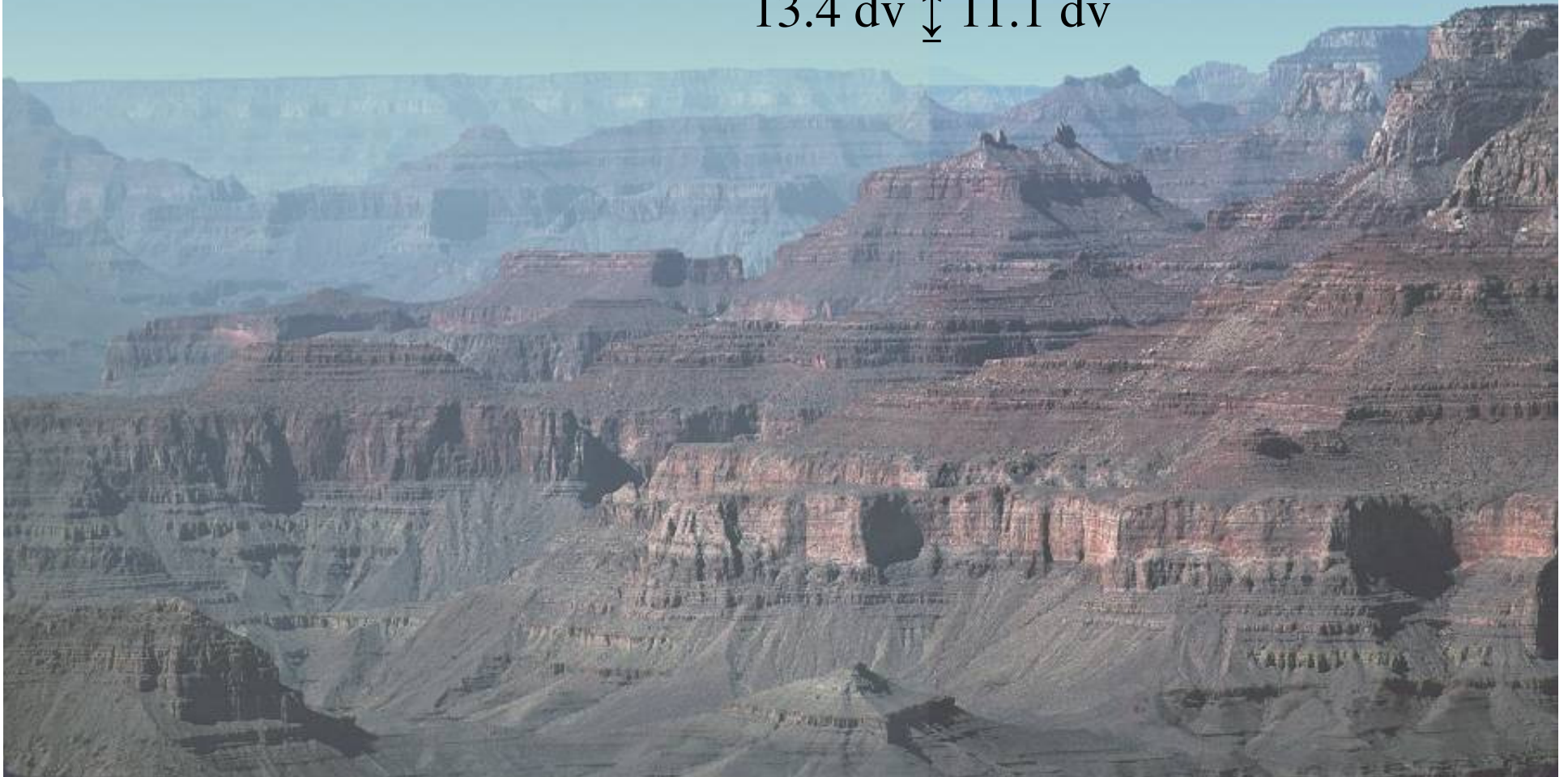
Visibility Trends at Grand Canyon National Park





*Improvement Between 1990 and 2006:
20% Worst Days*

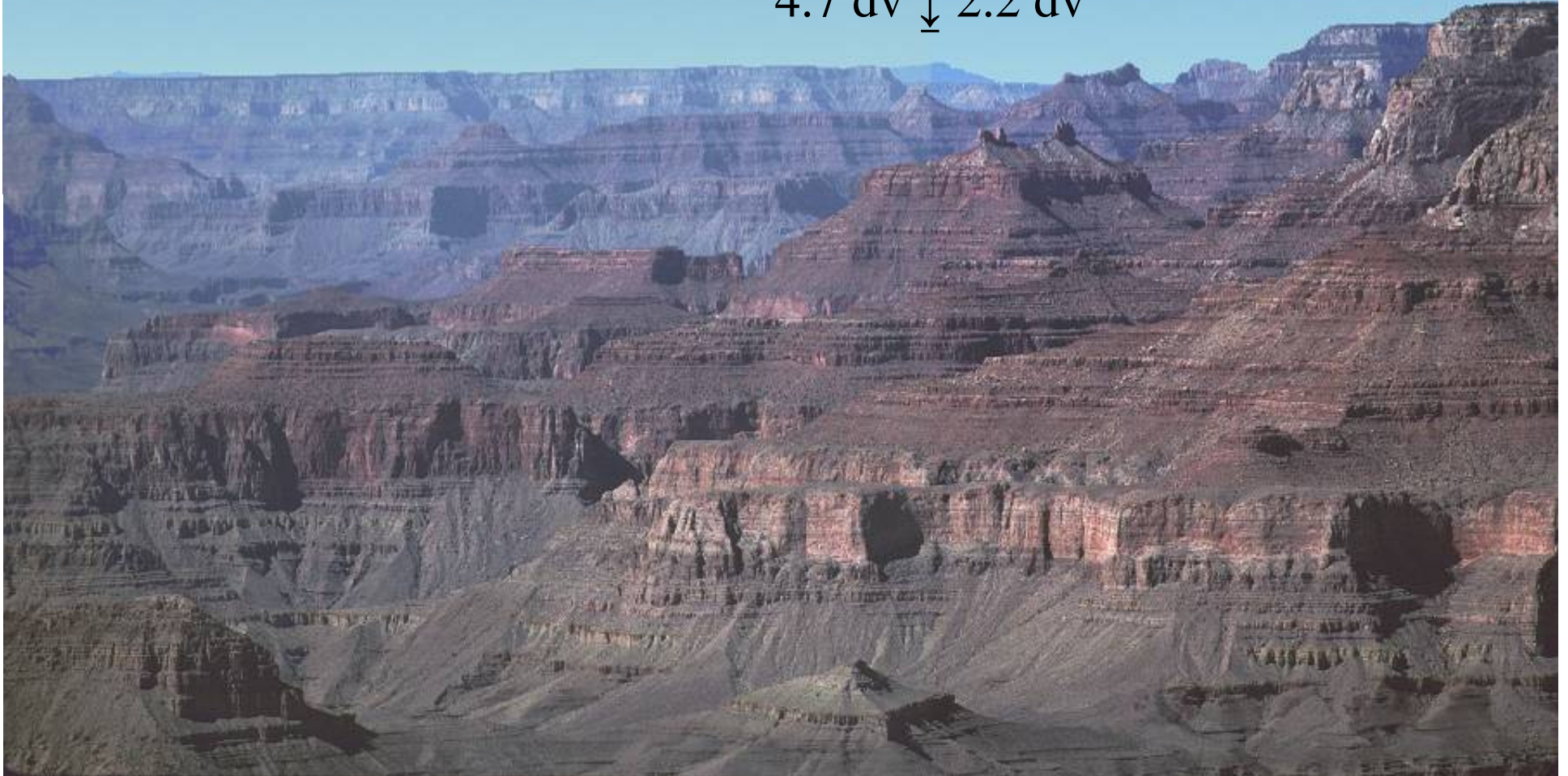
13.4 dv \updownarrow 11.1 dv





*Improvement Between 1990 and 2006:
20% Best Days*

4.7 dv \updownarrow 2.2 dv





Much more work ahead

- Completing 309 SIP for the Colorado Plateau Areas
- Preparing 309(g) SIP for the remaining 8 Class I areas
 - Increasing coarse matter and NO_x impacts at some
 - Two adjacent to major urban areas: Saguaro NM and Superstition Wilderness



Best 20% vs. Worst 20% Days, 2006

7.8 dv \updownarrow 16.0 dv













Nonattainment and Maintenance

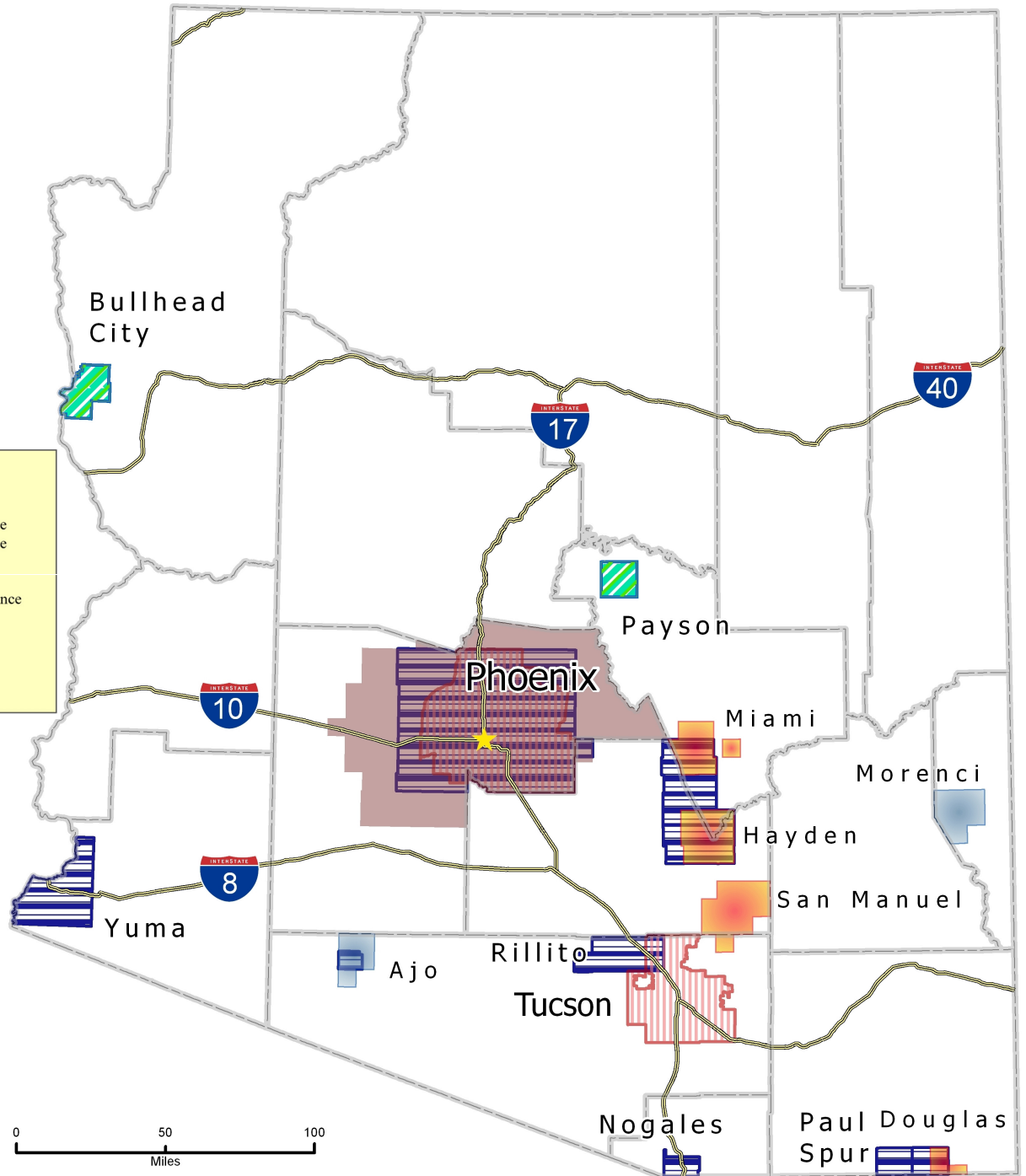
- Nineteen Nonattainment Areas in 1990
 - 6 Sulfur dioxide
 - 2 Carbon monoxide
 - 1 Ozone
 - 10 PM₁₀

ARIZONA NONATTAINMENT AND MAINTENANCE AREAS

Nonattainment Area Summary and Classification

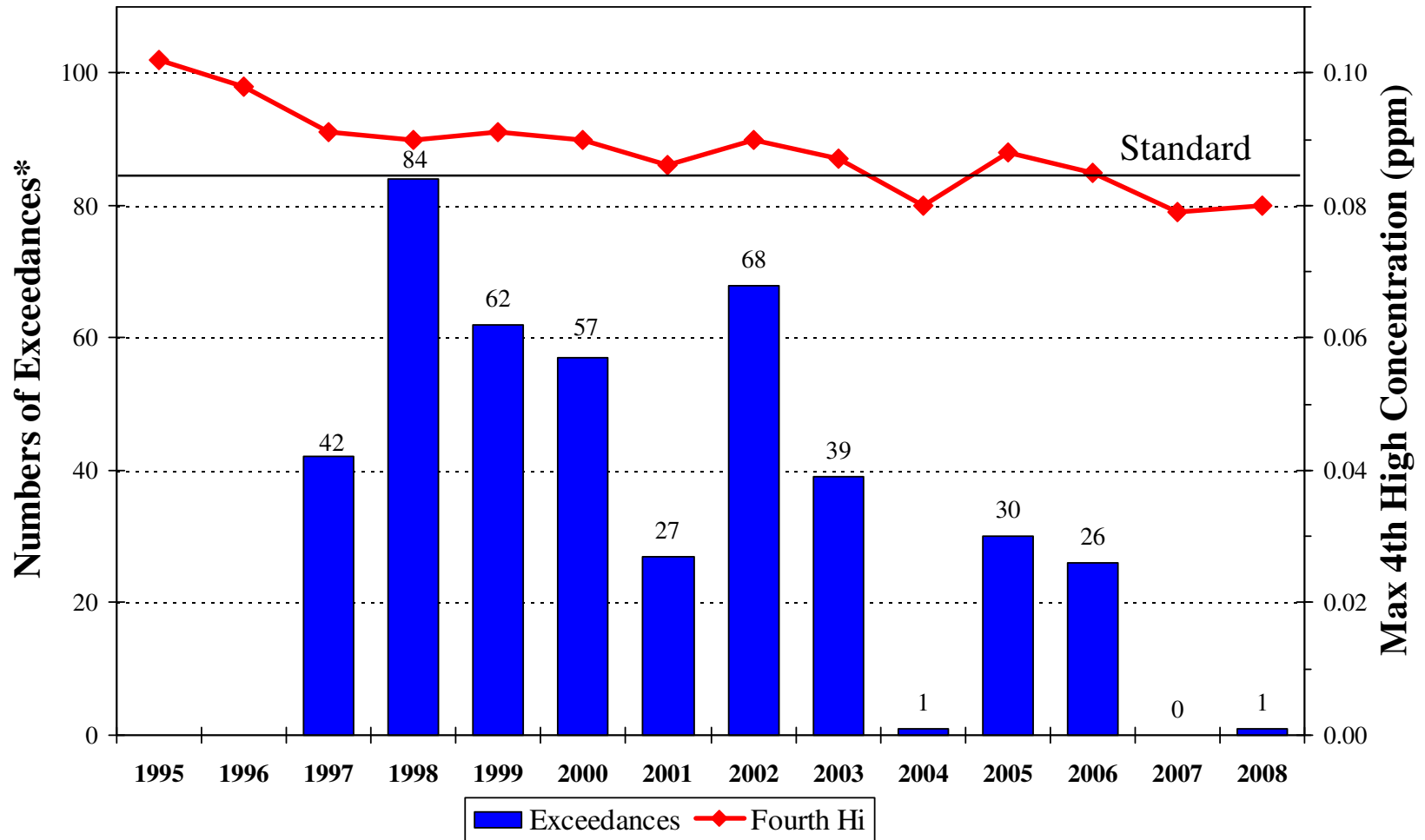
SO ₂ Areas		PM ₁₀ Areas		CO Areas	
Ajo	Maintenance	Ajo	Moderate	Phoenix	Maintenance
Douglas	Nonattainment	Bullhead City	Maintenance	Tucson	Maintenance
Hayden	Nonattainment	Douglas	Moderate		
Miami	Nonattainment	Hayden/Miami	Moderate	1 - Hour O ₃ Area	
Morenci	Maintenance	Nogales	Moderate	Phoenix	Maintenance
San Manuel	Nonattainment	Paul Spur	Moderate		
		Payson	Maintenance	8 - Hour O ₃ Area	
		Phoenix	Serious	Phoenix	Basic
		Rillito	Moderate		
		Yuma	Moderate		

-  County Boundary
-  PM₁₀ Attainment Area
-  PM₁₀ Nonattainment Area
-  Phoenix CO Maintenance Area and 1 - hour O₃ Maintenance Area
-  8 - Hour O₃ Nonattainment Area
-  Tucson CO Attainment Area
-  Sulfur Dioxide Attainment Area
-  Sulfur Dioxide Nonattainment Area





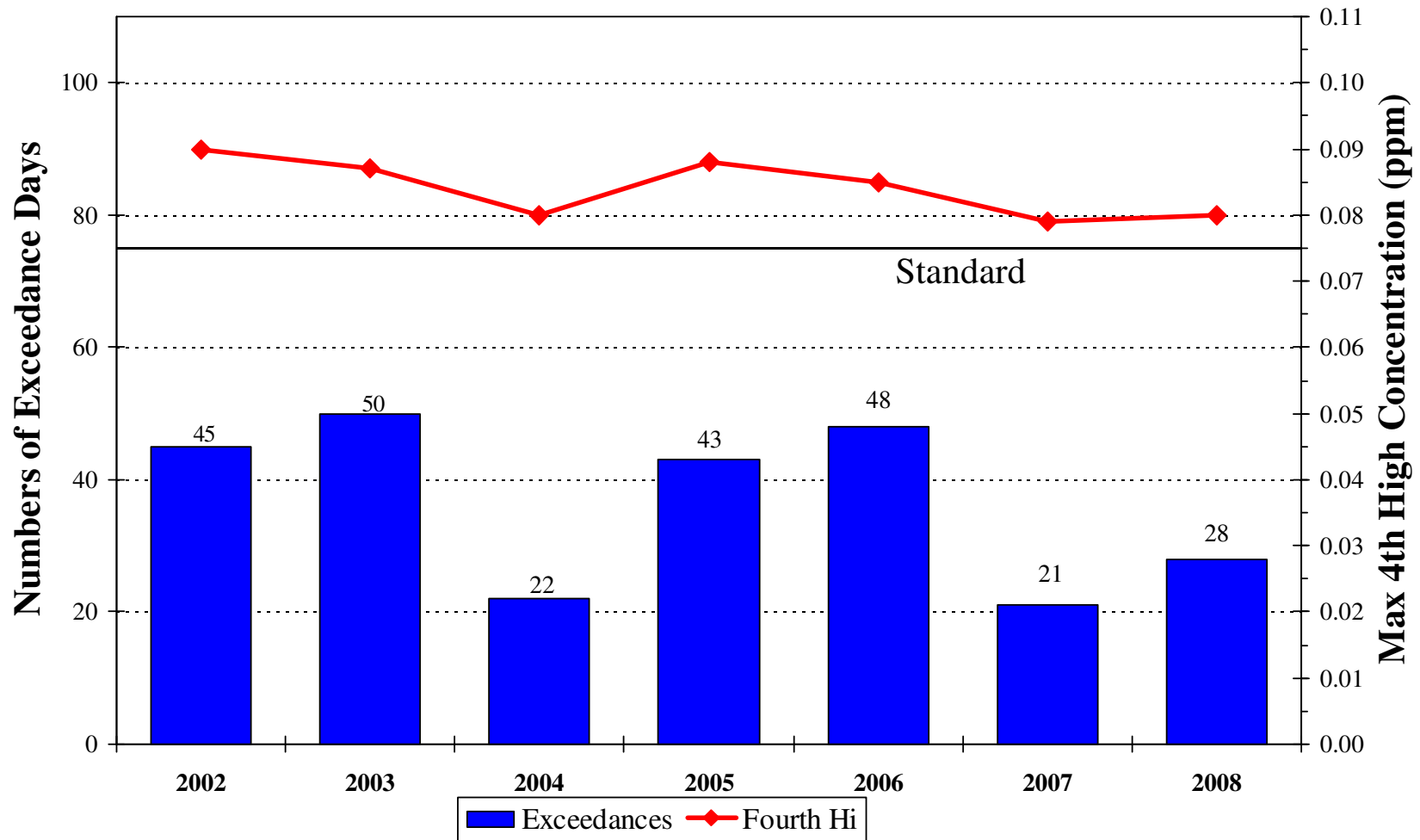
8-hour Average Ozone Exceedances and Concentrations 1997 Standard, Maricopa County, 1995 - 2008



*1995 and 1996 exceedance count excluded because there were fewer monitors in the network than in subsequent years.



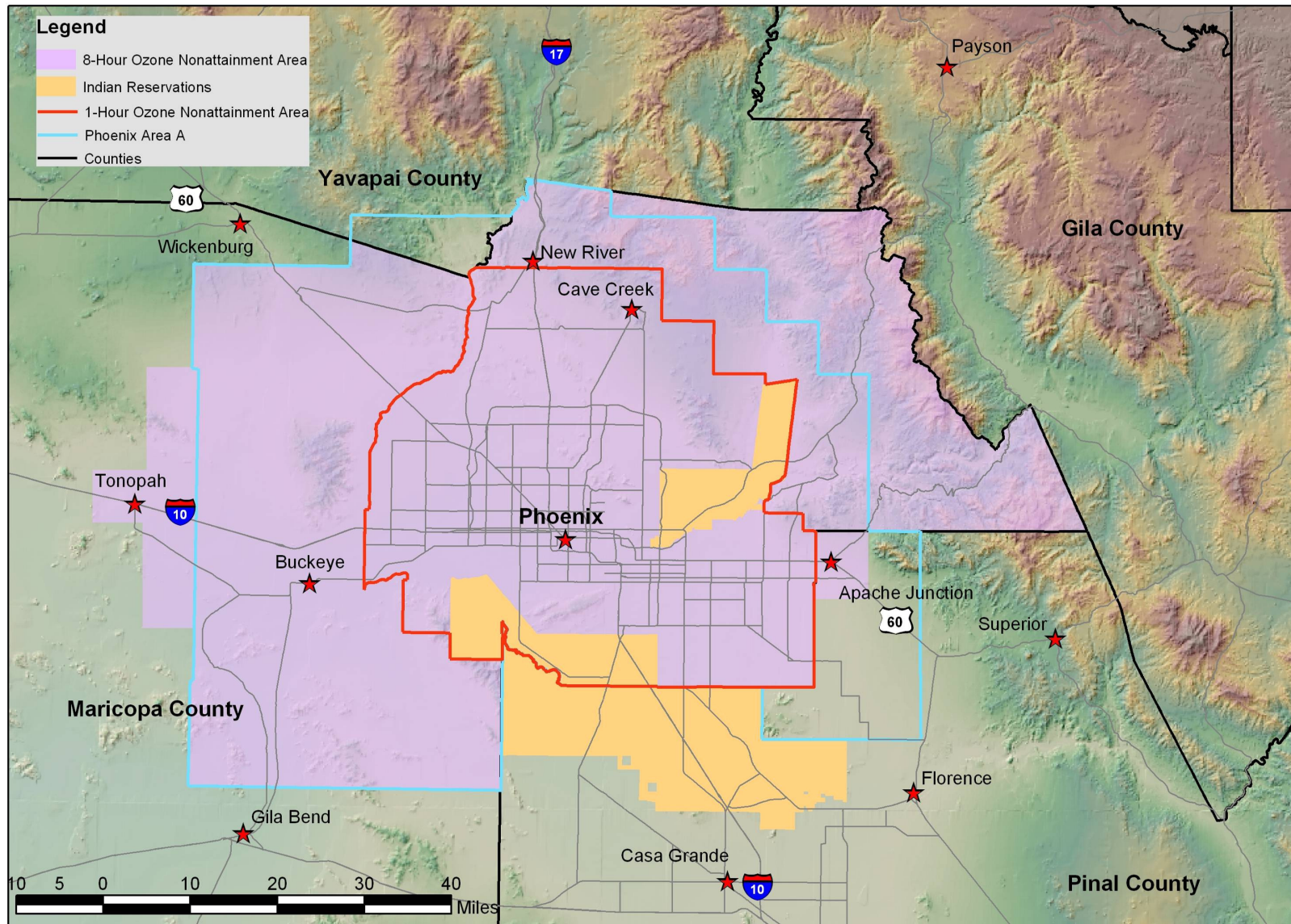
8-hour Average Ozone Exceedances and Concentrations 2008 Standard, Maricopa County, 2002 - 2008



*1995 and 1996 exceedance count excluded because there were fewer monitors in the network than in subsequent years.



Phoenix Area 8-Hour Ozone Nonattainment Area





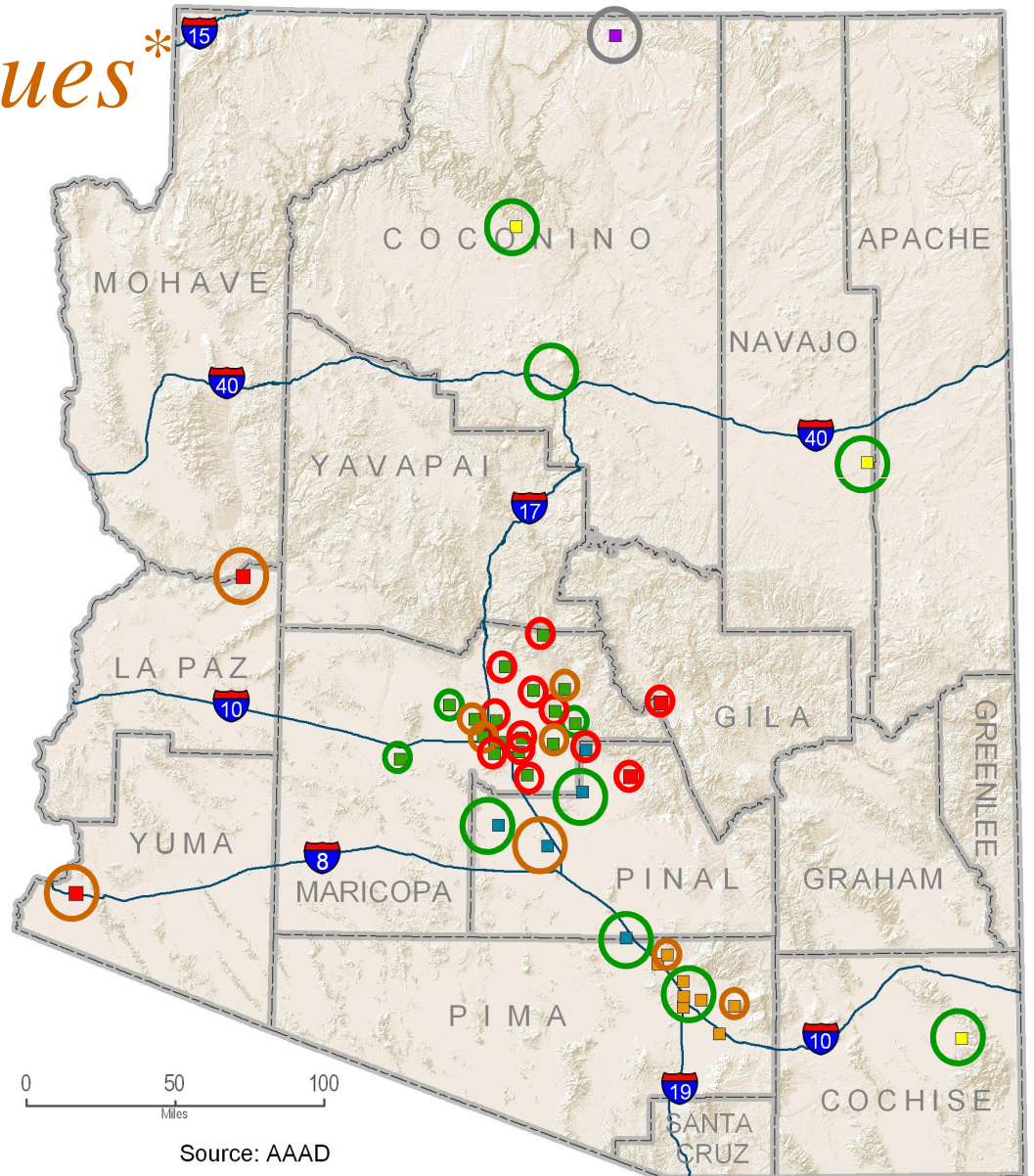
Ozone Design Values* 2006 - 2008

- 0.076 ppm and higher
- 0.071 – 0.075 ppm
- 0.064 – 0.070 ppm
- Unknown

O3 MONITOR OPERATOR

- ADEQ
- NATIONAL PARKS SERVICE
- MARICOPA COUNTY
- PIMA COUNTY
- PINAL COUNTY
- SOURCE OPERATED

*3-year average of the
 4th high values.





The West needs
more 105 \$\$
For PM10
problems!

“Ira! Ira! Ira! If you
can’t stand a little
dust, whatever
possessed you to
live in Arizona?”

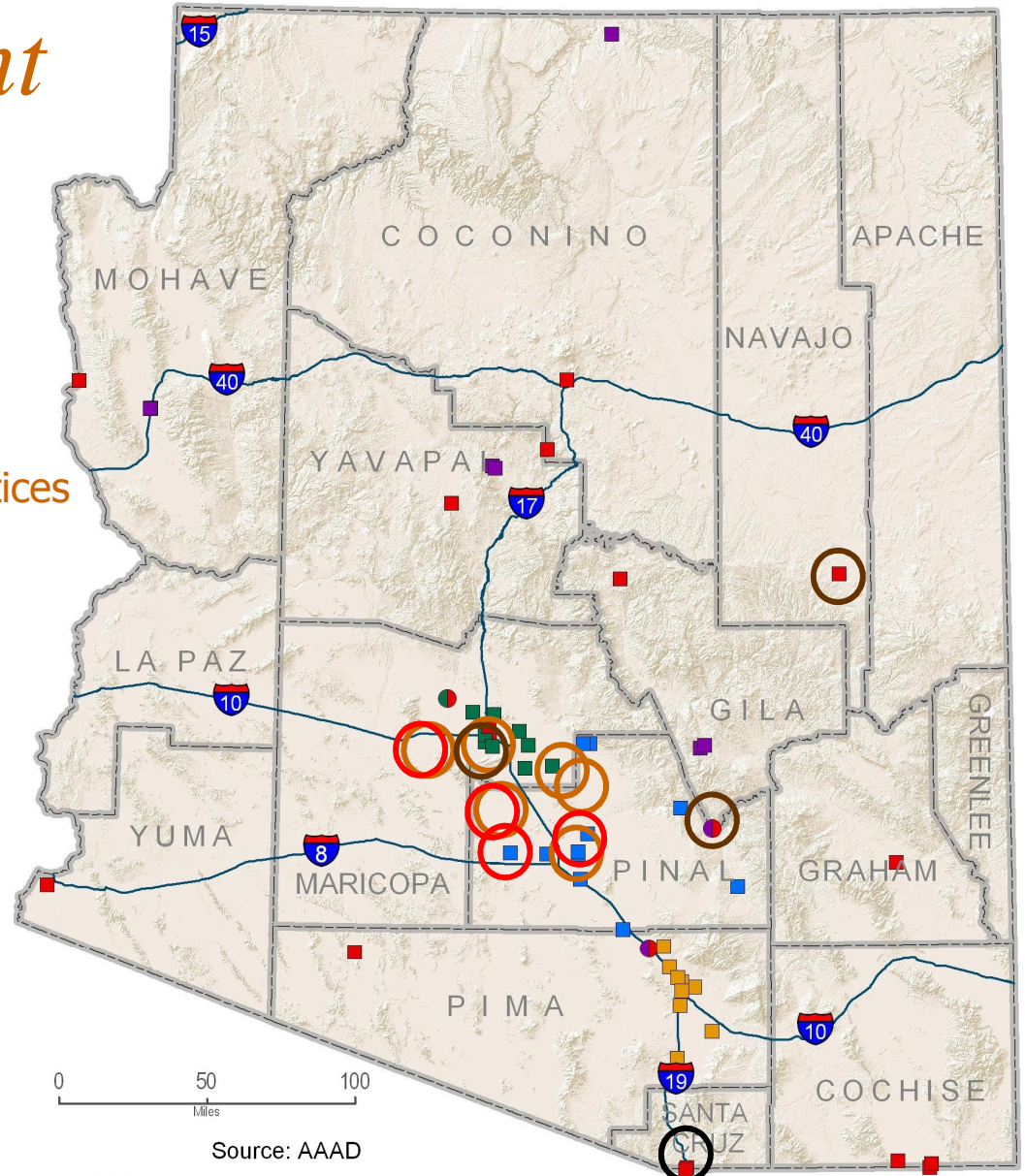


PM₁₀: A Persistent Problem

- Agriculture
- Construction, development practices
- Industrial
- International transport

PM10 MONITOR OPERATOR

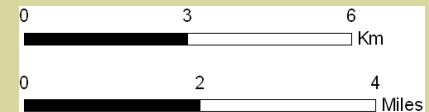
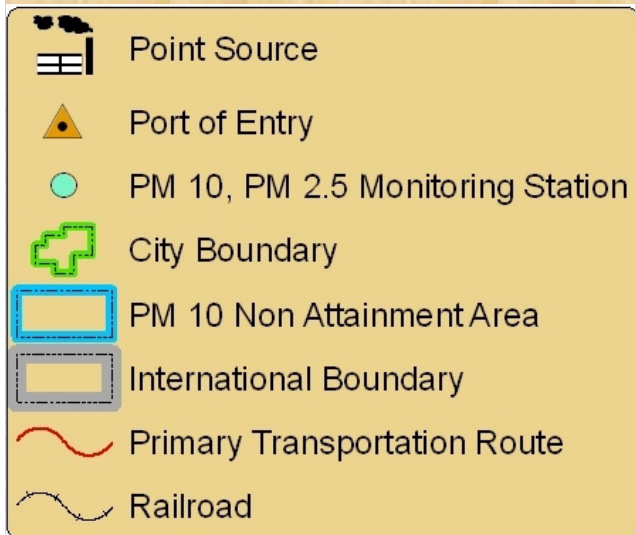
- ADEQ
- MARICOPA
- MARICOPA ADEQ
- PIMA
- PINAL
- SOURCE OPERATED
- SOURCE & ADEQ





Oh, pretty
please, John.
Just a few more
105 \$\$\$ for
The West?

Nogales PM_{2.5} Nonattainment Area



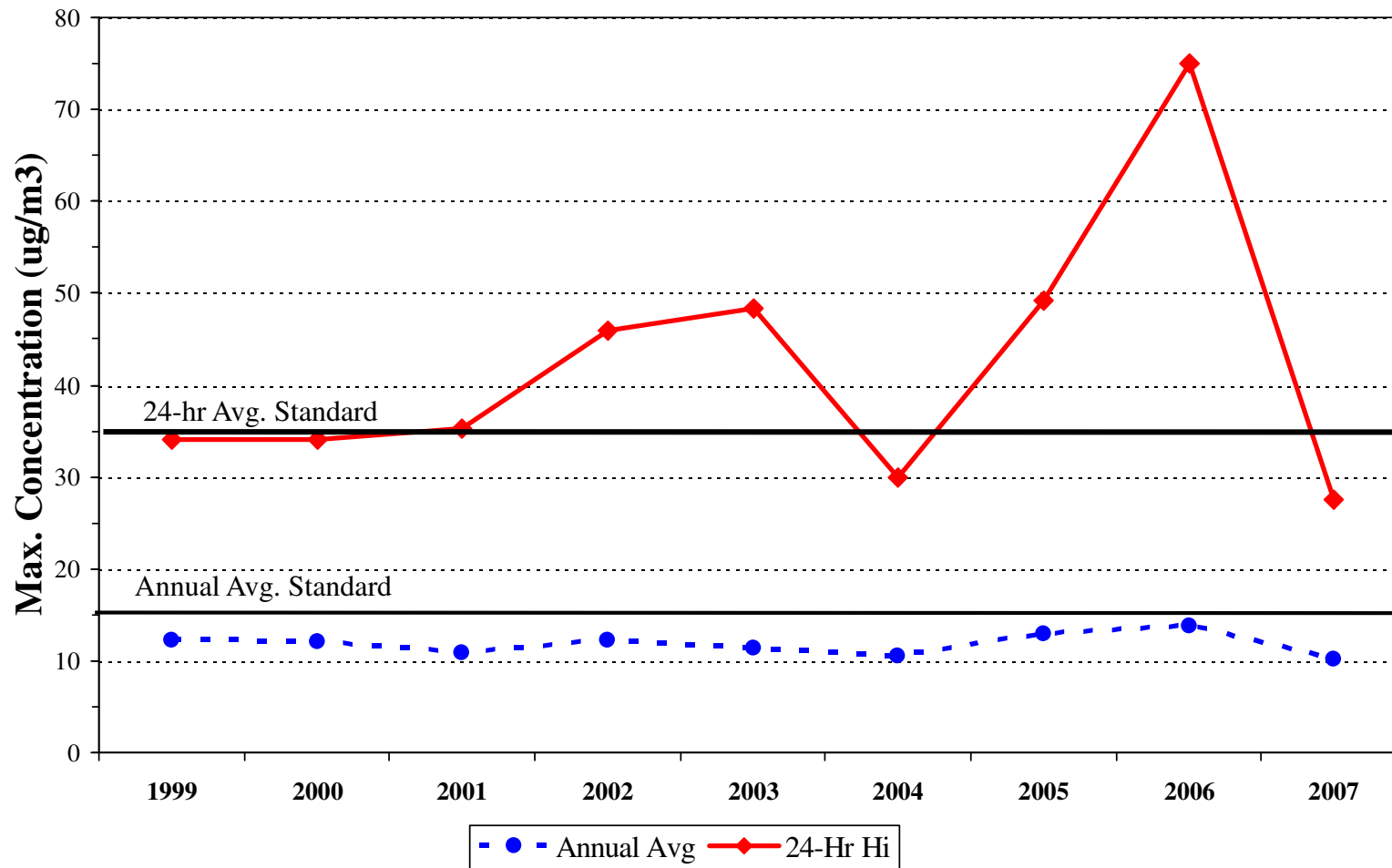


International Transport in Ambos Nogales





PM_{2.5} Concentrations Maricopa County, 1999 - 2007





10:00 am Christmas Day, 2006



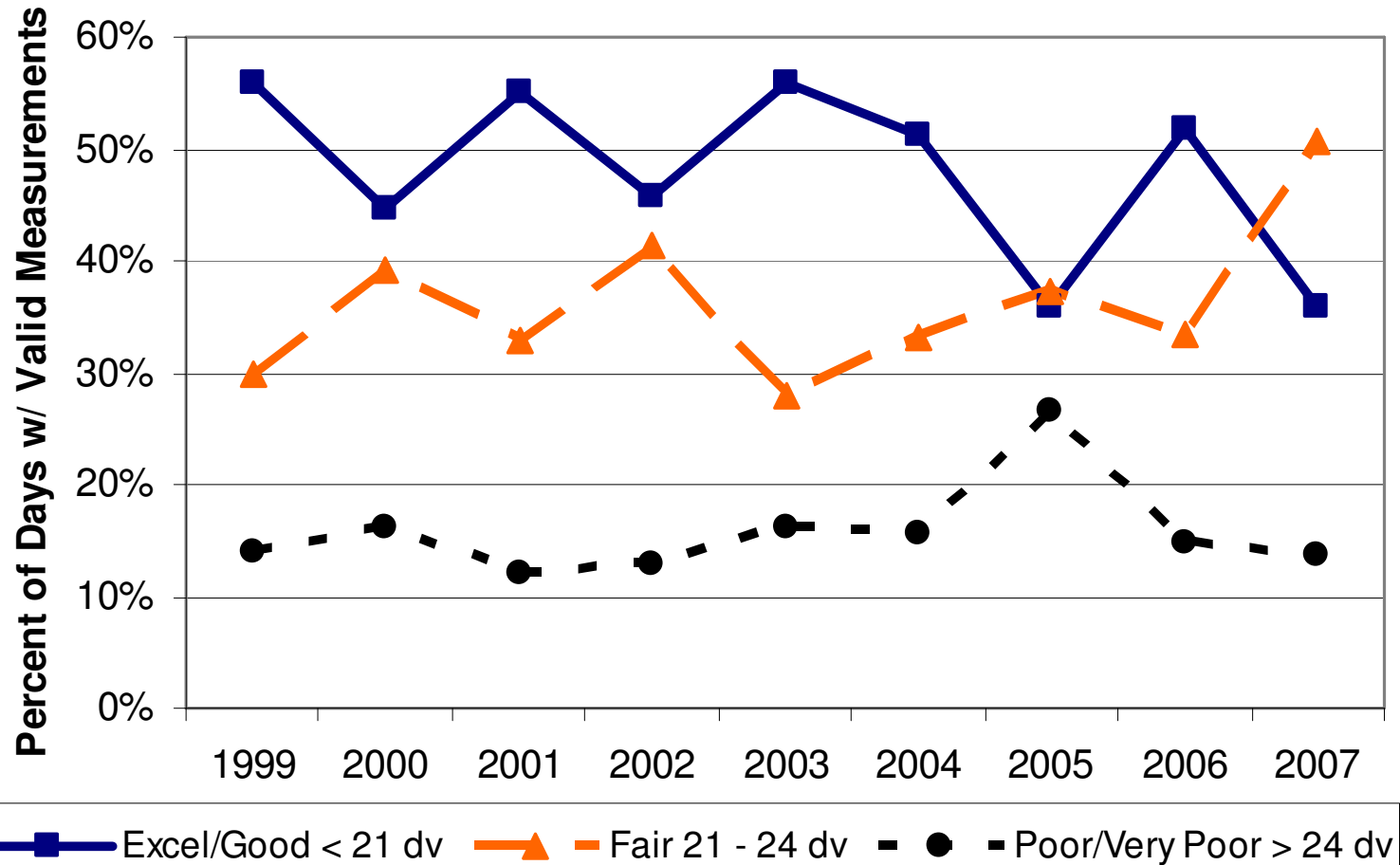


Phoenix Area Visibility Index

- ☉ Phoenix area network of 5 cameras and nephelometers, 2 transmissometers
 - ☐ See www.PhoenixVis.net for real-time reporting
- ☉ The Visibility Index
 - ☐ Excellent < 15 dv
 - ☐ Good 15 – 20 dv
 - ☐ Fair 21 – 24 dv
 - ☐ Poor 25 – 28 dv
 - ☐ Very Poor > 28 dv



Phoenix Visibility Index Trends 1999 - 2007*



*2007 Data are preliminary.



Exceptional and Natural Events

- Particulate matter primarily
- Almost all events in the southern deserts
- Most events in Nogales (international transport) and Phoenix area (windblown dust)



Desert Dust Storms and Haboobs

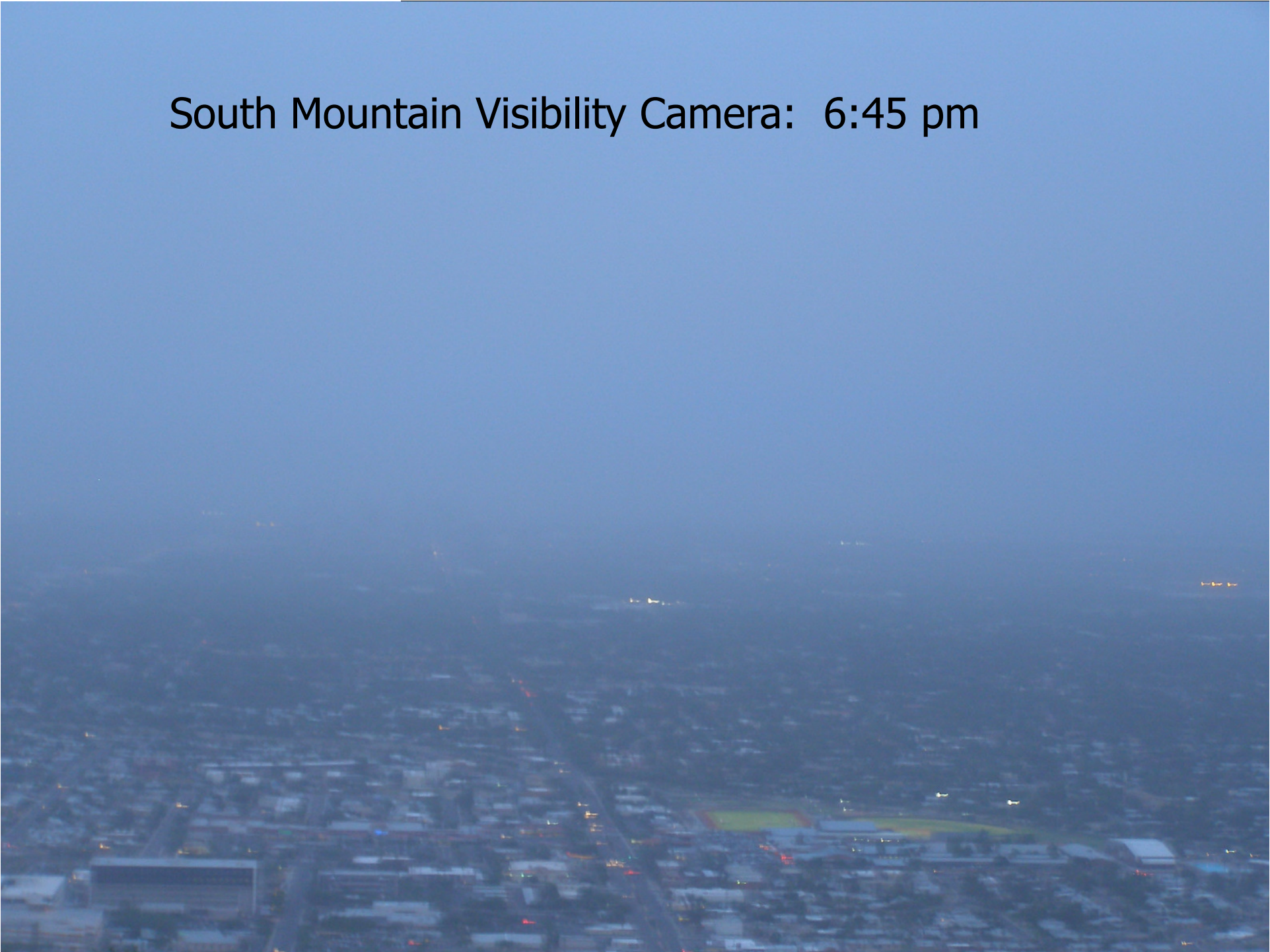
- ☉ Some events driven by strong, dry frontal systems in spring and less often in autumn
 - ▣ Wind speeds generally gusting 35 to 50 mph
- ☉ Haboobs the result of collapsing thunderstorms
 - ▣ Column of cold air descends at speeds of up to 100 mph with hail and/or heavy rain
 - ▣ Lateral winds gusting from 35 to over 60 mph



September 11, 2008

- Massive thunderstorm cell 50 miles southwest of Phoenix central city
- PM₁₀ 1-hr average readings 1,000 to 2,100 $\mu\text{g}/\text{m}^3$ during the event
- Maximum 24-hr average PM₁₀ that day was 119 $\mu\text{g}/\text{m}^3$ – NAAQS is 150 $\mu\text{g}/\text{m}^3$
- Typically these events cause exceedances from just over to several times the NAAQS

South Mountain Visibility Camera: 6:45 pm





Video

Enjoy our beautiful state!

