



Denver's Experience with PM Outreach

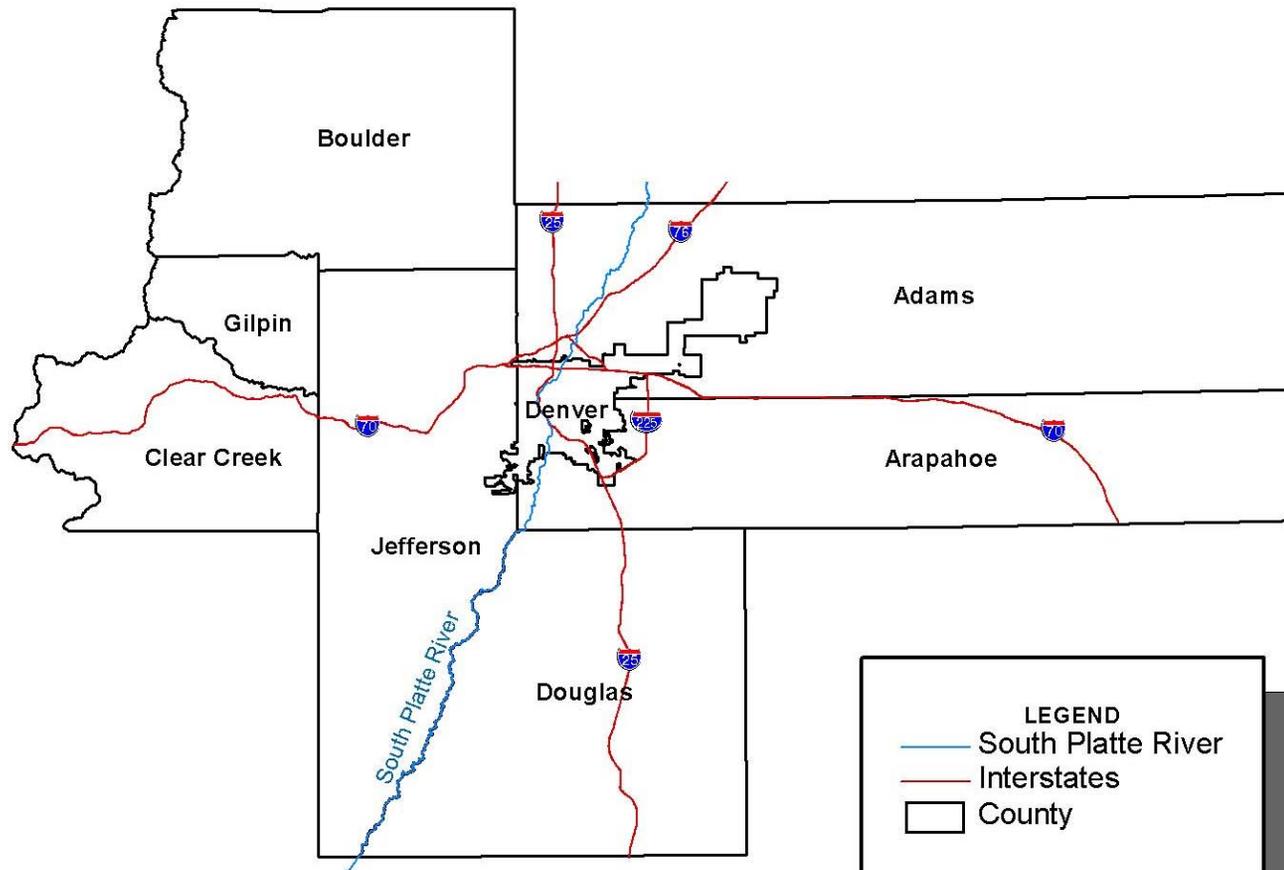
Ken Lloyd

Regional Air Quality Council

U.S. EPA's 2003 National Air Quality
Conference

San Antonio, TX

Denver Metro Area



LEGEND

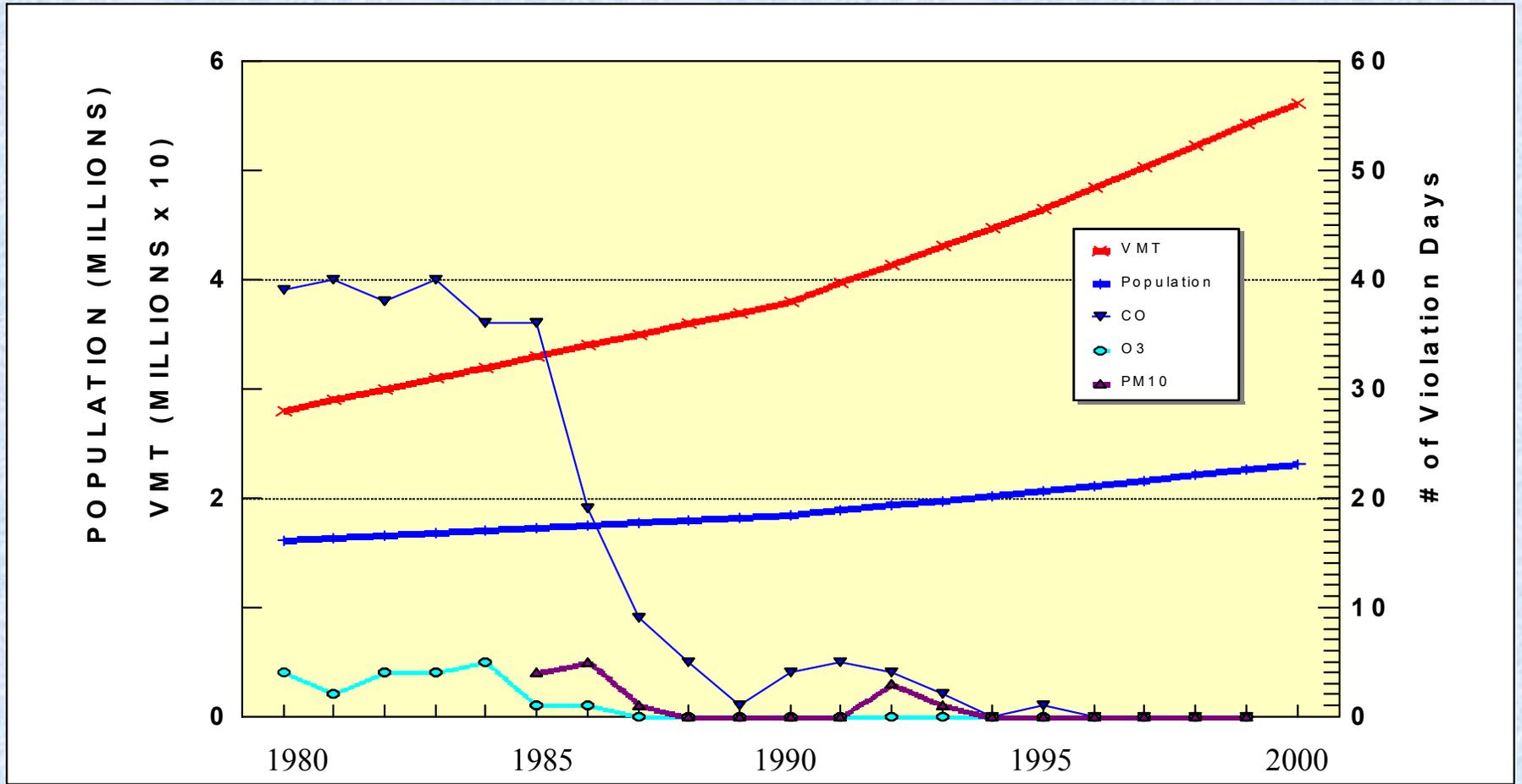
- South Platte River
- Interstates
- County



The Past

- 25 years ago Denver had a reputation for among the worst air quality in the country
- Exceeded federal air quality standards more than 150 times per year
 - Carbon Monoxide
 - Ozone
 - TSP
- Nonattainment for PM-10 standard in 1987
- Denver was well known for its “Brown Cloud”

The Progress



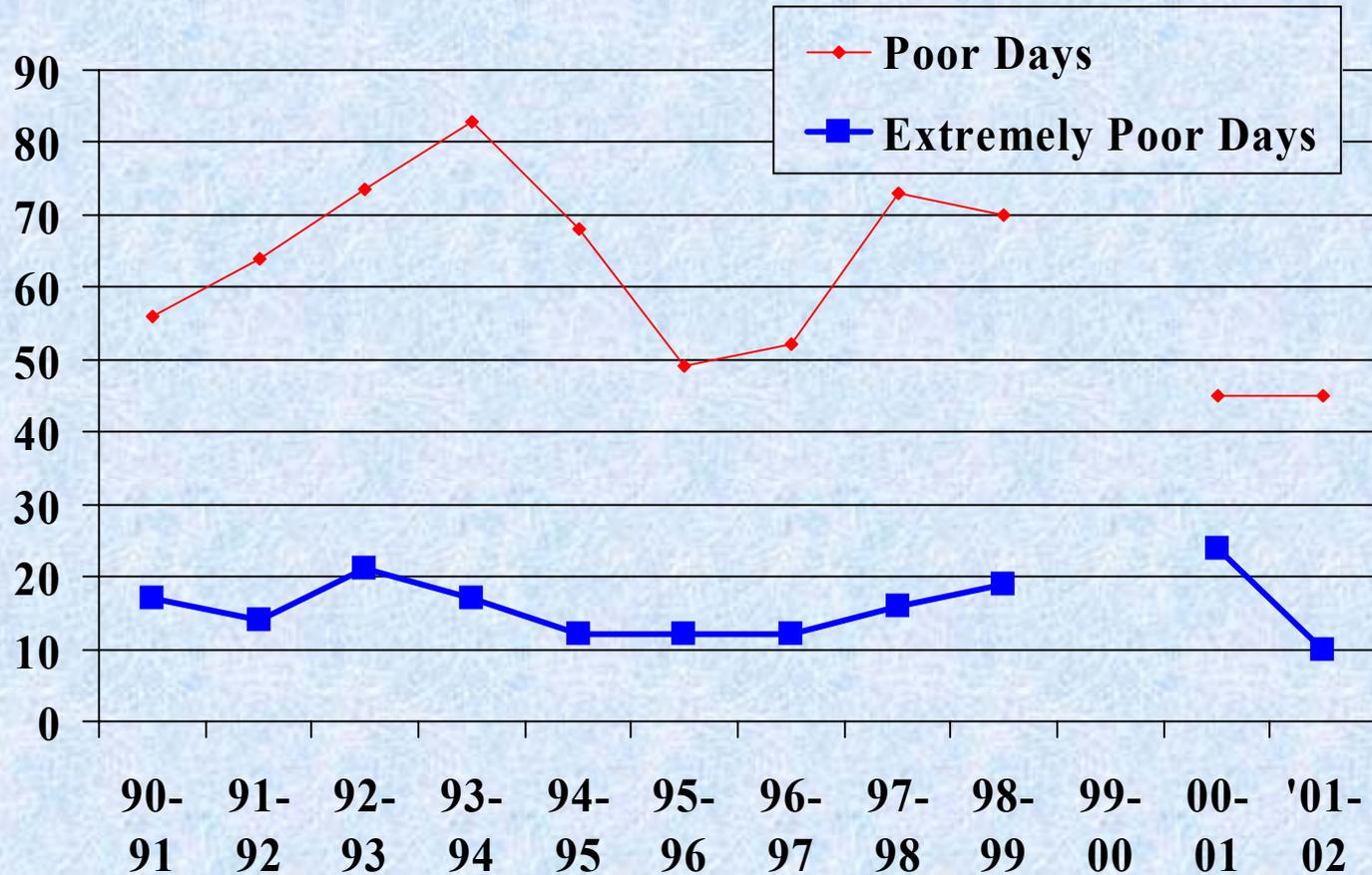


The Achievement

- Denver area became the first area to achieve redesignation to attainment for all EPA standards:
 - **Ozone** -- redesignation effective October 2001
 - **CO** -- redesignation effective January 2002
 - **PM-10** – redesignation effective October 2002



The Brown Cloud Remains





Keys to Success

- **Business community leadership**
- **Local government involvement**
- **Citizen support and interest**
- **Innovation**
- **Public/private partnerships**
- **Federal standards and programs**



Winter High Pollution Program

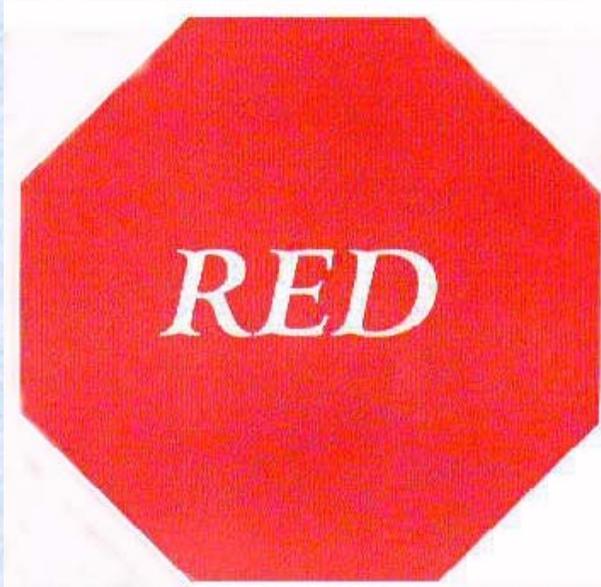
- Multi-pollutant approach
 - **Carbon Monoxide**
 - **PM-10**
 - **Visibility**
 - **PM-2.5**
- Many varied elements
 - **High pollution days**
 - **Visibility standard**
 - **Woodburning**
 - **Power plants**
 - **Diesel vehicles**
 - **Street sanding**
 - **Reduced driving**



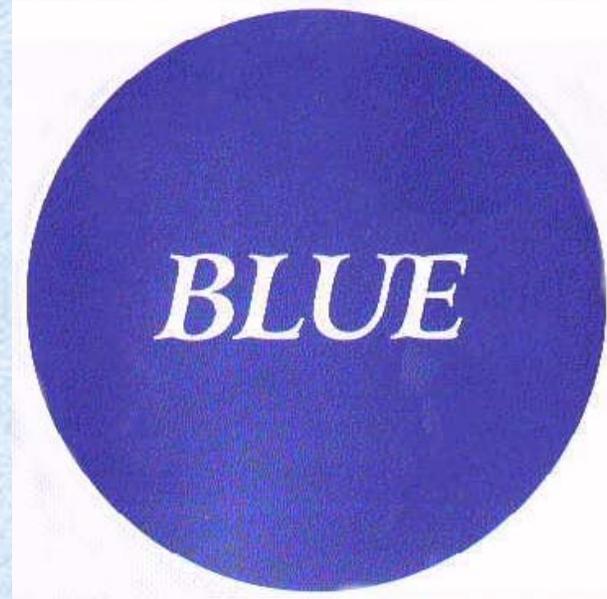
High Pollution Day Forecasts

- First implemented winter of 1987/88
 - **Initially based on CO and PM-10**
 - **Visibility added in 1990**
 - **PM-2.5 added in 2000**
 - **Runs from Nov. 1 to March 31**
- Initially implemented with a three-tiered call:
 - **Red**
 - **Yellow** (*dropped in 1990*)
 - **Blue**
- Visibility has become the prime basis for the calls -- 50-60 red days per year

HPD Symbols



*Conditions are poor
or expected to worsen*



*Conditions are good
or expected to improve*



Urban Visibility Standard

- In 1989 State legislature directed state agency to establish an urban visibility standard
- Standard established through a public involvement process
- Standard is based on visual range
- Serves as a basis for high pollution day calls and woodburning restrictions
- Standard is a goal – no other regulatory enforcement



Woodburning Program

- Worked cooperatively with wood heating industry to develop a multi-faceted program:
 - **Wood stove standards**
 - **Local government woodburning restrictions on high pollution days**
 - **Ban on fireplaces in new construction**
 - **Woodburning conversions – Great Stove and Fireplace Changeout**
- Wood smoke emissions have decreased dramatically



Power Plants

- Power plant emissions estimated to contribute about 10-15% of PM-2.5 and visibility
- *Xcel Energy* implemented a voluntary emission reduction program to reduce emissions at 3 coal-fired metro area power plants:
 - Up to 50% NO_x reduction
 - 70% average SO₂ reduction
 - 85% SO₂ reduction at larger units
 - Repowered some smaller units with natural gas



Diesel Vehicles

- Colorado established a Diesel Inspection/Maintenance Program in 1988
 - Diesel Opacity Inspection Program
 - Fleet self-inspection program
- Economic incentives for alternative fuels
- Transit company has purchased alternative fuels and hybrid fuel buses
- Currently launching new *Clean Air Fleets* outreach and awareness program
 - School bus fleets
 - Truck fleets



Street Sanding

- Major contributor to PM-10, but also important to a lesser degree for PM-2.5
- Since 1989, amount of sand applied to Denver area roadways has been reduced by nearly 60%:
 - **Guidelines developed by street maintenance officials**
 - **Commitments made by local governments and CDOT**
 - **Better management practices**
 - **Use of alternative deicing materials**
 - **Increased street sweeping**



Reduced Driving

- **Voluntary reductions part of HPD message**
- **Region-wide networks of Transportation Management Organizations**
- **EcoPass/Guaranteed Ride Home program**
- **Rush Hour Relief program**
- **Developing a network of transit lines and HOV lanes**



Future Challenges

- Maintain current air quality standards
 - Maintenance plans in place
- Achieve new air quality standards
 - PM-2.5 standard
 - 8-hour ozone standard
- Reduce the Brown Cloud



Voluntary Ozone Reduction Program

- Implemented in 1999 after high readings in 1998
 - Ozone alerts
 - Public information materials and messages
 - Media coverage
 - Voluntary RVP reduction program
 - *“Stop at the Click”* vehicle refueling program
 - *“Put a Cap on Ozone”* gas cap program
 - *“Mow Down Pollution”* lawnmower exchange
 - *“Citizens Choose Clean Air”* promotion
 - *“Repair the Air”* high-emitter repair program

