Panel Discussion – Current and Future Challenges for Western States
Western US Monitoring Issues

- Enormous Landscapes/Huge Distances to represent through monitoring
- Areas of both high population density and very rural, sparse population
- Urban areas with rapid growth, rampant construction, traffic congestion
- Air pollution levels high for PM (both), ozone, air toxics
- Many of the nation’s Class I Areas
- Historically, states and locals have operated independently on monitoring. Little regional planning organization activity
- Topography and Meteorology (basin and range phenomenon concentrates pollution)
- Large expanses of agricultural production
- Reporting daily PM$_{2.5}$ to public in more areas
- Shipping channel activity impacts to west coast ($O_3$, PM, NOx and SOx)
Ozone

- Western US background Influenced by offshore sources
- Urban impacts outside urban areas; transport not addressed
- Rapid growth of urban areas, Las Vegas, Phoenix, Sacramento
- Challenges: areas unable to get more emission reductions
- Lower 8-hour standard, many more areas not attaining
Ozone Trends at NPS Sites

Trends in 3-Year Average 4th Highest 8-Hour Ozone Concentrations, 1994-2003
FY2004 Annual Performance Report for NPS Government Performance and Results Act (GPRA)
Air Quality Goal 1a3

Downward pointing arrows denote trends toward decreasing ozone concentrations and improving air quality. Similarly, the up arrows correspond to trends toward higher ozone concentrations and hence worsening air quality. Park names underlined in red denote parks where monitored ozone levels exceed the level of the NAAQS or are part of an ozone non-attainment area.
Particulate Matter

- Fine and coarse PM pollution widespread
- Fugitive dust difficult to define or control
- Neither projected to improve thru 2015
- Visibility
- Wildfires contribute in uncontrollable ways
- Meteorological monitoring networks not adequate for documentation of exceptional events (fires hundreds of miles away, etc)
- Improvements have been made for PM$_{10}$
PM$_{10}$ Nonattainment Areas

Status of Current PM$_{10}$ Nonattainment Counties
(Counties with one or more current nonattainment areas, based on 2003-2005 air quality data)
Currently Designated PM$_{2.5}$ Nonattainment Areas - 1997 Standards
Violated annual and/or 24-hour NAAQS with designated data (2001-2003*)

- Violated annual NAAQS (15.0 µg/m$^3$) and 24-hour NAAQS (65 µg/m$^3$) [2 areas]
- Violated only 24-hour NAAQS (65 µg/m$^3$) [0 areas]
- Violated only annual NAAQS (15.0 µg/m$^3$) [37 areas]

* 2002-2004 data were considered in the designation process but all nonattainment designations were based on 2001-2003 data
Counties Exceeding New NAAQS Levels, 2003-2005

- Violates annual NAAQS (15.0 µg/m³) and 24-hour NAAQS (35 µg/m³) [56 counties]
- Violates only 24-hour NAAQS (35 µg/m³) [70 counties]
- Violates only annual NAAQS (15.0 µg/m³) [17 counties]

- Data from AQS 7/10/2006
- Completeness criteria: 2006 CFR or 11+ samples per quarter
Counties Projected to Exceed the PM$_{2.5}$ NAAQS in 2020
Based on EPA Modeling*
Annual $15$ ug/m$^3$ and 24-Hour $35$ ug/m$^3$

Legend
County with monitor exceeding:
- both annual and 24-hour PM2.5 standards $17$
- ONLY the 24-hour PM2.5 standard $28$
- ONLY the annual PM2.5 standard $03$
Total Counties Exceeding $48$

Projections as of September 2006. EPA models assume implementation of CAIR/CAMR/CAVR, Title IV of the Clean Air Act, the NOx SIP Call, and some existing state programs. This approach does not forecast actions states will take to meet current PM standards.
PM$_{2.5}$ Composition (Annual)

Table 2-5. Percent Contribution to PM$_{2.5}$ by Component, 1999

<table>
<thead>
<tr>
<th>Component</th>
<th>East (10 sites)</th>
<th>West (26 sites)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sulfate</td>
<td>56</td>
<td>33</td>
</tr>
<tr>
<td>Elemental Carbon</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Organic Carbon</td>
<td>27</td>
<td>36</td>
</tr>
<tr>
<td>Nitrate</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Crustal Material</td>
<td>7</td>
<td>17</td>
</tr>
</tbody>
</table>

Units are µg/m$^3$. Pie chart sizes are scaled by the annual average PM$_{2.5}$ concentrations.
Additional Issues

- Exceptional events
  - Fires
  - Volcanoes
  - Dust storms

- Air monitoring site retention while networks still growing

- Determining PM composition and sources

- Air toxics

- Funding
United States Air Quality

OZONE

Frequency of Exceeding the 8-hour National Standard
2003–2005

Standard = 0.08 ppm – 8 hour average concentration

Only sites not meeting the standard (40 CFR 50.10) are shown. Based on 2003 thru 2005 data from US EPA's AQS database.
United States Air Quality

PARTICULATES PM-10
Frequency of Exceeding the 24-hour National Standard 2003-2005

Standard = 150 micrograms per cubic meter - 24-hour average concentration
Based on 2003 thru 2005 data from US EPA's AQS database.
United States Air Quality

PARTICULATES
PM-2.5

Severity of Annual National Standard Exceedances
2003-2005

National Standard = 15 micrograms per cubic meter - annual mean concentration.
Based on 2003 thru 2005 data from US EPA's AQS database.
United States Air Quality
PARTICULATES PM-2.5
Severity of 24-hour National Standard Exceedances
2003-2005

National Standard = 65 micrograms per cubic meter = 24-hour average concentration
Based on 2003 thru 2005 data from US EPA's AQS database.