



Transboundary Ozone Pollution Conference

U.S. EPA, Region 9

April 2, 2015

Presentation outline

- EPA collaborations to improve understanding of international transport.
- EPA collaboration with China on improving air quality and mitigating climate change.
- EPA analyses of “background ozone”
 - TAO is a component of background ozone (see schematic).
- Policy options for addressing for background ozone, including TAO.

Session question: Are there promising technology and policy options at the international, bilateral, or regional scales capable of reducing regional TAO impacts caused by fossil fuel combustion in Asia?

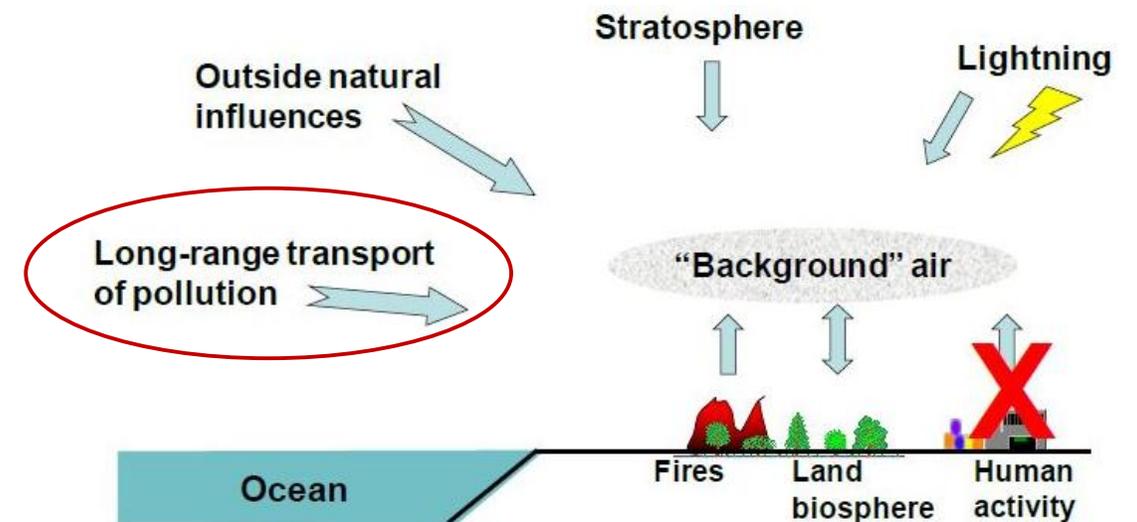


Figure 3-7 Schematic overview of contributions to North American (NA) background concentrations of O₃.

U.S. EPA (2013): Integrated Science Assessment for Ozone

Improving Our Understanding of International Transport

- EPA has been a global leader in the effort to improve our understanding of the intercontinental transport of air pollution since evidence of potentially significant transport began to emerge in the late 1990s.
- For the last 10 years, EPA has co-chaired the Task Force on Hemispheric Transport of Air Pollution (TF HTAP) under the UNECE Convention on Long-Range Transboundary Air Pollution. This Task Force has engaged experts from around the world to develop an improved understanding of intercontinental transport across the Northern Hemisphere and the potential for mitigation actions.
 - TF HTAP, the Western Regional Air Partnership (WRAP), and the National Center for Atmospheric Research (NCAR) are holding a series of workshops entitled “Modeling Air Quality from the Global to Regional Scale” in Boulder 11-15 May 2015. The meetings are open to participation in person or through web conferencing.
- EPA, along with NASA, NOAA, and NSF, sponsored the 2010 National Academy of Sciences report Global Sources of Local Pollution. EPA continues to work with its federal partners through the interagency Air Quality Research Subcommittee to identify opportunities for cooperation that will yield insights.
- EPA has incorporated the consideration of background levels of air pollution in its assessments, linking GEOS-Chem and other global models to CMAQ, and explicitly exploring the influence of international transport in the NAAQS review process.
- EPA has developed new tools, such as hemispheric-scale CMAQ, to improve the ability to quantify extra-regional influences on air quality in the United States.

Mitigating Sources of International Transport

EPA is working to strengthen air quality management efforts and mitigate sources of international transport through

- bilateral agreements with Mexico, Canada, China, and other countries, and
- multi-lateral institutions and partnerships, such as UNEP and the Climate and Clean Air Coalition (CCAC).

One focus of multi-lateral attention is methane mitigation, which is a significant contributor to tropospheric ozone on a global scale, as well as a potent greenhouse gas.



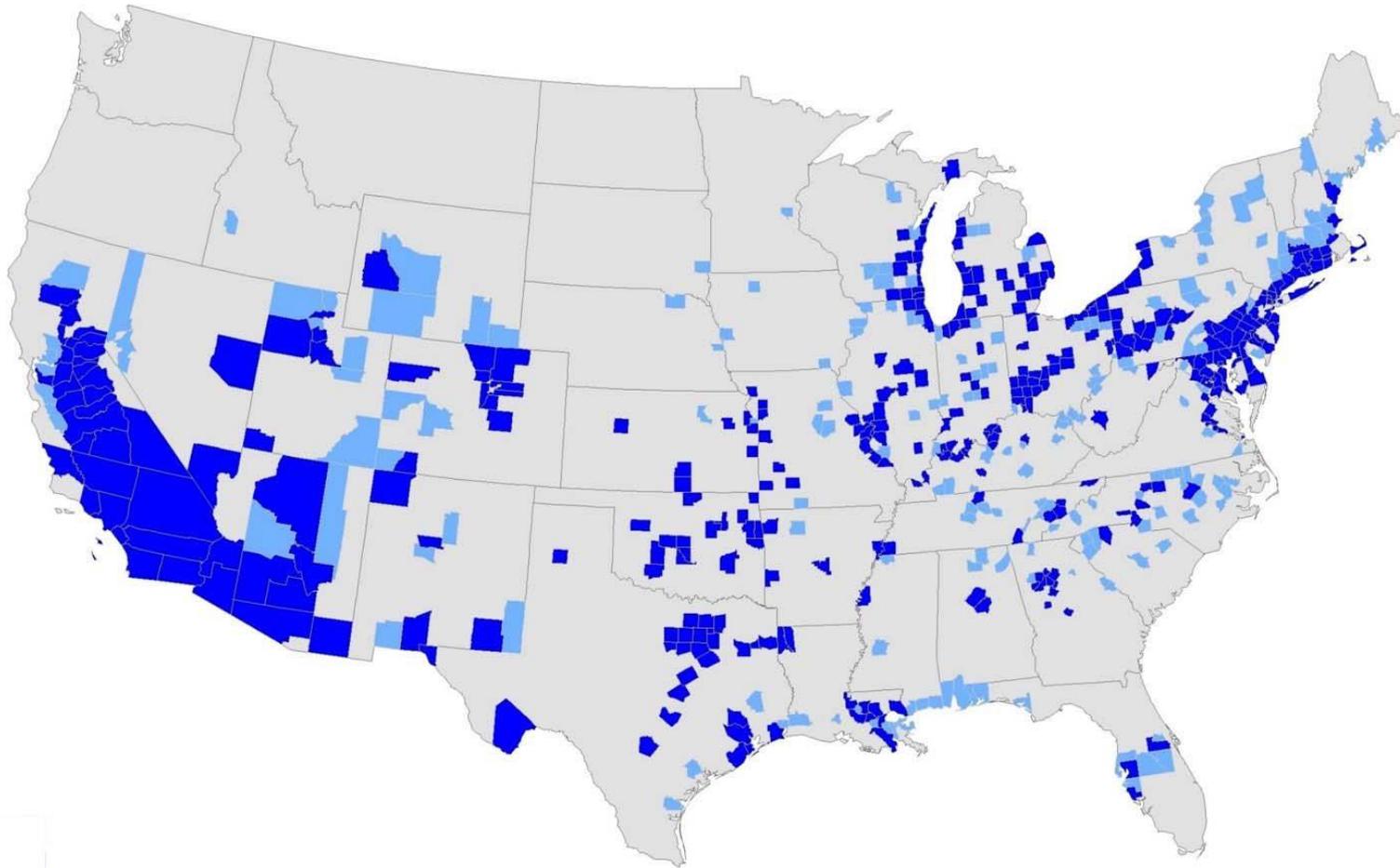
Collaboration with China on improving air quality

- EPA collaborates with China to share expertise and experience in the monitoring, assessment and reduction of air pollutants. This includes promoting the use of integrated air quality and regional multi-pollutant air quality management strategies, and the development of frameworks and technical capacities to adopt effective emissions reduction strategies.
 - EPA has collaborated with China's Ministry of Environmental Protection (MEP) to develop SO₂ emissions cap and trading mechanisms and with MEP and Provinces to promote cleaner fuels and vehicles.
 - EPA also collaborated with the Shanghai Environmental Protection Bureau and Shanghai Environmental Monitoring Center to establish the AIRNow-International real-time air quality information system.
 - EPA continues assisting with hosting study tours, training, and cooperation on multi-pollutant and mercury controls, power sector emissions, motor vehicle engine compliance, and helping China in controlling PM_{2.5} emissions.
 - EPA co-sponsors with MEP Regional Air Quality Monitoring conferences to address priority air quality issues such as regional coordination of PM_{2.5} control and best practices for air quality planning.
 - EPA and MEP have undertaken a pilot project in Jiangsu Province to develop a model air quality plan that adapts best practices from the U.S. to China in collaboration with the U.S. Trade and Development Agency.

Collaboration with China on mitigating climate change

- With China, EPA participates in the U.S.-China Climate Change Working Group to the Strategic and Economic Dialogue. This working group intends to:
 - Support development of domestic fuel and freight policies
 - Support development of methodologies for collecting and managing greenhouse gas emissions data,
 - Provide technical assistance on the design and implementation of multi-pollutant emission control programs that reduce conventional pollutants and greenhouse gases, and
 - Engage in dialogues on energy efficiency in new and existing buildings.
- Climate mitigation measures resulting from the collaboration are expected to have air quality co-benefits.

2011-2013 O₃ design values relative to proposed NAAQS range



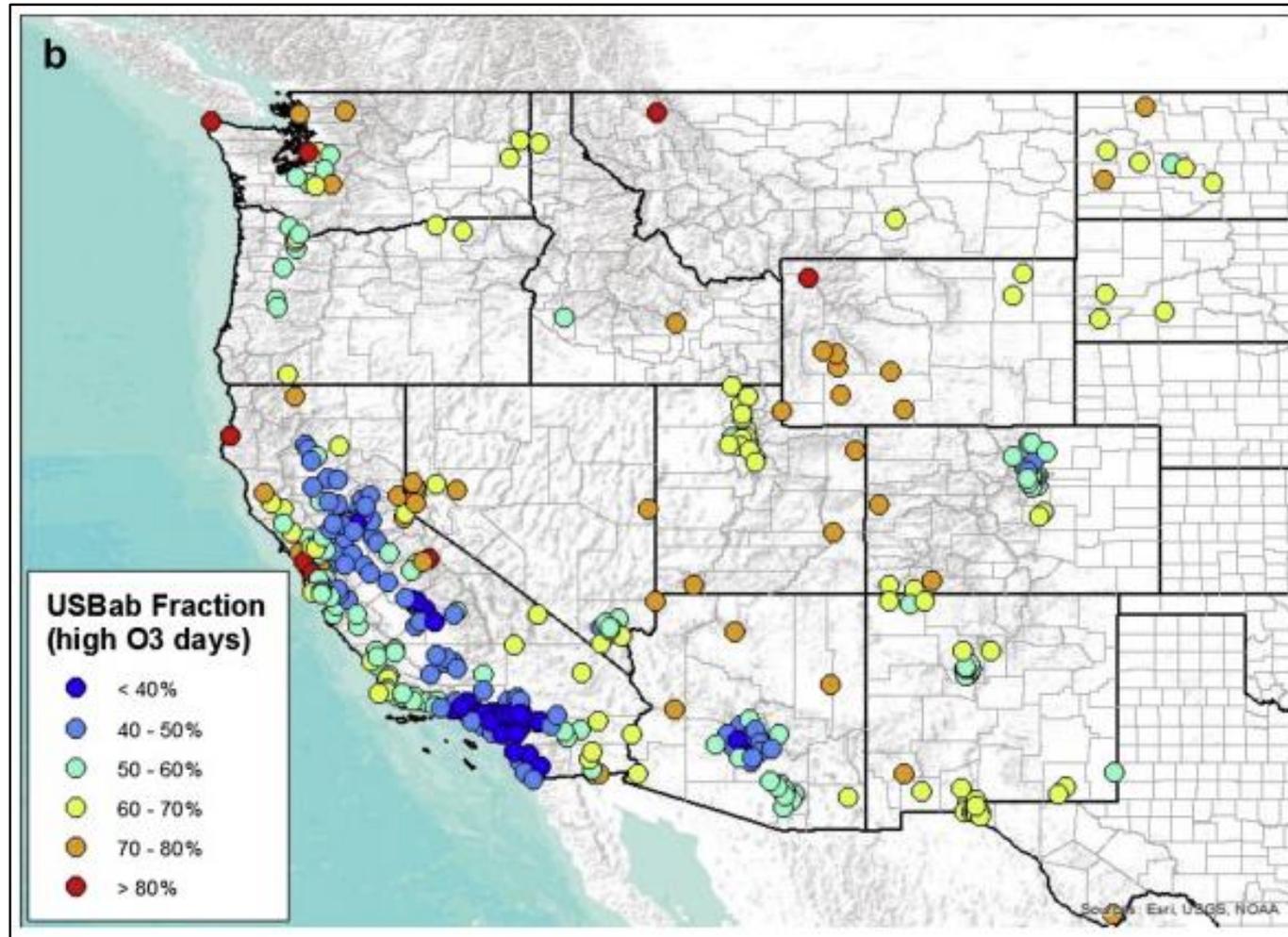
- Based on 2011-2013 monitoring data:
 - 358 counties would violate 70 ppb (darker blue)
 - 200 additional counties would violate 65 ppb.
- EPA projects most counties would meet the proposed range of standards by 2025



EPA estimates of model background ozone

- Background O₃ refers to ozone that is formed by processes that cannot be impacted by local controls
 - Transport of O₃ from the stratosphere
 - Natural O₃ precursors: biogenic VOC & NO_x, wildfires, lightning
 - Non U.S. anthropogenic emissions of O₃ precursors (TAO)
 - Global methane background
- U.S. Background (USB) O₃ is estimated using air quality model simulations that remove all U.S. anthropogenic emissions or otherwise track the contribution of sources other than U.S. man-made sources.
- EPA assessed model performance across the domain and specifically on days/sites with high estimates of model background and concludes the model platform is suitable for use in estimating USB contributions.

EPA estimates of western U.S. background fractions on high ozone days



(Dolwick et al., 2015, Fig 9b)

- Most violations of the ozone NAAQS are driven by U.S. man-made emissions.
- In some locations of the country, there may be days for which natural and/or TAO sources are a significant proportion of local ozone concentrations.
 - Background contributions are proportionally highest in rural, high-elevation areas across the western U.S.
- EPA does not expect this to be a widespread issue at the higher end of the proposed NAAQS range.
- There are a number of CAA mechanisms and national programs that can help ensure states are not required to develop unreasonable local control measures for attainment.

Policy options for addressing background O₃: Exceptional Events



- An “exceptional event” generally refers to either a natural event, or an event caused by human activity unlikely to recur, which is also not reasonably controllable or preventable.
 - A state can request and EPA may exclude air monitoring data influenced by exceptional events from use in making regulatory decisions, provided states prepare documentation that meets certain regulatory criteria.
 - Example natural “exceptional” events that could impact O₃: stratospheric intrusions, wildfires.
 - EPA recently approved a demonstration from Wyoming for a June 2012 stratospheric O₃ intrusion event.
- EPA anticipates proposing revisions to Exceptional Events Rule in the near-future:
 - Intent: simplify process for making exceptional event demonstrations
 - Also developing guidance to help air agencies in addressing the Exceptional Events Rule criteria for wildfires.

Policy options for addressing background O₃ : Rural Transport Areas and Interstate Transport



- The Clean Air Act allows a nonattainment area to be treated as “rural transport areas” if it can be demonstrated that the area meets these criteria:
 - The area does not contain emissions sources that make significant contributions to ozone in the area, or other downwind areas.
 - The area does not include and is not adjacent to a Metropolitan Statistical Area.
- A rural transport area is considered to have met its CAA obligations if it satisfies the Marginal classification requirements
 - Includes nonattainment NSR (including offsets)
 - No attainment demonstration required
- As part of the CAA process, each state is required to submit a plan that prevents emissions from within the state from contributing to nonattainment or interfering with maintenance in downwind states (aka “Good Neighbor” provision).

Policy options for addressing background O₃: Transboundary anthropogenic ozone



- The Clean Air Act (section 179B) allows the EPA Administrator to determine whether an area would meet the ozone NAAQS by the attainment date “but for” emissions contributing to the areas from outside the U.S.
 - If such a plan is approved, an area would be exempt from reclassification, FIPs, and potential sanctions.
 - Provides relief from adopting more than reasonable controls to demonstrate attainment.
- EPA has used section 179B authority in the past to approve attainment plans for Mexican border areas in El Paso (including 1-hour ozone), Nogales (PM), and the Imperial Valley of CA (PM).

Summary



- EPA is working on a number of fronts to better understand potential international sources of ozone and identify opportunities for reducing long-range transport of this harmful pollutant and its precursors.
 - On the science front, EPA is working with other federal agencies and through the TF HTAP. On the policy front, EPA is working with air quality officials in China and other countries to improve their air quality management capabilities.
 - In addition, global efforts to reduce methane emissions, such as the Global Methane Initiative, will contribute to decreases in ozone concentrations.
- While most exceedances of the ozone NAAQS in the U.S. are caused by man-made emissions within the U.S., there may be cases in which background ozone is a significant proportion of local ozone concentrations.
 - These events are most frequent in rural, high-elevation sites in the western U.S.
 - This background ozone can result from a combination of sources, including international anthropogenic emissions.
 - The relative proportion of various background terms can be highly variable and is contingent on meteorological conditions.

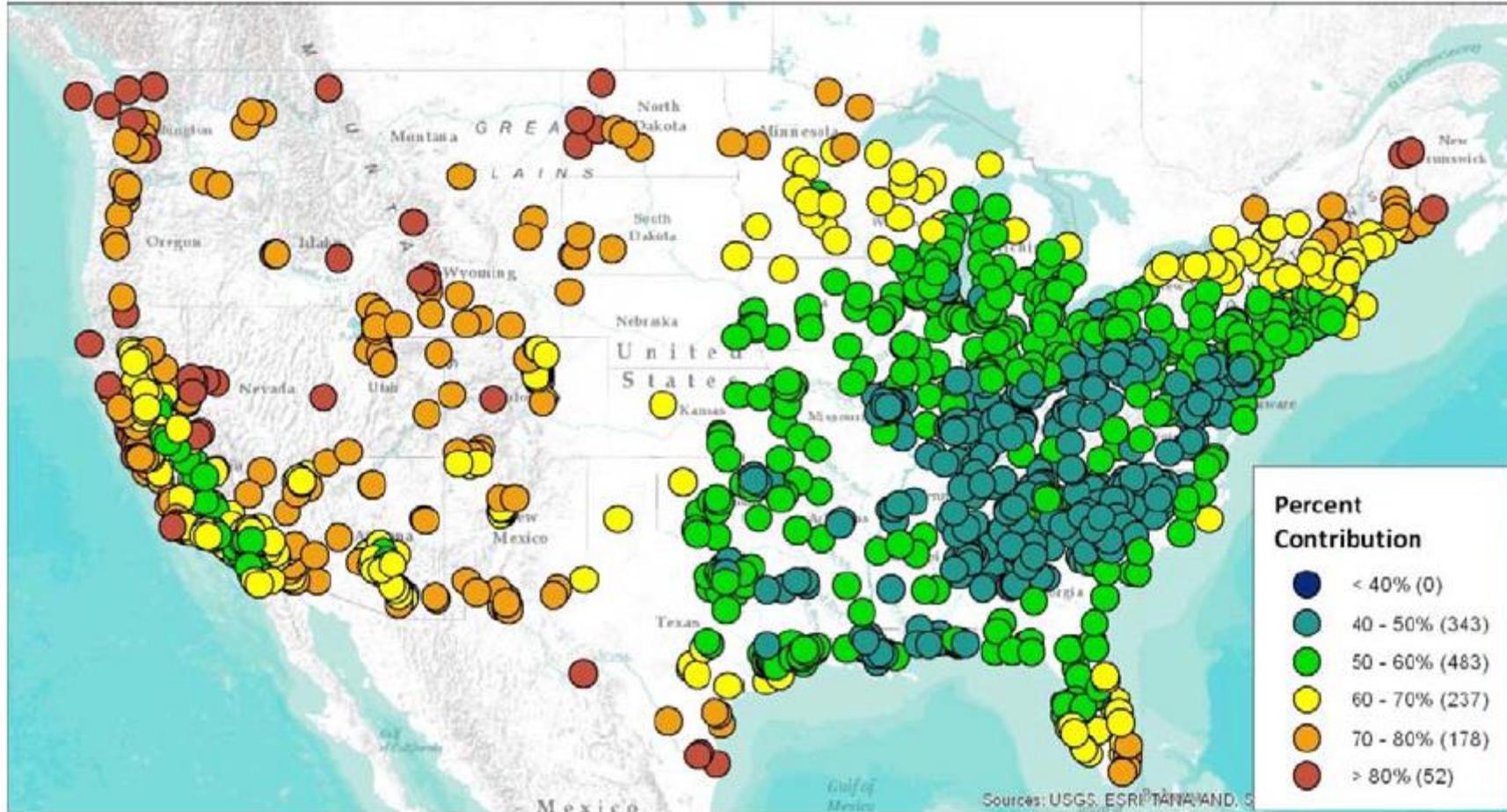
Summary (continued)



- Under the Clean Air Act, states are not responsible for reducing emissions that are not in their control. Existing and upcoming EPA regulations and guidance will assist states in ensuring background ozone (including TAO) does not create unnecessary control obligations as they continue their work to improve air quality.
 - This was noted in the outreach materials provided with EPA's proposal to update the ozone NAAQS.
 - <http://epa.gov/glo/pdfs/20141125fs-tools.pdf>
- EPA has a long history of working with states as they develop State Implementation Plans (SIPs) to reduce emissions of ozone precursors within individual jurisdictions. The agency will continue these collaborative efforts for any revised ozone National Ambient Air Quality Standards (NAAQS), including working with stakeholders to identify implementation solutions for treatment of ozone formed outside an area's jurisdiction.
 - <http://epa.gov/glo/pdfs/20141203-background-ozone-states.pdf>

Extra Slides

EPA estimates of model seasonal mean U.S. background fractions



(EPA, 2014, Ozone Policy Assessment: Fig 2-13)