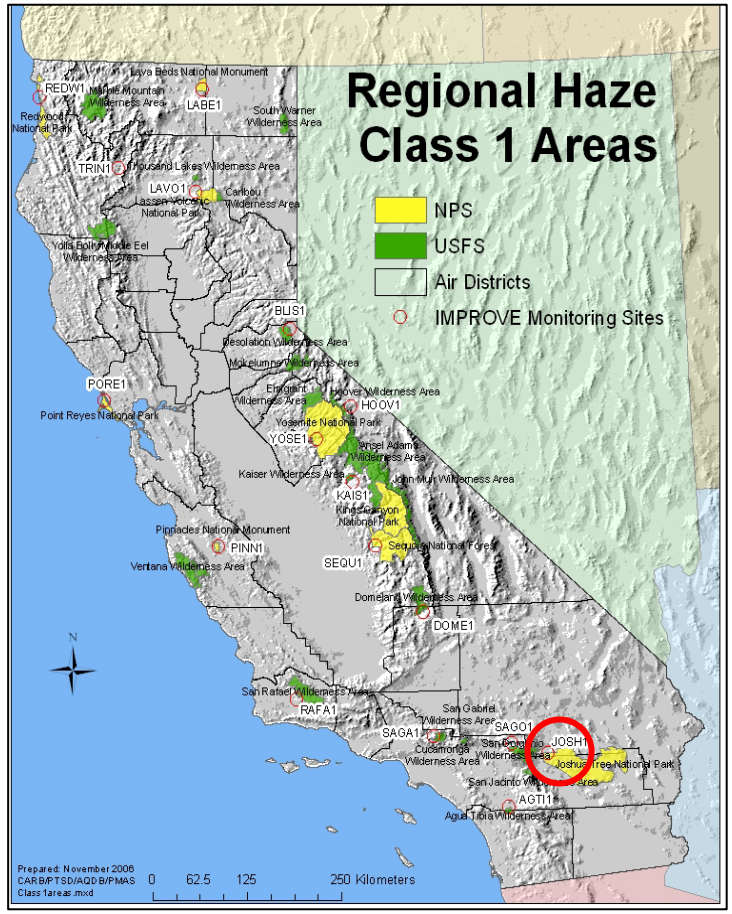
Highlighting Monitor: JOSH

Joshua Tree National Park



Preliminary Draft
January 14, 2007

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Joshua Tree National Park

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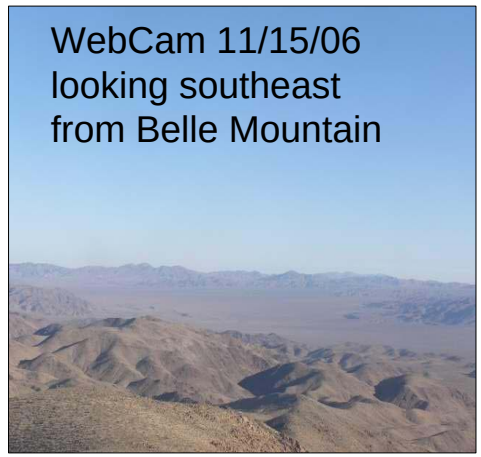
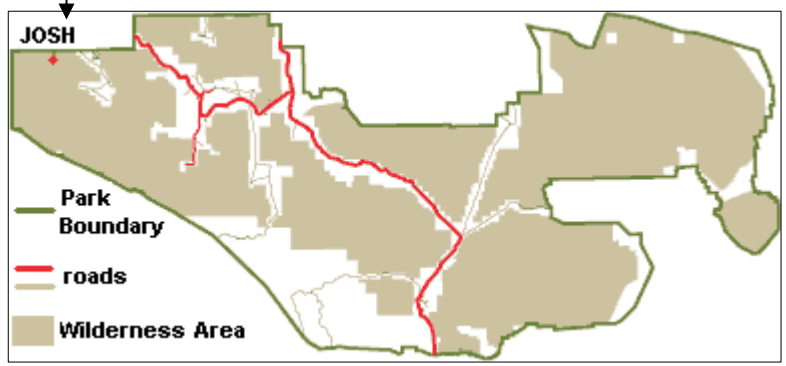
Joshua Tree Wilderness Area (429,690 acres/~10 sq. mi.)

- Within Joshua Tree National Park
- Southern California (inland desert)
- Influence from LA Basin through San Gorgonio
- Influence from Mexico and the Gulf





Source: all images from http://www.nps.gov/jotr/

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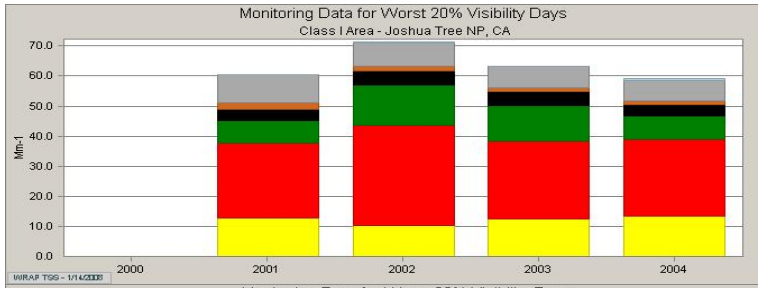

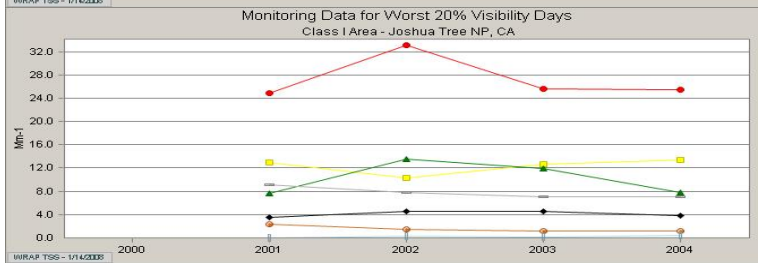

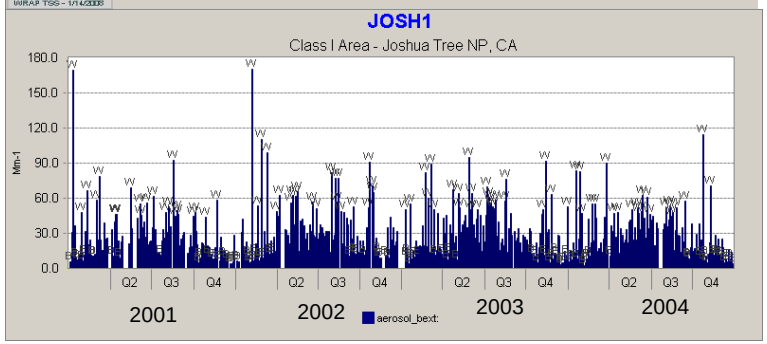

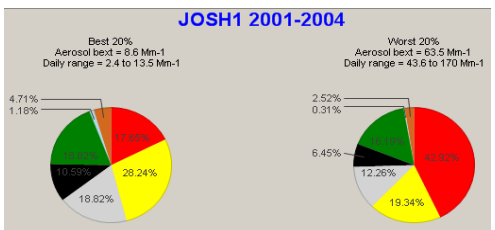

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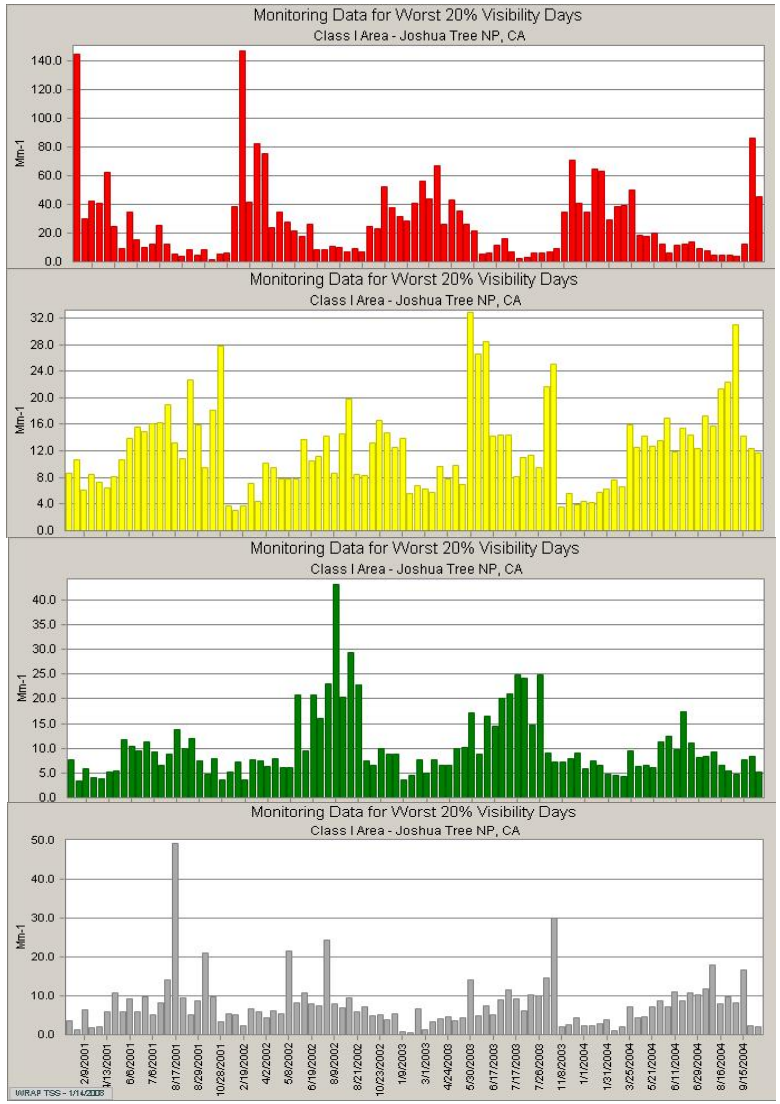

In the baseline years (2001-2004) all worst days in wet winter months (November-April) are driven by nitrates.

Nitrates drive 50% of the worst days.

Sulfates, Organics, and Coarse Mass are drivers May through October, when nitrates are low.

Reducing NOx emissions should reduce nitrate formation and greatly benefit visibility at Joshua Tree.

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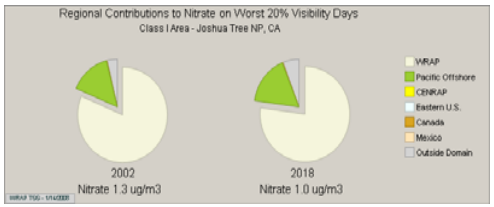
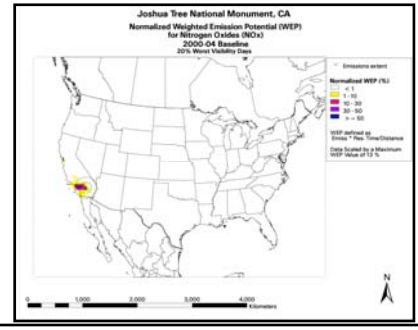
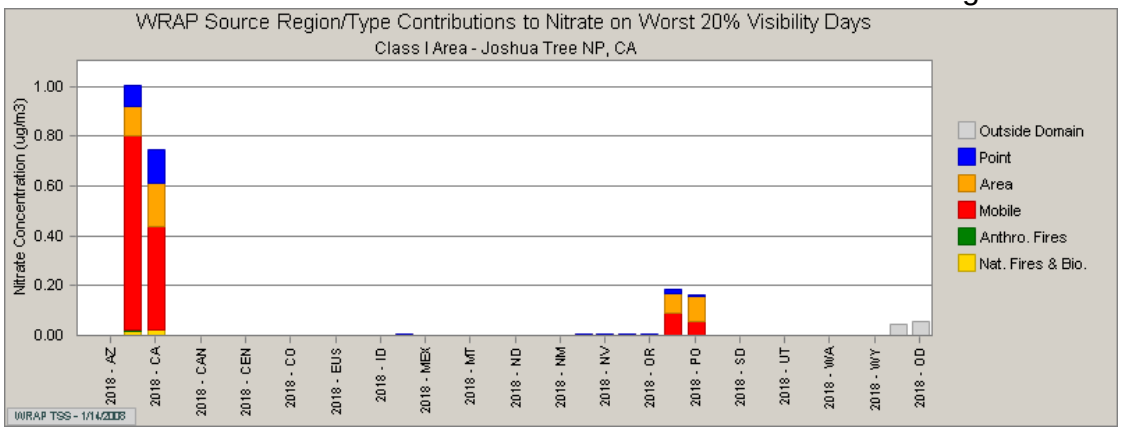


Nitrates come predominately from the WRAP region, including California

Pacific Offshore contributions may change when the offshore marine shipping emissions are included in future 2018 modeling

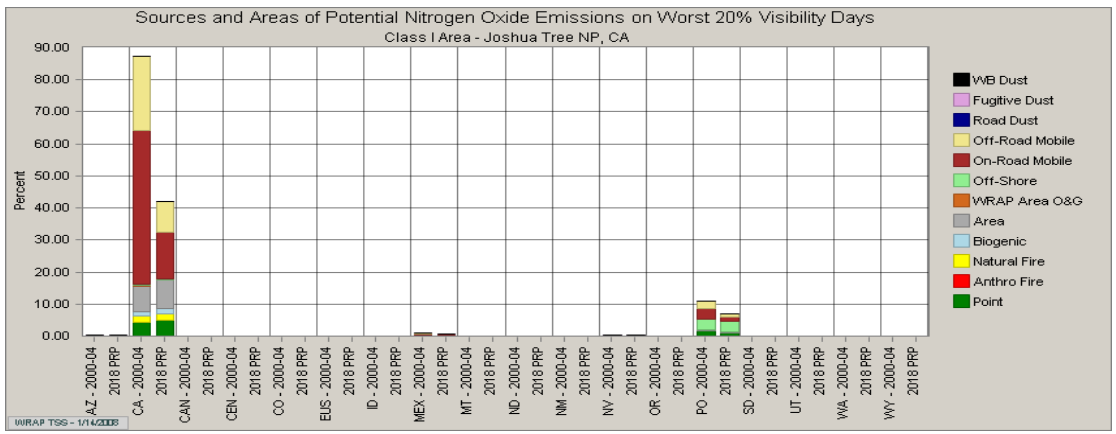


Weighted Emissions Potential – generalized location of influential NOx emissions in the days prior to worst days



Reductions in mobile source nitrate concentration shows almost a 50% decrease from California by 2018 for worst days

Although not shown, influence from states to the east of California increases slightly on the best days



Types of NOx sources (nitrate precursor emissions) include on-road and off-road mobile source emissions; these are predicted to decrease to roughly half their current share by 2018

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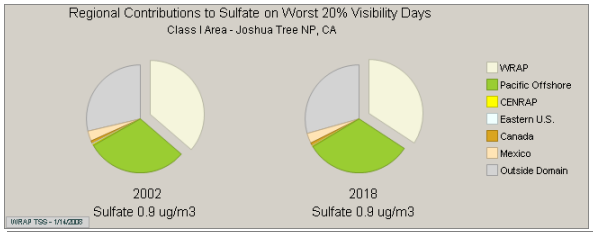
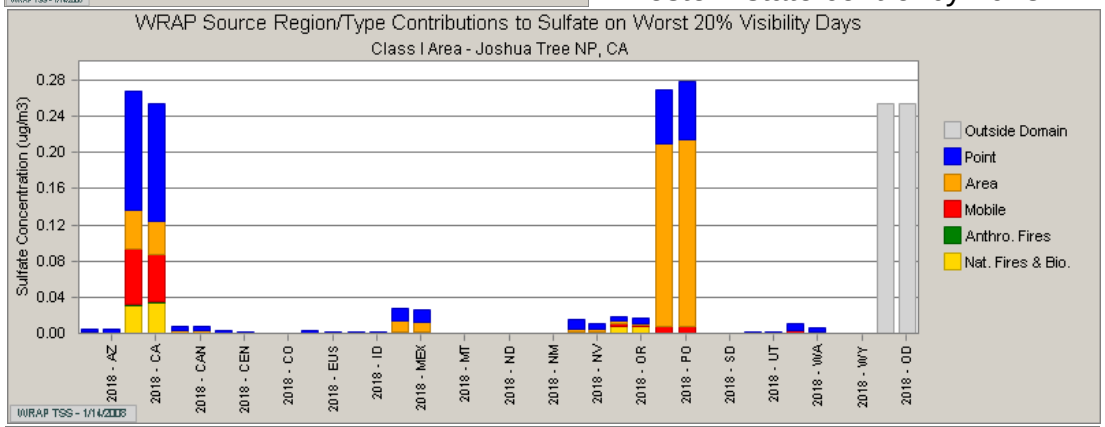
Weighted Emissions Potential – generalized location of influential SOx emissions in the days prior to worst days

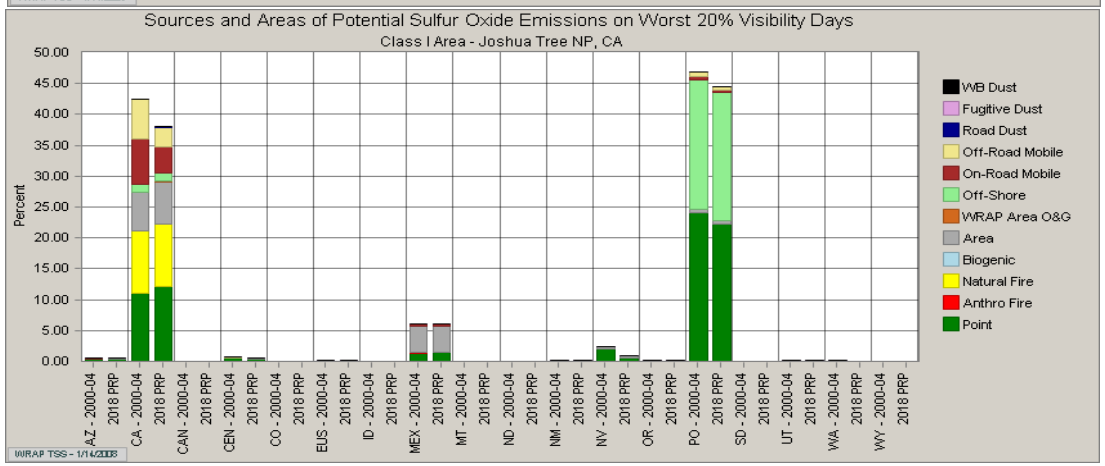


More than two-thirds of the source areas contributing to **sulfate** at Joshua tree are locations outside California's control

Slightly more will be beyond California or western state control by 2018



Point sources are major contributors to sulfate concentration, but they are dwarfed by the contributions from Pacific offshore "area sources" (which may include marine shipping emissions and off-shore oil exploration and production)



Small predicted growth in point source emissions in-state will be offset by reductions in mobile source emissions

Offshore commercial marine shipping emissions were not grown to 2018 in inventory used for this modeling exercise

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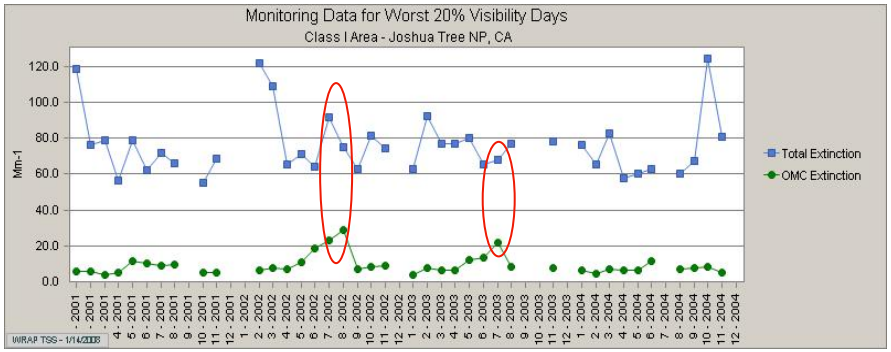
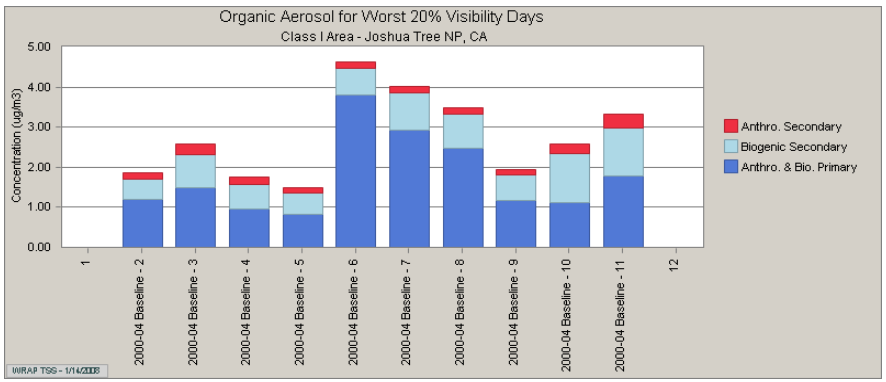
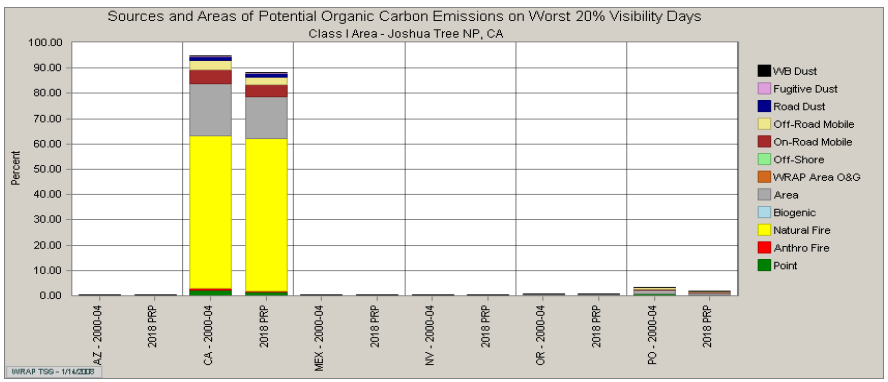
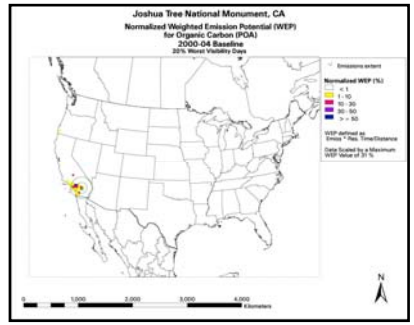






Organic carbon occasionally is the driver for worst days



Weighted Emissions Potential – generalized location of influential primary organic carbon emissions in the days prior to worst days

Primary organic aerosols from man-made and natural sources predominate, especially from June – August when organic matter is more likely to be a worst day driver

Natural fires are the main source of organic carbon emissions, then area sources, and mobile sources

Very little contributions from out-of-state sources by comparison to in-state sources

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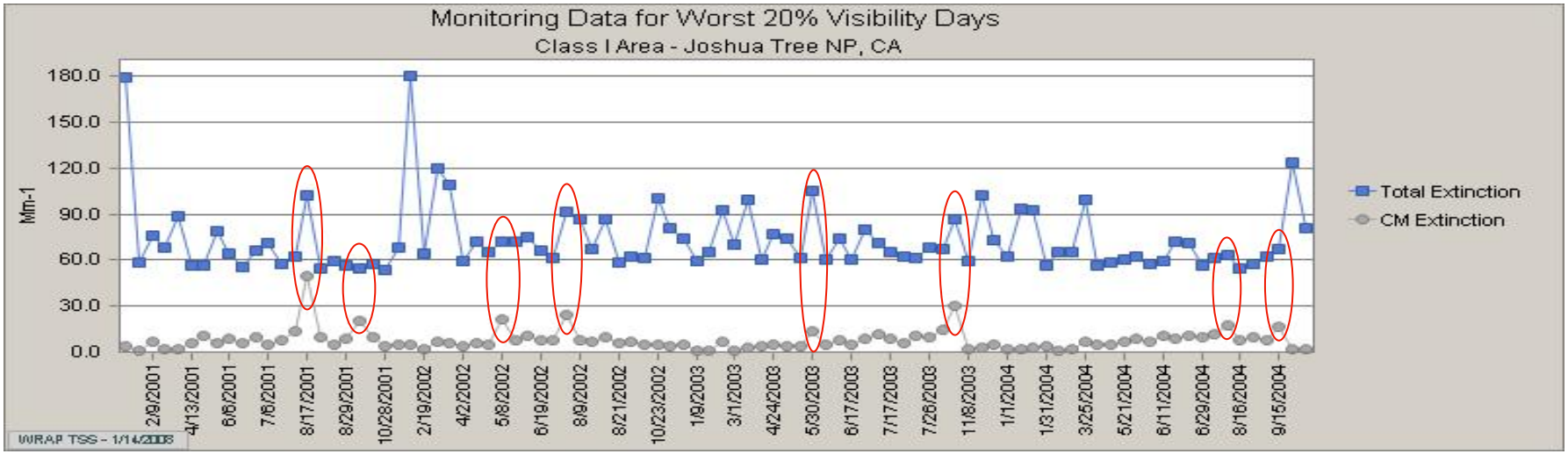

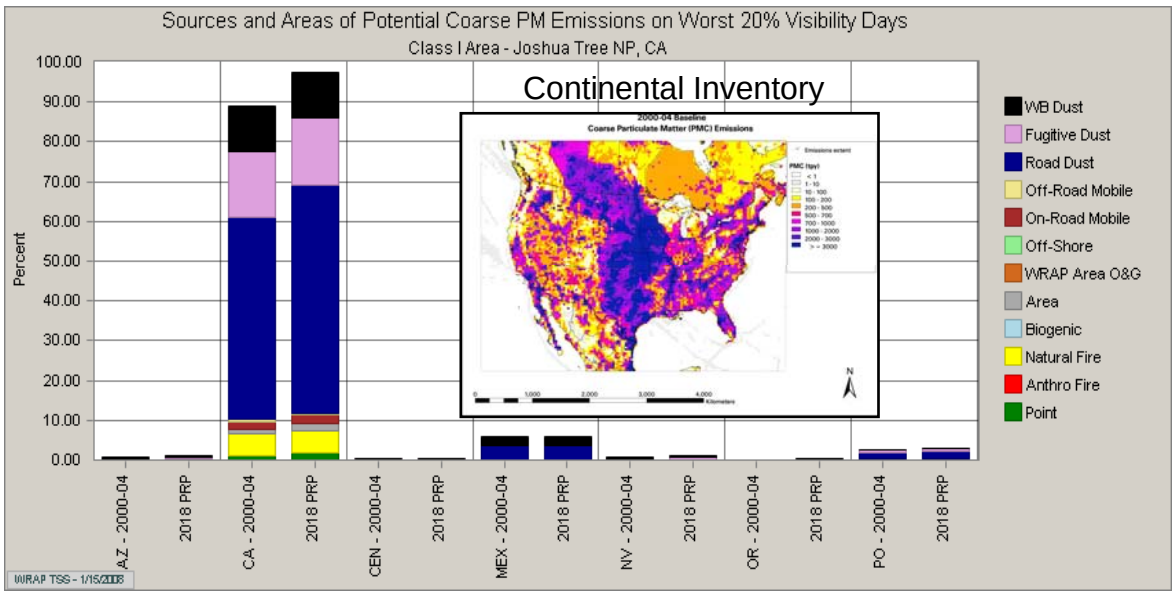

Coarse Mass is the worst day "driver" only occasionally, when elevated, the coarse mass contribution is only slightly higher than other species; meteorological event (wind) may be the cause

Weighted Emissions Potential Analysis indicates regions where coarse mass sources are elevated in the emissions inventory; it is not likely that distant sources have real influence unless lofted into jet stream and eventually deposited elsewhere than origin (e.g. "Asian dust")

Road Dust, Fugitive Dust, and Windblown Dust are largest sources of coarse mass

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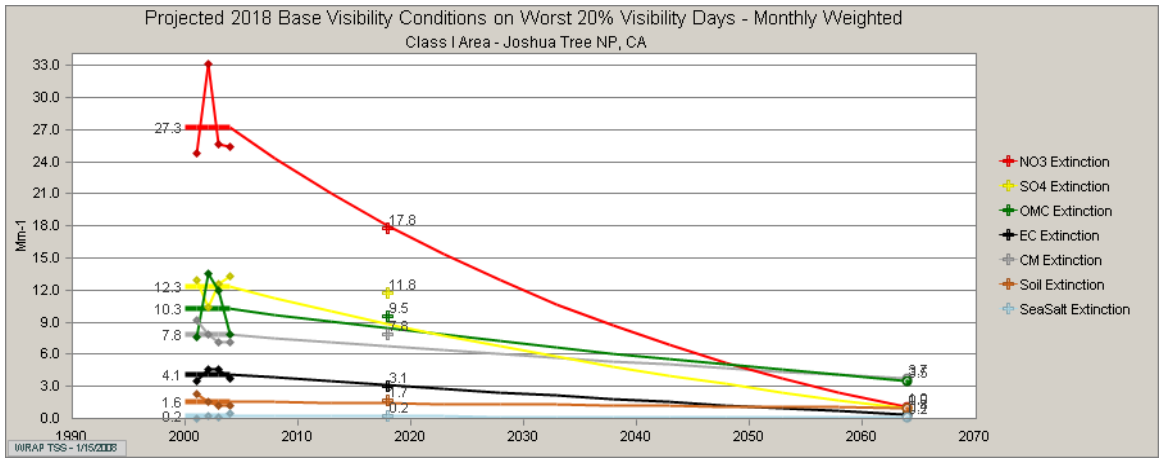
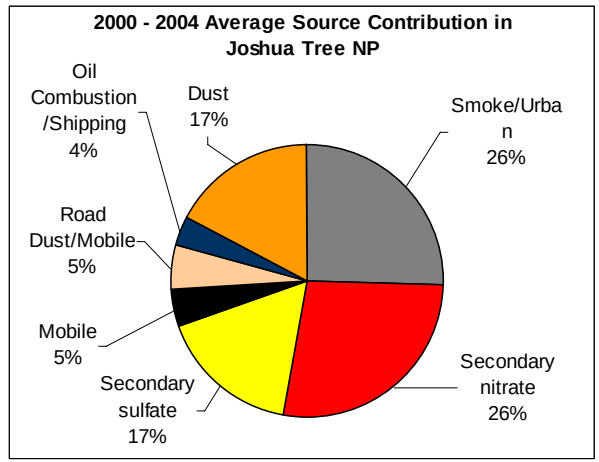
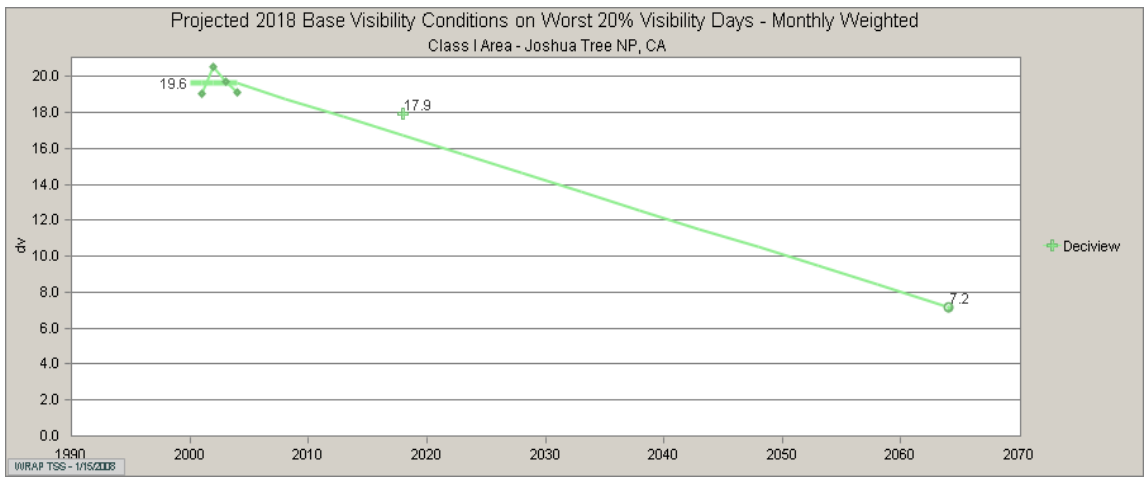
2000-2004 Baseline (plan02c) with 2018 Base Case Projection (base18b)







Preliminary draft Reasonable Progress Goal is 17.9 deciviews by 2018

Most of visibility benefit achieved by lowering NOX emissions from mobile sources

Positive Matrix Factorization (PMF, pie chart above) lists major contribution types from immediate region

Need inventory information to better understand what smoke and urban sources are and to find potential precursors of secondary nitrates and sulfates