



Specialty Crop Technology Session

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What are the Environmental Issues Growers face?

● Air Quality

- Dust (PM10, PM2.5)
 - From field activities
 - From motors used in agriculture
 - From fertilizer inputs (NOx release)
- Ozone (VOCs and NOx)
 - From motors used in agriculture
 - From pesticides (emulsifiable concentrates and soil fumigants)
 - From fertilizer inputs (NOx release)
 - From animal production, composting (methane, NOx)
- Greenhouse gas fluxes (emissions and sequestration)

● Water Quality

- Run-off/spray drift of field inputs

● Endangered Species Act

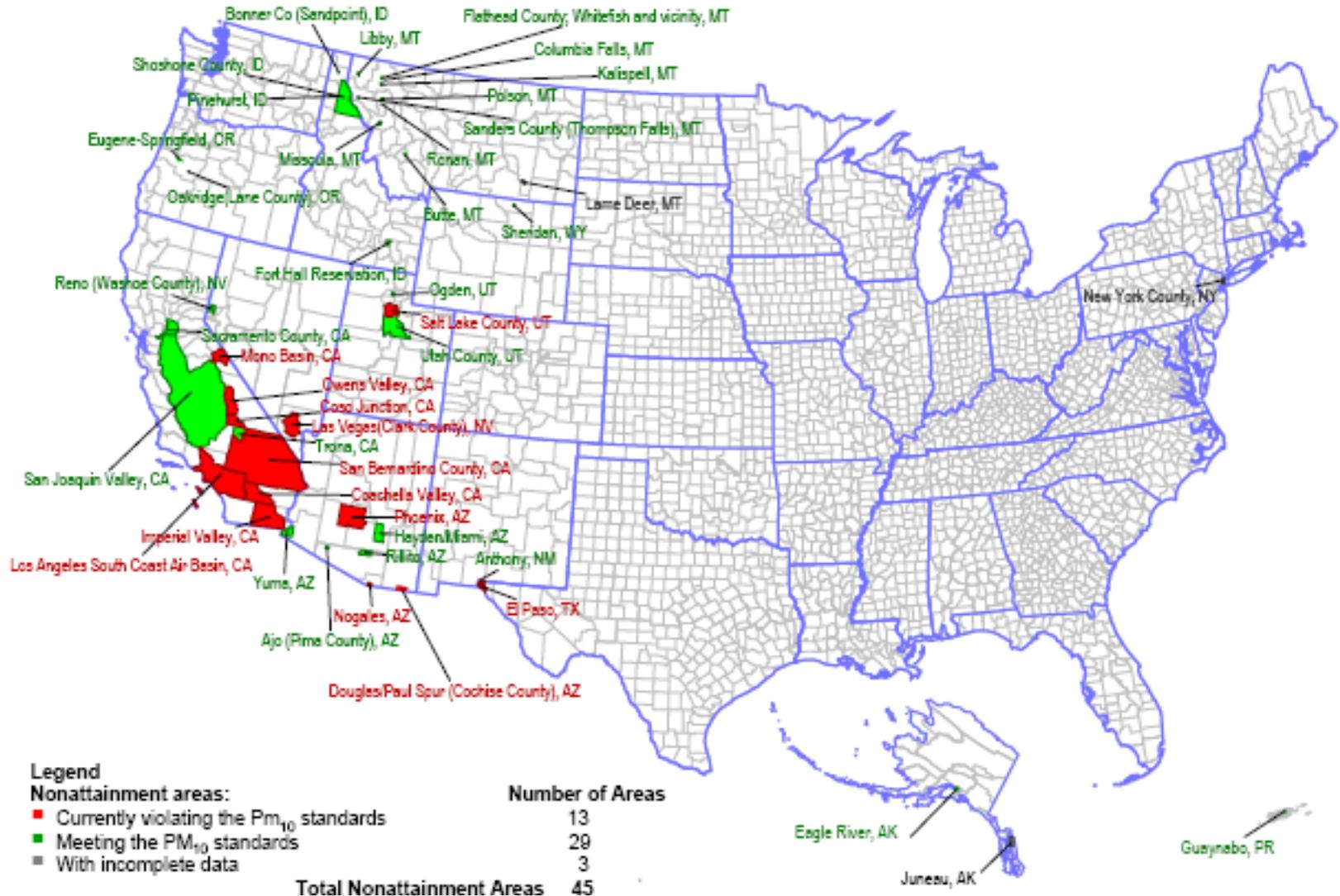
- Major role now in pesticide registration actions
- Habitat protection/enhancements



Technology Needs - Environment



Status of Current PM₁₀ Nonattainment Areas Based on 2003 – 2005 Air Quality





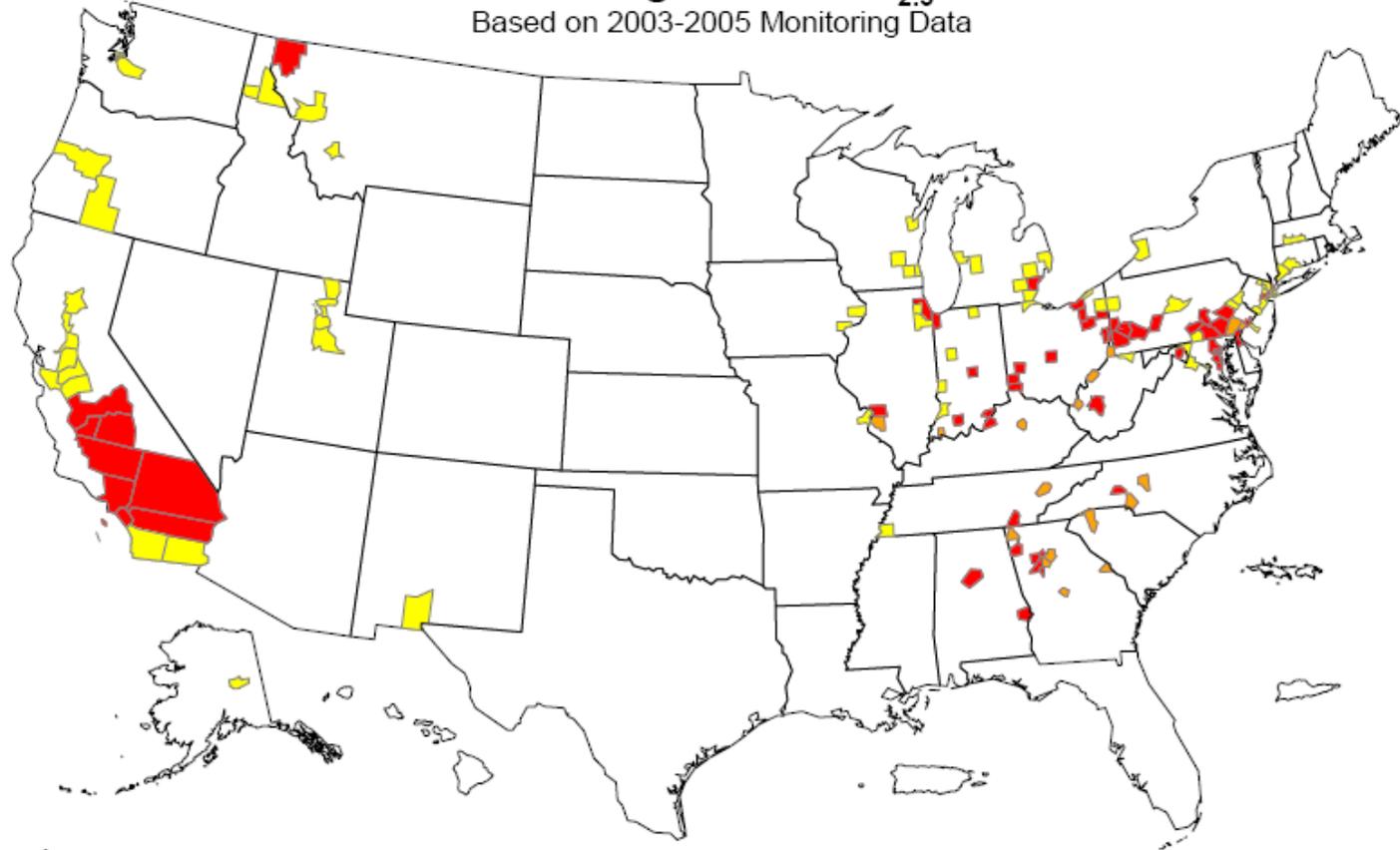
Almond Harvest - Sweeping



Technology Needs - Environment

Counties Exceeding Revised PM_{2.5} Standards

Based on 2003-2005 Monitoring Data



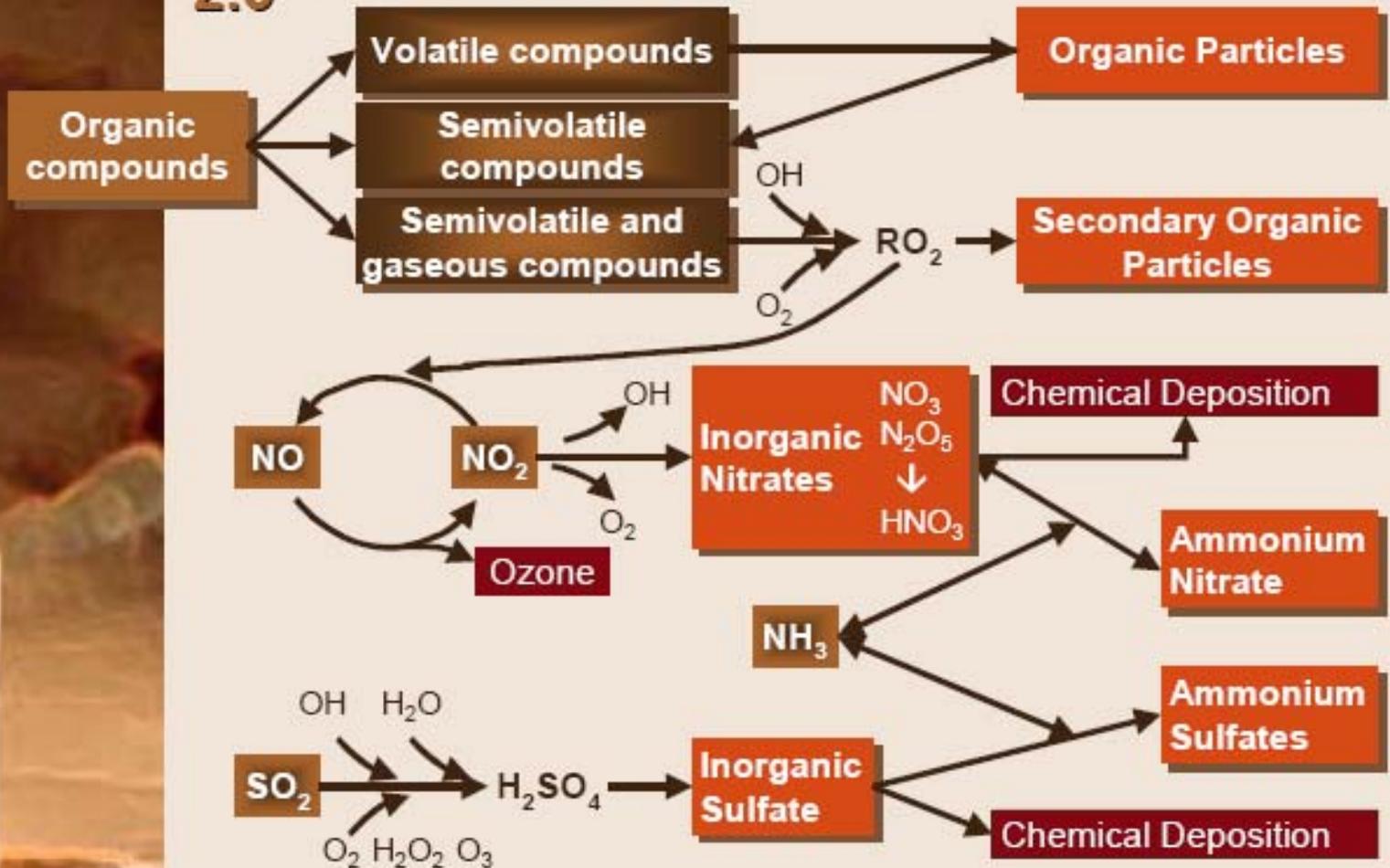
Legend

County with monitor exceeding:	Number of Counties
■ both annual (15 µg/m ³) and 24-hour (35 µg/m ³) PM _{2.5} standards	56
■ ONLY the 24-hour PM _{2.5} standard (35 µg/m ³)	70
■ ONLY the annual PM _{2.5} standard (15 µg/m ³)	17
Total Counties Exceeding	143

- Data from AQS 7/10/2006
- Data completeness computed per CFR 7/10/2006
- EPA will not base designations for the new fine particle standards on these data.

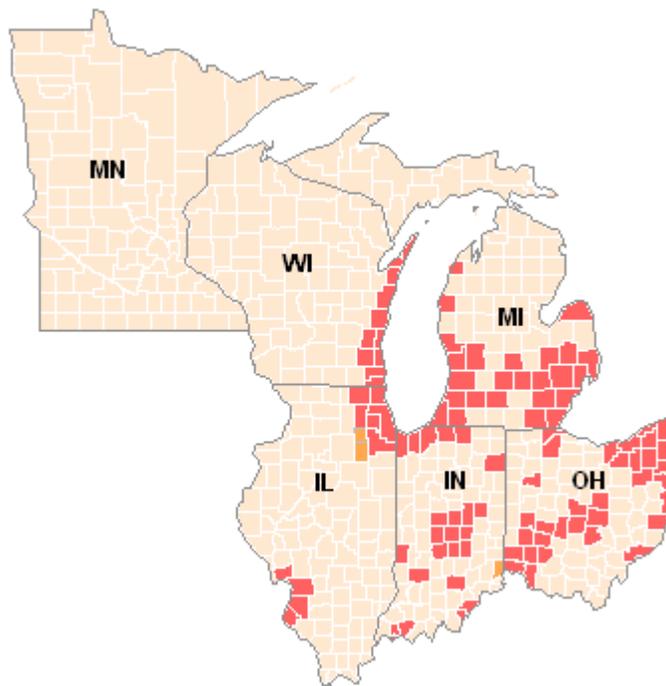


PM_{2.5} Formation



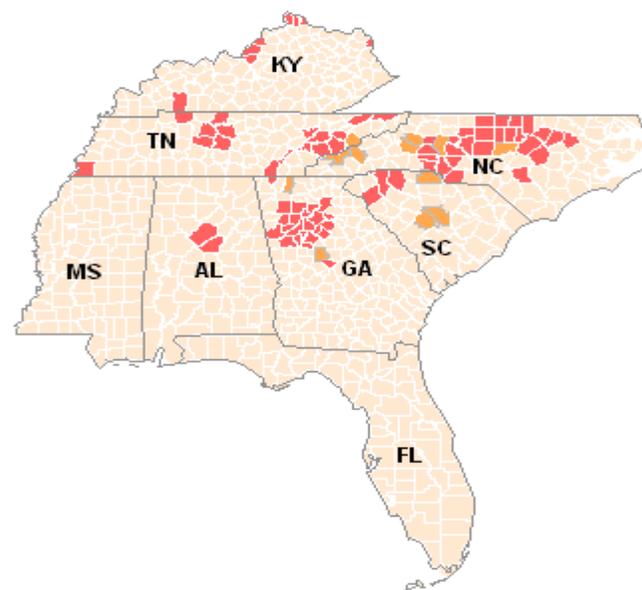
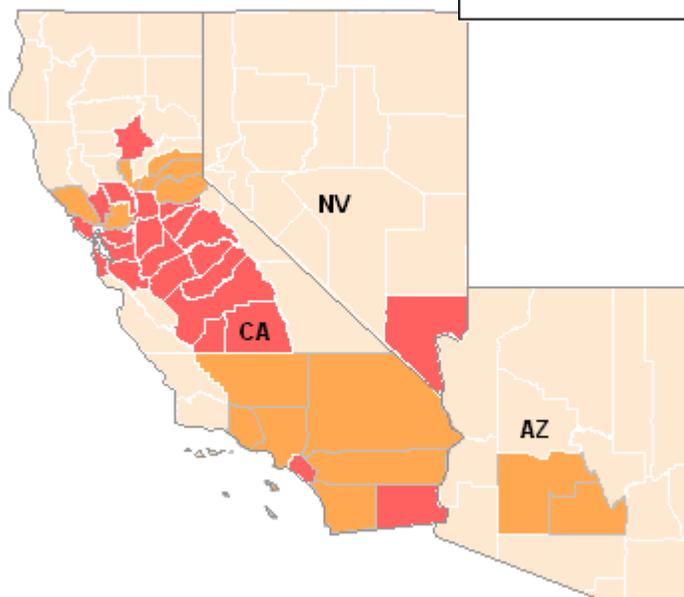


8 h Ozone Designations



8-Hour Ozone Designations
April 15, 2004

- Unclassifiable/Attainment
- Nonattainment
- Nonattainment (part county)
- Unclassifiable



Hawaii has not submitted recommendations.

Top 10 Source of VOCs & NOx in SJV



Top 10 Source Categories San Joaquin Valley Air Basin of ROG and NOx

Rankings			Summer Emissions:	ROG (tpd)			
2005	2014	2023	SOURCE CATEGORY	2005	2014	2023	
1	2	4	Light Duty Passenger Cars	79	48	30	
2	1	1	Livestock Waste (Dairy Cattle)	39	51	64	
3	3	2	Prescribed Burning	34	33	31	
4	5	5	Oil and Gas Production (Evaporative Losses)	28	26	23	
5	7	8	Recreational Boats	26	21	18	
6	4	3	Consumer Products	23	27	31	
7	6	6	Pesticides	23	21	21	
8	12	16	Heavy Duty Diesel Trucks	13	8	6	
9	9	9	Food and Agriculture (Crop Processing and Wineries)	13	14	15	
10	8	7	Coatings (Paints and Thinners - Non Architectural)	12	16	19	
				Total of Top 10	290	265	258
				Total of SJVAB	436	399	393
				Top 10 as % of Total Emissions	67%	66%	66%

Rankings			Summer Emissions:	NOx (tpd)			
2005	2014	2023	SOURCE CATEGORY	2005	2014	2023	
1	1	1	Heavy Duty Diesel Trucks	226	127	73	
2	4	5	Light Duty Passenger Cars	63	33	16	
3	3	4	Farm Equipment (Tractors)	62	37	17	
4	2	2	Manufacturing and Industrial (Boilers and IC Engines)	38	44	47	
5	6	12	Off-road Equipment(Construction and Mining)	36	18	8	
6	5	3	Trains	24	21	22	
7	7	7	Agricultural Irrigation Pumps	22	17	10	
8	8	9	Off-road Equipment (Other)	21	15	9	
9	9	8	Oil and Gas Production (Combustion)	11	10	10	
10	13	11	Cogeneration (Electricity Generation and Heat Recovery)	10	7	8	
				Total of Top 10	513	329	220
				Total of SJVAB	520	335	227
				Top 10 as % of Total Emissions	99%	98%	97%

This inventory is based on the July 12, 2006 update of the California Emissions Forecast System (CEFS) Ozone SIP Planning Projections.





Water Quality

- Water quality is being monitored by several groups in California
 - Monitoring in the parts per trillion range
 - Water Resources Board developing their own risk assessments
 - Focus on aquatic species/endangered species

- Issues
 - Spray drift
 - Run-off of pesticides/fertilizers/manures, etc



Airblast Sprayer





Airblast Sprayer



- Improved Techniques to apply inputs
 - Reduce amount of inputs by better applications techniques such as:
 - Better methods to apply inputs that reduce spray drift, spray on the ground, etc.
 - Improved spray technologies (e.g. update methods for trees/vines)
 - Easy methods to calibrate sprayers to ensure proper applications
 - Better ability to pin point where inputs are needed
 - Remote sensing
 - In field sensing of problems
 - Pest phenology models
 - Innovative technologies to monitor for pests, e.g. DNA technologies



Technology Research Needs - Environment

- Improved Techniques to apply inputs, contd.
 - Techniques to keep soil fumigants in the ground and out of the air or water
 - Improved water use efficiencies

- Cleaner Engines for Ag. Equipment
 - such as tractors, pumps, processing equipment
 - More energy efficient motors
 - Engines with reduced NO_x, SO_x emissions
 - Techniques to reduce the number of passes through a field
 - Economical techniques to mitigate emissions from Ag. Equipment such as:
 - Technologies to reduce VOC emissions
 - Technologies to reduce energy use during processing
 - Technologies to reduce dust emissions from production practices

Improving Quality through Technology

Improved technology to enhance food quality and safety

● Issues:

- Food Safety – detection of contaminants, e.g. mycotoxins, human pathogens
- Food Quality – detection of internal damage, etc.
- Phytosanitary Issues/Export Markets – detection/removal of pests

➔ Development and refinement of technology platforms for measuring/assessing quality-related attributes



Improving Quality through Technology

● Examples of Technologies Needed

- Use of sensor technologies to assess the quality of products
 - Could be used to see external or internal blemishes and then determine into which market a particular item goes
 - Could be used to “see” if a produce item is infested with pests
 - This would be extremely helpful for maintaining and expanding export markets
 - Could be used to detect insect damaged nuts that may be contaminated with aflatoxins
 - Again helpful in maintaining export markets and food safety
 - Ability to detect foods contaminated with human pathogens
- Use of technologies to improve the transportability of produce and maintain quality
 - Controlled atmosphere
- Technologies to control pests of phytosanitary concern yet maintain quality

➔ Need innovative analytical tools and technologies

