



California Environmental Protection Agency  
Department of Pesticide Regulation

# **Volatile Organic Compound Emissions from Pesticides**

Randy Segawa

July 2008

# Agenda

---

- Background
- Draft 2005-6 pesticide VOC emission inventory
- Ventura fumigant VOC allowances

# Volatile organic compounds

---

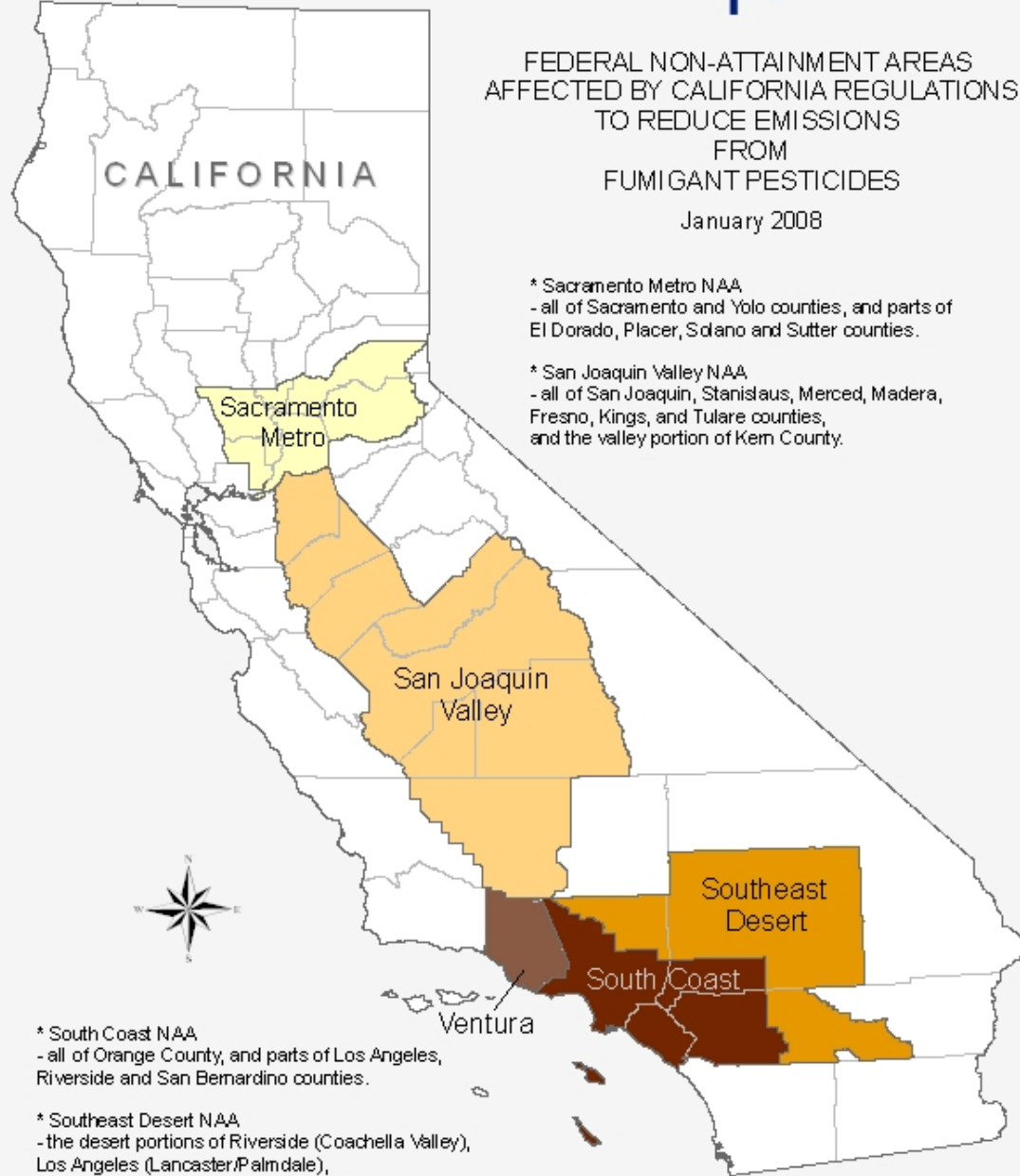
- Volatile organic compounds (VOCs) and nitrogen oxides (NOx) react with sunlight to form ozone, a major air pollutant
- Many pesticide active and inert ingredients are VOCs
- **State Implementation Plan (SIP)** to achieve ozone standard requires DPR to
  - Develop and maintain an inventory to track pesticide VOC emissions, based on VOC content of products and use
  - Implement regulations by 1/26/08 to achieve 20% reduction from 1991 in five **nonattainment areas (NAAs)**, per court order
  - Field fumigant regulations adopted 1/25/08

FEDERAL NON-ATTAINMENT AREAS  
AFFECTED BY CALIFORNIA REGULATIONS  
TO REDUCE EMISSIONS  
FROM  
FUMIGANT PESTICIDES

January 2008

\* Sacramento Metro NAA  
- all of Sacramento and Yolo counties, and parts of  
El Dorado, Placer, Solano and Sutter counties.

\* San Joaquin Valley NAA  
- all of San Joaquin, Stanislaus, Merced, Madera,  
Fresno, Kings, and Tulare counties,  
and the valley portion of Kern County.



\* South Coast NAA  
- all of Orange County, and parts of Los Angeles,  
Riverside and San Bernardino counties.

\* Southeast Desert NAA  
- the desert portions of Riverside (Coachella Valley),  
Los Angeles (Lancaster/Palmdale),  
and San Bernardino (Barstow) counties.

\* Ventura NAA - all of Ventura County.

# Summary of field fumigant regulations (Regulation #1)

---

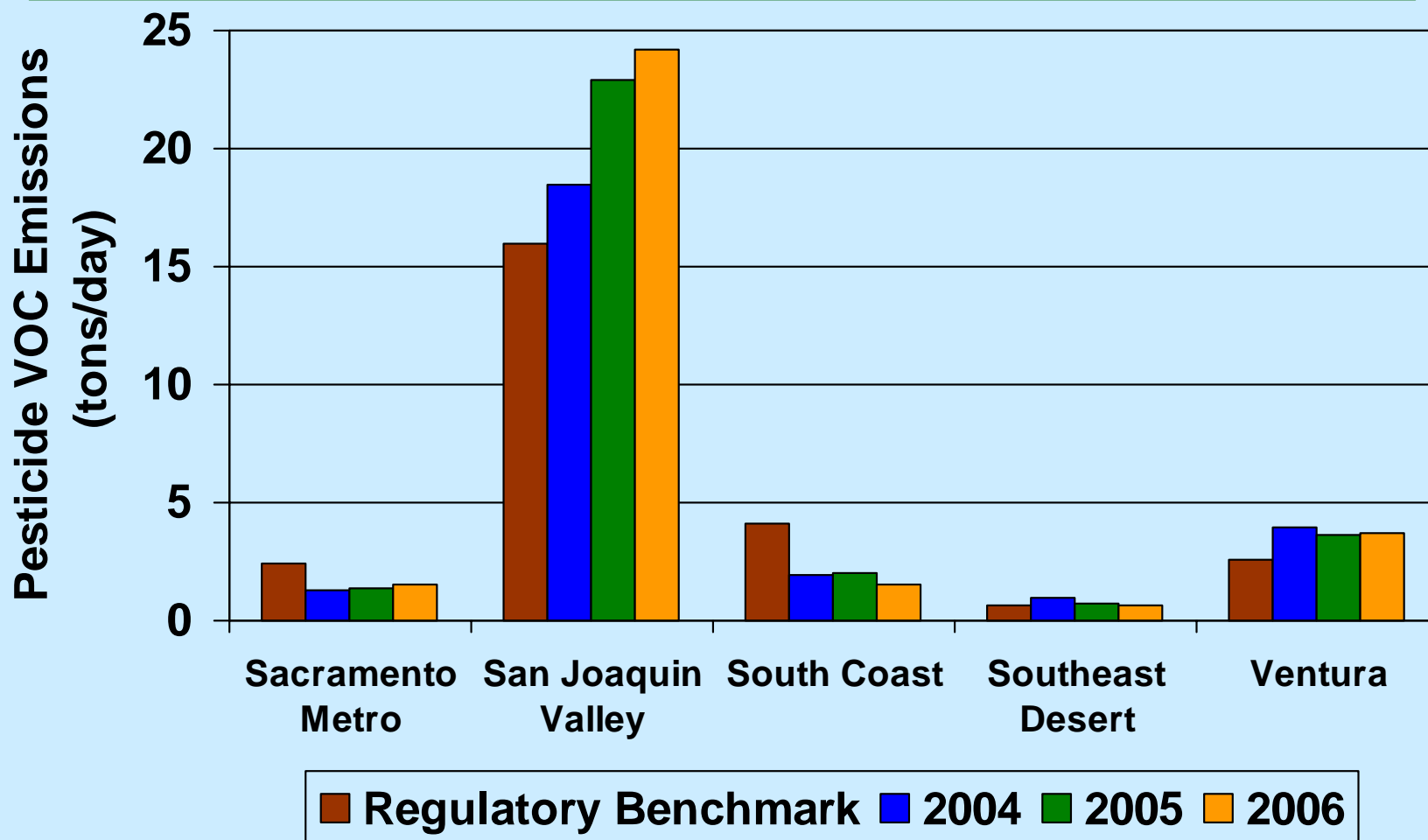
- **Licensing:** Pest control businesses must have person certified in new fumigation subcategory by 1/1/09
- **Fumigation methods:** “Low-emission” methods required in San Joaquin Valley, Southeast Desert, Ventura NAAs during May-Oct
- **Records and reporting:** Pesticide use reports in NAAs include 4-digit fumigation method code
- **Fumigant limits and allowances:**
  - Total pesticide (fumigant + nonfumigant) benchmarks established (20% reduction from 1991)
  - Limit on fumigant emissions to meet benchmarks in Ventura beginning 2008, San Joaquin Valley and Southeast Desert beginning 2009

# Draft 2005-2006 pesticide VOC emission estimates

---

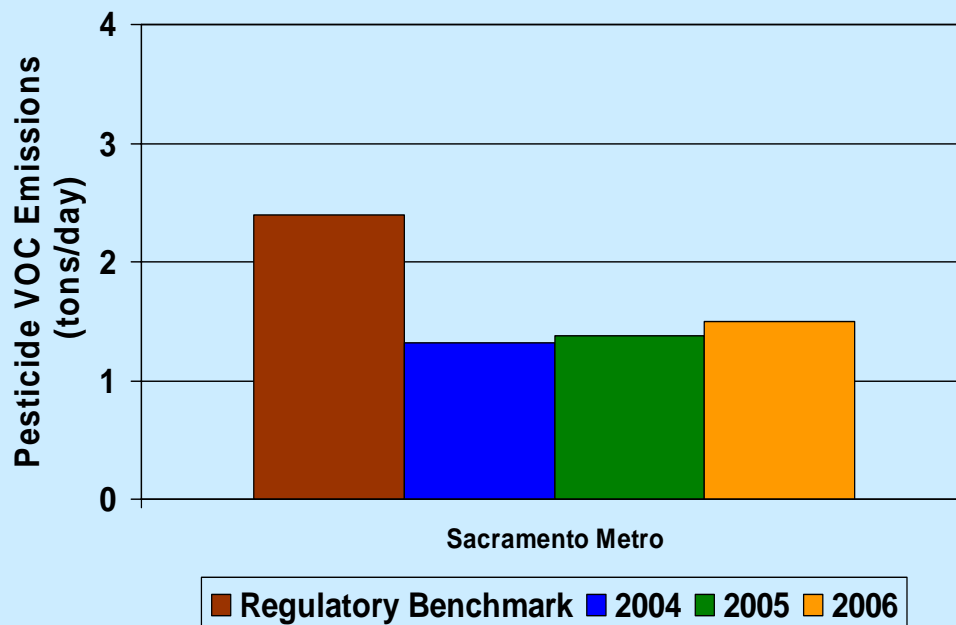
- Fumigant regulations primarily based on 2004 emission data
- For 2005-2006, pesticides still among top 10 VOC sources in several NAAs
  - Fumigants continue to contribute the most pesticide VOCs in most NAAs, even after accounting for field conditions
  - Emulsifiable concentrates are still major contributors, particularly in San Joaquin Valley

# Draft 2005-2006 pesticide VOC emission estimates (May-Oct)



# Draft pesticide VOC inventory for Sacramento Metro (May-Oct)

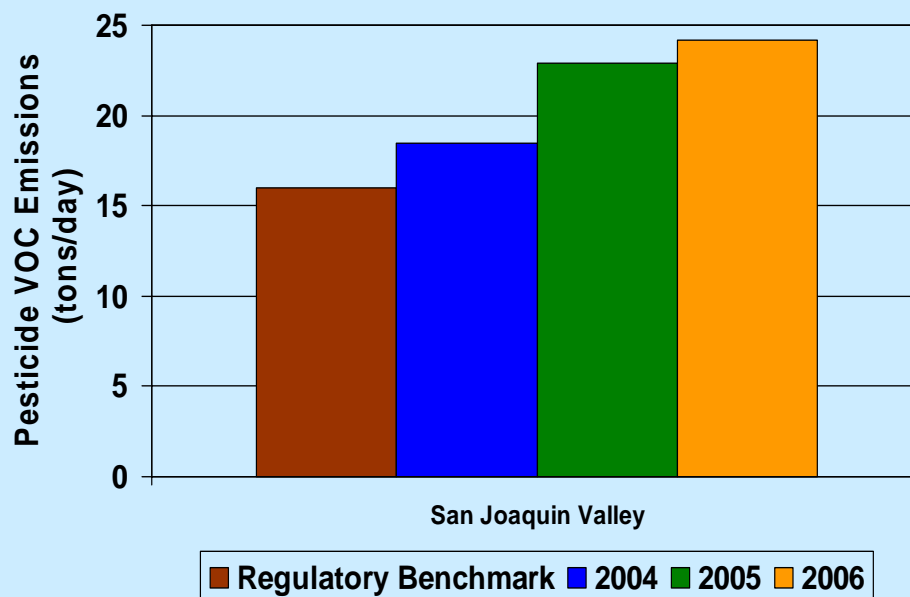
- Top active ingredients (% of 2006 pesticide emissions)
  - Trifluralin (8.2%)
  - Chlorpyrifos (7.6%)
  - Ethalfluralin (5.5%)
  - Metam-sodium (4.2%)
  - Propylene oxide (3.7)
- Top application sites
  - Tomato (15.2%)
  - Structural (13.1%)
  - Walnut (10.7%)
  - **Rice (10.6%)**
  - Grape, wine (7.1%)





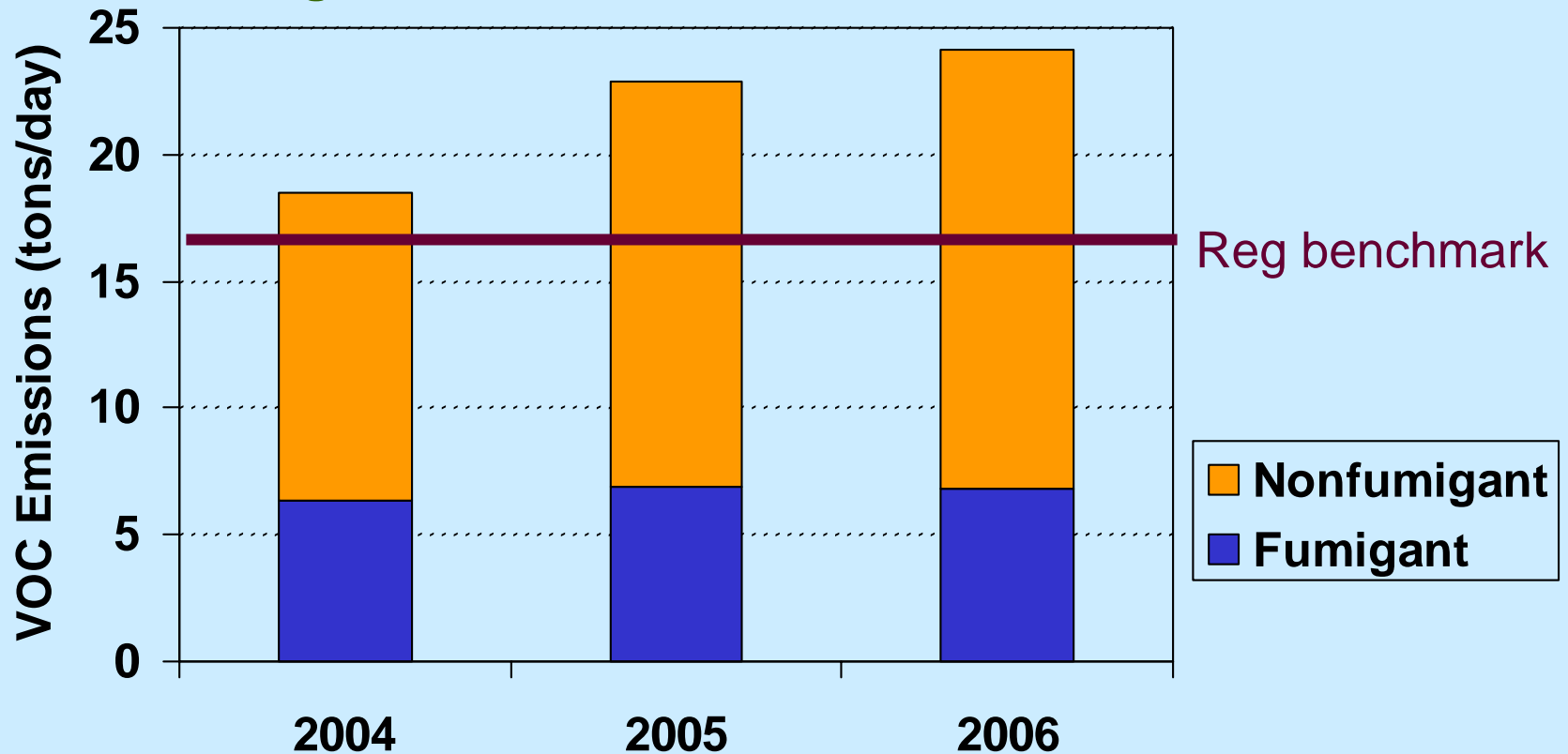
# Draft pesticide VOC inventory for San Joaquin Valley (May-Oct)

- Top active ingredients (% of 2006 pesticide emissions)
  - Chlorpyrifos (16.5%)
  - Metam-sodium (10.6%)
  - **Petroleum oil (9.2%)**
  - 1,3-dichloropropene (8.5%)
  - Methyl bromide (4.6%)
- Top application sites
  - Almond (15.2%)
  - Carrot (13.3%)
  - Cotton (8.1%)
  - Orange (7.7%)
  - Outdoor nursery (5.0%)



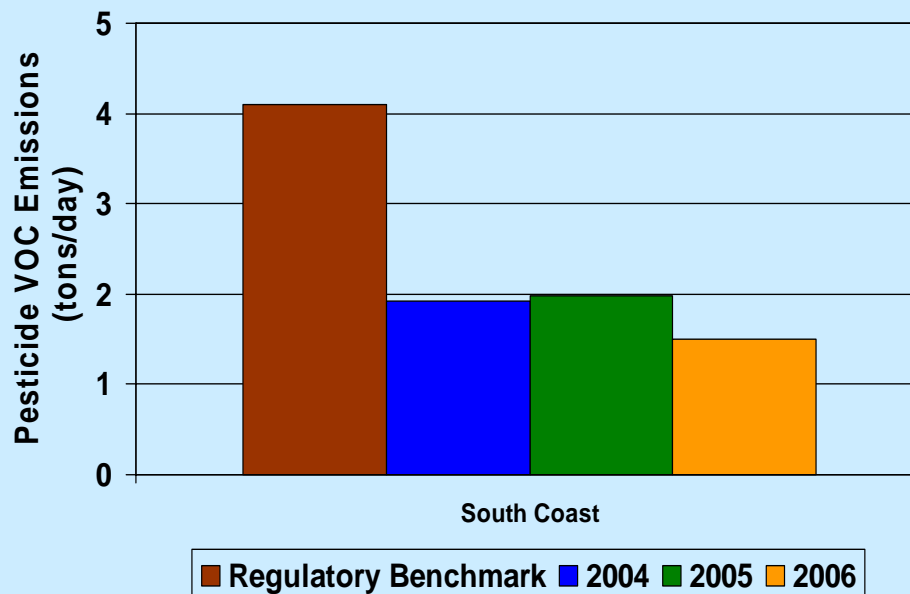
# Fumigant and nonfumigant emissions for San Joaquin Valley

DPR proposes to set the 2009 fumigant limit by subtracting the 2007 nonfumigant emissions from the benchmark



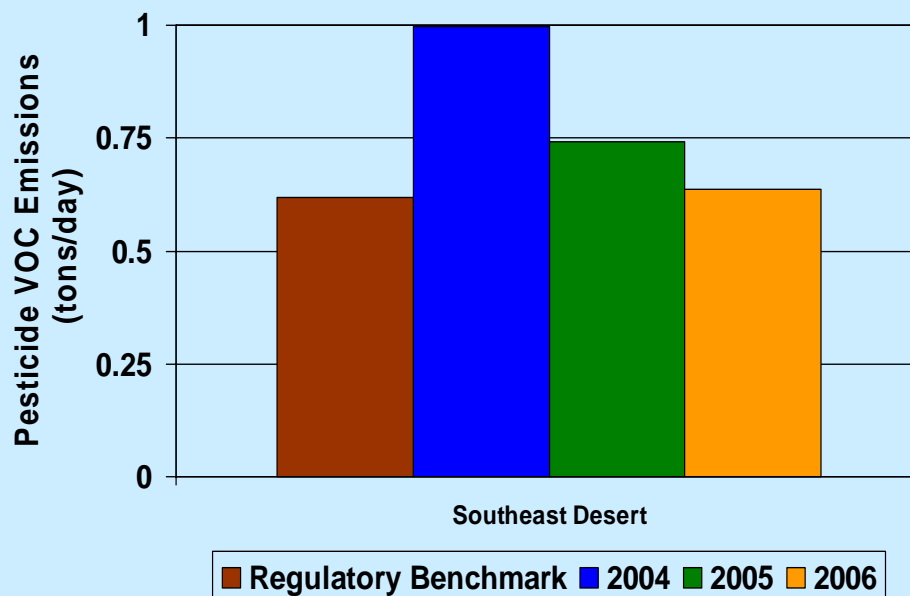
# Draft pesticide VOC inventory for South Coast (May-Oct)

- Top active ingredients (% of 2006 pesticide emissions)
  - Permethrin (22.9%)
  - Methyl bromide (17.4%)
  - Chloropicrin (7.4%)
  - Bifenthrin (4.1%)
  - Imidacloprid (4.0%)
- Top application sites
  - Structural (39.4%)
  - Strawberry (37.8%)
  - Landscape maint (8.1%)
  - Fumigation (4.4%)
  - Rights of way (1.8%)



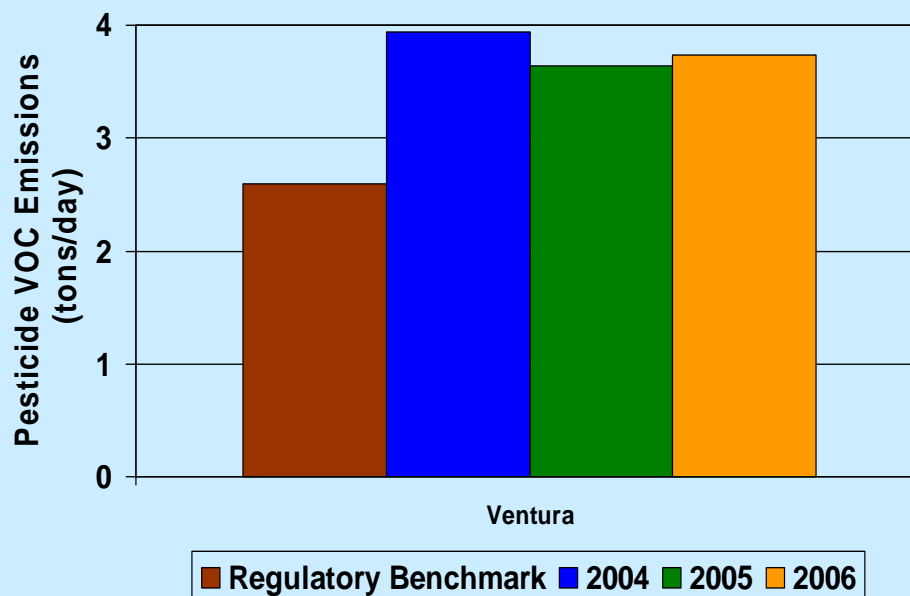
# Draft pesticide VOC inventory for Southeast Desert (May-Oct)

- Top active ingredients (% of 2006 pesticide emissions)
  - Metam-sodium (43.5%)
  - Permethrin (10.6%)
  - Methyl bromide (6.5%)
  - 1,3-dichloropropene (4.8%)
  - Chloropicrin (4.4%)
- Top application sites
  - Uncultivated ag (21.1%)
  - Pepper (19.4%)
  - Strawberry (16.8%)
  - Structural (7.4%)
  - Carrot (4.8%)



# Draft pesticide VOC inventory for Ventura (May-Oct)

- Top active ingredients (% of 2006 pesticide emissions)
  - Methyl bromide (32.6%)
  - Chloropicrin (31.1%)
  - 1,3-dichloropropene (19.3%)
  - Petroleum oil (2.2%)
  - Metam-sodium (1.9%)
- Top application sites
  - Strawberry (65.8%)
  - Soil fumigation (22.7%)
  - Tomato (2.5%)
  - Lemon (2.2%)
  - Raspberry (1.0%)



# Emission inventory key points

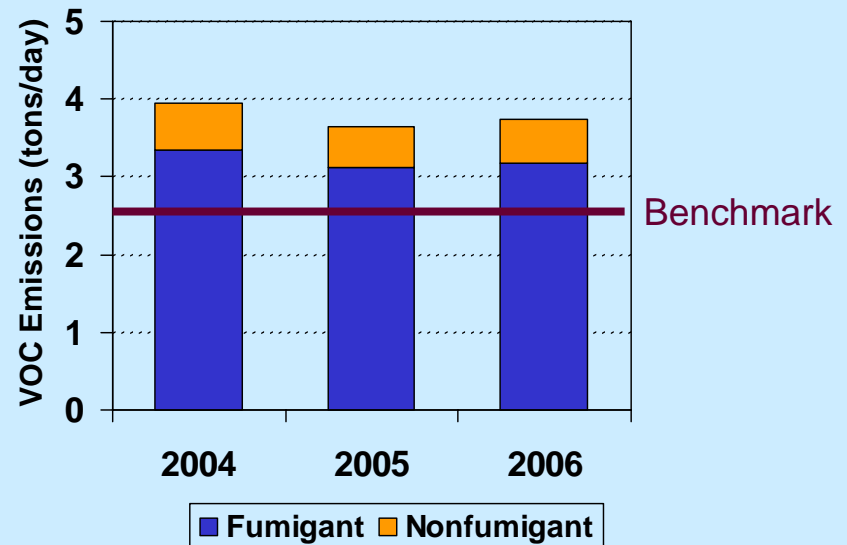
---

- In comparison to 2004 pesticide VOC inventory:
  - **Sacramento Metro:** emissions increased, but remain well within SIP compliance
  - **San Joaquin Valley:** emissions increased due to nonfumigants, placing NAA further out of compliance
  - **South Coast:** emissions decreased, and remain well in compliance
  - **Southeast Desert:** emissions decreased, but remain slightly out of compliance
  - **Ventura:** emissions decreased, but remain out of compliance

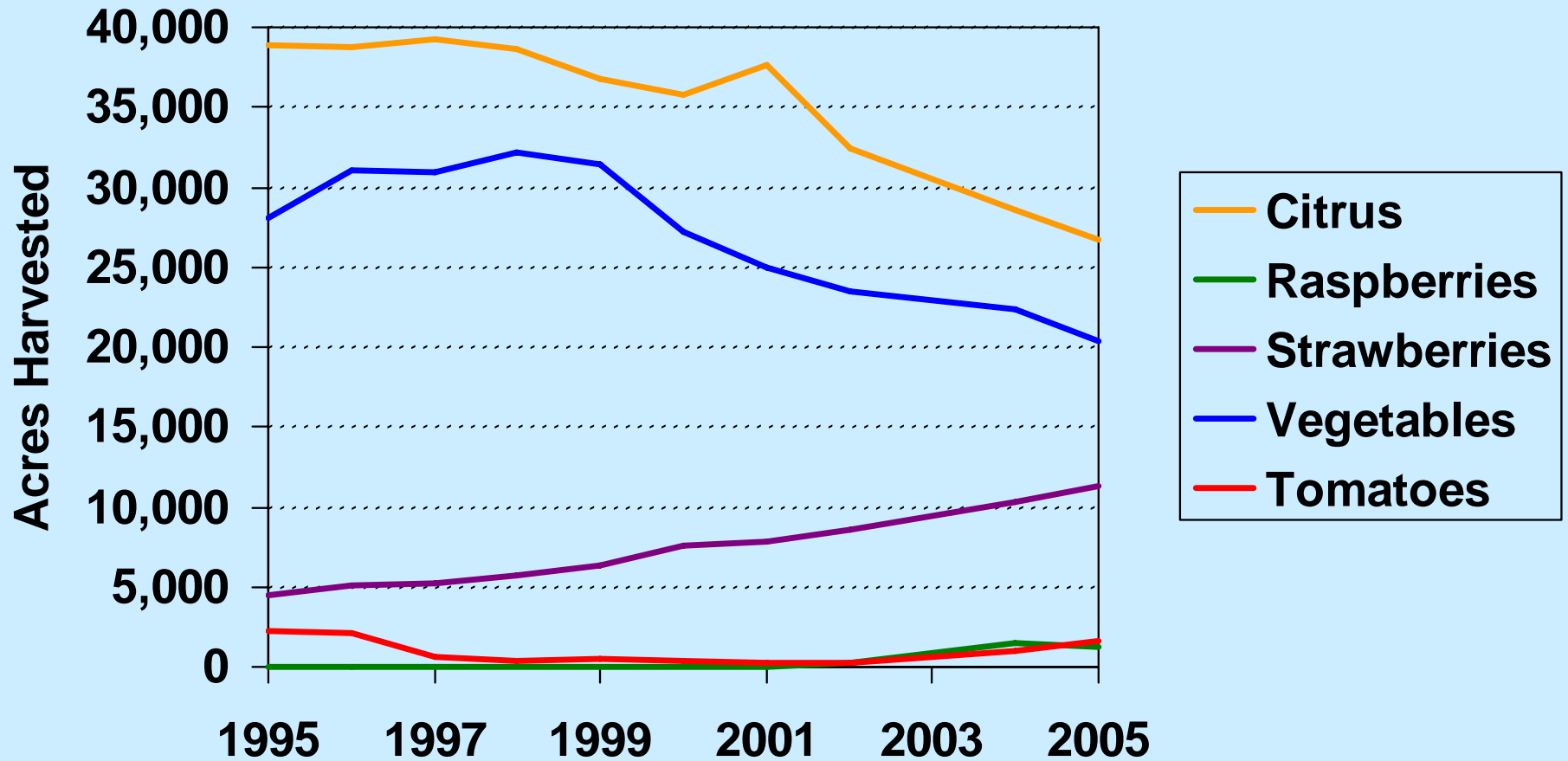
# Ventura fumigant limit and allowances

---

- Regulation establishes total pesticide VOC (fumigant + non-fumigant) benchmarks
- Limit on fumigant emissions if total pesticide emissions exceed 80% of benchmark
  - Fumigant emission limit of 734,000 lbs (2.0 tpd) in Ventura for 2008
  - Fumigant limits updated each year, based on most recent data for fumigants and non-fumigants



# Ventura crop acreage





# Emission allowances

---

- Fumigant limits enforced through emission allowances issued to permittees for May-Oct
  - Permittees request allowance through county agricultural commissioner
  - DPR proportionally reduces all requests to meet limit
  - Allowances implemented as conditions of restricted materials permits
  - For 2008, almost all requests included a “default” fumigation method to facilitate equitable acreage reduction

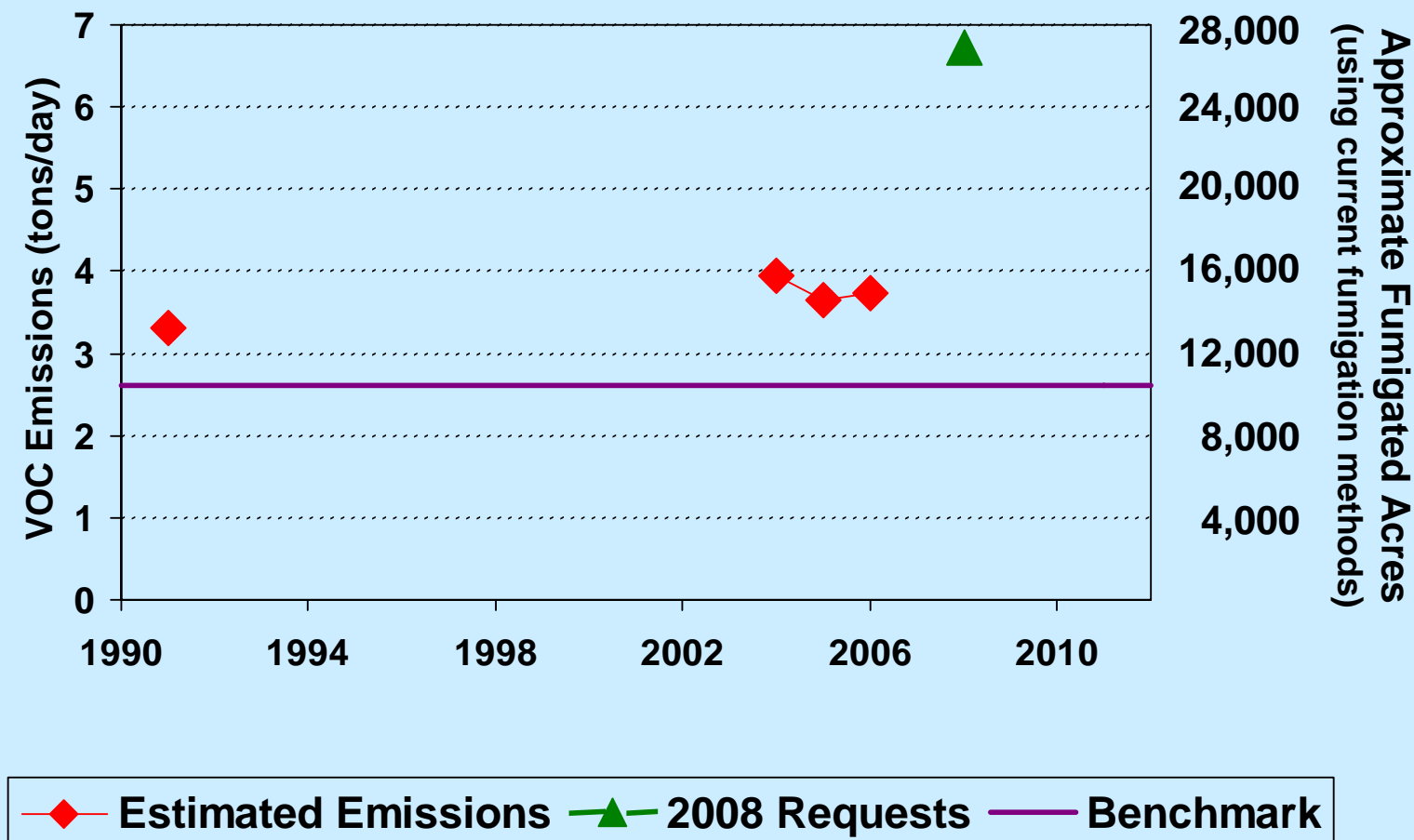
# 2008 Ventura fumigant requests

	2006	2008 Requests
Number of permittees	104	72
Number of fumigations	488	268
Acres treated	16,138	17,686
Fumigant product (lbs)	3.9 million	5.3 million
VOC emissions (lbs)	1.4 million	2.5 million

# 2008 Ventura fumigant products requested

<b>Fumigant Products</b>	<b>2006 (acres)</b>	<b>2008 Requests (acres)</b>
Methyl bromide-chloropicrin mix	4,886	17,645
1,3-D	5,820	41
Chloropicrin-only	2,977	0
MITC-generators	2,177	0
Enzone	276	0

# Ventura pesticide VOC emissions

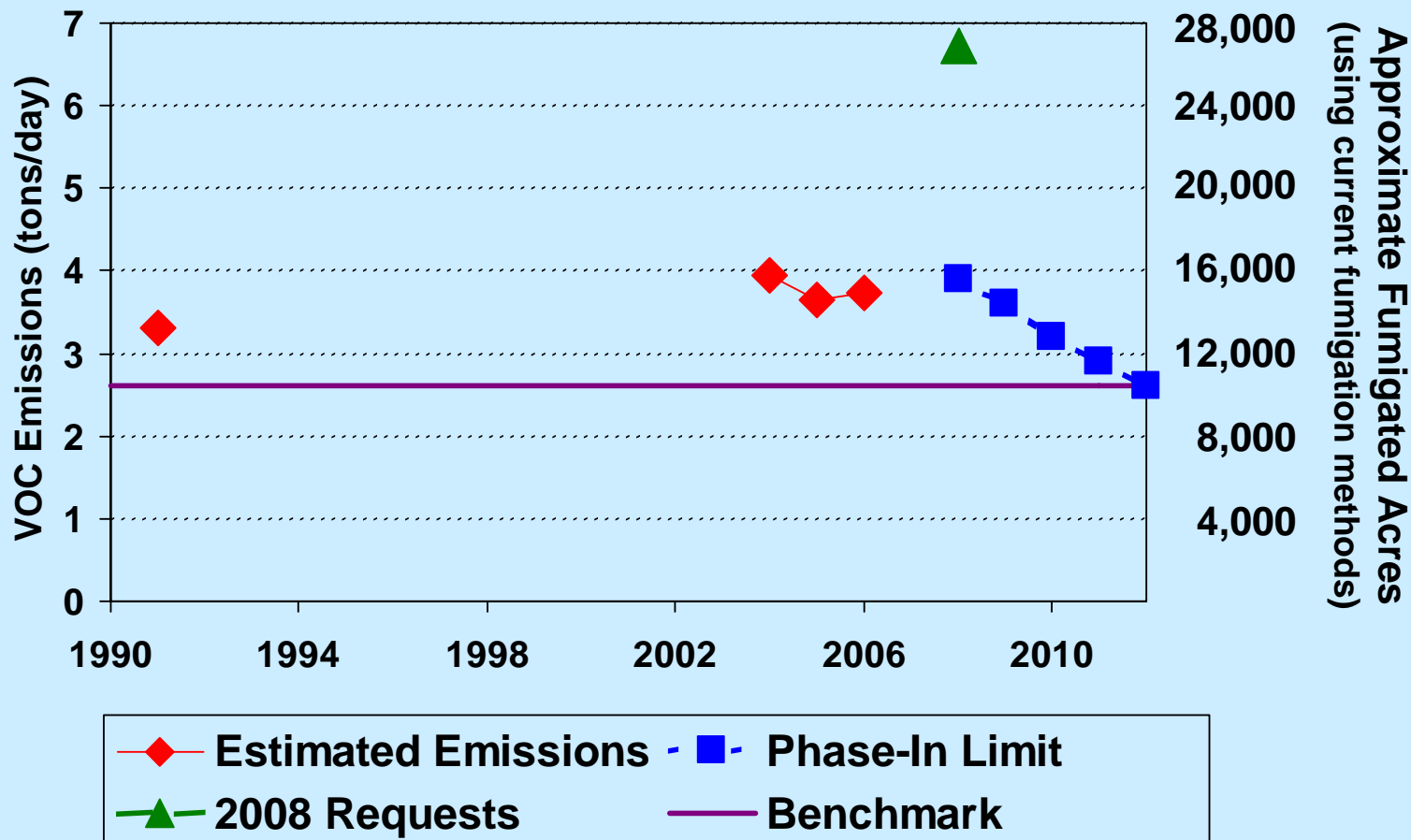


# Proposed Ventura pesticide VOC reduction phase-in (Regulation #2)

---

- Proposed DPR regulation
  - Pesticide VOC reductions phased in over 5 years
  - Regulation on hold until Appendix H completed
- SIP Appendix H
  - DPR “borrows” VOC emissions from ARB
  - Requires ARB approval (completed), and
  - Requires EPA approval (effective Aug 18)
- DPR will adopt regulation once Appendix H effective
  - DPR and ag commissioner will reissue allowances

# Proposed Ventura pesticide VOC reduction phase-in



# Emission allowance responsibilities

---

- Grower/applicator must
  - Submit allowance request
  - Control emissions and comply with allowance by
    - Using low emission methods
    - Reducing application rate
    - Reducing acreage fumigated
    - Shifting fumigation dates outside May-October
- DPR and agricultural commissioner must
  - Evaluate and total requests
  - Determine proportional reduction to meet limit
  - Include allowances as permit condition
  - Enforce allowances by tracking and denying Notices of Intent

# Ventura allowances key points

---

- SIP obligation achieved by limiting fumigant emissions
- Fumigant limits enforced by issuing allowances to growers
- DPR revising regulations to phase in pesticide VOC reductions over 5 years
- Allowances will be reissued in Aug
- Pesticide use and emissions in 2008 should be similar to 2006



# Additional information

---

- For more information
  - [www.cdpr.ca.gov](http://www.cdpr.ca.gov)
  - Click on “Air” under Quick Finder
  - Link to “Volatile Organic Compounds”

Randy Segawa

916-324-4137

[Rsegawa@cdpr.ca.gov](mailto:Rsegawa@cdpr.ca.gov)