

Fumigant Application Technologies and Compliance with Current Regulations



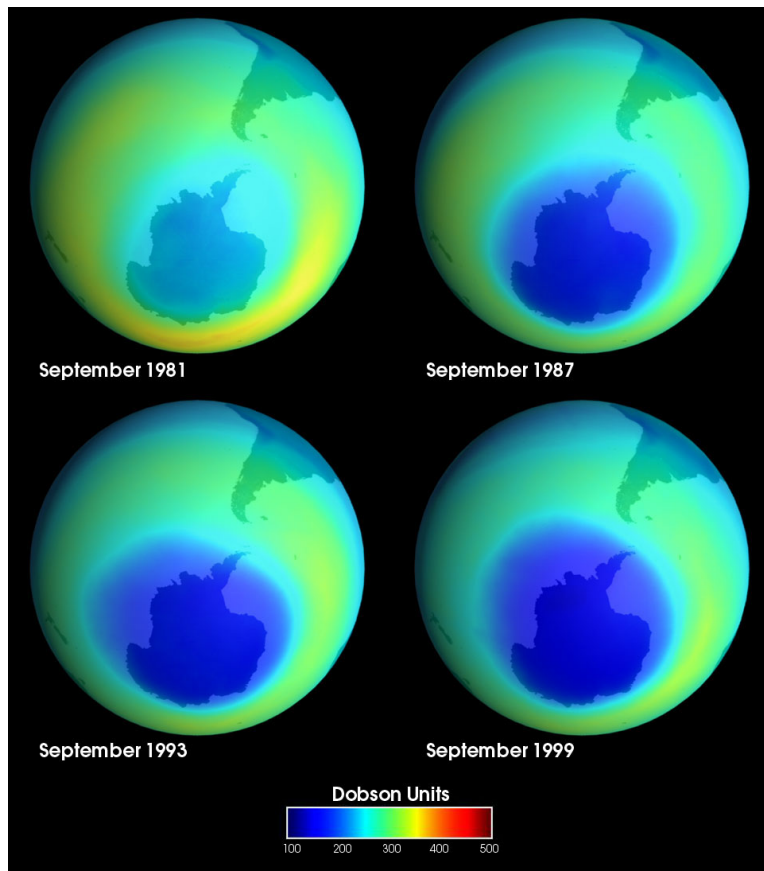
**Methyl Bromide
1,3-Dichloropropene
Chloropicrin**

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TriCal, Inc.**

April 2015

Methyl Bromide

**Montreal Protocol:
International ban on
substances that deplete
the Ozone Layer**



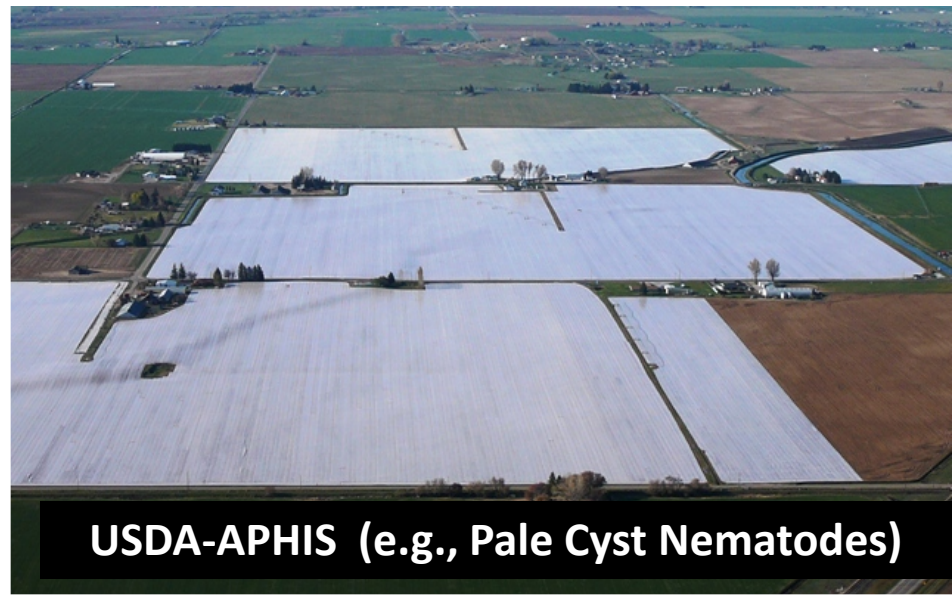
Elimination / Phase-Out of:

- Refrigerants, insulating foams, and solvents
 - Chlorofluorocarbons (CFCs)
 - Hydrofluorocarbons (HFCs)
- Halons (fire extinguishers) and others
- **Methyl Bromide:**
 - Quarantine/Pre-Shipment (QPS) is exempt
 - Crop, Post-Harvest, and Structural Use Phase-Out
 - Developed Countries: phase-out by 2005
 - Critical Use Exemptions post-2005
 - Developing Countries: phase-out by 2015
 - Developing Critical Use Exemptions

Quarantine/Pre-Shipment (QPS) treatments are exempt



Strawberry and Other Nursery Crops



USDA-APHIS (e.g., Pale Cyst Nematodes)

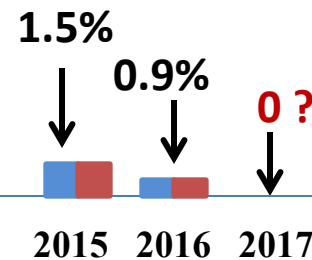
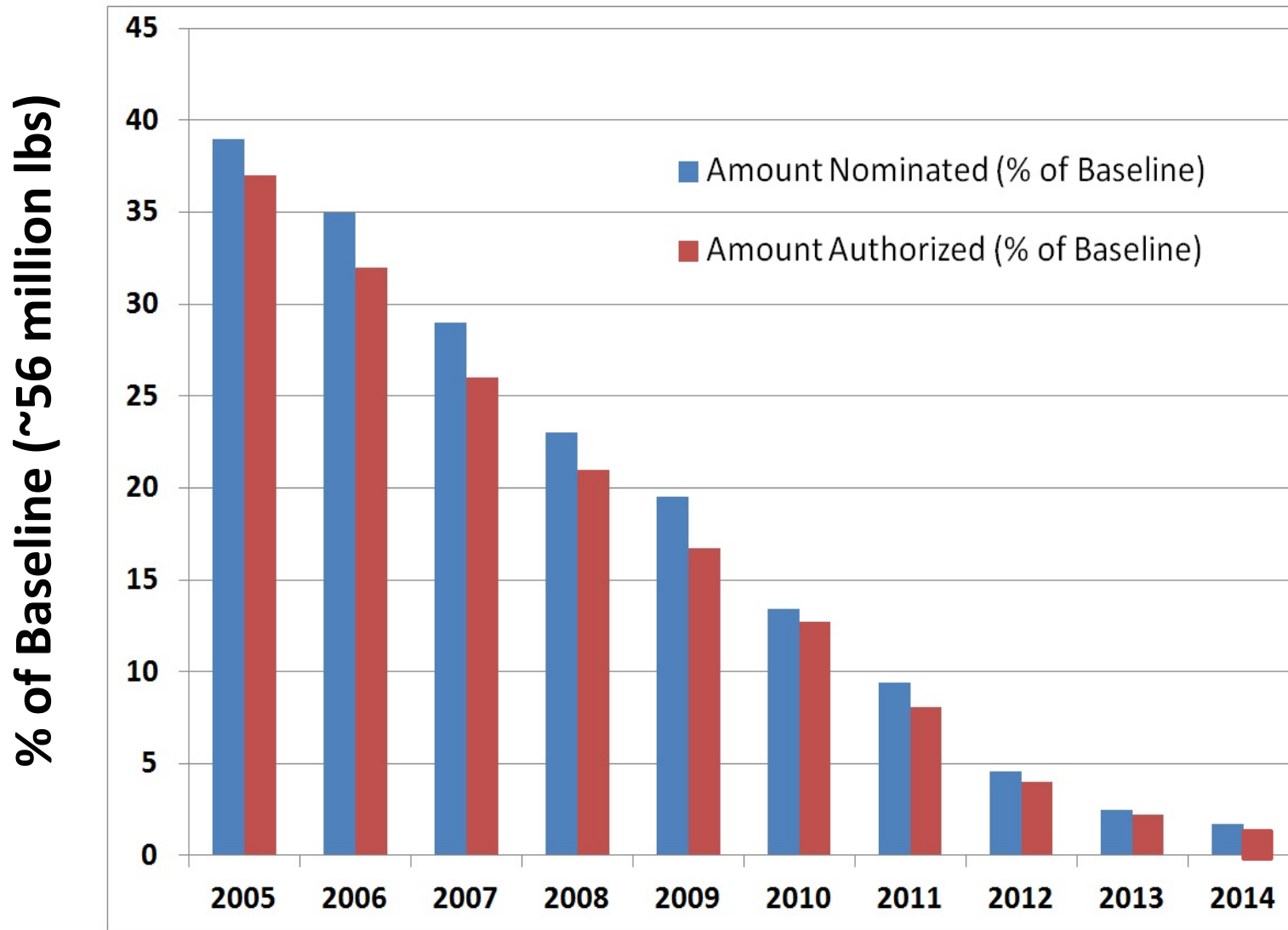


Fruit Import (e.g., Chilean Grapes)



Oak Log Export

10⁺ Years of Critical Use Exemptions (CUE) US Methyl Bromide Nominations and Approvals



For non-quarantine uses, current federal MB labels restrict use of MB to crops that have current CUE

Crop	Actual Status for 2014
Eggplant	Lost CUE
Cucurbits	Lost CUE
Forest Seedlings, Orchard Seedlings, Strawberry Nurseries	Lost CUE (but covered under CDFA Nematode-Free Certification Program)
Ornamentals	Lost CUE
Orchard Replant	Lost CUE
Peppers	Lost CUE
Strawberry Fruit (2015-2016)	CUE
Sweet Potato Slips	Lost CUE
Tomato (fresh market)	Lost CUE

**Some sectors have reapplied for CUE.
CA cut flowers, CA orchard replant, Golf Courses**

USEPA Soil Fumigant Re-Registration: MB, Pic, MITC Generators

Approximately 15 years of data generation, reviews and dialog with USEPA

○ = was under development

● = was adopted completely

Risk Mitigation Measure	Phase I (2010)	Phase II (2012)
Restricted Use	●	●
Use site limitations	●	●
Rate reductions	●	●
Good Agricultural Practices	●	●
New handler protections	●	●
Tarp cutting and removal restrictions	●	●
Extended worker reentry restrictions	●	●
Training information for workers	●	●
Fumigant Management Plans	●	●
First responder and community outreach	○	●
Applicator training	○	●
Compliance assistance and assurance measures	○	●
Restrictions on applications near sensitive areas	○	●
Buffer zones; Credits; Posting; Overlap Prohibitions	○	●
Emergency preparedness measures	○	●

USEPA's Registration Review started September 2013.

- Opportunity for refinements to labels.
 - Can we streamline the FMPs?
 - Can newer (post-2009) emissions data reduce the federal buffer zones?
- Runs through ~2019
- MB, Pic, MITC, and will also include 1,3-D (RED completed in 1998)



CDPR

Chloropicrin Risk Mitigation Program VOC Regulations Telone Township Caps



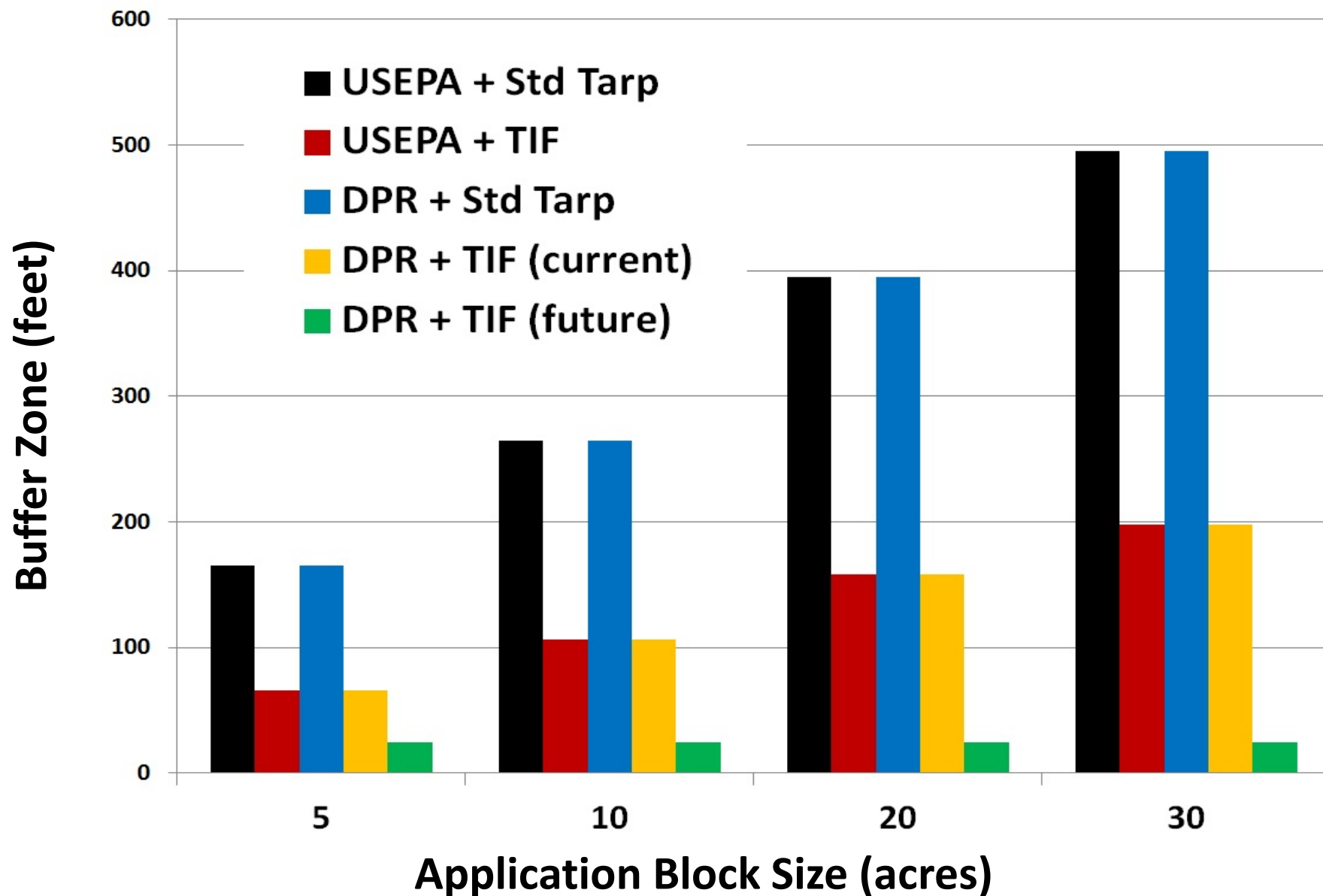
Chloropicrin Mitigation in California Timeline

July 2008	USEPA finalized the Re-Registration Eligibility Decision (Pic, MB, MITC)
Feb 2010	DPR completed the Risk Characterization Document
Dec 2010	DPR issues Risk Management Directive (endpoint = 73 ppb, same as EPA)
Jan 2011	Chloropicrin designated a Toxic Air Contaminant (triggers Risk Mitigation)
Dec 2012	Federal (Phase II) Labels go into effect
May 2013	DPR issued Proposed Mitigation Measures (Acute Exposure to Bystanders/Residents)
Jan 2015	DPR issues Final Chloropicrin Mitigation Measures (Bystanders/Residents) DPR proposal for worker exposure changes has not yet been released
May 2015	Negotiate California-specific labels with DPR and USEPA
2016	New CA labels go into effect

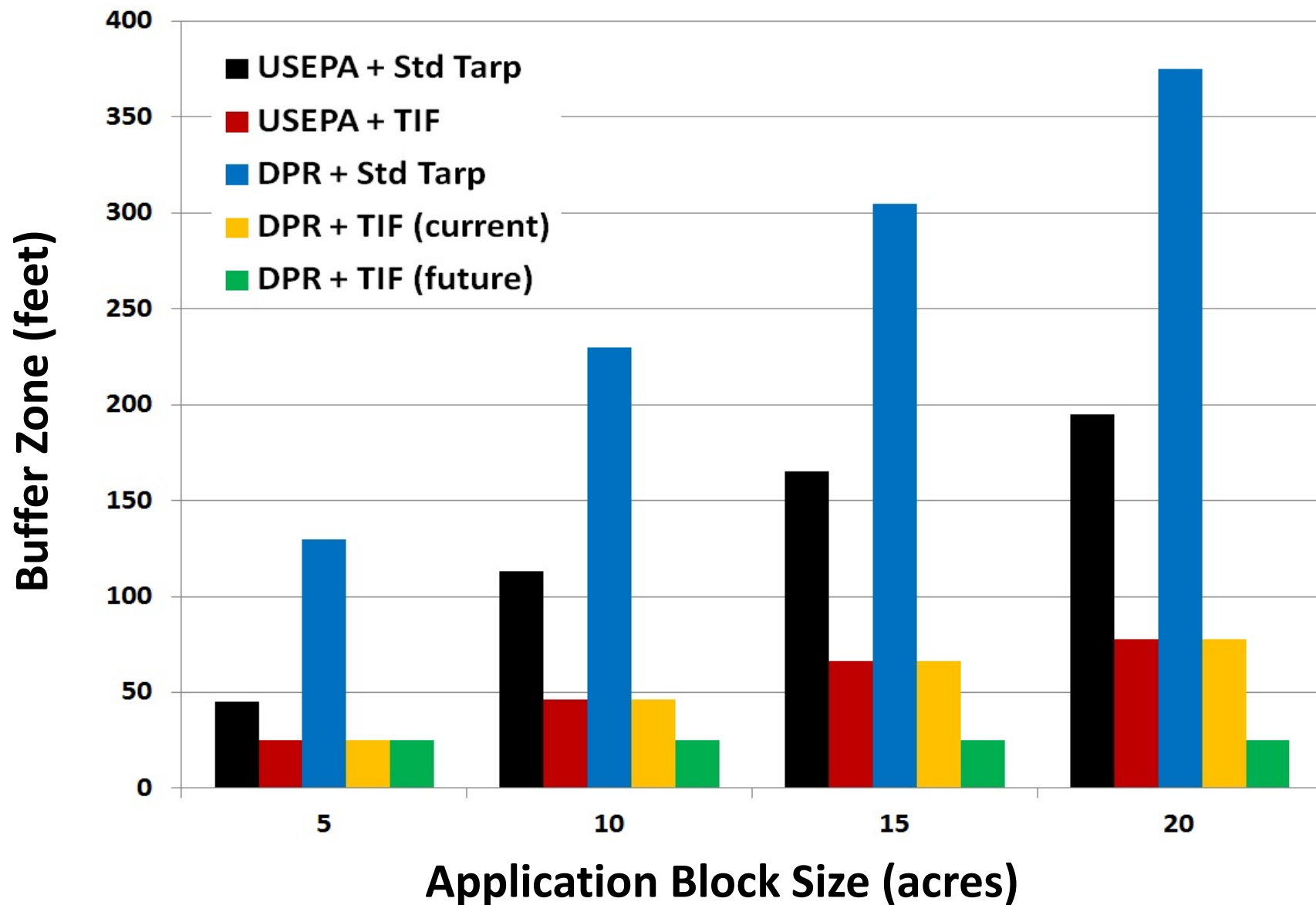
DPR changes affect:

- **Buffer Zones**
- **Buffer Credits**
- **Approved Tarps**
- **Minimum Buffer Zones**
- **Acreage Limits**
- **Overlapping Buffer Zones**
- **Emergency Preparedness and Response**
- **Emergency Response Plan**
- **Notice of Intent Requirements**
- **Tarp Cutting Requirements**
- **Tree Hole Fumigation**
- **Fumigation Time Restrictions**

Buffer Zone Distance (feet) for 300 lbs chloropicrin/acre Tarped Broadcast



Buffer Zone Distance (feet) for 225 lbs chloropicrin/acre Tarped Drip



Approved Buffer Zone Reduction Credits: USEPA vs. DPR

Credit	USEPA	DPR
1-2% organic matter	10%	0%
2-3% organic matter	20%	0%
>3% organic matter	30%	0%
Water Seals	15%	0%
Degradation Accelerants	15%	0%
Metalized Tarp	20%	0%
VIF Tarp	40%	0%
TIF Tarp	60%	60%
Additive Totals	80% max credit	60% max credit

DPR is refining the list of TIF-qualified (60% buffer credit list).

Films behave differently in the presence of high relative humidity

Film Composition	Ambient %RH	High %RH	Fold Increase
Polyethylene (LDPE)	2.2710	2.6259	No real change
Polyethylene (HDPE)	0.7104	0.7754	No real change
Nylon-1	0.0011	0.1563	142
Nylon-2	0.0001	0.3877	3,877
Nylon-3	0.0001	0.9499	9,499
EVOH-1	0.0001	0.0038	38
EVOH-2	0.0001	0.0006	6

**The nylon films on USEPA's 60% buffer credit list will likely not qualify for DPR's "TIF" list.
These nylon films would be treated the same as polyethylene.**

VOC Regulations

Volatile Organic Compound (VOC)

Regulations:
Non-Attainment
Areas

Sacramento Metro

San Joaquin Valley

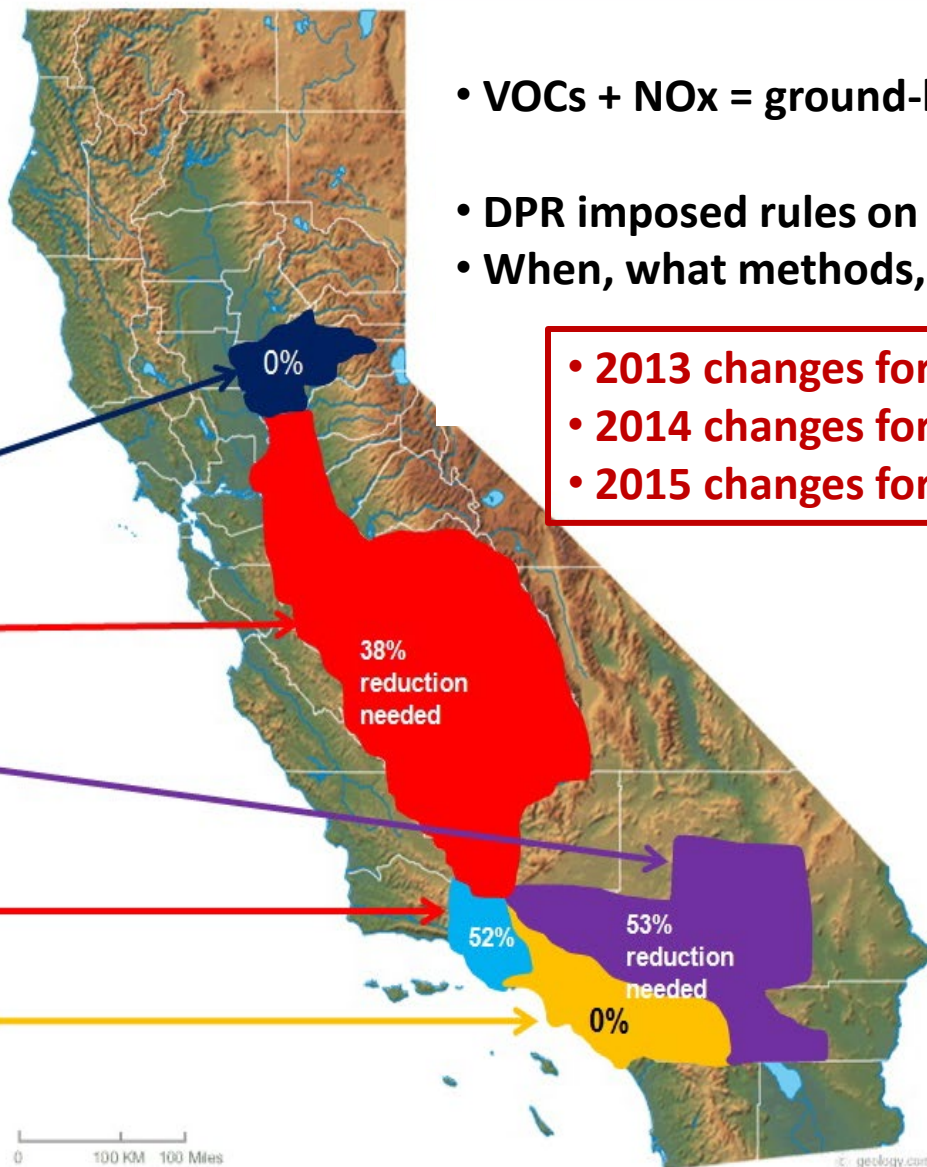
Southeast Desert

Ventura County

South Coast

- VOCs + NO_x = ground-level ozone (smog)
- DPR imposed rules on fumigant use:
- When, what methods, etc.

- 2013 changes for broadcast TIF
- 2014 changes for non-tarped Pic
- 2015 changes for drip TIF (in progress)



DPR's VOC Emissions Ratings – 2013 changes for tarps

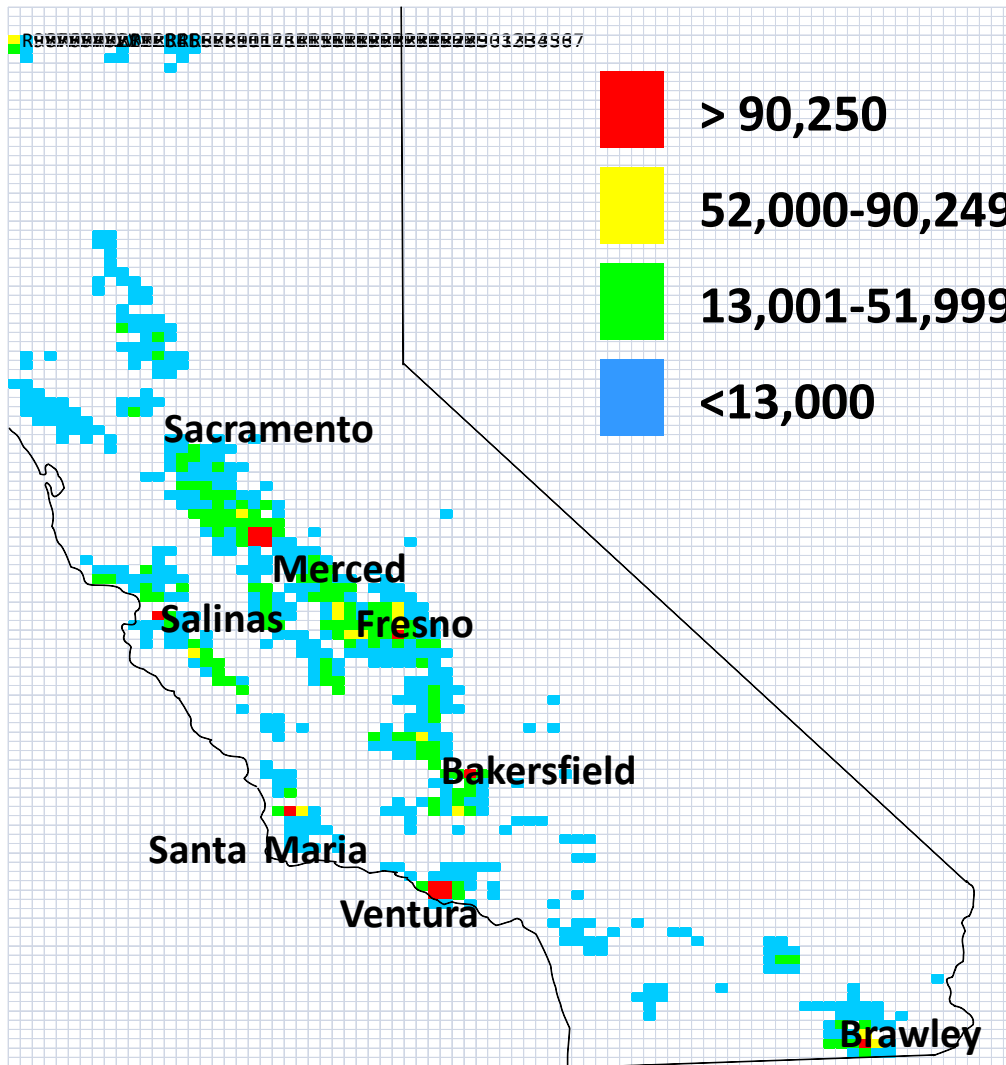
(% emitted = affects method options, rates, and timing)

Fumigant	Application Method	Standard Tarp	TIF
Chloropicrin	Shallow or Deep Broadcast	44%	7%
	Drip	12%	7%
1,3-D	Shallow Broadcast	65%	10%
	Deep Broadcast	26%	10%
	Drip	29%	Data in progress

***Prohibited during May-October (Poly tarp)**

*** Approved year-around (Standard Film)**

*** Approved year-round (TIF)**



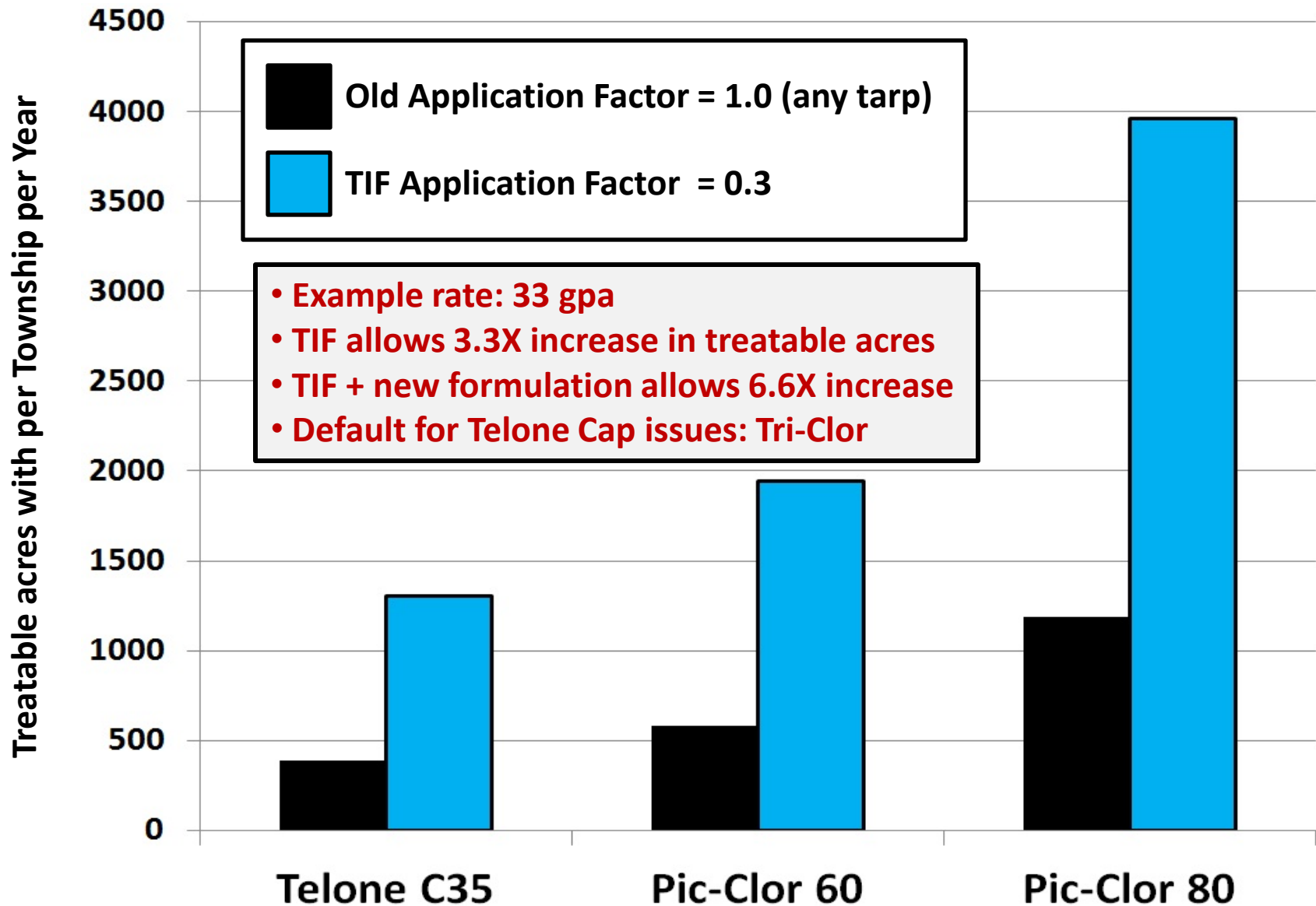
Ave 1,3-D Use since 1995 by
Township

Telone Township Caps

- Early 2014, DPR eliminated Cap Exceptions
- Townships with 'banked' lbs can still use 180,000 adjusted lbs
- No other changes for non-tarped
- Affects sweet potatoes, carrots
- TIF changes: Tarped markets should be able to navigate current and future Township Cap issues

Telone Township Caps: **Tarped Shank (drip data pending)**

(allowed 90,250 “adjusted” lbs 1,3-D per 6x6 mile area per year)



Regulatory Update

