

AGIS

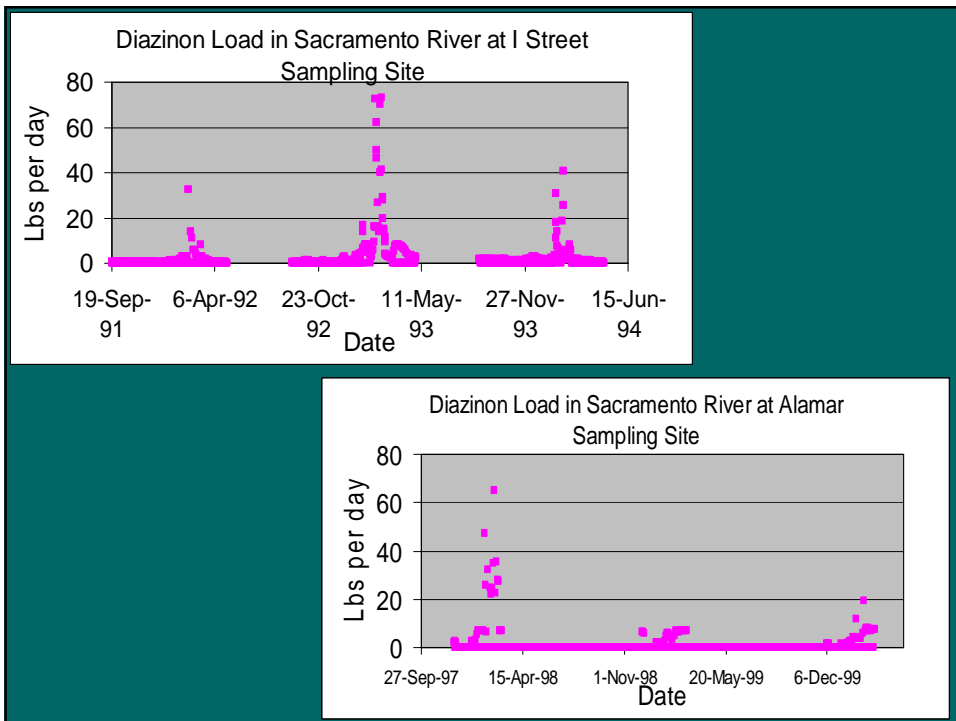
4th PUR Workgroup Meeting – 30 March 2005

## Spatial Assessment of Use of Dormant OP and Alternatives in Almond Orchards

Minghua Zhang (UC Davis/DPR)

Eike Luedeling (UC Davis)





## Objectives

1. Document temporal dynamics of dormant pesticide use
2. Examine spatial patterns of dormant pesticide use
3. Correlate orchard locations with geographical and environmental attributes
4. Attempt an estimation of pollution risk

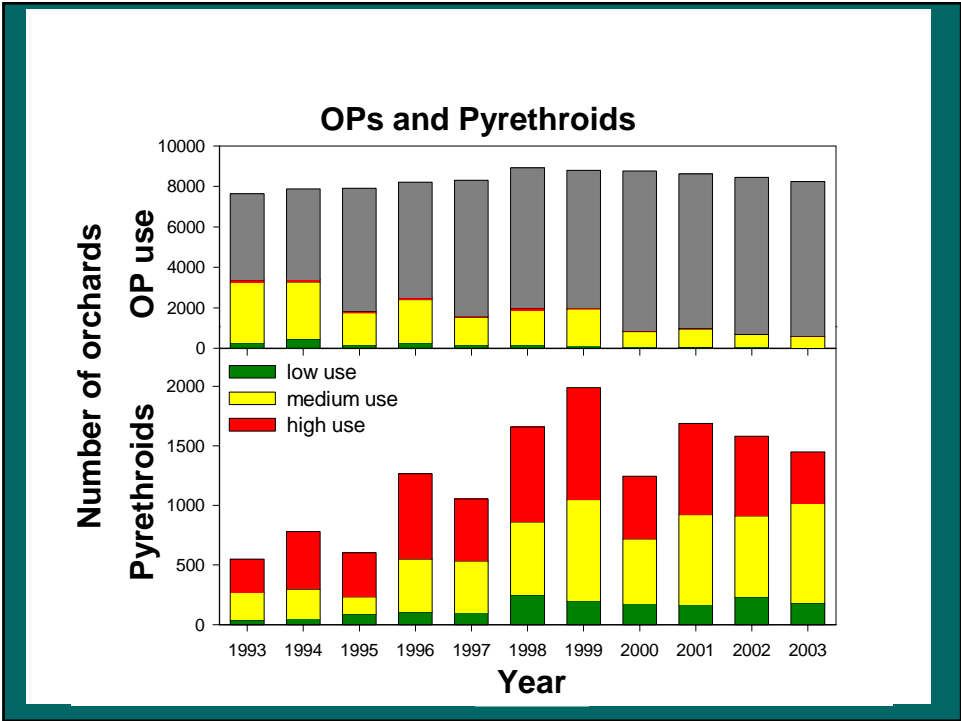
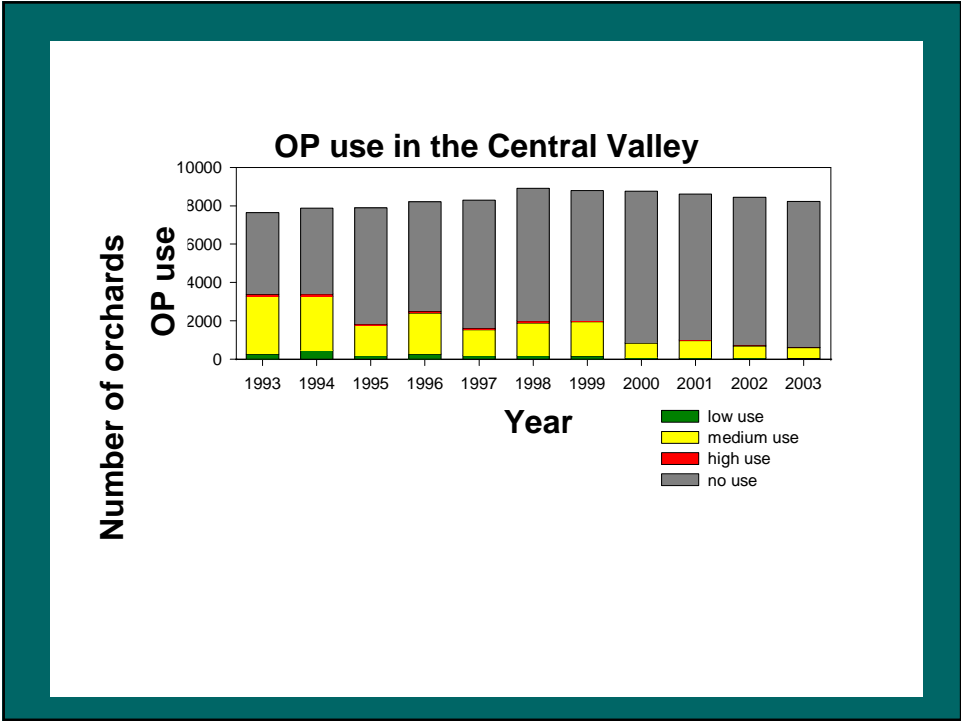
## Outline

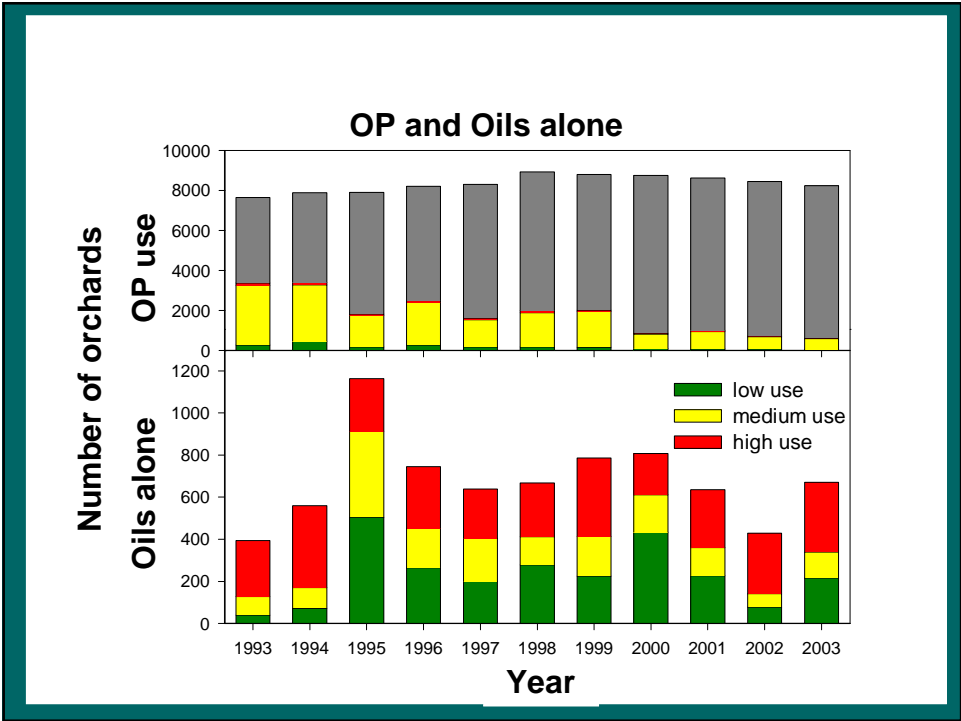
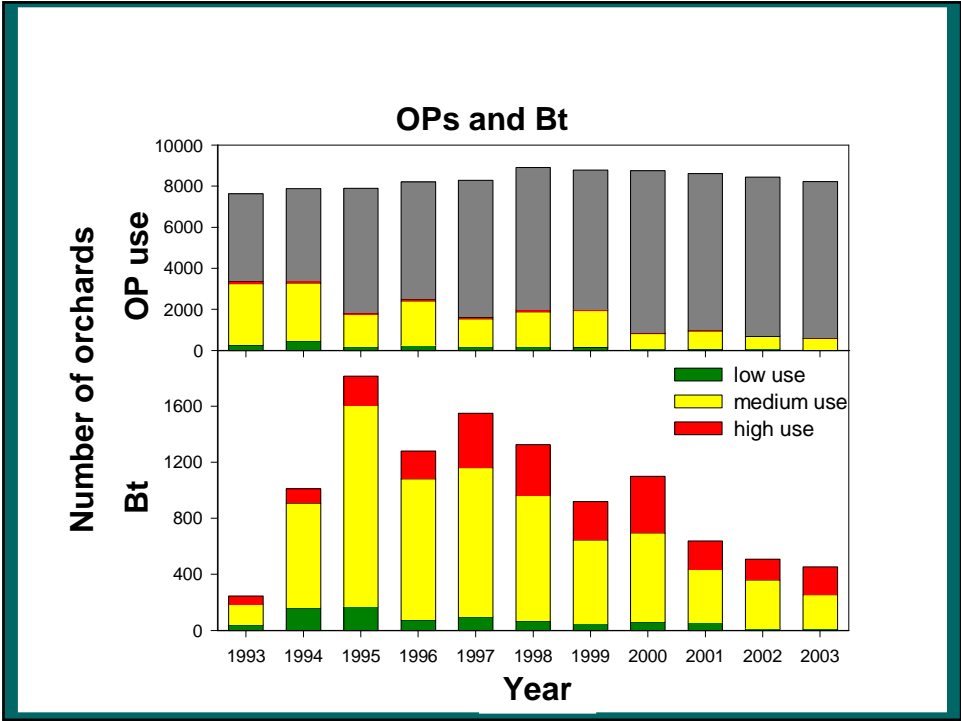
1. OPs and alternatives: Temporal dynamics
2. OPs and alternatives: Spatial patterns
3. Locations of high dormant OP users
4. Choice of alternatives to dormant OP
5. Conclusions and further work.

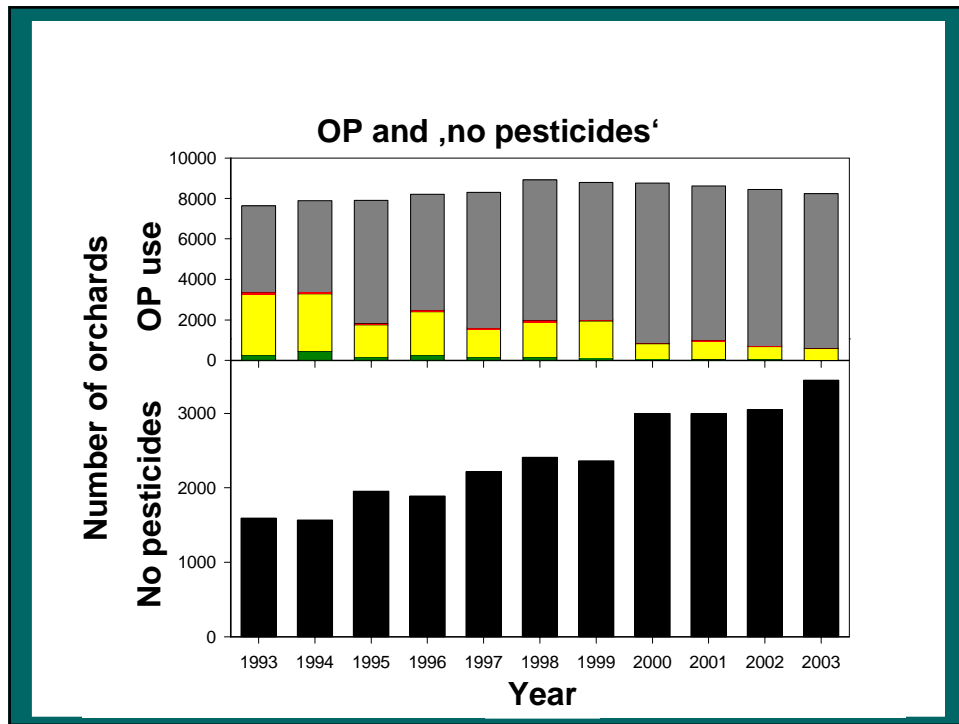
## OPs and alternatives: Temporal dynamics

### Methods

1. Classify OP use and use of alternatives (Pyrethroids, Bt, Oils)
2. High use: >150% of long-time average
3. Medium use: 50% -150% of long-time average
4. Low use: <50% of long-time average
5. Track dynamics over 11-year span (1993-2003)

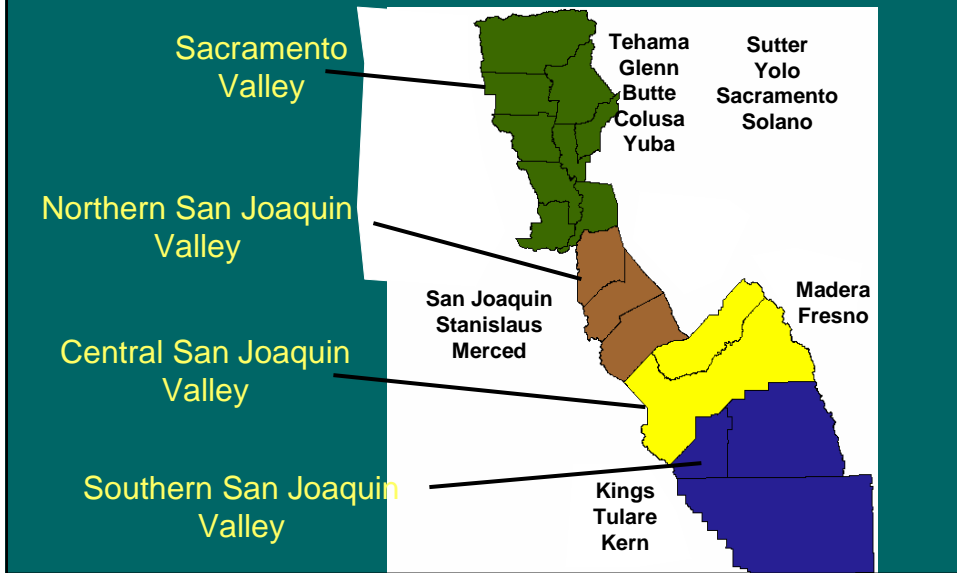




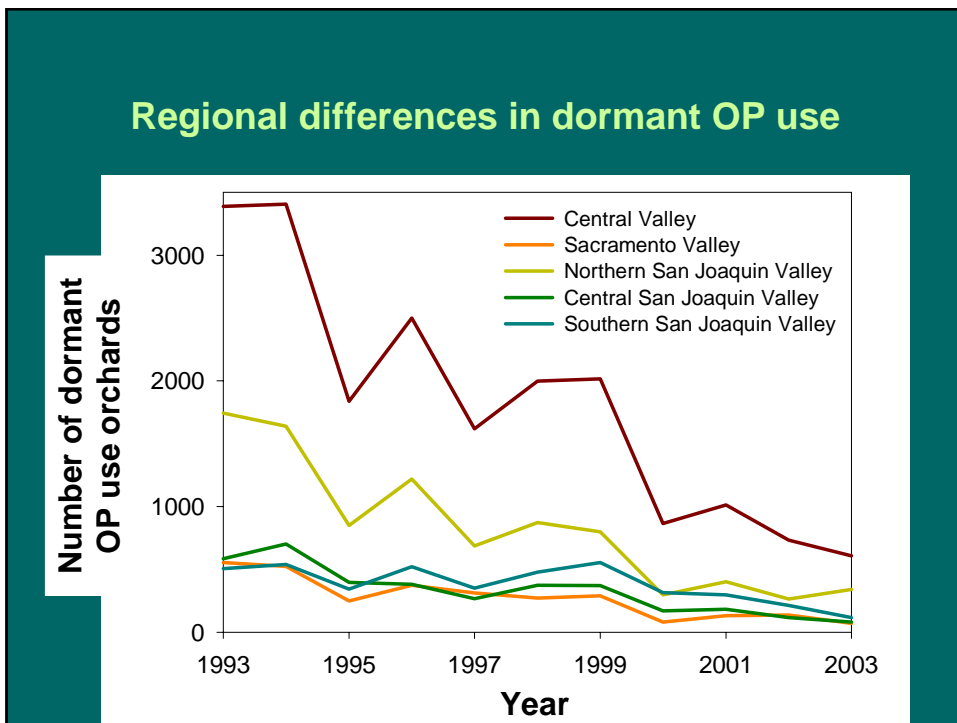


OPs and alternatives:  
Spatial patterns

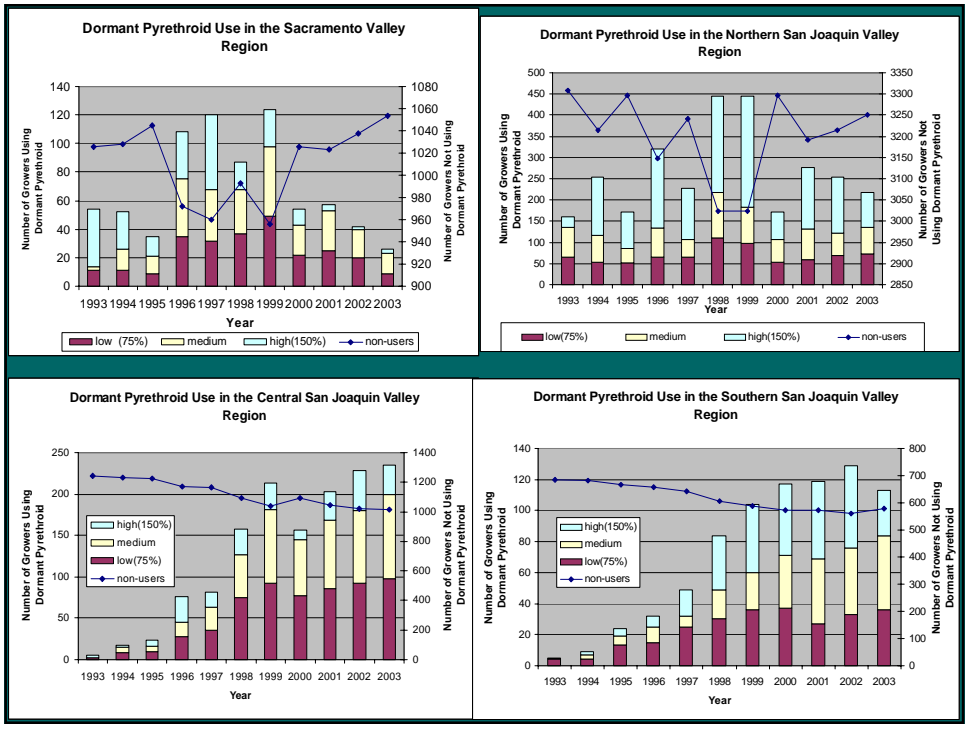
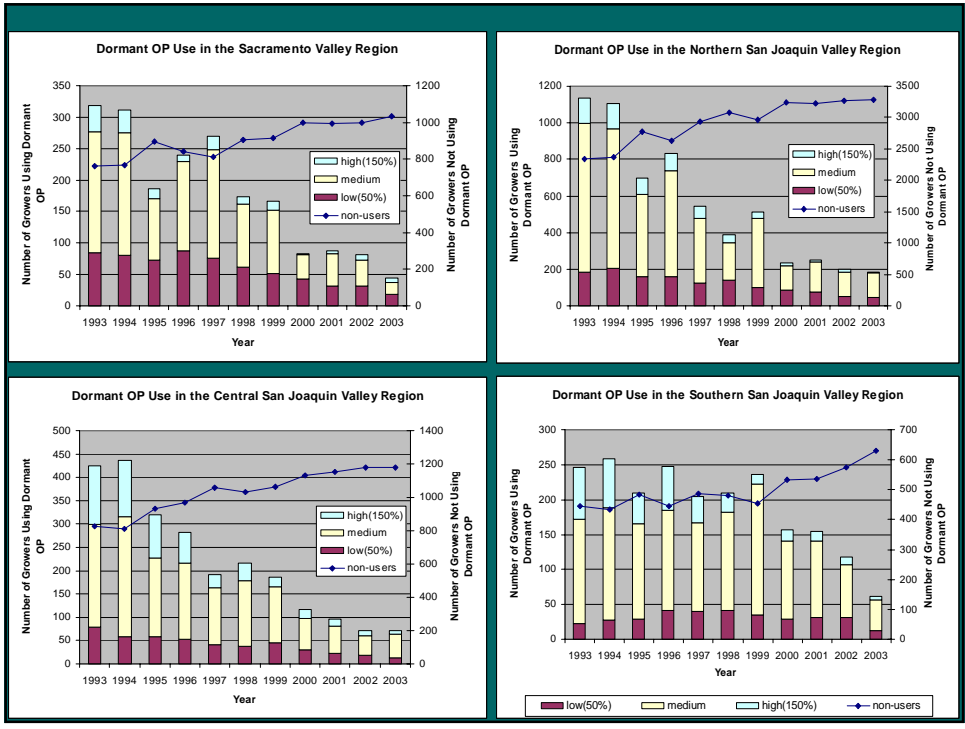
## Regional differences in dormant OP use



## Regional differences in dormant OP use







## Locations of high dormant OP users

**1. Orchards above the 2002 average application rate**

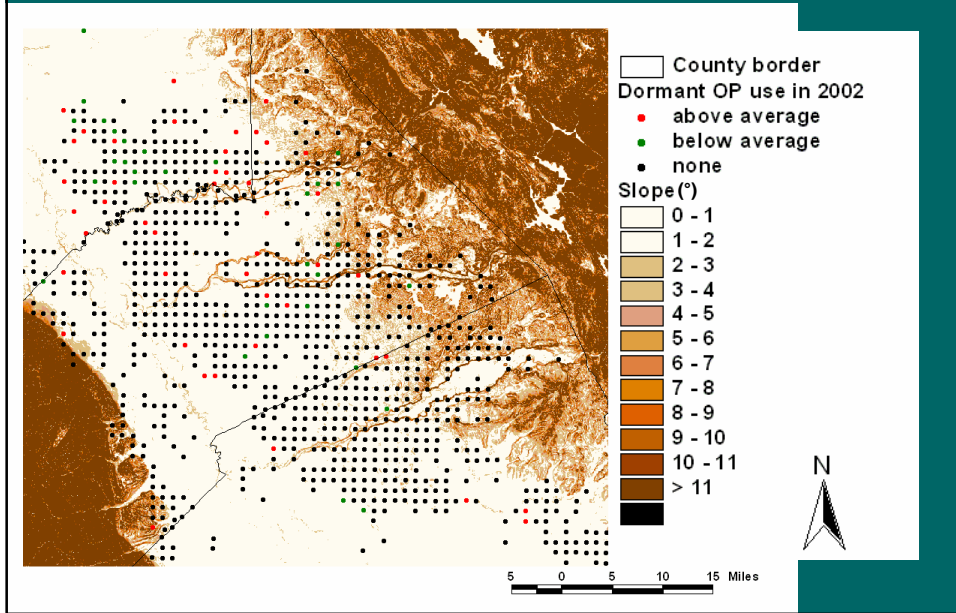
**2. Inclination of orchards (slope in °)**

Derive from digital elevation model (90 m resolution)

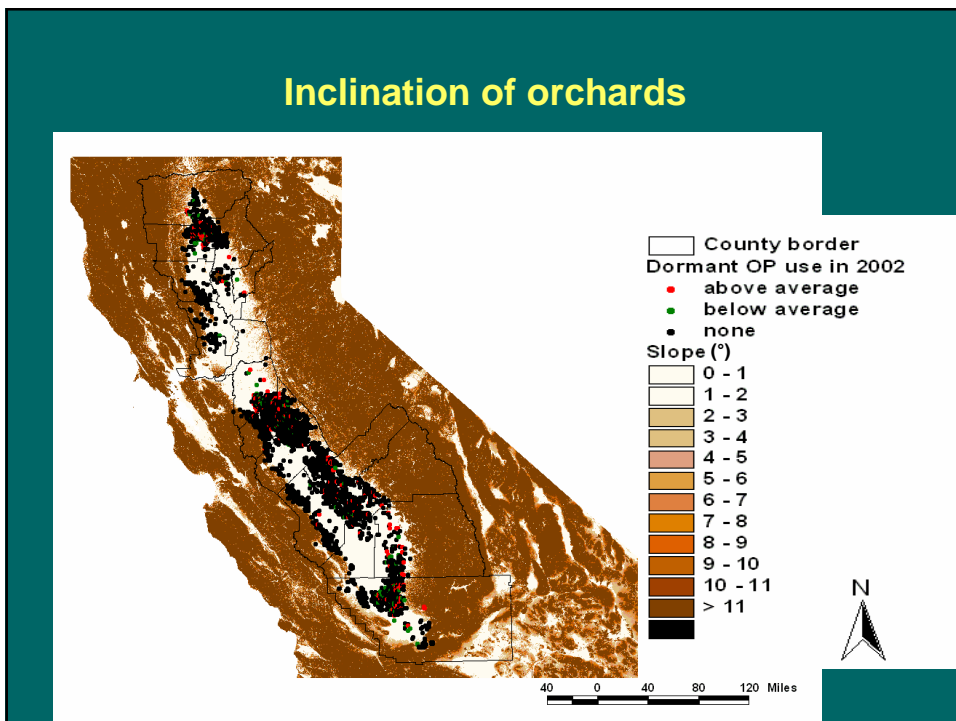
**3. Distance of orchards from streams**

Derive from streams shapefile (primary, secondary, tertiary streams)

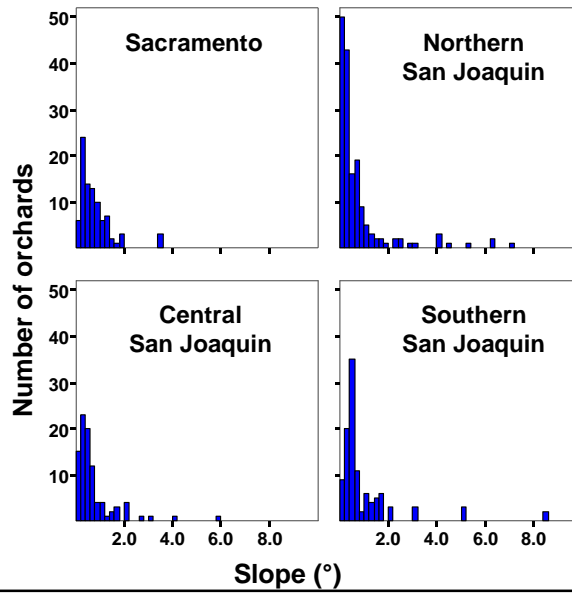
## Inclination of orchards



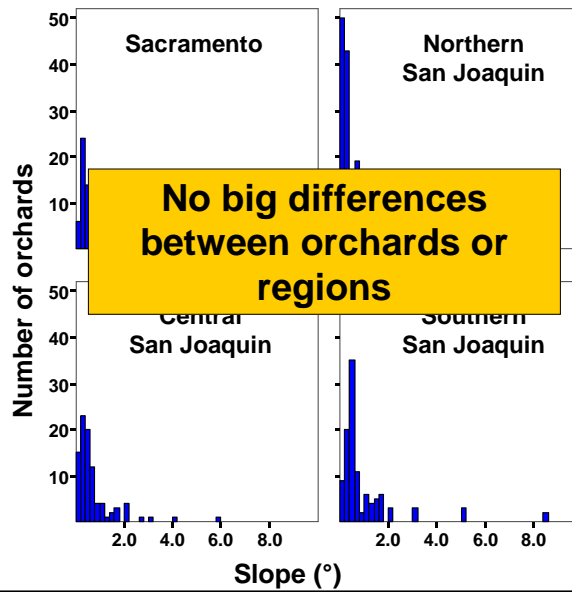
## Inclination of orchards



## Inclination of orchards



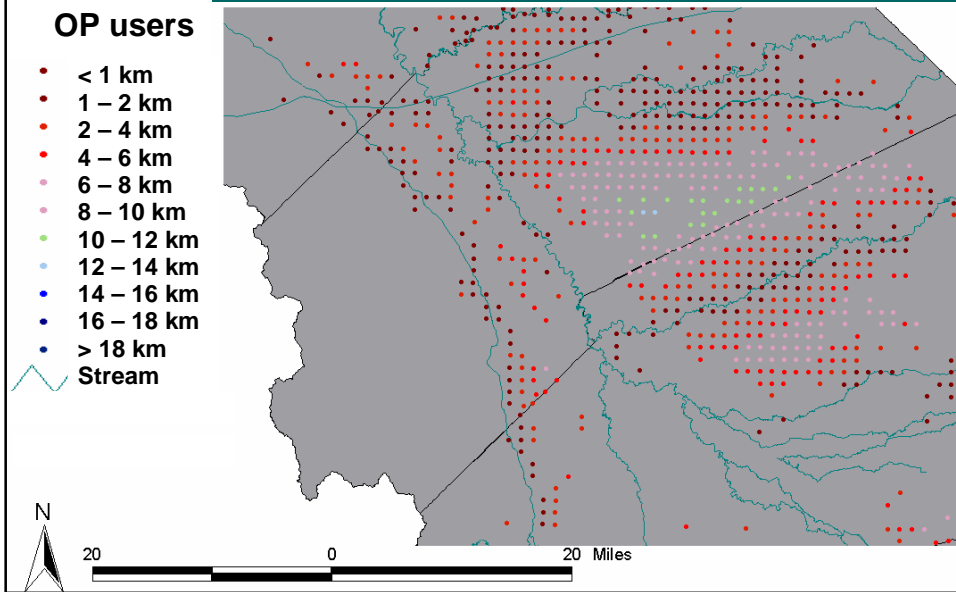
## Inclination of orchards



## Distance from streams

2002 dormant  
OP users

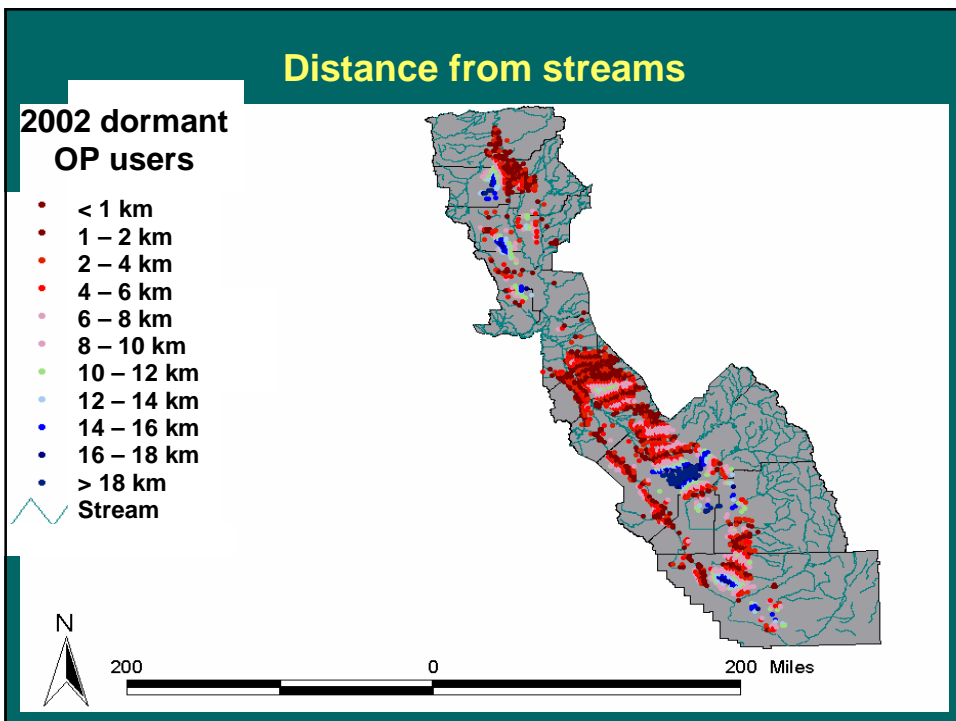
- < 1 km
- 1 – 2 km
- 2 – 4 km
- 4 – 6 km
- 6 – 8 km
- 8 – 10 km
- 10 – 12 km
- 12 – 14 km
- 14 – 16 km
- 16 – 18 km
- > 18 km
- Stream



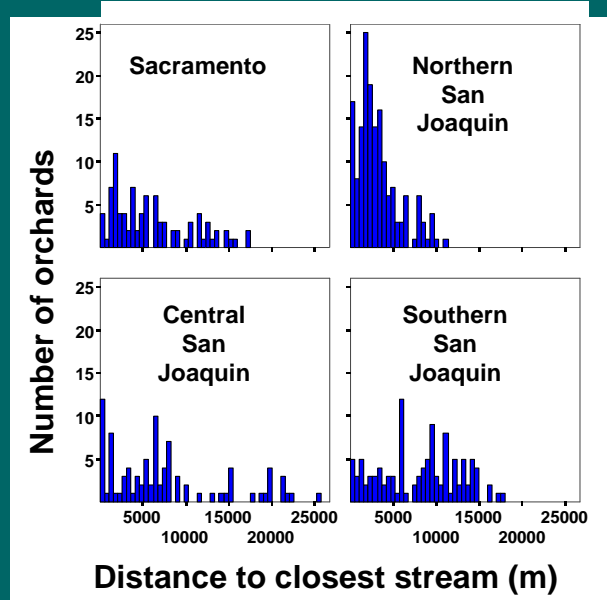
## Distance from streams

2002 dormant  
OP users

- < 1 km
- 1 – 2 km
- 2 – 4 km
- 4 – 6 km
- 6 – 8 km
- 8 – 10 km
- 10 – 12 km
- 12 – 14 km
- 14 – 16 km
- 16 – 18 km
- > 18 km
- Stream



## Distance from streams

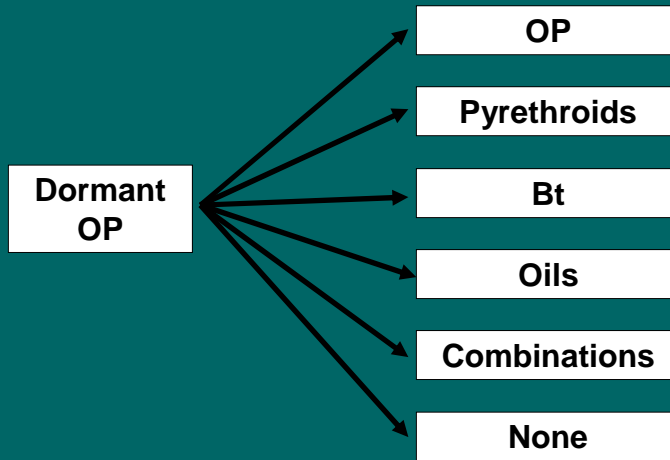


Choice of alternatives to dormant OP

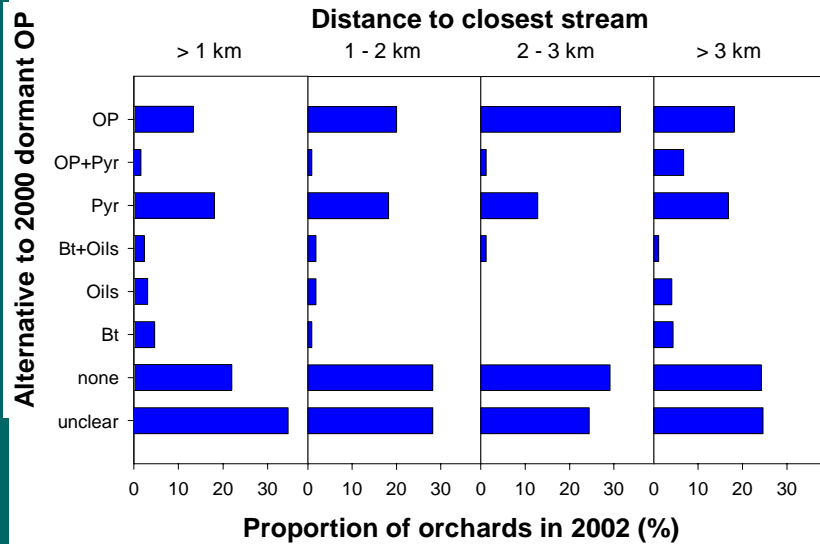
## Choice of alternatives to dormant OP

Pest control in 2000

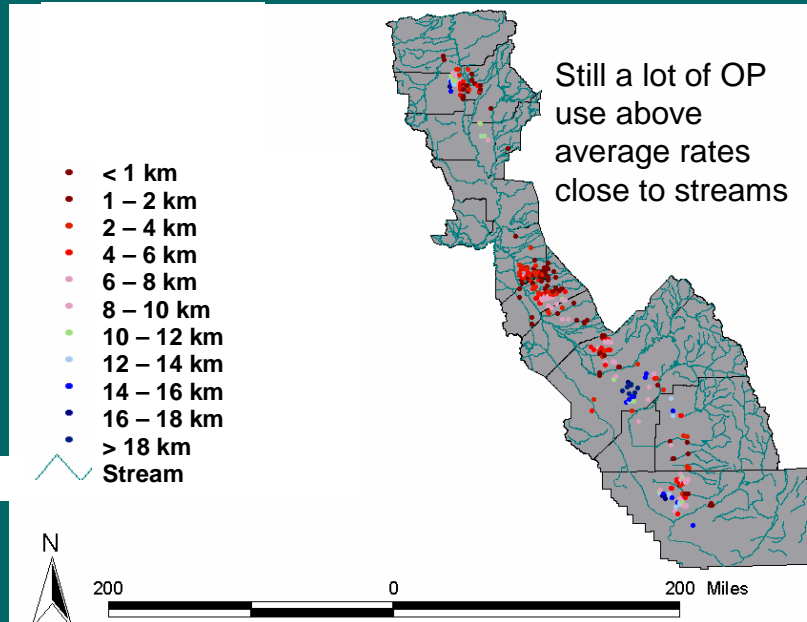
Pest control in 2002



## Choice of alternatives to dormant OP



## Distance to streams of 2002 above average dormant OP users



## Conclusions

### Temporal dynamics

Dormant OP use is declining

Most orchards stopped using dormant pesticides

40% of orchards applied no pesticides at all in 2003 → Incomplete reporting or real phenomenon?

### Geographical distribution

Still high OP use near streams were observed

Most alternative pesticide use were further away from streams



## Further Work

### **Estimation of pollution risk**

Based on environmental (e.g. soil type) or geographical (e.g. distance to streams) factors

### **Constraints**

Resolution of datasets as a rule not good enough to derive risk for individual orchards

### **Calibration requirements**

Requires calibration of data on smaller area with better data

Requires calibration with real pollution, pesticide flow measurements