Surface Water Monitoring for Pesticides in Agricultural Areas of California

Xin Deng, Ph.D.
Environmental Monitoring Branch

Pesticide Regulation 101
11. 9. 2015

Outline

- Objectives
- Sampling regions and watersheds
- Sampling schedule
- Pesticides prioritized for monitoring
- Results (2012-2014)
- Future plan

Objectives

- Determine occurrences and concentrations of high priority pesticides
- Assess short-term changes and long-term trends
- Evaluate potential impacts on aquatic organisms
- Evaluate regional differences
- Identify emerging pesticides with potential to cause water quality problems

Sampling Regions and Watersheds

Salinas Valley

- Salinas River, Drainage Area = 11,082 km^2
- Tembladero Slough, Drainage Area = 291 km^2

Santa Maria Valley

- Orcutt Creek, Drainage Area = 301 km^2
- Oso Flaco Creek, Drainage Area = 51 km^2

Imperial Valley

- Alamo River, Drainage Area = 1,264 km^2
- New River, Drainage Area = 1,729 km^2
- Palo Verde Drain, Drainage Area = 778 km^2

Sampling Sites

Sites on Main Streams = 44%

Sites on Ag Drains and Tributaries = 56%

Sampling Schedule (2014-2015)

- **Imperial Valley**: March and October
- **Salinas Valley**: Monthly from April to September
- **Santa Maria Valley**: May, July, September
- **Palo Verde Drainage**: March

Budget : $ 250~280K for chemical analyses

Pesticides for Monitoring (2014-2015)

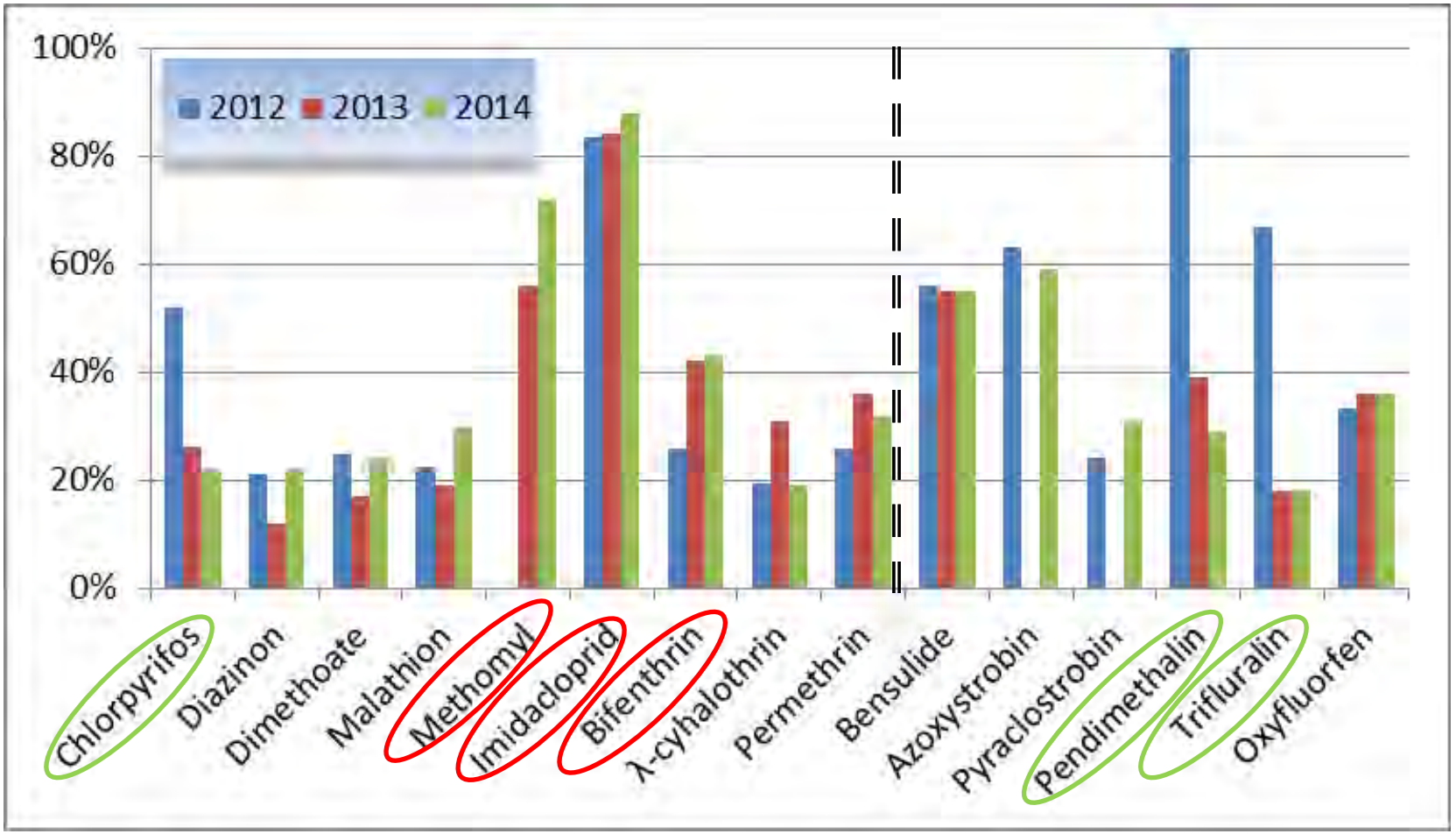
Pesticide Monitoring List by Prioritization Model

- 2013 – 2014 based on statewide and county uses
- 2015 based on uses at watershed level

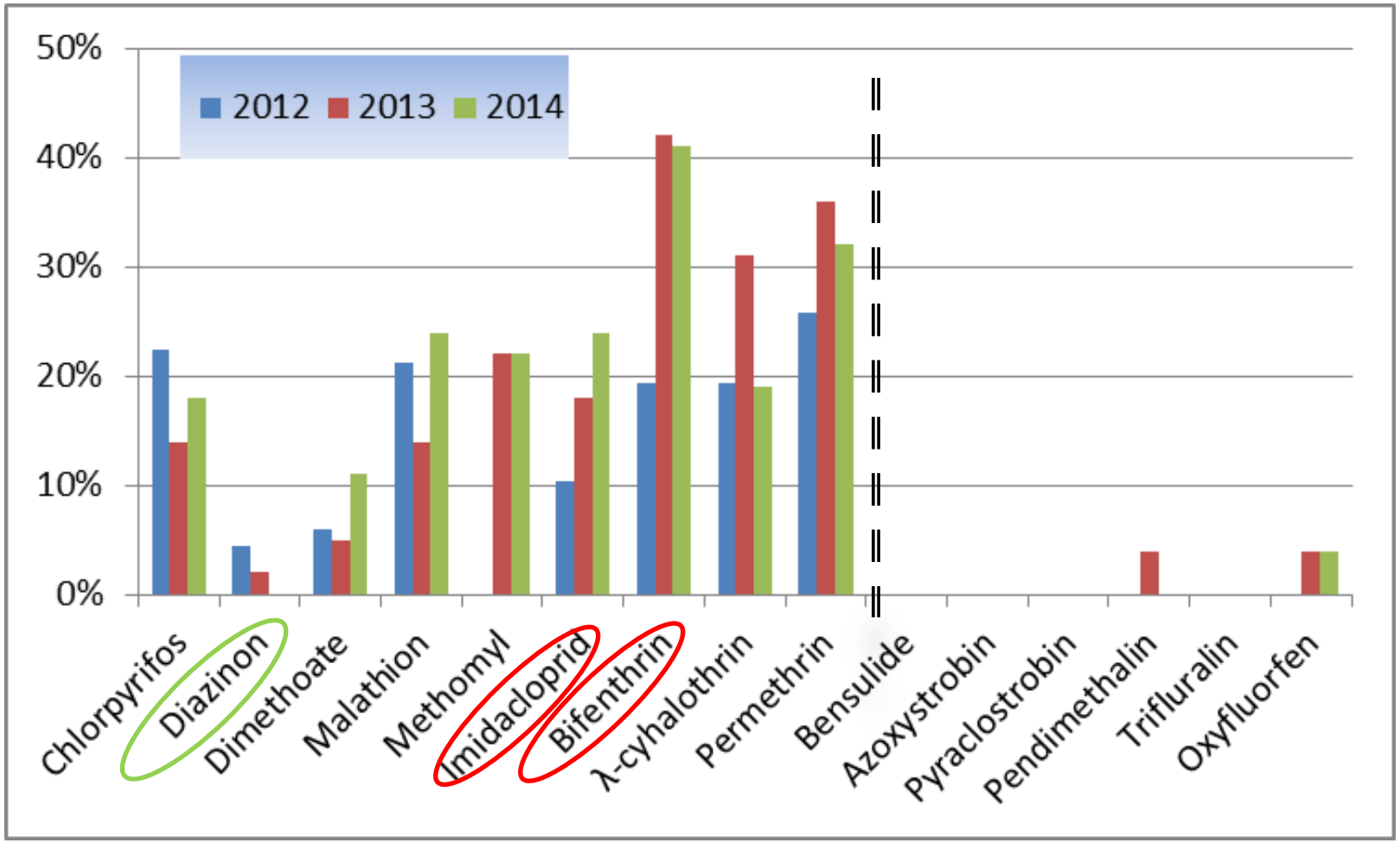
Pesticide Analyte Group (~30 analytes)

- Insecticides: organophosphates (5 analytes); carbamate (1); diacylhydrazines (2); neonictinoid (1); pyrethroids (6)
- Herbicides: dinitroanilines (6); bensulide; oxyfluorfen
- Fungicides: strobilurines (4)

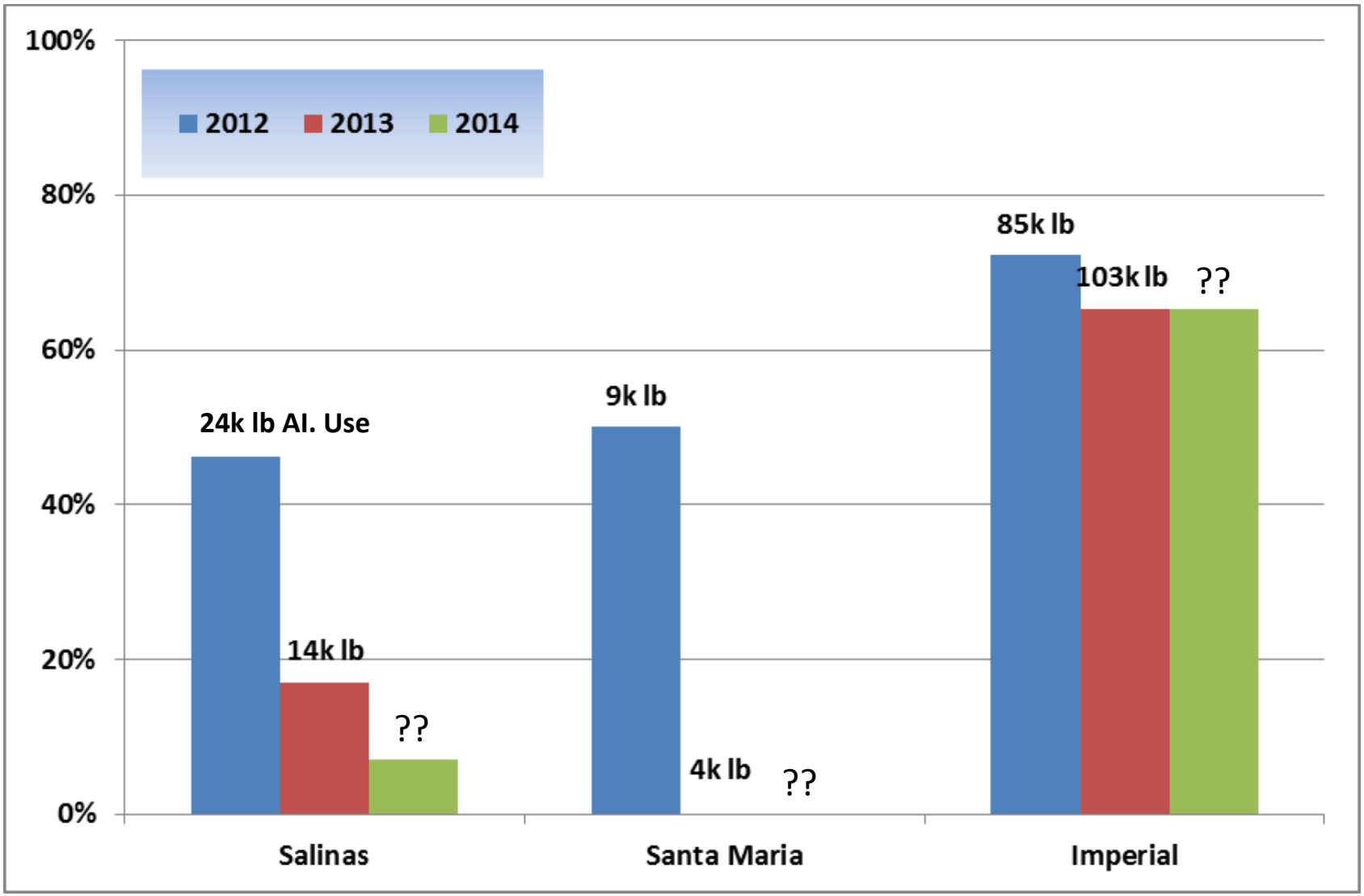
Results – Detection Frequencies (2012-2014)



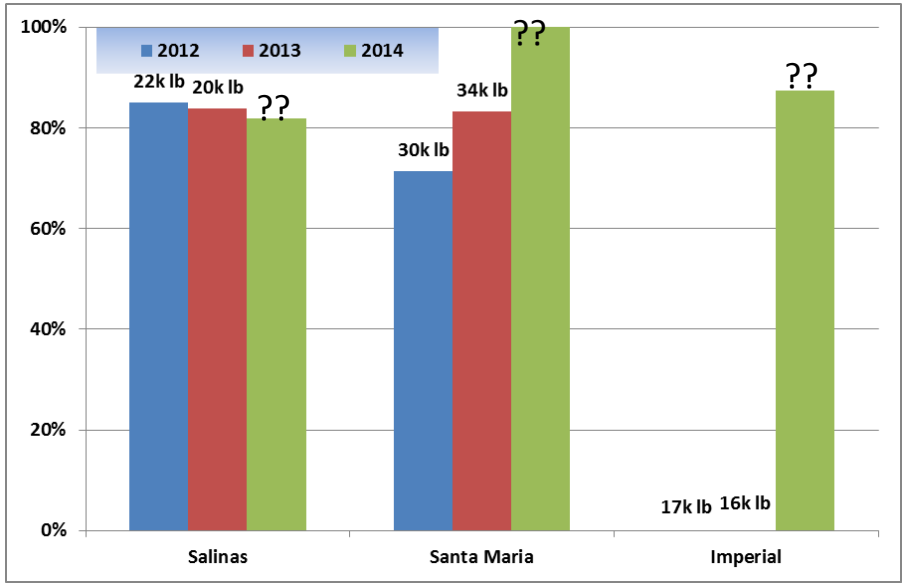
Results – Benchmark Exceedances (2012-2014)



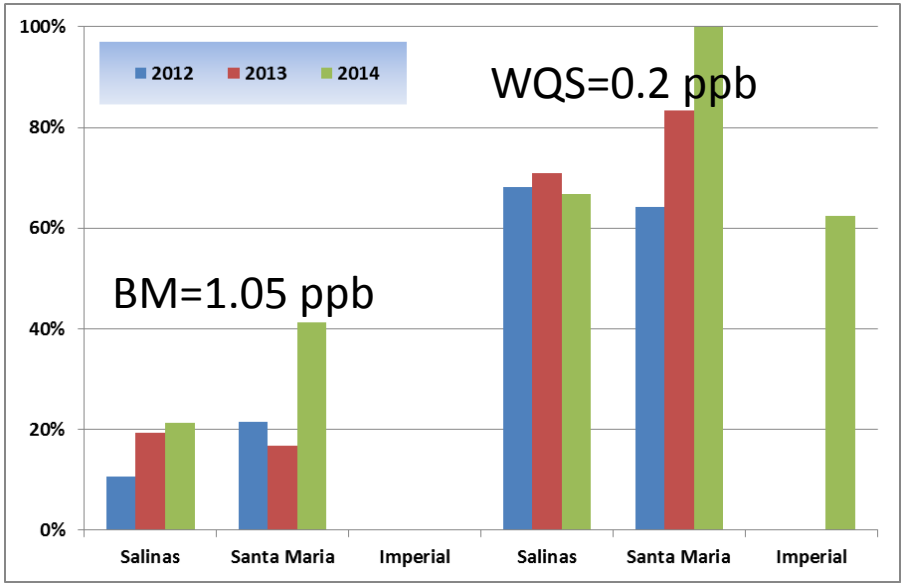
Results – Chlorpyrifos
Detection Frequencies by Region



Results – Imidacloprid
Detection and Exceedance Frequencies



Detection Frequencies by Region



Exceedance Frequencies by Region

- use changes = ± 5-13%
- detection % > 70%
- uses for seed treatments unknown

BM = lowest aquatic life benchmark (US EPA)
WQS = short term water quality standard published by Smit et al. 2015

Future Plan

Ag Monitoring Work Group:

Yuzhou Luo - Modeling and Hydrology

Dan Wang - Statistics

Xin Deng, April DaSilva - Aquatic Toxicology

Objectives: 1. Evaluate current Ag monitoring sites;

2. Expand monitoring coverage into other areas within current budget (April DaSilva);

3. Establish consistent criteria for site selection

Time line: 09.2015-06.2016

Thank You!

Contact: xin.deng@cdpr.ca.gov

916.445.2506