PANNA Water & Pesticides Information Center (WaterPIC)

Pesticide Action Network North America (PANNA)
Tony Choi, Placer Data, Susan Kegley, Ph.D, PANNA, Brian Hill, Ph.D., PANNA
achoi@placerdata.com, skegley@panna.org, brian_hill@panna.org

Introduction to WaterPIC

- Why We Need a WaterPIC
  - Released: November, 2005
- Background
  - PUR, surface water monitoring, TMDLs
- WaterPIC Demonstration
- Potential Study Areas

The Problem: In A Nutshell

Problems: Using Available Data Sets

- Very large
- Scattered: not under one roof
- Different formats
- Idiosyncratic data
- Specialized software and skills to do spatial analysis required
- TIME CONSUMING!!!!

Background: PUR

STATE OF CALIFORNIA
DEPARTMENT OF PESTICIDE REGULATION
PR-ENF-023 (REV. 2/99)

PESTICIDE USE REPORT

☐ Nursery

County No.	Section	Township	Range	Base & Meridian	App. Method	Permittee/Property Operator	Applicator Name
		☐N ☐S	☐E ☐W	S M H ☐ ☐ ☐	Air ☐ Ground ☐ Other ☐		

Operator ID/Permit No.	Site Identification Number	Total Planted Acres/Units

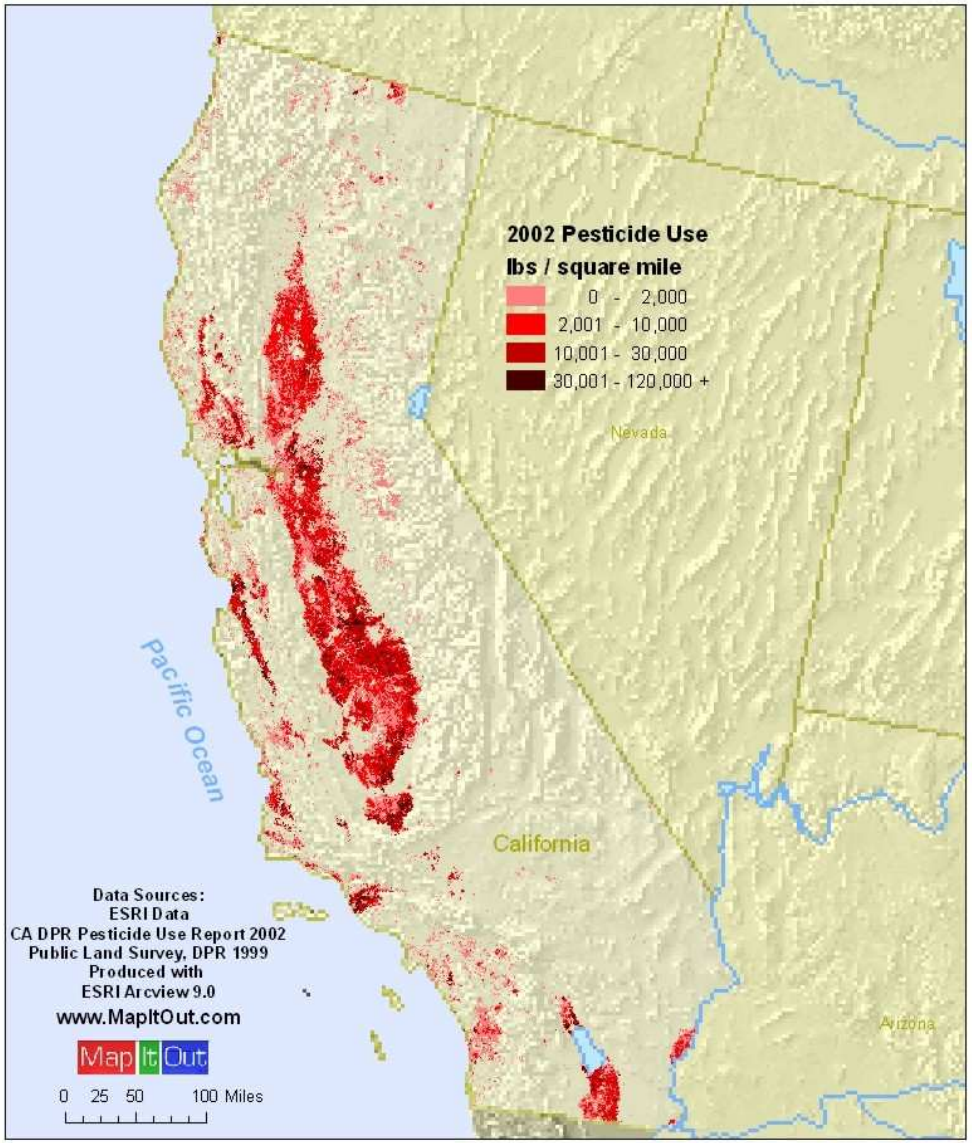
Location	Block ID (If Applicable)

Date/Time Applied	Acres/Units Treated	Commodity/Site Treated

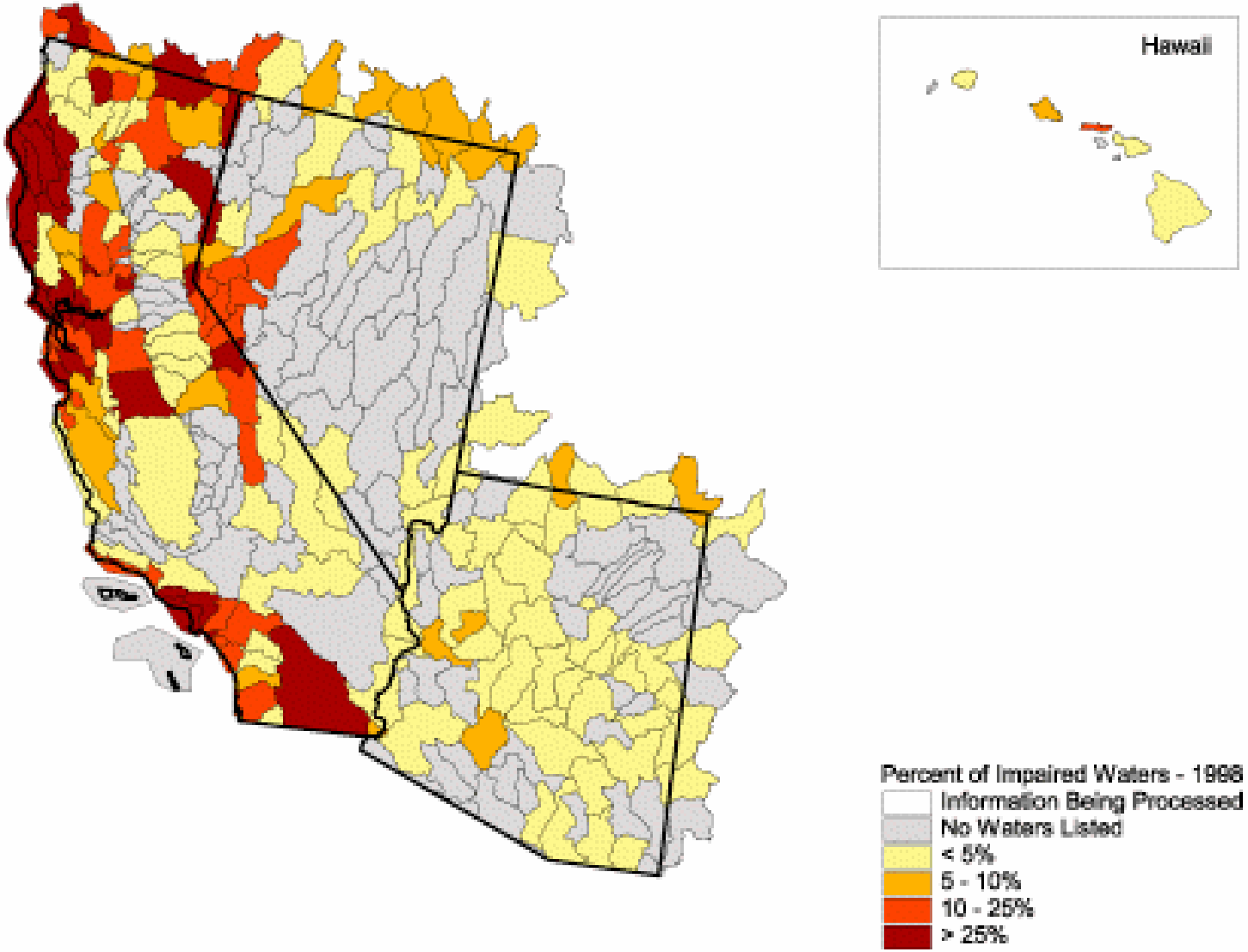
Chem No.	Manufacturer/Name of Product Applied	EPA/Calif. Registration No. From Label	Total Product Used	Rate

Reported Agricultural Pesticide Use in California, 2002

Total Pounds of Active Ingredient Applied per Square Mile



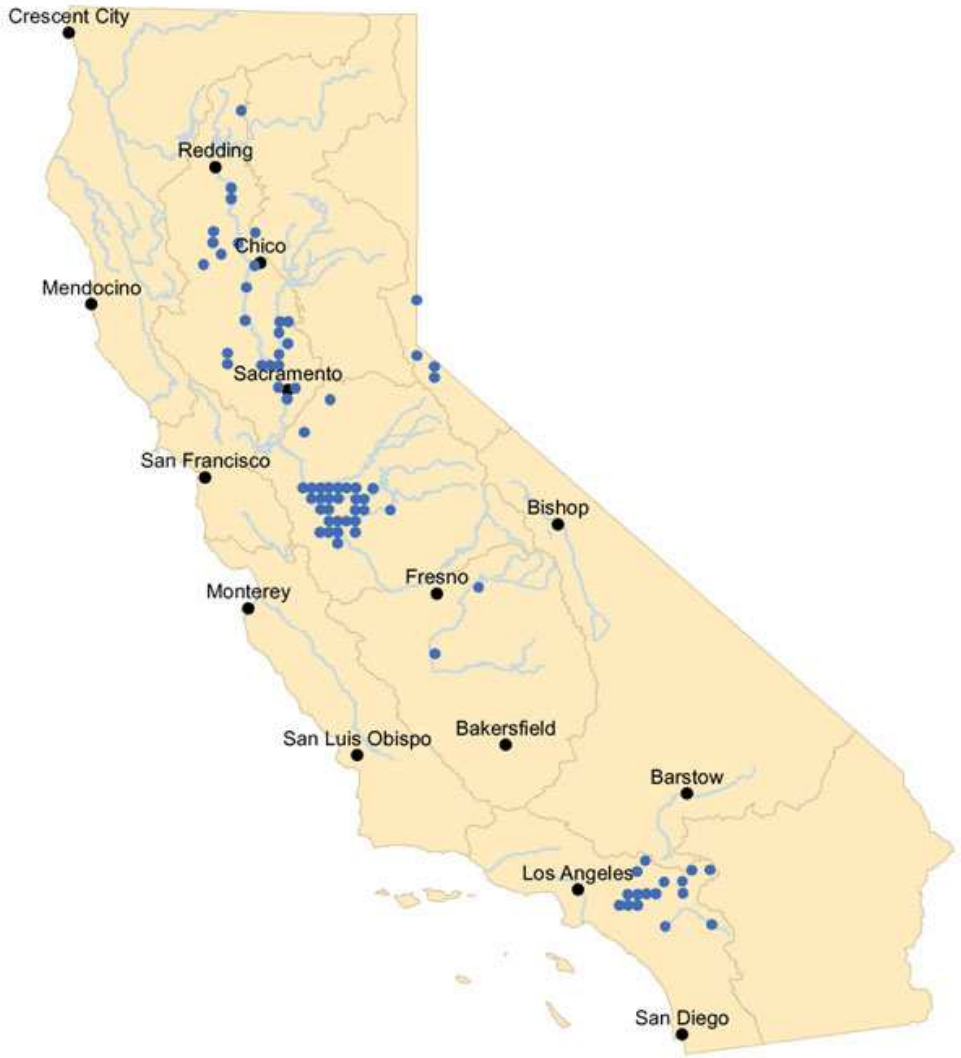
USEPA Region 9: Percent of Impaired Waters, 1998



Background: Major Pollutants in California

1. **Sediments**
2. Nutrients
3. Pathogens
4. **Pesticides**
5. Toxics: Inorganics (Metals)
6. Toxics: Organics
7. Mercury

Background: USGS Monitoring Data



Background: Department of Pesticide Regulation (DPR) Monitoring Data

Background: Total Maximum Daily Loads (TMDL)

- Address non-point source pollution such as agricultural pesticide runoff
- Set limits on pesticide concentrations that show up in water from a given watershed
- Will result in regulation of pesticide runoff
- WaterPIC designed to help in the process

WaterPIC Objectives

- Harmonize datasets under one roof
- Accelerate analysis of pesticides impacts on the environment including use trends
- Facilitate a greater understanding of relationships between pesticide use and environmental impacts in water
- Create an easy to use and easy to understand tool for regulators, scientists, watershed groups, and the general public

Hypothetical Users

- Molly the Policy Maker
  - Regulators, legislators, policy analysts
- Brad the Mad Scientist
  - Scientists and researchers at academic institutions, regulatory agencies, etc.
- John Q. Public
  - The general public, growers, public interest groups, etc.

WaterPIC Datasets

- DPR Pesticide Use Reporting (PUR) data
- Surface water quality monitoring data
  - USGS
  - DPR
- Geospatial information
  - RWQCB TMDL watershed delineations
  - CalWater 2.2.1 watershed delineations
  - USGS HUC watersheds delineations
  - PUR's modified Public Land Survey (PLS)
- Aquatic toxicity
  - EPA AQUIRE data

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Welcome to the **WaterPIC**

The Water & Pesticides Information Center (WaterPIC) provides information about the relationships between reported, agricultural pesticide use in California and measured surface water concentrations in the environment. Follow the steps below to study this relationship over the area and time of interest.

Step 1 of 5: Please select a regional watershed from the map or click a link below:

Central Coast | Colorado River | East Sacramento River | North Coast | North Lahontan | San Francisco Bay | San Joaquin | South Coast | South Lahontan | Tulare Lake | West Sacramento River

Search by one of the following watershed delineations:

- [x] Calwater defined
- [ ] RWQCB defined TMDL
- [ ] USGS defined hydrologic unit code (HUC)

Your selections so far:

1. **Watershed**: Not specified
2. **Study Area**: Not specified
3. **Time Period**: Not specified
4. **Pesticide**: Not specified

Help files regarding:

Step 1

Watersheds and other geographic information

Citation: A. Choi, *Placer Data*, S. Kegley, B. Hill, and S. Orme *PAN Pesticide Database*, Pesticide Action Network, North America (San Francisco, CA. 2006), http:www.pesticideinfo.org.

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Step 2 of 5: Select a Calwater watershed:

Hydrologic Unit [map]
COLUSA BASIN

Hydrologic Area [map]
Glenn Colusa

Select Hydrologic Area
Butte Basin
Glenn Colusa
Sutter Bypass
Sycamore-Sutter

Hy
Hy
Select Hydrologic Subarea First

Hydrologic Planning Watershed
Select Hydrologic Super Planning Watershed First

Submit Reset

Your selections so far:
1. Watershed: West Sacramento River
2. Study Area: Not specified
3. Time Period: Not specified
4. Pesticide: Not specified

West Sacramento River Watershed

Size: 8,072,752 acres (32,669 km^2)

Total pounds of pesticides active ingredients used in the West Sacramento River Watershed in 2003:
17,382,472 lbs (7,901,124 kg)
(more pesticide use information at www.pesticideinfo.org)

California Regional Water Quality Control Boards:
Central Valley Sacramento Main Office - Region 5
11020 Sun Center Drive #200
Rancho Cordova, California 95670-6114
Phone: (916) 464-3291
Fax: (916) 464-4645

Central Valley RWQCB Redding Branch Office - Region 5
415 Knollcrest Drive, Suite 100
Redding, California 96002
Phone: (530) 224-4845
Fax: (530) 224-4857

Help files regarding:
Step 2
Calwater watersheds

Pesticide use and other agricultural information for counties in the West Sacramento River Watershed:

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Step 2 of 5: Select a RWQCB-defined TMDL watershed:

RWQCB defined TMDL Watershed

Select a TMDL watershed | Submit

- Select a TMDL watershed
- American River
- Butte Sutter Basin
- Colusa Drain
- Feather River
- Natomas Cross Canal Area
- Sacramento River Above Colusa

Your selections so far:
1. Watershed: West Sacramento River
2. Study Area: Not specified
3. Time Period: Not specified
4. Pesticide: Not specified

cramento River Watershed

Size: ~3,322,000 acres (~13,440 km^2)

Total pounds of pesticides active ingredients used in the West Sacramento River Watershed in 2003:
12,559,768 lbs (5,697,015 kg)
(more pesticide use information at www.pesticideinfo.org)

California Regional Water Quality Control Boards:
Central Valley Sacramento Main Office - Region 5
11020 Sun Center Drive #200
Rancho Cordova, California 95670-6114
Phone: (916) 464-3291
Fax: (916) 464-4645

Central Valley RWQCB Redding Branch Office - Region 5
415 Knollcrest Drive, Suite 100
Redding, California 96002
Phone: (530) 224-4845
Fax: (530) 224-4857

Help files regarding:
Step 2
RWQCB defined TMDL watersheds

Pesticide use and other agricultural information for counties in the West Sacramento River Watershed:

Butte	Colusa	El Dorado	Glenn
Placer	Sacramento	Shasta	Sutter
Tehama	Yolo	Yuba	

Citation: A. Choi, *Placer Data*, S. Kegley, B. Hill, and S. Orme *PAN Pesticide Database*, Pesticide Action Network, North America (San Francisco, CA. 2006), http:www.pesticideinfo.org.
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Step 2 of 5: Select a USGS defined HUC watershed:

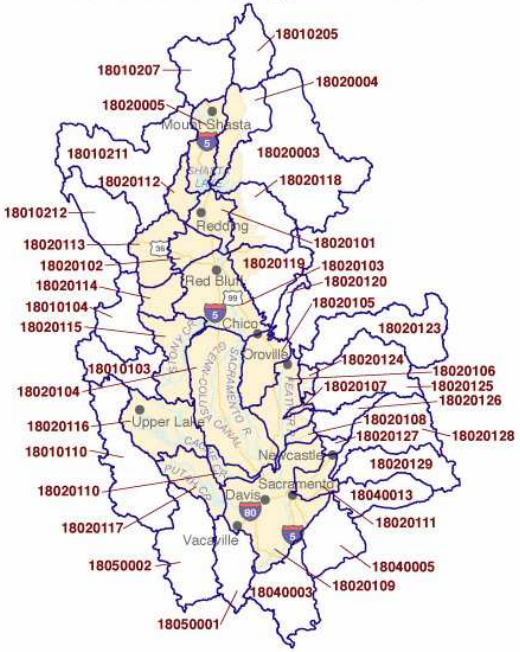
USGS defined HUC Watershed

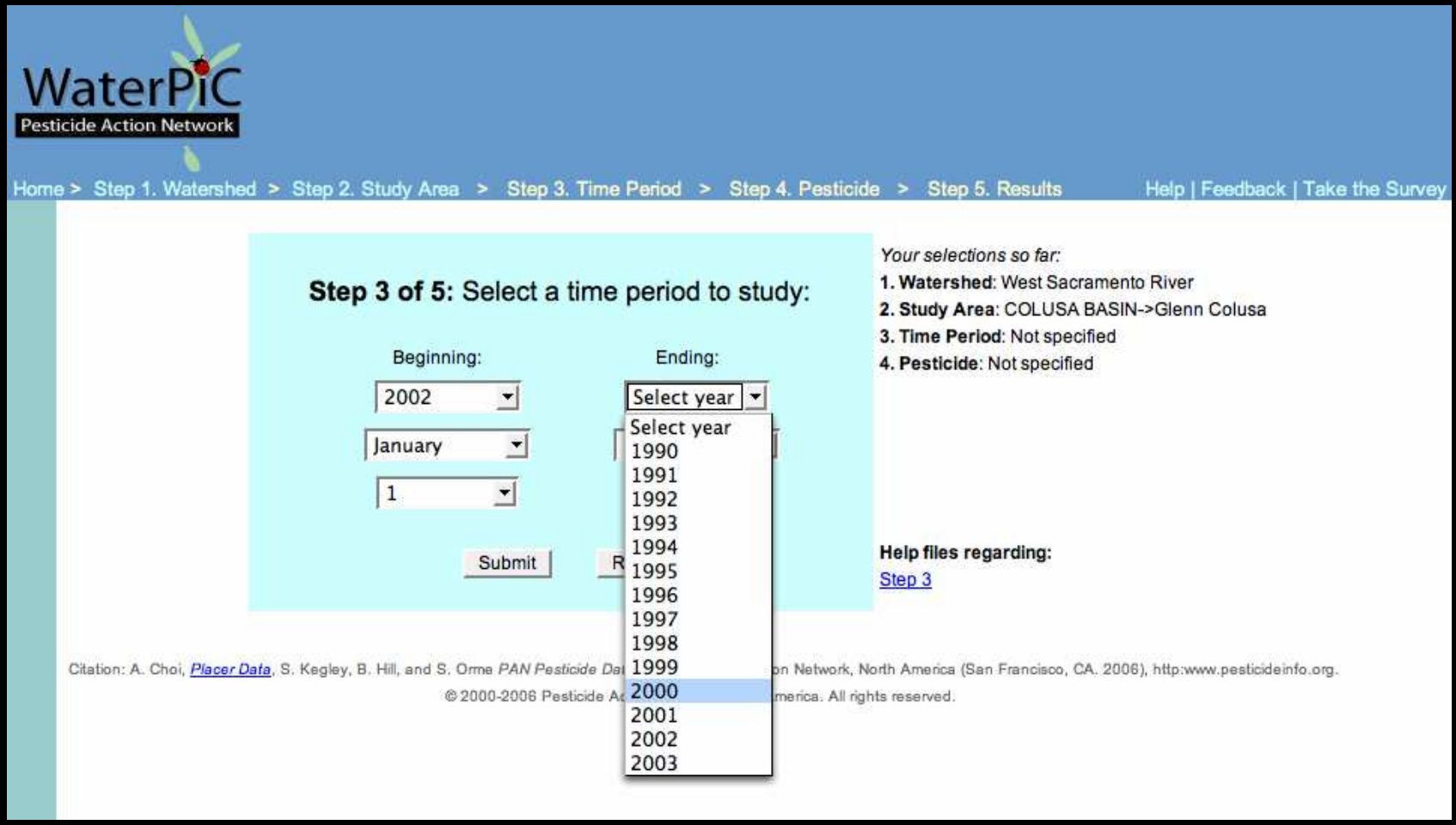
Select Hydrologic Unit Code (HUC) Submit

Your selections so far:
1. Watershed: West Sacramento River
2. Study Area: Not specified
3. Time Period: Not specified
4. Pesticide: Not specified

Help files regarding:
Step 2
HUC watersheds

West Sacramento Regional Watershed

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Pesticide Action Network
Home > Step 1. Watershed > Step 2. Study Area > Step 3. Time Period > Step 4. Pesticide > Step 5. Results
Help | Feedback | Take the Survey
Step 3 of 5: Select a time period to study:
Beginning:
Ending:
2002
Select year
January
1
Submit
Select year
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Your selections so far:
1. Watershed: West Sacramento River
2. Study Area: COLUSA BASIN->Glenn Colusa
3. Time Period: Not specified
4. Pesticide: Not specified
Help files regarding:
Step 3
Citation: A. Choi, Placer Data, S. Kegley, B. Hill, and S. Orme PAN Pesticide Da
on Network, North America (San Francisco, CA. 2006), http:www.pesticideinfo.org.
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Home > Step 1. Watershed > Step 2. Study Area > Step 3. Time Period > Step 4. Pesticide > Step 5. Results

Help | Feedback | Take the Survey

Step 4 of 5: Select a pesticide to study:

Note: Urban pesticide uses are not included in the WaterPIC

	Pesticide	Chemical Class	Total Pounds of Active Ingredients	Number of Pesticide Applications	Number of DPR Surface Water Samples	Number of USGS Surface Water Samples
☐	Copper sulfate (pentahydrate)	Inorganic-Copper	1,504,487	2,034		
☐	Sulfur	Inorganic	979,415	1,829		
☐	Propanil	Anilide	941,826	3,662		
☐	Mineral oil	Petroleum derivative	395,222	1,133		
☑	Thiobencarb	Thiocarbamate	393,607	1,566	35	
☐	Molinate	Thiocarbamate	337,690	1,381	35	
☐	Glyphosate, isopropylamine salt	Phosphonoglycine	190,384	4,598		
☐	Metam-sodium	Dithiocarbamate	141,502	58		
☐	Petroleum oil, unclassified	Petroleum derivative	124,271	139		
☐	Ziram	Dithiocarbamate	121,422	364		

Your selections so far:

1. Watershed: West Sacramento River

2. Study Area: COLUSA BASIN->Glenn Colusa

3. Time Period: January 1, 2002 to December 31, 2003

4. Pesticide: Not specified

Help files regarding:

Step 4

PUR

Surface Water Monitoring (USGS & DPR)

Submit Reset

PAN Pesticides Database - Chemicals

Dimethoate - Identification, toxicity, use, water pollution potential, ecological toxicity and regulatory information

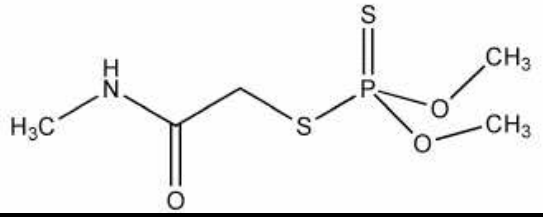
Note: See Working with the Information on this Page section below for important notes about this data.

Chemical ID	Identifying information, including synonyms, ID numbers, use type, chemical classification, a link to a list of all products containing this chemical and a list of the top crops this pesticide is used on in California.
Poisoning Symptoms	Signs and symptoms of poisoning, first aid, and links to treatment information for this chemical.
Toxicity	Toxicity to humans, including carcinogenicity, reproductive and developmental toxicity, neurotoxicity, and acute toxicity.
Regulatory	Links to world-wide registration status as well as regulatory information for the U.S. and California.
Water	Water quality standards and physical properties affecting water contamination potential.
Ecotoxicity	Toxicity to aquatic organisms.
Related Chems	List of chemicals in the same family, including breakdown products, salts, esters, isomers, and other derivatives.

Chemical Identification and Use for Dimethoate

Top

Basic Identification Information About This Chemical

Chemical Name:	Dimethoate
CAS Number:	60-51-5
U.S. EPA PC Code:	035001
CA DPR Chem Code:	216
Molecular Weight:	229.2800
Molecular Structure:	

PAN Pesticides Database

Home | Help | Feedback | Take the Survey

The PAN Pesticides Database is your one-stop location for current toxicity and regulatory information for pesticides. To find out more about insecticides, herbicides and other pesticides select one of the choices below. To learn more about our comprehensive collection of data sources see About the Data. This resource is a project of Pesticide Action Network North America.

NEW April 8, 2005: Version 6.0 of PesticideInfo is now live and ready to serve you. Most data sets have been updated and some new features added. Check out What's New!

- **Help Getting Started**
- **Chemical Search** or Alphabetized Chemical List
- **Product Search**
- **Pesticide Poisoning Diagnostic Tool**
- **International Pesticide Registration**
- **Aquatic Ecotoxicity**
- **California Pesticide Use**
- **Water & Pesticides Information Center (Beta)**
- **Pesticide Tutorial and Reference**
- **Least/Non-Toxic Alternatives**
- **Links to Other Resources**
- **Get Active!**

Pesticide Action Network NORTH AMERICA

This project made possible by our Sponsors. We need your support. Please consider making a donation today.

NOTE! · While all care has been taken to ensure that the information in the PAN Pesticide Database is as accurate as possible at the time of preparation, Pesticide Action Network and its funders take no responsibility for any errors or omissions in the original data sources or for data sources that may have changed since incorporation into the database. The information in this database does not in any way replace or supersede the information on the pesticide product labeling or other regulatory

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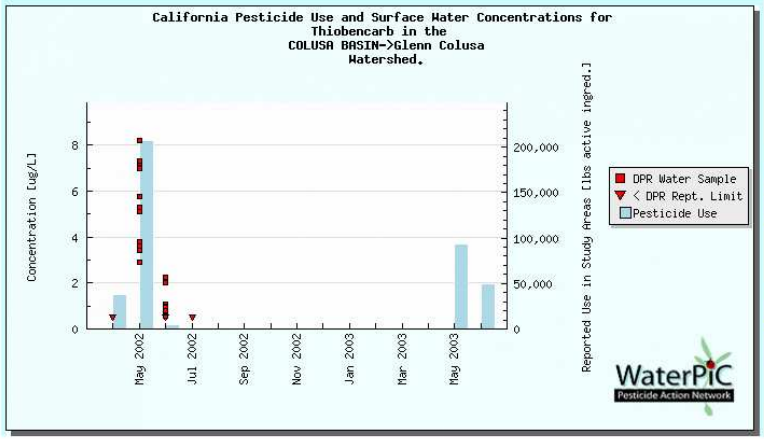
Step 5 of 5: View your results:



Your selections so far:
1. Watershed: West Sacramento River
2. Study Area: COLUSA BASIN->Glenn Colusa
3. Time Period: January 1, 2002 to December 31, 2003
4. Pesticide: Thiobencarb

Help files regarding:
Step 5
DPR and USGS data dictionary
Ecotoxicity Dataset (AQUIRE)

Download text files for:
DPR Monitoring Data
USGS Monitoring Data
Pesticide Use Reporting Data
(Right click -> "Save as" or "Download Linked File..")

Integrator Monitoring Sites

Notes:
1. For an explanation of what data is included in this graph please see the WaterPIC plotting help files
2. Please keep in mind that points (squares and triangles) shown above may represent more than one surface water sample.
3. Urban pesticide uses are not included in the WaterPIC
4. Rept. Limit = Reporting limit cited by study authors above which analytes were not detected. This number is typically the lowest concentration detectable for a given analyte, analytical method, and analyst.

Replot the graph above using the following water quality criteria: 4.19999981

*(Link to PANNA's Aquire database)

	Organism group	Species Common Name	Species Latin Name*	Average LC50 or LC50 Concentration Range	Number of Studies
☐	Molluscs	Common bay mussel,blue mussel	Mytilus edulis	3.0	1
☑	Molluscs	Clam	Corbicula leana	4.2	1
☐	Molluscs	Oriental mystery snail	Cipangopaludina chinensis	4.2	1
☐	Phytoplankton	Green algae	Scenedesmus acutus	5.0-9.0	2
☐	Phytoplankton	Algae, algal mat	Algae	10	3
☐	Phytoplankton	Green algae	Selenastrum capricornutum	10-39	5
☐	Fish	Fathead minnow	Pimephales promelas	28	5
☐	Fish	Longear sunfish	Lepomis megalotis	29	5
☐	Fish	Sturgeon family	Acipenseridae	50	1
☐	Insects	Midge	Chironomus plumosus	28-75	10
☐	Insects	Mayfly	Hexagenia bilineata	28-75	10

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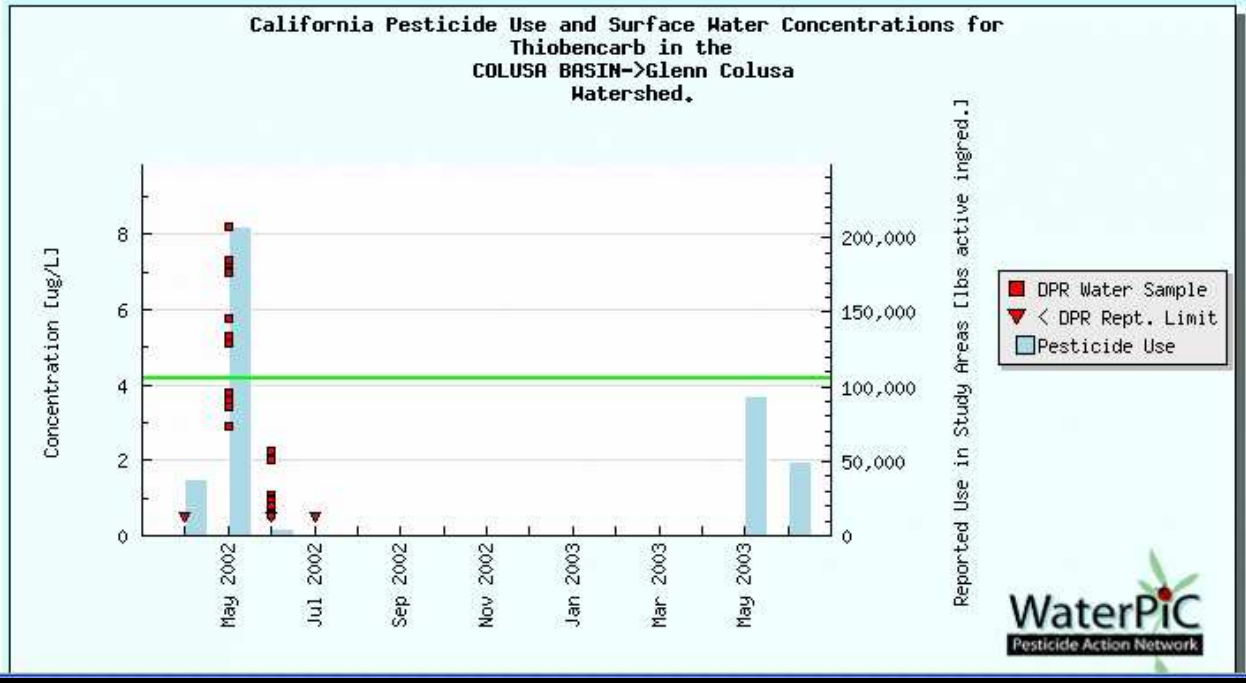
Home > Step 1. Watershed > Step 2. Study Area > Step 3. Time Period > Step 4. Pesticide > Step 5. Results

Help | Feedback | Take the Survey

Step 5 of 5: View your results:



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2. Study Area: COLUSA BASIN->Glenn Colusa

3. Time Period: January 1, 2002 to December 31, 2003

4. Pesticide: Thiobencarb

Help files regarding:

Step 5

DPR and USGS data dictionary

Ecotoxicity Dataset (AQUIRE)

Download text files for:

DPR Monitoring Data

USGS Monitoring Data

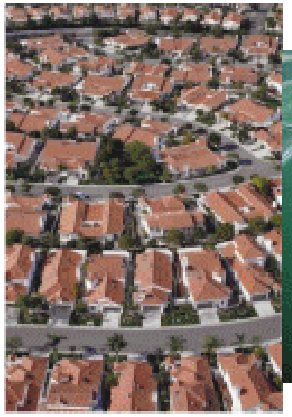
Pesticide Use Reporting Data

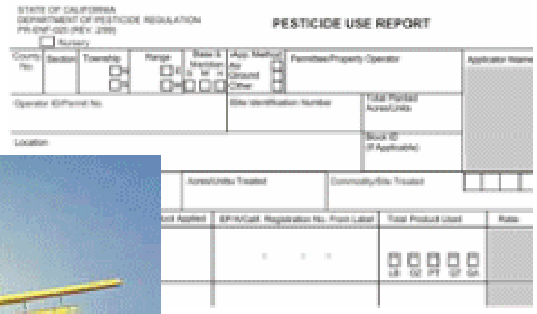
(Right click -> "Save as" or "Download Linked File..")

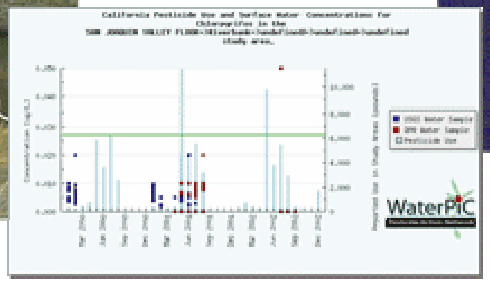
WaterPIC Potential Uses

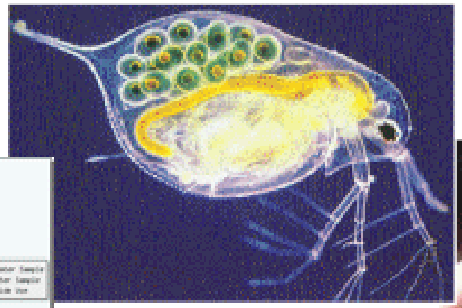
- Development of water monitoring programs
- First approximation correlation tool
- Provide temporal trend analysis
- Facilitate TMDL development
- Help growers evaluate BMPs (Ag Waiver)
- Find data gaps

WaterPIC Uses: In A Nutshell









WaterPIC Summary

- PANNA recognized a need for a Water & Pesticides Information Center
- The WaterPIC integrates pesticide use, monitoring, and toxicity data in one site
- Fast, free, easy to use from any internet connection
- Can be used to study temporal and spatial correlations between pesticide applications and environmental impacts
- Answers all your pesticide questions can be found at www.pesticideinfo.org

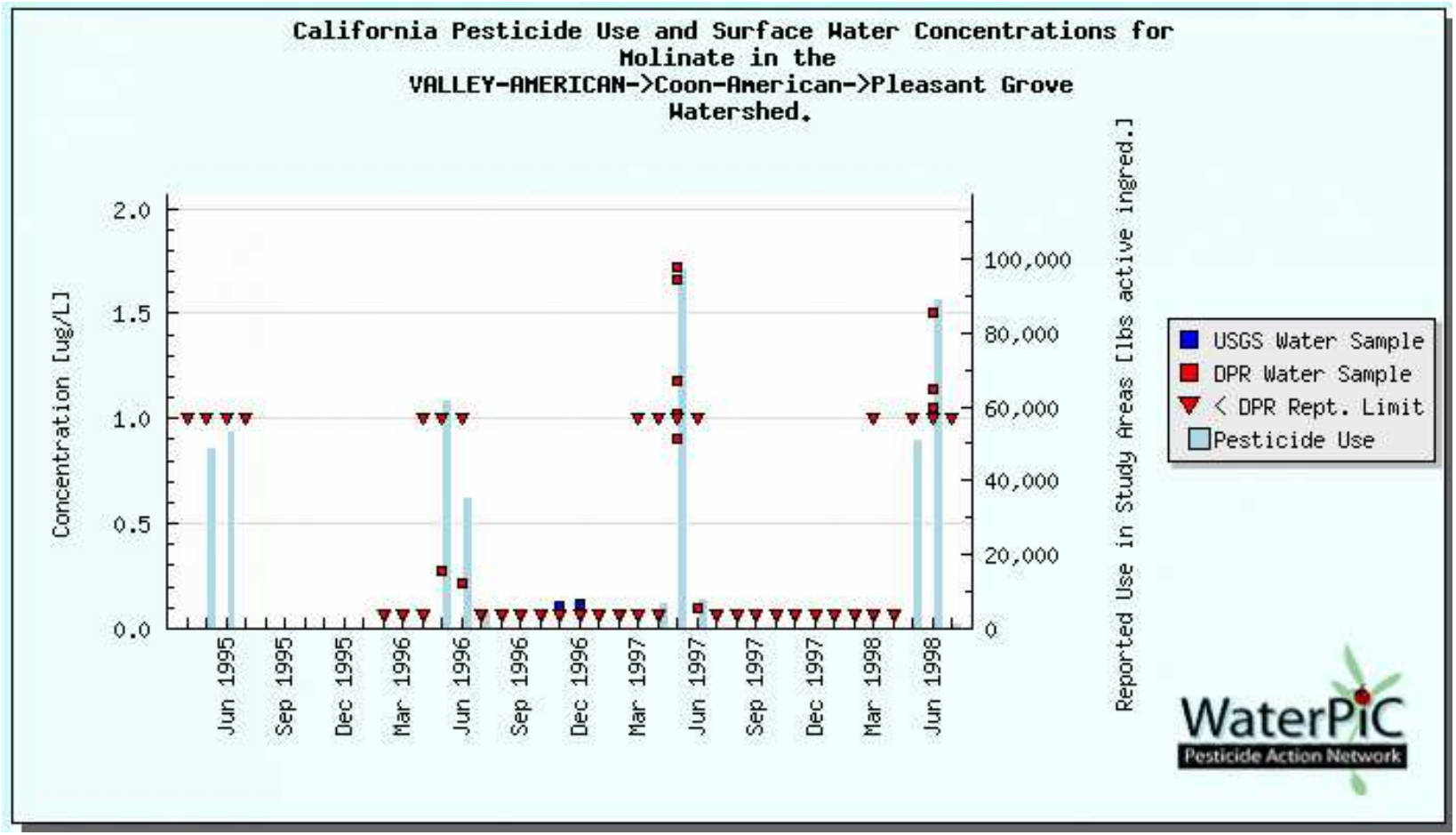
Acknowledgements

– Funders: USEPA Region 9, True North Foundation, San Francisco Foundation

– Stephen Orme, Susan Kegley PhD, Brian Hill PhD

– USEPA, DPR, USGS, RWQCB: data source providers

If we have time 1



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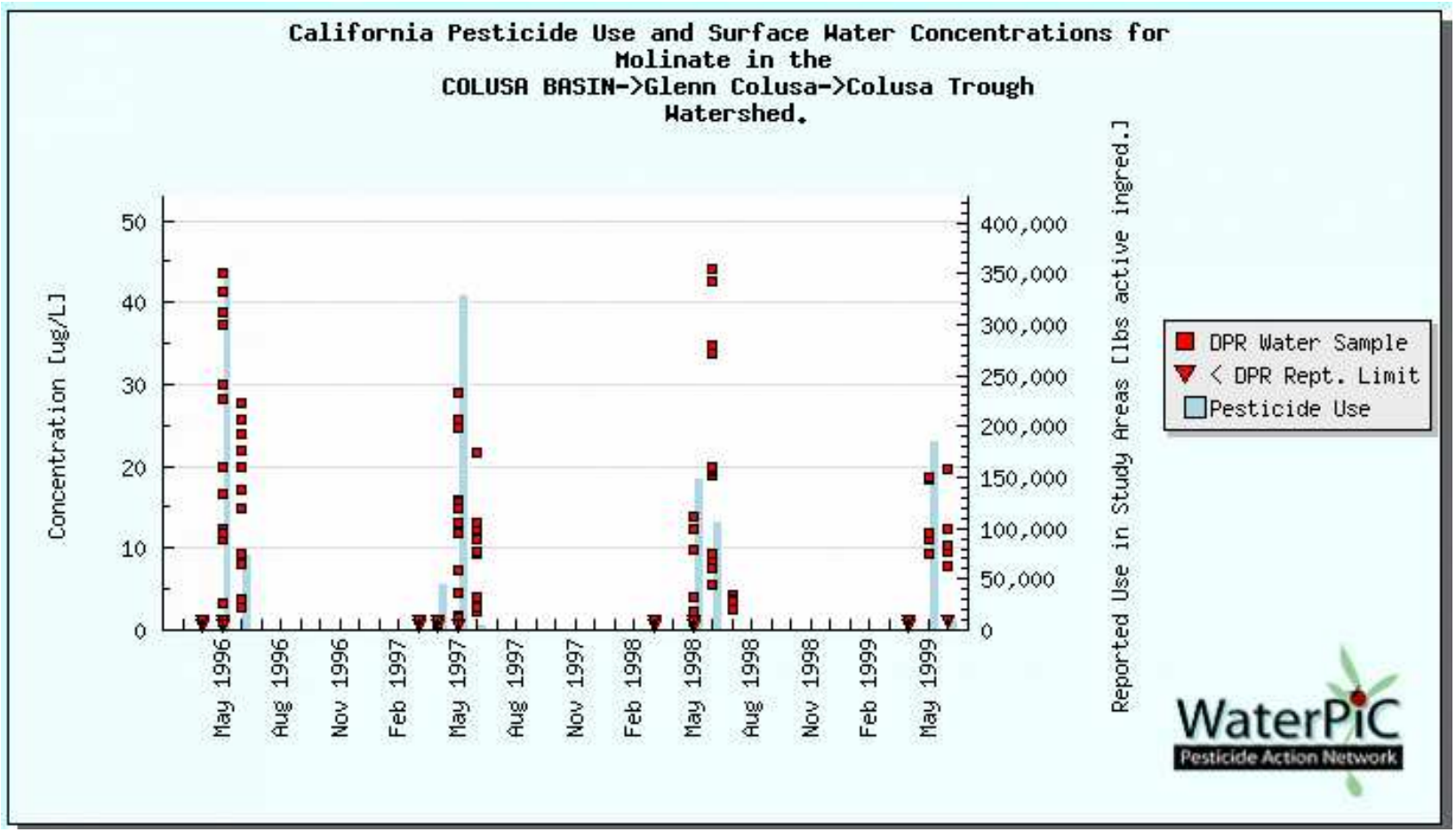
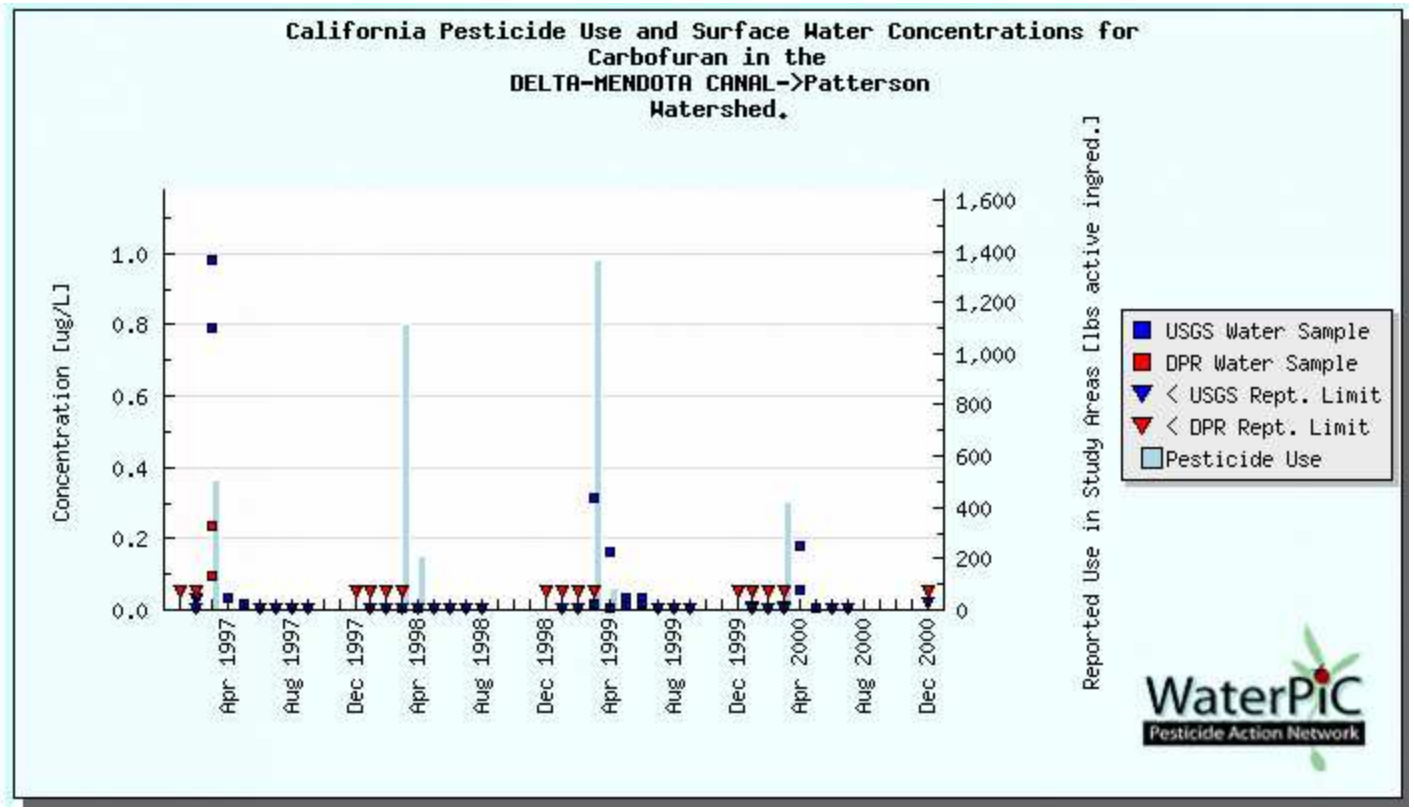
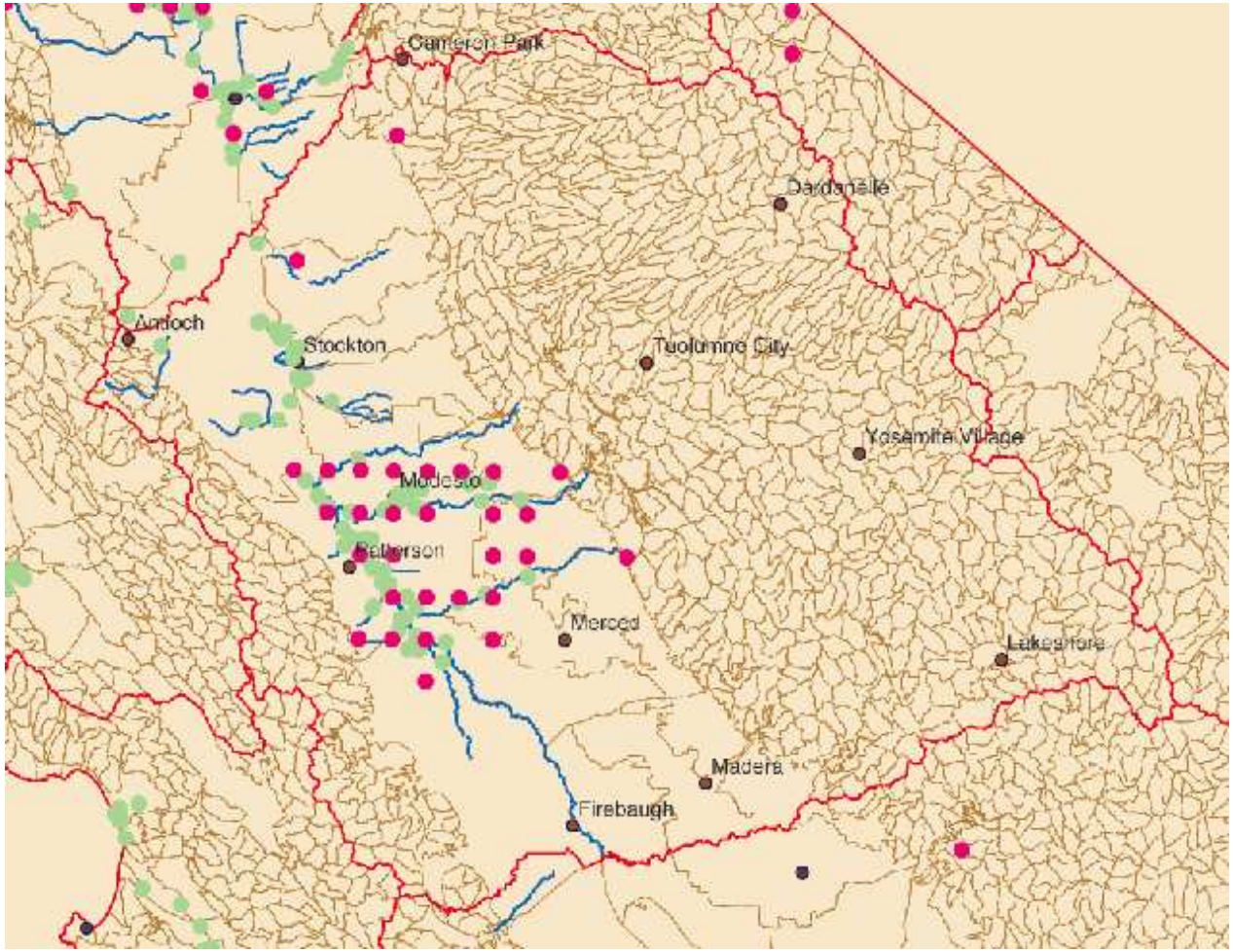


If we have time 3



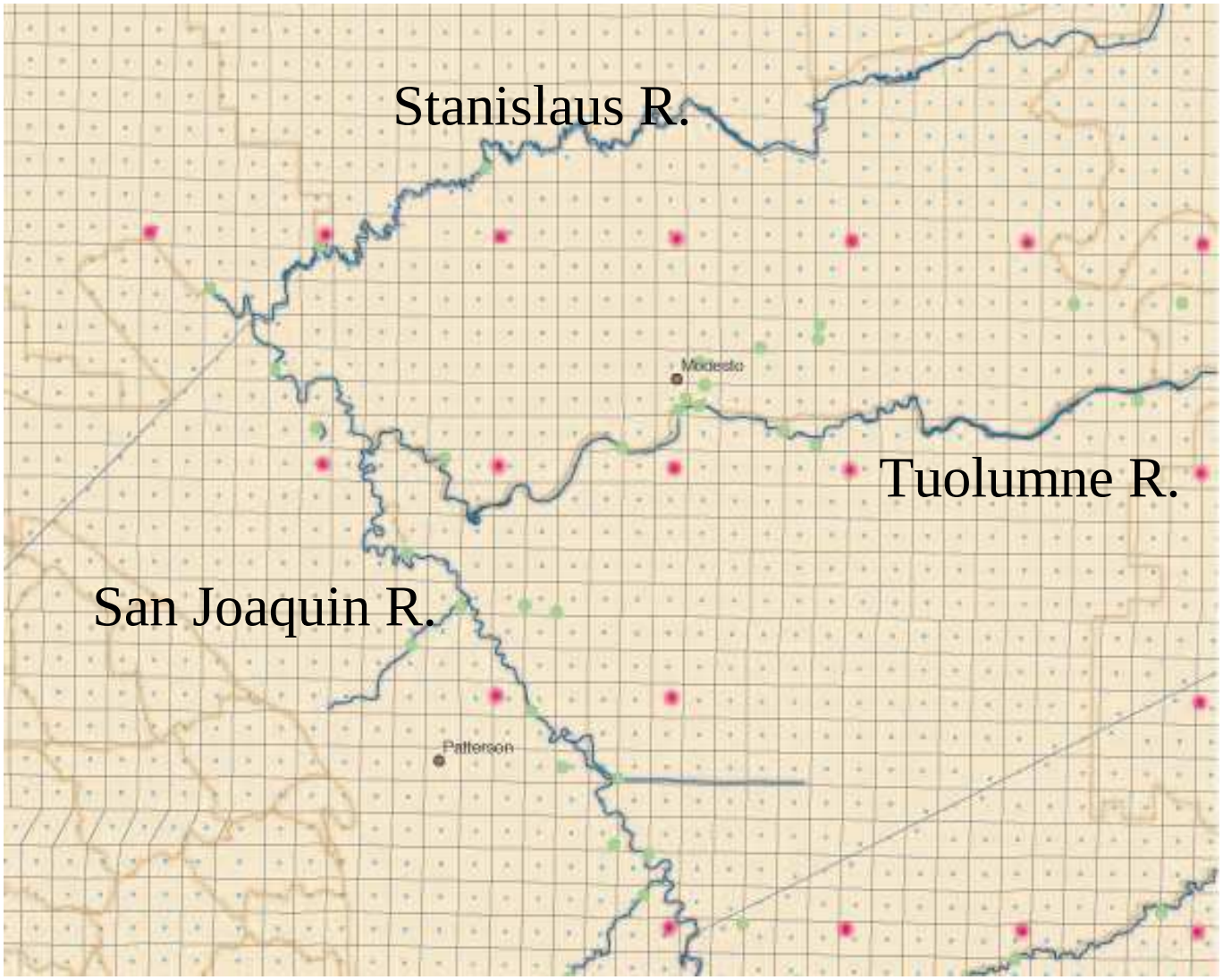
If we have time GIS 1 - San Joaquin Hydrologic Region



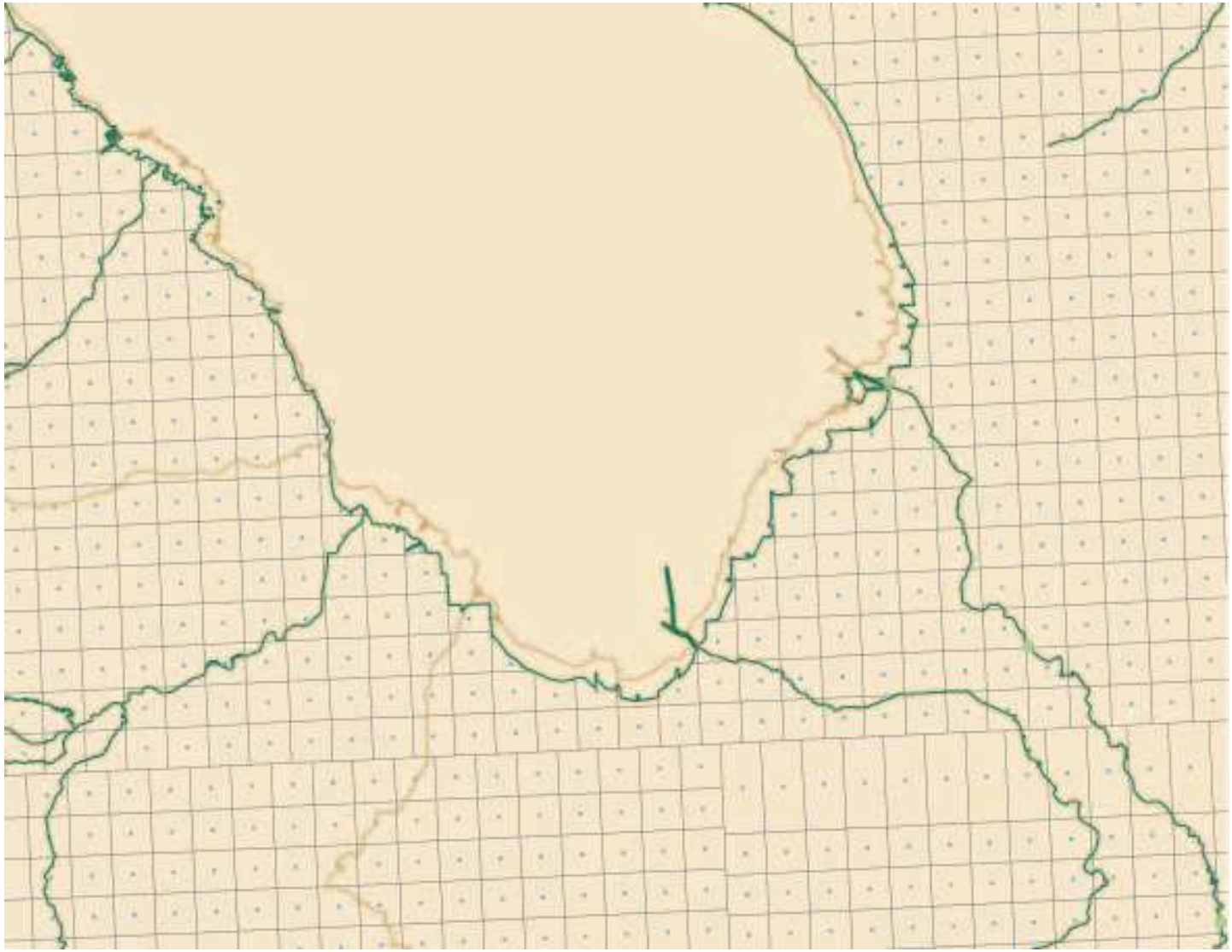
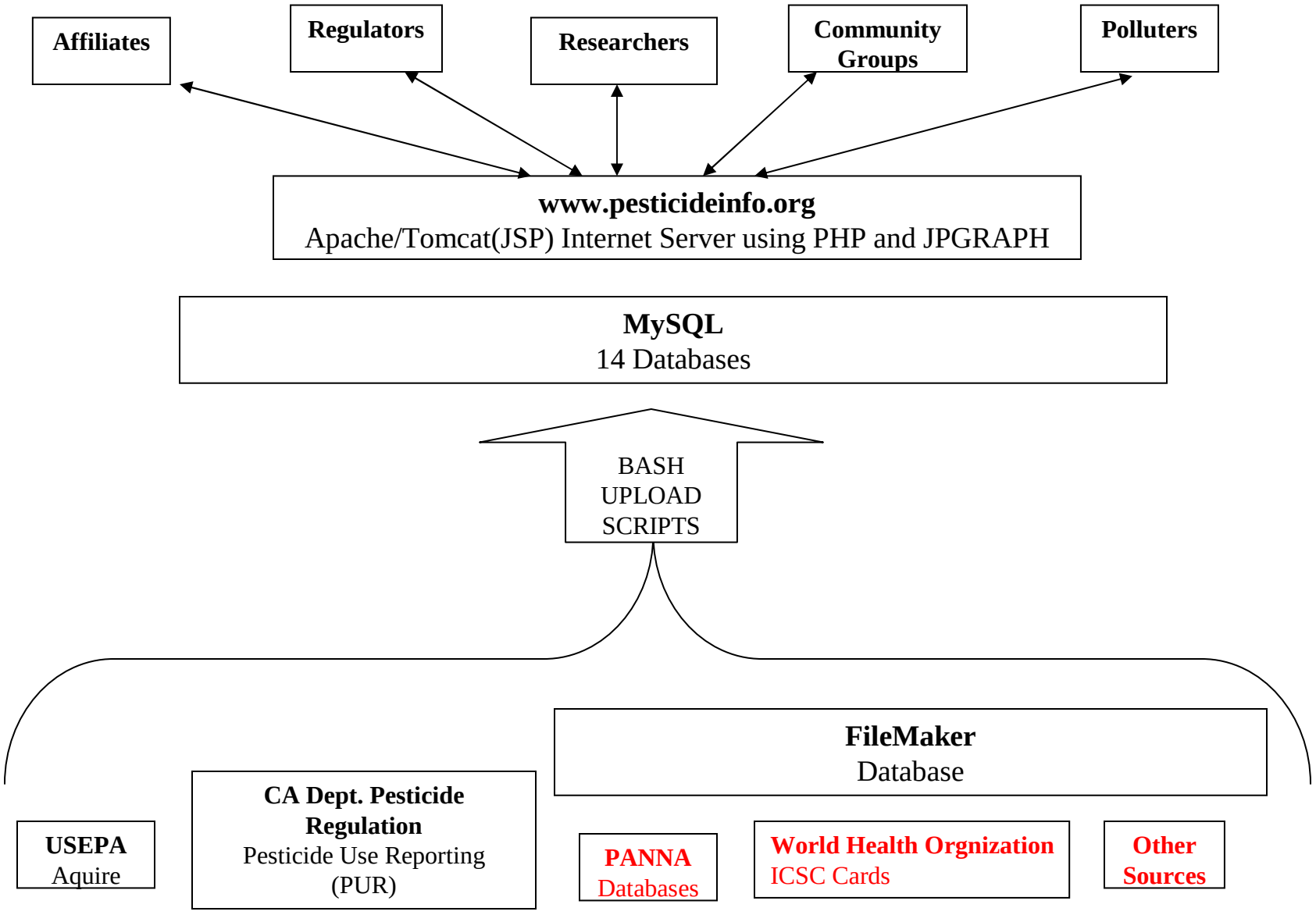
If we have time GIS 2 - San Joaquin Hydrologic Region Detail

Red: USGS

Green: DPR



If we have time GIS 3 - Salton Sea Centroid Problem



WaterPIC 1.2 - Technology