Stakeholder Meeting

Central Valley Pyrethroid Pesticides Total Maximum Daily Load and Basin Plan Amendment

5 May 2015

Outline

- **Project & Schedule Update**
- **Updated UC Davis water quality criteria**
- **Updates to draft language**
  - **Water quality objectives & bioavailability**
  - **Implementation language**
    - **Storm water**
    - **Agricultural dischargers**
    - **Wastewater**

Project Schedule

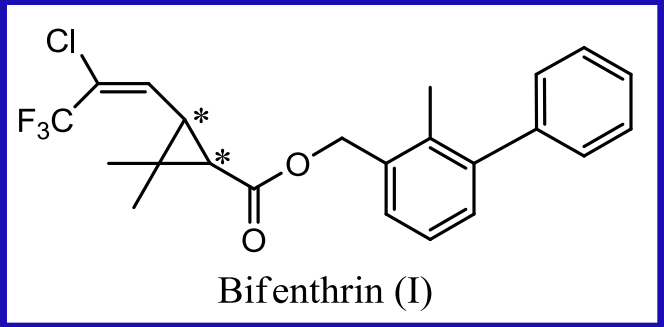
Milestone	Estimated Date
CEQA Scoping Meeting	*October 2012*
Stakeholder Meetings	*Sept, Oct, Nov 2014,* May
Data solicitation & Criteria Update	Jan-Apr 2015
Draft Staff Report for Peer Review	May 15, 2015
Draft Staff Report for Public Review	Winter 2015/2016
Regional Board Information Item	February 2016
Regional Board Hearing	April 2016
State Board Approval	Summer 2016
OAL Approval	Summer 2016
USEPA Approval	Late 2016

Changes to Draft Language

- Water quality objectives
- Actions for Regional Board, DPR, EPA
- Implementation provisions
  - Storm water
  - Ag dischargers
  - Wastewater
- Surveillance and Monitoring

Water Quality Objectives

- **Priority pyrethroids**
  - Bifenthrin
  - Cyfluthrin
  - Lambda-cyhalothrin
  - Cypermethrin
  - Esfenvalerate
  - Permethrin
- **Additive toxicity**



Bifenthrin (I)

Updated UC Davis Criteria

	2015 Acute Criteria (ng/L)	2015 Chronic Criteria (ng/L)
Bifenthrin	**0.06**	**0.01**
Cyfluthrin	**0.2**	**0.04**
Cypermethrin	**0.04**	**0.01**
Esfenvalerate	**0.2**	**0.03**
Lambda-cyhalothrin	**0.03**	**0.01**
Permethrin	**6**	**1**

Updated UC Davis Criteria

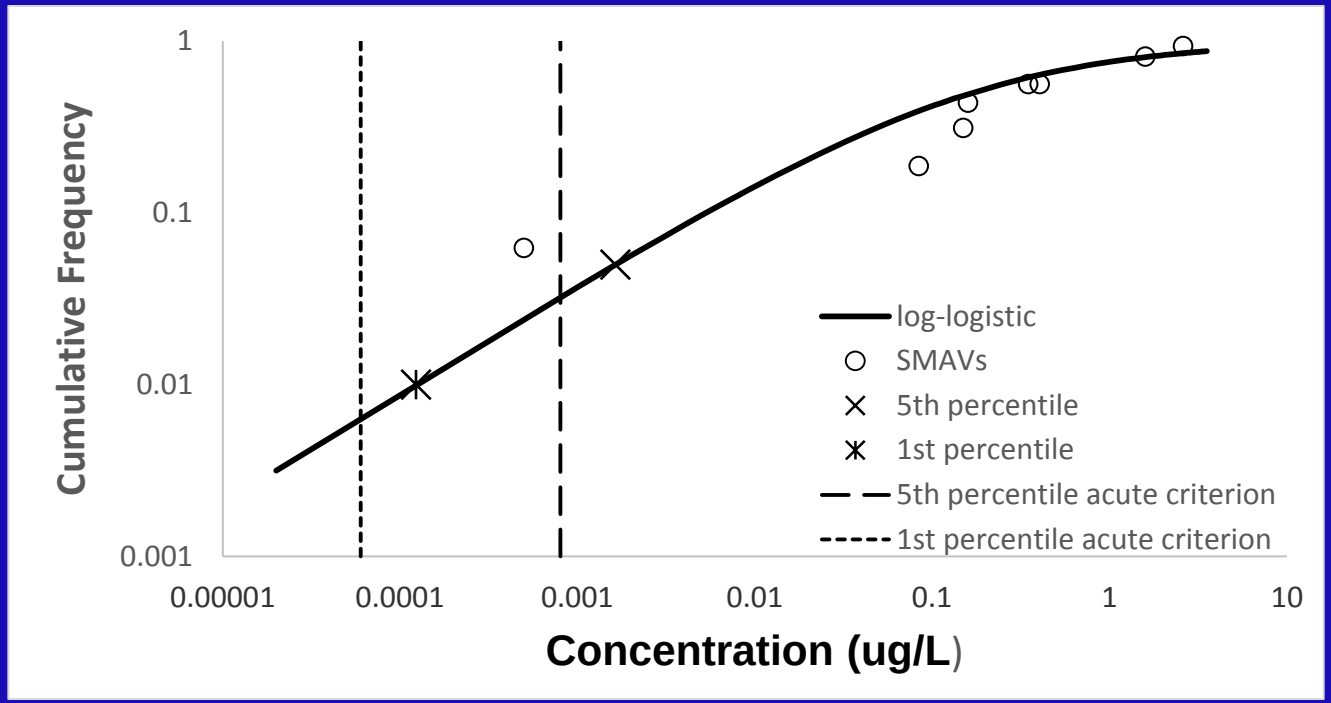
	2010 Acute Criteria (ng/L)	2015 Acute Criteria (ng/L)	PWG *H. azteca* LC50 (ng/L)
Bifenthrin	4	**0.06**	0.50
Cyfluthrin	0.3	**0.2**	0.55
Cypermethrin	1	**0.04**	0.56
Esfenvalerate	20 (Draft 2014)	**0.2**	0.85
Lambda-cyhalothrin	1	**0.03**	0.3
Permethrin	10	**6**	7.0

Updated UC Davis Criteria

	2010 Chronic Criteria (ng/L)	2015 Chronic Criteria (ng/L)
Bifenthrin	0.6	**0.01**
Cyfluthrin	0.05	**0.04**
Cypermethrin	0.2	**0.01**
Esfenvalerate	3 (Draft 2014)	**0.03**
Lambda-cyhalothrin	0.5	**0.01**
Permethrin	2	**1**

Updated UC Davis Criteria

Bifenthrin – 2015 acute SSD



Updated UC Davis Criteria

2015 Criteria	# of taxa fulfilled	Acute Criterion SSD & percentile
Bifenthrin	N=8 (5 of 5)	Log-logistic, 1st percentile
Cyfluthrin	N=8 (5 of 5)	Log-logistic, 1st percentile
Cypermethrin	N=14 (5 of 5)	Burr III did not fit → log-logistic, 1st percentile, lower 95% CI
Esfenvalerate	N=9 (5 of 5)	Burr III did not fit → log-logistic, 1st percentile
Lambda-cyhalothrin	N=20 (5 of 5)	Burr III, 1st percentile
Permethrin	N=20 (5 of 5)	Burr III, 5th percentile

Updated UC Davis Criteria

2015 Criteria	# of taxa fulfilled	Chronic Criterion ACR
Bifenthrin	N=4 (3 of 5)	Default ACR (11.4)
Cyfluthrin	N=4 (4 of 5)	3 measured ACRs (10.27)
Cypermethrin	N=1 (1 of 5)	1 meas & 2 default ACRs (9.2)
Esfenvalerate	N=3 (3 of 5)	1 meas & 2 default ACRs (12.2)
Lambda-cyhalothrin	N=2 (2 of 5)	3 measured ACRs (4.73)
Permethrin	N=2 (2 of 5)	1 meas + 2 default ACRs (8.5)

Water Quality Objectives

Additivity – criteria-normalized concentration units

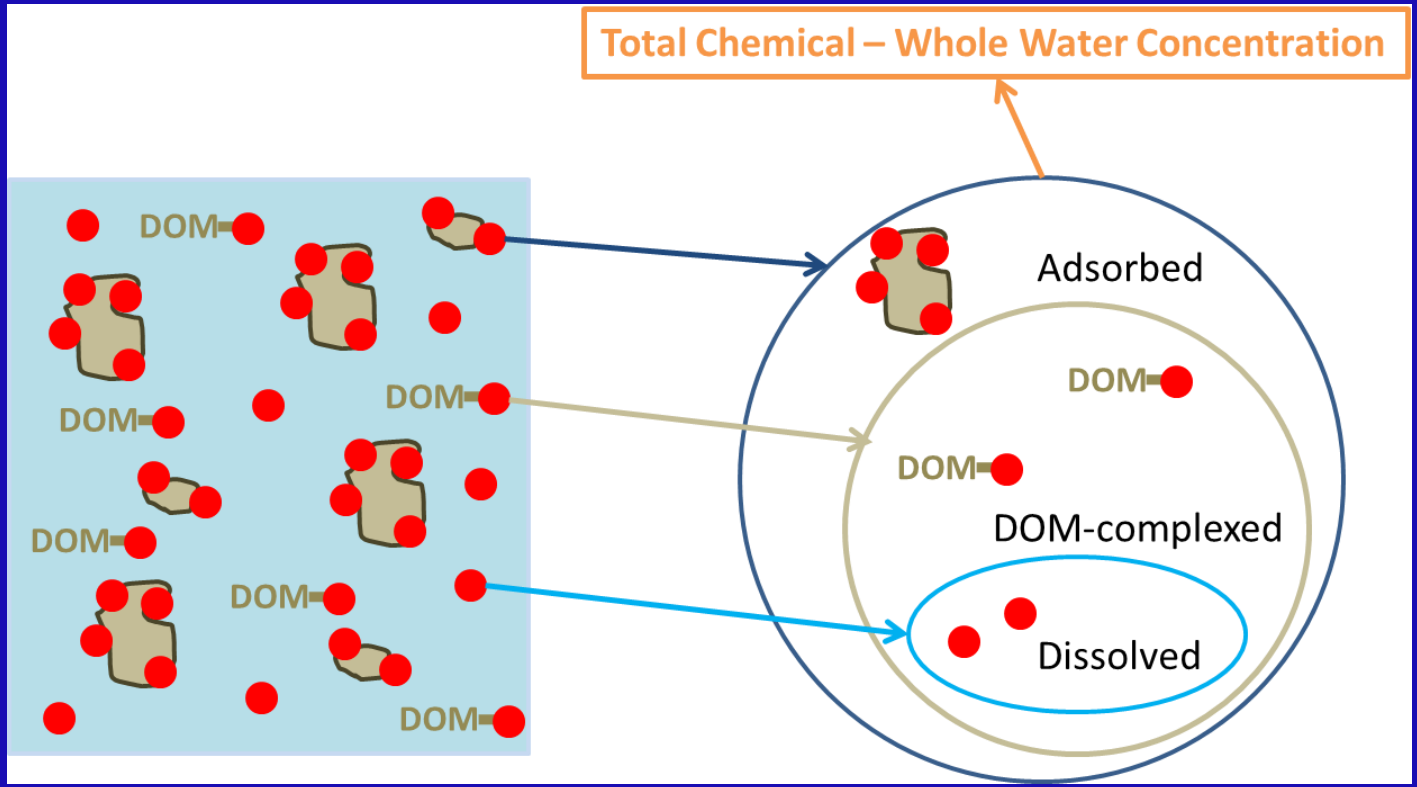
$$CNCU_{acute} = \frac{C_{bif}}{AC_{bif}} + \frac{C_{cyf}}{AC_{cyf}} + \frac{C_{cyp}}{AC_{cyp}} + \frac{C_{esf}}{AC_{esf}} + \frac{C_{lcy}}{AC_{lcy}} + \frac{C_{per}}{AC_{per}}$$

$$CNCU_{chronic} = \frac{C_{bif}}{CC_{bif}} + \frac{C_{cyf}}{CC_{cyf}} + \frac{C_{cyp}}{CC_{cyp}} + \frac{C_{esf}}{CC_{esf}} + \frac{C_{lcy}}{CC_{lcy}} + \frac{C_{per}}{CC_{per}}$$

Attainment: $CNCU \leq 1$

Exceedance: $CNCU > 1$

Bioavailability



Bioavailability

- Estimate freely dissolved concentration via partition coefficients

$$C_{dissolved} = \frac{C_{total}}{1 + ((K_{OC} \cdot [POC]) + (K_{DOC} \cdot [DOC]))}$$

Measure:

C_{total}

[POC]

[DOC]

Need:

K_{OC}

K_{DOC}

Bioavailability

- Default partition coefficients provided

	Ambient Waters	
Pyrethroid Pesticide	K_{OC}	K_{DOC}
Bifenthrin	1,032,000	1,203,323
Cyfluthrin	2,762,000	3,890,000
Cypermethrin	1,962,471	1,152,816
Esfenvalerate	2,136,235	11,068,000
Lambda-cyhalothrin	1,887,909	1,320,000
Permethrin	1,550,176	1,215,000

- Approved site-specific partition coefficients can be used

Bioavailability

- Data included in calculation of default partition coefficients:
  - Followed a standard batch equilibrium experimental design
  - Measured freely dissolved concentrations using SPME
  - Used natural sediment (not formulated)
  - Had comparable solids-to-solution ratios
- 3 studies fit these guidelines
  - Yang et al. 2006
  - Cui & Gan 2013
  - Chickering 2014 (confidential study provided by PWG)

Bioavailability

- Default partition coefficients are the 20th percentile of available values
  - # of values ranged 7-12 for K_{OC}
  - # of values ranged 1-6 for K_{DOC}
- 20th percentile is conservative
  - It is unlikely that the freely dissolved concentration will be underestimated

Storm Water Implementation

- TMDLs for addressing impaired waters
- Proposed implementation measures for WQOs & TMDLs
  - BMP categories: education/outreach & pollution prevention
  - At least one BMP from each category
  - Discharger would document why each BMP on the list is or is not appropriate for the discharger to implement, may propose other BMPs

Ag Implementation

- No significant changes
- Category 4b approach for addressing impaired waters
  - Clarified language to say that existing management plans can be modified to meet the requirements for impaired waters

Wastewater Implementation

- Proposed implementation for WQOs:
  - BMP categories: education/outreach & pollution prevention
  - At least one BMP from each category
  - Discharger would document why each BMP on the list is or is not appropriate for the discharger to implement, may propose other BMPs

Peer Review

- Scientific issues to be evaluated
  1. The scientific and technical basis of the proposed water quality objectives.
  2. The scientific and technical basis proposed TMDL loading capacity, allocations, and margin of safety.
  3. The scientific and technical basis of the underlying method for deriving the proposed pyrethroid pesticides water quality criteria, which are the basis of the proposed water quality objectives and TMDLs.

Peer Review

- Scientific issues to be evaluated

4. The scientific and technical basis of the proposed additivity formulas of the acute and chronic water quality objectives.

   - And the lack of a technical basis for assuming additive toxicity of other constituents with pyrethroid pesticides.

5. The scientific and technical basis of using freely dissolved aqueous concentrations of pyrethroid pesticides for determining attainment of water quality objectives.

   - The technical basis of the proposed equation to estimate freely dissolved concentrations and the default partition coefficients.

Current Status & Next Steps

- Draft staff report to peer review May 15
- E-mail updates sign up:

  http://www.waterboards.ca.gov/resources/email_subscriptions/reg5_subscribe.shtml

- Project website

  Central Valley Pyrethroid Pesticides TMDL and Basin Plan Amendment

Contact Info

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