

**Basin Plan Amendment for
Development of OC TMDLs in
Central Valley Waterbodies**

Stakeholder Meeting

17 June 2010

1

**General Project
Update**

06/17/2010

2

Purpose of Meeting

- Provide information on project
- Seek stakeholder input

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3

What are OCs?

- Previous use pesticides
- Persistent in environment
- Examples:
 - DDTs
 - Group A pesticides

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4

Group A Pesticides

- Consist of a total concentration from the following OCs:
 - aldrin, dieldrin, endrin, heptachlor, heptachlor epoxide, chlordane (total), hexachlorocyclohexane (total) including lindane, endosulfan (total), and toxaphene

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5

Why do we need this Project?

- 303(d) CWA listings
 - Covers 21 waterbody reaches
 - Pollutants: Organochlorine Pesticides

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6

Why focus on OCs?

- Ability to concentrate in sediment and fish:
 - Cancer
 - Bird eggshells
 - Aquatic insects

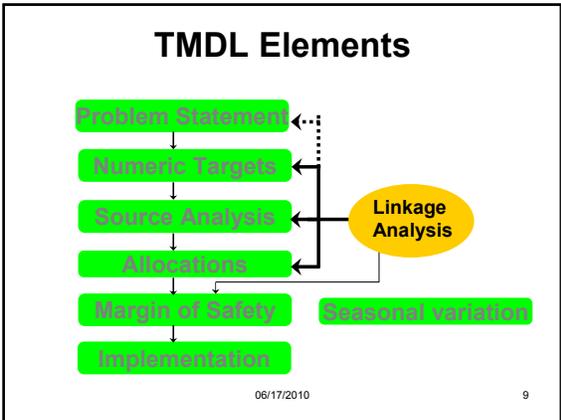
06/17/2010 7

What is a TMDL?

- Maximum amount of a pollutant that a waterbody can receive and still maintain water quality standards

- May involve Basin Plan Amendment

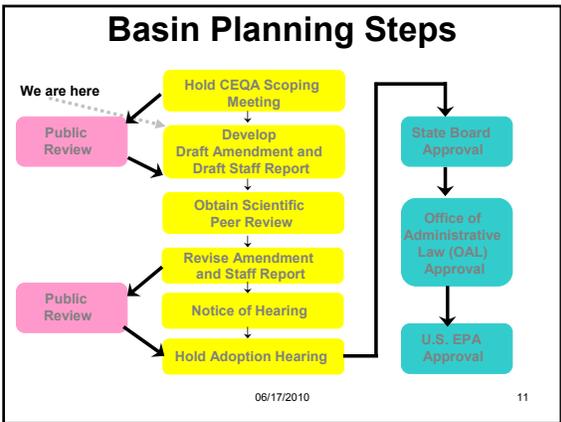
06/17/2010 8



What's a Basin Plan?

- Regulatory document
- Designates beneficial uses
- Establishes Water Quality Objectives
- Describes implementation plan
- Describes monitoring and surveillance

06/17/2010 10



Project Timeline

CEQA Scoping Meeting	7 July 2009
Stakeholder Meetings (Continue till...)	Jan. 2011
Public Review Draft Staff Report	Early spring 2011
Regional Board Adoption Hearing	August 2011

06/17/2010 12

MODULE 1

06/17/2010 13

Proposed Modules

Mod #	Module Topic	Prop. Dates
1	Project Scope, Watershed, Sources, Targets	June 17
2	Linkage Analysis and Allocations	Aug. 3
3	Implementation and Early Action Items	Sept. 20
4	Compliance Schedule/ Monitoring and Surveillance	Nov. 3
5	Synthesis of all previous Modules	Jan 18, 2011

06/17/2010 14

Comments

- **There are several ways to comment:**
 - Verbal: Any time during meetings

 - Written comments today

 - Written comments: by 1 July.

06/17/2010 15

How to submit Written Comments

- fkizito@waterboards.ca.gov

OR

- Fred Kizito
Pesticide TMDL Unit
Central Valley Regional Water Board
11020 Sun Center Drive, #200
Rancho Cordova, CA 95670

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16

What's in Module 1?

- Project Scope
 - Background
 - Waterbodies/Project Area
 - Sources
 - Potential targets

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17

BPA TEXT

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18

Supplemental Document & BPA Text

- Supplemental document:
 - Explains content in BPA text
- BPA Text:
 - Preliminary BPA language
 - Existing Basin Plan objectives
 - Highlighted
 - Italicized

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19

Waterbody Reaches

- What is a reach?
 - A reach is a segment of a waterbody
- Project has 21 waterbody reaches

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20

Impaired Reaches

San Joaquin River Basin	
SJR (Mendota Pool to Bear Creek)	Orestimba Creek (Below Kilburn Road)
SJR (Bear Creek to Mud Slough)	Orestimba Creek (Above Kilburn Road)
SJR (Mud Slough to Merced River)	Lower Merced R. (McSwain Res. to SJR)
SJR (Merced River to Tuolumne River)	Lower Tuolumne R. (Don Pedro Res. to SJR)
SJR (Tuolumne River to Stanislaus River)	Lower Stanislaus River
SJR (Stanislaus River to Delta Boundary)	
Sacramento River Basin	
Colusa Basin Drain	Lower Feather River (Oroville Dam to confluence with Sacramento River)
Sacramento-San Joaquin Delta	
Delta Waterways (Stockton Ship Channel)	Delta Waterways (Northern portion)
Delta Waterways (Eastern portion)	Delta Waterways (Central portion)
Delta Waterways (Western portion)	Delta Waterways (Export Area)
Delta Waterways (Southern portion)	Delta Waterways (Northwestern portion)

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21

Further details on reaches

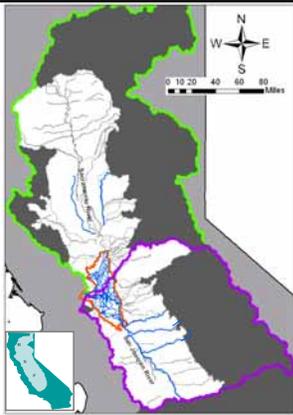
- Project area of impaired reaches can be found on OC website
- Link provided in supplemental document

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22

Project Area

- Legend
- Project Area
 - San Joaquin River Watershed Boundary
 - Sacramento River Watershed Boundary
 - Legal Delta Boundary
 - OC Impaired Reaches
 - Waterbodies in Project Area
 - Region 5
 - California Boundary



23

Sources of OC Pesticides

- Predominantly related to historic use in:
 - Urban
 - Residential
 - Agricultural settings
- Take the form of:
 - Point sources
 - Non-Point sources
 - Background sources

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24

TARGETS

06/17/2010 25

Potential Targets

- Targets:
 - Could be existing numeric objective or based on narrative objective with numeric guideline
- Implement water quality objectives for applicable beneficial uses

06/17/2010 26

Beneficial Uses

- See Suppl. Doc. Pg. 5 for Bus
- Some of most sensitive BUs:
 - Human health: MUN, REC1, REC2
 - Aquatic life: WARM, COLD, SPWN

06/17/2010 27

Water Column

- **Basin Plan Water Quality Objective**
– No detectable
- **California Toxic Rule (CTR)**
– protects aquatic organisms, predator species and humans

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28

Numeric Basin Plan Objective

- **Basin Plan III-6.01**
Total identifiable persistent chlorinated hydrocarbon pesticides shall not be present in the water column at concentrations detectable within the accuracy of analytical methods approved by the Environmental Protection Agency or the Executive Officer.

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29

Constituent	Method Detection Limits using EPA Method 608, µg/L
DDT and its isomers	
DDTs (total)*	-
p,p'-DDD	0.110
p,p'-DDT	0.012
p,p'-DDE	0.004
Group A Pesticides	
Aldrin	0.004
Dieldrin	0.002
Endrin	0.006
Heptachlor	0.003
Heptachlor epoxide	0.083
Chlordane (total)**	0.014
Hexachlorocyclohexane	
gamma-BHC (Lindane)	0.004
alpha-BHC	0.003
beta-BHC	0.006
delta-BHC	0.009
Endosulfan (total)	
alpha-Endosulfan	0.014
beta-Endosulfan	0.004
Endosulfan Sulfate	0.006
Toxaphene	0.240

30

CTR Criteria

- Aquatic Life
 - Criterion Continuous Concentration

- Human Health
 - Based on carcinogenic risk
 - Risk level is 1:1,000,000

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31

Constituent	CTR (µg/L)	CCC (µg/L)
DDT and its isomers		
DDTs (total)*	0.00059	-
p,p'-DDD	0.00083	-
p,p'-DDT	0.00059	0.0010
p,p'-DDE	0.00059	-
Group A Pesticides		
Aldrin	0.00013	-
Dieldrin	0.00014	0.0560
Endrin	0.76	0.0360
Heptachlor	0.00021	-
Heptachlor epoxide	0.00010	-
Chlordane (total)**	0.00057	0.0043
Hexachlorocyclohexane		
gamma-BHC (Lindane)	0.019	-
alpha-BHC	0.00390	-
beta-BHC	0.014	-
delta-BHC	-	-
Endosulfan (total)		
Endosulfan (total)	-	-
alpha-Endosulfan	110	-
beta-Endosulfan	110	-
Endosulfan Sulfate	110	-
Toxaphene	0.00073	0.0002

32

Potential Fish Tissue Targets

- Narrative Basin Plan Objective
 - SVs/FCGs

 - TTRLs

 - ATLS

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33

Narrative Basin Plan Objective

Basin Plan III-8.01:

- *All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.*

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34

OEHHA 1999 Screening Values

- **Considered**
 - 70 kg adult
 - 1×10^{-5} cancer risk level
 - Consumption of 21 g/day
- **Propose using SVs for:**
 - endrin, heptachlor epoxide, gamma-BHC (Lindane), alpha-BHC and endosulfan (total)

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35

OEHHA 2008 FCGs

- **Considers**
 - 70 kg adult
 - 1×10^{-6} cancer risk level
 - Consumption of 32 g/day
- **Propose using FCGs for:**
 - DDT, Chlordane, Dieldrin and Toxaphene

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36

OEHHA 2008 considerations

- Exposure Duration and Averaging Time
- Cooking reduction factors
- Equation for FCGs:

$$FCG(ppb) = \frac{(RiskLevel) * (kgBW) * (1000 \mu g / mg)}{[CSF(mg / kg / day)^{-1}] * (CRkg / day)(ED / AT)(CRF)}$$

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37

Tissue Threshold Residue Limits

- TTRLs are back calculated from:
 - CTR human health criteria
 - Bioconcentration factors
- TTRL equation:
 - TTRL = Cw * BCF

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38

TTRLs calculated with CTR criteria and Bio-concentration Factors (BCFs)

Constituent	CTR Criteria (µg/L)	BCF (L/Kg)	TTRL (µg/kg)
DDT and its isomers			
DDTs (total)*	0.00059	53600	31.62
p,p'-DDD	0.00083	53600	44.49
p,p'-DDT	0.00059	53600	31.62
p,p'-DDE	0.00059	53600	31.62
Group A Pesticides			
Aldrin	0.00013	384.61	0.05
Dieldrin	0.00014	4670	0.65
Endrin	0.76	3970	3017
Heptachlor	0.00021	11200	2.35
Heptachlor epoxide	0.00010	11200	1.12
Chlordane (total)**	0.00057	14100	8.04
Hexachlorocyclohexane			
gamma-BHC (Lindane)	0.019	130	2.47
alpha-BHC	0.00390	130	0.51
beta-BHC	0.014	130	-
delta-BHC	-	130	-
Endosulfan (total)			
Endosulfan (total)	-	-	29.700
alpha-Endosulfan	110	270	29.700
beta-Endosulfan	110	270	29.700
Endosulfan Sulfate	110	270	29.700
Toxaphene	0.00073	13100	9.56

39

Advisory Tissue Levels

- Guideline for fish consumption advisories
- Provides associated benefits fish consumption
- Inform consumers fish safe to eat frequently
- Equation for ATLs:

$$ATL(ppb) = \frac{(RiskLevel) * (kgBW) * (1000\mu g / mg)}{[CSF(mg / kg / day)^{-1}] * (CRkg / day)(ED / AT)(CRF)}$$

40

Constituent	ATL Options: ppb, wet weight			
	Three 8-ounce servings/week	Two 8-ounce servings/week	One 8-ounce serving/week	No Consumption
DDT and its isomers				
DDTs (total)*	≤520	>520-1,000	>1,000-2,100	>2,100
p,p'-DDD	-	-	-	-
p,p'-DDT	-	-	-	-
p,p'-DDE	-	-	-	-
Group A Pesticides				
Aldrin	-	-	-	-
Dieldrin	≤15	>15-23	>23-46	>46
Endrin	-	-	-	-
Heptachlor	-	-	-	-
Heptachlor epoxide	-	-	-	-
Chlordane (total)**	≤190	>190-280	>280-560	>560
Heptachlorocyclohexane				
gamma-BHC (Lindane)	-	-	-	-
alpha-BHC	-	-	-	-
beta-BHC	-	-	-	-
delta-BHC	-	-	-	-
Endosulfan (total)				
Endosulfan (total)	-	-	-	-
alpha-Endosulfan	-	-	-	-
beta-Endosulfan	-	-	-	-
Endosulfan Sulfate	-	-	-	-
Toxaphene	≤200	>200-300	>300-610	>610

41

Potential Sediment Targets

- Narrative Basin Plan Objectives
- Proposed Targets
 - Delta Waterways: State Board SQOs
 - Linkage to fish tissue and water column
 - Biota-Sediment Accumulation Factors
 - Toxic Effects Levels

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42

Narrative Objectives

Basin Plan III-6.0:

- *Discharges shall not result in pesticide concentrations in bottom sediments or aquatic life that adversely affect beneficial uses*

Basin Plan III-7.0:

- *The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.*

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43

Delta Waterways: SQOs

- Applicable for Delta Waterways
- Phase I: Direct Effects
 - Approved by EPA: September 2009
- Phase II: Indirect Effects
 - In progress

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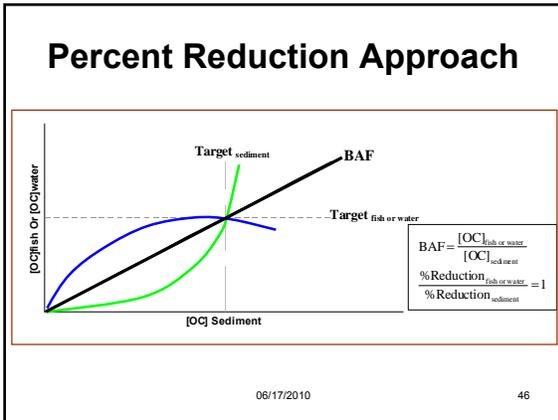
44

Linkage to Fish Tissue and Water Column

- No explicit fish tissue target
- Percent reduction approach
- Uses criteria and guidelines from CTR and OEHHA
- Assumes a linear percent reduction for sediment and fish or sediment and water

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45



Biota-Sediment Accumulation Factors

- Based on lipid normalized tissue and total organic carbon normalized sediment
- Calculated by dividing pollutant in tissue by pollutant in sediment
- BSAF Equation:

$$BSAF = \frac{C_t}{f_t} \div \frac{C_s}{f_{oc}}$$

47

Toxic Effects Level

- NOAA Guidelines
- Represent the concentration below which adverse effects would occur only rarely on aquatic organism
- Based on sediment toxicity bioassays or benthic community metrics

06/17/2010 48

Meeting Notes

Constituent	TEL (µg/L)
DDT and its isomers	
DDTs (total)*	6.98
p,p'-DDD	3.54
p,p'-DDT	-
p,p'-DDE	1.42
Group A Pesticides	
Aldrin	4.5
Dieldrin	2.85
Endrin	2.67
Heptachlor	-
Heptachlor epoxide	0.6
Chlordane (total)**	-
<i>Hexachlorocyclohexane</i>	
gamma-BHC (Lindane)	0.94
alpha-BHC	-
beta-BHC	-
delta-BHC	-
<i>Endosulfan (total)</i>	
alpha-Endosulfan	-
beta-Endosulfan	-
Endosulfan Sulfate	-
Toxaphene	-

49

DISCUSSION....

06/17/2010

50
