

June 2010

**Partial Preliminary Draft – for discussion purposes only**

**Preliminary Draft  
Proposed Basin Plan  
Amendment (BPA) Text**

**Control program for  
Organochlorine Pesticides  
Discharges in the  
Sacramento River Basin, San  
Joaquin River Basin and San  
Joaquin-Sacramento Delta.**

*The proposed preliminary Draft BPA text consists of additions to the current Water Quality Control Plan for the Sacramento River and San Joaquin River Basins (Basin Plan).*

All narrative water quality objectives from the existing Basin Plan are presented as *highlighted italicized text*. New material added to BPA is normally underlined but not shown as such here for better readability. In several instances, there are multiple options for the BPA text (shown here as “Alternatively/Or”). Staff preference for each target is presented as Option 1.

**a. Additions to Chapter IV, Implementation**

The organochlorine (OC) pesticide control program shall ensure compliance with applicable water quality objectives as described in the Pesticides Section of Chapter 3 of the Basin Plan. Applicable waterbodies for the OC control

program are presented in Table XX.0.

Table XX.0

Applicable Waterbodies	OC Pesticide
San Joaquin River (Mendota pool to Bear Creek)	DDT* Group A Pesticides**
San Joaquin River (Bear Creek to Mud Slough)	DDT Group A Pesticides
San Joaquin River (Mud Slough to Merced R.)	DDT Group A Pesticides
San Joaquin River (Merced R. to Tuolumne R.)	DDT Group A Pesticides
San Joaquin River (Tuolumne R. to Stanislaus R)	DDT Group A Pesticides
San Joaquin River (Stanislaus R. to Delta Boundary)	DDT Group A Pesticides Toxaphene
Tuolumne River, Lower (Don Pedro Reservoir to San Joaquin River)	Group A Pesticides
Stanislaus River, Lower	Group A Pesticides
Orestimba Creek (Below Kilburn Road)	DDE***
Orestimba Creek (Above Kilburn Road)	DDE***
Merced River, Lower (McSwain Reservoir to San Joaquin River)	Group A Pesticides
Feather River, Lower (Oroville Dam to confluence with Sacramento River)	Group A Pesticides
Colusa Basin Drain	Group A Pesticides
Delta Waterways (Stockton Ship Channel)	DDT Group A Pesticides
Delta Waterways (Eastern portion)	DDT Group A Pesticides
Delta Waterways (Western portion)	DDT Group A Pesticides
Delta Waterways (Southern portion)	DDT Group A Pesticides
Delta Waterways (Northern portion)	DDT Group A Pesticides
Delta Waterways (Central portion)	DDT Group A Pesticides
Delta Waterways (Export area)	DDT Group A Pesticides
Delta Waterways (Northwestern portion)	DDT Group A Pesticides

\* Sum of ortho and para DDTs, DDDs and DDEs.

\*\* Group A pesticides consist of a total concentration from the following organochlorine pesticides: aldrin, dieldrin, endrin, heptachlor, heptachlor epoxide, chlordane (total), hexachlorocyclohexane (total) including lindane, endosulfan (total), and toxaphene.

\*\*\* Orestimba Creek listed for DDE in the water column.

Sediment, water column and fish tissue targets are proposed below for the OC control program.

1. Water Column

Narrative toxicity water quality objective: (Basin Plan III-6.01)

*No individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses.*

Option 1A:

*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.*

And Option 1B:

California Toxic Rule (CTR):

The CTR criteria for protection of aquatic life, and humans from consumption of water and organisms are presented in Table XX.1.

Where more than one target may be applicable to a given constituent, as shown above, the most stringent target applies.

2. Fish Tissue

Narrative toxicity water quality 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.*

Proposed TMDL Targets

Option 1:

OEHHA Fish Contaminant Goals (FCGs) and Screening Values (SVs).

The California State Office of Environmental Health Hazard Assessment (OEHHA) FCGs and SVs are presented in Table XX.2.

Table XX.1

Constituent	CTR (µg/L)	CCC (µg/L)
<b>DDT and its isomers</b>		
DDTs (total)*	0.00059	-
p,p'-DDD	0.00083	-
p,p'-DDT	0.00059	0.0010
p,p'-DDE	0.00059	-
<b>Group A Pesticides</b>		
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
<i>Hexachlorocyclohexane</i>		
gamma-BHC (Lindane)	0.019	-
alpha-BHC	0.00390	-
beta-BHC	0.014	-
delta-BHC	-	-
<i>Endosulfan (total)</i>		
Endosulfan (total)	-	-
alpha-Endosulfan	110	-
beta-Endosulfan	110	-
Endosulfan Sulfate	110	-
Toxaphene	0.00073	0.0002

\* Sum of ortho and para DDTs, DDDs and DDEs.  
 - No applicable target exists.  
 \*\* Sum of alpha and gamma chlordane, cis- and trans-nonachlor and oxychlordane  
 ----- Constituent also exists as an independent listing.  
 CCC=CTR Criteria Continuous Concentration (Aquatic life).

Table XX.2

Constituent	FCGs*** (µg/kg)	SVs**** (µg/kg)
<b>DDT and its isomers</b>		
DDTs (total)*	21	-
p,p'-DDD	-	-
p,p'-DDT	-	-
p,p'-DDE	-	-
<b>Group A Pesticides</b>		
Aldrin	-	-
Dieldrin	0.46	1,000
Endrin	-	-
Heptachlor	-	4
Heptachlor epoxide	-	-
Chlordane (total)**	5.6	-
<i>Hexachlorocyclohexane</i>		
gamma-BHC (Lindane)	-	30
alpha-BHC	-	30
beta-BHC	-	-
delta-BHC	-	-
<i>Endosulfan (total)</i>		
Endosulfan (total)	-	20,000
alpha-Endosulfan	-	-
Beta-Endosulfan	-	-
Endosulfan Sulfate	-	-
Toxaphene	6.1	-

\* Sum of ortho and para DDTs, DDDs and DDEs.  
 - No applicable target exists.  
 \*\* Sum of alpha and gamma chlordane, cis- and trans-nonachlor and oxychlordane.  
 \*\*\* OEHHA FCGs: Based on 10<sup>-6</sup> cancer risk with 32 g/day (prior to cooking) for a 70 kg adult.  
 \*\*\*\*OEHHA SVs: Based on 10<sup>-5</sup> cancer risk with 21 g/day (prior to cooking) for a 70 kg adult.  
 ----- Constituent also exists as an independent listing.

Alternatively/Or:

Option 2:  
Tissue Threshold Residue Levels

Tissue Threshold Residue Levels (TTRL) assume the following relationship:

$$TTRL = C_w * BCF$$

Where: TTRL = Threshold Tissue Residue Level (µg/kg wet weight)  
C<sub>w</sub> = CTR Human Health Water Criterion (µg/L)  
BCF = Applicable bio-concentration factors derived from literature (L/kg).  
TTRLs are presented in Table XX.3.

Table XX.3

Constituent	Concentration (µg/kg)
<b>DDT and its isomers</b>	
DDTs (total)*	31.62
p,p'-DDD	44.49
p,p'-DDT	31.62
p,p'-DDE	31.62
<b>Group A Pesticides</b>	
Aldrin	0.05
Dieldrin	0.65
Endrin	3017
Heptachlor	2.35
Heptachlor epoxide	1.12
Chlordane (total)**	8.04
<i>Hexachlorocyclohexane</i>	
gamma-BHC (Lindane)	2.47
alpha-BHC	0.51
beta-BHC	-
delta-BHC	-
<i>Endosulfan (total)</i>	
Endosulfan (total)	-
alpha-Endosulfan	29,700
beta-Endosulfan	29,700
Endosulfan Sulfate	29,700
Toxaphene	9.56

\* Sum of ortho and para DDTs, DDDs and DDEs.  
- No applicable target exists.  
\*\* Sum of alpha and gamma chlordane, cis- and trans-nonachlor and oxychlordane.  
----- Constituent also exists as an independent listing.

Alternatively/Or:

Option 3:  
OEHHA Advisory Tissue Levels (ATLs)

ATLs for selected fish contaminants based on cancer or non-cancer risk using an 8-Ounce serving size (Prior to Cooking) (ppb, wet weight) are presented in Table XX.4.

Table XX.4

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

<sup>c</sup>ATLs are based on cancer risk.  
<sup>nc</sup>ATLs are based on non-cancer risk.  
\* Sum of ortho and para DDTs, DDDs and DDEs.  
\*\*Serving sizes are based on an average 160 pound person (See OEHHA, 2008).  
\*\*ATLs for DDTs are based on non-cancer risk for two and three servings per week and cancer risk for one serving per week.  
----- Constituent also exists as an independent listing.  
- No applicable target exists.

3. Sediment

Narrative sediment water quality 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.*

Proposed TMDL Targets

Option 1A:

Delta Waterways:

For applicable waterbodies listed in Table XX.1 as delta waterways, sediment quality objectives (SQOs) in the Water Quality Control Plan for Enclosed Bays and Estuaries of California used as sediment targets for aquatic life-benthic community protection.

*Phase I of the SQOs is in effect (Approved by US EPA 25 August 2009). Staff still needs to analyze how/if SQOs can be implemented to develop targets.*

*Staff is tracking Phase II SQOs to see if these take effect prior to adoption of this proposed Amendment.*

Waterbodies outside the legal Delta

Option 1B:

Linkage to Fish Tissue and Water Column

Sediment targets may be developed through a linkage analysis with percent reduction in pollutant concentrations in fish tissue and water column.

Alternatively/Or:

Option 2:

Calculation of Sediment Targets using biota-sediment accumulation factor (BSAFs).

BSAF is defined as:

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

Where,

C<sub>t</sub> = organism tissue concentration (µg/kg wet weight)

f<sub>t</sub> = the lipid fraction in the organism

C<sub>s</sub> = pollutant concentration in sediment (µg/kg dry weight)

f<sub>oc</sub> = organic carbon fraction of sediment

Alternatively/Or:

Option 3:

Freshwater sediment Toxic Effects Levels (TELs)

Sediment quality guidelines from the National Oceanographic and Atmospheric Administration (NOAA) Screening Quick Reference Tables using TELs may be considered as presented in Table XX.5.

Table XX.5

Constituent	TEL (µg/L)
<b>DDT and its isomers</b>	
DDTs (total)*	6.98
p,p'-DDD	3.54
p,p'-DDT	-
p,p'-DDE	1.42
<b>Group A Pesticides</b>	
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>	
Endosulfan (total)	-
alpha-Endosulfan	-
beta-Endosulfan	-
Endosulfan Sulfate	-
Toxaphene	-

\* Sum of ortho and para DDTs, DDDs and DDEs.

- No applicable target exists.

\*\* Sum of alpha and gamma chlordane, cis- and trans-nonachlor and oxychlordane.

----- Constituent exists as an independent listing.

**“Additional Preliminary BPA Text to follow” .....**