



DRAFT MEMORANDUM

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SUBJECT: **Review of Draft 2008 Update to 303d list: Sacramento River Watershed Listings Attributed to Agriculture**

This memorandum has been prepared as requested by the Sacramento Valley Water Quality Coalition. The purpose of this memo is to:

- Summarize and evaluate the proposed new listings in the Sacramento Valley watershed attributed to agriculture in the Draft 2008 Update to the California 303d list of impaired water bodies. These evaluations are based on the new listings released by the Regional Water Quality Control Board – Central Valley Region for public review.
- Provide draft comments based on investigations of reported criteria, data, and fact sheets for the selected listings.

Summary of new listings

The approach used by the Central Valley Regional Board to prepare the 2008 update to the 303d listing is described in detail in the Staff Report on the Development of the Clean Water Act Section 305/303d Integrated Report, which is available for download from the Region 5 website:

(http://www.waterboards.ca.gov/centralvalley/water_issues/tmdl/impaired_waters_list/303d_list.shtml). The basic approach to update to the 303d list was to gather available data and compare these data to water quality objectives in the Central Valley Region Basin Plan. Narrative objectives were compared to “Evaluation Guidelines” which were developed by Water Board staff from a variety of sources. The rationale and data used for listing or delisting pollutants are documented in fact sheets, which can also be accessed through the website listed above. The fact sheets contain links to data references that allow the data to be accessed. In most cases, the listing decisions were based on frequency of exceedance criteria contained in the SWRCB 303d Listing Policy¹, which can be accessed from the website listed above. It should be noted that

¹ SWRCB 2004. Water Quality Control Policy for Developing the Clean Water Act Section 303(d) List. Adopted 2004. State Water Resources Control Board.

the SWRCB 303d listing policy uses different criteria for minimum number of exceedances for toxicants (Table 3.1 in the Listing Policy) and conventional pollutants (Table 3.2 in Listing Policy). The listing threshold is based on an exceedance frequency of 3-18% for toxicants, and 10-25% for conventional and other pollutants. The reason stated in the Integrated Report for the large number of new listings in the current draft update is the large increase in water quality data available for consideration, rather than a deterioration of ambient water quality in the region. Much of this new data was generated by the Irrigated Lands Regulatory Program.

The full proposed 303d listing/delisting is available for download (Appendix A) from the same website listed above. The draft list contains 436 new listings for 44 pollutants in 198 different water bodies or stream segments and 23 delistings for 11 pollutants. Of these new listings, 133 are attributed to agriculture. 37 of these new listings attributed to agriculture are in the Sacramento River watershed (Table 1). Additional new listings attributed to agriculture include 2 new listings in the Delta, 2 in the Mokelumne River watershed, 85 in the San Joaquin River watershed, and 7 new listings in the Tulare watershed.

The remainder of this memorandum focuses on evaluating the listings attributed to agriculture in the Sacramento valley watershed. A complete listing of proposed water bodies and listed pollutants sorted by pollutant is presented in Table 2. This table can also be provided by LWA as an Excel spreadsheet file upon request. Spreadsheet files of the listings are not available from the Regional Water Board at this time.

Table 1. Summary of New 303d Listings for Agriculture Sources in the Sacramento River Watershed

Category	Total Listings
Registered pesticides	18
Legacy OC	7
Metals	4
Toxicity	3
Pathogen indicators	3
Physical	1
Salinity	1
Grand Total	37

Comments on Specific Proposed New Listings in the Sacramento Valley Watershed

Of the 37 new listings attributed to agriculture in the Sacramento River watershed, half (18) are for registered pesticides, including 10 total listings for chlorpyrifos (5) and diazinon (5). The remaining listings for registered pesticides include oxyfluorfen (2), diuron (2), dacthal (1), malathion (1), simazine (1), and dichlorvos (1). The other new agricultural listings in the watershed are distributed among legacy organochlorine pesticides, trace metals, toxicity, pathogen indicators, physical parameters (e.g., dissolved oxygen, temperature, pH), and salinity.

Evaluation of the proposed new 303d listings attributed to agriculture resulted in comments in four broad categories:

- Incorrectly assessed (does not comply with Listing policy requirements or guidance)
- Invalid Evaluation Guidelines
- Listings that should not be attributed to agriculture (incorrect source attributions)
- Incomplete assessments

Specific comments are organized by these categories and discussed in detail below.

Incorrect Assessments

There are many cases where proposed new listings are based on incorrect implementation of the State's listing policy. The following examples list several of these, but this list should not be considered comprehensive. Based only on the number of incorrect assessments discussed below, it appears that that Water Board staff should review all of the proposed new listings for consistency with the Listing policy.

The copper listing for Wadsworth Canal (Decision ID 11525) is based on a total of two "exceedances", one for dissolved copper and one for total copper, collected on the same day and time. The hardness basis for the criterion calculation is not cited, but no hardness data were collected or reported for the days of the reported exceedance.

Based on the available data, an actual exceedance of the CTR criterion for dissolved copper can't be determined. Additionally, the total copper data was inappropriately compared to CTR criteria and was double-counted with the dissolved copper result for the same sample date. Water Board staff should review all of the evaluations for trace metals to determine whether similar incorrect and inappropriate use of the metals data occurs with other listings.

The listings for copper and lead for Spring Creek in Colusa County (Decision IDs 12038, 12041) are incorrectly based only on comparisons of total metals concentrations to CTR criteria. Exceedances of these trace metals should be evaluated based only on dissolved metals concentrations, as is recommended in the CTR. Comparisons of total copper and lead to the CTR criteria is not a valid use of the criteria and does not provide a meaningful assessment of potential impairments of aquatic life beneficial uses. If the total trace metals data indicate a concern, new samples should be collected allow proper evaluation of potential impairments using appropriate dissolved metals data.

The data for diazinon in Ulatis Creek (Decision ID 11547) is not correctly evaluated. The evaluation for this listing does not follow the Listing policy guidelines. The fact sheet cites that the basis for the listing is four exceedances of the 0.1 ug/l criterion observed for 51 samples representing 4-day averages collected from 2002 – 2006. The minimum number of exceedances required to qualify a water body for the 303d list for this sample size is five (5) exceedances. In fact, the data set cited for the listing supports *delisting* of the water segment (4 or fewer exceedances out of 51 samples).

The data for simazine in Ulatis Creek (Decision ID 11550) is not correctly evaluated. The evaluation for this listing does not follow the Listing policy guidelines. The fact sheet cites that the basis for the listing is two exceedances observed for 73 individual samples collected from 2003 – 2005. The minimum number of exceedances required to qualify a water body for the 303d list for this sample size is seven (7) exceedances. In fact, the data set cited for the listing supports *delisting* of the water segment (6 or fewer exceedances out of 73 samples).

The data for chlorpyrifos in Sacramento Slough (Decision ID 4682) is not correctly evaluated. The evaluation for this listing does not follow the Listing policy guidelines. The fact sheet cites that the basis for the listing is two exceedances observed for samples representing 64 4-day averages collected from 2003 – 2005. The minimum number of exceedances required to qualify a water body for the 303d list for this sample size is six (6) exceedances. Based on the listing policy, Sacramento Slough should not be placed on the 303d list for chlorpyrifos.

The data for malathion in Arcade Creek (Decision ID 11312) is not correctly evaluated. The evaluation for this listing does not follow the listing policy guidelines. The fact sheet cites that the basis for the listing is five (5) exceedances observed for samples representing 76 4-day averages collected from 2000 – 2005. The minimum number of exceedances required to qualify a water body for the 303d list for this sample size is seven (7) exceedances. Based on the listing policy, Arcade Creek should not be placed on the 303d list for malathion.

Invalid Evaluation Guidelines

Listings for aldicarb, dichlorvos, and oxyfluorfen are not based on appropriately developed Evaluation Guidelines. The listing policy allows Evaluation Guidelines to evaluate narrative water quality objectives for developing 303d listings. However, the listing policy also requires that the Evaluation Guidelines are demonstrated to be scientifically based and peer reviewed, and must identify a range above which impacts occur. For non-threshold chemicals, risk levels must also be consistent with comparable water quality objectives or water quality criteria. The Evaluation Guidelines used for aldicarb, dichlorvos, and oxyfluorfen do not meet these listing policy guidelines: they are based on applying an arbitrary factor of 10 to published LC50 values for sensitive species. This is not a scientifically valid or peer reviewed methods for establishing concentrations above which impacts are expected. It does not represent accepted or consensus scientific practice for developing water quality criteria for the protection of aquatic life or other beneficial uses. This method is not consistent with established scientific methods of developing water quality criteria (e.g., USEPA's process) and results in a risk levels that are much lower than criteria developed for comparable purposes by USEPA.

Similarly, the evaluation guideline for diuron is based on a single published LC50 value for a sensitive alga species. No additional explanation, rationale, or support for selecting this value is provided. It can't be determined from the fact sheet whether the Evaluation Guideline meets the criteria of the listing policy.

Incorrectly Attributed to Agriculture

For three Sacramento Valley listings (Willow Slough and Tule Canal), agriculture is the only source cited for *E. coli* or fecal coliform listings when this is not supported by the monitoring data. Although agriculture is a potential source, it has not been demonstrated to be the sole or primary source of pathogen indicator organisms in these water bodies, and is not likely to be the primary source of the observed exceedances. There are known to be substantial wildlife and human sources (septic and "recreational" use) in these water bodies. Both of these listings should be attributed to "unknown

sources". This is probably true for a number of other *E. coli* listings attributed to specific sources.

For two Sacramento Valley listings (Yankee Slough, Decision ID 11452, and Little Tule River, Decision ID 11621), agriculture is cited as the sole source of toxicity of unknown cause. (Note also that Little Tule River cited in this decision is not in Shasta County.)

There is no information cited as to how this was determined other than the monitoring was done by a program regulating agricultural sources. It is not reasonable to attribute an unknown cause of toxicity to a specific source such as agriculture. Numerous other listings for toxicity of unknown cause are more appropriately attributed to unknown sources.

The listings for boron in Willow Slough and Willow Slough Bypass (Decision IDs 11488, 11457), and boron and salinity in Tule Canal (Decision ID 11625) are incorrectly attributed to agriculture. The primary source of elevated boron and salinity is the natural background source waters for these water bodies. The geology of the contributing watersheds and the local groundwater sources are naturally high in boron and other dissolved minerals. This also applies to the boron listings for Putah Creek, Knight's Landing, and Lower Cache Creek, which are attributed to "unknown sources". There are plentiful data and analysis available regarding sources of boron and salinity in the Yolo County area and the Cache Creek watershed, and these data have in fact been provided to the Water Board previously. Water Board staff need to consider these data in making the assessments for the 303d list.

The dichlorvos listing for Butte Slough (Decision ID) should also not be attributed to agriculture. Dichlorvos is not registered for application to irrigated crops. The most likely source of the dichlorvos detections is the use of naled for vector control (e.g., mosquito abatement). Dichlorvos is a breakdown product of naled, which has relatively little agricultural use. Applications for public health vector control accounted for more than 95% of the reported use of naled in 2005 and 2006 in Butte and Colusa counties. Naled used for mosquito abatement is typically applied by aerial spraying with a high probability of drift and potential contamination of surface water.

Incomplete Assessments

There are many incomplete assessments included in the proposed new 303d listings. In many cases, proposed listings would be modified or eliminated by additional data that the Water Board already has in hand (e.g., ILRP data collected through 2007), or that are readily available (e.g., ILRP data collected in 2008). While it is understood that there must be a cutoff for acquiring, compiling, and evaluating new data for 303d list development, there should be more effort made to use the available data. This is especially true in cases when limited data trigger new listings or when the only data available do not reflect current conditions (e.g., when management practices have changed or the only data evaluated are more than 10 years old). In these cases, additional effort should be made to acquire more current data reflective of actual ambient conditions. In fact, this is required by the listing policy. Specific instances of this are discussed below.

There are five new listings for diazinon in the Sacramento Valley watershed. The listing policy specifies that "*If the implementation of a management practice(s) has resulted in a change in the water body segment, only recently collected data [since the*

implementation of the management measure(s)] should be considered. The water quality fact sheet should describe the significance of the sample timing.” The findings failed to consider the decrease in the use of diazinon that has resulted from label changes and restrictions on diazinon use. For example, agricultural diazinon use in Yolo County has decreased by approximately 50% (from 3179 lbs in 2005 to 1802 lbs in 2007, the most recently available data from CDPR). Similar decreases in diazinon use have occurred throughout the watershed. Based on the listing policy, recent data should be considered before listing these water bodies as impaired.

Additional data for chlorpyrifos in Coon Creek (Decision ID 13132) should be considered. The fact sheet indicates that the basis for the listing is two exceedances observed for fifteen (15) individual samples collected from 2005 – 2006. Seventeen (17) additional samples were collected for the ILRP from 2007 – 2008 in this water body, with no exceedances of the 4-day or 1-hour criteria for chlorpyrifos. The minimum number of exceedances required to qualify a water body for the 303d list for this sample size (32) is three (3) exceedances.

Additional data for chlorpyrifos in Wadsworth Canal (Decision ID 11524) should be considered. The fact sheet indicates that the basis for the listing is five exceedances of the 1-hour criterion observed for 68 individual samples collected from 2005 – 2006, and two exceedances of the 4-day average criterion. Fifteen (15) additional samples were collected for the ILRP from 2005 – 2006 in this water body, with no exceedances of the 4-day or 1-hour criteria for chlorpyrifos. The minimum number of exceedances required to qualify a water body for the 303d list for a total sample size of 83 individual samples is eight (8) exceedances, and the minimum number for a total sample size of 29 4-day average samples is three (3) exceedances. Based on the listing policy, Coon Creek should not be placed on the 303d list for chlorpyrifos.

Additional data for dacthal in Colusa Basin Drain (Decision ID 13065) should be considered. The fact sheet indicates that the basis for the listing is two exceedances observed for 21 individual samples collected from 1996 – 1998. There are eight (8) additional samples collected for the ILRP in 2008 in this water body, with no exceedances of the 0.008 ug/L one-in-a-million incremental cancer risk used as the Evaluation Guideline. The minimum number of exceedances required to qualify a water body for the 303d list for this sample size (29) is three (3) exceedances. Based on the listing policy, Colusa Basin Drain should not be placed on the 303d list for dacthal. Additionally, the labels of dacthal products of concern were amended in 1998 to mitigate off-site movement of residues. Based on the listing policy, only data collected since the implementation of this management measure should be considered, and consequently there is no evidence of exceedances to support adding this to the 303d list.

Listings based on interpretation of narrative objectives for pesticides (e.g., diuron, dichlorvos, oxyfluorfen) fail to consider synoptic toxicity data for sensitive species along with the chemical concentration data. In at least some cases, the toxicity data indicate that the Evaluation Guidelines used for these pesticides are not appropriate or valid indicators of impairment.

Additional data should be considered for dissolved oxygen for the Middle Fork Feather River (Decision ID 12954). The fact sheet indicates that the basis for the listing is nine (9) exceedances observed for 36 individual samples collected from 2002 – 2006. The data set and assessment is incomplete on many levels. It does not contain the complete

set of data available for the stated period in 2005-2006, and it does not include new data available since 2006. Additionally, all of the cited exceedances occur at an upstream location that was determined not to be an appropriately representative monitoring site for the ILRP. The cause of low dissolved oxygen at this site was determined to be low flows, so the “unknown source” category does not apply. Additional data available for a new downstream site indicate no problems for dissolved oxygen. At a minimum, these results clearly demonstrate that the potential problem does not extend to the new site. Low dissolved oxygen condition clearly does not extend to the site at Merrimac, which is many miles downstream and is not in the same reach.

Miscellaneous Errors

There are many minor editorial and factual errors in the integrated report and fact sheets. E.g., three listings for Little Tule River (Decision ID 11620, 11621, 11619) incorrectly indicate the site is in Shasta County, and the fact sheet for Decision ID 11621 states “...0 of 35 samples tested with *Ceriodaphnia* exceed the narrative toxicity objective and this exceeds the allowable frequency listed in Table 3.1 of the Listing Policy”. Errors of this type are too numerous to list individually, but indicate a need for a thorough review by Water board staff of all of the materials that comprise the proposed listing.

Conclusion

The proposed 2008 update to the 303d list contains many listings that would not meet the listing policy criteria for addition to the 303d list, if properly and completely evaluated. The proposed update contains many errors and omissions and often fails to correctly implement the State’s listing policy, including the use of “Evaluation Guidelines” that do not meet the requirements of the listing policy. There are numerous additional proposed listings that do not completely evaluate the available data, or that should consider readily available new data. Although this evaluation is focused primarily on listings attributed to agriculture in the Sacramento Valley watershed, these problems extend to all other source categories (including “unknown” sources) and indicate the proposed update needs extensive re-evaluation and revision.

Table 2. Summary of New 303D listings in the Draft 2008 Proposal

Watershed	Constituent	Source Category and Number of Individual Listings					Grand Total
		Agri-culture	CAFO	Resource Extraction	Unknown	Urban Runoff	
Delta	Mercury				1		1
	Chlordane	1					1
	Chlorpyrifos				1		1
	D.O.				1		1
	Dieldrin	1					1
Mokelumne River	Mercury			3			3
	E. Coli				3		3
	D.O.				3		3
	Toxicity, unknown cause				2		2
	Chlorpyrifos	1			1		2
	Disulfoton	1					1
	pH				1		1
	Simazine				1		1
	Copper				1		1
	Diazinon				1		1
	Lead				1		1
	Sacramento River	Mercury			34	3	
Toxicity, unknown cause		2	1		19		22
D.O.					17		17
pH		1			12		13
PCB					10		10
E. Coli		2			8		10
Pyrethroids						9	9
Chlorpyrifos		5			4		9
Diazinon		5			3		8
Boron		3			3		6
Copper		1		1	2		4
Salinity		1			3		4
Dieldrin		3					3
Sed Tox		1			2		3
Diuron		2			1		3
DDT/DDE		2					2
Oxyfluorfen		2					2
Bis-2 (BEHP)					2		2
Fecal Coliform		1			1		2
Dieldrin		1					1
Malathion		1					1
Dacthal		1					1
Simazine		1					1
Temp					1		1

		Source Category and Number of Individual Listings					
Watershed	Constituent	Agri- culture	CAFO	Resource Extraction	Unknown	Urban Runoff	Grand Total
	TPH				1		1
	Dichlorvos	1					1
	PCP				1		1
	Chlordane	1					1
	Aldicarb				1		1
	Lead				1		1

Watershed	Constituent	Source Category and Number of Individual Listings					Grand Total
		Agri-culture	CAFO	Resource Extraction	Unknown	Urban Runoff	
San Joaquin	E. Coli	4			28		32
	Toxicity, unknown cause	8			17		25
	Chlorpyrifos	13			4		17
	Sed Tox	8			6		14
	Copper	1			12		13
	DDT/DDE	9			3		12
	Salinity	3			9		12
	D.O.				9		9
	Mercury			8	1		9
	Lead	1			7		8
	Dimethoate	7					7
	Temp				6		6
	Diazinon	5			1		6
	Dieldrin	5			1		6
	Diuron	5					5
	Dacthal	4					4
	pH				4		4
	Boron	1			2		3
	Simazine	3					3
	Chloride				2		2
	alpha-BHC	1			1		2
	Ammonia				1		1
	Pyrethroids	1					1
	Arsenic				1		1
	Bifenthrin	1					1
	Malathion	1					1
	Prometryn	1					1
	Trifluralin	1					1
	Lindane	1					1
	HCB				1		1
	Cis-permethrin	1					1
Nickel				1		1	
Tulare	Toxicity, unknown cause	2			7		9
	pH				7		7
	Chlorpyrifos	3					3
	D.O.				2		2
	Ammonia				1		1
	Dimethoate	1					1
	EC	1					1
Grand Total		133	1	46	246	9	435