

WMA Assessment Methodology (Condensed)

Previous Permit Cycle

Table 4-3. Interim Criteria for Evaluating Mass Loading and Dry Weather Station Data.

COC Frequency of Occurrence	Criterion No.	Definition
High ◆◆◆	1	Mass loading station tests results exceed WQO in greater or equal to 80% of samples.
	2	Six of the last consecutive storm samples at the MLS exceed WQO.
	3	Less than 80% and greater than or equal to 50% of the MLS samples exceed WQO <u>and</u> at least one DWS exceedance in the past year.
	4	Less than 80% and greater than or equal to 50% of the MLS samples exceed WQO <u>and</u> a significant increasing trend is found.
Medium ◆◆	5	Less than 80% and greater than or equal to 50% of the MLS samples exceed WQO <u>and</u> no exceedances or data available for DWS in the past year.
	6	Less than 80% and greater than or equal to 50% of the MLS samples exceed WQO <u>and</u> one or more exceedances found in last 2 years of monitoring at the MLS (generally applies to historical datasets).
	7	Greater than 50% of the DWS samples have exceedances in the past year.
Low ◆	8	DWS exceedances in 10 to 50% of the samples in the past year.
	9	MLS exceedances found in 25% to less than or equal to 50% of the samples <u>and</u> at least one exceedances found in last 2 years at the MLS (with or without DWS exceedances in the past year).
	10	Greater than 50% of the MLS samples have exceedances <u>and</u> no exceedances in the last 2 years at the MLS.
Coastal Program	11	Persistent exceedances (greater or equal to 80% of samples). Add one ◆ to bacteria determination (up to three ◆ maximum).

Note: Best professional judgment applies when unique situations arise (fewer samples at a site; sewage spills) and for toxicity once it is linked to a specific COC.

Table 4-5. Triad Definitions for San Diego Storm Water Monitoring Program.

Triad Component	Definition
Persistent Exceedance of Water Quality Objectives	A constituent of concern with a high frequency of occurrence based on wet and dry weather data exceedances compared to established list of benchmarks or trigger levels
Evidence of Persistent Toxicity	More than 50% of the toxicity tests for any given species have a NOEC of less than 100%.
Indication of Benthic Alteration	IBI score indicates a substantially degraded community (very poor)

Table 4-6. Tabular Decision Matrix – chemical, toxicity, and benthic assemblage data available (adapted from SMC Model Storm Water Monitoring Program, 2004).

Chemistry	Toxicity	Benthic Alteration	Example Conclusions	Example Actions or Decisions
1. Persistent exceedance of water quality objectives (high frequency COC identified)	Evidence of persistent toxicity	Indications of alteration	Strong evidence of pollution-induced degradation	1) Toxicity tests at higher dilutions to better quantify toxicity; Use TIE to identify contaminants of concern, based on TIE metric. 2) Evaluate/identify upstream source as a high priority.
2. No persistent exceedances of water quality objectives	No evidence of persistent toxicity	No indications of alteration	No evidence of current pollution-induced degradation Potentially harmful pollutants not yet concentrated enough to cause visible impact	1) No immediate action necessary. 2) Conduct periodic broad scans for new and/or potentially harmful pollutants.
3. Persistent exceedance of water quality objectives (high frequency COC identified)	No evidence of persistent toxicity	No indications of alteration	Contaminants are not bioavailable Test organisms not sensitive to problem pollutants	1) TIE would not provide useful information with no evidence of toxicity. 2) Continue monitoring for toxic and benthic impacts. Consider whether different or additional test organisms should be evaluated. 3) Initiate upstream source identification as a low priority.
4. No persistent exceedances of water quality objectives	Evidence of persistent toxicity	No indications of alteration	Unmeasured contaminant(s) or conditions have the potential to cause degradation Pollutant causing toxicity at very low levels Synergistic effects of multiple chemicals at low levels causing toxicity	1) Recheck chemical analyses and evaluate detection limits relative to reported toxic levels. 2) Verify toxicity test results; Consider additional advanced chemical analyses. 3) Toxicity tests at higher dilutions to better quantify toxicity: Use TIE to identify contaminants of concern, based on TIE metric; Evaluate/investigate upstream source as a medium priority.

Chemistry	Toxicity	Benthic Alteration	Example Conclusions	Example Actions or Decisions
5. No persistent exceedances of water quality objectives	No evidence of persistent toxicity	Indications of alteration	Alteration may be due to physical impacts, not toxic contamination Test organisms not sensitive to problem pollutants Synergistic effects of multiple chemicals at low levels causing toxicity	1) No action necessary based on toxic chemicals. 2) Consider whether different or additional test organisms should be evaluated. 3) Consider potential role of physical habitat disturbance.
6. Persistent exceedance of water quality objectives high frequency COC identified)	Evidence of persistent toxicity	No indications of alteration	Toxic contaminants are bioavailable, but in situ effects are not demonstrable Benthic analysis not sensitive enough to detect impact Potentially harmful pollutants not yet concentrated enough to change community	1) Determine if chemical and toxicity tests indicate persistent degradation. 2) Recheck benthic analyses; consider additional data analyses. 3) Toxicity tests at higher dilutions to better quantify toxicity: <ul style="list-style-type: none"> If recheck indicates benthic alteration, perform TIE to identify contaminants of concern, based on TIE metric. Evaluate/investigate upstream source as a high priority. If recheck shows no effect, use TIE to identify contaminants of concern, based on TIE metric. Evaluate/investigate upstream source identification as a medium priority.
7. No persistent exceedances of water quality objectives	Evidence of persistent toxicity	Indications of alteration	Unmeasured toxic contaminants are causing degradation Pollutant causing toxicity at very low levels Synergistic effects of multiple chemicals at low levels causing toxicity Benthic impact due to habitat disturbance, not toxicity	1) Recheck chemical analyses and consider additional advanced analyses. 2) Toxicity tests at higher dilutions to better quantify toxicity. Use TIE to identify contaminants of concern, based on TIE metric. 3) Evaluate/investigate upstream source identification as a high priority. 4) Consider potential role of physical habitat disturbance.
8. Persistent exceedances of water quality objectives (high frequency COC identified)	No evidence of persistent toxicity	Indications of alteration	Test organisms not sensitive to problem pollutants Benthic impact due to habitat disturbance, not toxicity	1) TIE would not provide useful information with no evidence of toxicity. 2) Evaluate/investigate upstream source identification as a high priority. 3) Consider whether different or additional test organisms should be evaluated. 4) Consider potential role of physical habitat disturbance.

2007-2008 WMA Assessment Methodology revisions

- New benchmarks (wet and dry)
- Separated ambient and dry assessments
- Provided an integrated assessment summary (with narrative discussion)

Table B-1. Interim Criteria for Evaluating Constituents of Concern Frequency of Occurrence

COC Frequency of Occurrence	Criterion No.	Definition
High ◆◆◆	1	Mass loading station MLS or temporary watershed assessment station (TWAS) tests results exceed benchmark WQO in greater or equal to 80% of samples.
	2	The last six consecutive sample events at the MLS or TWAS exceed water quality benchmark.
	3	Less than 80% and greater than or equal to 50% of the MLS or TWAS samples exceed the water quality benchmark <u>and</u> at least one DWS exceedance in the past year.
	4	Less than 80% and greater than or equal to 50% of the MLS or TWAS samples exceed the water quality benchmark <u>and</u> a significant increasing trend is found.
Medium ◆◆	5	Less than 80% and greater than or equal to 50% of the MLS or TWAS samples exceed the water quality benchmark <u>and</u> no exceedances or data available for DWS in the past year.
	6	Less than 80% and greater than or equal to 50% of the MLS samples exceed the water quality benchmark <u>and</u> one or more exceedances found in last 2 years of monitoring at the MLS or TWAS (generally applies to historical datasets).
	7	Greater than 50% of the DWS samples have exceedances in the past year.
Low ◆	8	DWS exceedances in 10 to 50% of the samples in the past year.
	9	MLS or TWAS exceedances found in 25% to less than or equal to 50% of the samples <u>and</u> at least one exceedance found in last 2 years at the MLS or TWAS (with or without DWS exceedances in the past year).
	10	Greater than 50% of the MLS or TWAS samples have exceedances <u>and</u> no exceedances in the last 2 years at the MLS or TWAS.
Coastal Storm Drain Program	11	Persistent exceedances (greater or equal to 80% of samples). Add one ◆ to bacteria determination (up to three ◆ maximum for ambient conditions only).

Note: Best professional judgment applies when unique situations arise (fewer samples at a site; sewage spills) and for toxicity once it is linked to a specific COC.


1. Definitions were updated to incorporate ambient data and TWAS data and associated new programs detailed in RWQCB Order No. R9-2007-0001.

Table B-2. Interim Wet Weather Condition Matrix of Findings

Constituents With Any Wet Weather Benchmark or Dry Weather Action Level Exceedance		San Luis Rey River																Urban Runoff Program Results ¹	Frequency of Occurrence	Criterion No.
		Wet Weather Receiving Water Results at MLS and/or TWAS																		
		2001/2002		2002/2003		2003/2004		2004/2005		2005/2006		2006/2007		2007/2008		CUMULATIVE				
#/3	%	#/3	%	#/3	%	#/3	%	#/3	%	#/3	%	#/3	%	#/22*	%	#	%			
Conventional Parameters																				
pH	0	0	1	33	0	0	0	0	0	0	0	0	0	0	1	5	3	9		
Conductivity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3		
BOD	0	0	0	0	1	33	0	0	0	1	33	0	0	0	2	9	NA	NA		
Total dissolved solids	3	100	3	100	3	100	3	100	3	100	3	100	4	100	22	100	NA	NA		
Total suspended solids	0	0	1	33	0	0	1	33	0	0	0	0	3	75	5	23	NA	NA		
Turbidity	0	0	1	33	0	0	2	67	0	0	1	33	4	100	8	36	7	20		
Ammonia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	7		
Nutrients																				
Orthophosphate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	9		
Nitrate as N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	7		
Bacteriological																				
Total coliform	0	0	0	0	0	0	1	33	0	0	1	33	3	75	5	23	0	0		
Fecal coliform	0	0	1	33	1	33	3	100	3	100	3	100	4	100	15	68	0	0		
Enterococci	0	0	1	33	0	0	2	67	0	0	1	33	2	50	6	27	0	0		
Pesticides																				
Diazinon	1	33	0	0	0	0	0	0	0	0	0	0	0	0	1	5	0	0		
Chlorpyrifos	0	0	0	0	0	0	0	0	0	0	0	0	1	25	1	5	0	0		
Toxicity																				
<i>Ceriodaphnia</i> 7-day reproduction	1	33	0	0	1	33	0	0	0	0	0	0	1	25	3	14	NA	NA		
<i>Hyalella</i> 96-hour acute	0	0	0	0	0	0	0	0	0	0	1	33	0	0	1	5	NA	NA		
<i>Selenastrum</i> 96-hour	0	0	0	0	1	33	0	0	0	0	0	0	0	0	1	5	NA	NA		
Bioassessment																				
San Luis Rey River, at Benet Rd., (Downstream of MLS)	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	NA	NA		
San Luis Rey River, TWAS ²	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	Very Poor	NA	NA		
Doane Creek, Ref. Site	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		

¹ Urban Runoff Program results from Jurisdictional Dry Weather Program, Wet MS4 Outfall, and Wet Source ID Monitoring Programs.
² = Total number of observations varied among constituents.
 NA = Not assessed, Not Applicable, or Not Analyzed.
 - = Constituent results are below the defined requirements for a Low Frequency of Occurrence rating.
 ♦ = Low Frequency of Occurrence rating.
 ♦♦ = Medium Frequency of Occurrence rating.
 ♦♦♦ = High Frequency of Occurrence rating.
³ Data from Fall 2001-Spring 2007 were collected approximately two miles downstream at the Mission Rd. Bridge under the Order R9-2001-01.

Table B-3. Interim Ambient Condition Matrix of Findings

San Luis Rey River								
Constituents With Any Ambient Receiving Water Benchmark or Dry Weather Action Level Exceedance	 Ambient Receiving Water Results at MLS and/or TWAS				Urban Runoff Program Results ¹		Frequency of Occurrence	Criterion No.
	2007/2008		CUMULATIVE		2007*			
	#/4	%	#/4	%	#	%		
Conventional Parameters								
pH	0	0	0	0	3	9	-	-
Conductivity	0	0	0	0	1	3	-	-
BOD	0	0	0	0	NA	NA	-	-
Chemical oxygen demand	1	25	1	25	NA	NA	◆	9
Total dissolved solids	4	100	4	100	NA	NA	◆◆◆	1
Turbidity	1	25	1	25	7	20	◆	8
Ammonia	0	0	0	0	3	7	-	-
Nutrients								
Orthophosphate	0	0	0	0	4	9	-	-
Nitrate as N	0	0	0	0	3	7	-	-
Bacteriological								
Total coliform	0	0	0	0	0	0	-	-
Fecal coliform	1	25	1	25	0	0	◆	9
Enterococci	3	75	3	75	0	0	◆◆◆	4
Pesticides								
Diazinon	0	0	0	0		0	-	-
Toxicity							EVIDENCE OF PERSISTENT TOXICITY?	
<i>Ceriodaphnia</i> 7-day reproduction	0	0	0	0	NA	NA	No	
<i>Selenastrum</i> 96-hour	0	0	0	0	NA	NA	No	
Bioassessment	IBI Rating						EVIDENCE OF BENTHIC ALTERATION?	
San Luis Rey River, at Benet Rd., (Downstream of MLS)	Very Poor		Very Poor		NA		Yes	
San Luis Rey River, TWAS	Very Poor		Very Poor		NA			
Doane Creek, Ref. Site	Very Good		Very Good		NA			

¹ Urban Runoff Program results from Jurisdictional Dry Weather Program, Dry-Coastal Storm Drain Monitoring Program, Dry MS4 Outfall, and Dry Source ID Monitoring Programs.

* = Total number of observations varied among constituents.

NA = Not assessed, Not Applicable, or Not Analyzed.

- = Constituent results are below the defined requirements for a Low Frequency of Occurrence rating.

◆ = Low Frequency of Occurrence rating.

◆◆ = Medium Frequency of Occurrence rating.

◆◆◆ = High Frequency of Occurrence rating.

Table B-4. Interim Integrated Watershed Area Management Assessment



San Luis Rey WMA Integrated Watershed Management Area Assessment					
Assessment Category	Program	Frequency of Occurrence Assessment Findings	Persistent Toxicity Observed	Evidence of Benthic Impairment	Integrated WMA Assessment Summary
 Ambient	Ambient Receiving Water	MLS, TWAS, and Bioassessment Monitoring	◆◆◆-TDS, enterococci ◆-COD, turbidity, fecal coliform	No	Yes TDS is identified as a high frequency of occurrence COC in receiving waters during ambient conditions and wet weather conditions. TDS is associated with importation of drinking water, irrigation, and potential recycled water uses (San Diego Regional 303(d) Workgroup, 2002). COD, turbidity, and fecal coliform were also identified as low frequency of occurrence COCs in receiving waters. A link between urban runoff and receiving water conditions appears related only to turbidity with a possible link for bacteria. Bacteria re-growth issues may exist in the receiving water based on a study recently conducted in Tecolote Creek (WESTON, 2008).
	Ambient Urban Runoff Areas	Jurisdictional Dry Weather Monitoring, Coastal Storm Drain Monitoring, MS4 Program Data, Source Identification Monitoring	◆-Turbidity	NA	
 Wet Weather	Wet Weather Receiving Water	MLS, TWAS, and Bioassessment Monitoring	◆◆◆-TDS, fecal coliform ◆-Turbidity, enterococci	No	TDS was identified as a high frequency of occurrence COC during both ambient and wet weather conditions. Fecal coliform and enterococci frequency of occurrence COCs vary depending on season and is a function of the benchmarks used for comparison.
	Wet Weather Urban Runoff Areas	MS4 Program Data and Source Identification Monitoring	(No data from the programs to date)	NA	

Table B-5. Interim Triad Definitions for San Diego Storm Water Monitoring Program

Triad Component	Definition
Persistent Exceedance of Water Quality Benchmarks	A high frequency of occurrence constituent of concern based on receiving water data, jurisdictional dry weather data, and coastal storm drain monitoring data exceedances compared to established list of benchmarks or action levels.
Evidence of Persistent Toxicity	More than 50% of the toxicity tests for any given species have a NOEC of less than 100%.
Indication of Benthic Alteration	IBI score of Poor or Very Poor.

Table B-6. Triad Approach to Determining Follow-Up Actions (Section III.A.4, Table 3 of the Receiving Waters and Urban Runoff Monitoring and Reporting Program, No. R9-2007-0001)

	Chemistry	Toxicity	Bioassessment	Action
1.	Persistent exceedance of water quality objectives (high frequency constituent of concern identified).	Evidence of persistent toxicity.	Indications of alteration.	Conduct TIE to identify contaminants of concern, based on TIE metric. Address upstream sources as a high priority.
2.	No persistent exceedances of water quality objectives.	No evidence of persistent toxicity.	No indications of alteration.	No action necessary.
3.	Persistent exceedance of water quality objectives (high frequency constituent of concern identified).	No evidence of persistent toxicity.	No indications of alteration.	Address upstream sources as a low priority.
4.	No persistent exceedances of water quality objectives.	Evidence of persistent toxicity.	No indications of alteration.	Conduct TIE to identify contaminants of concern, based on TIE metric. Address upstream sources as a medium priority.
5.	No persistent exceedances of water quality objectives.	No evidence of persistent toxicity.	Indications of alteration.	No action necessary to address toxic chemicals. Address potential role of urban runoff in causing physical habitat disturbance.
6.	Persistent exceedance of water quality objectives (high frequency constituent of concern identified).	Evidence of persistent toxicity.	No indications of alteration.	If chemical and toxicity tests indicate persistent degradation, conduct TIE to identify contaminants of concern, based on TIE metric and address upstream source as a medium priority.
7.	No persistent exceedances of water quality objectives.	Evidence of persistent toxicity.	Indications of alteration.	Conduct TIE to identify contaminants of concern, based on TIE metric. Address upstream sources as a high priority. Address potential role of urban runoff causing physical habitat disturbance.
8.	Persistent exceedance of water quality objectives (high frequency constituent of concern identified).	No evidence of persistent toxicity.	Indications of alteration.	Address upstream source as a high priority.

WMA Assessment Methodology

Overall Purpose

- Provides short term, annually updated assessment of the watershed (based on available program monitoring data)
- Was used to determine triad decision matrix results for determining a variety of monitoring based actions (e.g. TIEs, source identification studies, etc...)
- Triad actions are now incorporated into the monitoring sections of the permit
- Guides next monitoring cycle objectives

WMA Assessment Method Pros and Cons	
Pros	Cons
Uses a defined methodology that has been used since 2004 to assess watershed priorities	Lacks flexibility for incorporating new data sets
Triad data plugs into matrix to guide management actions (monitoring driven)	Outdated-required revision to incorporate new TWAS
Uses a triad based assessment	Applied to entire watershed and inferred watershed wide problems (which may or may not be the case)
Assessment based strictly on data (did not use 303(d) listing to provide a score)	Did not provide information at the sub-watershed or drainage area scale.
Provides an overall watershed score	Criterion numbers do not provide meaningful information
Is specific to COCs, does not use a parameter group	Different symbol and terminology for Priority
Incorporates trend information	Did not differentiate between receiving waters and MS4 system
	Lacks flexibility for incorporating new data sets
	Outdated-required revision to incorporate new TWAS

Recommendations

- blend useful items from LTEA and WMA Assessments
- drop items that confuse ability to compare with LTEA priorities