

Watershed Data Assessment Framework

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MEC

Document Contents

1. Introduction
2. Terminology
3. Defining the Questions
4. Data Quality Requirements
5. Watershed Data Assessment
6. Data Assessment Tools
7. Discussion
8. References

Introduction

- ◆ Brief overview
- ◆ Purpose statement
- ◆ “Living Document”
- ◆ Highlight Sections 3, 4, 5

Terminology

- ◆ Introduces most common terms in the document
 - COC
 - Frequency of occurrence
 - Water quality problems
 - Prioritizing water quality problems
- ◆ Acronyms and Abbreviations

Defining the Questions

- ◆ *A Framework for Assessing the Effectiveness of JURMPs (Oct. 2003)*
- ◆ Current core questions
 - What are the high priority water quality problems and where do they occur?
 - What is causing them (COC or stressors)?
- ◆ Long term questions
 - What are the changes to discharge and receiving water quality?

Other Basic Technical Questions

- ◆ Guidance – *Assessing California Surface Waters, SWRCB.*
- ◆ *Data and Information Management Plan, Copermittees (January 2002)*
- ◆ *Model Storm Water Monitoring Program for MS4 in Southern California, Stormwater Monitoring Coalition (Jan. 2004)*



Data Quality Requirements

- ◆ Quantitative data (Type 1 or T1)
- ◆ Semi-quantitative data (Type 2 or T2)
- ◆ Qualitative data (Type 3 or T3)



Data Quality Requirements

- ◆ Chemistry Data needs
 - QAPP or comparable documentation (methods, RL, QA/QC)
 - Accredited laboratory
 - Dataset situations
 - ◆ Varying reporting limits
 - ◆ Varying units
- ◆ Third party chemistry data

Biological Data

- ◆ California Stream Bioassessment Procedure (CSBP)
- ◆ Index of Biotic Integrity (IBI)
 - Very good, good, fair, poor and very poor
- ◆ Taxonomy standards (CAMLnet)
- ◆ Quality assurance
- ◆ Basic procedures



Toxicity Data

- ◆ Species and Methods
- ◆ Third party data
 - Independent quality control by a professional aquatic toxicologist



Ambient Bay and Lagoon Monitoring Data

- ◆ Phase I and Phase II
- ◆ “Worse case” conditions
- ◆ Sediment chemistry assessment
 - Methods
- ◆ Sediment toxicity
- ◆ Benthic infauna assessment
- ◆ Third party data



Watershed Data Assessment

- ◆ San Diego Stormwater Copermitttee Core Management Questions
 1. What are the water quality conditions in the watershed?
 2. Are beneficial uses being impacted based on existing external information?
 3. Are water quality conditions in the watershed getting better or worse?
 4. What is the relative contribution of urban runoff to the conditions in the watershed?
 5. What are the sources to urban runoff that contribute to water quality conditions?

COC Frequency Interim Criteria

(Table 5-3)

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.
	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.
	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.
Low ◆	8	DWS exceedances in 10 to 50% of the samples.
	9	MLS 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 (with or without DWS exceedances).
	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. Add one ◆ to bacteria determination (up to three ◆ maximum).

Question #1 - Continued

- ◆ Biological Data
 - Benthic community alteration
 - ◆ Defined in San Diego County if Very Poor
 - ◆ Some reference sites are Fair or Poor
- ◆ Toxicity Data
 - Persistent Toxicity
 - ◆ 50% of toxicity tests to date have a NOEC less than 100%
- ◆ Apply Revised Triad Decision Matrix
 - Chemistry, Benthic alteration and toxicity

Triad Component Definitions

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 5-5

Triad Decision Matrix

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

Table 6-7

Question #2

- ◆ *Are beneficial uses being impacted based on existing external information?*
 - Beneficial uses in Basin Plan (1994)
 - SWRCB 303(d) List of WQLWB
 - SWRCB Monitoring List or Comparable (pending final statewide policy)
 - San Diego County Beach Closure Report
 - Beach Closure and Advisory Report
 - Etc.

Question #3

- ◆ *Are water quality conditions in the watershed getting better or worse?*
 - MLS long term data trend analysis
 - ABLM Data Assessment
 - ◆ Chemistry, Biological, Toxicity data
 - ◆ Ranking system to identify links with upstream watershed (MLS) conditions

Hypothetical ABLM Integrated Data Assessment (Table 5-8)

Embayment	Sediment Chemistry Ranking	Benthic Infauna Ranking	Toxicity Ranking	Sum of Ranked Values for Embayments	Relative Summed Rank*	Upstream Watershed Rank
SMR	6	11	1	18	6	4
OH	9	8	4	21	7	7
SLR	12	5	6	23	8	9
BVL	11	3	9	23	8	10
AHL	5	1	11	17	5	6
BL	10	12	12	34	10	3
SEL	3	10	2	15	3	8
SDL	2	9	3	14	2	2
LPC	7	4	5	16	4	1
MB	1	2	7	10	1	12
SRE	8	7	10	25	9	5
TJR	4	6	11	21	7	11

* The **lower** the relative summed rank, the less-impacted the site is.

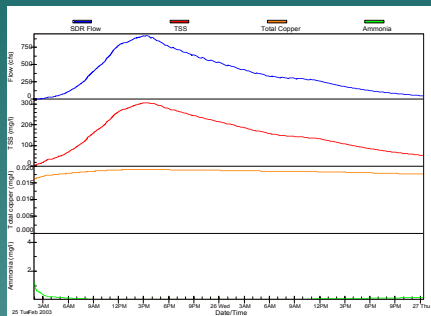
Questions #4 and #5

- ◆ *What is the relative contribution of urban runoff to the conditions in the watershed?*
- ◆ *What are the sources to urban runoff that contribute to water quality conditions?*
 - Cross-Watershed Comparisons
 - Statistical Methods
 - Modeling

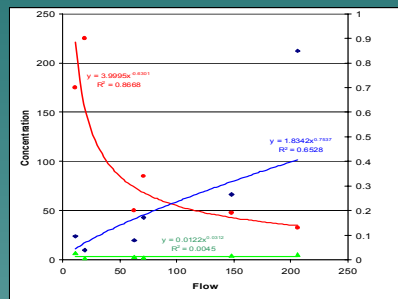
Cross-Watershed Comparison (ANOVA)

Total Phosphorus*	0.0001	TJR	TC	AH	CC	SDR	EC	SMR	PC	SR	SLR	SDC
mg/l		2.26	1.16	0.95	0.70	0.64	0.61	0.58	0.57	0.30	0.25	0.11

Modeling



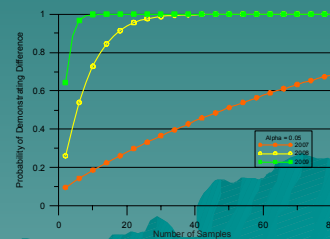
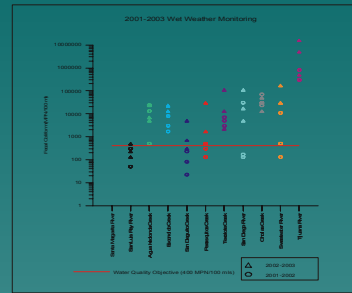
Modeled Water Quality Results



Data Quality Rating Curves

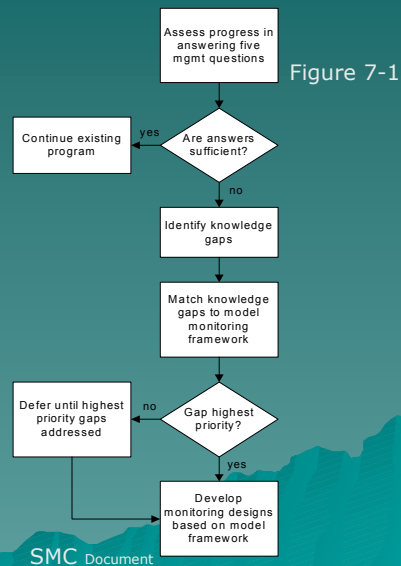
Data Assessment Tools

- ◆ Quantitative
 - T test
 - ANOVA with multiple range test
 - Regression analysis
 - Predictive interval test
- ◆ Semi-quantitative
 - Cluster analysis
 - Threshold comparisons
 - Ranking
- ◆ Qualitative
 - Visual observations
 - Photographic documentation



Discussion

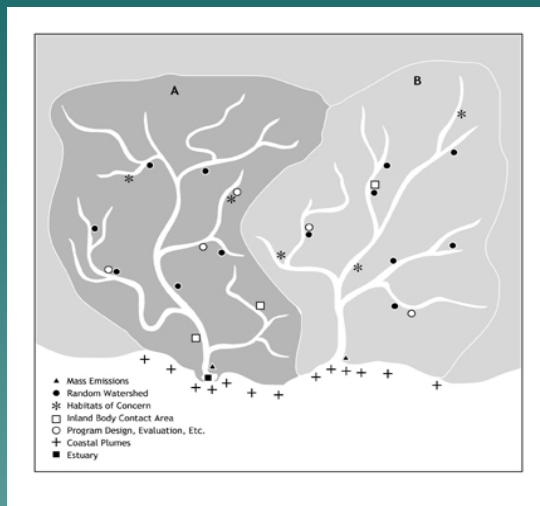
- ◆ Assess progress in answering five core management questions
- ◆ Identify knowledge gaps
- ◆ Prioritize gaps
- ◆ Develop monitoring based on model framework



Questions and Comments

MFC

“Ideal” Watershed Model Monitoring Program



SMC Model
Monitoring

