

# **Targeting the Pollutants: How Stormwater Monitoring and Management Must Change to Meet the MEP Standard**

by Armand Ruby  
Armand Ruby Consulting

**CASQA Conference Presentation  
September 26, 2006**

## **INTRODUCTION:**

I want to first thank Pamela Creedon for her insightful and meaningful opening address. I agree with much of what she said, and her talk sets the stage quite nicely for what I have planned to say. Her themes of commitment, integration, and cooperation complement and echo the central themes of my presentation.

For most of the past 15 years I have worked as a consultant to public agencies in CA. During that time I have seen the stormwater program evolve under the general framework of the MEP standard, using the iterative/BMP approach. Concurrently over the past several years we have seen the implementation of the TMDL program under CWA Section 303(d). Throughout all of this, lurking in the background has been the specter of numerical effluent limits for stormwater discharges.

What has often been lacking in the stormwater program is a real connection between urban runoff and the creeks, rivers, bays and oceans that the runoff flows into – collectively known as “receiving waters”. This presentation addresses the importance of making that connection.

In the U.S., the fundamental regulatory requirement for control of stormwater discharges has been the “MEP standard”: that is, the permitted entity must reduce discharges of pollutants to the “maximum extent practicable (MEP).” This standard has stood in lieu of numerical effluent limitations, the regulatory standard for wastewater treatment plants, for good reasons. Stormwater discharges are intermittent – and in fact unpredictable – in their occurrence, and are highly variable in rate, volume, and quality. The State Water Board’s Blue Ribbon Panel recently concluded that numeric effluent limits for municipal BMPs and urban runoff discharges are not feasible.

But for somewhat the same reasons, defining MEP and demonstrating whether it is being achieved have proven to be problematic. It has been hard to quantify what effect the stormwater management programs as implemented have had on improving discharge quality – much less receiving water quality – and a lack of focus on specific pollution problems has made any assessment of program effectiveness problematic.

The current path leads almost inevitably to costly end-of-pipe treatment of runoff to meet numeric effluent limits, with questionable – or unknown – benefits to receiving water quality. Numerical receiving water quality objectives are really surrogates for evidence of actual water body health or beneficial use impairment. When numerical effluent limits

and numerical receiving water quality objectives are used as the principal means of compliance with water quality standards, some of the more pressing water quality issues can go unaddressed.

There is a better way to do what is reasonable and prudent by way of improving stormwater discharge quality to help meet receiving water quality objectives. That is for both the regulated community and the regulators to commit to a more focused NPDES program that better integrates stormwater monitoring and management.

For MEP to be an effective standard of practice, it must be an ongoing iterative process. It is possible to functionally define MEP and demonstrate that it is being achieved on an ongoing basis, if stormwater monitoring and management function together in an integrated process to target specific pollutants. This presentation describes a way to achieve that. The main components of this process are: identifying and prioritizing the stormwater pollutants that are affecting receiving water quality, identifying the sources of the high-priority pollutants, and identifying and applying controls and practices to limit discharges from those sources.

By using this process to maintain focus on high-priority pollutants of concern, three key things can be achieved:

- An effective nexus between stormwater monitoring and management
- Actual reductions in discharges of pollutants that matter
- A practical means of defining and demonstrating MEP

As part of this process we need to broaden our concept of how stormwater discharges may affect the environment, for example by considering the effects of pollutants such as pyrethroid pesticides on sediments in creeks and rivers that receive stormwater runoff.

Along the way, the monitoring program should be revised to meet the information needs of the process. In this way monitoring program resources can be effectively targeted to serve the objectives of the management program.

Yes, this approach requires a more concentrated effort up front to decide where to invest stormwater management program dollars – but in the end the results should be more meaningful, and the process provides a functional means of demonstrating reduction of pollutants in stormwater discharges to the MEP.

This process can be effectively applied to development of TMDLs and TMDL implementation plans, as the results can help stormwater management agencies both demonstrate their in-stream contributions to the problematic pollutant, and their ability to contribute to a solution.

# Targeting the Pollutants: How and Why Stormwater Monitoring and Management Must Change to Meet the MEP Standard

by Armand Ruby

Armand Ruby Consulting



# Stormwater Regulation: A Brief History

- NPDES Permit Program: Established MEP Standard: “...*reduce discharge of pollutants to the maximum extent practicable*”
- CTR: Set Objectives for Receiving Waters
- Statewide Implementation Plan (SIP): MS4s Dodged the Numerical Effluent Limits Bullet
- TMDLs: “(Waste)Load Allocations” – Pressure for Quantitative (Numeric) Limitations
  - (Need to know *concentration and flow* to quantify loadings...)



# Progress to Date:

- NPDES Stormwater Program
  - Larger MS4s and Industries since 1990s; have resources: staff and funding
  - Phase II program for smaller MS4s
  - Construction and Industrial General Permits (incl. numeric “benchmarks”)
- TMDLs: must cover all sources of pollutant



# Problems with the MEP Approach (I):

- Stormwater Discharges are Intermittent (unpredictably so) *and*
- Highly Variable in Quantity and Quality
  - Difficult to quantify discharges
  - Difficult to demonstrate reductions in pollutant discharges (to the MEP)
- MEP is hard to define



# Problems with the MEP Approach (II):

## Biggest Issue:

- Most MS4s Don't Actually Do It (much less demonstrate it)
- Public (i.e., Environmental Organizations) and Regulators Don't See Sufficient Progress



# Problems with the MEP Approach (III):

## Biggest Issue (cont'd):

### Most Stormwater Programs:

- Are Not Focused on Pollutants of Concern
- Lack Integration between Monitoring and Management Programs



When life gives you flies on your cupcakes...



# The ABCs of Effective MEP Implementation:

## A. Ask: What Pollutants Are Known to Be Present in Runoff?

- Use effective methods to quantify spatial/temporal (esp. seasonal) variation
- Is the runoff itself toxic?
  - If so, what causes the toxicity?
- Track literature to identify new/emerging pollutants



# The ABCs of Effective MEP Implementation:

B. Ask: What Evidence is There of Water Quality Impacts in Local/Regional Receiving Waters?

- Include all available sources
  - Use all types of monitoring data
  - Use monitoring data from all source types
  - Include environmental health indicators
  - Identify known historical/legacy pollutant sources/problems
  - Identify known issues of public concern
- 

# The ABCs of Effective MEP Implementation:

- C. Ask: Where Is There a Match Between Lists A (runoff) and B (receiving waters)?  
Call Them “Pollutants of Concern” or “Target Pollutants”; then ask:
- What are the sources? – requires investigation
  - How can those sources be controlled/limited?
  - What are the constraints/opportunities? – requires balancing funding and available resources with practical aspects of implementation



# Key Idea/Goal:

Feed all available information into the stormwater management decision-making process, *and* actually base investments of public funds on actions that can make a real difference.



# Twelve-Step Process:

- Efficient and Effective Approach to Managing Discharges of Pollutants in Stormwater Runoff
- Focus on Stormwater Pollutants that are Having Observable Effects on Receiving Water Quality

(Note important distinction between “pollutant” and “pollutant of concern” (POC) or “target pollutant” (TP))



# Step 1:

Admitted that we were powerless over the weather; that stormwater runoff had become unmanageable



# Step 2:

Came to believe that a power higher than the Water Board could restore sanity to the process



# 12 Steps to MEP

## *Step 1*

Develop Criteria to Identify Pollutants of Concern/Target Pollutants

## *Step 2*

Compile All Available Runoff Quality Data

## *Step 3*

Compile All Available Receiving Water Quality Information



# 12 Steps to MEP

## *Step 4*

Combine Runoff and Receiving Water Data into a Functional Database

## *Step 5*

Develop Process to Weight Importance of Criteria; Rank POCs/TPs

## *Step 6*

Identify Sources of Highly-Ranked POCs/TPs



# 12 Steps to MEP

## Step 7

Identify BMPs/Controls to Address Significant Sources of Highly-Ranked POCs/TPs

## Step 8

Specify Questions re: Needed Data/Information about POCs/TPs and their Sources, Effects

## Step 9

Design Monitoring Program to Answer Specified Questions; Establish Objectives, Specify Data Needed, Determine How to Get It\*

\* See *Caltrans Guidance Manual: Stormwater Quality Monitoring Protocols, Ch. 2*  
<http://www.dot.ca.gov/hq/env/stormwater/pdf/CTSW-RT-03-105.pdf>



It helps to have specialized expertise...



# 12 Steps to MEP

## >*Step 10*<

Analyze Results of Annual Monitoring; Quantify/  
Estimate Reductions in Pollutant Discharges;  
Interpret Results re: Questions Posed; Assess  
Implications for Stormwater Management

## *Step 11*

Revise/Update Stormwater Management  
Plan/Program to Incorporate New Information

## *Step 12*

Identify New Questions; Revise/Update Monitoring  
Program



# Data analysis: a computer and a wild 'do...



# 12 Steps to MEP

Rinse with Rain Water  
and Repeat



# Why This Approach is Superior to Broadly-Based Numeric Limits:

- Targets Pollutants Most Likely to Be Impacting Receiving Water Health /Beneficial Uses
- Effectively/Efficiently Addresses Local Conditions

[Environmental Groups' Proposed Approach Does Neither; Treats All Dischargers the Same, with Same Limits for Generic Set of Pollutants]



# Enforceability is An Issue, But:

- TMDLs Address the Most Glaring Issues
  - Focused MEP Approach is Most Effective Way to Meet Allocations
- Where Persistent Receiving Water Impacts Occur and for Pollutants/Watersheds Where Stormwater Runoff is a Significant Contributor, Focused MEP Approach Will Provide Increasing Improvements Over Time
- Where Progress Is Insufficient/When All Else Fails – Numeric Effluent Limits as Regulatory Hammer?



# Lessons Learned/ Recommendations (I):

What the Environmental Groups (and others) Think Matters:

- Accept them as part of your constituency
- Don't leave this task to the Water Board (analogous to stakeholder-driven watershed approach)



# Lessons Learned/ Recommendations (II):

## Take Initiative with Water Board/Permit Process:

- Demand better, more interactive working with Water Board staff
- Insist on joint annual review/revision of Monitoring/Reporting Program *and* SWMP/SQIP implementation
- Use 5-Year Permit as *less prescriptive* template/framework



# Lessons Learned/ Recommendations (III):

## Create Lean, Focused Monitoring Program:

- Develop TP/POC List
- Design Monitoring Program to answer specific questions
- Integrate monitoring results with Management Program planning
- If it doesn't benefit SWMP/SQIP efforts to control a specific POC/TP, don't waste money on it



# Contact Information

## Armand Ruby Consulting

*New Address:*

4705 Jewel Street, Capitola, CA 95010

*New Phone:*

831-477-1214

*Same e-mail:*

armand@armandruby.com

