Reasonable Assurance Analyses in Los Angeles and San Diego

Stephen Carter, PE

Huub Cox, PhD, PE
Los Angeles County MS4 Permit
• Incorporates WLAs associated with all TMDLs
• Watershed Management Programs
  ▪ Report of BMPs to meet WLAs and address 303(d) impairments
  ▪ Reasonable Assurance Analysis (RAA) – modeling (WMMS, SBPAT, or HSPF) to demonstrate that BMPs will result in compliance

San Diego Regional MS4 Permit
• Incorporates WLAs associated with all TMDLs
• Watershed Management Programs
  ▪ Report of BMPs to meet WLAs
  ▪ No guidance on models
RAA Guidelines

- Los Angeles: RAA methods driven by Regional Board guidelines
  - Critical conditions
  - Metrics for calibration
  - Ranges for model parameters
  - etc.
- San Diego: No guidelines developed
Watershed Management Modeling System (WMMS)

LSPC
- **Data**
  - Real Rainfall
  - Stream Gages
  - Monitoring
  - Land Use
  - Elevation
  - Slopes
  - Evaporation
  - Infiltration
  - Reservoirs
  - Spreading Grounds

Watershed Model

Results
- Runoff
- Metals
- TSS
- Nutrients
- Bacteria

SUSTAIN
- "BMP Selection Tool"

Large Scale BMP Results

REGIONAL OPTIMIZATION

Subwatershed BMP Results
LSPC Calibration

Precipitation (in.)
- Observed: Brea Creek below Brea Dam, near Fullerton, CA
- Modeled Streamflow

Streamflow (cfs)

Precipitation (in.)

Normalized Streamflow (in.)

Concentration (See Units Below)
- TSS (mg/L)
- TCu (ug/L)
- TPb (ug/L)
- Tzn (ug/L)

Total Zinc (lbs/day)

Flow Exceedance Percentile (%)
Structural BMP Processes

- **Distributed BMPs**
  - Green streets
  - LID on parcels
  - Residential programs

- **Regional BMPs**
  - Infiltration basins
  - Detention basins
  - Regional wetlands
BMP sizing is important
**RAA Process**

**Numeric Goals**
- Water Quality Priorities
- 85th Percentile Storm
- Baseline Loading

**BMP Opportunities**
- Committed ($\Delta$, $\$)
- Proposed ($\Delta$, $\$)
- Possible ($\Delta$, $\$)

**Compliance Points**
- EWMP Area
- Receiving Waters
- Jurisdictions

**BMPs over Time**
- Attain Milestones
- Capital + O&M ($\$)

**Adaptive Mgmt:**
- Assess Milestones
- Incorporate CIMP Data
- Modify as Needed

**Reasonable Assurance Analysis**

1. **Gather Data and Assess Priorities**
2. **Evaluate BMP Opportunities**
3. **Refine Required Load Reductions ($\Delta$, $\$)**
4. **Identify Compliance Points**
5. **Monitor BMPs over Time**
6. **Adapt and Refine Management**
7. **Check Progress**
8. **Revise or Refine Approach to Achieve Numeric Goals**

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**Use cost-effectiveness ($\$) to guide BMP selection**
BMP Planning

- Institutional BMPs
- Regional BMPs on Public Parcels
- Distributed BMPs on Public Parcels or Rights-of-Way
- Distributed BMPs on Private Parcels
- Private Regional BMPs

Load Reduction vs. BMPs over Space & Time
Lower LA River: Load Reduction Targets

* Organics managed through metals and associated sediment reductions. Cu not limiting after brake pad reductions.
Cost-effectiveness curve

Solution that meets target at the lowest implementation cost

All possible BMP combinations

Walnut Creek (Unincorporated County)
**Streets Ordinance**

**Planned LID**

**Public LID**

**Residential LID**

**Green Streets, All Components**

<table>
<thead>
<tr>
<th>Subwatershed ID</th>
<th>% Load Reduction</th>
<th>Critical Condition</th>
<th>Total BMP Capacity (acre-ft)</th>
<th>Low-Impact Development</th>
<th>Streets</th>
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**COMPLIANCE TARGETS:**

**MEASURABLE AND ENFORCEABLE BMP GOAL**

**EWMP IMPLEMENTATION PLAN:**

**APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT**

(BMP capacity expressed in units of acre-feet)

**Regional BMPs**

1st: Use cost-optimization to identify BMP solutions to achieve a wide range of percent pollutant load reductions for each jurisdiction and each assessment area/watershed.

2nd: Determine equitable % pollutant load reduction needed for each jurisdiction that will result in RWL attainment (and validate).

3rd: Extract the optimized BMP solution for the required % load reduction, and it becomes the RAA output and EWMP implementation plan.

**RED = Subwatersheds with highest required % load reductions**

**BLUE = Subwatersheds with highest BMP capacities within a BMP category**
Spatial Representation for each Jurisdiction
### Compliance with Milestones

#### Table 7A-2. Beverly Hills, Ballona Creek: RAA Output and EWMP Implementation Plan

<table>
<thead>
<tr>
<th>Subwatershed ID</th>
<th>For Metals by 2021</th>
<th>For Bacteria by 2021</th>
<th>% Load Reduction Critical Condition</th>
<th>Low-Impact Development</th>
<th>Streets</th>
<th>Regional BMPs</th>
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<td>24-hour Volume Managed (acre-ft)</td>
<td>Additional 24-hour Managed (acre-ft)</td>
<td>Ordonance Planned LID Public LID Residential LID Green Streets Very High (public-owned) High (public-owned) Medium (public-owned) Non-owned Private Total BMP Capacity (acre-ft) Regional BMPs Cumulative BMPs (acre-ft)</td>
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WMP Reporting and Planning Tool (Home Page)

- Click on project location, tool connects to database of rainfall/storm information
- Can report completed projects, OR help plan new projects

For selected location, weather and waterbody information determined

Selected project location
WMP Reporting and Planning Tool (Reporting Page)

- Users specify project information (dimensions, land uses, etc.)
- Tool generates stormwater capture volume estimates in different units

Many different BMP types

Drainage area information

Stormwater capture volumes and rainfall and peak flow information
WMP Reporting and Planning Tool (Dashboard)

• Track overall BMP implementation
• Each jurisdiction would have a dashboard to track progress
• Connects planning to reporting
• Can generate forms for annual reporting by Groups
City of Los Angeles Enhanced Watershed Management Plans

- Watersheds: 4
- Consultant teams: 3
- Partner agencies: 30
- Stakeholders: many

-> Agree on overall strategy early on
-> Coordinate and communicate
Project Schedule

- Nov/12: Permit Adoption
- Dec 2012:
- Nov/13: EWMP Kick-off
- Oct 2013:
- Jun/14: EWMP Work Plan
- Jun 2014:
- Mar/15: EWMP Workshop #3
- Mar 2015:
- Notice of Intent Jun/13
- Apr 2014:
- EWMP Workshop #1 Apr/14
- Apr 2014:
- EWMP Workshop #2 Nov/14
- Nov 2014:
- Submit draft EWMP Jun/15
- Jun 2015:
- Approval of EWMP Apr 2016
- Apr 2016:
- Implementation
Open Communication with Regional Board Staff is Key

• Early meetings with Regional Board staff to discuss expectations of the EWMPs
  ▪ *Buy-in on methods for reporting “recipes of compliance”*
  ▪ *Discussion of modeling approaches*
• Active in working with Regional Board staff to establish RAA Guidelines
• First trial run of alternative compliance pathway requires partnership of Regional Board staff and permittees to demonstrate that it will work
• Regional Board staff understand the challenges and are highly supportive of approaches used
Several Meetings Required to Coordinate With Permittees, the Regional Board, and the Public

• Technical Advisory Committee Meetings to coordinate separate EWMPs
  ▪ Reasonable Assurance Analysis
  ▪ Coordinated Integrated Monitoring Program

• Public participation process
• Monthly Watershed Management Group meetings
• Internal City briefings
Challenges in Planning EWMP Implementation

- EWMP “recipes for compliance” essential for meeting permit requirements
  - BMP volumes to meet reduction targets over time
  - Specific to BMP categories and each jurisdiction
- Additional work needed to convert results to Capital Improvement Plans
  - Individual project costs and schedules for each phase (e.g., planning, design, construction) by FY
  - Holistic city-wide list of projects to justify increased funding needs
- Funding needs to meet first interim milestones
## EWMP Implementation Cost

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<tr>
<th>Watershed</th>
<th>Capital cost</th>
<th>Final milestone</th>
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<td>Marina del Rey</td>
<td>$252 million</td>
<td>2021</td>
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Converting the EWMP to a CIP

CIP list of projects that maximizes runoff capture per dollar and integrates with other public works projects

Scenarios of time to implement EWMP based on available funding

Signature Project - La Cienega Park/Frank Fenton Field
- City costs for project phases distributed over early FYs (planning, design, construction)

Other Regional Projects
- Identify High and Medium tier projects
- Determine drainage areas and BMPs
- Develop cost and schedule over FYs
- Co-locate if possible with other City projects

Green Streets & LID
- Co-locate with other City projects
- Develop costs and schedule for unit green street (e.g., 200’ for City block)
- Identify several areas where green streets could be most effective