

# Reasonable Assurance Analyses in Los Angeles and San Diego

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## Los Angeles County MS4 Permit

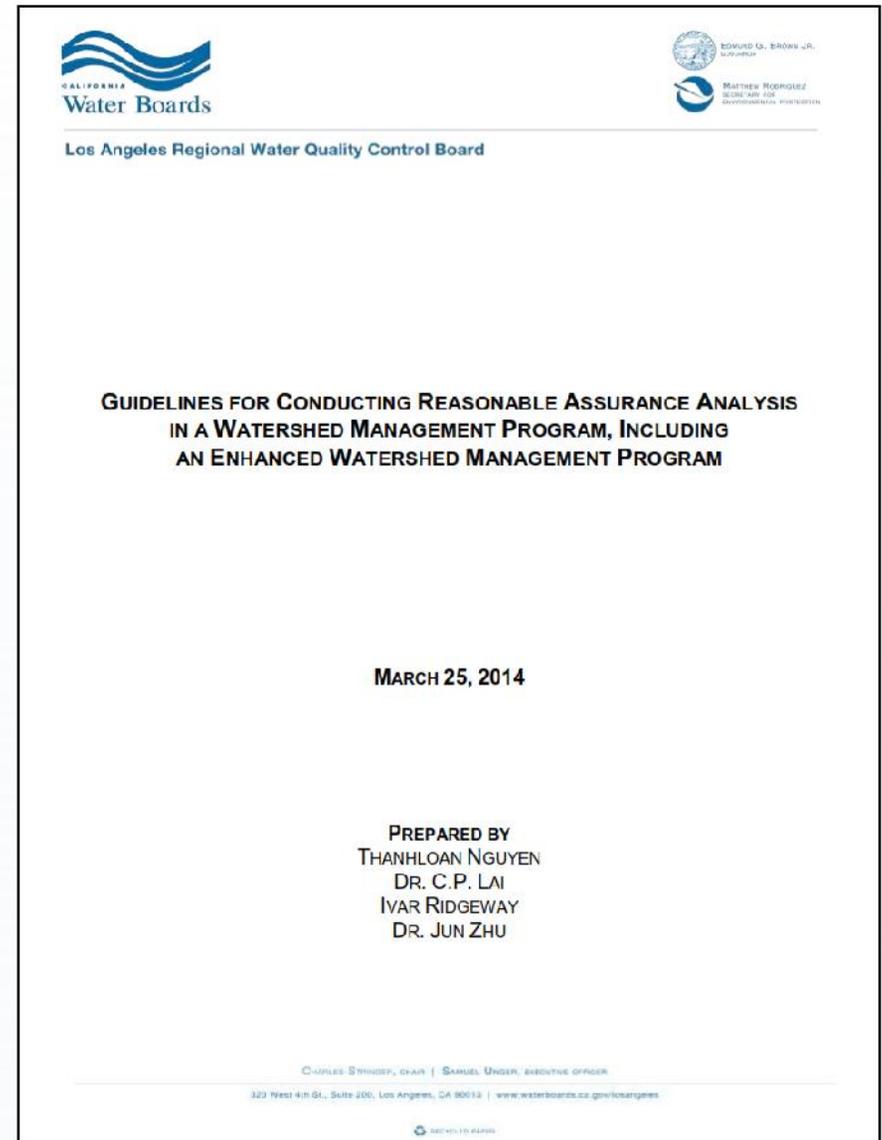
- Incorporates WLAs associated with all TMDLs
- Watershed Management Programs
  - Report of BMPs to meet WLAs and address 303(d) impairments
  - Reasonable Assurance Analysis (RAA) – modeling (WMMS, SBPAT, or HSPF) to demonstrate that BMPs will result in compliance

## San Diego Regional MS4 Permit

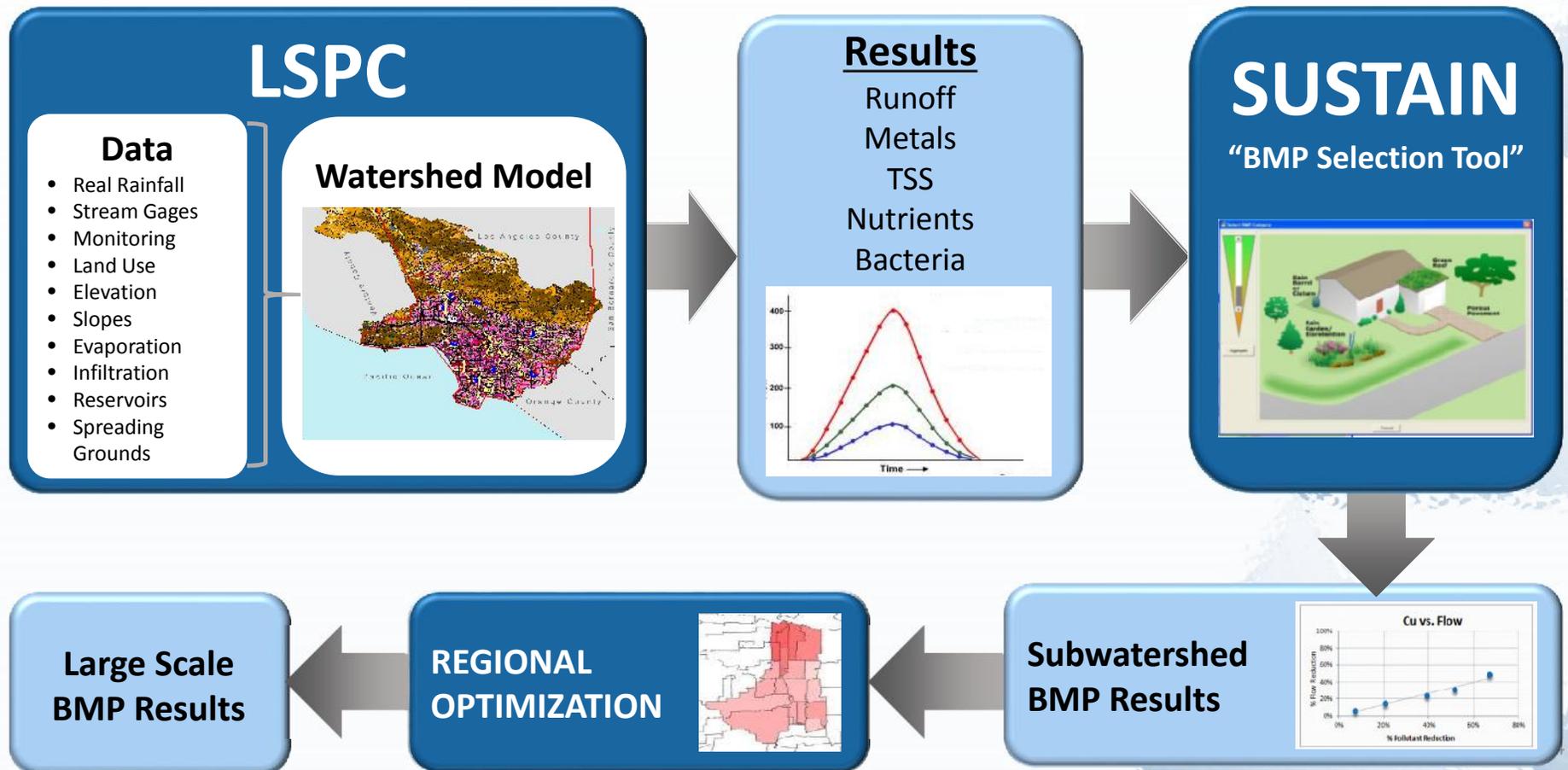
- Incorporates WLAs associated with all TMDLs
- Watershed Management Programs
  - Report of BMPs to meet WLAs
  - No guidance on models

# RAA Guidelines

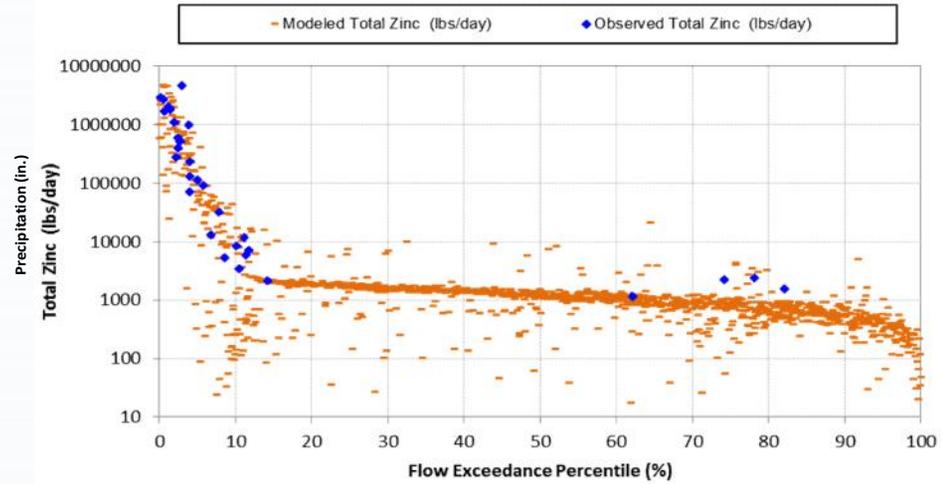
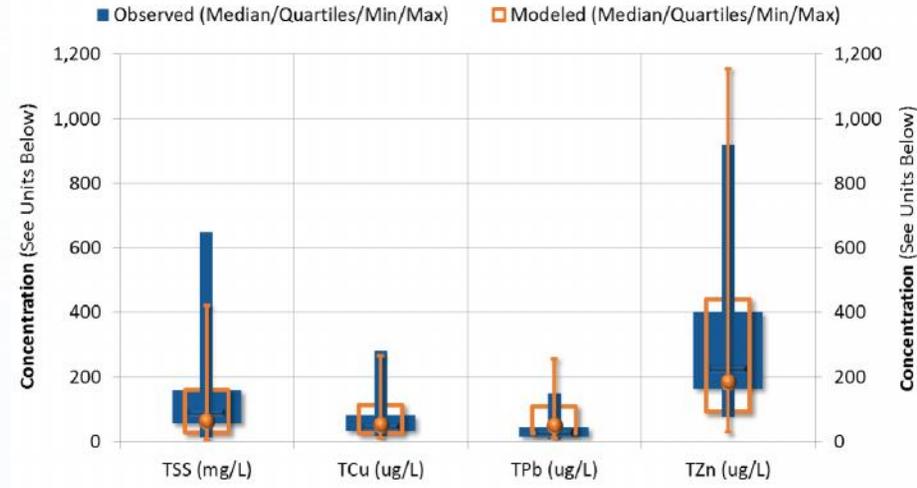
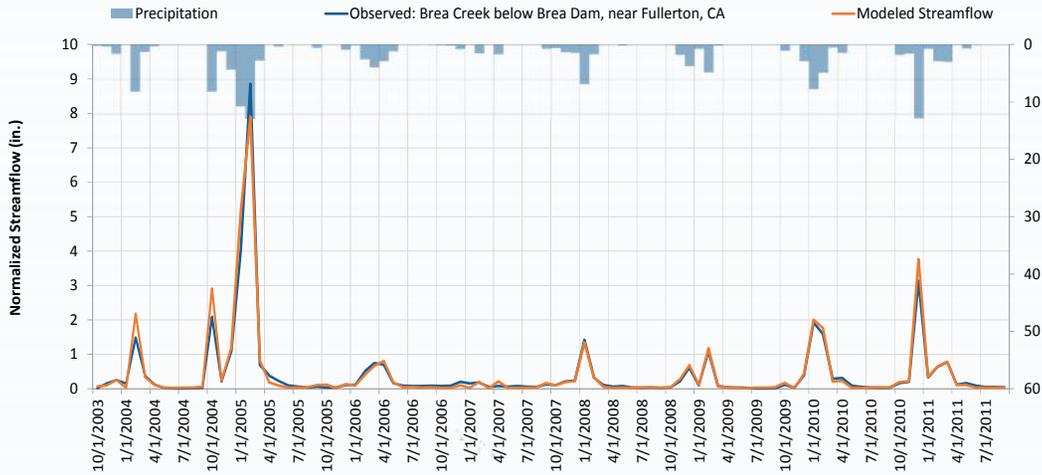
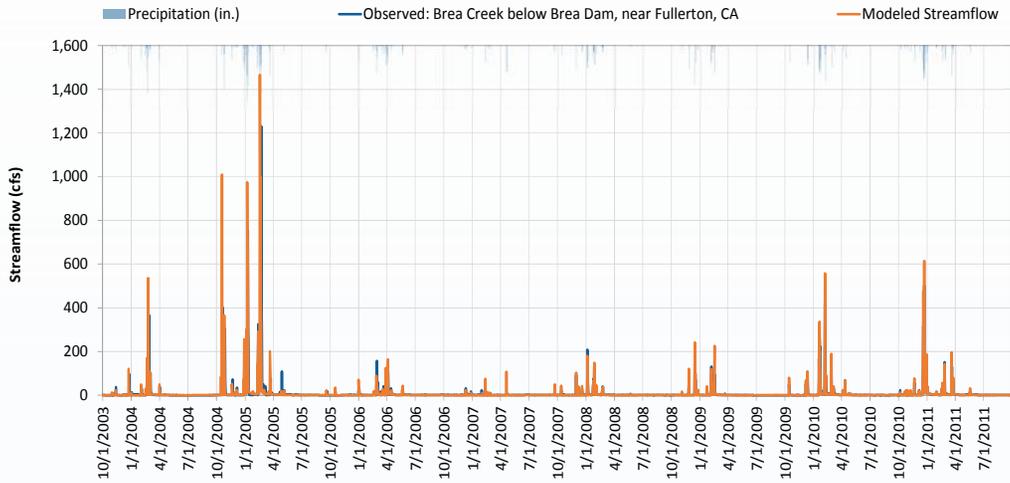
- Los Angeles: RAA methods driven by Regional Board guidelines
  - Critical conditions
  - Metrics for calibration
  - Ranges for model parameters
  - etc.
- San Diego: No guidelines developed



# Watershed Management Modeling System (WMMS)

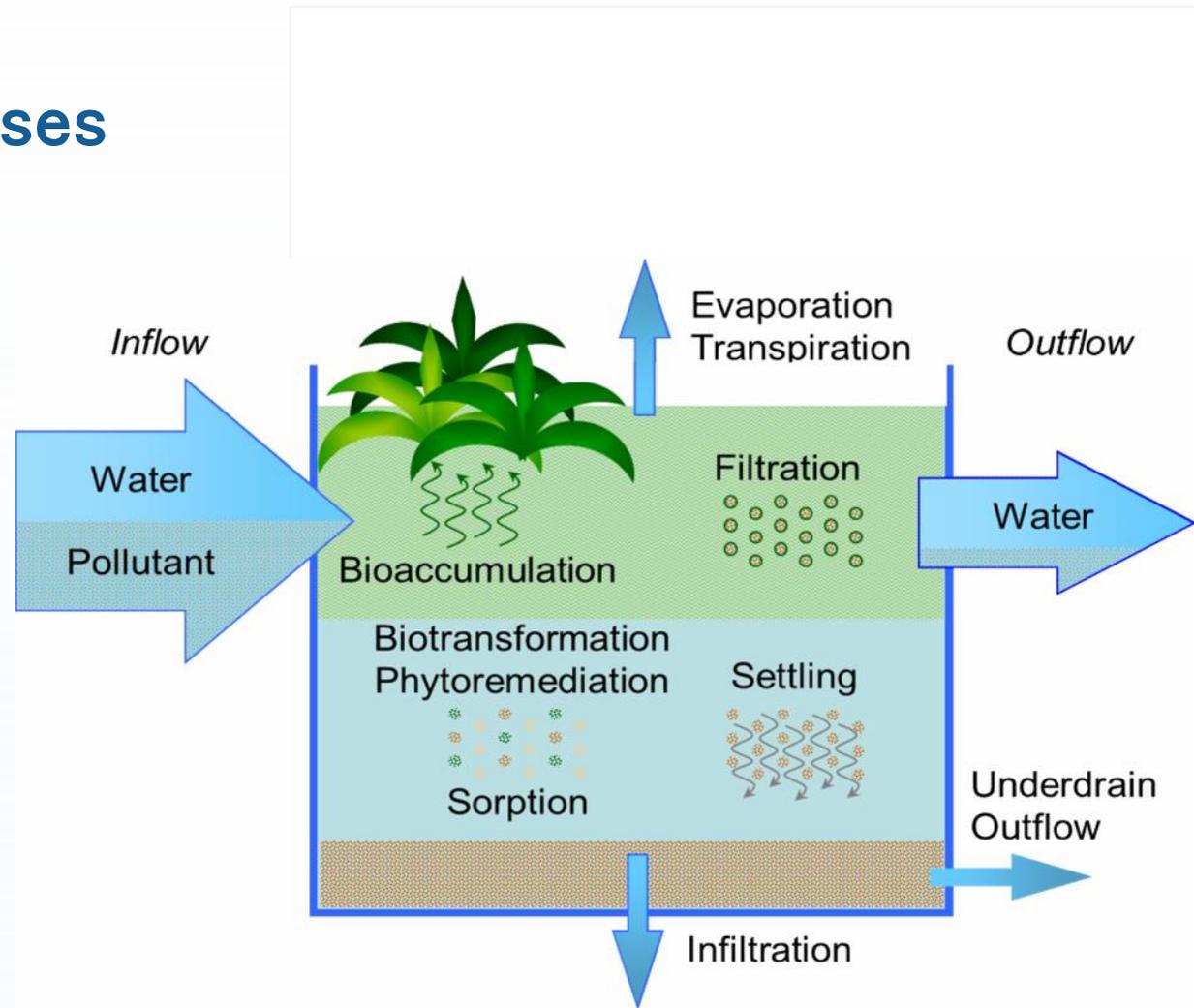


# LSPC Calibration

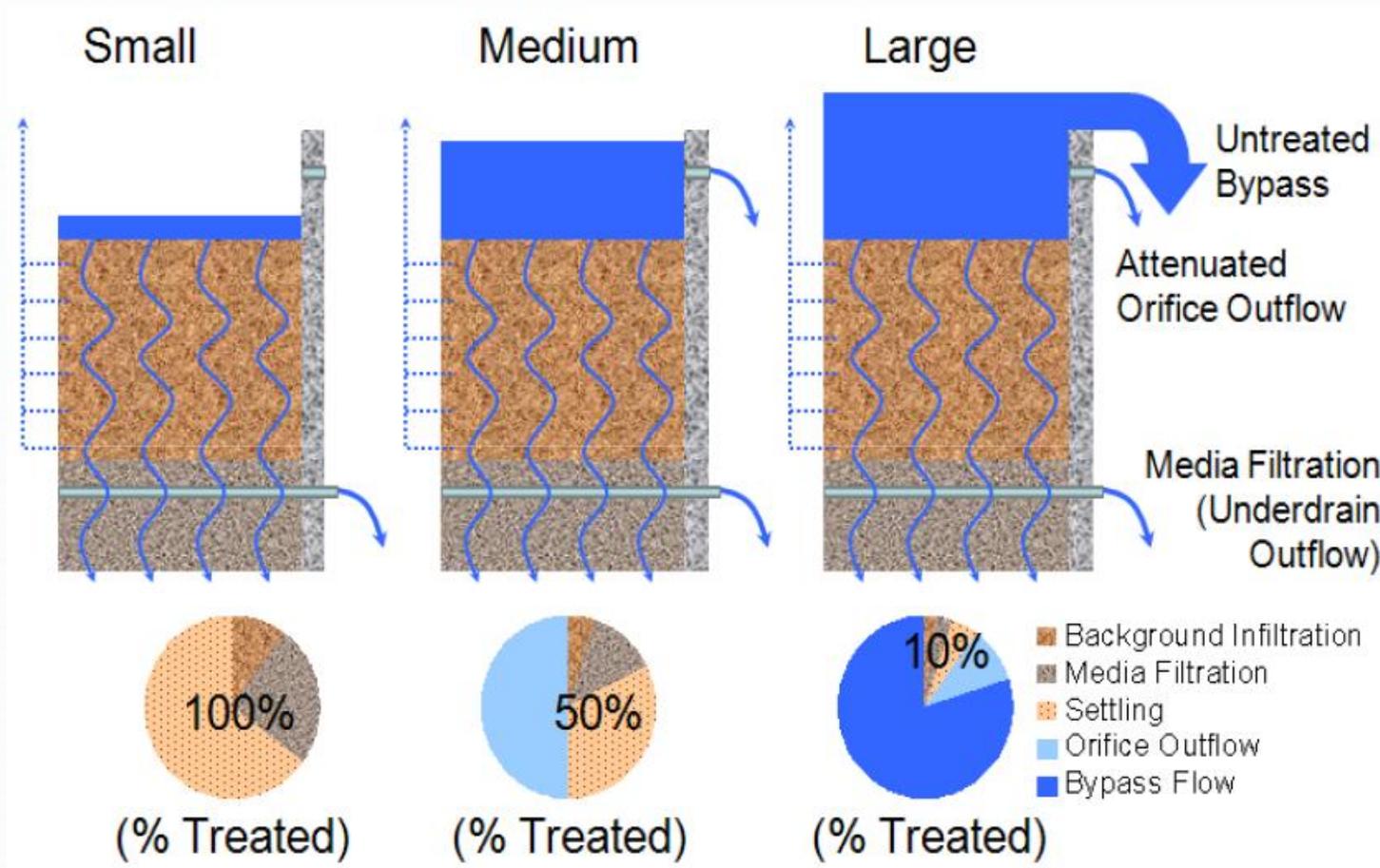


# Structural BMP Processes

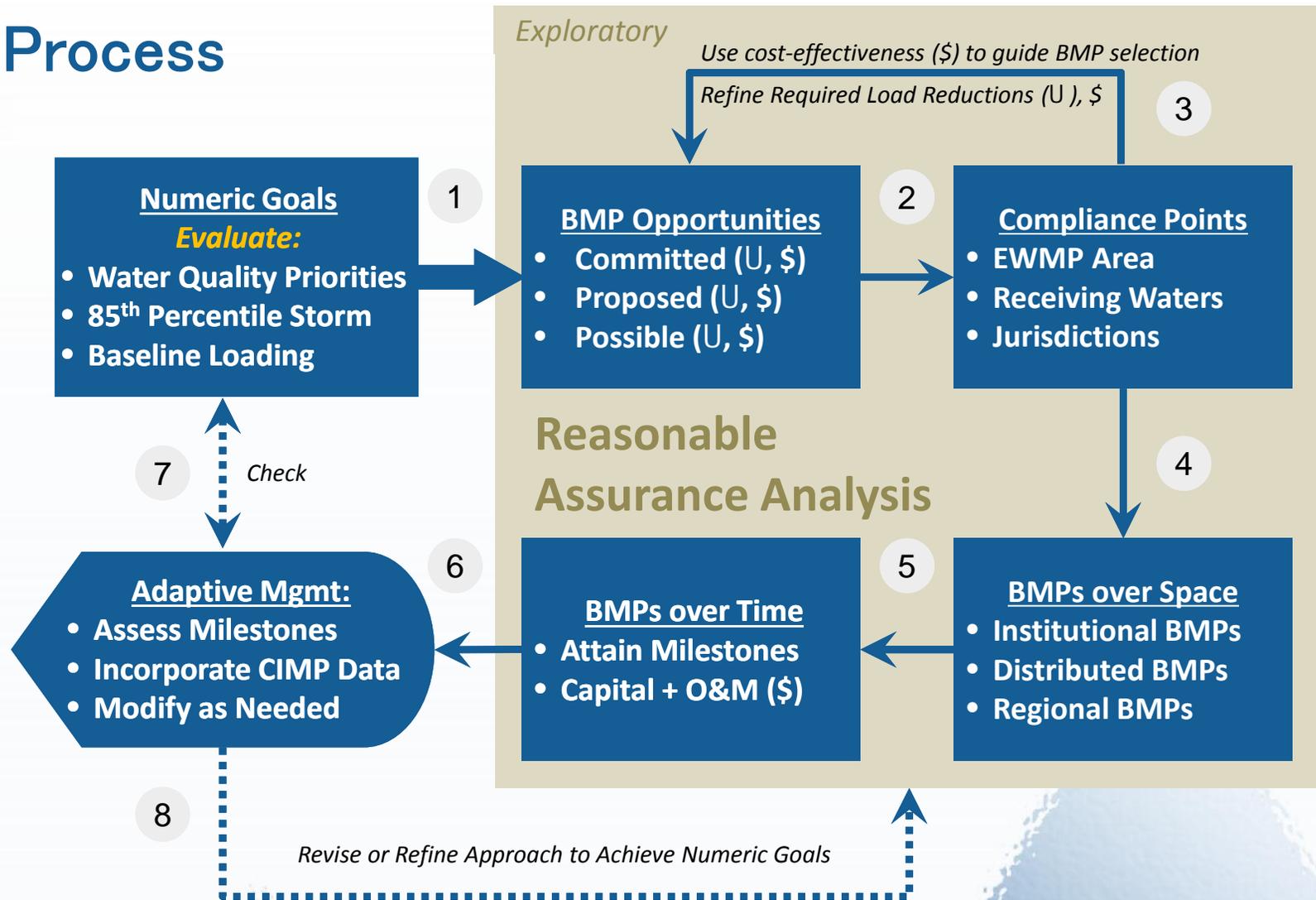
- Distributed BMPs
  - Green streets
  - LID on parcels
  - Residential programs
- Regional BMPs
  - Infiltration basins
  - Detention basins
  - Regional wetlands



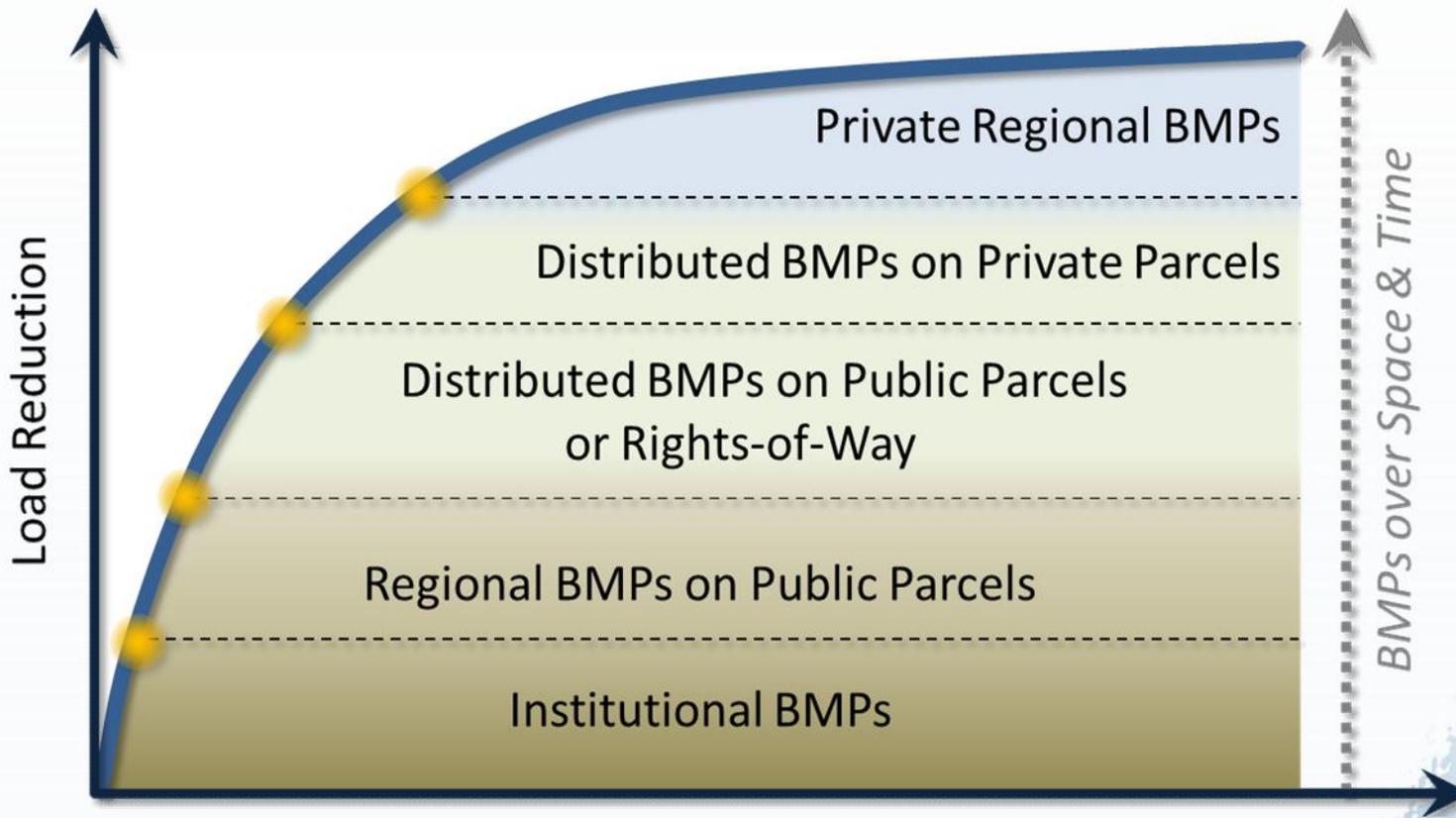
# BMP sizing is important



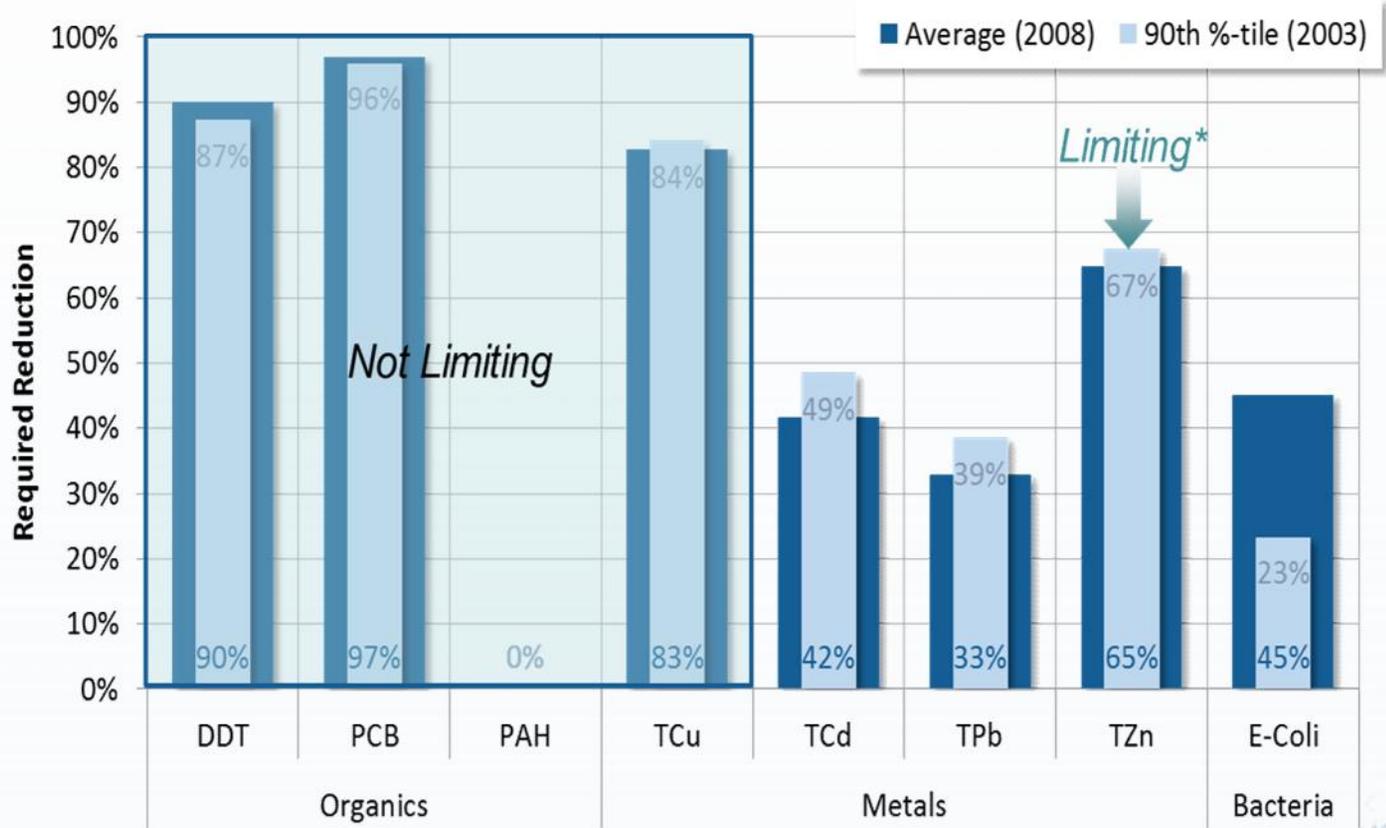
# RAA Process



# BMP Planning

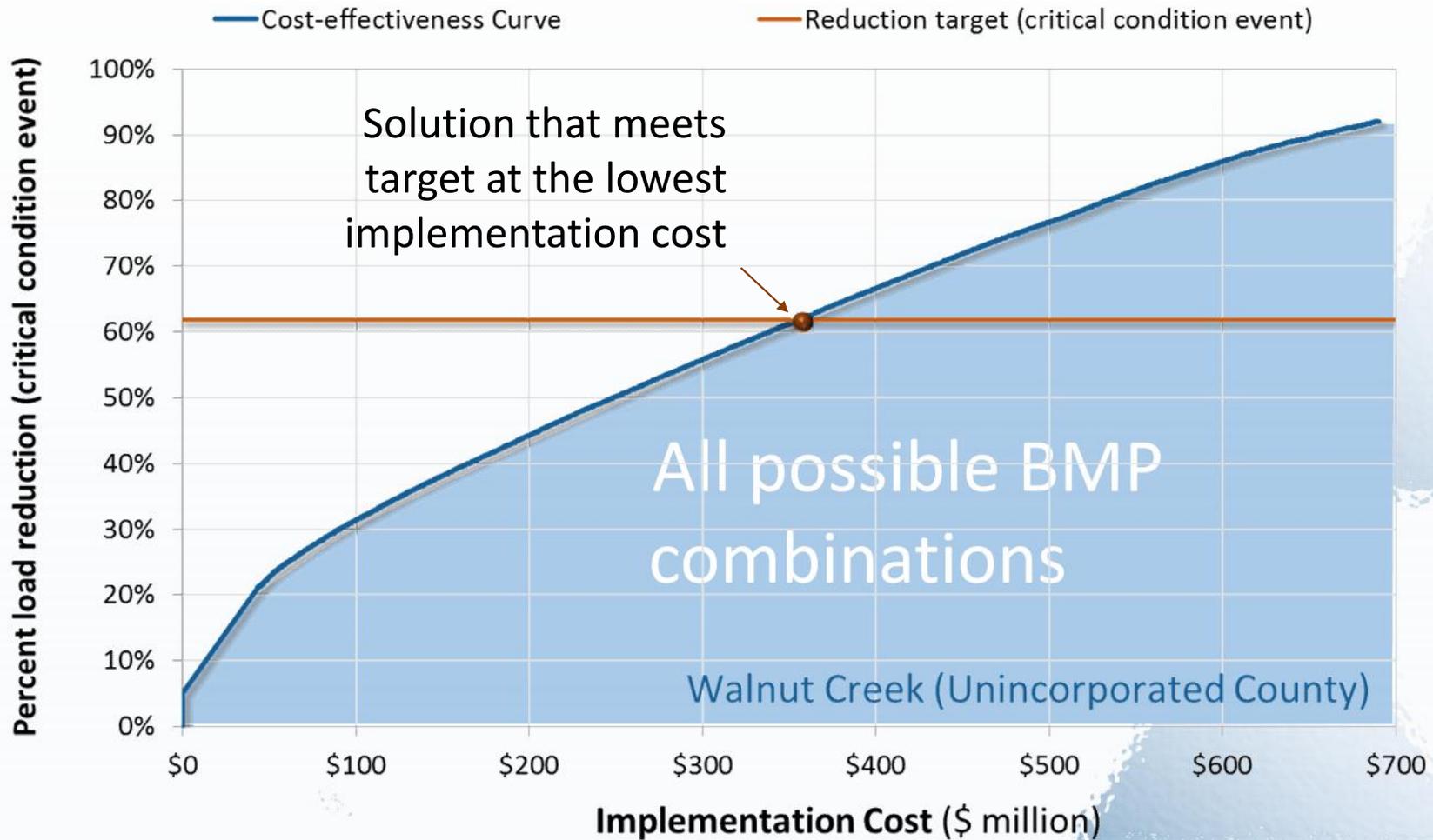


# Lower LA River: Load Reduction Targets

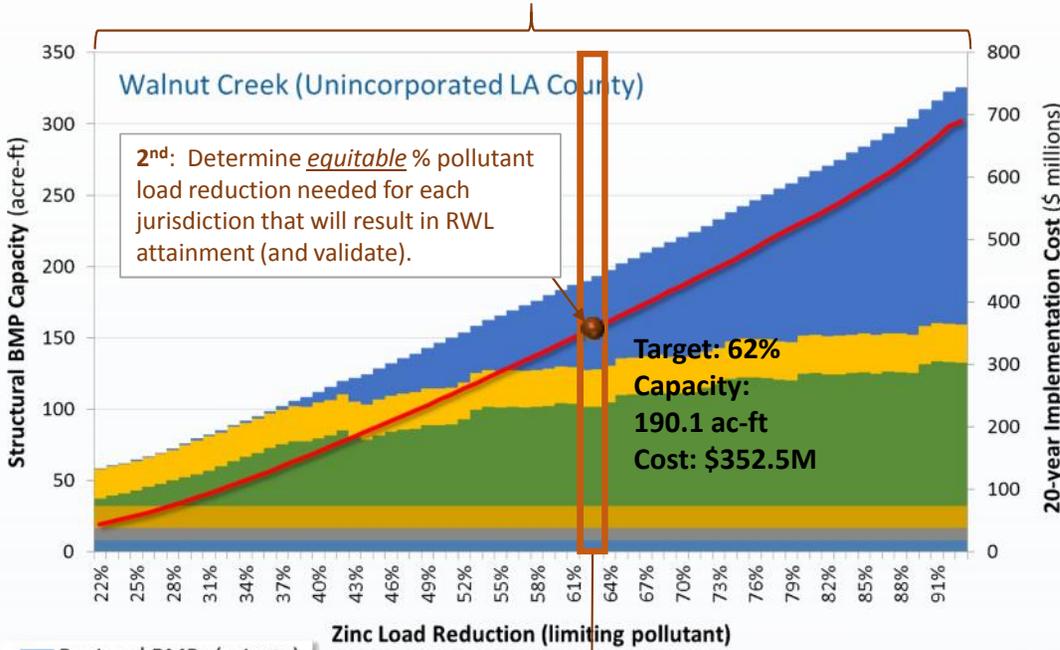


\* Organics managed through metals and associated sediment reductions. Cu not limiting after brake pad reductions.

# Cost-effectiveness curve



1<sup>st</sup>: 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.



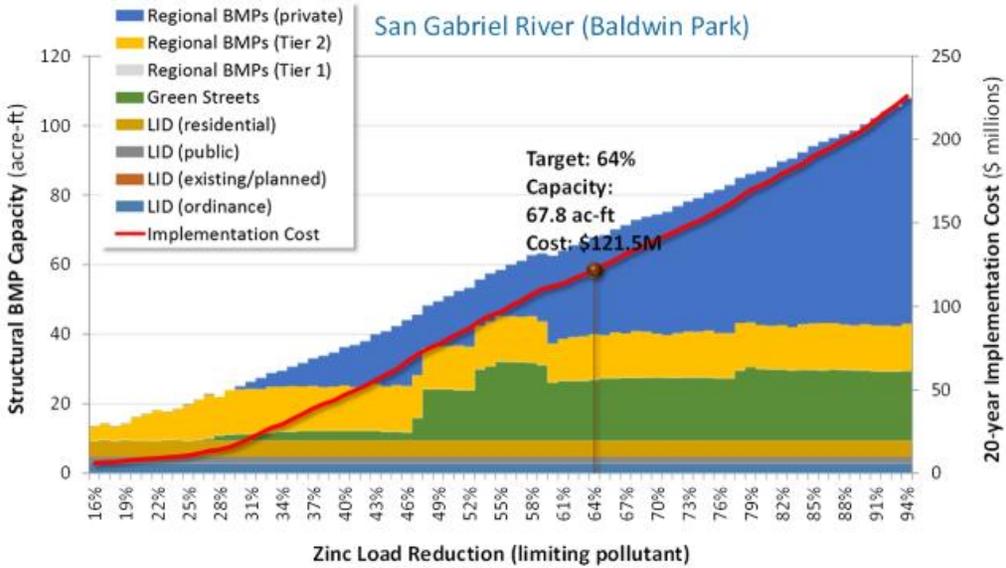
- Regional BMPs (private)
- Regional BMPs (Tier 2)
- Regional BMPs (Tier 1)
- Green Streets
- LID (residential)
- LID (public)
- LID (existing/planned)
- LID (ordinance)
- Implementation Cost

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

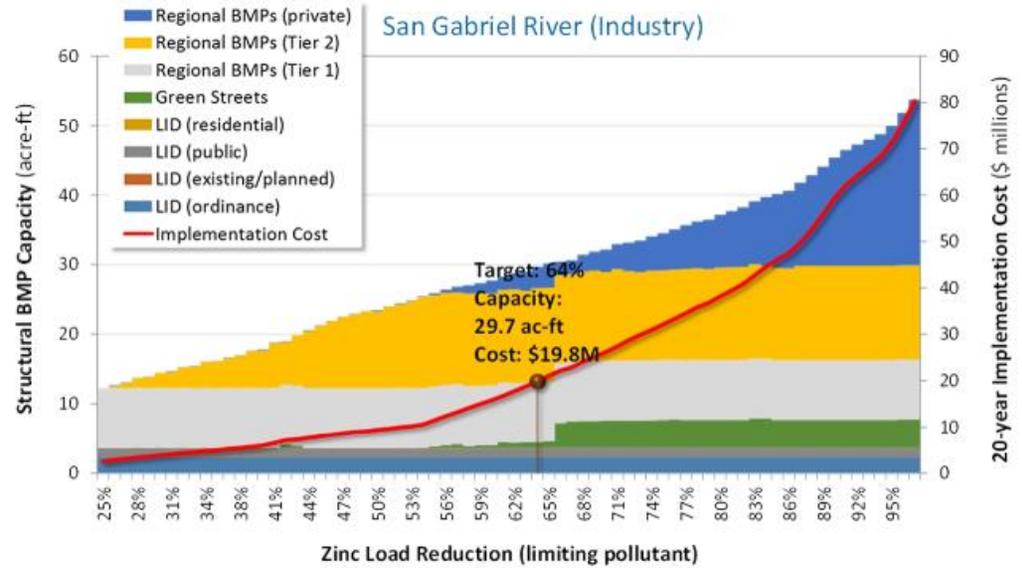
Subwatershed ID	COMPLIANCE TARGETS: MEASURABLE AND ENFORCEABLE BMP GOAL		EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT (BMP capacity expressed in units of acre-feet)							
	% Load Reduction Critical Condition	Total BMP Capacity (acre-ft)	Low-Impact Development				Streets	Regional BMPs		
			Ordinance	Planned LID	Public LID	Residential LID	Green Streets, All Components	Regional BMPs, Tier 1	Regional BMPs, Tier 2	Private Regional BMPs
536083	83%	6.8	0.28	---	0.75	0.37	0.01	0.00	1.10	4.25
536283	31%	0.6	0.02	---	0.06	0.01	0.00	0.00	0.55	0.00
536383	99%	1.3	0.26	---	---	---	1.00	0.00	0.00	0.00
536483	29%	14.9	1.05	---	0.20	2.16	1.43	0.00	10.05	0.00
536683	88%	5.5	0.32	---	---	0.02	1.47	0.00	3.66	0.00
536783	89%	1.1	0.05	---	---	0.02	0.03	0.00	0.45	0.59
537183	100%	0.4	0.02	---	---	0.08	0.33	0.00	0.00	0.00
537683	11%	1.4	0.04	---	---	0.19	1.01	0.00	0.00	0.14
538483	24%	0.0	0.01	---	---	0.00	0.01	0.00	0.00	0.01
...	...	...	...	...	...	...	...	...	...	...
546883	99%	0.6	0.01	---	---	0.03	0.00	0.00	0.00	0.51
546983	8%	5.4	0.16	---	0.02	0.17	0.00	0.00	0.00	5.04
547283	29%	18.9	0.35	0.00	---	0.97	12.27	0.00	0.00	5.31
548483	17%	0.4	0.17	---	---	0.22	0.06	0.00	0.00	0.00
548583	78%	4.3	0.46	---	0.85	0.85	0.43	0.00	0.00	1.68
548683	82%	0.0	0.01	---	---	---	0.00	0.00	0.00	0.00
548783	13%	0.1	0.05	---	---	---	0.00	0.00	0.00	0.00
548883	5%	0.0	---	---	---	---	0.00	0.00	0.00	0.00
548983	7%	0.0	0.01	---	---	---	0.00	0.00	0.00	0.00
570183	5%	0.0	---	---	---	---	0.00	0.00	0.00	0.00
<b>Total</b>	<b>62%</b>	<b>190.1</b>	<b>8.1</b>	<b>0.2</b>	<b>8.7</b>	<b>15.2</b>	<b>69.4</b>	<b>0.0</b>	<b>25.7</b>	<b>62.7</b>

RED = Subwatersheds with highest required % load reductions  
 BLUE = Subwatersheds with highest BMP capacities within a BMP category

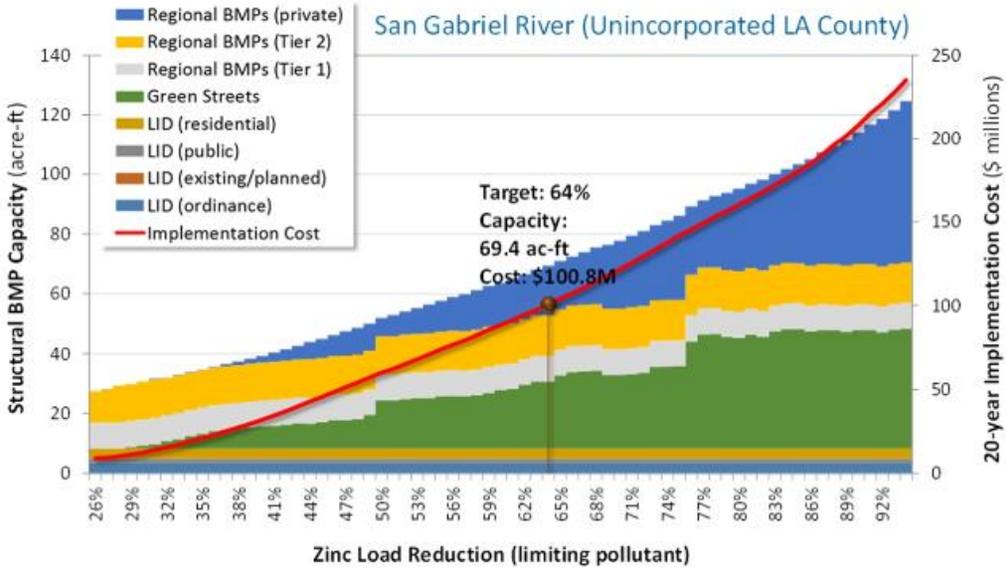
San Gabriel River (Baldwin Park)



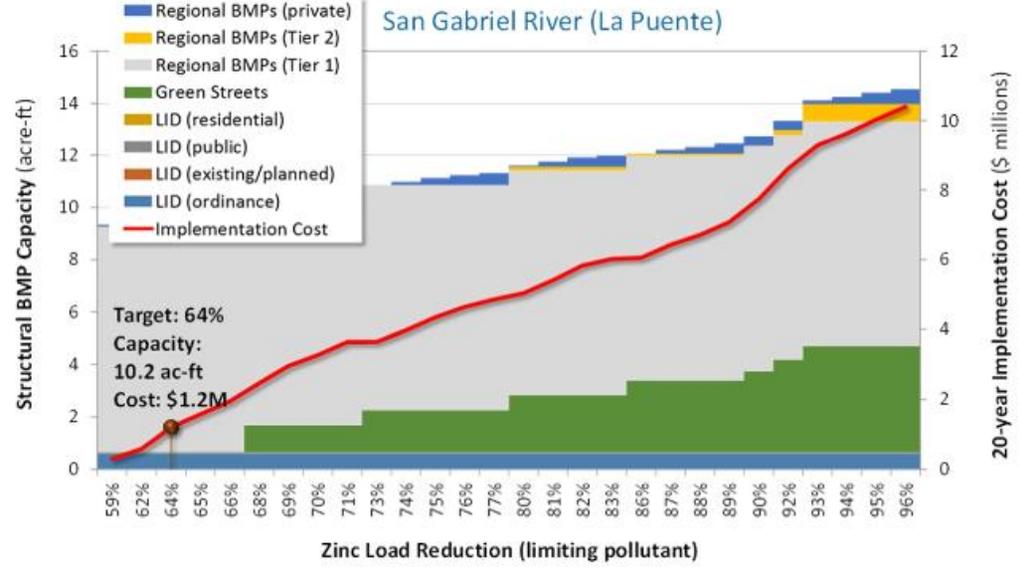
San Gabriel River (Industry)



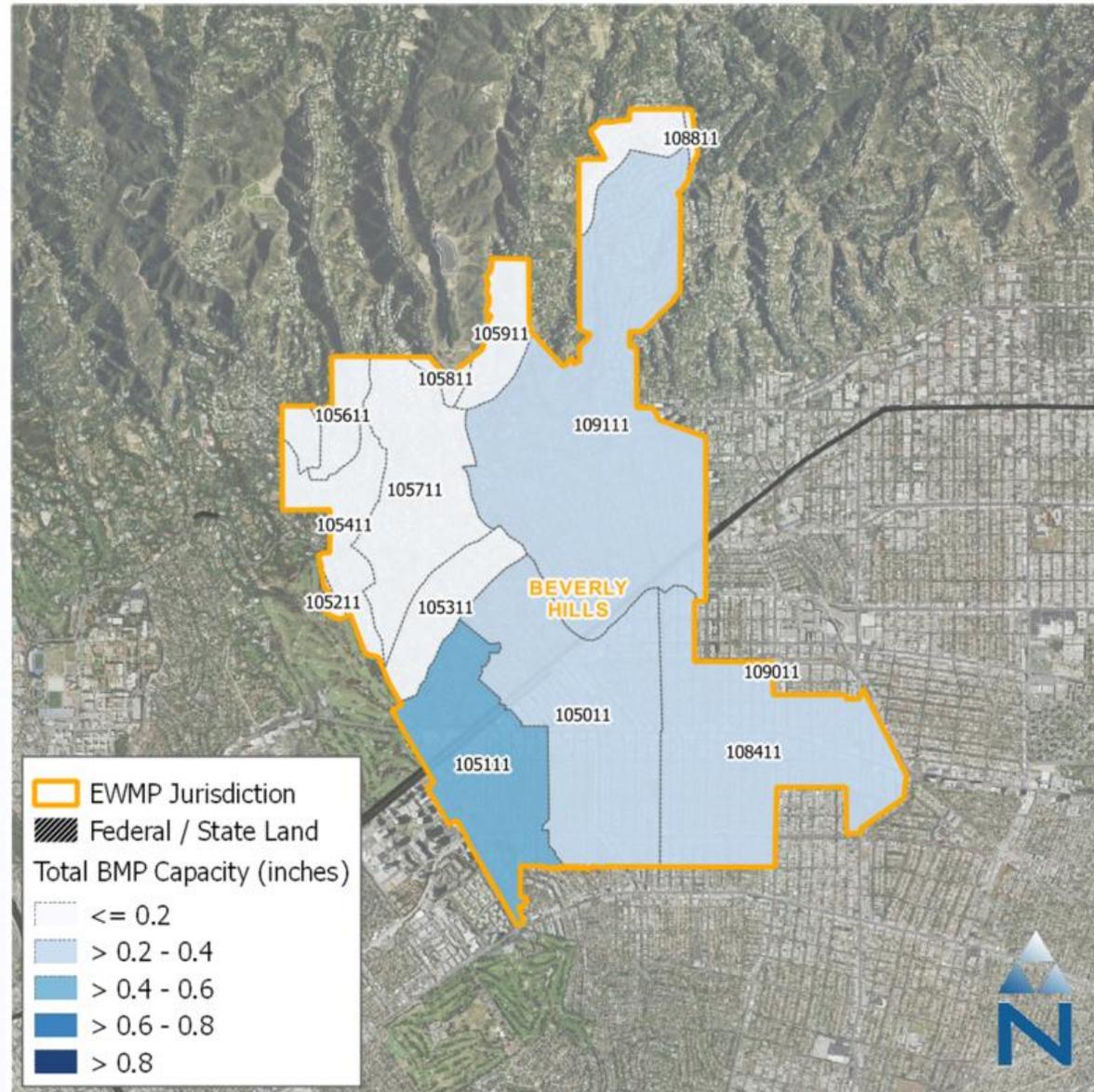
San Gabriel River (Unincorporated LA County)



San Gabriel River (La Puente)



# Spatial Representation for each Jurisdiction



# Compliance with Milestones

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

Subwatershed ID	COMPLIANCE TARGETS: BMP PERFORMANCE GOAL		EWMP IMPLEMENTATION PLAN: APPROACH TO ACHIEVE COMPLIANCE TARGETS, SUBJECT TO ADAPTIVE MANAGEMENT (BMP capacity expressed in units of acre-feet)												
	For Metals by 2021	For Bacteria by 2021	For Metals Attainment by 2021											For Bacteria Attainment by 2021	
	24-hour Volume Managed (acre-ft)	Additional 24-hour Volume Managed (acre-ft)	% Load Reduction Critical Condition	Low-Impact Development				Streets	Regional BMPs				Total BMP Capacity (acre-ft)	Regional BMPs (private)	Cumulative BMP Capacity for both Metals and Bacteria (acre-ft)
			Ordinance	Planned LID	Public LID	Residential LID	Green Streets	Very High (public, owned)	High (public, owned)	Medium (public, non-owned)	Private				
105011	19.86	3.94	58%	0.29	---	2.29	0.44	15.86	---	---	---	---	18.9	3.94	22.8
105111	18.62	---	90%	0.19	---	1.08	0.33	8.13	---	---	---	6.95	16.7	---	16.7
105211	0.00	0.02	5%	0.00	---	---	---	---	---	---	---	---	0.0	0.02	0.0
105311	1.14	0.25	48%	0.07	---	0.02	0.19	0.86	---	---	---	---	1.1	0.25	1.4
105411	0.55	0.31	37%	0.09	---	0.07	0.03	0.42	---	---	---	---	0.6	0.31	0.9
105511	0.00	0.07	6%	0.02	---	0.00	0.02	---	---	---	---	---	0.0	0.07	0.1
105611	0.27	0.13	37%	0.04	---	---	0.03	0.19	---	---	---	---	0.3	0.13	0.4
105711	0.24	1.32	6%	0.20	---	0.41	0.10	---	---	---	---	---	0.7	1.32	2.0
105811	0.05	0.02	21%	0.01	---	0.11	0.01	0.00	---	---	---	---	0.1	0.02	0.1
105911	0.14	0.57	7%	0.08	0.00	0.17	0.19	---	---	---	---	---	0.4	0.57	1.0
106011	0.00	0.00	5%	0.00	---	---	---	---	---	---	---	---	0.0	0.00	0.0
108411	27.48	0.95	84%	0.29	---	1.18	0.51	8.96	2.80	---	---	---	13.7	0.95	14.7
108811	0.04	0.00	53%	0.00	---	---	0.01	0.04	0.02	---	0.00	0.00	0.1	0.00	0.1
109011	0.00	0.00	63%	0.00	---	---	---	0.00	0.00	---	---	---	0.0	0.00	0.0
109111	30.06	2.40	43%	0.53	---	0.69	0.95	4.65	17.65	---	---	---	24.5	2.40	26.9
<b>Total</b>	<b>98.5</b>	<b>10.0</b>	<b>73%</b>	<b>1.8</b>	<b>0.0</b>	<b>6.0</b>	<b>2.8</b>	<b>39.1</b>	<b>20.5</b>	<b>0.0</b>	<b>0.0</b>	<b>6.9</b>	<b>77.2</b>	<b>10.0</b>	<b>87.1</b>

# 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

EWMP Reporting and Planning Tool

Dashboard

For selected location, weather and waterbody information determined

Selected project location

**Project Information**

Subwatershed ID: 500804  
City: Artesia  
Receiving Water: Coyote Creek  
Weather Station: Los Coyotes Reclamation

**Project Name**

Streetscape Infrastructure Improvement

Plan New Project Report New Project

- OR -

**Bulk Upload**

If you have multiple projects to report, you can bulk upload them as a CSV file in a [specified format](#).

Upload New Project List

**Project List**

- Griffith Park (Planning)
- Rancho Park Golf Course (Planning)
- San Pedro Street (Reported)
- Los Angeles Hillcrest Country (Reported)
- Stone Canyon Reservoir (Planning)
- West Clarendon Reservoir (Planning)

# WMP Reporting and Planning Tool (Reporting Page)

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

The screenshot displays the EWMP Reporting and Planning Tool interface. The top navigation bar includes the tool name and a 'Dashboard' link. The main content area is divided into several sections:

- Map:** A map on the left shows the project location. Red boxes with arrows point to it, labeled 'Many different BMP types' and 'Drainage area information'.
- Project Information:** Fields for Project Name (Streetscape Infrastructure Improvement), Subwatershed ID (500804), City (Artesia), Receiving Water (Coyote Creek), and Weather Station (Los Coyotes Reclamation).
- BMP Configuration:** Fields for BMP Type (Green Street (Bioretention)), Infiltration Rate (0.4 in/hour), BMP Footprint (1.8 acres), and BMP Depth (1.5 feet).
- Drainage Areas:** Two areas are listed: Commercial (14 acres) and Secondary Roads (4 acres). Each has a 'Delete Drainage Area' button and an 'Add Drainage Area' button.
- Print Project Report:** A button to generate a report.
- Rainfall and BMP Performance Analysis:** Four tables showing performance metrics for different storm events.

The performance analysis tables are as follows:

85th Percentile Storm (24-hour)				
Total Rainfall (in)	Peak Rainfall Intensity (in/hr)	Peak Inflow (cfs)	Total Inflow (acre-ft)	Stormwater Captured (acre-ft)
1.05	2.10	14.3	1.43	0.56

Critical Zinc Storm (24-hour)				
Total Rainfall (in)	Peak Rainfall Intensity (in/hr)	Peak Inflow (cfs)	Total Inflow (acre-ft)	Stormwater Captured (acre-ft)
1.16	2.33	15.9	1.59	0.62

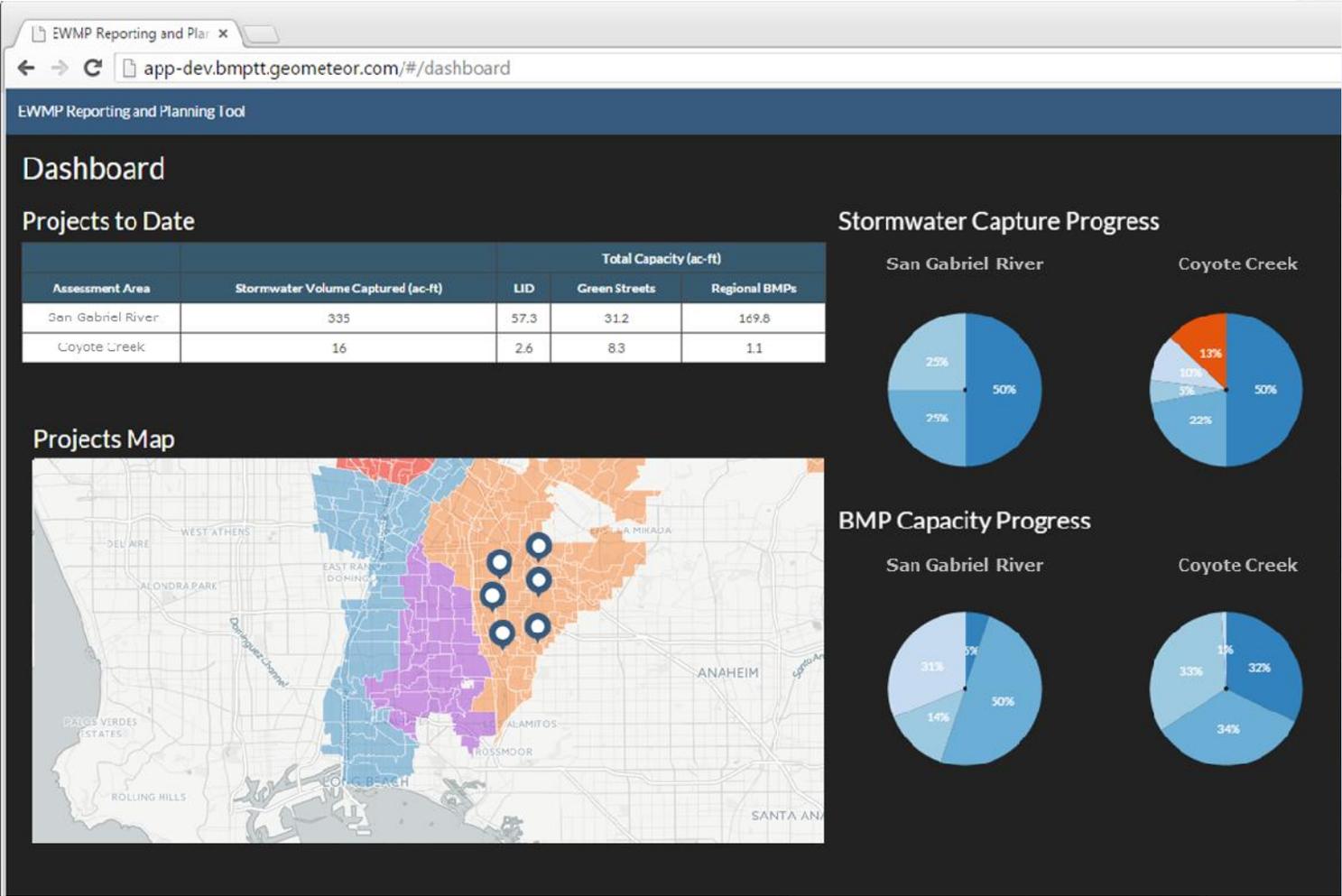
Critical Bacteria Storm (24-hour)				
Total Rainfall (in)	Peak Rainfall Intensity (in/hr)	Peak Inflow (cfs)	Total Inflow (acre-ft)	Stormwater Captured (acre-ft)
0.35	0.70	8.4	0.48	0.48

Annual Average Rainfall				
Total Rainfall (in)	Peak Rainfall Intensity (in/hr)	Peak Inflow (cfs)	Total Inflow (acre-ft)	Stormwater Captured (acre-ft)
11.7	3.45	28.4	15.9	6.18

Red arrows point from a box at the bottom labeled 'Stormwater capture volumes and rainfall and peak flow information' to the data columns in the performance analysis tables.

# WMP Reporting and Planning Tool (Dashboard)

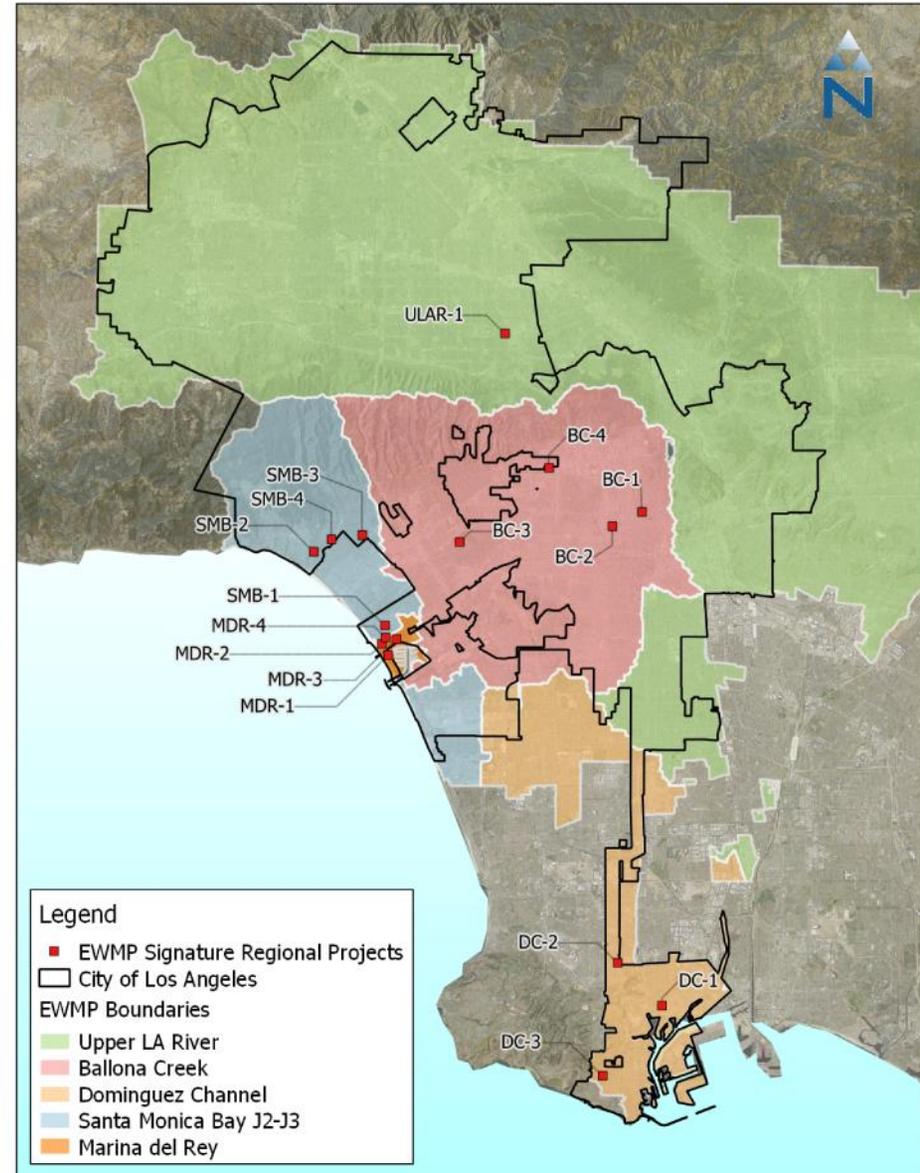
- Track overall BMP implementation
- Each jurisdiction would have a dashboard to track progress
- Connects planning to reporting
- Can generate forms for annual reporting by Groups



# 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

Nov /13  
EWMP  
Kick-off

Jun/14  
EWMP  
Work Plan

Mar/15  
EWMP  
Workshop #3

Approval  
of EWMP

Dec  
2012

Oct  
2013

Jun 2014

Mar  
2015



Jun  
2013

Apr 2014

Nov 2014

Jun 2015

Notice  
of Intent  
Jun/13

EWMP  
Workshop #1  
Apr/14

EWMP  
Workshop  
#2  
Nov/14

Submit draft  
EWMP  
Jun/15

*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

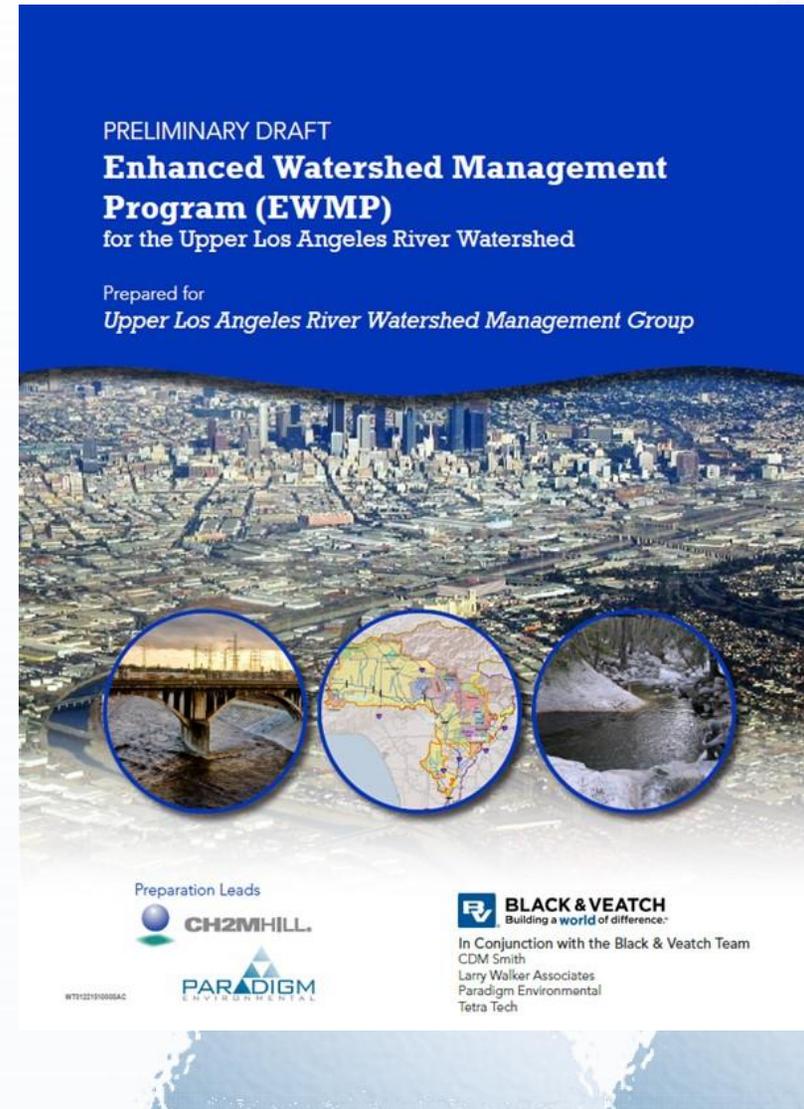
- Technical Advisory Committee Meetings to coordinate separate EWMPs
  - **Reasonable Assurance Analysis**
  - **Coordinated Integrated Monitoring Program**
- Public participation process
- Monthly Watershed Management Group meetings
- Internal City briefings



# 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

Watershed	Capital cost	Final milestone
Upper LA River	\$3,820 million	2037
Ballona Creek	\$2,282 million	2021
Santa Monica Bay	\$408 million	2021
Dominguez Channel	\$533 million	2032
Marina del Rey	\$252 million	2021

# 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

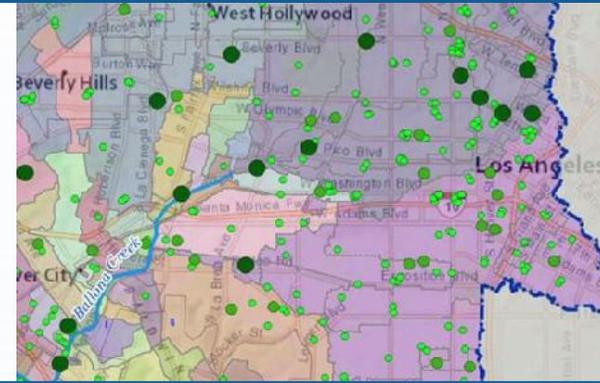
## Signature Project - La Cienega Park/Frank Fenton Field

- 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

