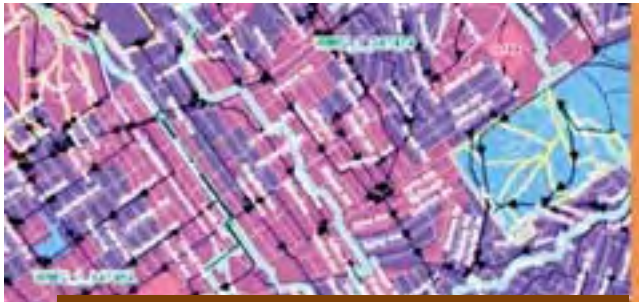


Catchment Prioritization

BMP Screening

General BMP Evaluation

Site Specific BMP Evaluation

Los Angeles County-Wide

Structural BMP Prioritization Methodology

A Guidance Manual for Strategic Storm Water Quality Project Planning

County of Los Angeles
City of Los Angeles
Heal the Bay
GeoSyntec

April 17, 2006
Alhambra, CA

Welcome and acknowledgements

Dan Lafferty, P.E.
County of Los Angeles, Watershed Management

Shahram Kharaghani, Ph.D., P.E.
City of Los Angeles, Watershed Protection

Mark Gold, D. Env.
Heal the Bay

Overview

- Welcome and acknowledgements
- Motivation, Goals, Objectives
- Process Development
- Methodology
- Test Implementation
- Conclusions and next steps
- Closing Remarks

Motivation for Methodology

- To date, Best Management Practice (BMP) projects planning opportunistic and site-specific, based on funding opportunity or regulatory requirement
- Strategic placement of BMP projects is a complex, multi-factored process
- Structural BMPs will likely play a significant role in attainment of WQ goals

Methodology Project Goal

To develop a systematic, semi-automated methodology that can be used by stakeholders in LA County to prioritize structural BMP projects to cost-effectively maximize stormwater quality benefits

Specific Objectives

Methodology must:

- Be applicable to all watersheds in LA County
- Focus on stormwater
- Identify regional and distributed BMP projects
- Be semi-automated, GIS based
- Be flexible and transparent so that various goals and scenarios can be accomadated
- Be easily modified over time
- Account for many watershed and BMP factors
- Available to all stormwater managers and other stakeholders

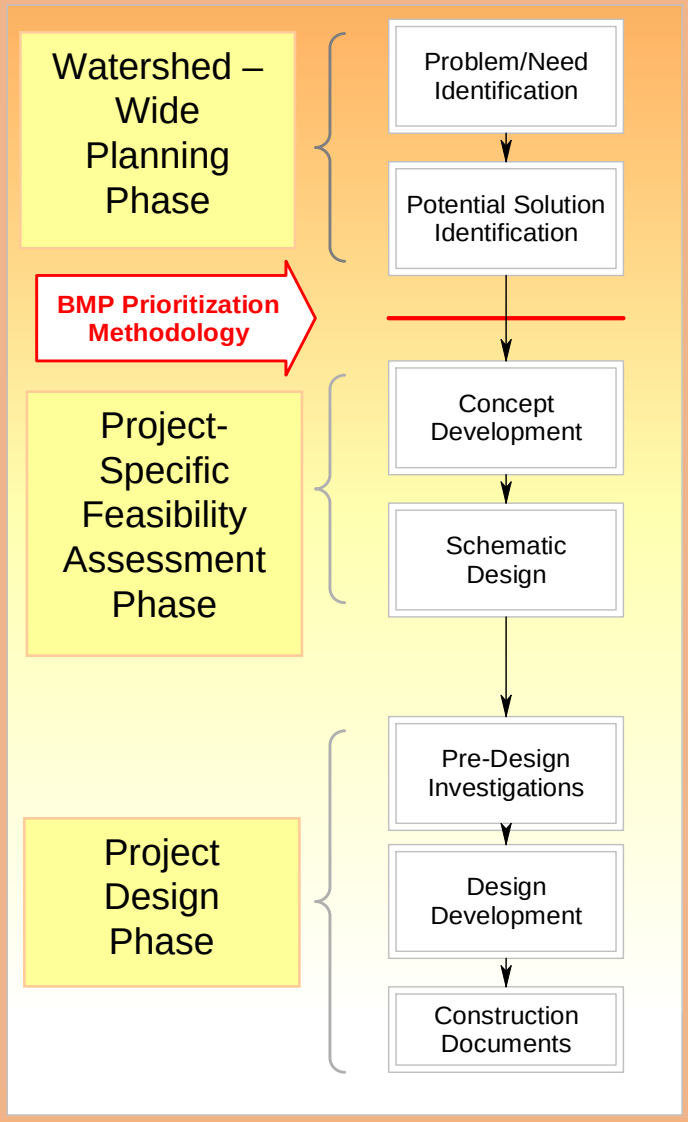
Work Products

Methodology for prioritizing BMPs

- User Guidance Manual available to all stakeholders
- Website: www.labmpmethod.org

Demonstration Project Results: Ballona Creek Watershed

Purpose and Intent



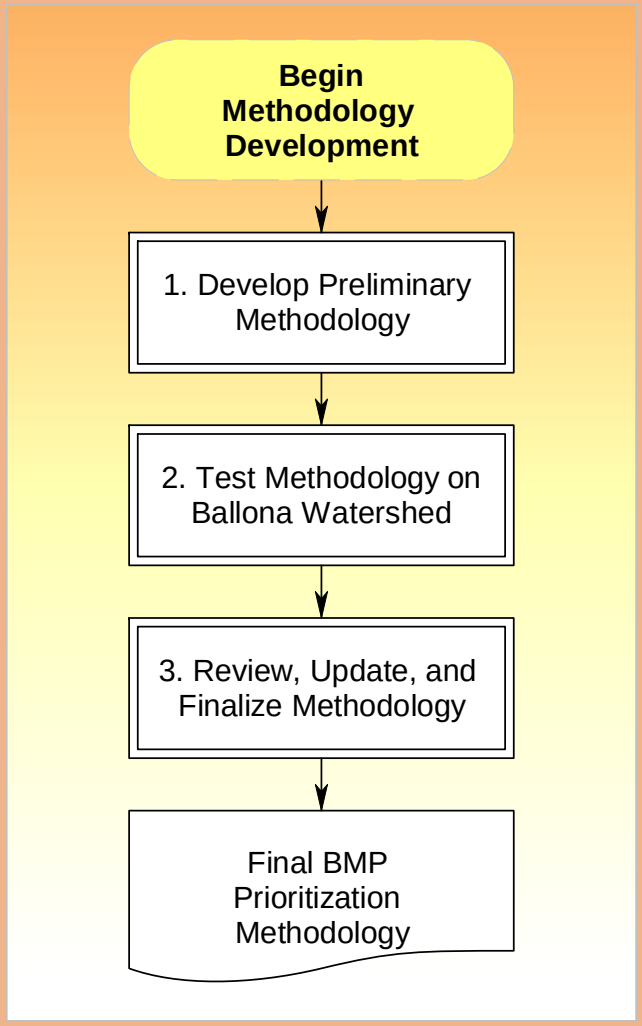
Process Development

Phase 1: Develop preliminary Methodology.

- Leverage Efforts of Other Projects.
- Integrate City Measure O criterias.
- Include only structural BMPs.
- Ensure wide-range applicability of Methodology.
- Address only wet weather flows.

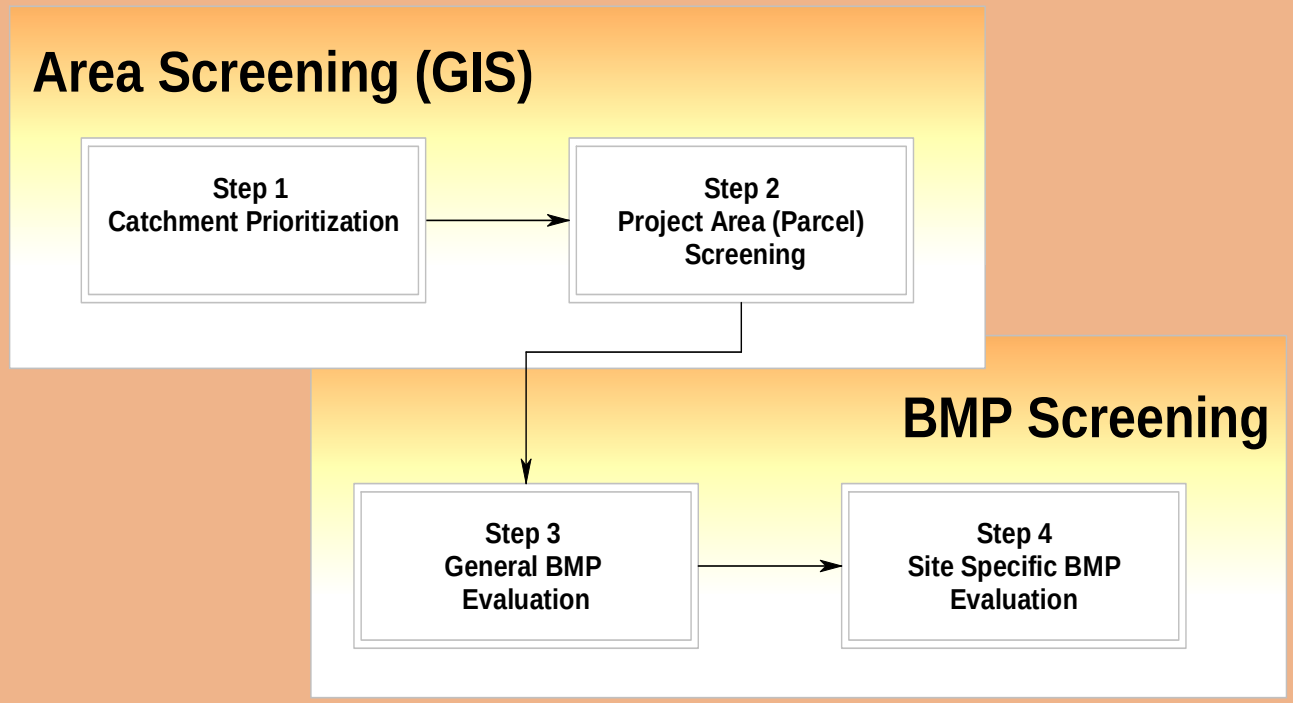
Phase 2: Implement and test Methodology in Ballona Creek Watershed

Phase 3: Update and finalize Methodology



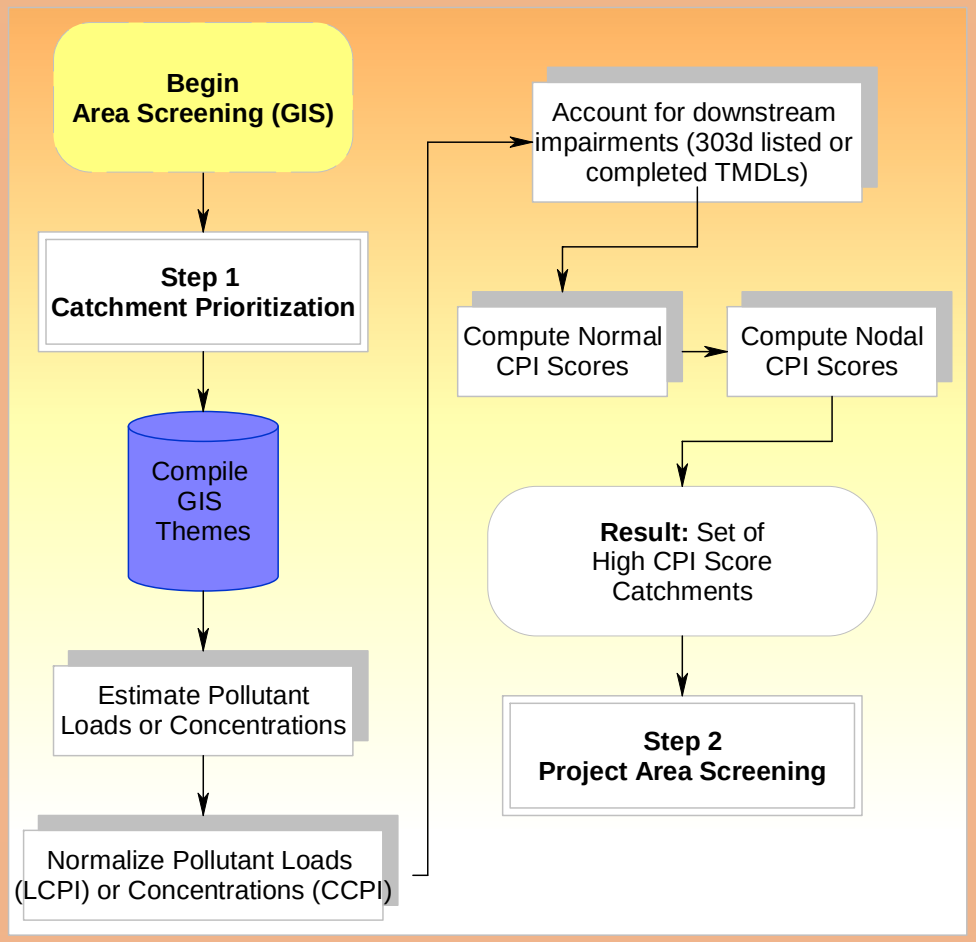
Methodology

Four Steps



Step 1. Catchment Prioritization

Catchment Prioritization Index (CPI) Determination



Step 1. Catchment Prioritization

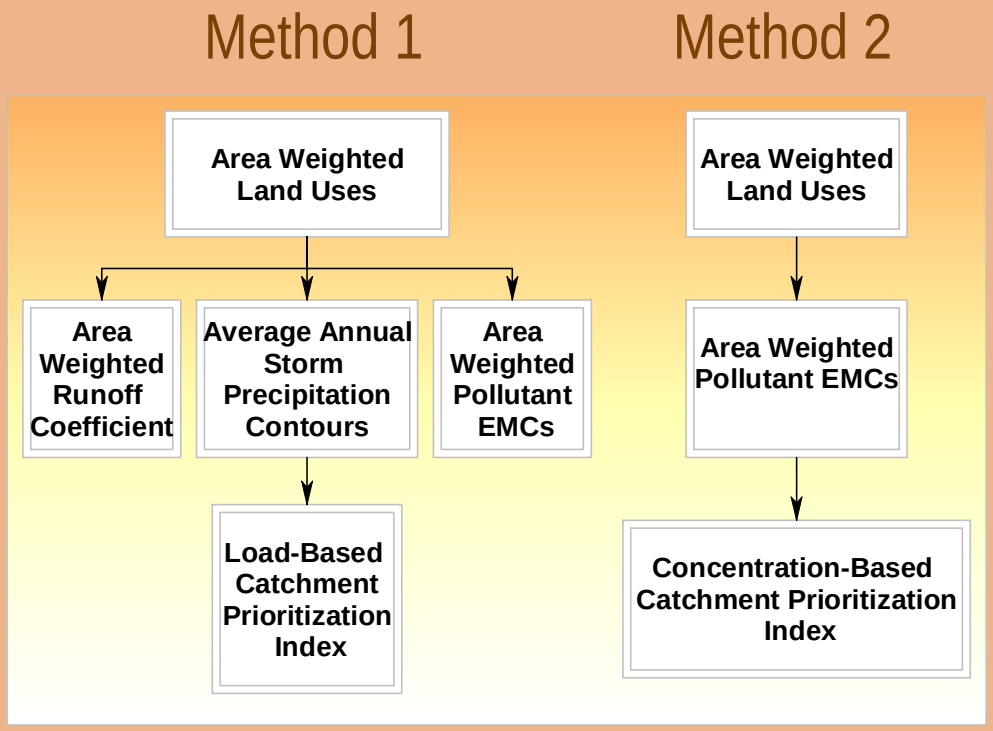
GIS Themes

Data	Type	Purpose
Catchments	Polygon	Primary unit of analysis
Land use*	Polygon or grid	Calculate area-weighted runoff coefficient and pollutant-loading/EMC scores per catchment
85th-percentile 24-hour rainfall depth contours	Line	Calculate average storm event precipitation depth per catchment
Trash (from City/County catch basin monitoring studies)	Polygon	Compute catchment trash CPI scores (where actual monitoring data is available)
303(d)-listed water bodies*	Line/polygon	Designate catchments with downstream impairments
Completed TMDLs	Line/polygon	Designate catchments with downstream completed TMDLs
Hydrologic drainage network with connectivity	Line/Point	Designate catchments with downstream impairments/TMDLs
Topography	Grid (DEM)	If drainage network unavailable, used to designate catchments with downstream impairments/TMDLs

*See APPENDICES A and B for land use and 303(d) grouping assumptions, respectively

Step 1. Catchment Prioritization

Catchment Prioritization Index (CPI) Determination



$$LCPI_x = \frac{\sum_y \left(EMC_{x,y} * RC_y * A_y * P\right)}{\sum_y A_y}$$

$$CCPI_x = \frac{\sum_y \left(EMC_{x,y} * A_y\right)}{\sum_y A_y}$$

Step1. Catchment Prioritization

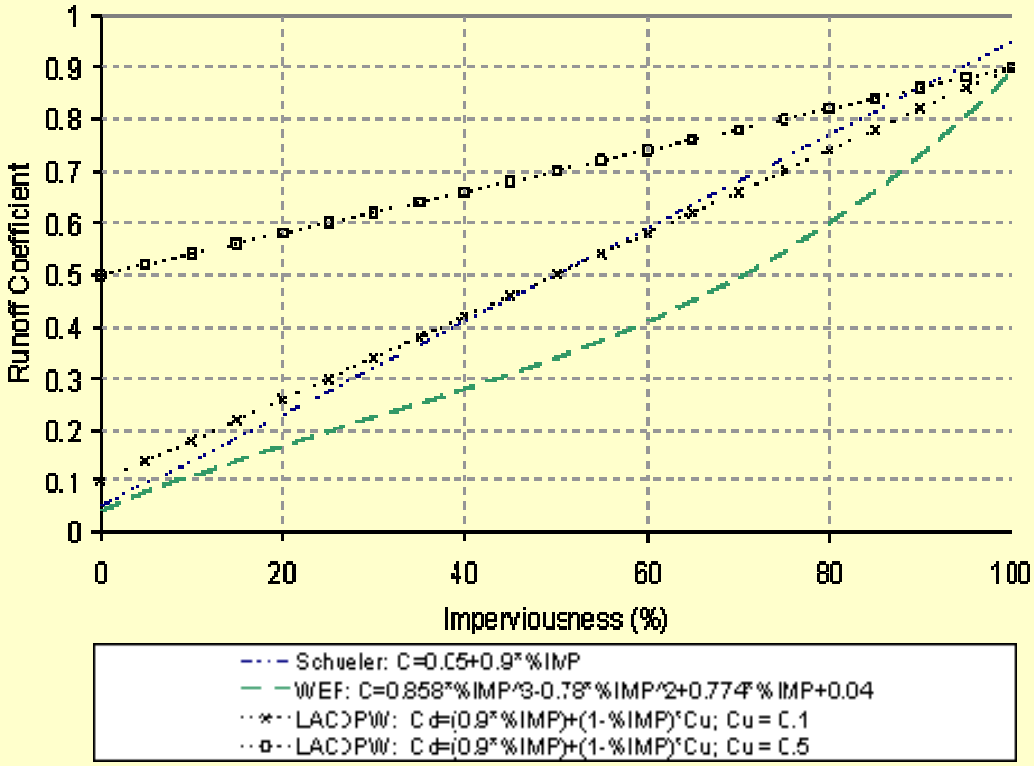
Runoff coefficients (linked to Land Use)

SCCWRP Calibrated

Land Use	RC, Runoff Coefficient
Agriculture	0.10
Commercial/ Educational	0.61
Industrial/ Transportation/ Other Urban[1]	0.64
Open	0.06
Residential	0.39

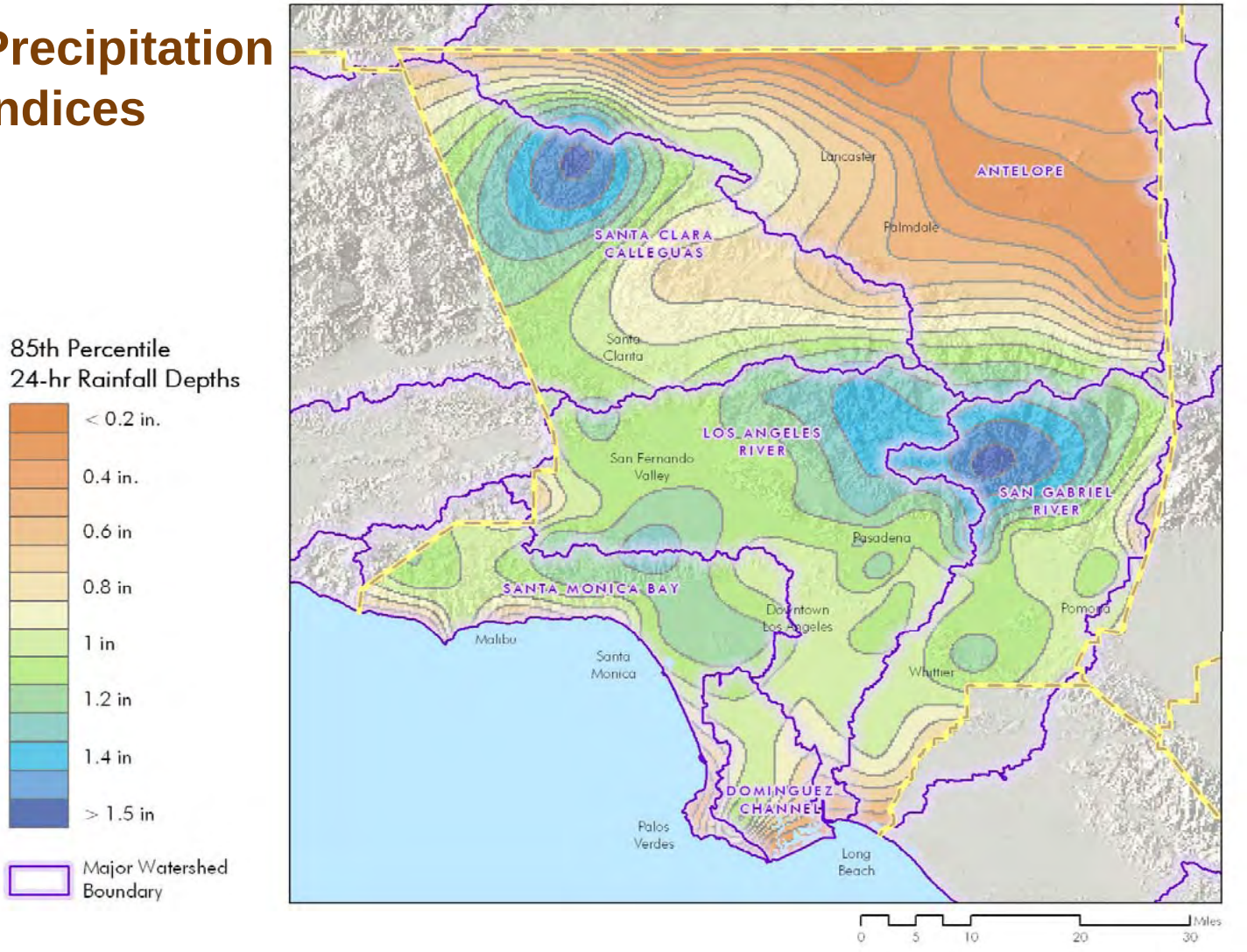
[1] "Other urban" category, which included includes "mixed industrial/commercial" and "under construction" SCAG land use categories, represents <1% of total County area.

Other Methods



Step 1. Catchment Prioritization

Precipitation indices



Step 1. Catchment Prioritization

Pollutant-related assumptions

Analysis Details:

- Pollutant Loading Families & Identification of Indicators
  - Bacteria – Fecal Coliform
  - Nutrients - Nitrate
  - Trash – Raw Trash Data
  - Metals
    - Copper - Total
    - Lead - Total
    - Zinc - Total
  - Sediment – TSS
- Intended for single watershed large watersheds

Step 1. Catchment Prioritization

Pollutant-related assumptions

Analysis Details:

- **Statistical Analysis of EMC datasets**
- **303(d)/TMDL list loading factors (*See APPENDIX B for linkage)***
- **Other priority factors (bioaccumulation, toxicity, legacy pesticides, or ecological impacts)**

Step 1. Catchment Prioritization

Calculation Matrix

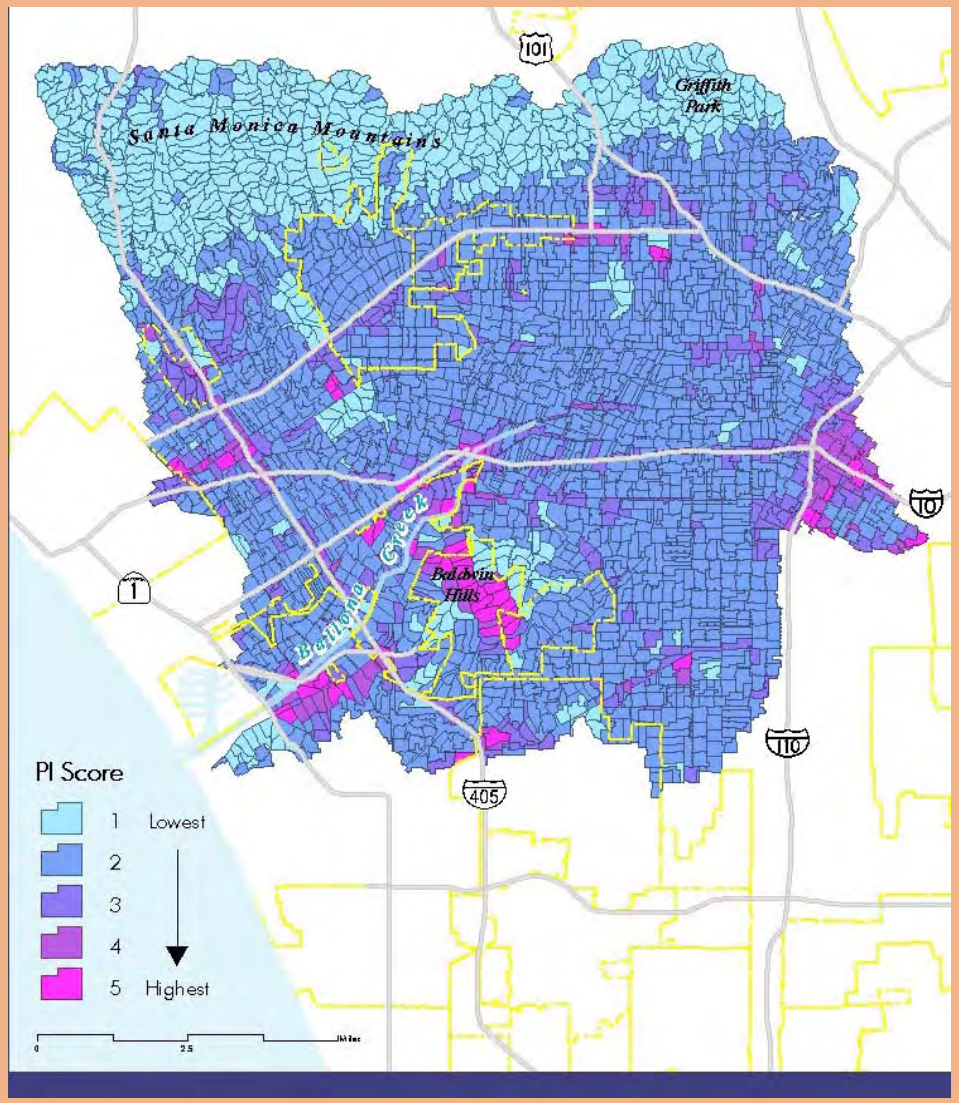
Candidate Catchment Factors	Max Points
1. Rank catchment by pollutant load per unit area (5 bins each)	50
Trash	10
Nutrients (Nitrate)	10
Bacteria (Fecal Coliform)	10
Total Metals (Total Cu, Total Pb, Total Zn)	15
Sediment (TSS)	5
2. Multiply pollutant score by 2 if a d/s impairment, by 3 if a d/s TMDL	x2 or x3
3. Add 5 points for each “other” impairment (bioaccumulation, toxicity, legacy pesticides, and ecological impacts)	20
Maximum catchment pollutant load score	**170**

Step 1. Catchment Prioritization

- Utilize processes in methodology to develop a series of GIS maps
- Look at catchment prioritization on pollutant-specific basis

Step 1. Catchment Prioritization

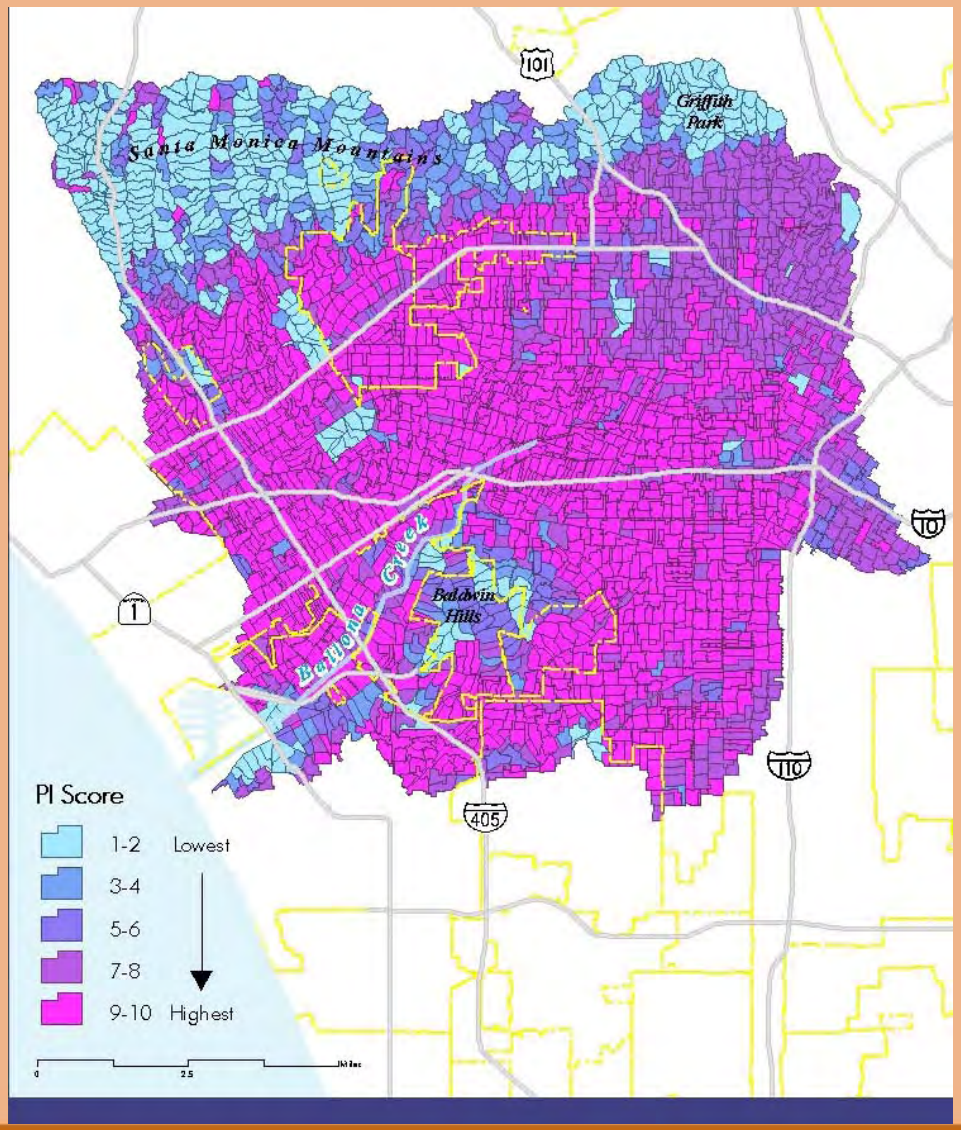
Copper



Industrial/transportation land uses

Step 1. Catchment Prioritization

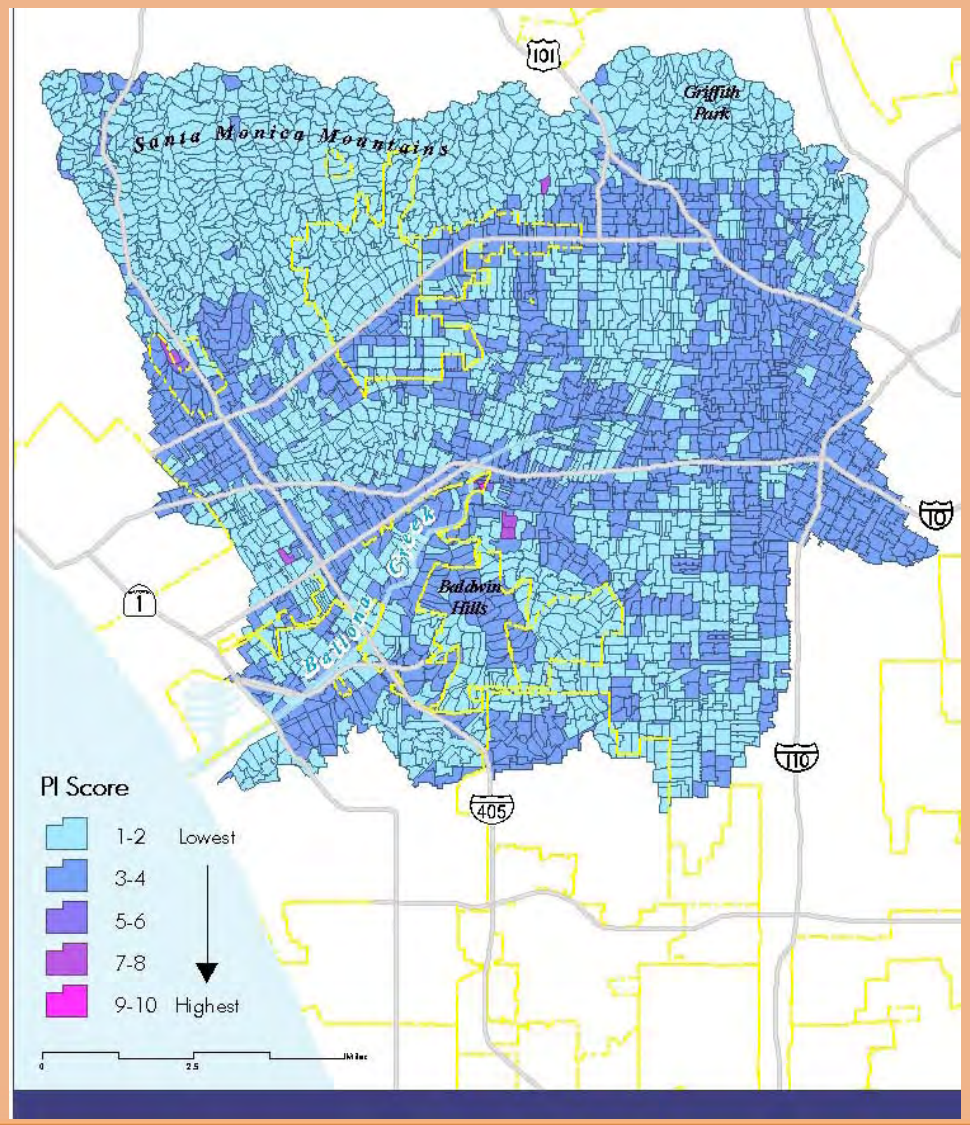
Fecal Coliform



Residential loading high

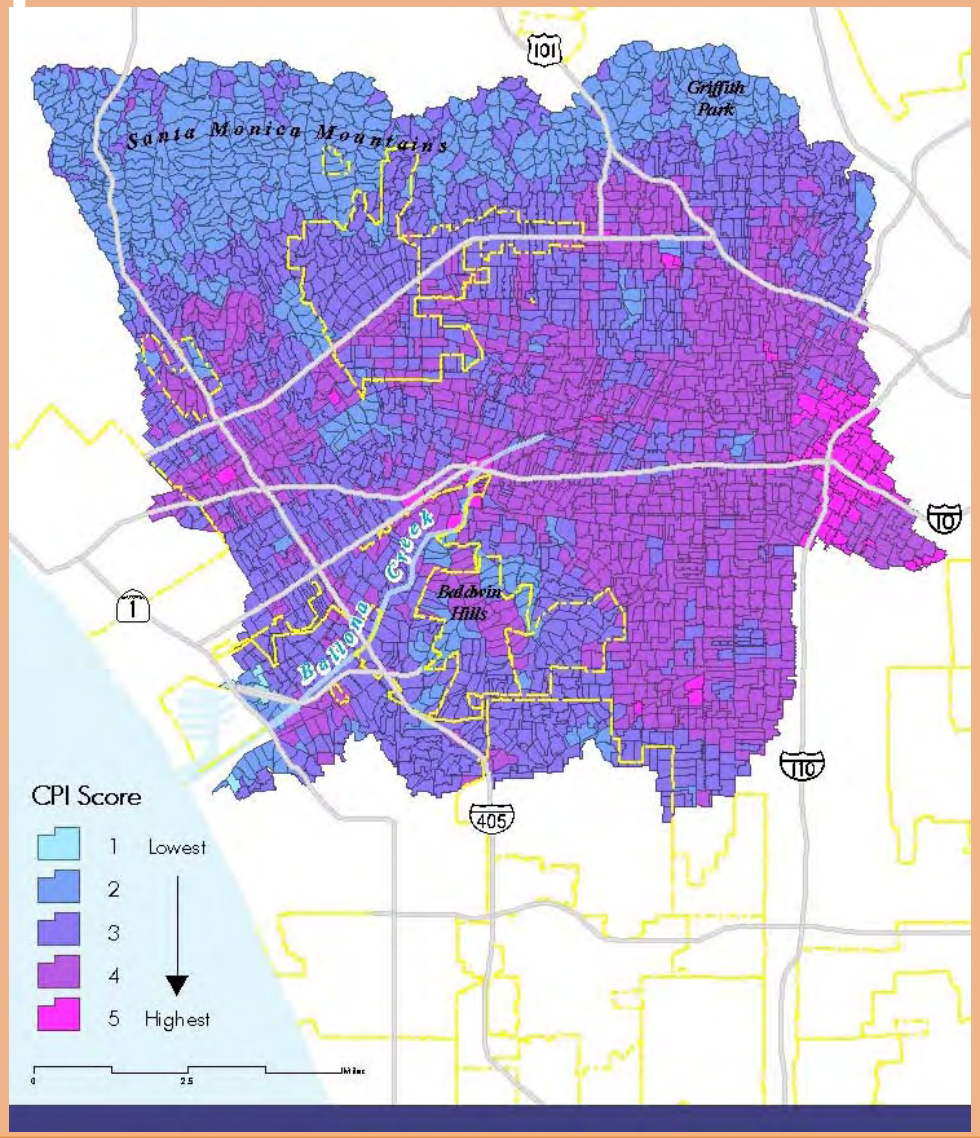
Step 1. Catchment Prioritization

Nitrates



Step 1. Catchment Prioritization

Composite CPI



Dependent on receiving water impairments

Step 1. Catchment Prioritization

Why Nodal CPI development?

- Regional solution opportunities
- Decrease sensitivity to catchment size
- Expands flexibility of method

Step 1. Catchment Prioritization

Nodal CPI development

$$Nodal\ CPI = \frac{Normal\ CPI \times A + \sum_u \left(Normal\ CPI_u \times A_u \right)}{A + \sum_u A_u}$$

Where:

Nodal CPIz= nodal CPI for study catchment

Normal CPIz = normal CPI for study catchment

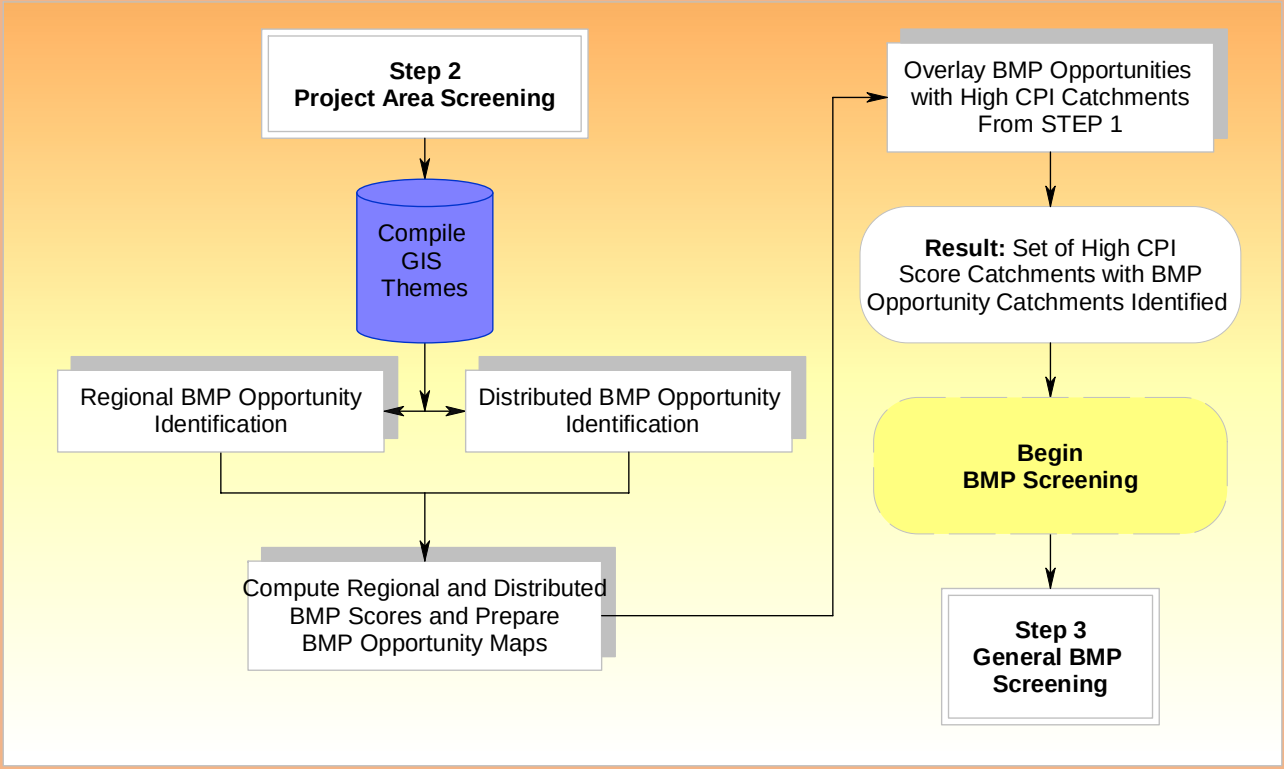
Normal CPIu = normal CPI for upstream catchment "u"

A, Au = area of study catchment and of upstream catchment "u", respectively

Step 2 Project Area Screening

Project Area Screening for BMPs

- Regional/Subregional BMPs
- Distributed BMPs
- Structural institutional BMPs



Step 2 Project Area Screening

Project Area Screening: Regional/subregional BMPs

- Runoff from large catchment areas (~100 acres).
- Very large catchments not explicity considered
- Typically larger centralized facilities near the outlet of a subwatershed.

Step 2 Project Area Screening

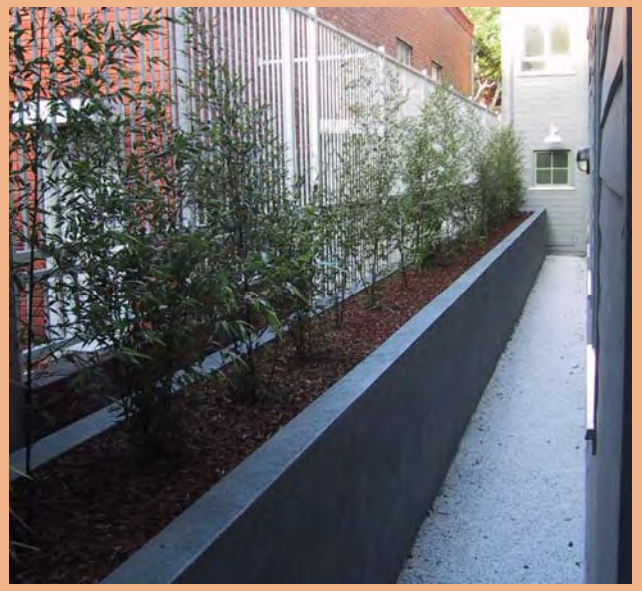
Project Area Screening: Distributed BMPs

- Implemented at a local scale (neighborhoods)
- Stormwater devices and landscaping practices dispersed throughout catchment
- Drainage areas ~10 acres.
- Could include treatment for large single parcels or sections of roadway.

Step 2 Project Area Screening

Project Area Screening: Structural Institutional BMPs

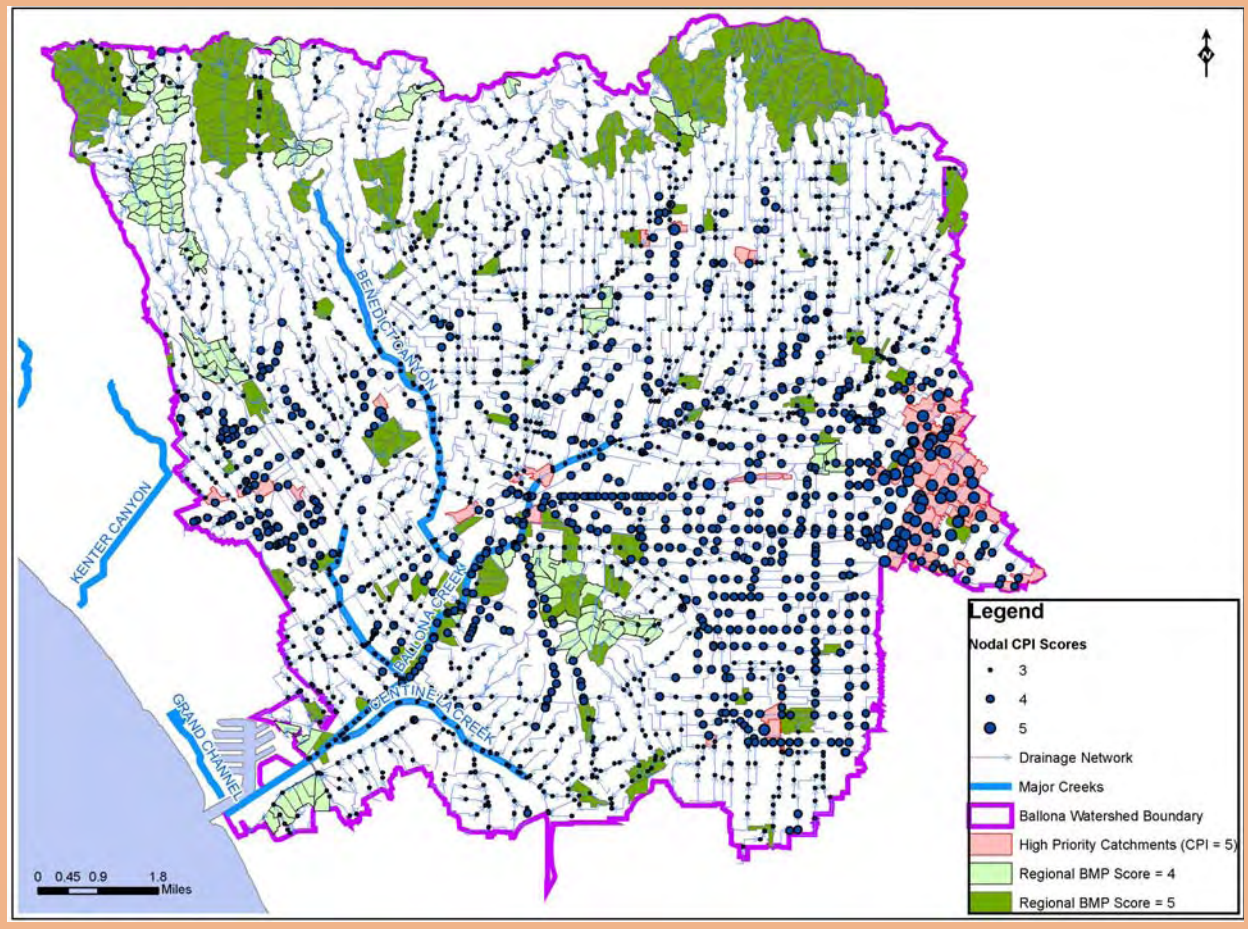
- Structurally based measures
- implemented or mandated at agency level through ordinances, policies, and incentives.
- LID approaches



Step 2 Project Area Screening

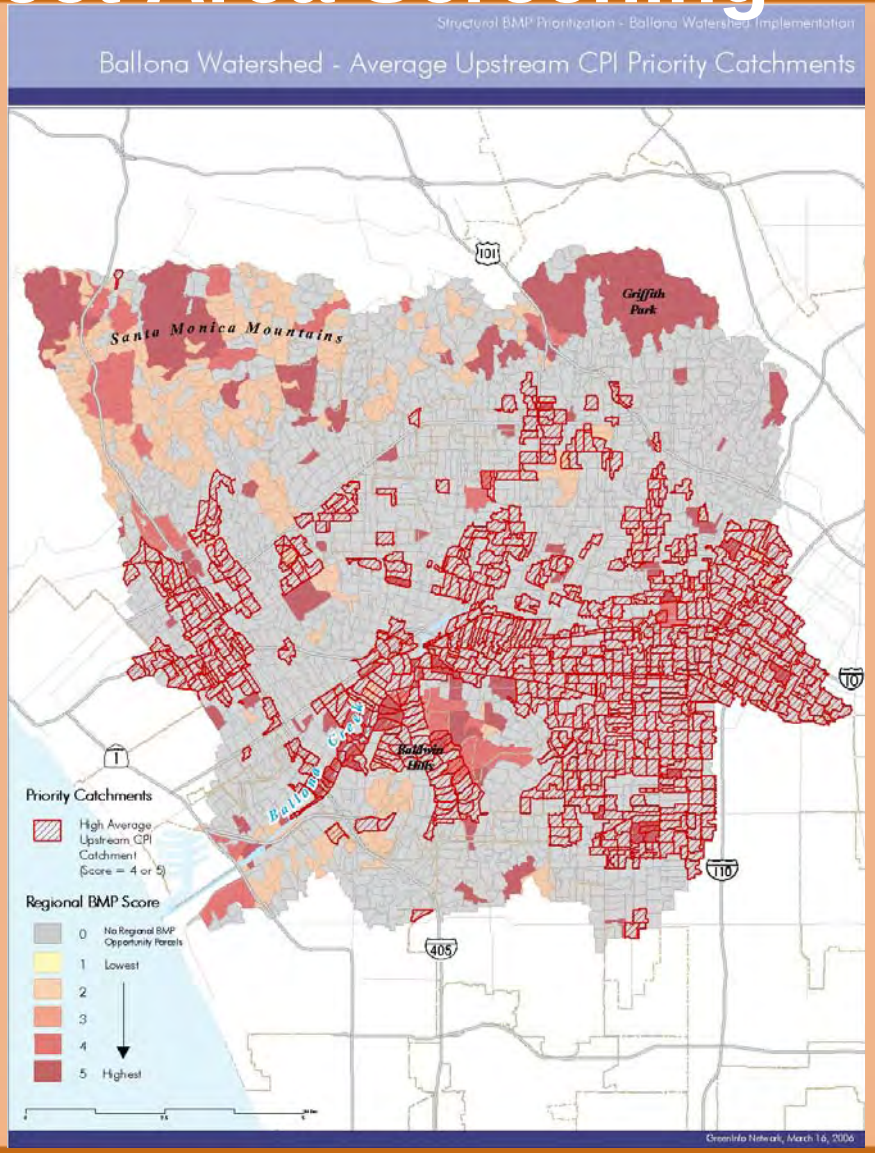
Screening Process

- Parcels & Roadways
- BMP Opportunity Maps
  - Available Space
  - Ownership
  - Slopes, Liquefaction
  - Environmental/SEA
- Link Priority to Catchments
  - Normal CPI to Distributed
  - Nodal CPI to Regional



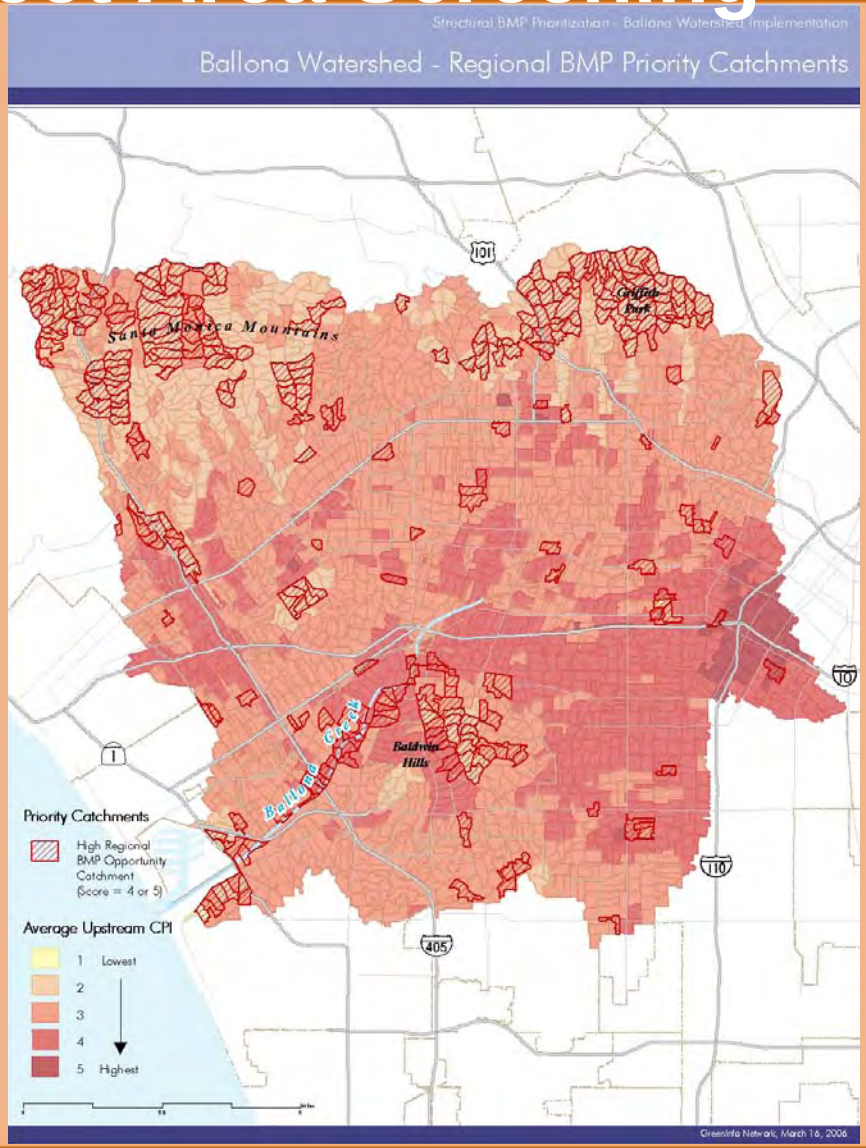
Step 2 Project Area Screening

- **High Priority Catchments overlaying Regional BMP Scores**



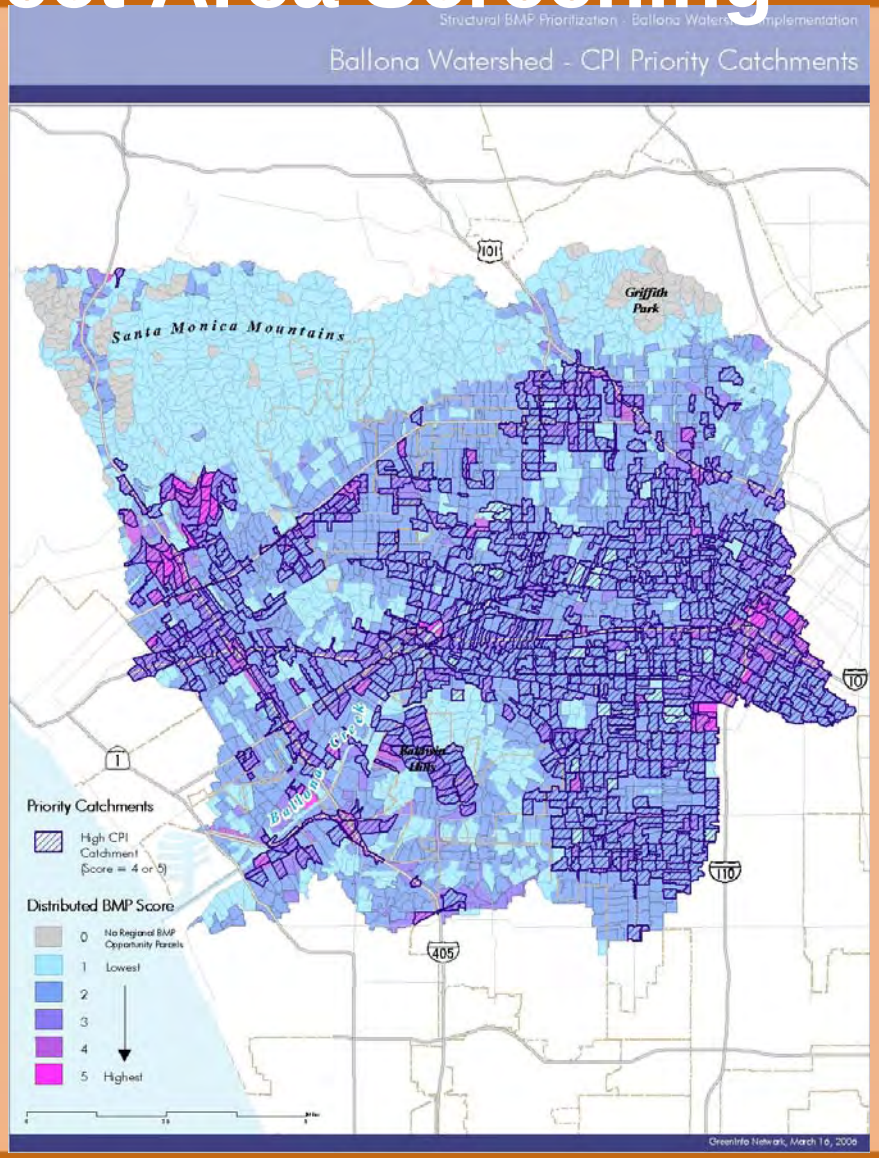
Step 2 Project Area Screening

- High Regional BMP scores overlaying high nodal CPI score



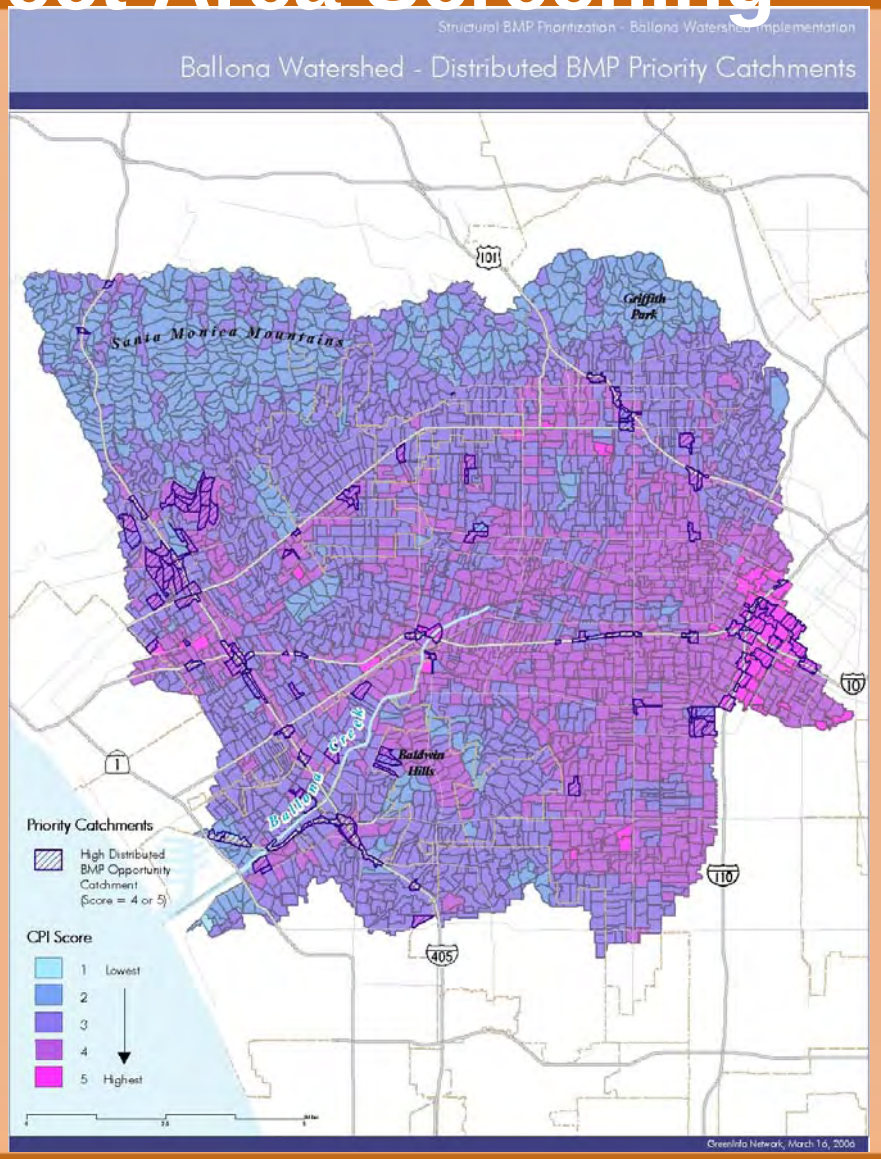
Step 2 Project Area Screening

- High Priority Catchments overlaying Distributed BMP Scores



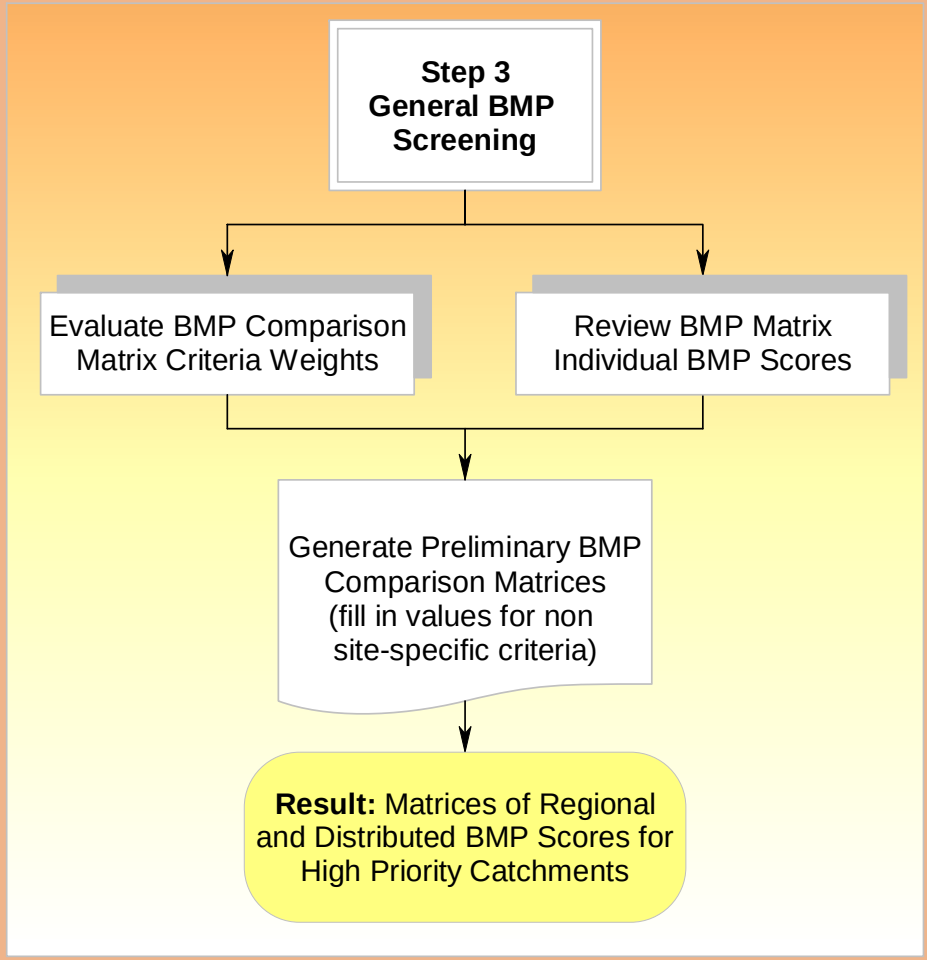
Step 2 Project Area Screening

- High Regional BMP scores overlaying high nodal CPI score

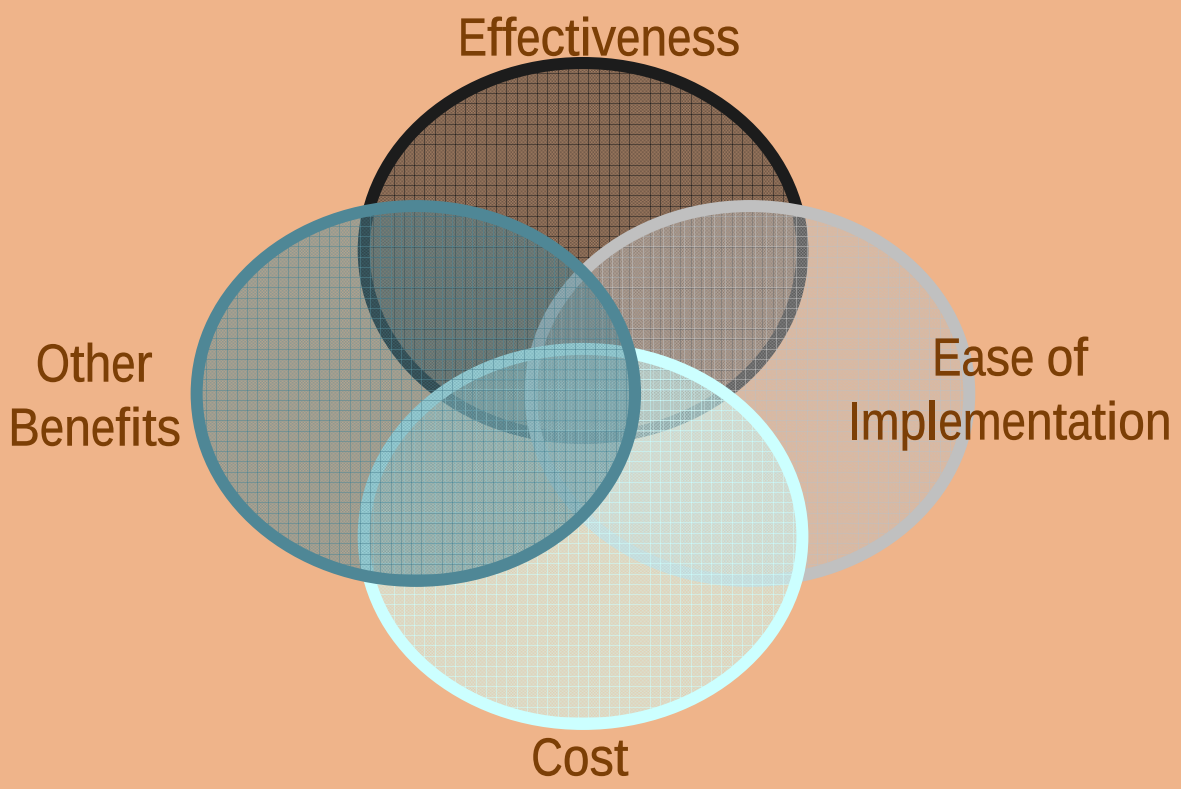


Step 3 General BMP Screening

Process Overview



Step 3. General BMP Screening Basis for Evaluation & Prioritization



Step 3. General BMP Screening Basis for Evaluation & Prioritization

- **Cost**
  - Capital
  - O&M
- **Effectiveness**
  - Pollutant Removals
  - Pollutant removal mechanism
  - Volume Reduction
  - Reliability
- **Ease of Implementation**
  - Engineering/Siting
  - Permitting/Water Rights
  - Available Space & Right-of-Way
  - Environmental Clearance
  - Safety

Step 3. General BMP Screening Basis for Evaluation & Prioritization

- **Other Benefits/Issues**
  - Flood control/detention storage
  - Downstream impacts
  - Water resources/conservation
  - Habitat development
  - Vector issues
  - Bacteria source/regrowth issues
  - Competing site uses

Step 3 General BMP Screening

Regional BMP Matrix

Ranking Factors	Potential Fatal Flaw?	Weight	Score (1=worst - 5=best, FF)						
			Infiltration Basins	Detention Basins	Detention w/SSF Wetlands	Constructed SF Wetlands	Treatment Facility	Hydrodynamic Devices	Channel Naturalization
Cost		**30%**							
– Capital	N	15%	4	4	2	4	1	3	4
– Operations and Maintenance	N	15%	1	3	2	2	2	4	3
Effectiveness		**30%**							
– Effluent Conc. (by pollutant group)									
- Trash	N	1.6%	5	4	5	5	5	4	2
- Nutrients	N	11.8%	5	2	5	5	5	2	5
- Bacteria	N	7.5%	5	2	4	3	5	2	1
- Metals	N	2.2%	5	3	5	5	5	3	4
- Sediment	N	1.9%	5	3	5	5	5	4	4
– Other Pollutants (e.g., toxicity, bioaccum.)	N	2.5%	5	3	4	4	4	3	3
– Volume Mitigation	N	2.5%	5	3	3	3	2	1	2
– Reliability	N	0.00%	2	3	3	3	5	3	3
Implementation		30%							
– Implementation Issues									
- Engineering/Siting Feasibility	Y	10.0%	Based on Site-Specific Evaluation						
- Ownership/ROW/Jurisdictions	Y	10.0%							
- Environmental Clearance	N	5.0%	4	4	4	4	2	4	2
- Permitting, Water Rights	Y	2.5%	5	5	5	2	2	2	2
– Safety (Public)	Y	2.5%	3	3	3	3	4	4	3
Environment/Other Factors		**10.0%**							
– Other Potential Benefits (e.g., conservation)	N	6.0%	5	4	4	4	1	1	5
– Other Potential Impacts (e.g., vectors)	Y	4.0%	3	2	3	2	3	3	3
Weighted Score		**100%**	**2.45**	**2.07**	**2.25**	**2.48**	**2.35**	**2.04**	**2.34**

Step 3 General BMP Screening

Distributed BMP Matrix

Ranking Factors	Potential Fatal Flaw?	Weight	Score (1=worst - 5=best, FF)							
			Cisterns	Bio-retention	Vegetated Swales	Green Roofs	Porous/ Permeable Pavements	GSRDs	Media Filters	Catch Basin Inserts
Cost		**30%**								
– Capital	N	15.0%	3	2	4	1	2	2	3	5
– Operations and Maintenance	N	15.0%	5	3	4	4	5	3	4	4
Effectiveness		**30.0%**								
– Effluent Conc. (by pollutant group)										
- Trash	N	**5.4%**	5	5	4	4	5	4	5	4
- Nutrients	N	**1.4%**	5	5	4	4	5	1	3	1
- Bacteria	N	**3.6%**	5	5	1	4	5	1	3	1
- Metals	N	**4.2%**	5	5	4	4	5	2	4	1
- Sediment	N	**0.6%**	5	5	3	4	5	3	5	2
– "Other" Poll (e.g.,tox, bioaccum.)	N	2.5%	4	4	4	4	4	1	4	1
– Volume Mitigation	N	2.5%	3	4	4	4	4	1	1	1
– Reliability	Y	10.0%	3	4	4	3	2	3	3	3
Implementation		**30.0%**								
– Implementation Issues										
- Engineering/Siting Feasibility	Y	10.0%	Based on Site-Specific Evaluation							
- Ownership/ROW/Jurisdictions	Y	10.0%								
- Environmental Clearance	N	5.0%	5	5	5	5	5	5	5	5
- Permitting, Water Rights	Y	2.5%	5	5	5	5	5	5	5	5
– Safety (Public)	Y	2.5%	4	3	3	4	3	4	4	4
Environment/Other Factors		**10.0%**								
– Other Potential Benefits(e.g., cons.)	N	6.0%	5	4	4	4	3	1	1	1
– Other Potential Impacts (e.g., vectors)	Y	4.0%	2	3	3	3	3	3	3	3
Weighted Score		**100%**	**2.44**	**2.11**	**2.29**	**1.86**	**2.21**	**1.47**	**2.09**	**2.02**

Step 3 General BMP Screening

Sidebar Discussion:

Costs

Assumptions

- Regionalized/adjusted documented values
- Engineers estimates
- Scaled on probable size (based on type of BMP)
- Costs comparable
- Capital + O&M (life cycle)
- Varying Uncertainty (note uncertainty not quantified)
- All assumptions documented
- Land costs excluded

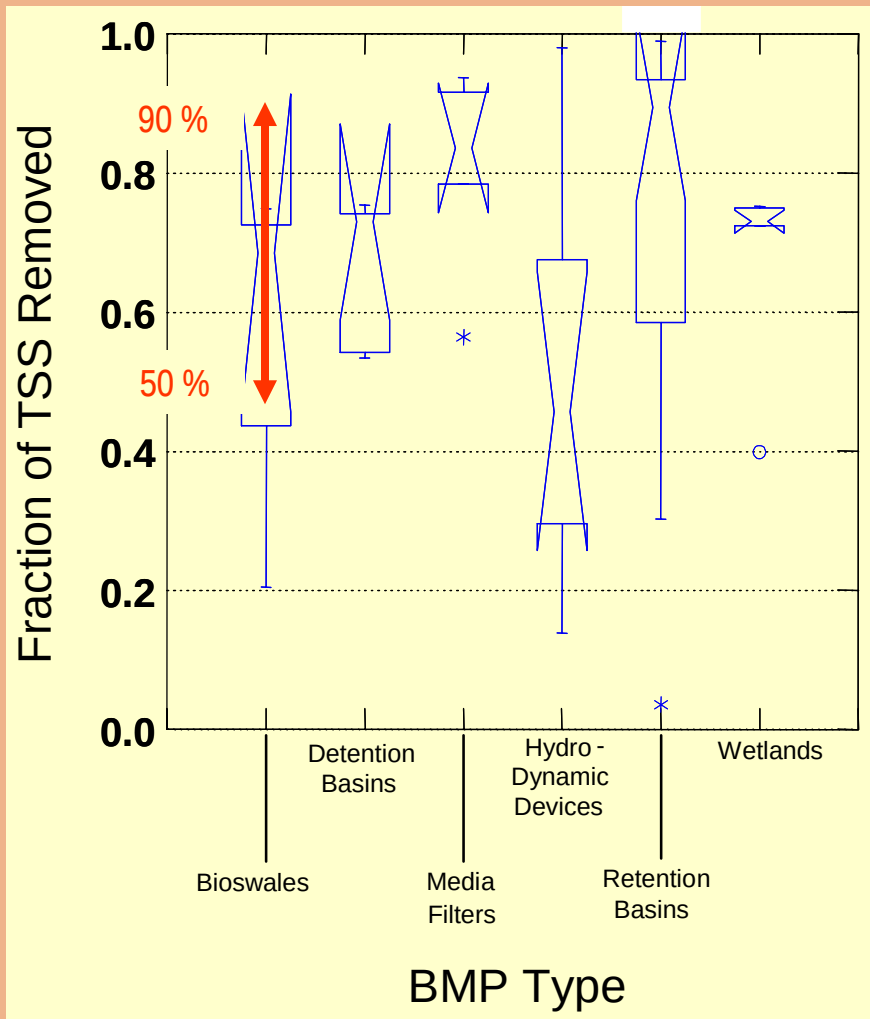
Step 3 General BMP Screening

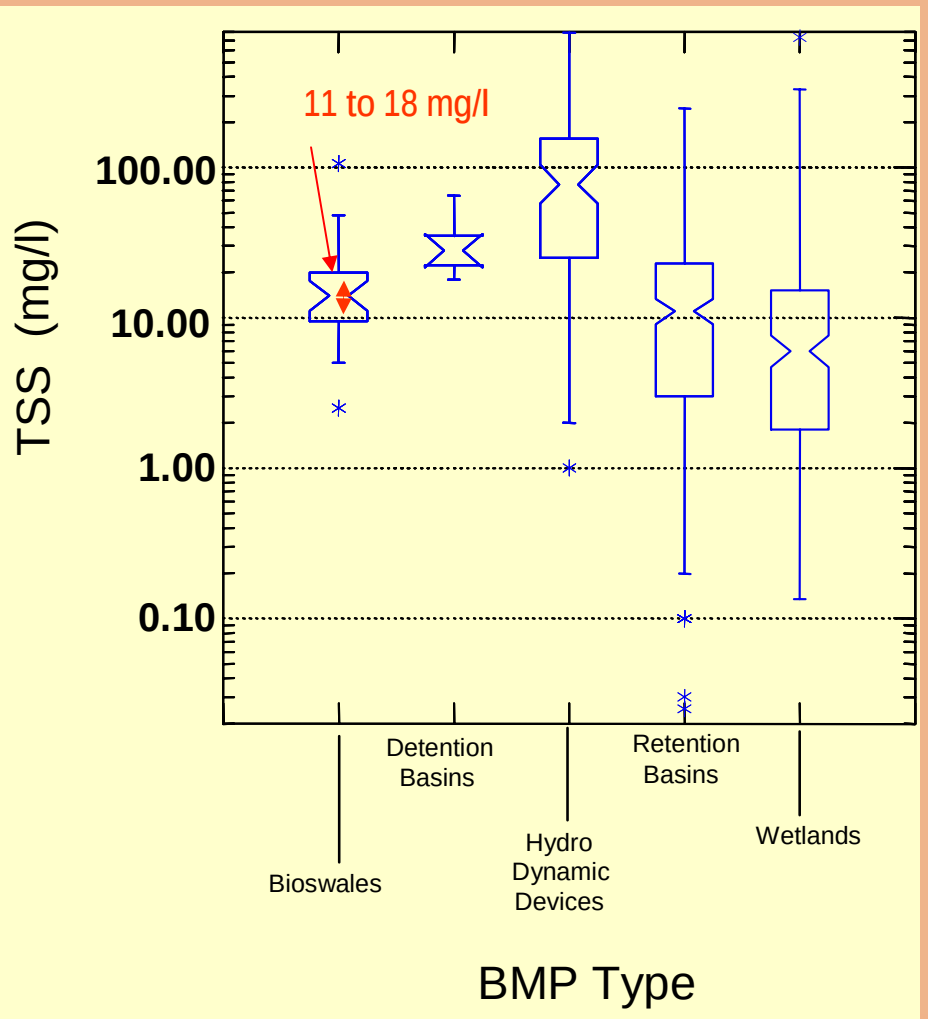
Sidebar Discussion:

Effectiveness Assessment

- **Assumptions**
  - Effluent Concentration Based
  - Volume Considerations and Benefits
- **Data Sources**
  - EPA/ASCE BMP Database
  - WERF Unit Processes
  - CASQA Handbooks

Step 3 General BMP Screening





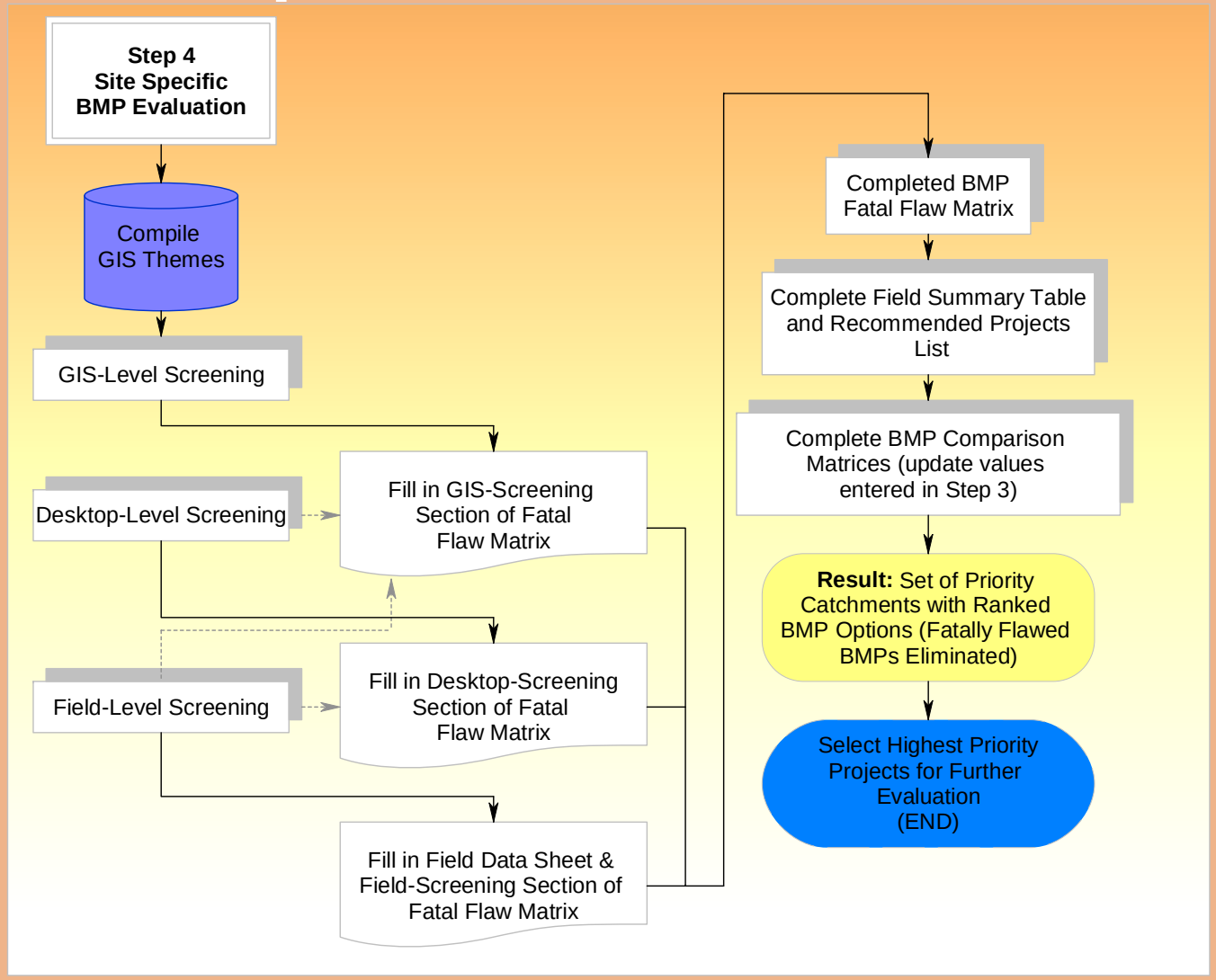
Step 4 Site-Specific BMPs

Critical Step in process

A. GIS-Level

B. Desktop-Level

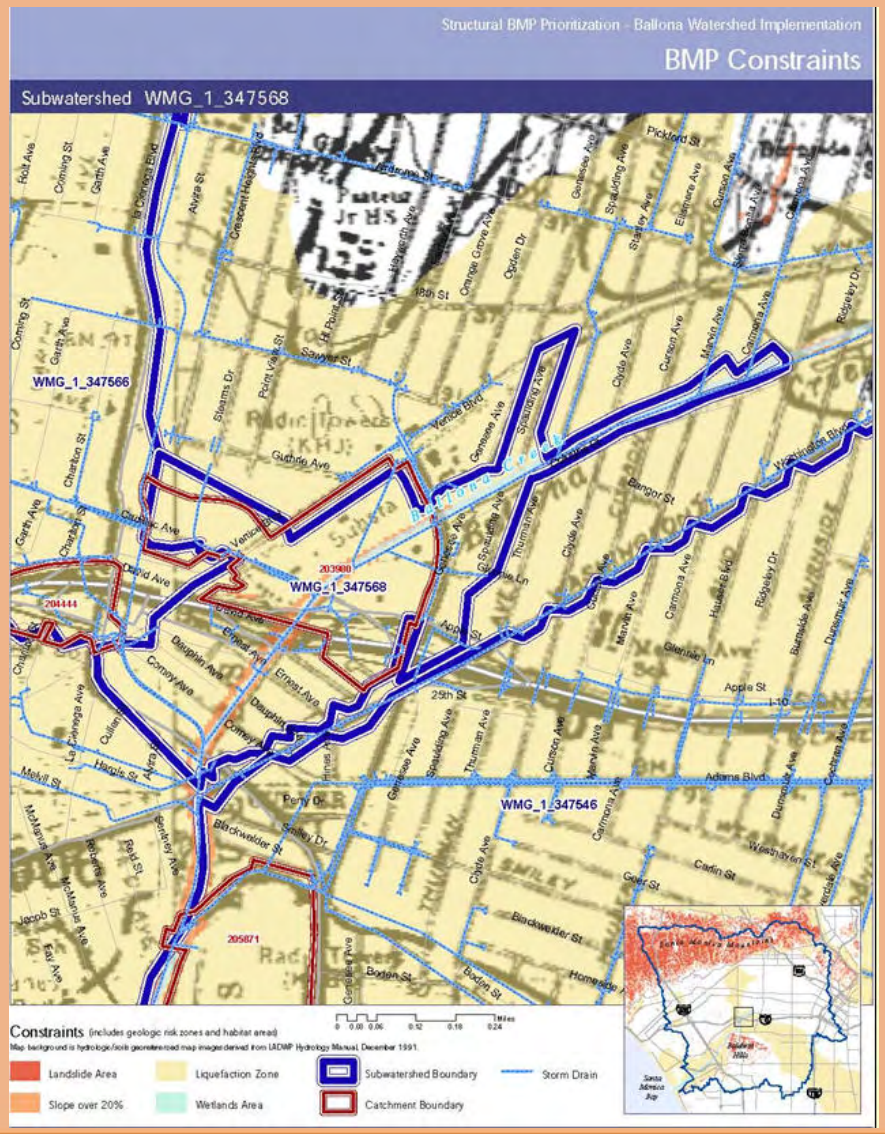
C. Field-Level



Step 4 Site Specific BMPs

A. GIS Screening

- Fatal Flaw screening
- Landslide zones,
- Liquefaction zones,
- Slope>20% zones,
- Environmentally sensitive areas (ESA),
- Wetlands areas,
- Low permeability soils (Hydrologic soils group: D)
- BMP data likely unavailable in GIS



Step 4 Site Specific BMPs

B. Desktop-Level Screening (As built review)

- **Create GIS-based maps for desktop and field-level screening**
- **Fatal Flaw Screening**
- **Verify constraints identified during initial GIS-level screening step**.
- **Identify additional constraints**.
  - No major open space, No significant green space near rooftops
  - No significant surface parking lot area,
  - No significant non-residential rooftop area.
- **Look for existing BMPs**
- **Look for additional potential downstream opportunities**.

Step 4 Site Specific BMPs

B. Desktop-Level Screening

- Fatal Flaw Screening matrices provided

Table 12: Distributed BMPs Fatal-flaw Matrix

Screening Level	Constraint	Distributed BMPs: Cisterns	Bioretention	Vegetated Swale	Green Roofs	Porous/ Permeable Pavements	GSRDs	Media Filters	Catch Basin Inserts
GIS-Screening	Landslide Zone		FF			FF			
	Liquefaction Zone								
	Slope>20% Zone								
	Envtl. Sens. Area (ESA)		FF			FF			
	Wetlands Zone		FF			FF			
	Soil Infiltration-Limited Zone[2]								
	Zero Reg. BMP Opp. Score (from Parcel Screening Step)								
	Zero Dist. BMP Opp. Score (from Parcel Screening Step)	FF	FF	FF	FF	FF			
Desktop-Screening[1]	No Major Open Space (for Reg. BMP Opp.)								
	No Sign. Green Space (for Dist. BMP Opp.)	FF							
	No Sign. Rooftop Area (non-residential)	FF			FF				
	No Sign. Surface Parking Lot Area					FF			
Field-Screening[1]	Proximity to Stormdrain/Channel						FF	FF	
	Flood Control Limitations in Stormdrain/Channel						FF	FF	
	Slope/Head Limitations								
	Soil Infiltration Limitations[2]		FF			FF			
	GW Depth Limitations (i.e., <5 ft to seasonal high gw level)		FF			FF			
	Space Limitations (i.e., <2% of drainage area available)								
	Space Limitations for Smaller Treatment Devices						FF	FF	
	Access Limitations (for maintenance)								
	Jurisdictional Restrictions	FF	FF	FF	FF	FF	FF	FF	FF
	Public Safety Issues	FF	FF	FF	FF	FF	FF	FF	FF
	Effectiveness Reliability Issues	FF	FF	FF	FF	FF	FF	FF	FF
	Permitting/Water Rights Issues	FF	FF	FF	FF	FF	FF	FF	FF
	"Other" Limitations (e.g., vectors, bacteria regrowth/ sources, competing site uses)	FF	FF	FF	FF	FF	FF	FF	FF
	Downspouts Unavailable/Inaccessible, or Too Far from Irrigation Area	FF							
	Available BR Area Not Downhill from Drainage Area		FF						
	Linear Area Unavailable for Conversion to Swale			FF					
	Flat (<20%) Rooftops Unavailable				FF				
	Catchbasins Unavailable/Inaccessible or Too Small/Few								FF

Step 4 Site Specific BMPs

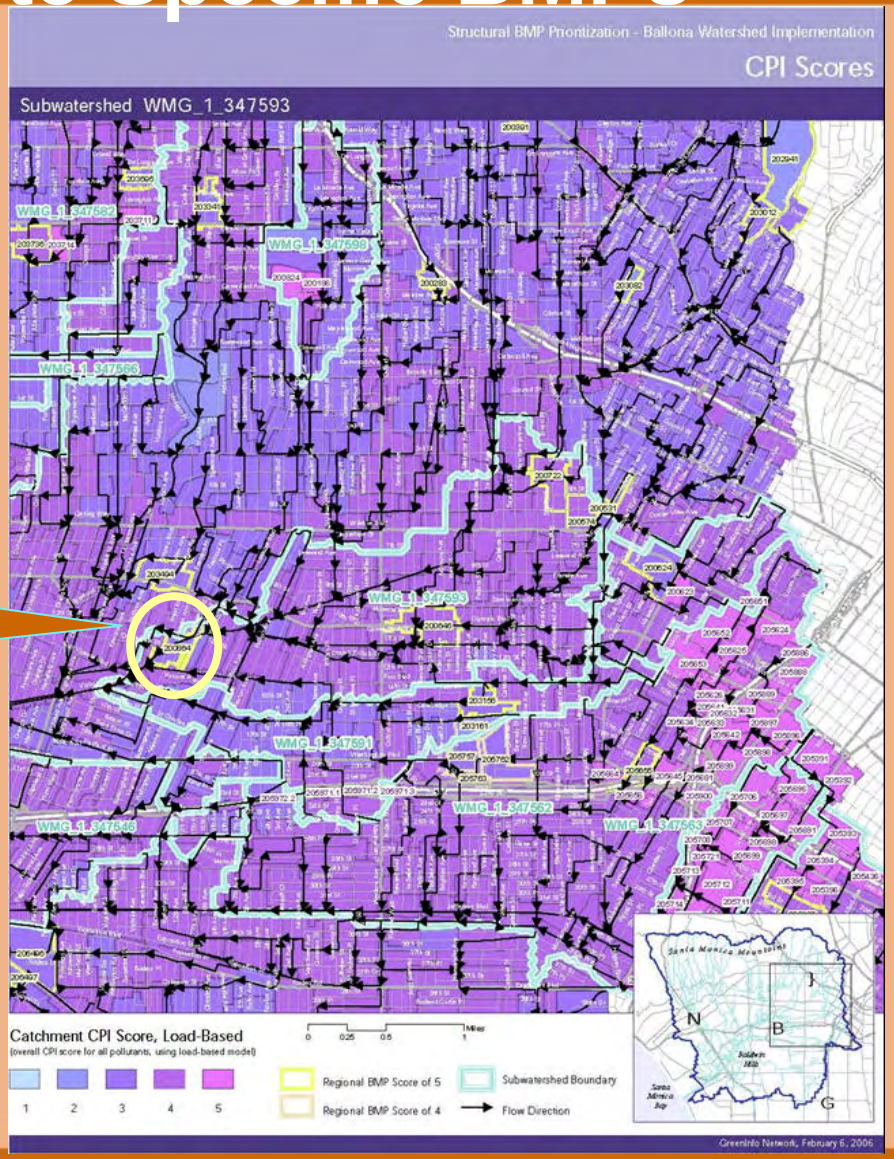
B. Desktop Level Screening (example)

High Priority Catchment

Step 4 Site Specific BMPs

B. Desktop Level Screening (example)

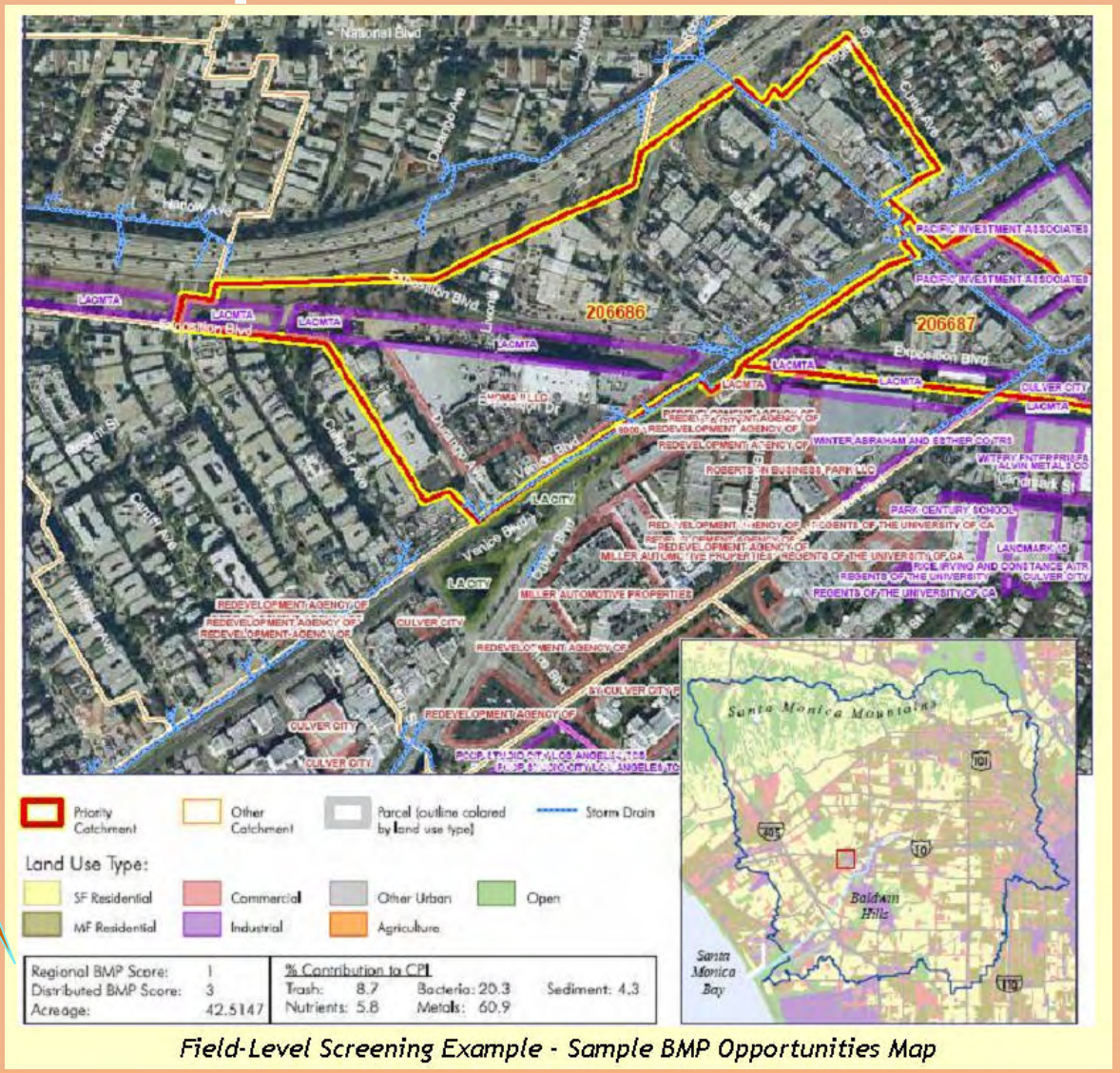
Regional Opportunity



Step 4 Site Specific BMPs

C. Field-Level Screening

Distributed Score = 3
Regional Score 1



Field-Level Screening Example - Sample BMP Opportunities Map

Step 4 Site Specific BMPs

C. Field-Level Screening (cont'd)

Look for Existing BMPs and potentially remove from priority list

Parking Lot Planter Boxes/ Bioretention Strip w/ Curb Cuts

Step 4 Site Specific BMPs

C. Field-Level Screening (cont'd)

Field Form

Catchment BMP Prioritization Field Observations Data Sheet

Catchment No.: _____ **Date:** _____
Field Personnel: _____

Regional BMP Score: _____ CPI Score _____
Distributed BMP Score: _____ Total Acreage _____

Major Land Uses _____
Major Cross-Streets _____

Drainage Description (general flow direction, major storm drains, location/no. of catch basins, downspouts, pervious areas)

Public Parcels Description (ownership/name, building characteristics, parking lots, landscaped areas, open space, x-streets)

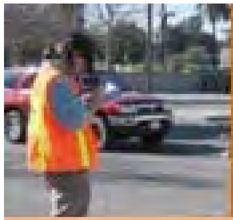
Other (Private) Large Parcels Description/General Notes

Most Promising BMPs and Implementation Locations (see notes below)

Notes - Consider the following areas when evaluating potential BMPs:
- Rooftops (for cisterns, green roofs, bioretention)
- Roadways (for bioretention, swales, catch basin inserts, hydrodynamic separators, GSRDs, media filters)
- Sidewalks and walkways (for bioretention, swales, porous pavement)
- Parking lots (for porous pavement, swales, bioretention, catch basin inserts, media filters)
- Blacktop areas such as school playgrounds (for bioretention)
- Patios and common areas (for bioretention)
- Vacant lots (for any regional BMP, bioretention, swales, media filters)
- Parks and playfields (for any regional BMP, bioretention, swales, media filters)
- Utility corridors (for infiltration basins, swales, bioretention, media filters)
- Riparian corridors/open channels (for channel naturalization)

Photo Log (also note photo ID no. and direction on accompanying catchment/stormdrain maps):

Figure 17. Blank Field Observation Data Sheet



Step 4 Site Specific BMPs

GeoSyntec Consultants

SITE-SPECIFIC BMP EVALUATION: METHODOLOGY STEP 4

Regional BMP Opportunities Summary

Suggested Maximum Drainage Area to BMP Area Ratios	
Infiltration Basin	25:1
Detention Basin	25:1
Det. w/ SSF Wetlands	25:1
SF Wetlands	25:1
Treatment Facility	N/A
Hydrodynamic Separator	Unknown
Channel Naturalization	N/A

Catchment ID:
Area (acres):
Nodal CPI Score:
Reg. BMP Score:

Potential BMP Location Description[1]	Recommended BMP Type[2]	Max. Approx. BMP Footprint (acres)[3]	Max. Approx. Treatable Area (acres)[4]

Catchment ID:
Area (acres):
Nodal CPI Score:
Reg. BMP Score:

Potential BMP Location Description[1]	Recommended BMP Type[2]	Max. Approx. BMP Footprint (acres)[3]	Max. Approx. Treatable Area (acres)[4]

Catchment ID:
Area (acres):
Nodal CPI Score:
Reg. BMP Score:

Potential BMP Location Description[1]	Recommended BMP Type[2]	Max. Approx. BMP Footprint (acres)[3]	Max. Approx. Treatable Area (acres)[4]

Catchment ID:
Area (acres):
Nodal CPI Score:
Reg. BMP Score:

Potential BMP Location Description[1]	Recommended BMP Type[2]	Max. Approx. BMP Footprint (acres)[3]	Max. Approx. Treatable Area (acres)[4]

[1] E.g., parcel's location in catchment, BMP's location in parcel, existing use of BMP location, potential source of stormwater, etc.
[2] I.e., inf. basin, det. basin, det. w/ SSF wetlands, constructed SF wetlands, tmt. facility, hydro. separator, channel naturalization
[3] Estimated at desktop level by reviewing catchment map and/or aerial photos.
[4] Computed by multiplying estimated BMP footprint by drainage area ratio shown in table at top of page.

Figure 19. Regional Project Recommendations Summary Sheet

GeoSyntec Consultants

SITE-SPECIFIC BMP EVALUATION: METHODOLOGY STEP 4

Distributed BMP Opportunities Summary

Catchment ID:
Area (acres):
Normal CPI Score:
Dist. BMP Score:

Potential BMP Location Description[1]	Recommended BMP Type[2]
Max. Total Approx. % of Catchment Area Treated:	90%

Catchment ID:
Area (acres):
Normal CPI Score:
Dist. BMP Score:

Potential BMP Location Description[1]	Recommended BMP Type[2]
Max. Total Approx. % of Catchment Area Treated:	

Catchment ID:
Area (acres):
Normal CPI Score:
Dist. BMP Score:

Potential BMP Location Description[1]	Recommended BMP Type[2]
Max. Total Approx. % of Catchment Area Treated:	

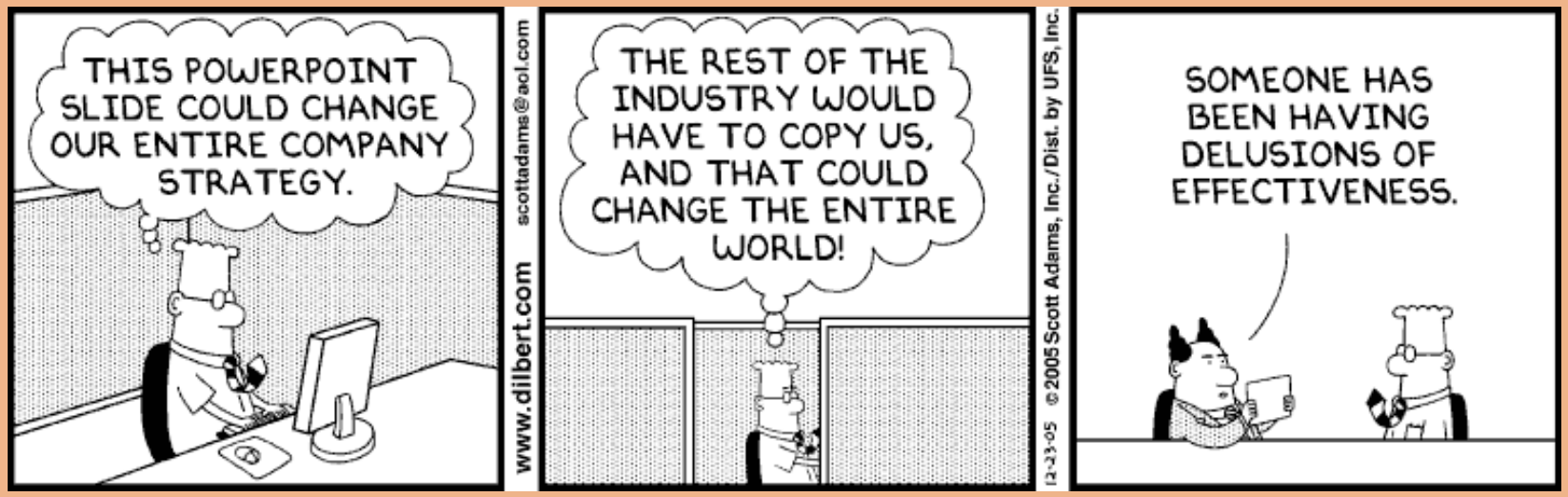
Catchment ID:
Area (acres):
Normal CPI Score:
Dist. BMP Score:

Potential BMP Location Description[1]	Recommended BMP Type[2]
Max. Total Approx. % of Catchment Area Treated:	

[1] Focus recommendations on major parcels highlighted in catchment maps. Example notes: parcel's location in catchment, BMP's location in parcel, existing use of BMP location, etc.
[2] I.e., cistern, bioretention, veg. swale, green roof, perm. pavement, man. separator system, media filter, CBI

Figure 18. Distributed Project Recommendations Summary Sheet

Does it work?


THIS POWERPOINT SLIDE COULD CHANGE OUR ENTIRE COMPANY STRATEGY.
THE REST OF THE INDUSTRY WOULD HAVE TO COPY US, AND THAT COULD CHANGE THE ENTIRE WORLD!
SOMEONE HAS BEEN HAVING DELUSIONS OF EFFECTIVENESS.
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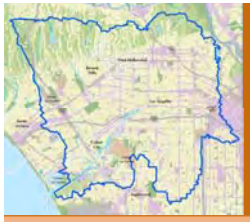
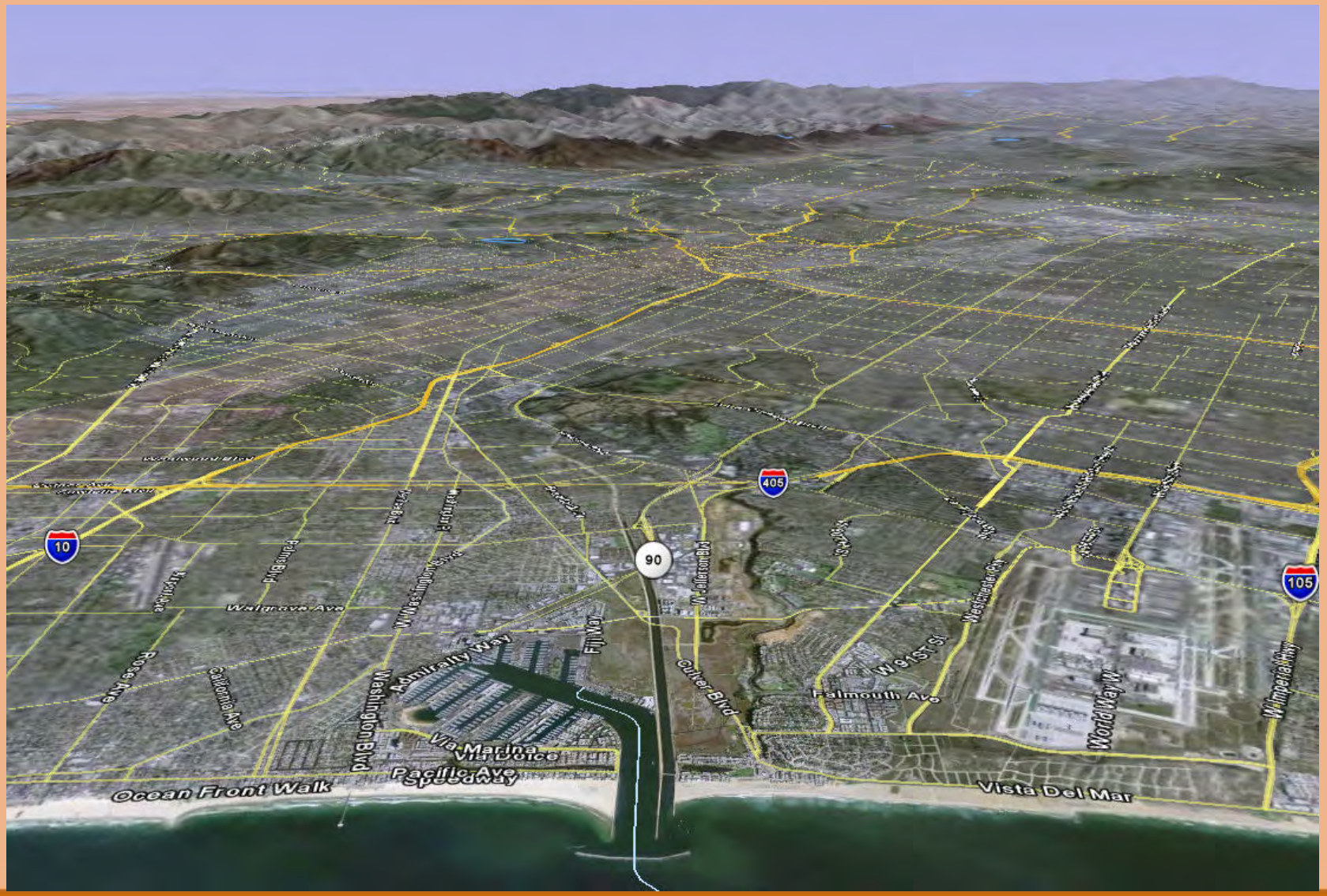
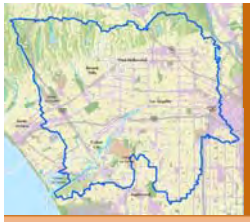
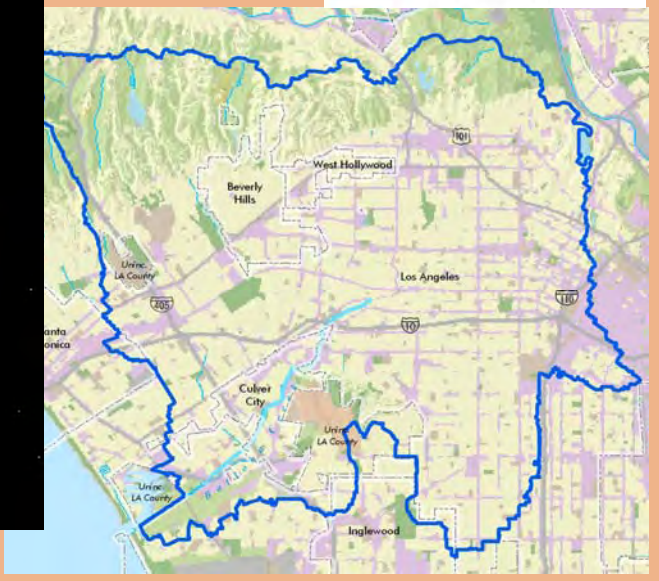


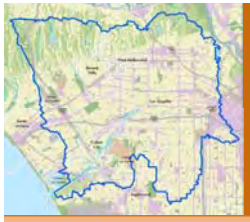
Test Implementation: Ballona Creek





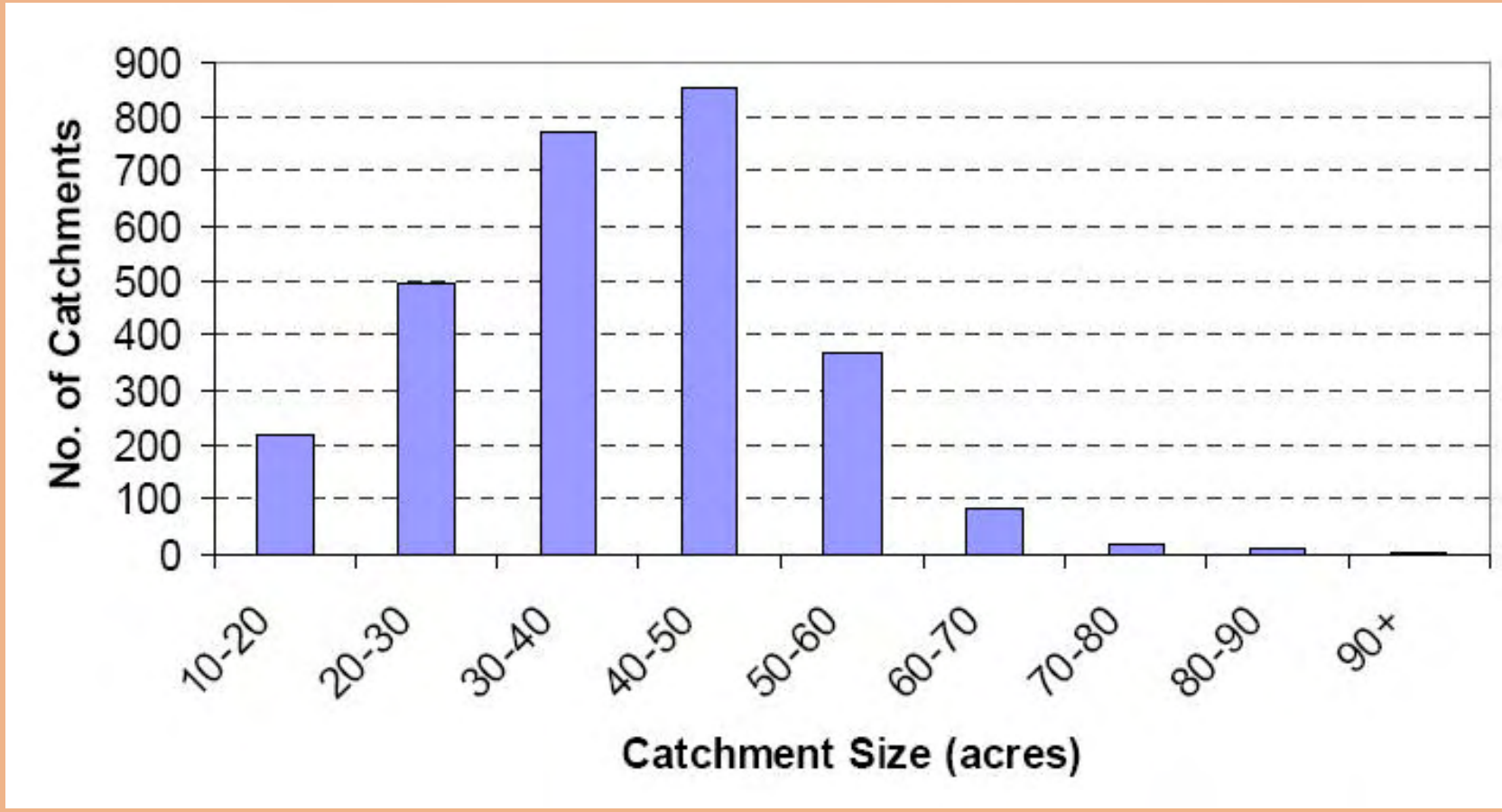
Test Implementation: Ballona Creek

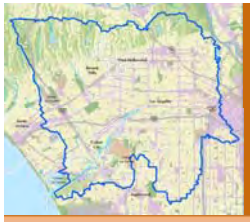




Test Implementation: Ballona Creek

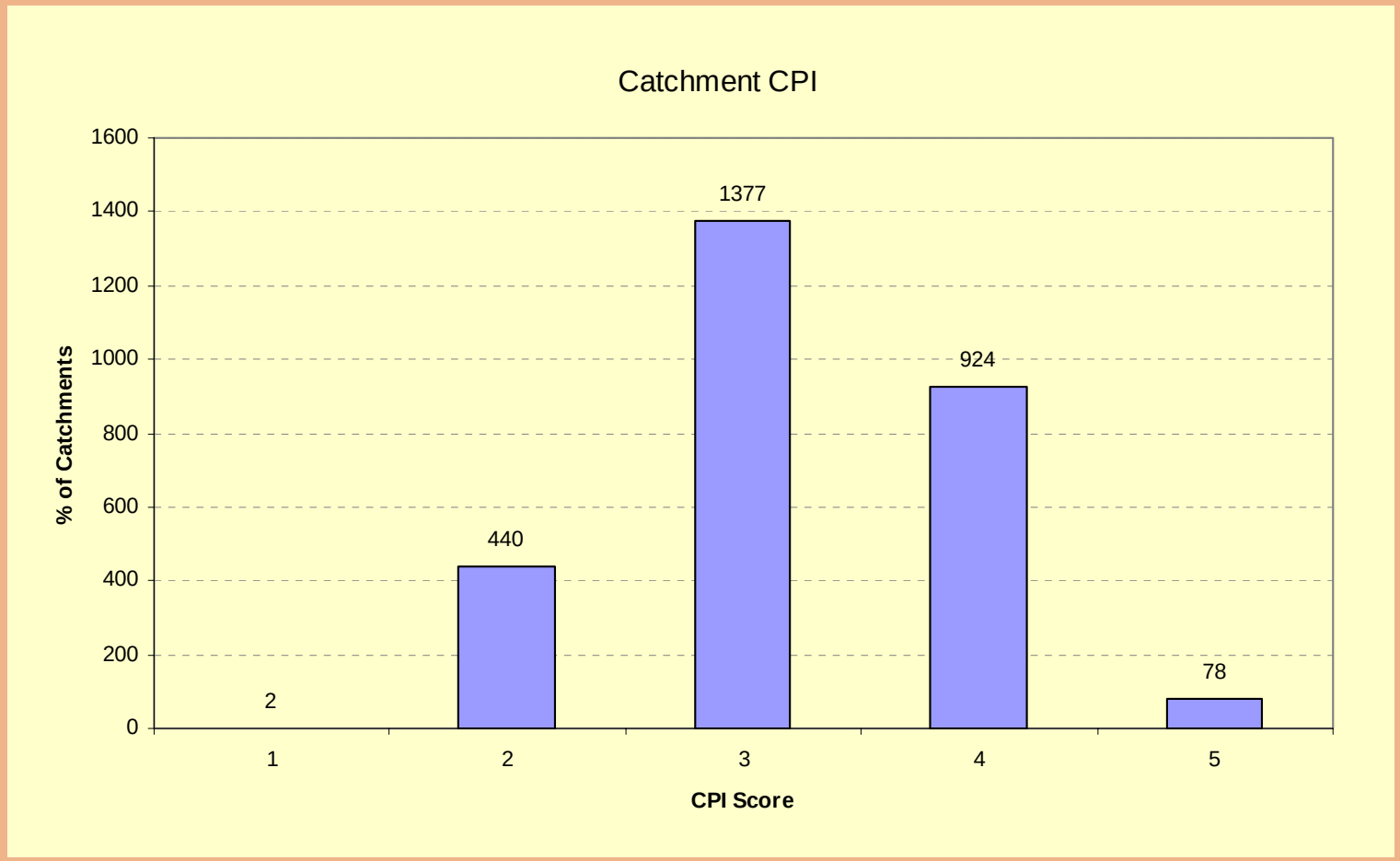
- Catchment Statistics





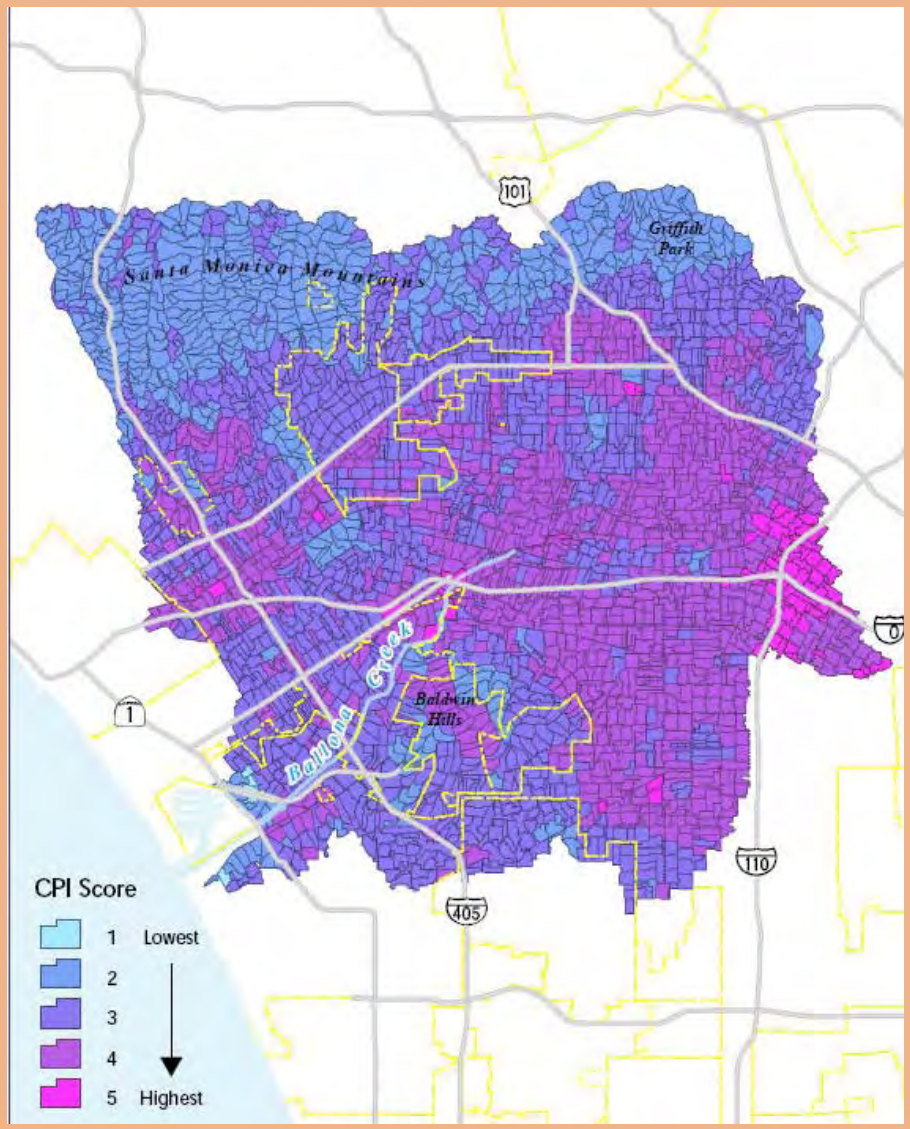
Test Implementation: Ballona Creek

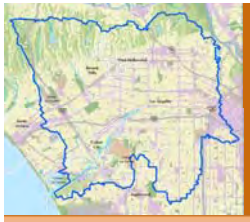
CPI Scores for Ballona Creek Catchments



Test Implementation: Ballona Creek

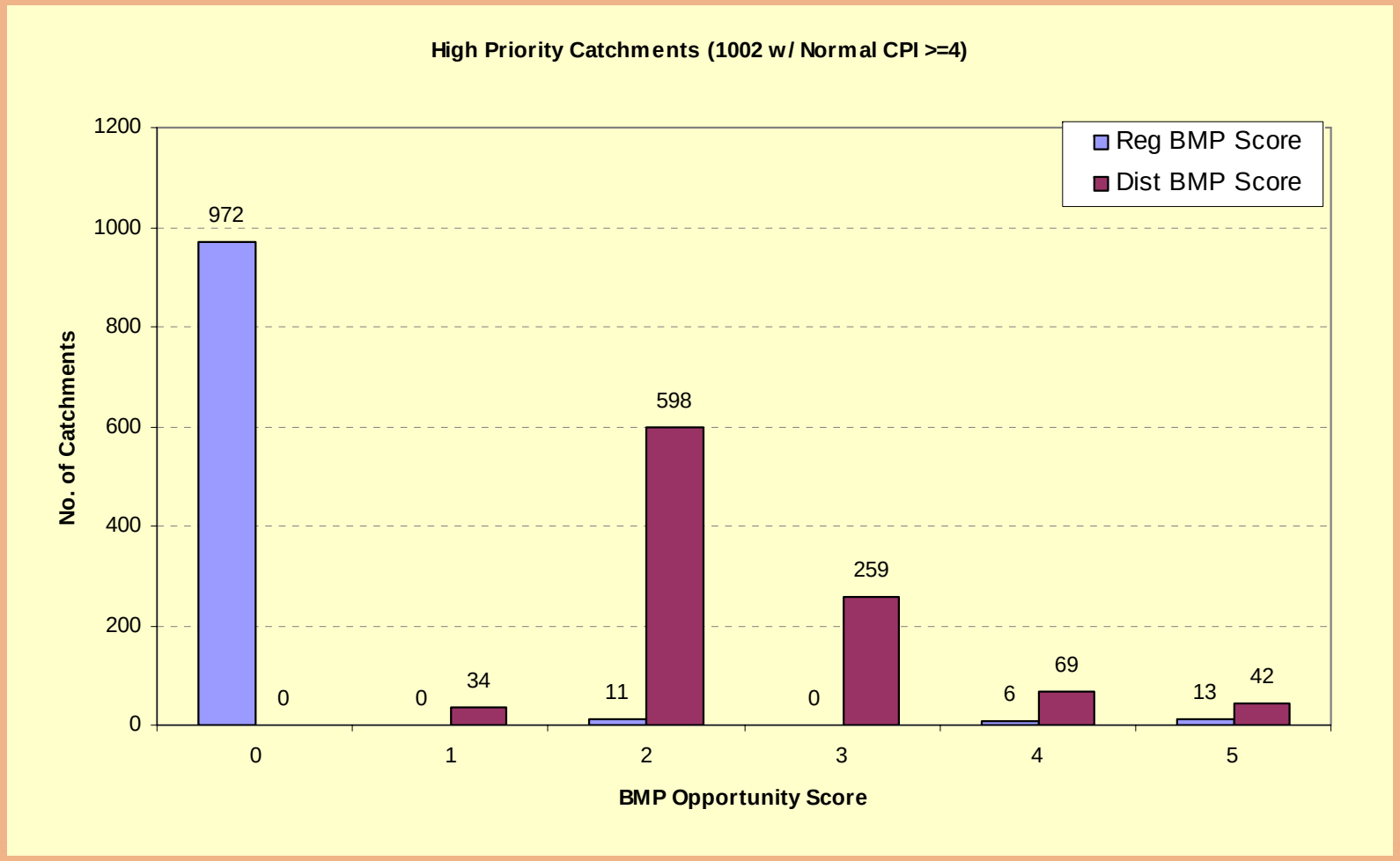
CPI Map





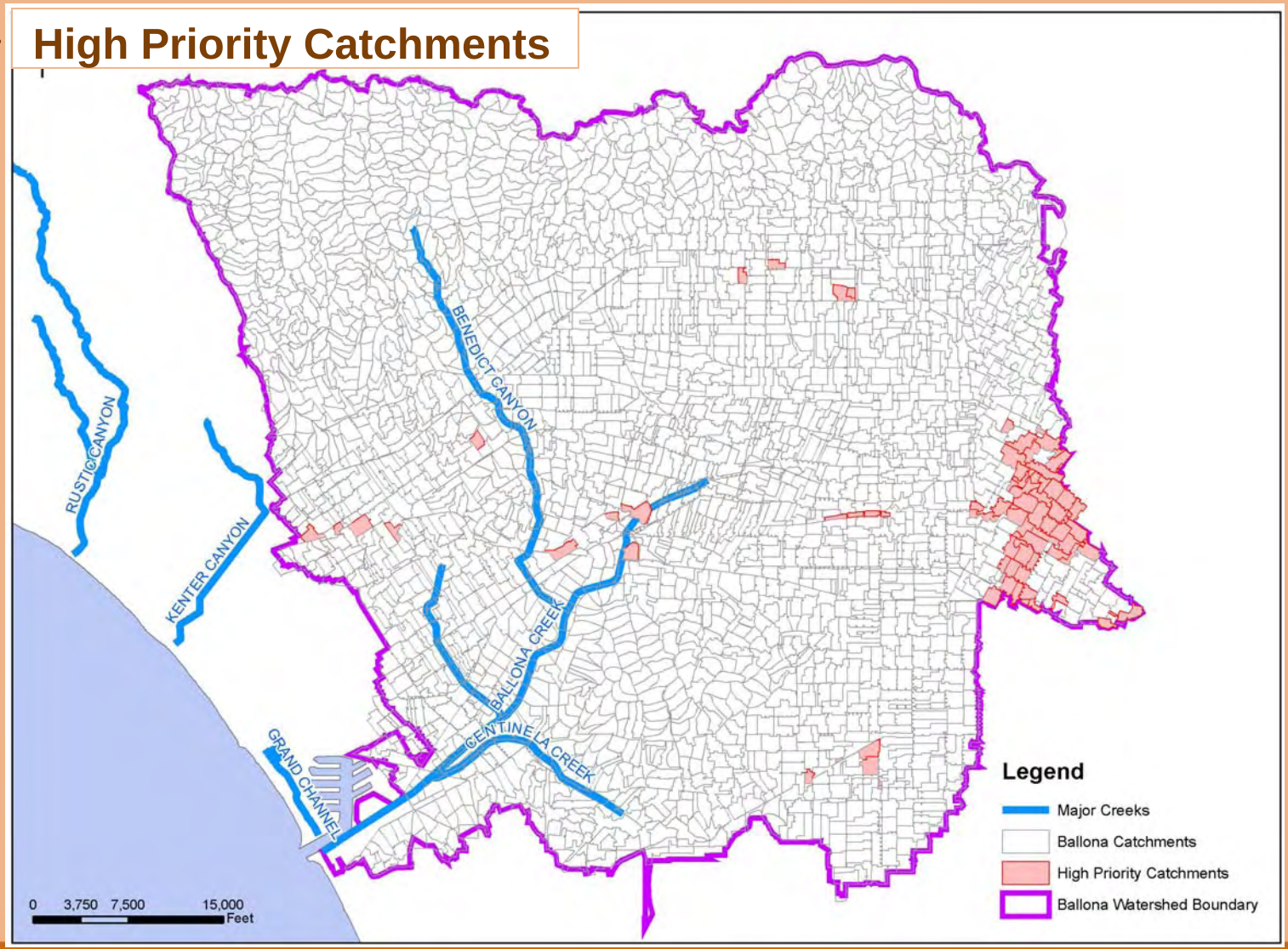
Test Implementation: Ballona Creek

Opportunities



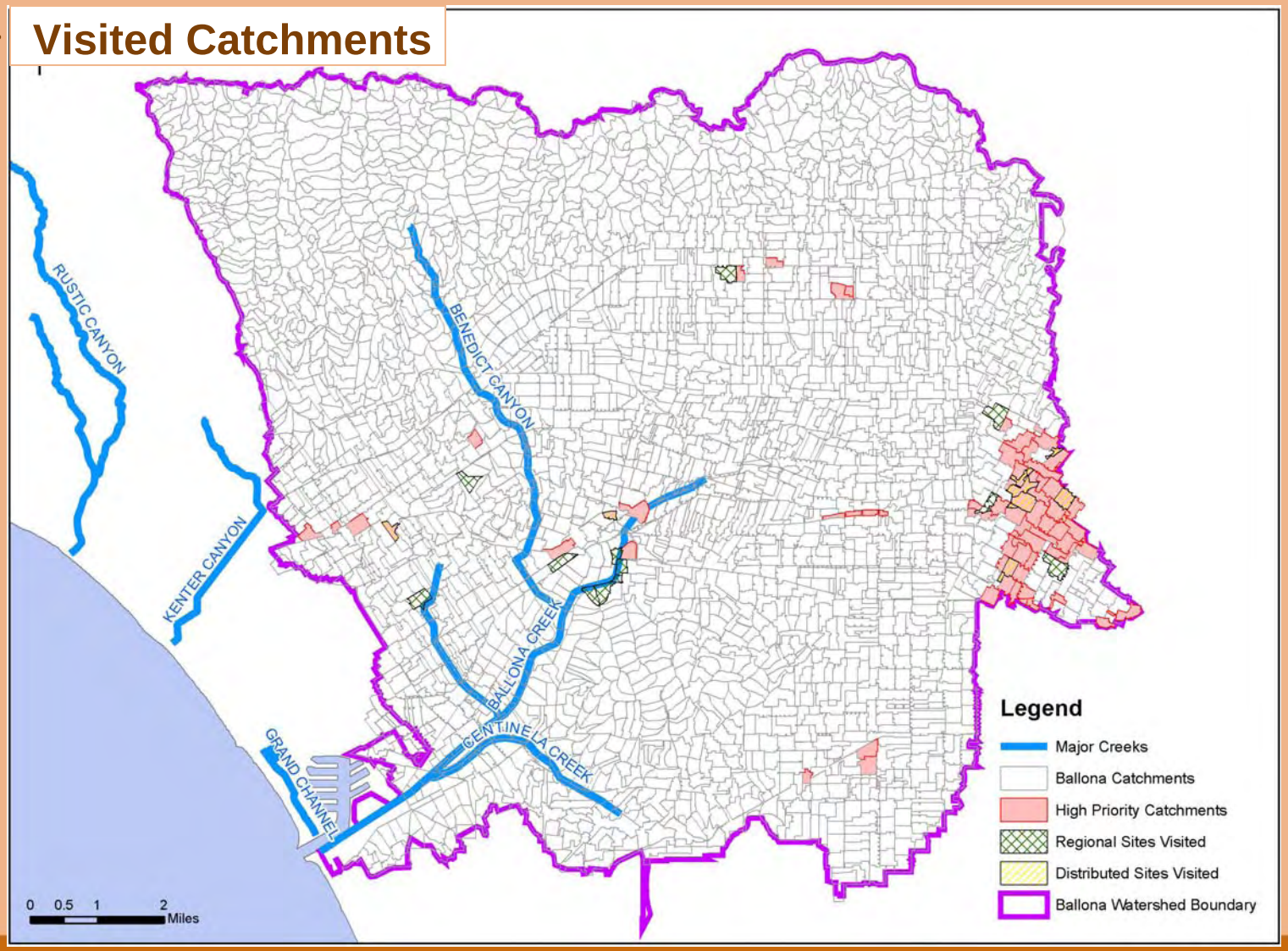
Test Implementation: Ballona Creek

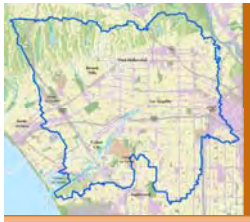
High Priority Catchments



Test Implementation: Ballona Creek

Visited Catchments

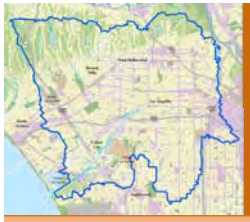




Test Implementation: Ballona Creek

Sites Visited

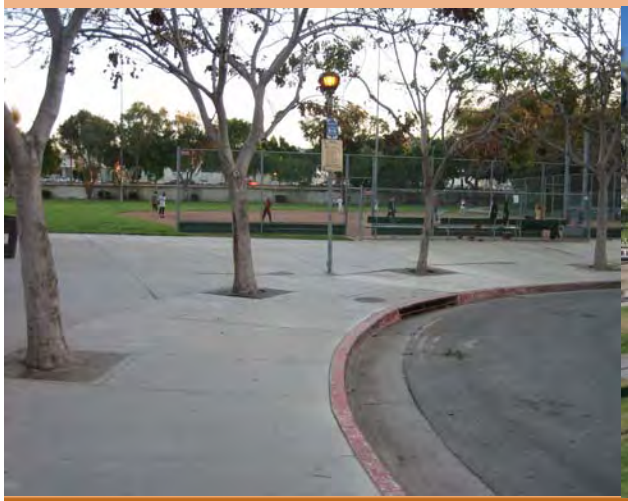
- 8 Regional Opportunity Sites, covering 26 upstream high priority catchments
- 17 Distributed Opportunity Sites
- 43 of 78 highest priority catchments effectively covered

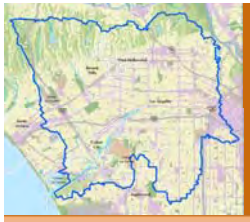


Test Implementation: Ballona Creek

Sites Visited

- 50% of the high priority catchments were field verified
- 2800 acres would be treated by regional solutions, and 200 acres by distributed BMPs.
- While this is only 4% of the watershed, it is in the highest pollutant loading areas

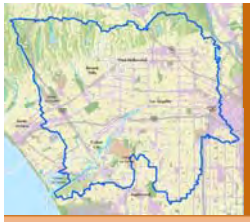




Test Implementation: Ballona Creek

Regional Example: Catchment ID: 205878

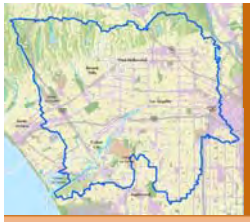
- Area (acres): 20-25 ac
- Nodal CPI Score: 4
- Reg. BMP Score: 5
- Potential BMP Location Description
  - Syd Kronenthal Park along National Blvd & Ballona Creek; baseball fields; major regional stormdrain along National at S edge of park
- Recommended BMP Types
  - (multiuse) infiltration/detention basin, detention w/ SSF wetlands, hydrodynamic separator pretreatement, bioretention, cistern, SF constructed wetlands
- Max. Approx. BMP Footprint (acres): 3 ac
- Max. Approx. Treatable Area (acres): 75 ac



Test Implementation: Ballona Creek

Distributed Example: Catchment ID: 203714

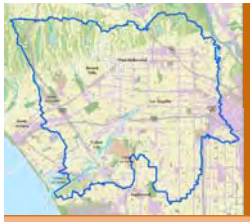
- Area (acres): 17.3 ac
- Normal CPI Score: 5
- Dist. BMP Score: 2
- Potential BMP Location Description and BMPs
  - Minor green parkways along Willoughby Ave (near Formosa Ave) & La Brea Ave (west side near Willoughby)
    Bioretention
  - Major parking lots north and south of west end of Romaine Street
    Permeable Pavement
  - Major catchbasin retrofit opportunity at 2 curb inlets at Willoughby and Formosa where most of ind/comm catchment drains to via sheet flow
    Separator, Filter, CBI
- Max. Total Approx. % of Catchment Area Treated: 90%



Test Implementation: Ballona Creek

Distributed Summary (preliminary screening of opportunities)

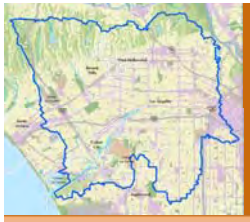
- Bioretention (including downspouts): 22
- Filters: 16
- Catchbasin Inserts: 15
- Swales: 13
- Infiltration trenches: 11
- Hydrodynamic separators: 9
- Pervious pavements: 8
- Cisterns: 4



Test Implementation: Ballona Creek

Primary Objective of Test Implementation is *to improve Methodology*

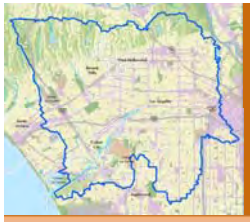
- Changes
  - Regional BMP scores process – Nodal CPI score development
  - Development of comprehensive BMP Project determination methods
    - GIS-Based
    - Desktop-Based
    - Enhanced Field Investigation Processes
  - Enhanced Database for Cost Analysis
- Secondary Objective: To provide initial lists for Ballona Creek Watershed



Test Implementation: Ballona Creek

Conclusions

- Few regional opportunities on Public Land (golf courses, parks etc.) in high priority catchments; land acquisition may be required for significant regional BMP implementation.
- Distributed opportunities through retrofit are plentiful, however, would may require large-scale implementation of suites of BMPs



Test Implementation: Ballona Creek

Recommendations

Use the methodology to investigate implementation scenarios:

- (Regional BMPs) conduct additional investigations for the use or acquisition of land in and downstream of high priority catchments (private land acquisition was weighted low in opportunity index)
- Implementation of distributed BMPs by land use groups, e.g.
  - Parking lots
  - Industrial/commercial rooftops
  - Major thorough fares and highways

Project Conclusions

Project Conclusions

Methodology provides users with a useful, next generation tool for structural BMP planning that:

- Generates high priority catchment and project maps
- Identifies high priority projects that have been field verified and screened for fatal flaws
- Allows users to change weights of factors to reflect different goals and to run various implementation scenarios

Project Conclusions

Strengths of the Methodology:

- Systematic approach to using multiple data sources and weighing multiple factors to prioritize BMPs
- Identified projects are field-verified and screened for fatal flaw - provides strong foundation for planning
- Transparent, flexible, adaptable, unbiased

Project Conclusions

Future modifications to the methodology could include:

- **Enhancement to provide linkage between structural BMPs plans and attainment of water quality goals (TMDLs, standards, etc.)**
- **Consistency with Integrated Water Resources Approach which**
  - Incorporates multi-purpose projects
  - Results in solutions that address multiple pollutants
  - Focuses on beneficial use of runoff
- **Incorporation of planning-level costs into basis for prioritization, and establishment planning-level cost-benefit ratios.**
- **Develop reviewed existing BMP project database**

Project Conclusions

- **The tool is ready for watershed groups and municipalities to develop and rank structural BMP projects**
- **Other potential uses:**
  - TMDL implementation planning
  - Watershed planning (RWIPs)
  - Integrated regional water management planning (IRWMPs)
- **We cannot just "push the button" and get a plan – professional judgment and experience is critical.**
- **The methodology is designed to allow for iterative and adaptive improvement.**

Proposition 13 Disclosure

Funding for this project was provided in full or in part through an agreement with the State Water Resources Control Board (SWRCB) pursuant to the Costa-Machado Water Act of 2000 (Proposition 13) and any amendments thereto for the implementation of California's Nonpoint Source Pollution Control Program. The contents of this document do not necessarily reflect the views and policies of the SWRCB, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

Thank You

www.labmpmethod.org

(available May 2006)

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