Geosyntec consultants

Watershed Planning for Improved Water Quality

One aspect of Southern California Water Management – Stormwater Quality

Ken Susilo, PE, D.WRE, CPSWQ, Principal, Geosyntec Consultants
Southern California Water Dialogue
October 28, 2015

Objectives

- To share experiences and strategies region-wide
- To discuss multiple benefits and financial considerations
- To share conclusions and implications from these watershed planning efforts

2012/2013 MS4 Permits

- 2012 Los Angeles County
  - Enhanced Watershed Management Programs (EWMPs)
  - Watershed Management Programs (WMPs)
- 2013 (2015) San Diego Region
  - Water Quality Improvement Plans (2nd Drafts Submitted in San Diego)
- Incorporation of *Total Maximum Daily Loads* (TMDLs)
- Disclaimer: still in draft form/comments pending (LA WMPs conditionally approved, presentations November 5th to RWQCB)

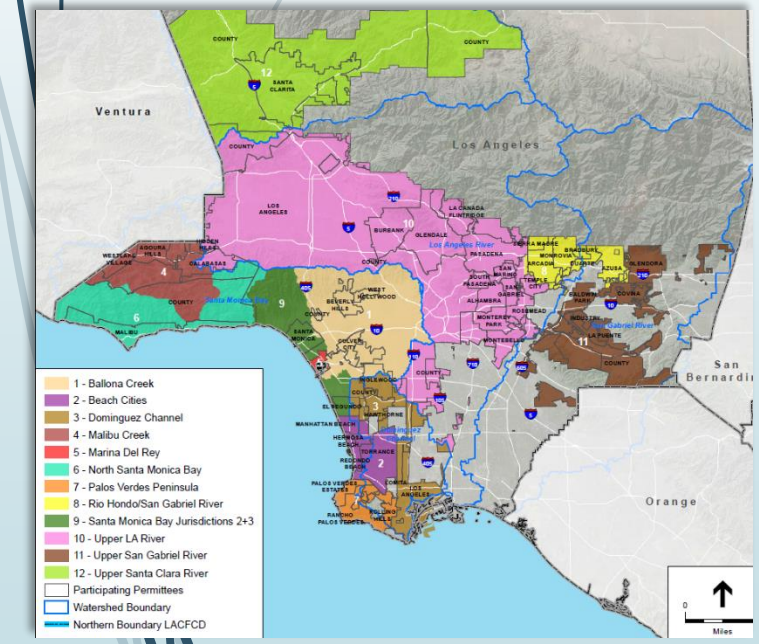
Reasonable Assurance Analysis

- **Reasonable**
  adj., adv. in law, just, rational, appropriate, ordinary or usual in the circumstances. It may refer to care, cause,compensation, doubt (in a criminal trial), and a host of other actions or activities.
  - West's Encyclopedia of American Law, edition 2. (2008).
- **Assurance**
  Noun, positive declaration intended to give confidence.
  - Dictionary.com (2015)
- **Reasonable Assurance Analysis** "… consists of an assessment (through quantitative analysis or modeling) to demonstrate that the activities and control measures (i.e. BMPs) … will achieve applicable water quality based effluent limitations and/or receiving water."
  - LARWQCB (2012)

Arguably the most comprehensive watershed-based planning analyses conducted for MS4 compliance in the nation.

Examples Cited / Data Sources (Public)

~$15-20M (est) in planning studies!



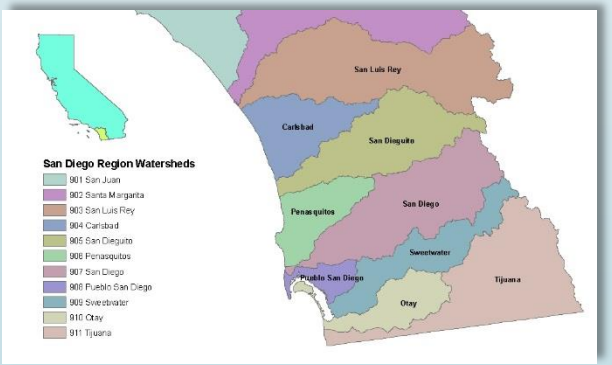
Source: LACDPW

Los Angeles Region

- Upper Santa Clara River
- Malibu Creek
- North Santa Monica Bay
- Santa Monica Bay(J2/J3)
- Marina Del Rey
- Ballona Creek
- Southbay Beach Cities
- Peninsula Cities
- Upper Los Angeles River
- Upper LA River Upper Reach 2
- Lower Los Angeles River
- Dominguez Channel
- Rio Hondo/ San Gabriel
- Upper San Gabriel River
- East San Gabriel River

San Diego Region

- Carlsbad
- Los Penasquitos
- Mission Bay
- San Dieguito
- San Luis Rey
- San Diego Bay
- San Diego River
- Tijuana River



Source: SDRWQCB

Geosyntec consultants

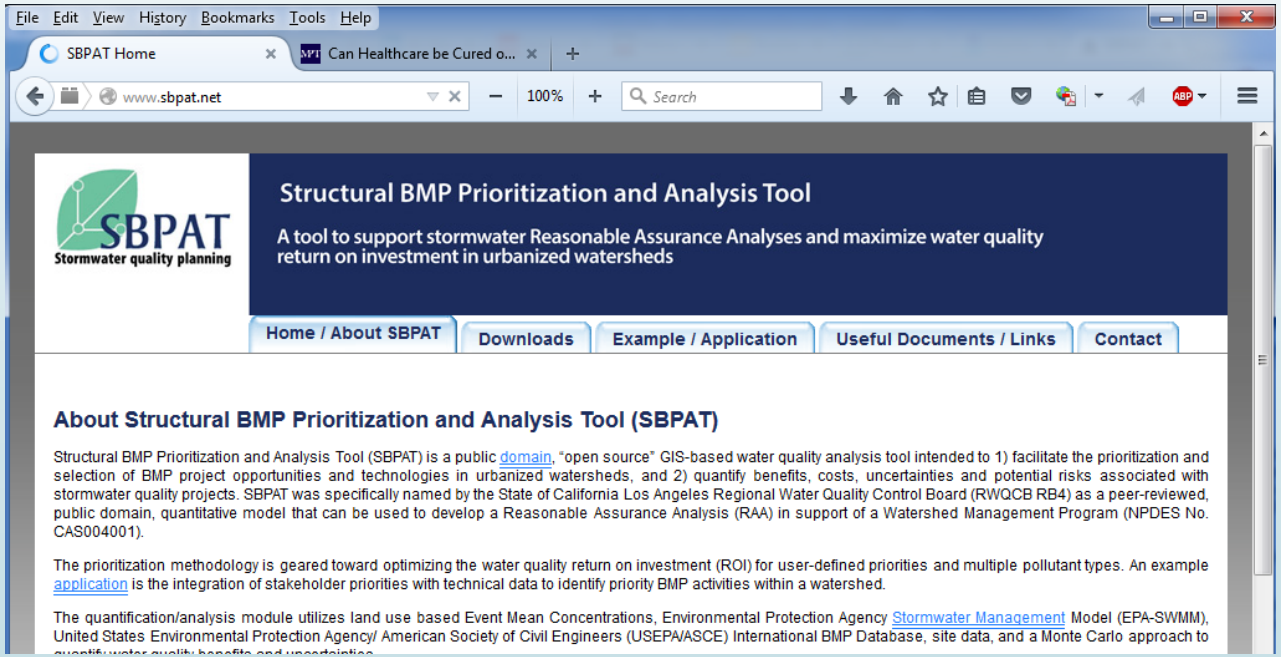
How is Reasonable Assurance Modeled?

- LA MS4 Permit/Models Defined
  - LA MS4 Requirement(Part VI.C.5.b.iv(5)) "Models to be considered for the RAA, without exclusion, are the Watershed Management Modeling System (WMMS), Hydrologic Simulation Program-FORTRAN (HSPF), and the Structural BMP Prioritization and Analysis Tool (SBPAT)."
  - SBPAT
  - LSPC-SBPAT
  - WMMS (LSPC-SUSTAIN)
  - NS BMP Approaches
- SD Region MS4 Permit Models Used
  - SBPAT
  - LSPC-SBPAT
  - LSPC-SUSTAIN
  - NS BMP Approaches

GIGO

What is SBPAT?

- Jointly developed by Heal the Bay, City of Los Angeles, County of Los Angeles Public Works; funded by the SWRCB, RWQCB and developing partners
- Public Domain, GIS-Based transparent, "open source"
- Land Use/Runoff - based algorithms
- Used in Los Angeles, San Diego, Orange, Ventura Counties



www.sbpat.net

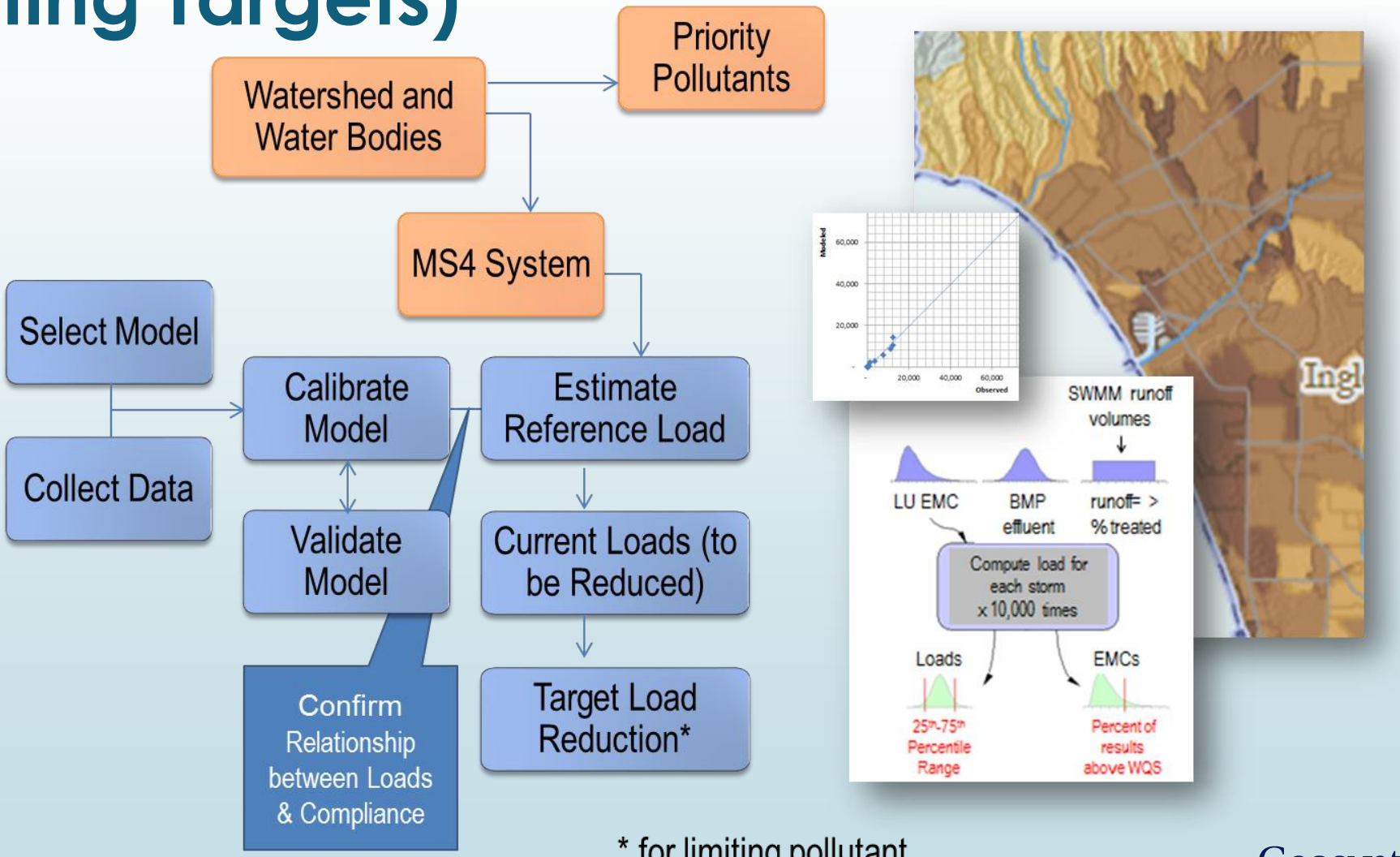
Geosyntec consultants

Planning *processes* vary between regions

Public Outreach & Deliverable Process

- Los Angeles Region
  - Progress/intermediate workshops throughout
  - Technical Advisory Committee/Technical Working Groups
  - RWQCB Guidance
  - Submittal of detailed Work Plan
- San Diego Region
  - Public workshops
  - Representative Consultation Panels
  - Submittals Priorities: H/PWQC & Strategies; Goals, Strategies & Schedules (BMPs and "RAA"); Watershed Management Area Analyses, Water Quality Equivalency Studies

Reasonable Assurance Analyses (Setting Targets)

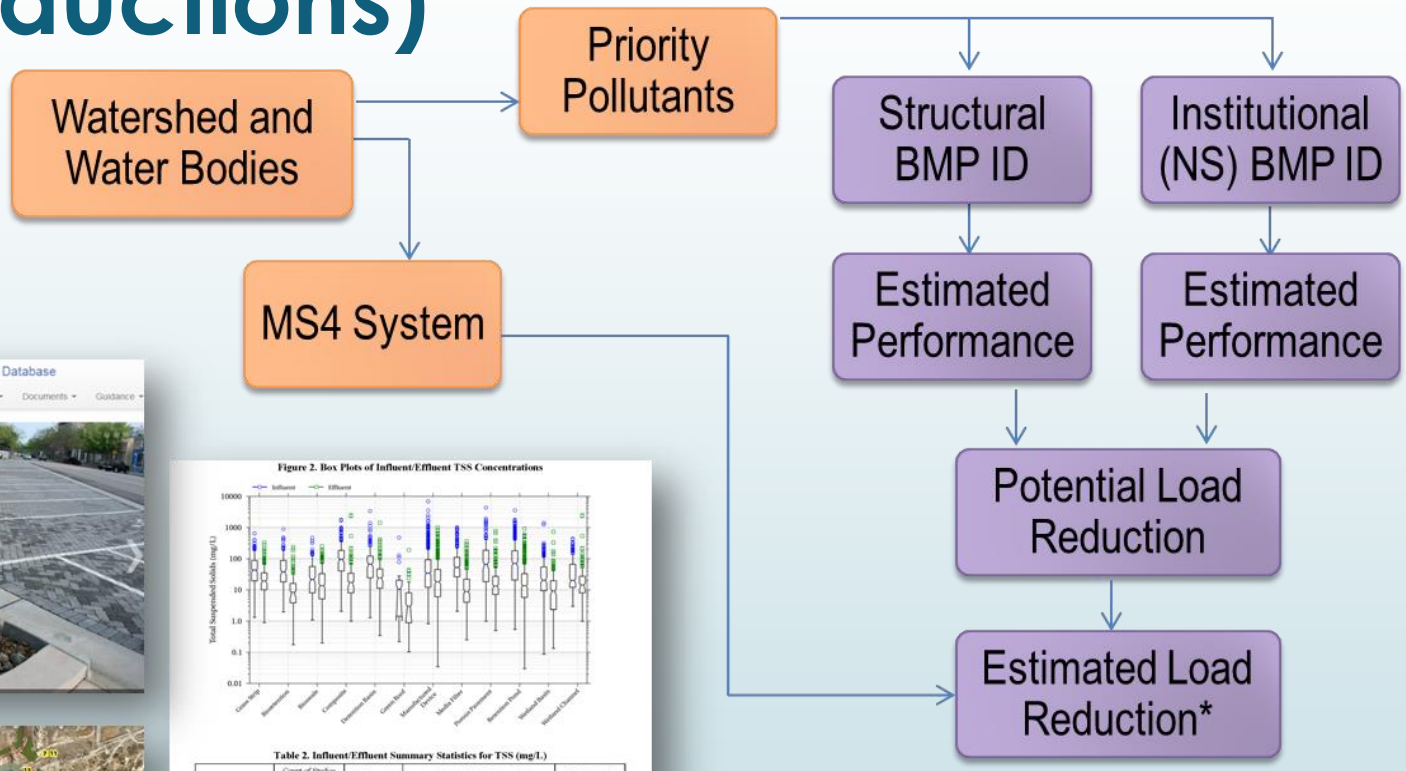


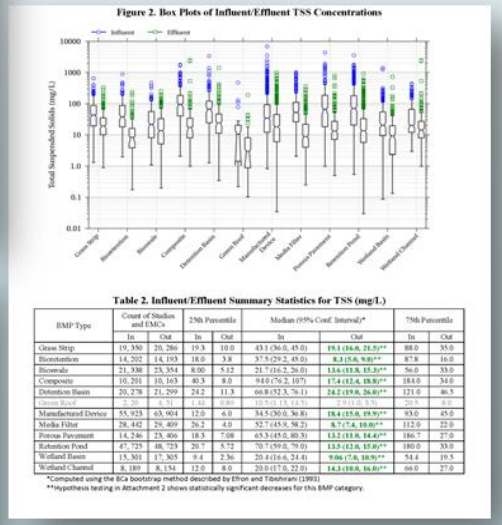
From
SMB EWMP RAA

* for limiting pollutant

Geosyntec consultants

Reasonable Assurance Analyses (Load Reductions)

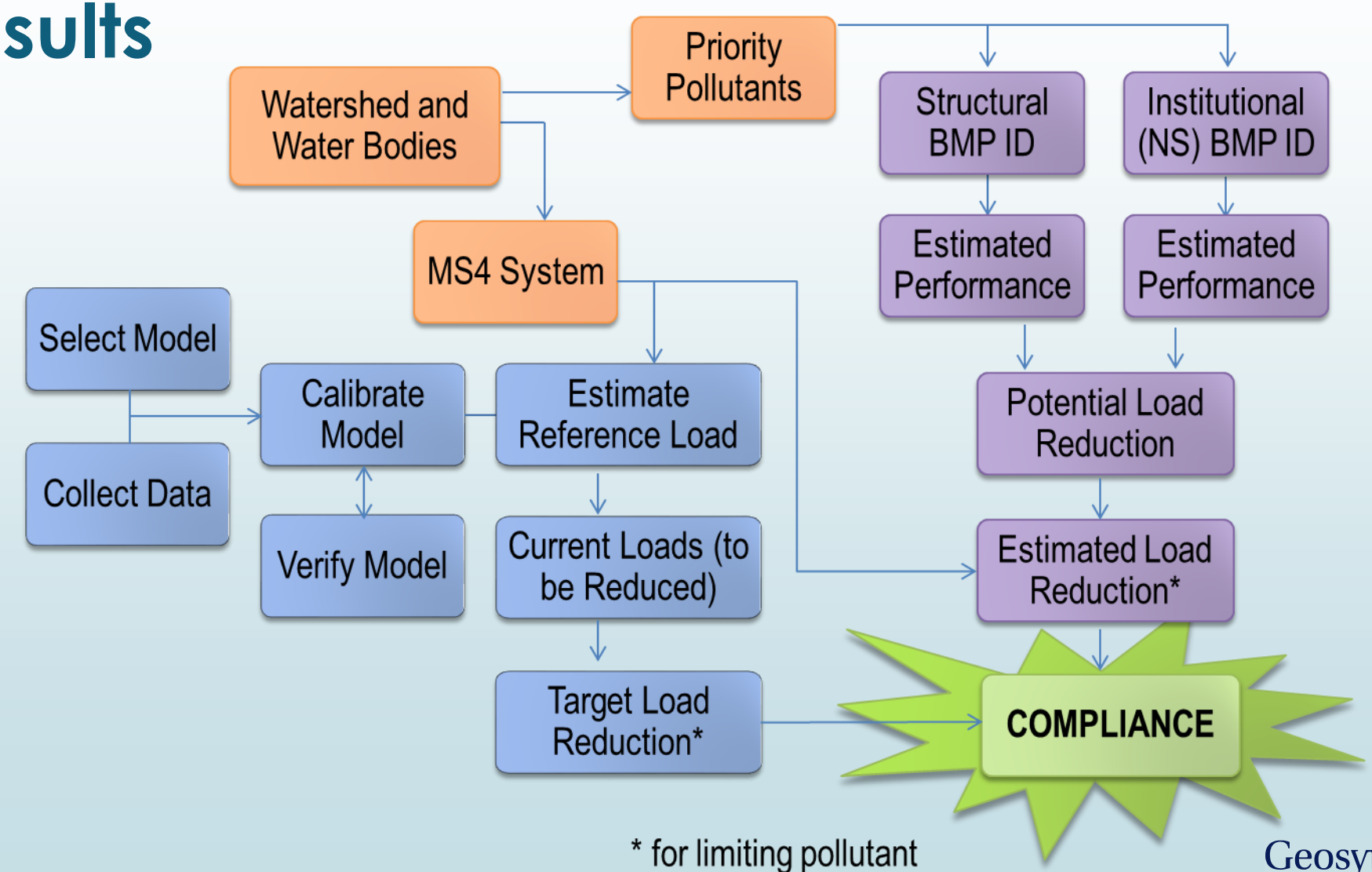




From
SMB EWMP RAA

Geosyntec consultants

Reasonable Assurance Analyses Results



From
SMB EWMP RAA

* for limiting pollutant

Geosyntec consultants

How did we get there?
BMP Implementation Approaches

- Non Structural BMPs
  - Source controls
  - Source tracking studies
  - Institutional controls
- Structural BMPs
  - Distributed
  - Centralized/Regional
  - Restoration Projects

Best Management Practices

How did we get there? BMP Implementation Approaches

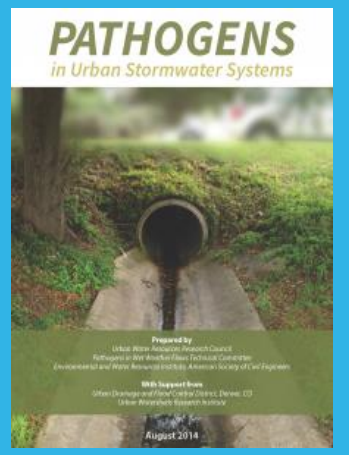
- Non Structural BMPs
  - Source controls
  - Source tracking studies
  - Institutional controls
- Structural BMPs
  - Distributed
  - Centralized/Regional
  - Restoration Projects

- Phasing out of copper in brake pads
- Targeting zinc in tires and reducing galvanized steel
- Product replacement
- Enhanced activities

How did we get there? BMP Implementation Approaches

- Non Structural BMPs
  - Source controls
  - Source tracking studies
  - Institutional controls
- Structural BMPs
  - Distributed
  - Centralized/Regional
  - Restoration Projects

- Microbial Source Tracking (MST) studies
- Identification and elimination of human markers

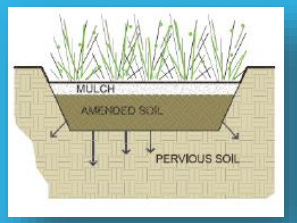


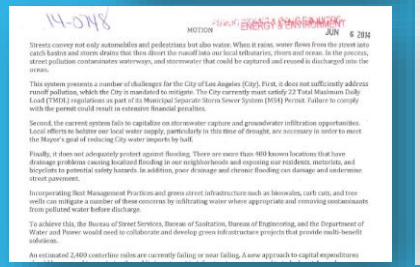
Geosyntec consultants

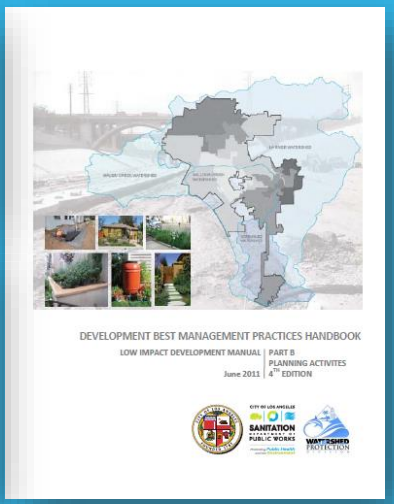
How did we get there?
BMP Implementation Approaches

- Non Structural BMPs
  - Source controls
  - Source tracking studies
  - Institutional controls
- Structural BMPs
  - Distributed
  - Centralized/Regional
  - Restoration Projects

- Low Impact Develop./ Redevelopment Rates
- GI in Public ROW
- Other ordinances





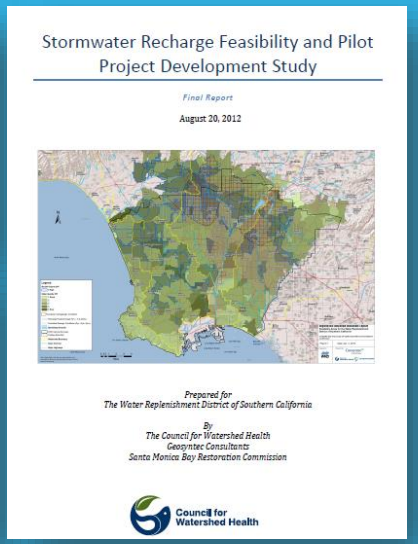


Geosyntec consultants

How did we get there?
BMP Implementation Approaches

- Non Structural BMPs
  - Source controls
  - Source tracking studies
  - Institutional controls
- Structural BMPs
  - Distributed
  - Centralized/Regional
  - Restoration Projects

- Green Streets
- Public Parcel Retrofits
- Public Private Partnerships (P3s)



Geosyntec consultants

How did we get there?
BMP Implementation Approaches

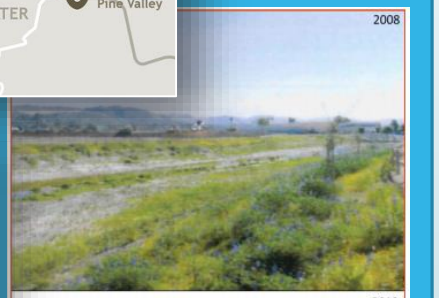
- Non Structural BMPs
  - Source controls
  - Source tracking studies
  - Institutional controls
- Structural BMPs
  - Distributed
  - Centralized/Regional
  - Restoration Projects

- Capture and Treat
- Wetlands; Infiltration
- P3s

How did we get there?
BMP Implementation Approaches

- Non Structural BMPs
  - Source controls
  - Source tracking studies
  - Institutional controls
- Structural BMPs
  - Distributed
  - Centralized/Regional
  - Restoration Projects

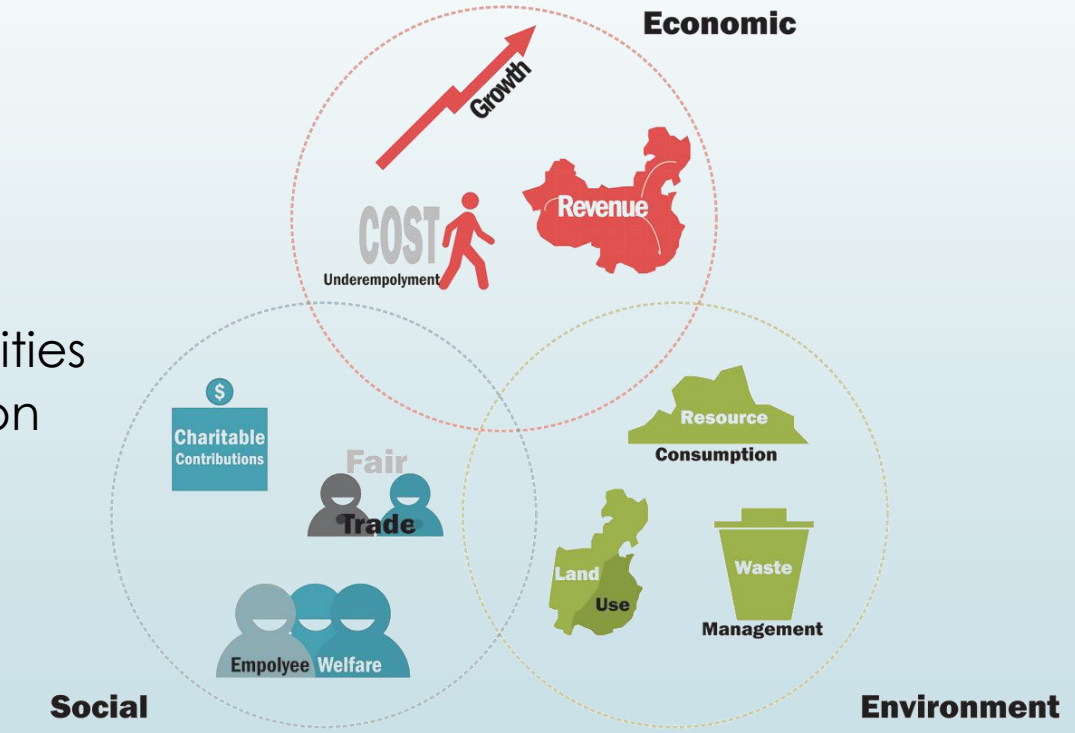
Forrester Creek, SDR WQIP



Geosyntec consultants

Multiple benefits of regional/ centralized BMPs (beyond WQ)

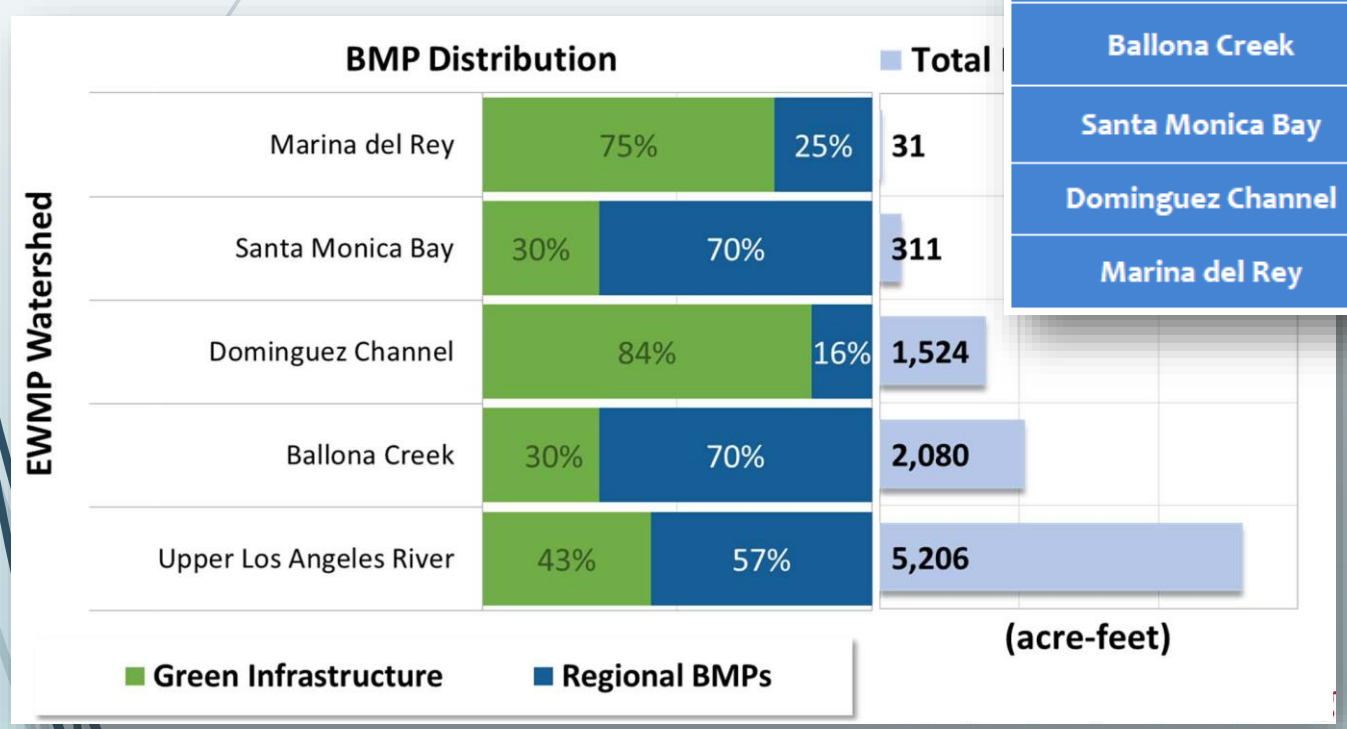
- Environmental
  - Restoration
  - Habitat
  - Urbanization Effects
- Social
  - Parks/Disadvantaged Communities
  - Trails/Passive & Active Recreation
- Economic
  - Water Supply
  - Jobs (Construction & O&M)
  - Property Values/*

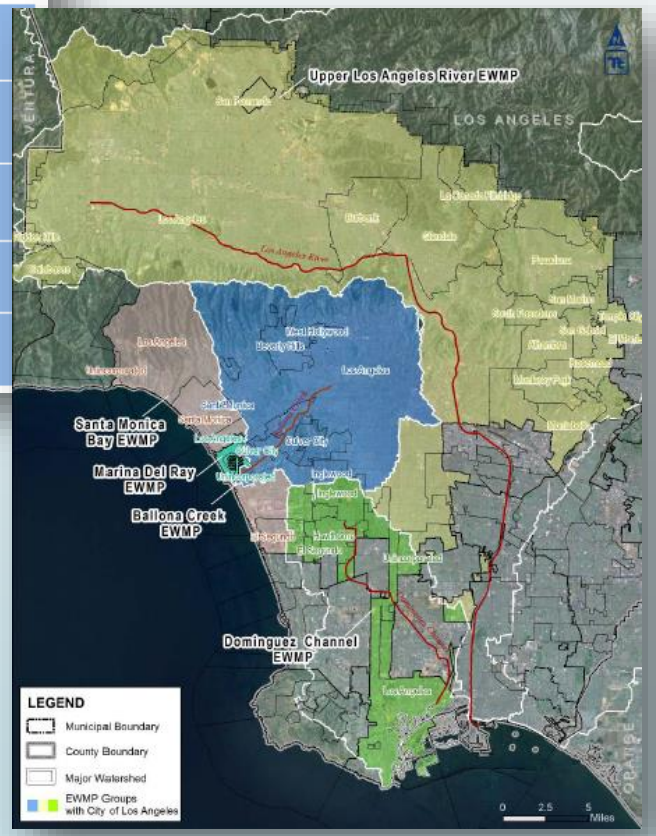


Geosyntec consultants

Results: BMP Types (LA Watersheds Example)

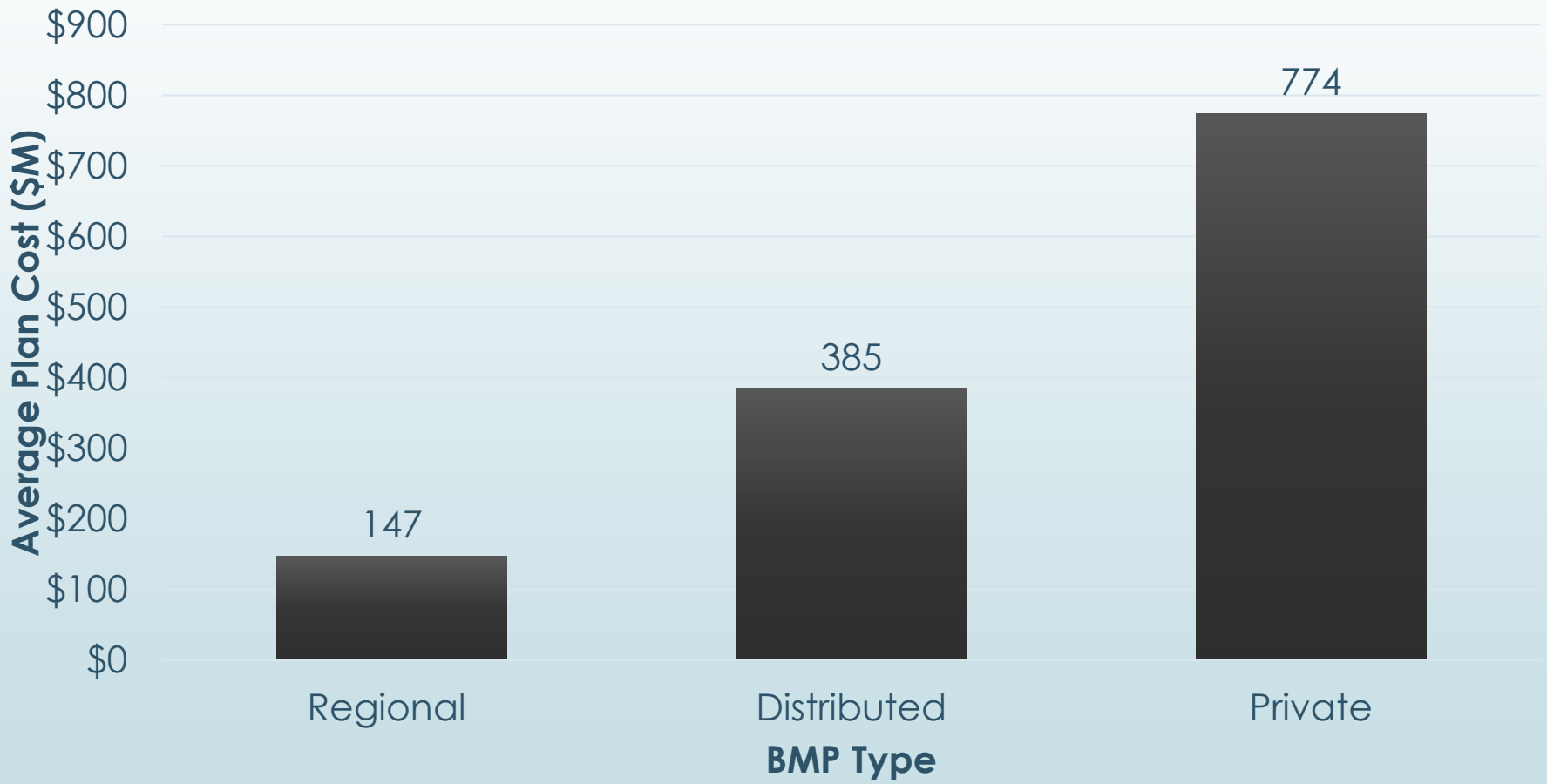
Watershed	Limiting TMDL Pollutants
Upper LA River	Bacteria, Zinc, Toxics
Ballona Creek	Bacteria, Zinc, Toxics
Santa Monica Bay	Bacteria
Dominguez Channel	Toxics
Marina del Rey	Bacteria, Toxics, Metals





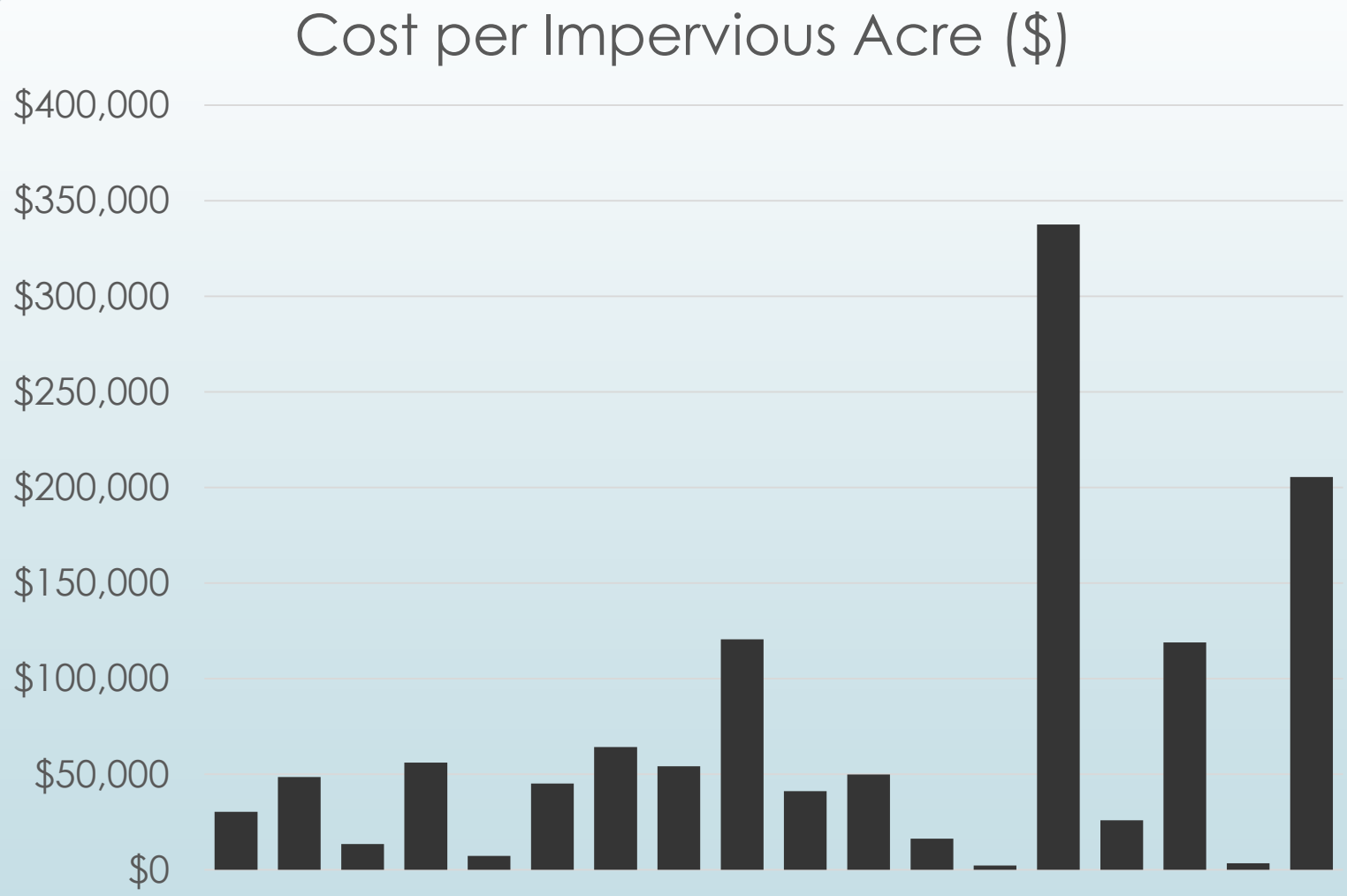
Geosyntec consultants

Totals Costs by BMP Type & Ownership



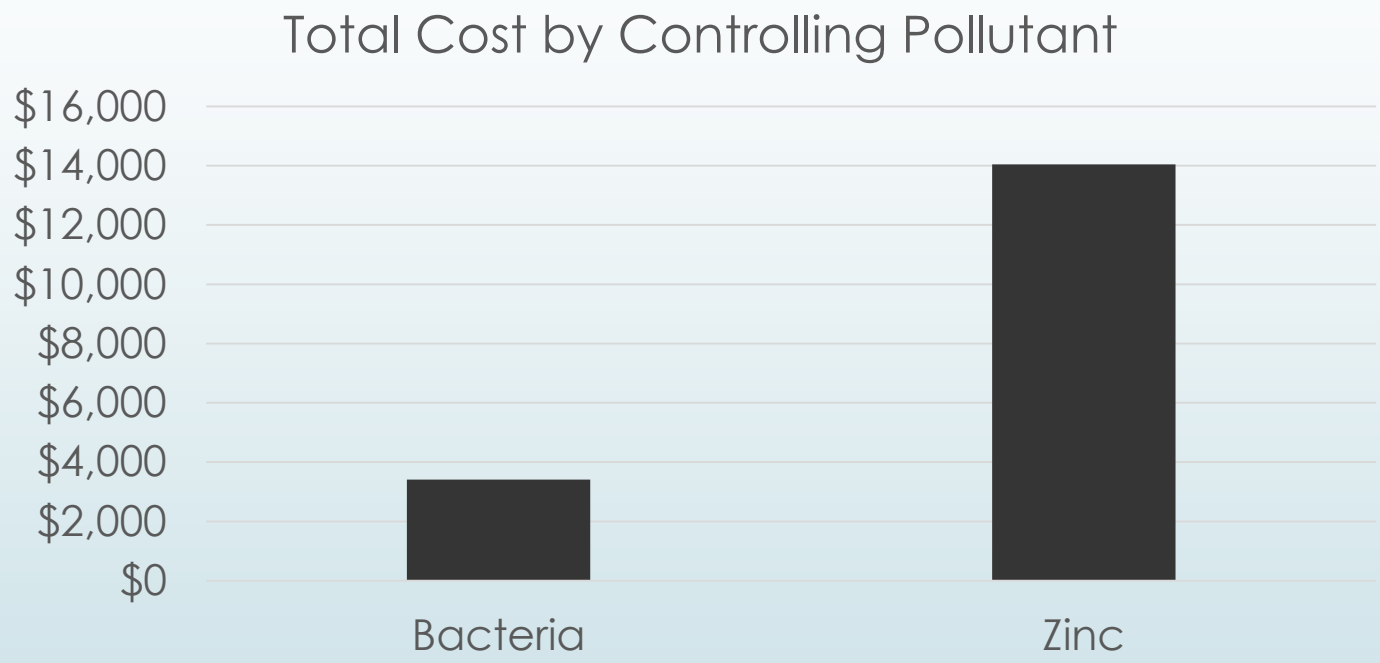
Geosyntec consultants

Costs/Impervious Area (SD & LA)



Geosyntec consultants

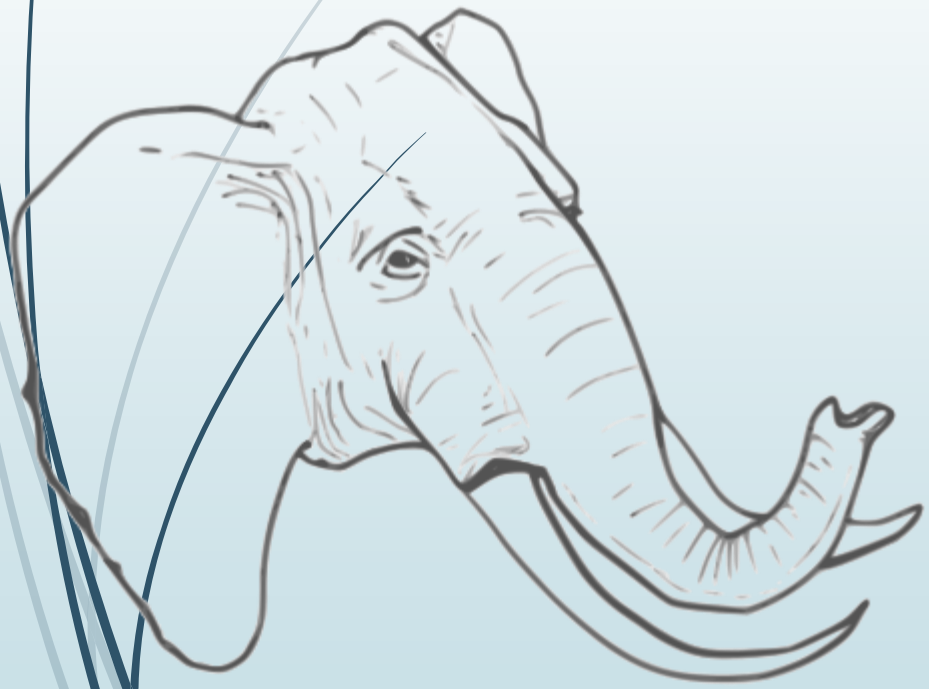
Costs variability by POC (SD & LA)



	Total Cost ($M)	Average Cost ($M)	Avg. Cost/Imp Acre ($)	Std. Dev Cost/Imp Acre ($)	# of plans
Bacteria	$3,409	$426	$62,769	$67,754	8
Zinc	$14,047	$1,405	$73,842	$98,604	10
Total	$17,456				18

Geosyntec consultants

The Elephant in the Room… $17.5B



- Prop 218 compliant fee studies
- AB 2403 (Rendon) - clarifies the definition of "water" under 218 to include urban runoff and all other potential sources of water
- SB 985 (Pavley)– Stormwater Resources Plan for Water Bond Funding
- Transportation-related funding (OC Measure M2)
- Regional multi-agency approaches
- Water as a commodity? ➡ P3s?

Level of confidence for compliance? (what surety do we get for $17.5B?)

Depends on:

- Protection afforded by TMDLs/WQBELs
- Ability of model to simulate urban/natural processes
- Ability of model to link performance metrics to WQBELs
- Adequacy of data for use as predictive tools
- Characterization of natural variability/performance uncertainty/ implementability/ variability
- Sources of jursidictional uncertainty (non-MS4s)
- Basis for, and scalability of, capital costs? O&M costs?

How do we increase confidence?

- Adaptive management
- Understand differences between natural variations and data-limited uncertainty
- Conduct studies to confirm/refine watershed characterization data
- Conduct/compile studies to confirm/refine BMP performance data (and compliance metrics)
- Development of "parameterized" new construction cost data (and areas for optimization)
- Analyze new data from CIMPs/MAPs and project implementation

Conclusions

- Significant value in work done – best available data and technologies; nationally leading efforts.
- Relevance (partial list of upcoming efforts):
  - South Orange County/Riverside (Hearing **Nov 2015**)
  - North Orange County (Draft **October 2015**)
  - SF Bay Area Regional Permits (Draft **October 2015**)
  - Central Coast WLA Attainment Plans
  - Ventura County
  - Others…
- Water has Value – a logical evolution of thinking…

Acknowledgements

- Geosyntec colleagues who mined and synthesized the data presented herein
- Southern California MS4 clients and regulators responsible for watershed planning and permit compliance
- Professional technical community (researchers, consultants)

Questions

Ken Susilo, PE, D.WRE, CPSWQ
Principal, Water and Natural Resources
Vice President and Los Angeles Manager
Geosyntec Consultants
310-957-6111
ksusilo@Geosyntec.com

Geosyntec consultants