



# **Storm Water Regulatory Update**

Western Coalition of Arid States

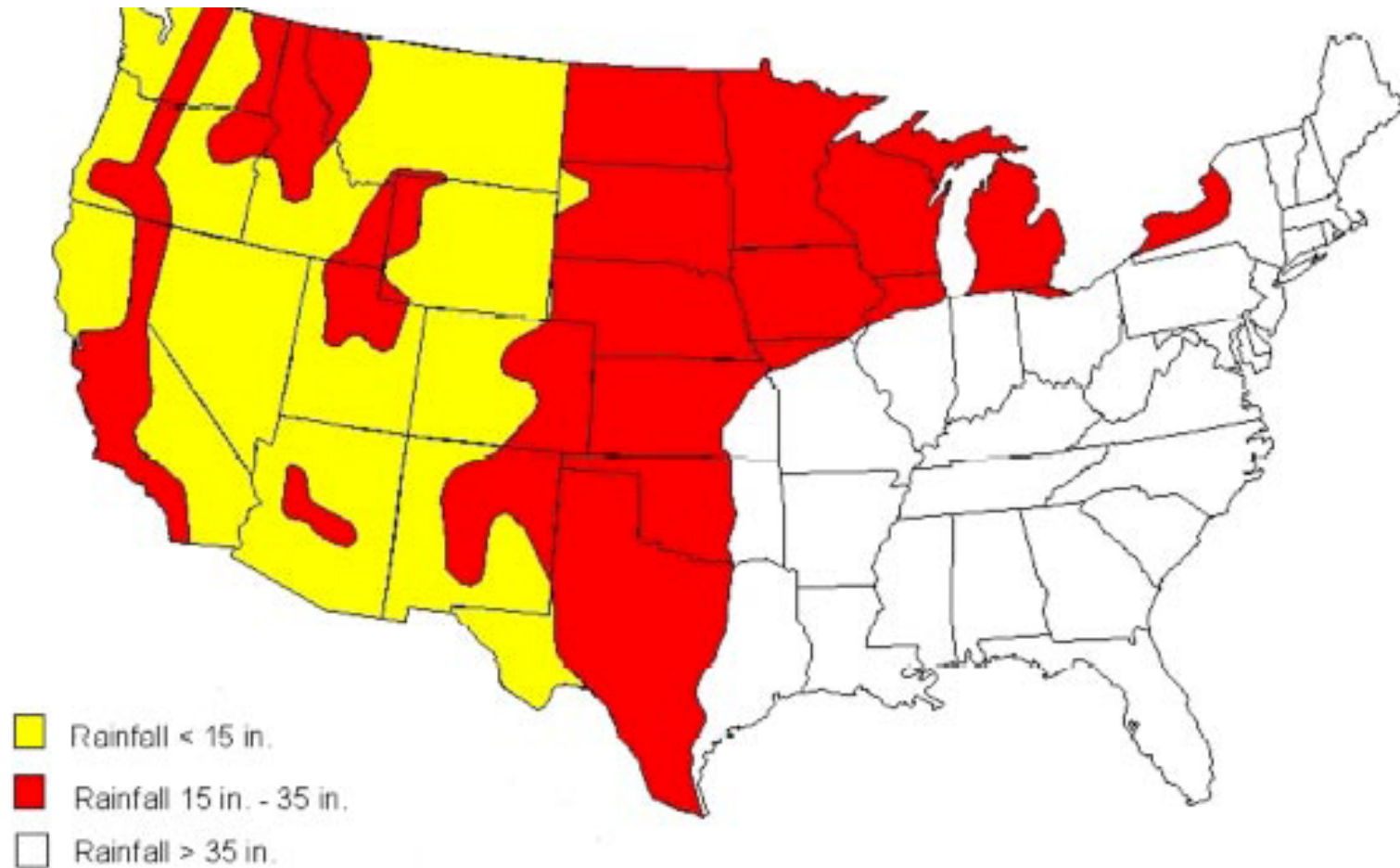
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# Storm Water in Arid Environments: Challenges and Opportunities



# The West is Different

- Aquatic resources and management objectives are fundamentally different
- Rainfall depths are much lower
- Evaporation rates much higher
- Pollutant concentrations much greater
- Vegetative cover is sparse
- Sediment movement is great
- Dry weather flow is rare, dominated by return flows



# Pollutant Event Mean Concentrations



**Table 3: Stormwater Pollutant Event Mean Concentrations in Arid and Semi-Arid Regions  
(Units: mg/l, except for metals which are in ug/l)**

Pollutant	National	Phoenix, AZ	Boise, Idaho	Denver, Colorado	San Jose, California	Dallas, Texas
Source	(1)	(2)	(3)	(4)	(5)	(6)
Rainfall		7.1 inches	12 inches	13 inches	14 inches	28 inches
No. of Samples	2-3000	40	15	35	67	32
TSS	78.4	227	116 *	384	258	663
BOD	14.1	109	89	nd	12.3	12
COD	52.8	239	261	227	nd	106
Total N	2.39	3.26	4.13	4.80	nd	2.70
Total P	0.32	0.41	0.75	0.80	0.83 #	0.78
Soluble P	0.13	0.17	0.47	nd	nd	nd
Copper	14	47	34	60	58	40
Lead	68	72	46	250	105	330
Zinc	162	204	342	350	500	540

## Other Important Differences

- Groundwater recharge important consideration
- Impervious cover greatly increases flows



# Arid Urban Watersheds – Potential Opportunities



- Because there is a demand for water:
  - Increased acceptance for stormwater re-use, including acceptance by some POTWs
  
- Because extended dry periods:
  - Possibilities for temporarily holding runoff without substantial impacts on site operations



# Project Example: Los Alamitos Race Track



- Stabling area regulated as Confined Animal Feeding Operation (CAFO)
- Requires containment for 25-year, 24-hour storm event plus all wash water
  - 10 acre feet minimum
- Treatment plant option - \$7M to \$10M



# Instead of Treatment Plant – Discharge to POTW



- Orange County Sanitation District – Recycled Water Program
  - \$500M, 70 mgd capacity for recharge
  - Conservation efforts resulted in shortfall of available wastewater
- Provides opportunity for discharges from the Race Track
- Important condition: no significant discharge during rain events





# Storm Water Management Opportunities in Arid Regions

- Reduced need for dedicated water storage areas/tanks
  - Operational areas can provide storage capacity
  - Loss of use is limited
- Not just for flood control purposes
  - Los Alamitos Race Track – use parking lot for storage during wet weather
  - Another example: Auto Recycling Yard



# Significant Trends in Storm Water Permits



- Industrial General Permits
- Construction General Permits
- MS4 Permits

# Industrial General Permits – Federal MSGP



- Federal Multi-Sector General Permit
  - Covers NH, MA, NM, AK, ID, PR, DC, Indian Country, Guam, American Samoa, Commonwealth of Northern Mariana Islands, and certain Fed. Facilities
  - Effective September 29, 2008
  
- Key aspects:
  - Defends EPA's use of non-numeric limits
    - “EPA has substantial discretion to impose non-quantitative permit requirements pursuant to Section 402(a)(1), especially when the use of numeric limits is infeasible”
  - Prior notice for authorizing discharges
    - Existing sources – 30 days (no change)
    - New sources – 60 days (or 30 if link to SWPPP is provided)

- Key issues (cont.)
  - Water Quality Based Limits
    - More flexible than the prior MSGP
    - Control discharges as necessary to meet:
      - Applicable water quality standards
      - Applicable waste load allocations (TMDL), or
      - Further control discharges to impaired waters (no TMDL)
  - Discharges to impaired waters
    - Discharger must certify:
      - Prevent all exposure of contaminant causing impairment
      - Pollutant is not present
      - Applicable WQS will be met at point of discharge; or
      - Sufficient waste load allocation exists

- New monitoring requirements (discharges to impaired waters):
  - Analytical monitoring 1X per year for pollutants for which receiving water is impaired
    - Limitations:
      - Only required if there is a standard analytical method for the pollutant
      - Not required for biological impairment where a pollutant has not been identified; or where impairment caused by hydromodification, impaired hydrology, or temperature
      - Not required if discharger can show pollutant is background
      - Not required if there is a TMDL for that pollutant, and then only as specified by EPA
      - No further testing if shown not to be present after first year of testing, unless required by TMDL

- Benchmark monitoring – starts on a quarterly basis
  - If average is less than benchmark, no further testing required
  - If average above benchmarks, continued quarterly until less than benchmark – Unless infeasible/impractical to reduce further
- Changes in benchmark concentrations:
  - Ammonia 19 mg/l to 2.14 mg/l
  - Turbidity 5 NTU to 50 NTU
  - Metals now hardness dependant, some are lower
- Public access to SWPPPs
  - “Public” must request through EPA, instead of directly requesting from discharger



# Industrial Permit - Arizona



- Current permit is expired, draft permit to be adopted soon
- In many ways similar to Federal MSGP
- Includes Arizona-specific conditions:
  - Expanded list of authorized non-storm water discharges
  - Limitations for discharges to impaired waters
    - » Must demonstrate that pollutants are not present, won't be discharged, or won't cause exceedance of WQS
    - » For impaired waters w/o TMDL: meet WQS at point of discharge
    - » For impaired waters w/ TMDL: demonstrate sufficient WLA exists
    - » SWPPP to be reviewed by ADEQ prior to authorization to discharge
- Includes additional monitoring and Corrective Actions in response to benchmark exceedances



# Industrial Permit - California



- Expired since 2002
- Two drafts issued and hearings held
  - Common issue – Numeric Standards
- NGO perspective: Industry needs (wants?) objective measures to access compliance
- Discharger perspective: Numeric effluent limits not practical
  - Often no nexus to impaired receiving waters
  - Impossible to meet
  - Creates complicated monitoring and reporting issues

- State Solution:
  - Convene “Blue Ribbon Panel” regarding numeric limits
  - Change focus to issuing draft Construction General Permit
  
- Blue Ribbon Panel
  - Panel consisted of storm water experts
  - Goal was to determine feasibility of NELs
  - Concluded, there is not enough data to establish storm water NELs
  - Recommended consideration of “**action levels**” while additional data are collected

# Industrial Permit - California



- NGO solution: third-party lawsuits
- In general, targets have been:
  - Scrap recyclers
  - Automobile dismantlers
  - Other industries with significant exposure
- Recent Ekco/Kramer motion for summary judgment
  - Action brought by the Santa Monica Bay Keeper against two scrap recyclers located in Los Angeles



**SANTA MONICA  
BAYKEEPER**

# Recent Kramer/Ekco MSJ Decisions



- Benchmarks:

*“The Court finds that the EPA Benchmarks are appropriate to use as objective guidelines in assessing whether Ekco has implemented BMPs that achieve BAT/BCT, but that they are only one part of such an analysis. Accordingly, as discussed below, the Court denies summary judgment on this ground.”*

- California Toxics Rule (CTR):

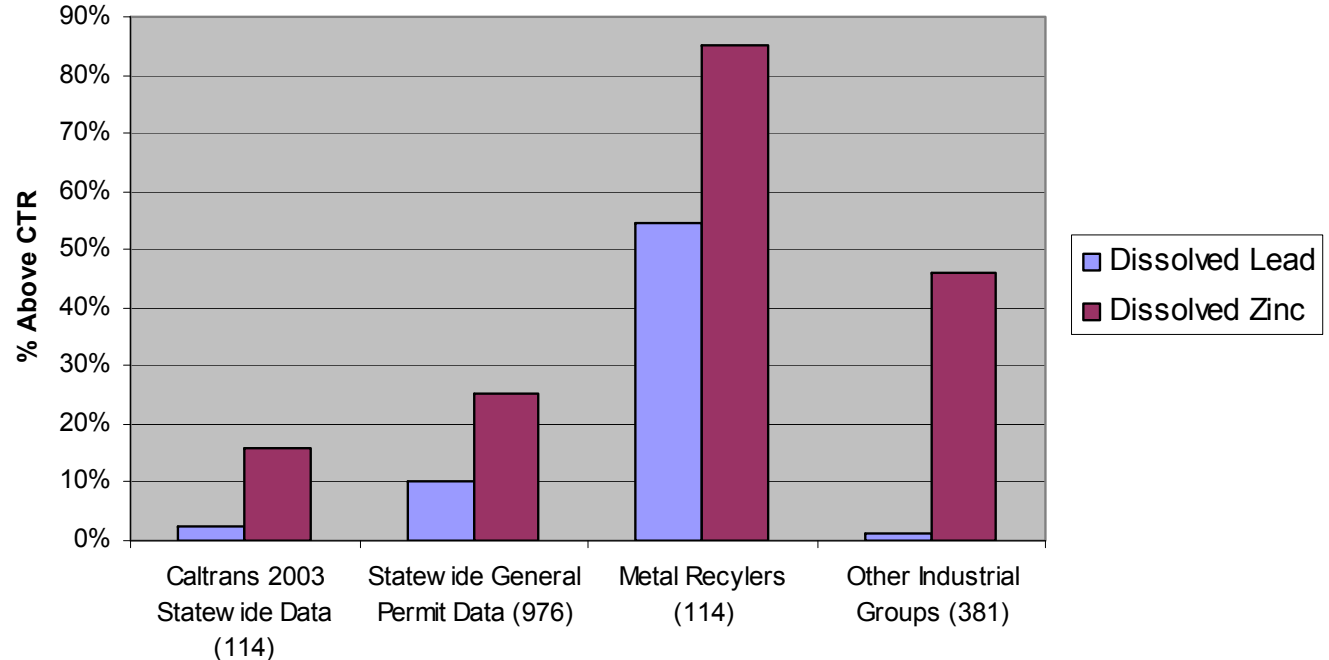
*“Because these numbers exceed the applicable WQS, the Court finds that there were violations of Receiving Water Limitation C(2) at the Ekco facility.”*



# If CTR Exceedances = Non Compliance

There are a lot of dischargers:

- Potentially out of compliance; and/or
- Lacking monitoring data to determine compliance



**Note: Dissolved metals concentrations were estimated based on Caltrans 2003 Statewide data**



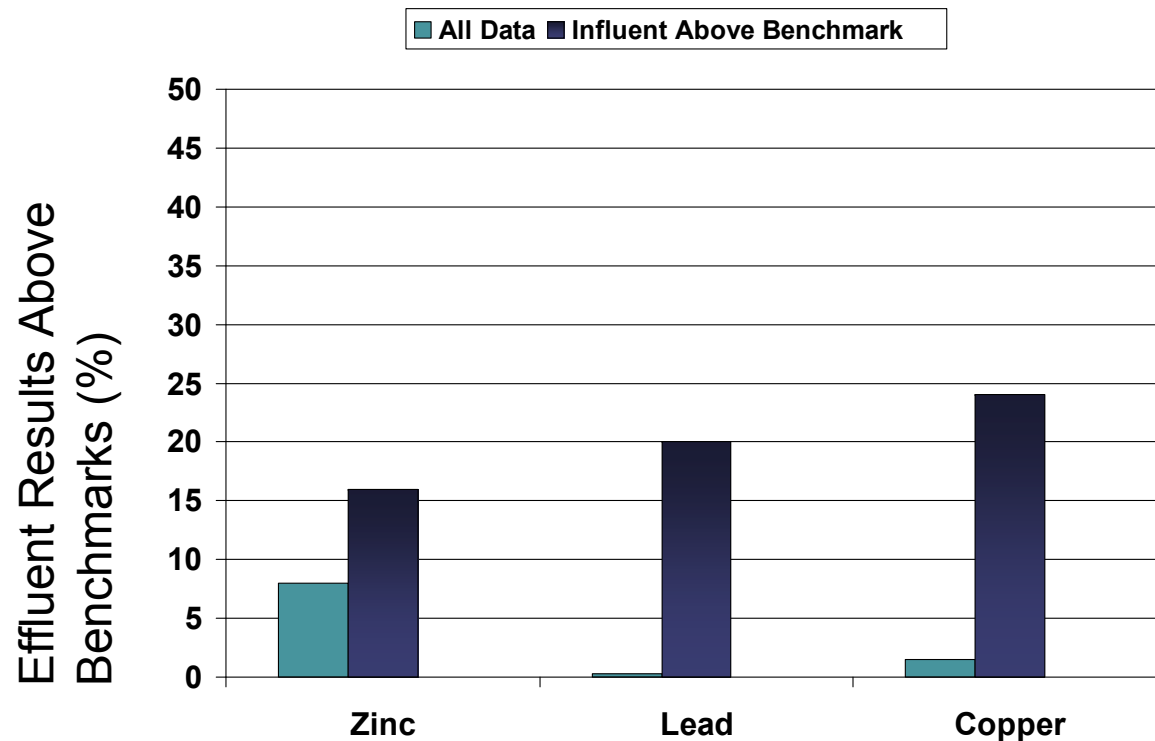
- Resolved through Consent Agreements
- Before Ekco/Kramer:
  - “Goal” – “Compliance” with Multi-Sector Benchmarks
  - “Stretch Goal” – “Compliance” with California Toxics Rule
- After Ekco/Kramer:
  - Mandate: Compliance with Benchmarks and CTR
- Potential benefits of recent Consent Agreements:
  - NGO Recognition of “design storm” concept
  - NGO Consideration of alternative strategies for achieving and measuring compliance

# Alternative Compliance Approaches Necessary Because.....



- Current technology is insufficient alone
- Dischargers forced to invest with uncertain outcome

Filtration System Post Treatment Performance



# Strategies for Achieving “Compliance”

- Treatment and discharge
- (Pre)treatment and infiltration
- Diversion
  - Discharge to POTW?



# Treatment and Discharge

- Sand/media filtration
  - Considered by some as a preferred method
- Reality – very little data regarding performance at industrial sites
- Probably not capable of achieving benchmarks or CTR consistently



# Diversion

- Avoiding/reducing storm water contact with industrial activities
- Roofs must be “non polluting”
- Reduces volume of runoff
  - Reduced treatment system size
  - Provides “credit” under more recent settlement agreements



# Infiltration Solution?

- With the appropriate conditions:
  - Could be a cost-effective alternative to propriety treatment systems
  - Generally supported by NGOs





# Infiltration – Important Considerations



## ■ Potential roadblocks:

- Not all sites are candidates for infiltration systems
  - Soil conditions are critical
  - Pre-existing contamination should be avoided
- Potential for regulatory resistance/interest
- Potential to be regulated as Class V injection well
- Concerns about long term impacts to soil and groundwater
  - Are you trading one headache for another?
- Water rights issues? Who might claim that water you are not discharging?

# Design Storm Considerations



- Recent Baykeeper/Coastkeeper/CSPA Consent Decrees:
  - Filtration systems: 5-year 24-hour
  - Infiltration system: 25-year 24-hour
- Even smaller systems can provide substantial benefit
  - 96 percent treated with 2-year
  - 97 percent treated with 5-year
  - 99 percent treated with 25-year
- There is a point of limited return on investment
  - Does industry need to design for the “extreme” event?

# Federal Construction General Permit

- Construction General Permit (CGP) issued July 2008
  - Substantially similar to 2003 CGP
  - Issued for 2 years, only for new discharges
- EPA proposes to extend the 2008 CGP to 2011
  - Extension necessary to incorporate Construction and Development effluent limitation guidelines
- Construction and Development ELG – proposal:
  - Standards set for sedimentation basins for sites over 10 acres
  - Site with high energy rainfall and significant clay must limit turbidity to 13 NTUs
  - Could require use of Advanced Treatment Systems



# California Construction General Permit



- Adopted Sept. 9, 2009
- Establishes “risk based” permitting approach
- Includes:
  - Narrative Effluent Limitations
  - Numeric Effluent Limitations (NELs) for Risk Level 3
    - pH between 6 and 9
    - Turbidity <500 NTUs
  - Numeric Action Levels (NALs) for Risk Levels 2 and 3
    - pH between 6.5 and 8.5
    - Turbidity <250 NTU

- Failure to meet NELs – permit violation
  - “Directly enforceable in administrative or judicial forums.”
  - “ensures that the dischargers do not ‘write’ their own permits
  
- Includes electronic filing of all permit documents, including NAL/NEL exceedance Reports
  - Provides water boards and citizen enforcers the necessary information to initiate enforcement actions against dischargers

# California Construction General Permit



- Establishes new minimum BMPs – active treatment systems
  - Where traditional sediment/erosion controls don't control accelerated erosion
  - Site constraints inhibit construction of a correctly sized basin; or
  - Where clay and/or highly erosive soils are present



- Additional post-construction requirements
  - Sites must maintain pre-project hydrology
  - Requires implementation of LID



- Status of permit requirements
  - Everyone requiring Maximum Extent Practicable (MEP) performance
  - Most requiring compliance with TMDL limits/load reduction
  - End game for some – NELs in permits

# Changing Role of WQS in Permits



- Then, A GOAL: “...to reduce the discharge of pollutants to the MEP...” (CWQ 1987)
- Now, A MANDATE: “...prohibit the discharge of pollutants...which cause the violation of a WQS.” (San Diego Permit, 2001)

# The Evolution of SW NPDES Permits

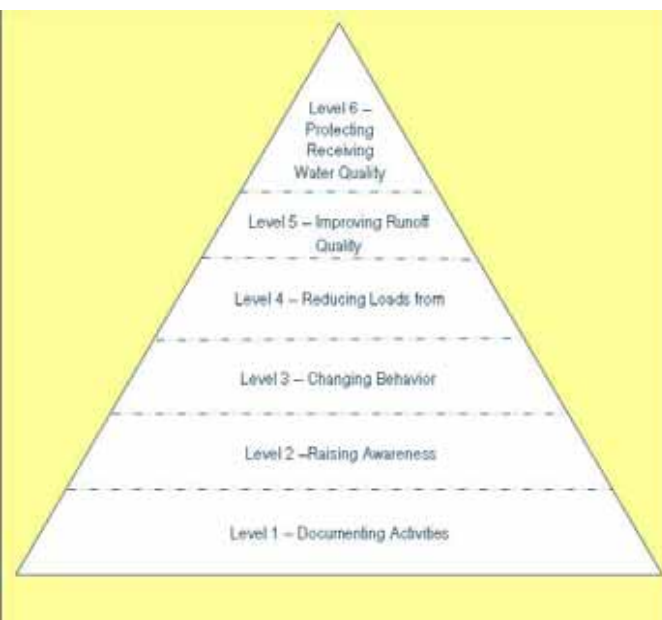


- Permit Round 1: Implement locally designed SWPPP/BMP programs
- Permit Round 2: Response to failures of SWPPP/BMPs to achieve WQS
- Permit Round 3/4: Attainment of NELs

## Ongoing Challenge for MS4: Demonstrating Program Effectiveness

- One approach (besides NELs): CASQA Program Effectiveness Assessments

Instead of reporting implementation, report progress



**CALIFORNIA STORMWATER  
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## *“Urban Stormwater Management in the United States”* October, 2008

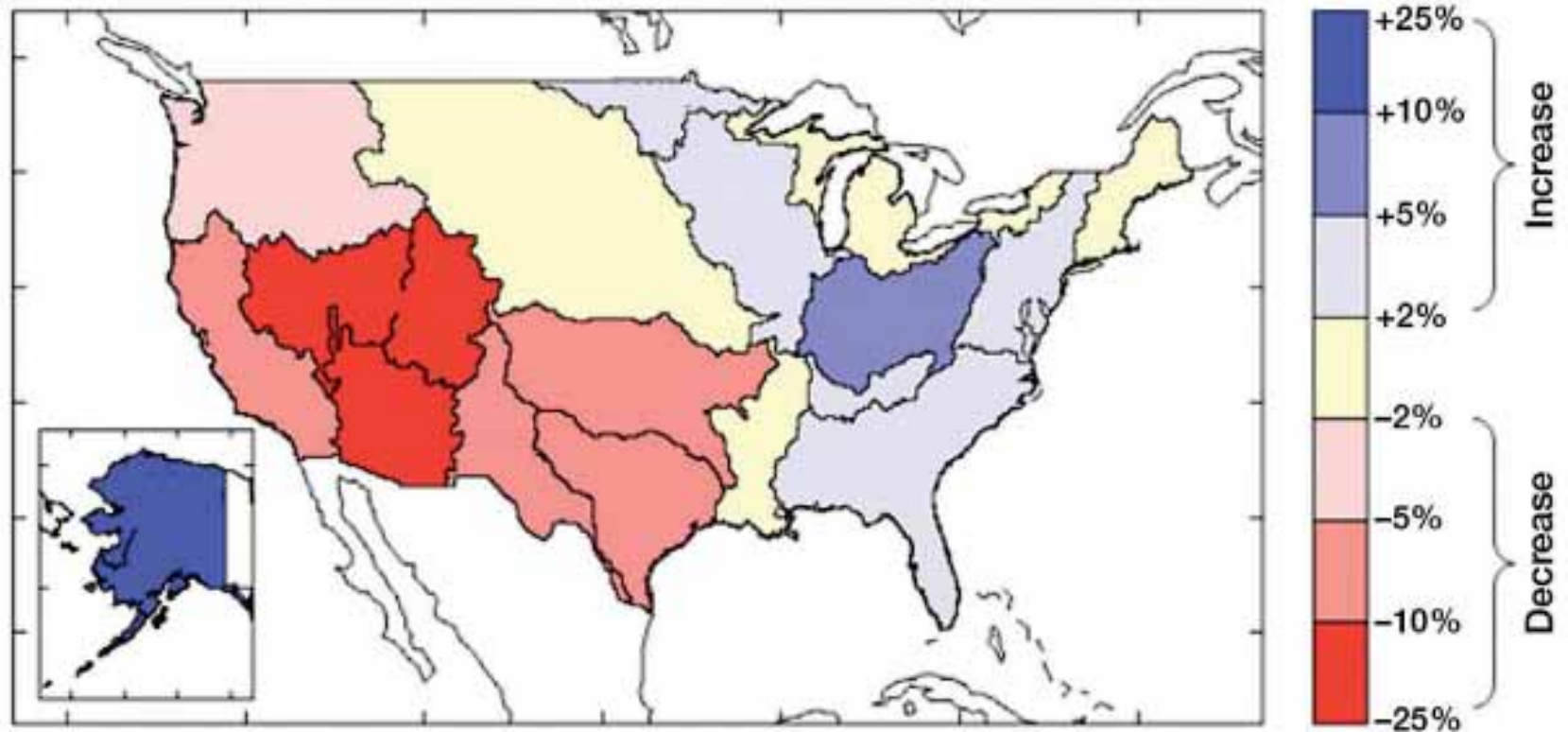
- According to EPA, most “problematic” finding:
  - “requirements governing stormwater dischargers leave a great deal of discretion to the dischargers themselves in developing stormwater pollution prevention plans and self monitoring to ensure compliance”
- Significant recommendations:
  - Flow and related parameters (impervious cover) should be used as a proxy for pollutant loading
  - Practices that infiltrate, evapotranspire and harvest will be most effective
  - Convert piecemeal system into watershed-based system
    - » Regulate everyone in watershed
    - » More responsibly to MS4s to regulate industry and construction
    - » Compliance based on achieving beneficial uses of receiving water
  - EPA should develop numerical expressions for MEP

*“A Clear Blue Future – How Greening California Cities Can Address Water Resources and Climate Challenges in the 21<sup>st</sup> Century” - August, 2009*

- Used GIS to project potential water, energy and CO<sub>2</sub> savings by implementing LID in Southern California and the Bay Area
- Conclusion: Implementing LID practices at new and redeveloped residential and commercial properties in parts of California can increase water supplies by billions of gallons each year, providing an effective and much-needed way to mitigate global warming's impact on California
  - By 2030, yearly savings as much as:
    - » 2/3 the water supply for the City of Los Angeles
    - » 1,225,500 megawatt hours
    - » Avoiding release of 535,500 metric tons of CO<sub>2</sub>



Figure 2. Projected changes in runoff for the period of 2041–2060 relative to 1901–1970. Modified from U.S. Climate Change Science Program, 2008.



# Ventura County Permit



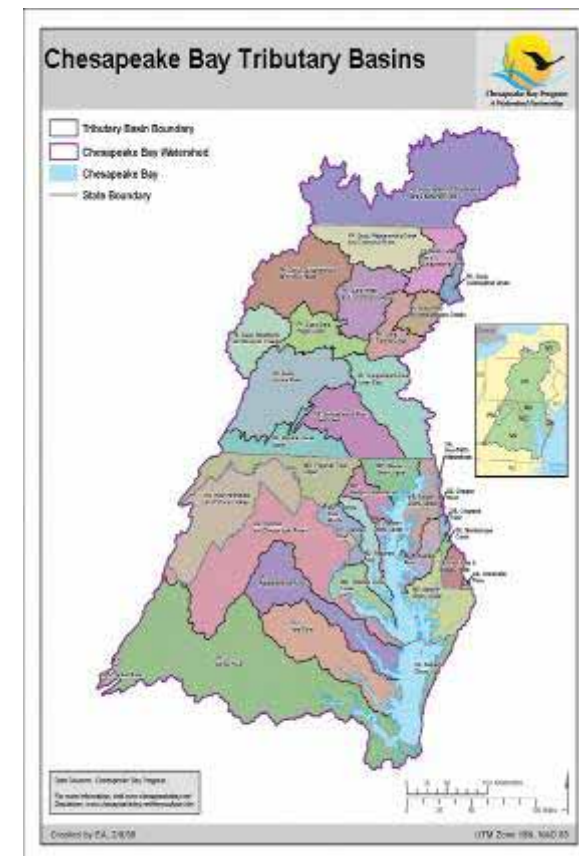
- New permit adopted May, 2009
- First and second drafts included Municipal Action Levels
  - Exceedance of MAL = non-compliance with MEP
- Final draft: MALs are gone, but replaced by significant restrictions on Effective Impervious Area (EIA)
  - Mimic pre-development runoff (conditions prior to first development)
  - Limit EIA to 5% for new development, 30% for redevelopment
  - Even with mitigation, max EIA is 30%
  - Offsite mitigation if design storm cannot be retained onsite within the 5% EIA limitations
  - Design storm – 85<sup>th</sup> percentile 24-hour storm
- Estimated compliance costs: 5 – 20% of entire project costs (source BIA)

# Chesapeake Bay TMDL



“EPA is leading a major initiative that will drive actions to clean local waters and the Chesapeake Bay.”

- EPA is “increasing accountability for all Partners”
  - MD for example, will have 51 TMDLs
  - Each TMDL will address all sources
- Use regulatory authority to:
  - Require States to regulate impervious surfaces, even those not part of regulatory program
  - Expand reach of CAFO regulation
- Set criteria for all stream segments
  - Require States to meet standards through Watershed Implementation Plans





# Regulatory Update Conclusions



- Regulatory programs becoming more results focused, activity alone is no longer enough
- Enforcement is on the rise
- Courts are defining many important aspects of permits and compliance:
  - MEP, applicability of WQS, authority to impose WQS, TMDLs, applicability of benchmarks, etc....
- Increasing trend for MS4s to regulate all discharges to their system
- NELs are creeping into many permits, trend will only increase
  - Driven by TMDLs and other issues
- LID is the new mantra



**Bioswale in a Corporate Setting**

**Stormwater Management**  
Describes how rainwater is collected and filtered by plants and soil.

**Stormwater Storage**  
Describes how rainwater is stored in a tank for later use.

**Stormwater Treatment**  
Describes how rainwater is treated by plants and soil.

**Stormwater Reuse**  
Describes how rainwater is used for irrigation and other purposes.

**Stormwater Discharge**  
Describes how rainwater is discharged into a nearby water body.

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# What About Risks Associated with Increased Infiltration?



## Water Augmentation Study - The Los Angeles & San Gabriel Rivers Watershed Council

- Ambitious multi-site, multi-year infiltration study
  - Assess impacts to groundwater
- Six monitoring sites
  - Industrial (2), commercial, residential, school, park
  - Depth to groundwater varied from 22 to 350+ feet
  - Soil types varied from sandy soils to silty-clay soil
- Comprehensive monitoring system
  - 12 surface runoff monitoring stations
  - 16 lysimeters
  - 10 groundwater wells
- Long-term monitoring (4 to 5 years)
- Comprehensive analytical suite



# Water Augmentation Study (WAS)

## Project Partners



**Bureau of Reclamation**

**City of Los Angeles Department of Water & Power**

**City of Los Angeles Watershed Protection Division**

**City of Los Angeles Bureau of Street Services**



**City of Santa Monica Environmental Programs**

**County of Los Angeles Department of Public Works**



**Metropolitan Water District of Southern California**

**Regional Water Quality Control Board, LA Region**

**The Los Angeles and San Gabriel Rivers Watershed Council**



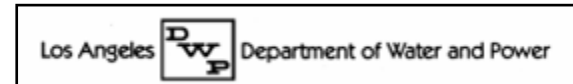
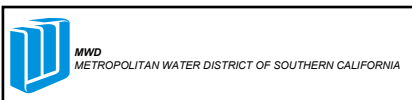
**TreePeople**

**University of California, Riverside**



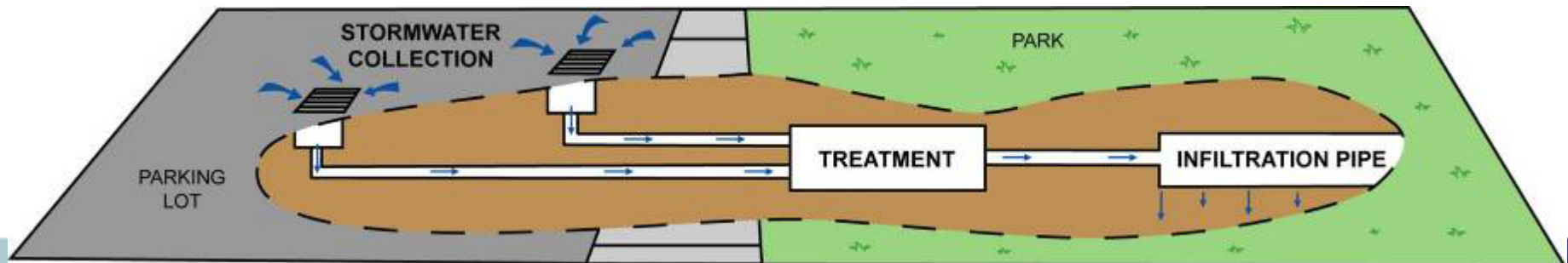
**Water Replenishment District of Southern California**

**State grants: Prop 13 SWRCB, CalFed, Prop 50 DWR**





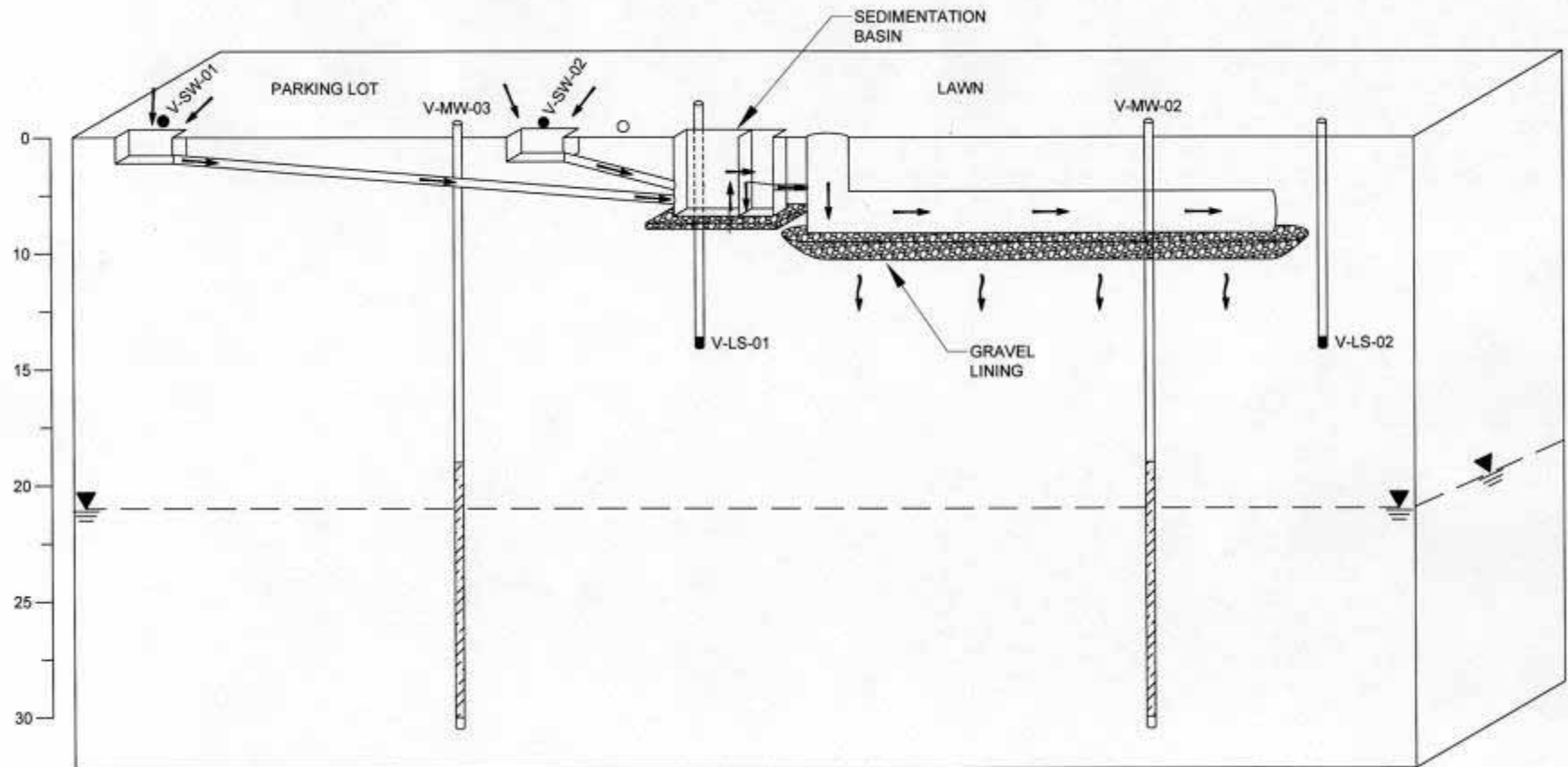
# City Park BMP Installation



# Scrap Metal Recycler Installation



# Monitoring Program





# Monitoring Program

## Summary of Analytical Suite

Category	Storm Water and Wells	Lysimeters
General Minerals and Nutrients	X	X
Trace Metals (total and dissolved)	X	X
Oil and Grease	X	Residential
Perchlorate	X	X
Glyphosate	X	Park
Volatile Organic Compounds (VOCs)	X	X
Semi-volatile Organic Compounds (SVOCs)	X	
NDMA	X	
Surfactants	X	
Bacteria (total coliform, fecal coliform, e. coli)	X	X



# Mann-Kendall Trend Analysis



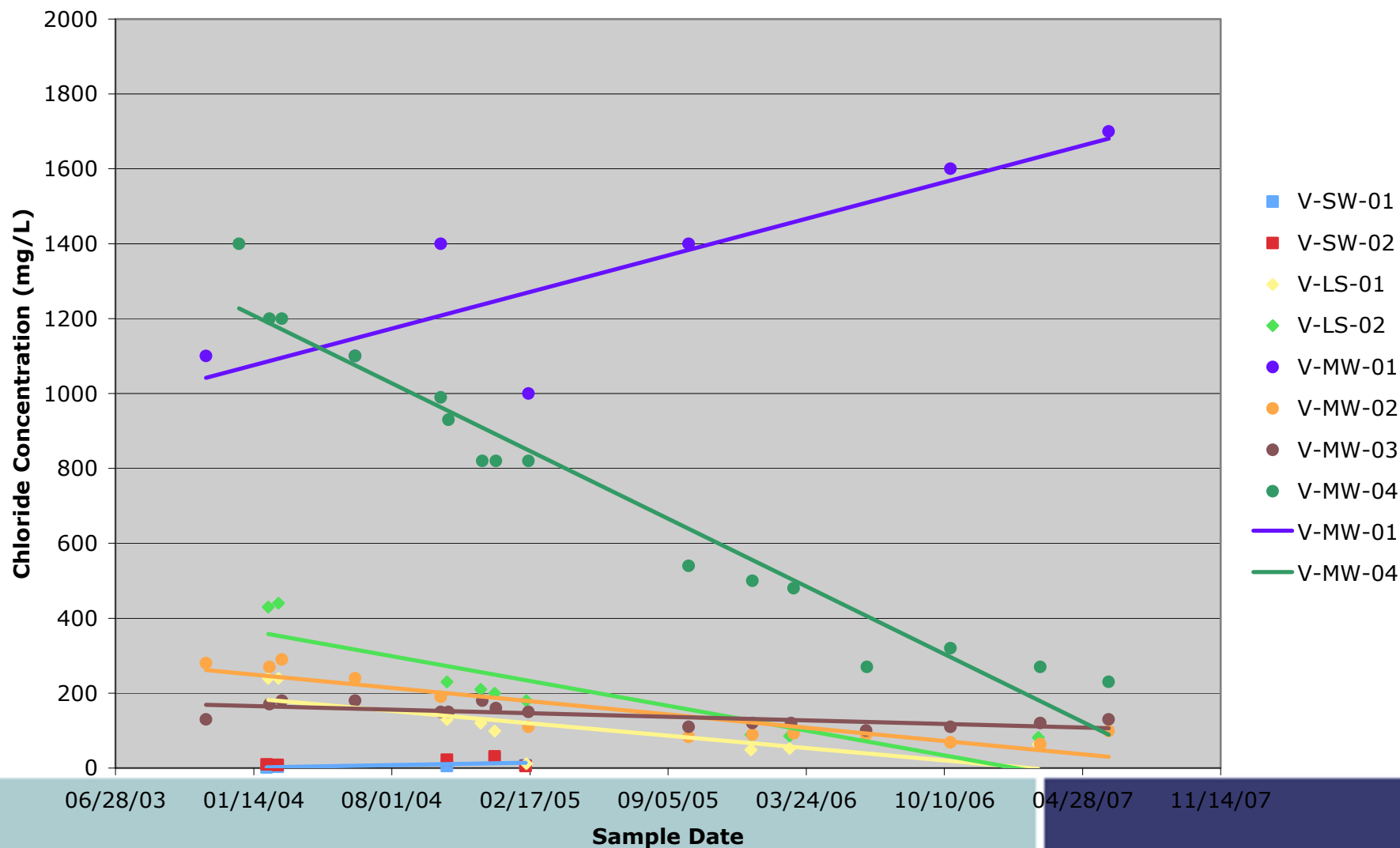
- Tests Whether Apparent Increasing or Decreasing Trends are Statistically Significant
- Of 600+ Tests for Trend Conducted, Less than 80 Trends were Detected in Subsurface (lysimeter and groundwater) Samples
  - Most (84%) were negative trends
  - In groundwater samples, 4 positive trends were detected

# Chloride – Veterans Park

(MCL = 250 ug/L)



Chloride - Veterans Park



# Water Augmentation Study Findings – Fate of Infiltrated Contaminants



- No statistical evidence of significant degradation of groundwater quality related to infiltration
- At sites with shallow groundwater, concentrations of most constituents in groundwater samples decreased or are stable
- Constituents of concern for groundwater generally occur at low concentrations or are ND in runoff
- VOCs present in runoff were generally different than VOCs present in groundwater

# Conclusions – Water Augmentation Study



Provided hydrogeological conditions (soil conductivity, depth to groundwater, no subsurface contamination) are favorable:

- Storm water infiltration is generally feasible for most constituents of concern
- Pre-treatment may be warranted at many sites
- Storm water with high concentrations of nutrients or salts should probably not be infiltrated

