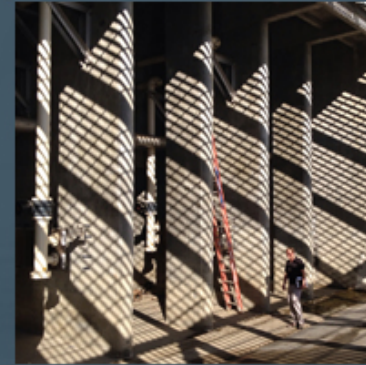
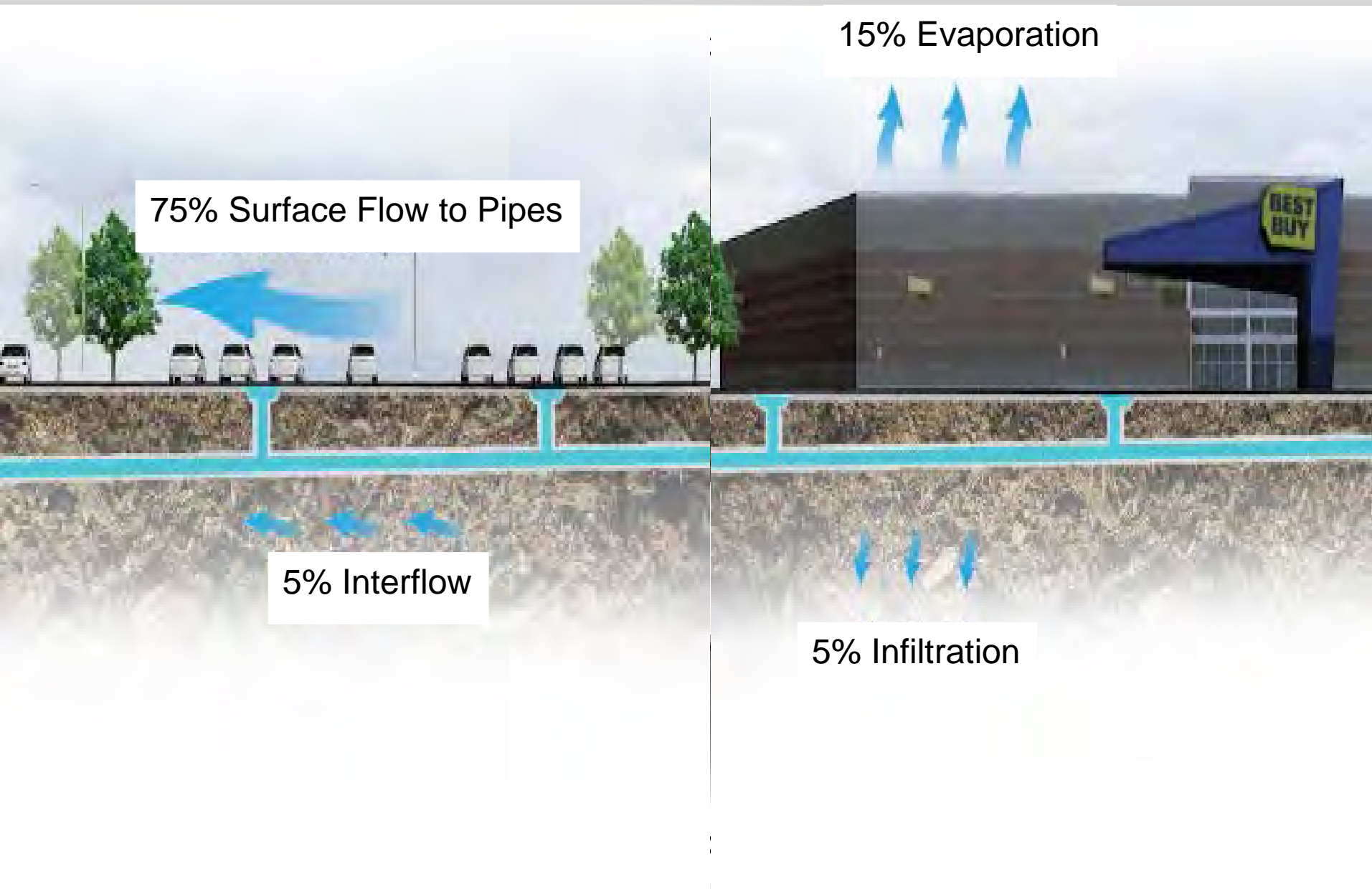


# Orange County – Report of Waste Discharge



July 1, 2014

# Landscape Change



# Stormwater and Land Use Change

*There are four interrelated but separable effects of land-use changes on the hydrology of an area: changes in peak flow characteristics, changes in total runoff, changes in quality of water, and changes in the hydrologic amenities.*

Luna Leopold, 1968



# Municipal Stormwater Permits

The federal Clean Water Act requires that stormwater permits for discharges from municipal storm sewers:

- may be issued on a system- or jurisdiction-wide basis;
- shall include a requirement to effectively prohibit non-stormwater discharges into the storm sewers; and
- shall require controls to reduce the discharge of pollutants to the maximum extent practicable, including management practices, control techniques and system, design and engineering methods, and such other provisions as the Administrator or the State determines appropriate for the control of such pollutants.

1990



1996



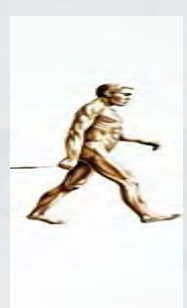
2003



2009



2014



# Report of Waste Discharge



# Report of Waste Discharge

**Submitted by**

The County of Orange, Orange County Flood Control District and Cities of Aliso Viejo, Dana Point, Laguna Beach, Laguna Hills, Laguna Niguel, Laguna Woods, Lake Forest, Mission Viejo, Rancho Santa Margarita, San Clemente, and San Juan Capistrano

**May 20, 2014**

# State of the Environment

## → Four key questions:

- Is our water safe to drink?
- Is it safe to swim in our waters?
- Is it safe to eat fish and shellfish from our waters?
- Are our aquatic ecosystems healthy?



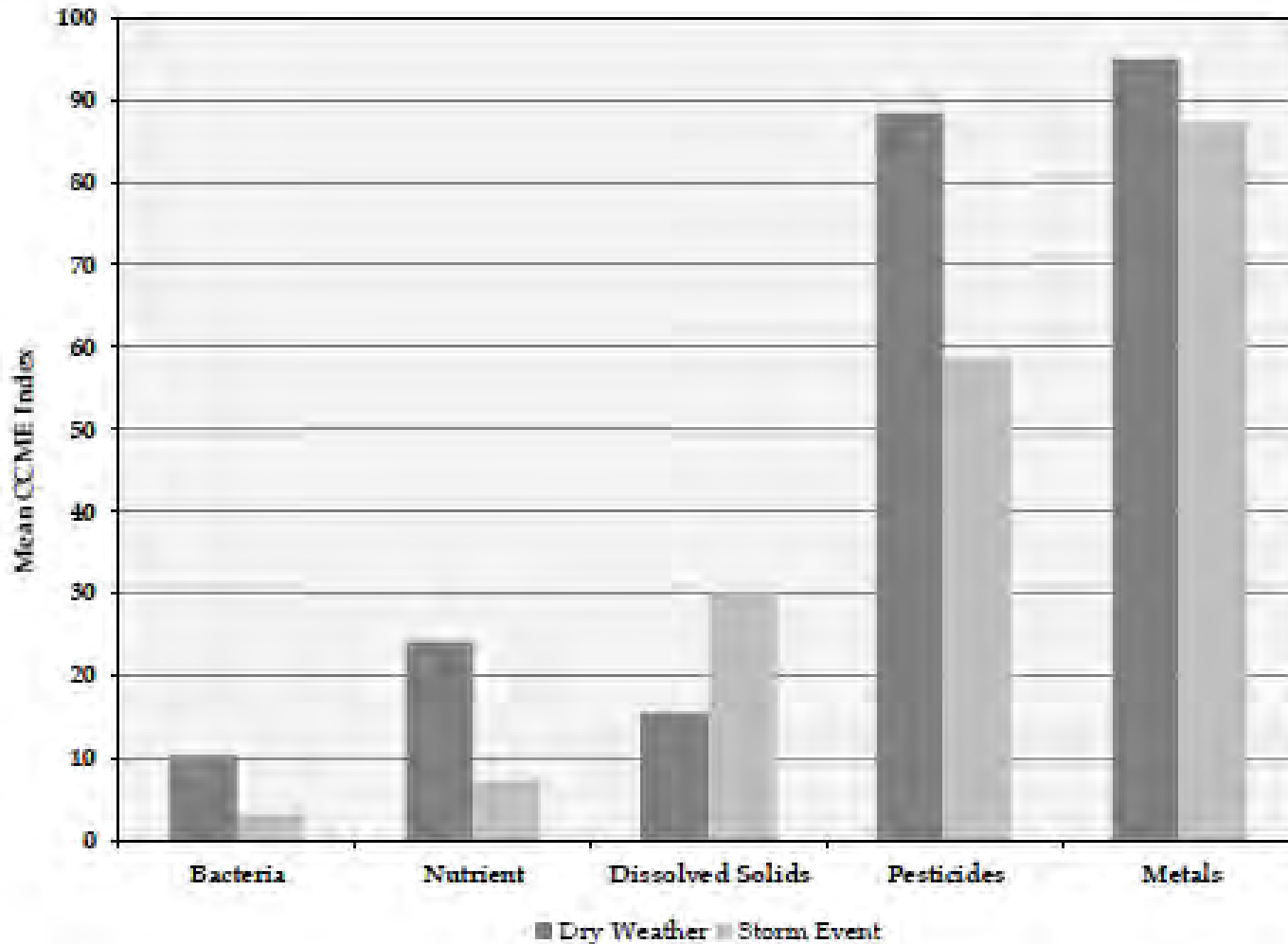
# Prioritization

- Raw exceedance frequencies provide only partial information
- CCME water quality index<sup>1</sup> integrates
  - Percent of indicators with exceedances
  - Percent of measurements/tests with exceedances
  - Magnitudes of exceedances
- Index produces a score from 0 – 1 (or 0 – 100) with higher scores reflecting lower overall exceedances
- Used widely (e.g., Central Coast Regional Board)

<sup>1</sup> Canadian Council of Ministers of the Environment . 2001. Canadian water quality guidelines for the protection of aquatic life: CCME Water Quality Index 1.0, Technical Report. In: Canadian environmental quality guidelines, 1999, Canadian Council of Ministers of the Environment, Winnipeg.



# CCME Index

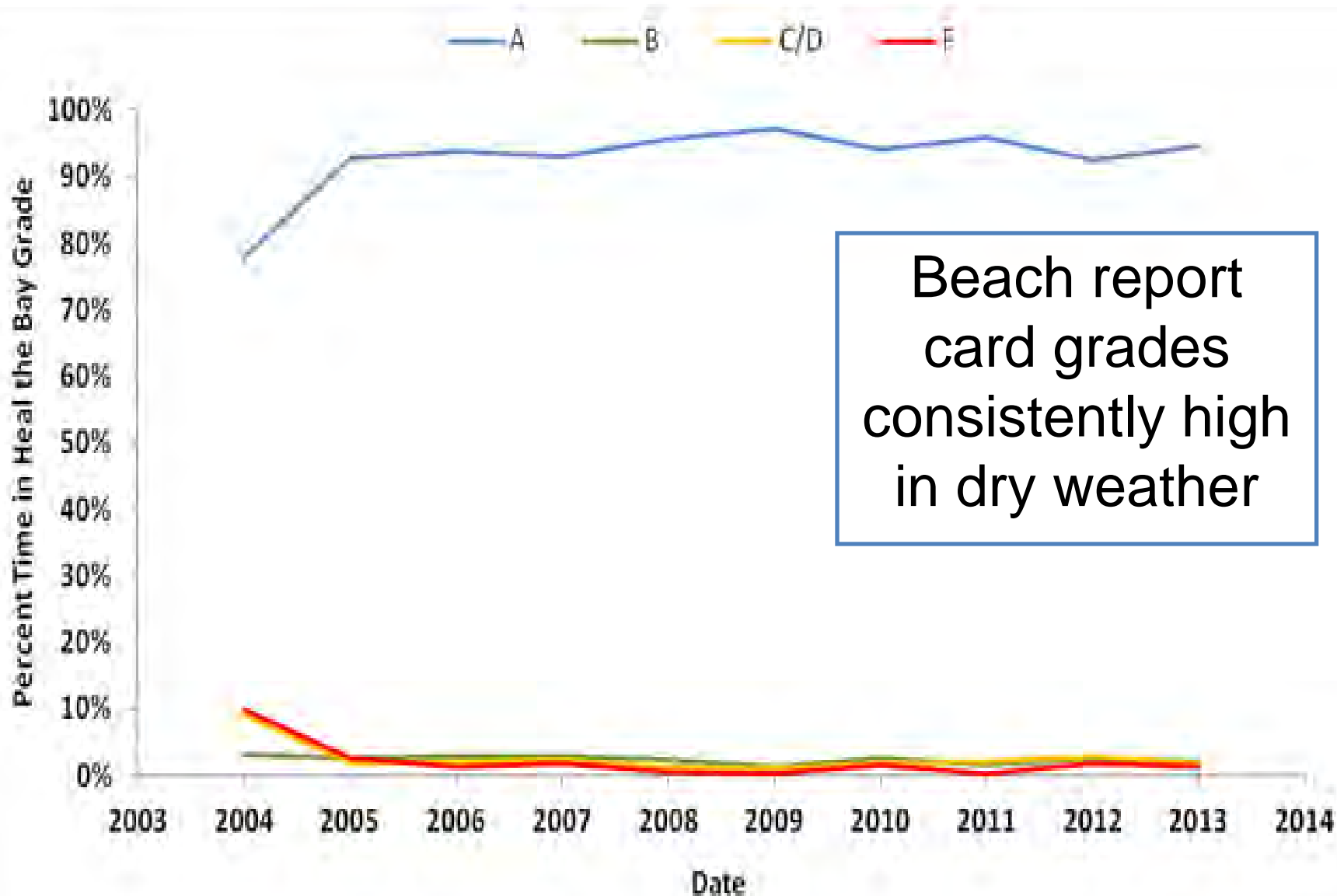




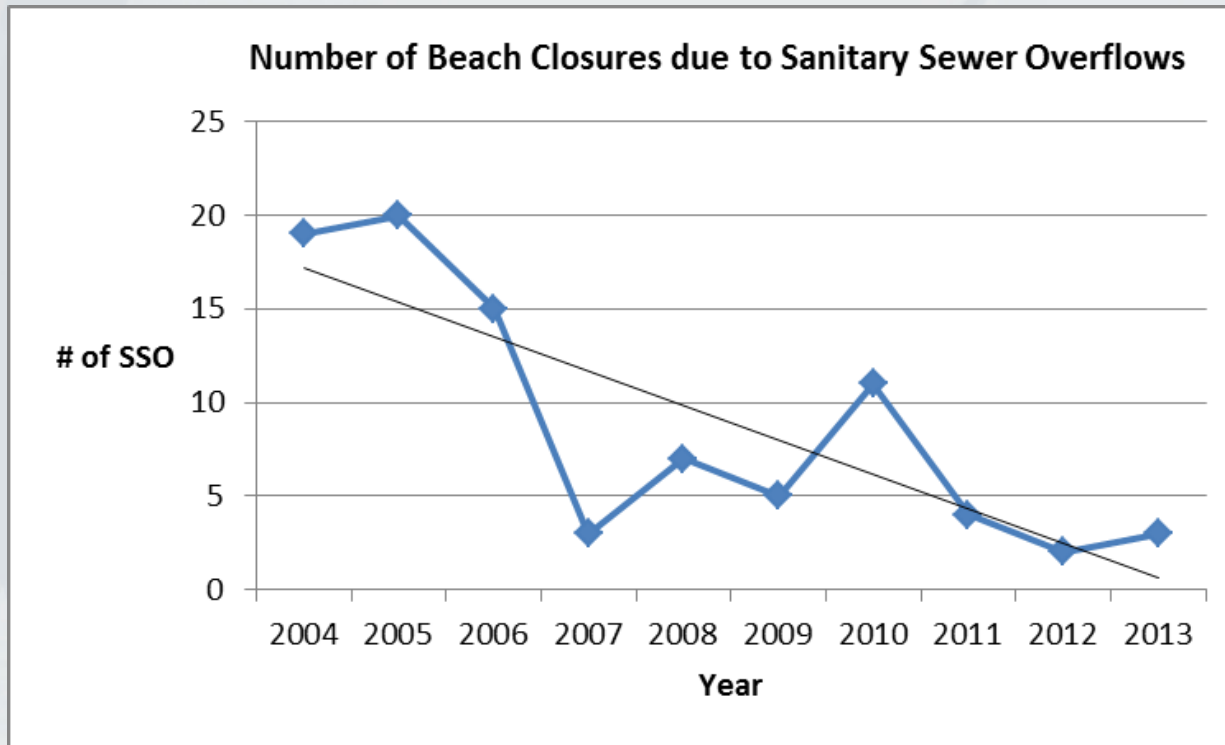
# BACTERIA



# Bacteria: Report Card Grades

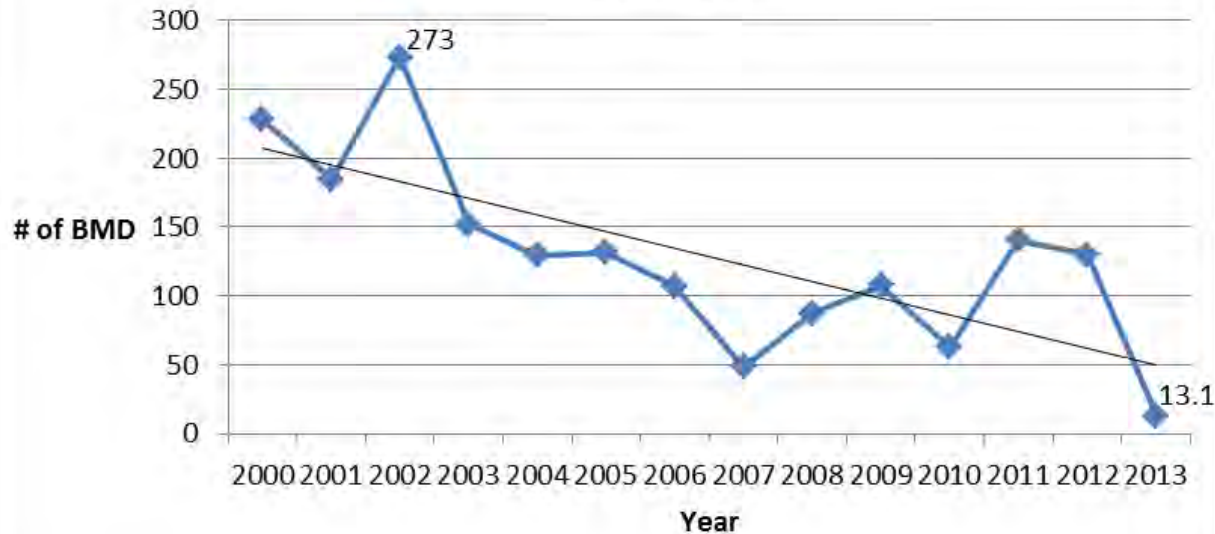


# Bacteria: Beach Closures

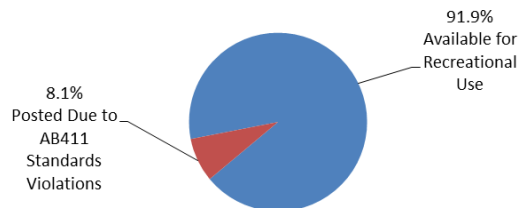


# Bacteria: Beach Advisories

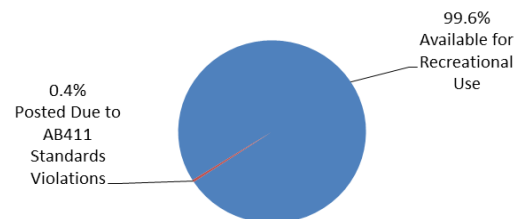
**Beach Mile Days of Postings Due to AB411 Exceedances  
2000 - 2013**



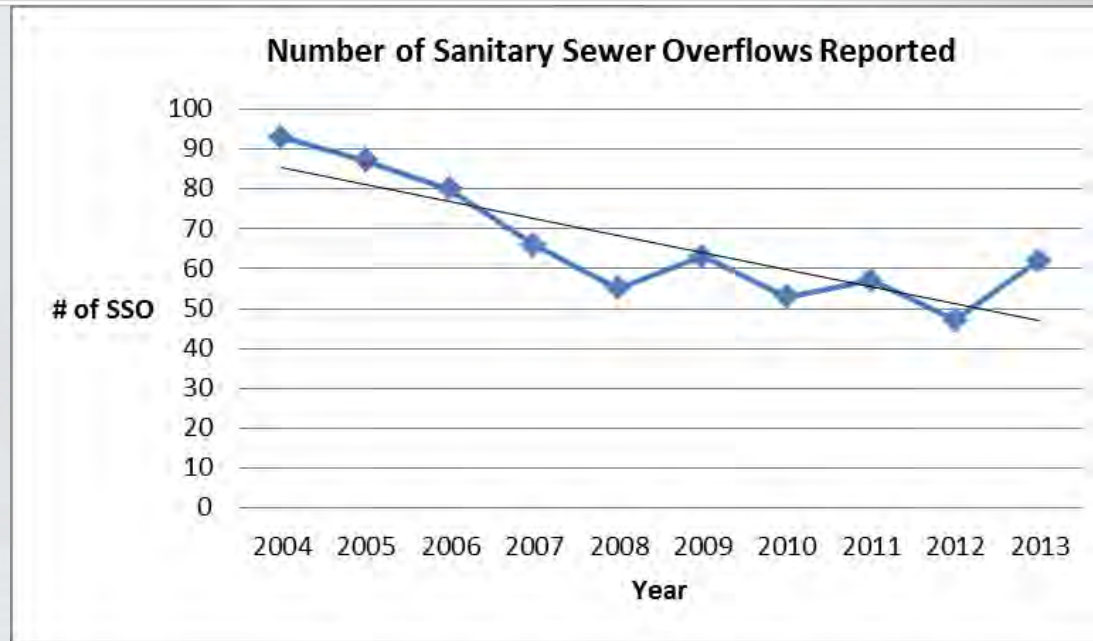
**Percentage of Beach Available for  
Recreational Use - 2002  
(3,354 Total BMD/year)**



**Percentage of Beach Available for  
Recreational Use - 2013  
(3,354 Total BMD/year)**



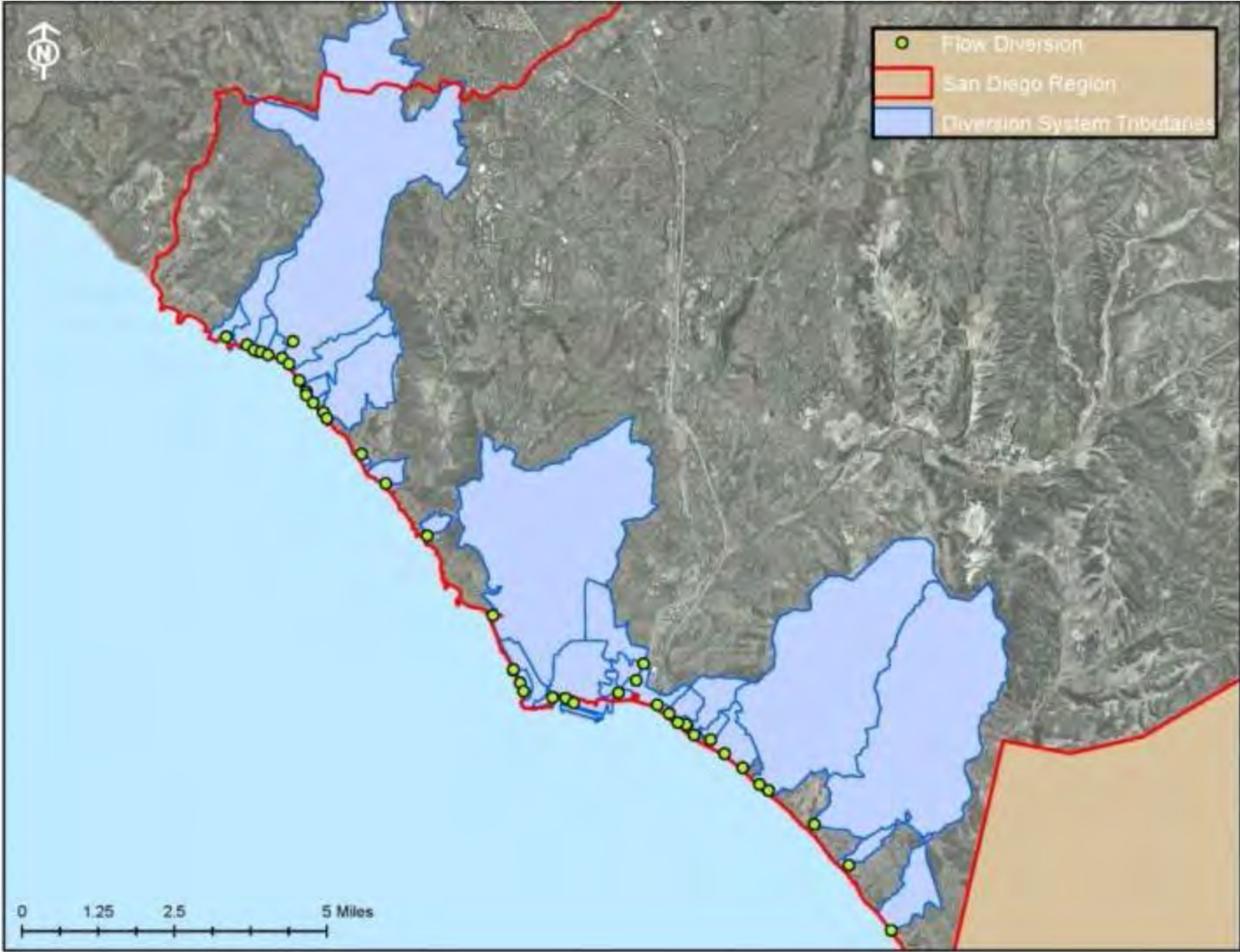
# Bacteria: Sanitary Sewer Overflows



# Bacteria: CASC

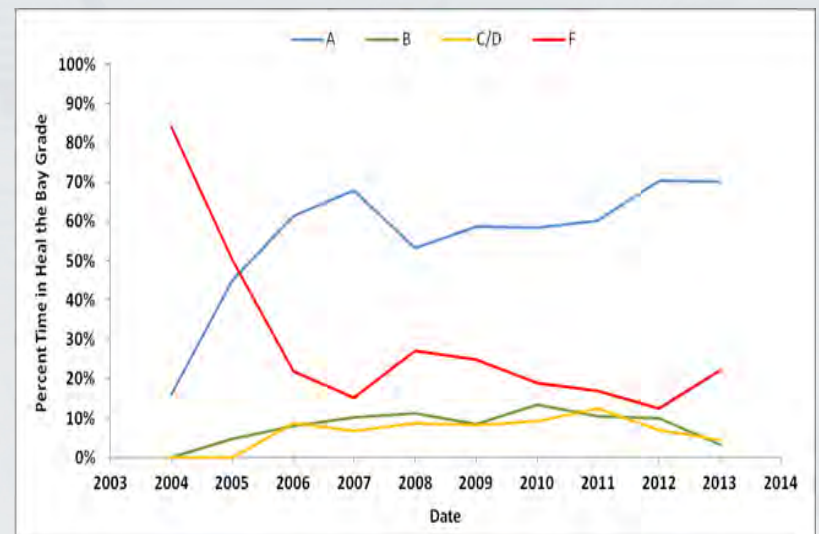
Incident Triggering CASC Activation	Receiving Waters	Date	Type	Volume Diverted to Sanitary Sewer (Gallons)
Sanitary sewer force main rupture	Tijeras Creek/San Juan Creek/Doheny Beach	March 23, 2010	SSO (public)	2,500,000
Mobile home community, Lake Forest	Aliso Creek	June 25, 2010	SSO (private)	2,400
Sanitary sewer force main rupture	Buck Gully Creek/Little Corona Beach	July 2 , 2010	SSO (public)	710,000
Manufacturer corporate HQ, Irvine	Peters Canyon Channel	January 13, 2011	Other (fountain discharge)	100,000
Residential apartment complex, Anaheim	Santa Ana River	April 12, 2012	SSO (private)	1,900
Residential apartment complex, Anaheim	Santa Ana River	April 18, 2012	SSO (private)	77,500
Packaging products manufacturer, Buena Park	Fullerton Creek/Coyote Creek/San Gabriel River	July 25, 2012	Other (clarifier discharge)	355,000
Ammonia refrigeration leak, Santa Ana	Santa Ana Delhi Channel	February 4, 2013	Other (ammonia discharge)	200
Industrial chemical facility fire, Santa Ana	Greenville-Banning Channel	August 28, 2013	Other (fire suppression runoff)	~3,000,000
Sanitary sewer pump station failure, Newport Beach	Santa Ana-Delhi Channel/Upper Newport Bay	August 31, 2013	SSO (public, mixed with channel water)	45,000
Hotel facility HVAC system discharge	Lane Channel	December 16, 2013	Other (HVAC discharge w/ dye)	140,000
			<b>Total:</b>	<b>6,932,000</b>

# Bacteria: Dry Weather Diversions



# Bacteria: Wet Weather Challenges

- Poorer conditions
- Larger flows
- Potential for new methods
  - Wet weather epidemiology study
  - Source tracking tools, including for in situ virus detection

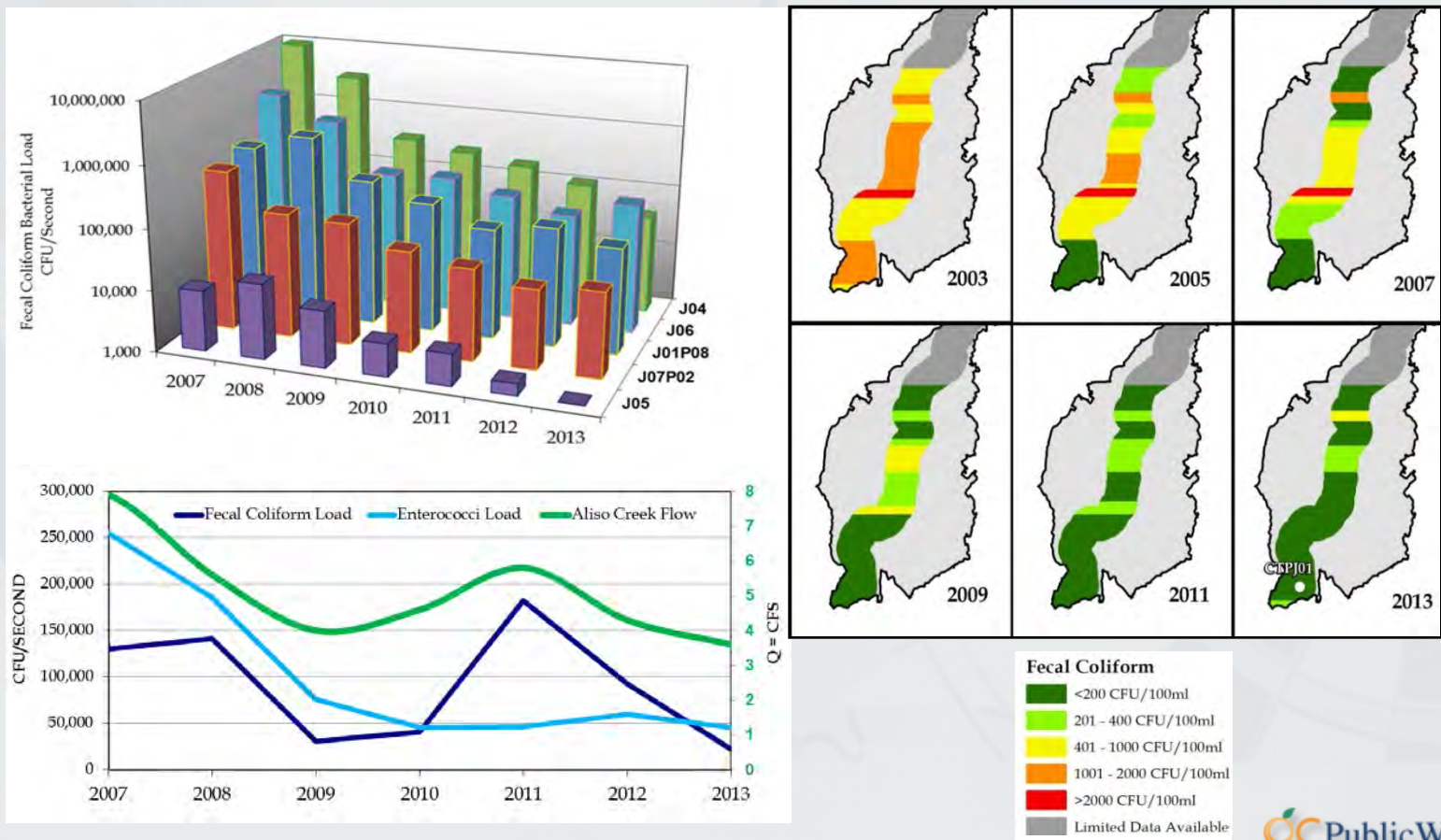




# Bacteria: TMDL Programs

## ➔ Bacteria TMDL Programs

- Seeing significant dry weather progress through BMPs and water conservation/flow reduction efforts



# Bacteria: CLRP BMP Effectiveness Study

## → Horno Retarding Basin (2003)

- Designed to reduce peak flows from ~1,800 acres of the Ladera Ranch Planned Community
- Includes Water Quality Detention Basin (~8 acres) to treat dry weather and first-flush flows (up to 265 cfs)



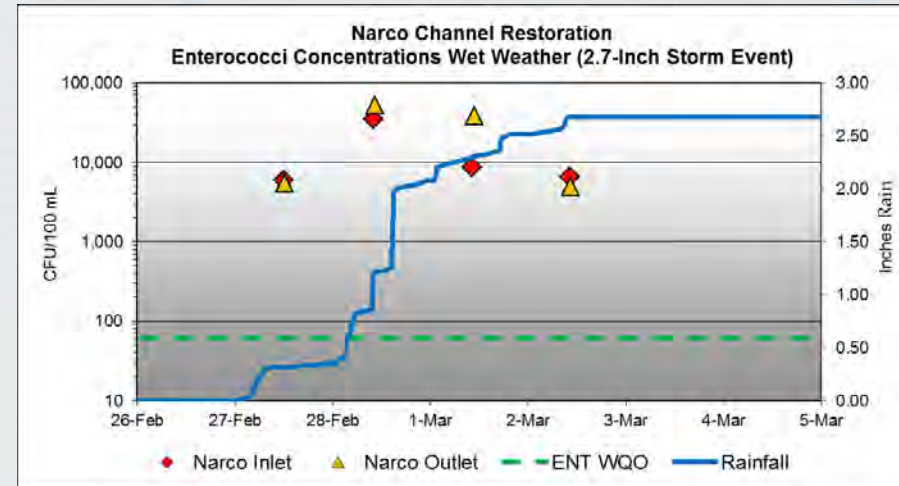
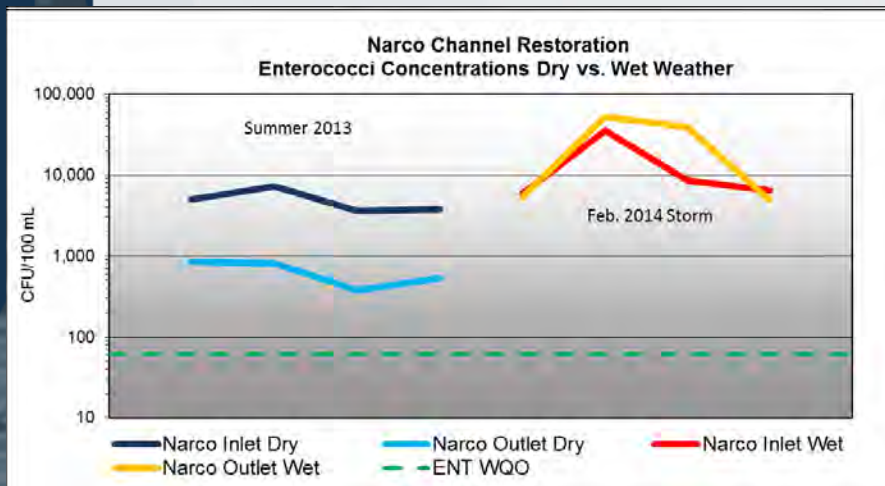
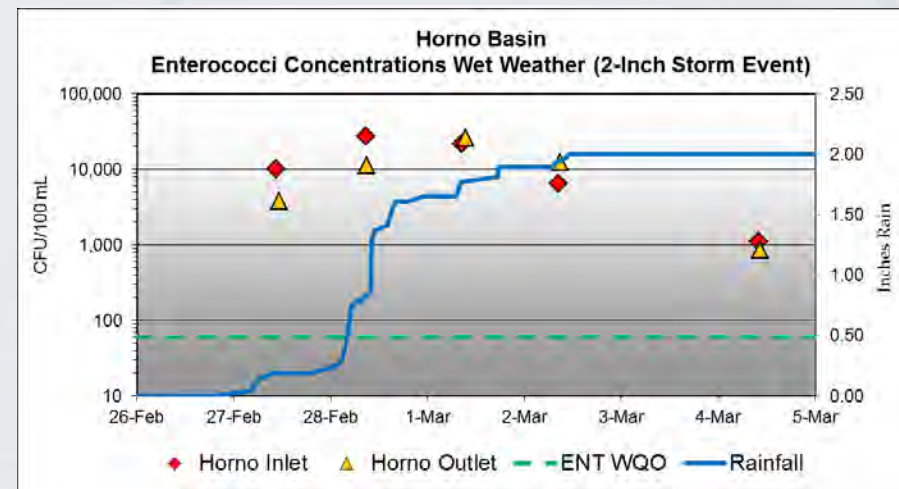
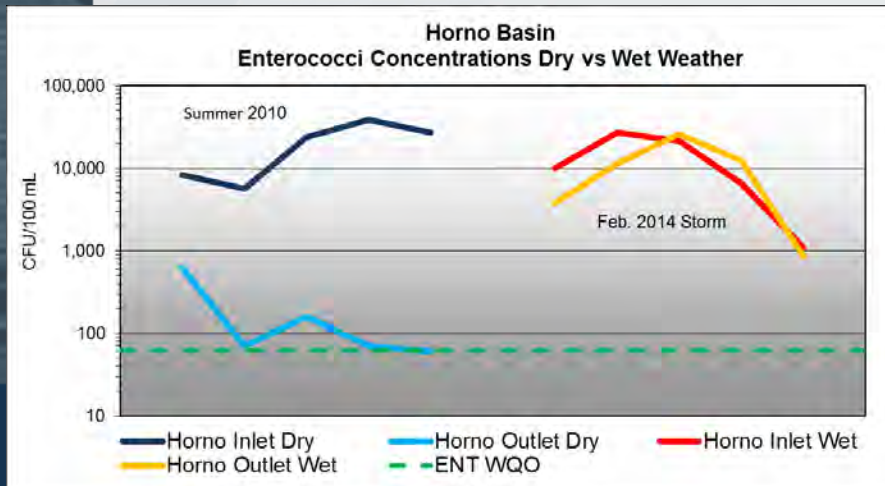
## → Narco Channel Restoration (2005)



- 1000ft of existing rock/earthen channel dredged and widened and revegetated with native plants

# Bacteria: CLRP BMP Effectiveness Study

## ➔ BMP Effectiveness - Bacteria Reductions (Enterococci)



# Bacteria: Summary

- BMPs and overall flow reductions resulting in significant reductions in dry weather
- Successful dry weather bacteria BMPs appear ineffective in providing meaningful wet weather reductions
- Microbial source tracking may be useful tool assist with isolating remaining bacteria sources causing exceedances
- Overall reduction in the number of sewage spills correlates with lower number of beach closures and increased recreational water use. (Countywide Area Spill Control Program – CASC)
- Decrease in the total number of beach mile days posted due to AB411 standards violations has increased beneficial use. Example: Doheny



# NUTRIENTS



# Nutrients: A Regional Problem

- Exceedances widespread
- Algal overgrowth less so but occurs in undeveloped areas as well
- May contribute to harmful algal blooms



# Nutrients: Summary

- Nonpoint and diffuse sources such as leaching from upland soils and intrusions from shallow groundwater are increasingly important.
- Nutrients can be readily transported in and out of various reservoirs (e.g., sediments, groundwater) and undergo complex biological transformation and cycling, making traditional pollutant control strategies less effective for nutrients.
- Improved management strategies may contribute to further progress, particularly in streams and channels, by accounting for site-specific conditions, promoting Low Impact Development, and accounting for broader regional sources.



# TOXICITY





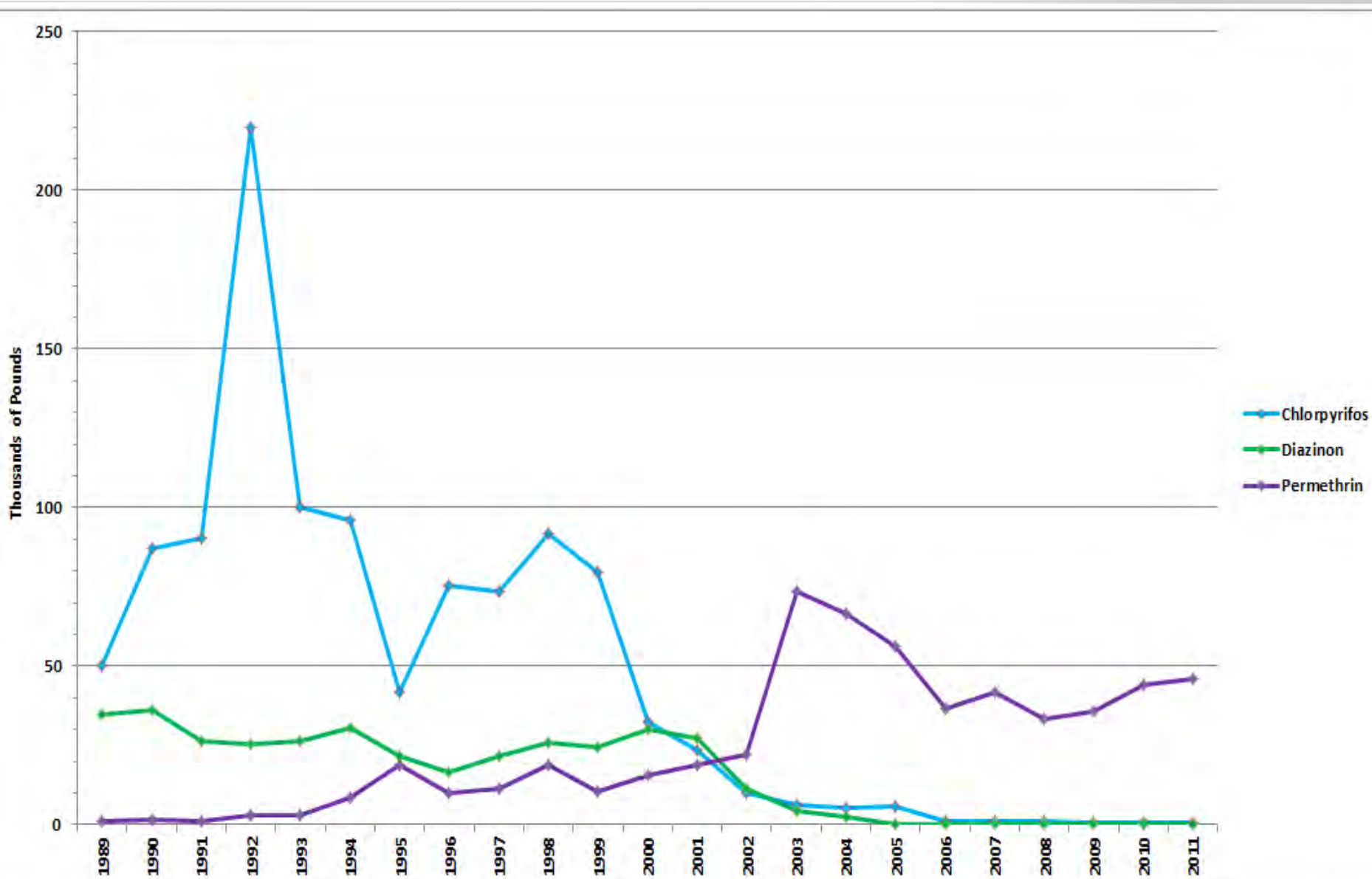
# Regional Toxicity Patterns

- Toxicity widespread but sporadic and at low levels
- No apparent trends over time

	% Stream Miles	
Ceriodaphnia Reproduction	Open	Urban
Toxic	63.0	37.4
Nontoxic	37.0	62.6



# Pesticides Most Likely Cause



# Source Control: Pesticides

## Summary of Toxicity - California Watersheds – SWRCB – 2010

- Of the 992 sites, 48% had at least 1 sample which exhibited toxicity
- With the exception of ammonia, all evaluations implicated pesticides, primarily OPs and more recently pyrethroids.

Analysis by U.C. Davis of new DPR rule making suggests that the regulations will largely--but not completely--end widespread water and sediment toxicity from pyrethroids in California's urban watersheds (Kelly Moran pers.comm.).



# Toxicity: Summary

- Pesticides are contributing to chronic toxicity;
- Need to improve information on pesticide use.
- Support source control approaches.
- Metals are not an issue.
- Geochemistry.

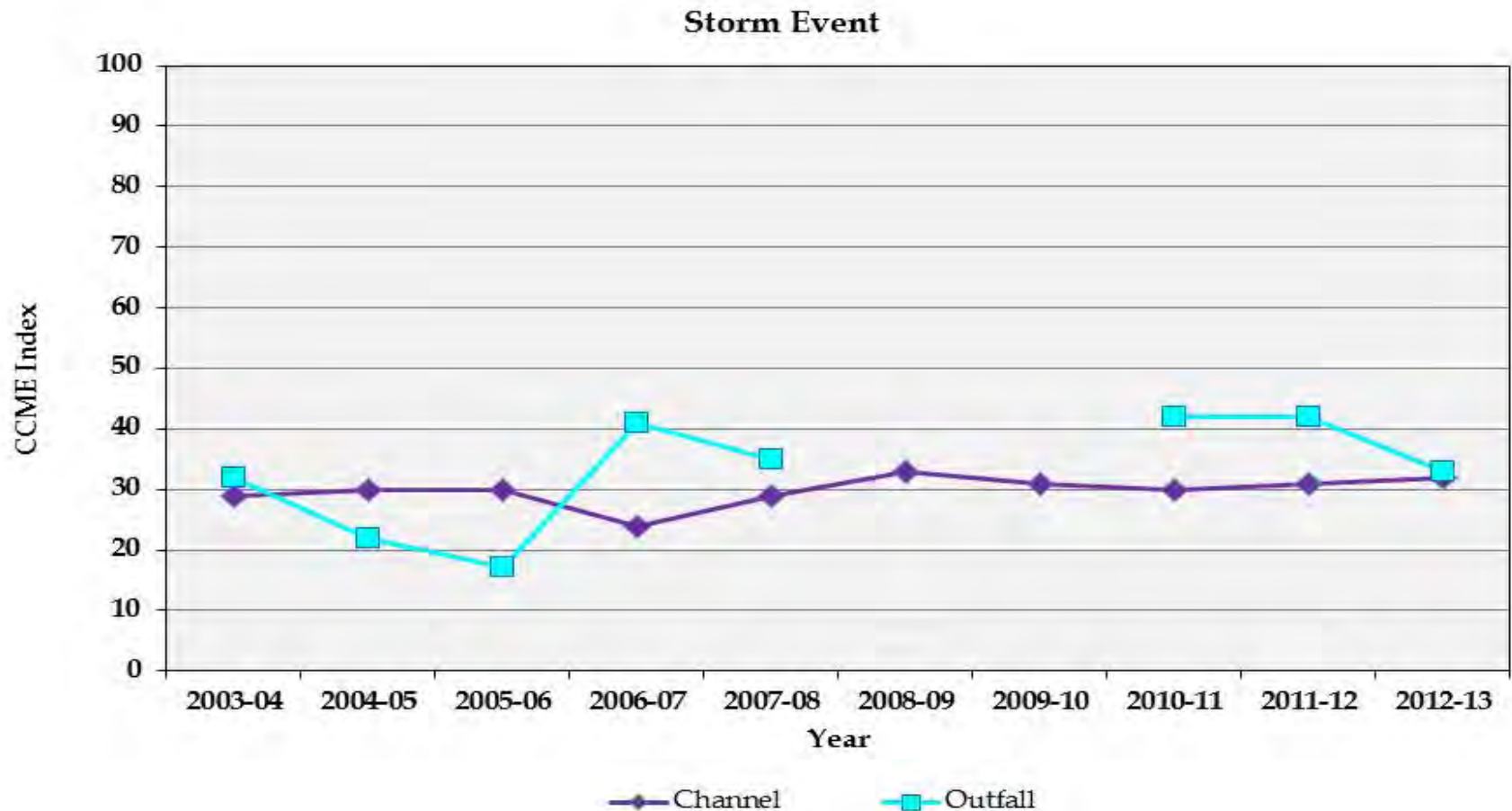


# DISSOLVED SOLIDS



# DISSOLVED SOLIDS: PRIMARY ISSUES

➔ Persistent and widespread exceedances of total dissolved solids occur in channels and at discharge outfalls.



# DISSOLVED SOLIDS: SUMMARY

- Natural sources in regional groundwater represent a large portion of elevated dissolved solids.
- Understanding local geology is key to understanding sources of dissolved solids and the pathways they travel in the watershed.
- While the flood control system provides one pathway for dissolved solids in groundwater to reach the surface, other natural pathways (such as artesian springs) exist and there is evidence of historically elevated dissolved solids levels in surface water in the region.
- Determine significance of TDS as a stressor.
- Investigate feasibility of mass balance study.

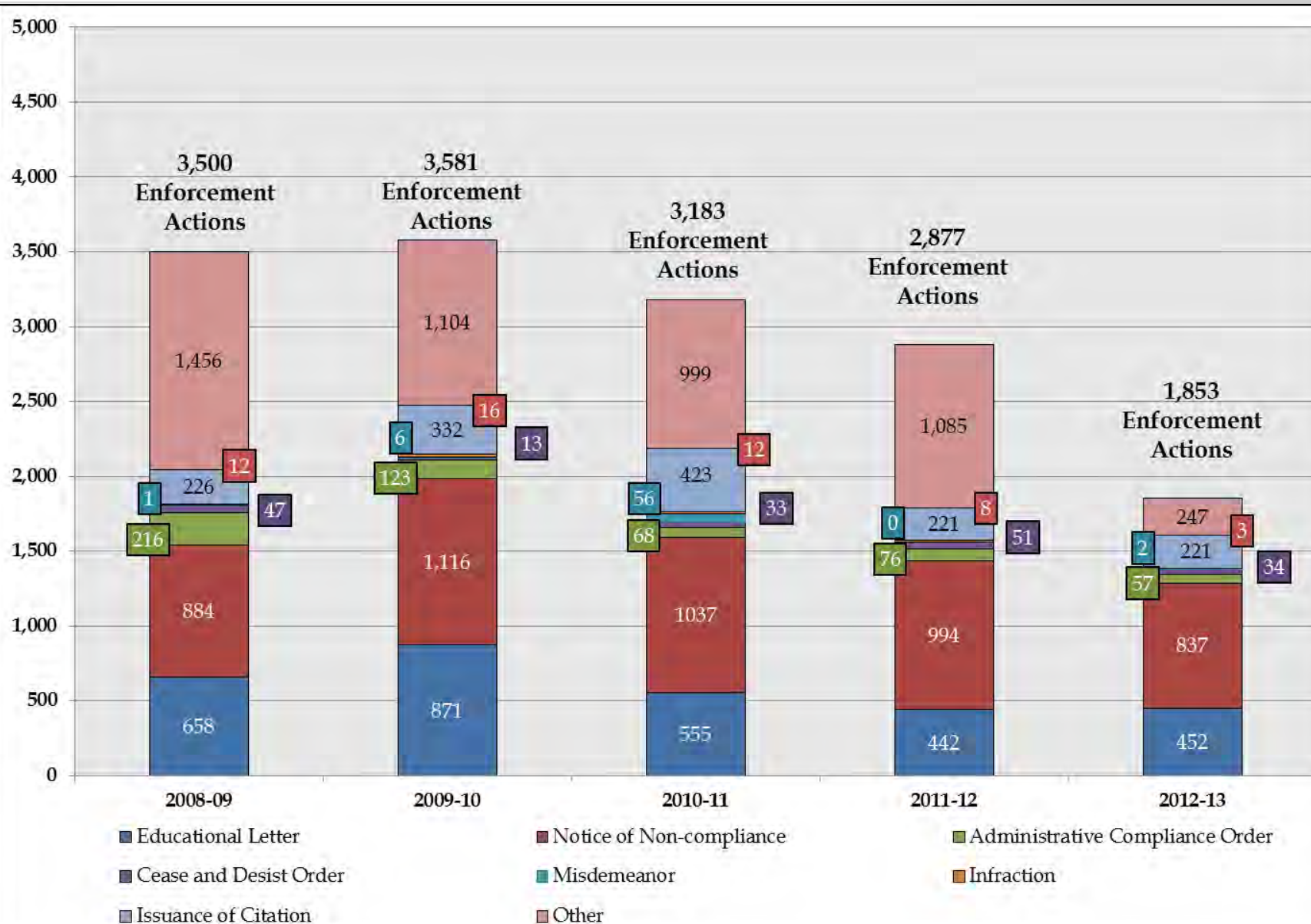


# DRY WEATHER RECONNAISSANCE & ID/IC





# ID/IC Complaints & Enforcement



# Dry Weather Reconnaissance: NALs

## → NALs vs. Als (Dry Weather)

Constituent	# of NAL Exceedances	% of NAL Exceedances	# of Reconnaissance Action Level Exceedances	% of Reconnaissance Action Level Exceedances
			2011-2012	2009-2010
pH	1	2	0	0
TDS	42	93	0	0
Dissolved Oxygen	2	4	0	0
Turbidity	3	7	3	1
Surfactants	3	7	14	5
Total Coliforms	24	53	0	0
Fecal Coliforms	19	42	0	0
Enterococcus	42	93	0	0
Unionized Ammonia	3	7	8	3
Total Nitrogen	41	91	0	0
Total Phosphate	38	84	11	4
Cadmium	13	28	0	0
Copper	1	2	0	0
Nickel	7	15	0	0
Zinc	1	2	0	0
<b>Total # of Site Visits</b>	<b>45</b>		<b>274</b>	

Table 3.7.1. Comparison of the 2011-12 NALs Data with the Weather Hybrid Reconnaissance Monitoring Program Data for the 2009-10 Reporting Period

# Dry Weather Reconnaissance: Summary

## → NALs Program Summary:

- The current NALs program has made achievements in reducing anthropogenic sources of NALs constituents, but lacks the flexibility to re-prioritize sites or reach definitive endpoints.
- Source investigation resources are therefore confined to a limited number of outfall sites Countywide.
- Groundwater, geologic conditions, and other related discharge sources are an ongoing challenge to meeting the NALs utilizing the current Basin Plan Objectives.
- The current NALs program does not account for evaluating impacts to receiving waters, which could be utilized in a potential site prioritization program.



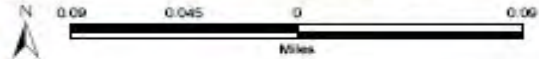
# Dry Weather: Recommendation

## → NALs Program Summary:

- Reinstatement Dry Weather Reconnaissance Program



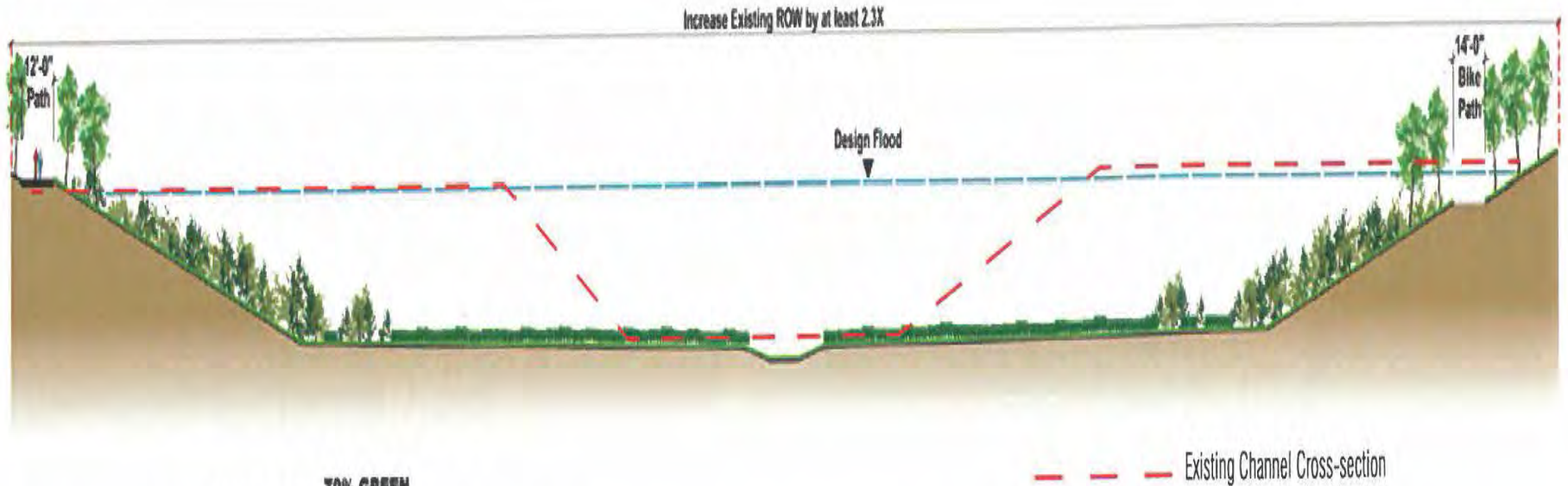
# Hydromodification



Sources: ESRI, CCPW, OC Parks, Microsoft Satellite Imagery, SDRWQCB

**Prima Deshecha Watershed - 1947 vs. 2012 Alignment**  
**San Diego Regional Water Quality Control Board**

# Hydromodification



**70% GREEN**  
**APPROX. 5 X EXISTING CAPACITY**

Expansion in channel capacity needed to make the River's surface area 70-percent green.

The approximately "5 times the current width" illustration is meant to illustrate the width that could be necessary if only the channel were widened

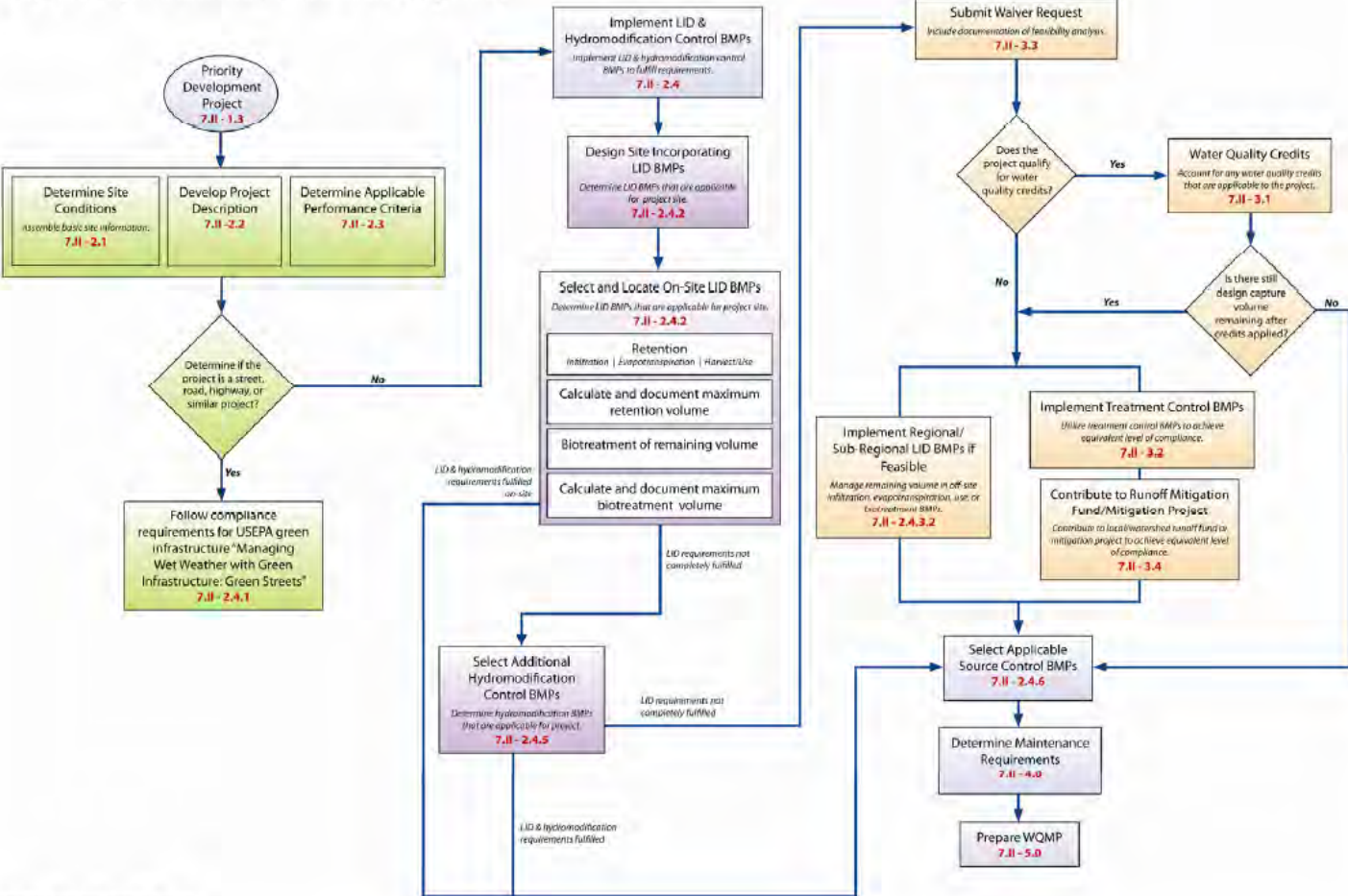
# Hydromodification: Recommendation

- Implement an approach to hydromodification that is (pre)informed by a watershed analysis and channel-specific protection goals.
- Pending completion of the analysis, land development projects discharging to engineered channels are exempted from requirements.



# LID Hierarchy

Figure 7.II-5: WQMP Development Process Flow Chart for South Orange County

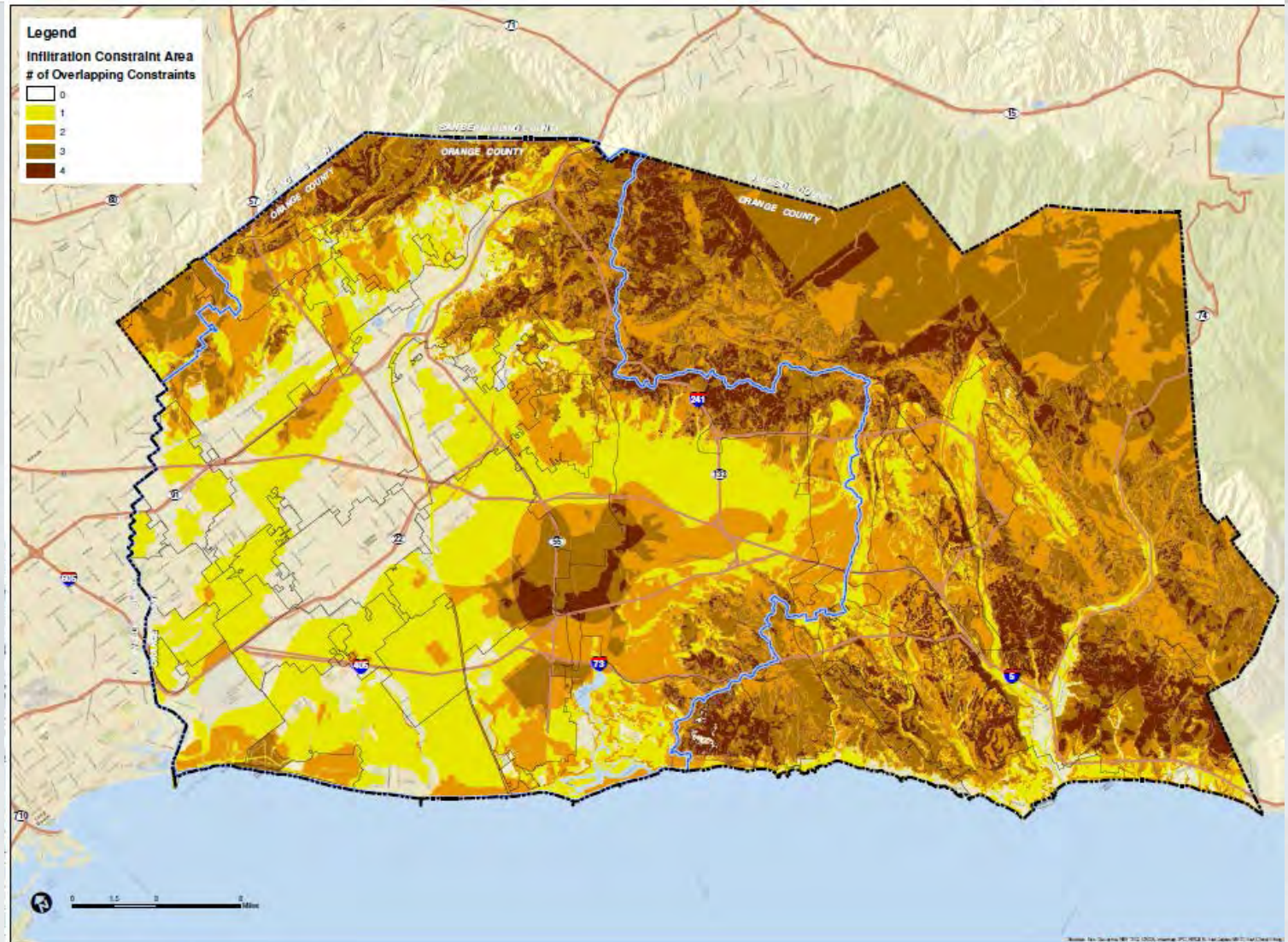


Note: Model WQMP sections shown in red





# Runoff Retention - Soils

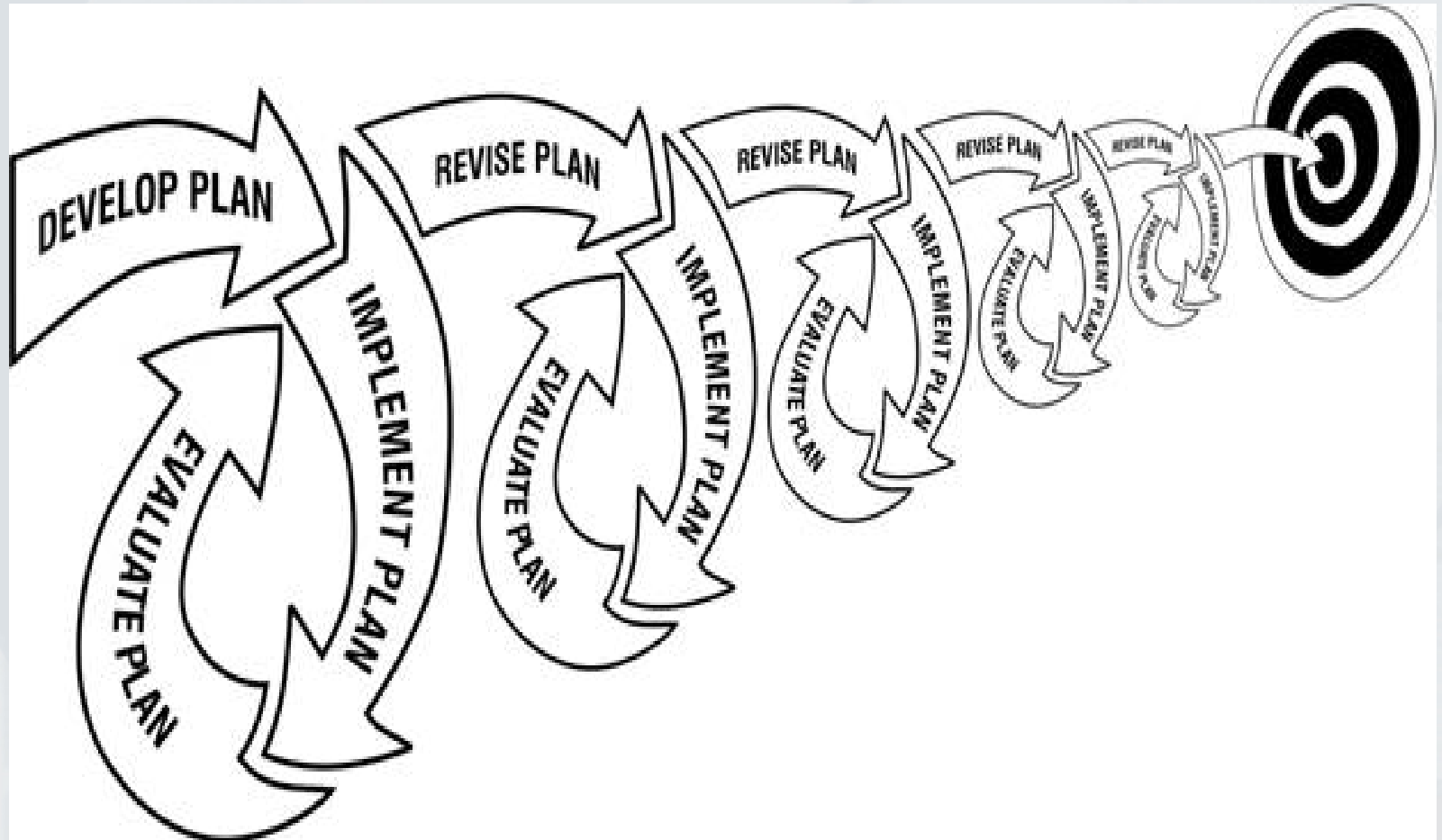


# LID Hierarchy: Recommendation

- Incorporate Integrated Water Resource Management (IRWM) element into land planning.
- Modify LID Hierarchy to establish equivalency of “On-Site BMP” and “Off-Site BMP” solutions.



# Receiving Water Limitations (RWL)



# RWL: Recommendation

A.1 Discharge  
Prohibition

A.2 Receiving  
Waters  
Limitation

B.3.c  
Compliance  
Option



# Questions (?)

