

SECTION C-11

WATER QUALITY MONITORING

**PROGRAM EFFECTIVENESS ASSESSMENT
2009-10**





C-11.0 WATER QUALITY MONITORING

C-11.1 Introduction (LIP Section A-11.1)

The countywide monitoring program is conducted on behalf of the Permittees by the County as the Principal Permittee. The countywide monitoring program consists of two separate programs to address the respective requirements of the San Diego and Santa Ana Region MS4 Permits for Orange County:

- The 2009-10 reporting period represented the seventh and final year of implementation of the Third Term San Diego Region MS4 Permit monitoring programs. The 2010-11 reporting period will transition to the monitoring programs required by the Fourth Term MS4 Permit for the San Diego Region of Orange County
- The 2009-10 reporting period represented the first year of implementation of the Fourth Term Santa Ana Region MS4 Permit monitoring programs, which are essentially unchanged from the Third Term Permit.

C-11.1.1 County of Orange Water Quality Monitoring in the San Diego Region

The countywide monitoring program in the San Diego Region under the Third Term Permit has consisted of the following elements:

- Mass Emissions Monitoring to determine year-to-year trends in pollutant loads from major storm channels;
- Coastal Stormdrain Outfall Monitoring to assess the impacts of dry-weather urban runoff on recreational uses along the coast;
- Urban Stream Bioassessments to determine the biological health of the storm channels;
- Ambient Coastal Receiving Water monitoring to determine the impacts of urban runoff on the ecologically sensitive areas along the coast;
- Dry Weather Monitoring to identify illegal discharges and illicit connections.

Section C-11 of the 2009-10 Unified Annual Progress Report should be consulted for details of these monitoring efforts.

C-11.1.2 County of Orange Water Quality Monitoring in the Santa Ana Region

The countywide monitoring program in the Santa Ana Region under the Fourth Term Permit consists of the following elements:

- Long Term Mass Emissions Monitoring to determine year-to-year trends in pollutant loads from major storm channels;
- Estuary/Wetlands Monitoring to describe impacts on estuarine and wetlands ecosystems and the relationship of any impacts to runoff;
- Bacteriological/Pathogen Monitoring, to identify spatial and temporal patterns of elevated level in order to prioritize problem areas;



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- Urban Stream and Bioassessment Monitoring to determine the biological health of the storm channels;
- Dry Weather Monitoring to identify illegal discharges and illicit connections;
- Land Use Correlations to identify changes in runoff associated with the urbanization of previously agricultural land;
- Nutrient TMDL Monitoring to track progress of nutrient control measures over time, based on comparison with TMDL targets.

Section C-11 of the 2009-10 Unified Annual Progress Report should be consulted for details of these monitoring efforts.

C-11.1.3 Dry-Weather Monitoring

The County, on behalf of the Permittees, conducts dry-weather monitoring of storm drain discharges during the months of May through September to identify and eliminate illegal discharges and illicit connections (ID/ICs) to the stormdrain system. Observations in the field that indicate an immediate and acute problem at the drain trigger a source investigation. For example, discoloration, high turbidity, unusually high flow, chemical odors, etc., are all examples of signs that an ID/IC might be impacting the stormdrain.

Monitoring results for constituents such as bacteria, metals, nutrients, surfactants, and pesticides, are compared to tolerance intervals to determine if a problem in the drainage area exists. Tolerance intervals are calculated as the upper bound of the 90th percentile from all random site data for each constituent. Consecutive exceedances of the tolerance interval for a particular constituent trigger a source investigation.

County Dry Weather Monitoring Data 2009-10

During the 2009-10 reporting period, the following drains within County jurisdiction were monitored as part of the dry weather program:

Random Sites (sampled 3 times between May & September)

- COL02P50 (Ladera Ranch, residential area, San Juan Creek Watershed)
- COL02P55 (Ladera Ranch, commercial/residential area, San Juan Creek Watershed)
- COF13@FH (North Tustin, residential area, Newport Bay Watershed)
- COC01S03 (Rossmoor, residential area, Anaheim Bay-Huntington Harbor Watershed)

Targeted Sites (sampled 5 times between May & September)

- COF07S01 (North Tustin, residential area, Newport Bay Watershed)

New Targeted Sites Added prior to the 2010 Dry Weather Season

- COL05USB01 (Ladera Ranch, upstream end of the Horno Water Quality Basin, San Juan Creek Watershed)



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- COL05DSB01 (Ladera Ranch, downstream end of the Horno Water Quality Basin, San Juan Creek Watershed)
- COC01S01@MT (Rossmoor , commercial/residential area, Anaheim Bay-Huntington Harbor Watershed)

Targeted Sites Eliminated following the 2009 Dry Weather Season

- COSACC@F01 (Unincorp. Newport Beach, commercial area, Newport Bay Watershed) - eliminated due to lack of flow - dry on 7 consecutive site visits.

Below is a breakdown of the percentage of tolerance interval exceedances for specific constituents at the County's dry weather monitoring sites.

Percentage of Dry Weather Monitoring Results Exceeding Tolerance Interval						
San Diego Region Dry Weather Monitoring Sites						
Stormdrain (Random or Targeted)	Reporting Period	Nutrients (Nitrate/ Ammonia/ Reactive Phosphorous)	Metals (Nickel/ Copper/ Zinc/ Cadmium)	Bacteria (Total/ Fecal/ Enterococcus)	Pesticides (Diazinon/ Chlorpyrifos/ Dimethoate/ Malathion)	Surfactants (MBAS)
COL02P50 (Random)	2003-04	0%	6%	0%	0%	0%
	2004-05	0%	25%	0%	0%	0%
	2005-06	0%	0%	0%	0%	0%
	2006-07	0%	0%	0%	0%	0%
	2007-08	0%	0%	0%	0%	0%
	2008-09	0%	0%	0%	0%	0%
	2009-10	0%	0%	0%	0%	0%
COL02P55 (Random)	2003-04	8%	63%	0%	0%	0%
	2004-05	0%	38%	33%	0%	0%
	2005-06	25%	31%	42%	0%	0%
	2006-07	25%	33%	0%	0%	0%
	2007-08	25%	8%	17%	17%	0%
	2008-09	33%	11%	17%	0%	0%
	2009-10	11%	25%	11%	0%	33%
COL05USB01 (New Targeted Site)	2009-10	33%	0%	0%	0%	0%
COL05DSB01 (New Targeted Site)	2009-10	0%	0%	0%	0%	0%



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Santa Ana Region Dry Weather Monitoring Sites						
COF13@FH (Random)	2006-07	0%	0%	0%	0%	25%
	2007-08	0%	0%	7%	0%	0%
	2008-09	0%	0%	0%	0%	0%
	2009-10	0%	0%	0%	0%	0%
COF07S01 (Targeted)	2006-07	33%	0%	0%	0%	0%
	2007-08	0%	4%	13%	4%	13%
	2008-09	7%	0%	0%	0%	0%
	2009-10	7%	10%	0%	4%	0%
COSACC@F01 (Targeted)	2006-07	29%	11%	5%	0%	14%
	2007-08	10%	14%	10%	4%	43%
	2008-09	Zero exceedances - dry on 4 out of 5 site visits.				
	2009-10	Site eliminated after 2009 season due to lack of flow.				
COC01S03 (Targeted)	2006-07	Targeted Site added during 2007-08 Reporting Period				
	2007-08	0%	0%	0%	0%	0%
	2008-09	0%	0%	13%	0%	0%
	2009-10	8%	0%	8%	5%	0%
COC01S01@MT (New Targeted Site)	2009-10	0%	0%	0%	0%	0%

As indicated above, dry weather monitoring locations were added upstream and downstream of the regional water quality treatment basin (Horno Basin) in the unincorporated community of Ladera Ranch. Below are the concentrations for ammonia and bacteria at these sites from sampling events in May and June of 2010.

Sample Date	Ammonia		Total Coliform		Fecal Coliform		Enterococcus	
	Upstream	Down-stream	Upstream	Down-stream	Upstream	Down-stream	Upstream	Down-stream
5/20/2010	2.03	0.1	>57,000	>650	14,700	490	8,200	620
6/18/2010	3.9	0.36	8,900	>410	360	70	5,600	70
Average % Removal		92.5%		97%		89%		96%



C-11.1.4 Other Studies

13225 Directive for Aliso Creek

Please see **Section C-3.5** of this report for discussion of monitoring under the 13225 Directive for Aliso Creek.

Heal the Bay 2009-10 Annual Beach Report Card

Orange County has been recognized for its efforts to prioritize coastal monitoring resources. Page 16 of Heal the Bay's *2009-10 Annual Beach Report Card* states the following:

"Orange County has begun to integrate the multiple agencies' efforts into a model monitoring program by attempting to integrate the sampling resources of wastewater facilities, stormwater programs, and environmental health programs. With the uncertain future of state funding for local monitoring efforts, Orange County has begun to eliminate monitoring locations deemed redundant or overlapping and plans to drop consistently clean locations to afford continued monitoring of high-use and problematic locations. Heal the Bay has provided feedback on the proposed plan, and we will monitor its progress as Orange County moves forward on maximizing available county resources for health protection of the beachgoing public."

In terms of beach water quality year-round during dry weather, Orange County was at the "top of the class" in the State according to an article in the LA Times (May 27, 2010) covering the Heal the Bay report. Page 16 of the report states the following:

"Orange County grades for both year-round dry weather and the AB411 time period were among the best on record and again well above the state average. 99% of monitoring locations received an A or B during the AB411 time period as well as 97% for year-round dry weather (Figure 6). Even Doheny Beach scored A grades for dry weather during AB411 last year."

Wet weather beach water quality in Orange County suffered a setback according to Heal the Bay's 2009-10 report as only 42% of monitored locations received an A or B grade compared to 48% in 2008-09.

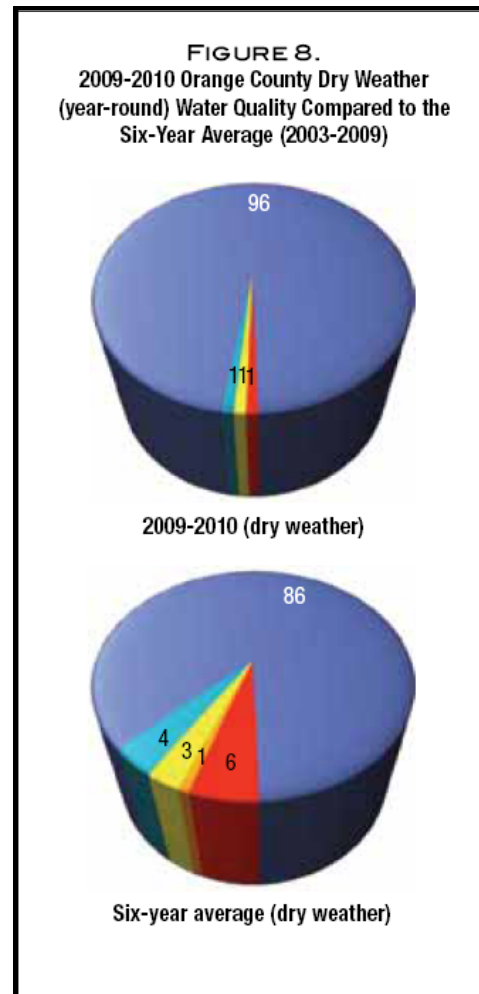
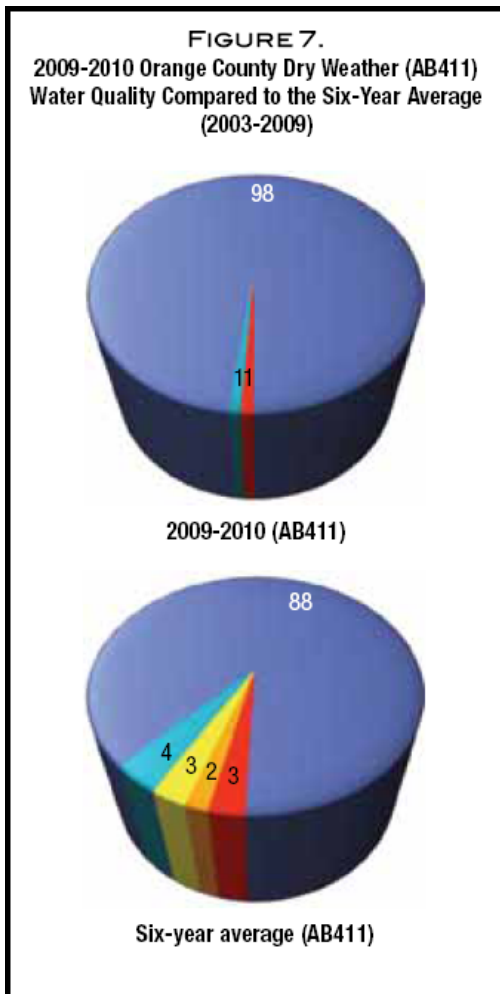
The entire report is available for download at:

http://sites.healthebay.org/assets/pdfdocs/brc/annual/2010/HtB_BRC_Annual_2010_Report.pdf

Below are **Figures 7** and **8** from the report which graphically illustrate the AB411 season and year-round dry weather results referenced above:



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Key: ● = A ● = B ● = C ● = D ● = F

The Annual Beach Report Card is a completely independent report prepared by Heal the Bay. The improvements in beach water quality over the last six years in Orange County noted in the 2009-10 report are an indication that the various program elements of the Orange County Stormwater Program are achieving the desired outcome of protecting receiving water quality to support recreational beneficial uses (Level 6 Outcome).



C-11.2 Water Quality Monitoring Program Modifications

As the last step in the effectiveness assessment process, the County has evaluated this program element to determine if any modifications are necessary. Based on the County's evaluation, the water quality monitoring program continues to provide meaningful data which will allow for increasingly integrated assessment in the future.

As larger unincorporated areas are annexed to existing cities or become incorporated into new cities, this data will prove important in city attempts to target BMPs to existing and new development in those areas. At the same time, to the extent smaller islands are not annexed for years, the value of the data to the County itself may be limited, as it is responsible in these areas typically for only fragments of a given watershed or subwatershed.

The Fourth Term MS4 Permit for the Santa Ana Region of Orange County adopted on May 22, 2009, does not require major changes to the monitoring program. The Fourth Term MS4 Permit for the San Diego Region of Orange County however, requires a significant change in the regional monitoring program and 2010-11 will mark the first reporting period where those monitoring activities are conducted. Among new programs being developed for implementation in 2010-11 are wet and dry weather outfall monitoring programs that will compare concentrations for certain constituents to numeric action levels.

The cost of monitoring continues to grow and it is prudent, with reference to the previous Heal the Bay section, to recognize that ongoing efforts to improve the efficiency of monitoring must continue and perhaps even move more toward current efforts on beach monitoring and the SMC Bioassessment Program.