

# Preparing for Wet Weather CBRPs

Presenters:

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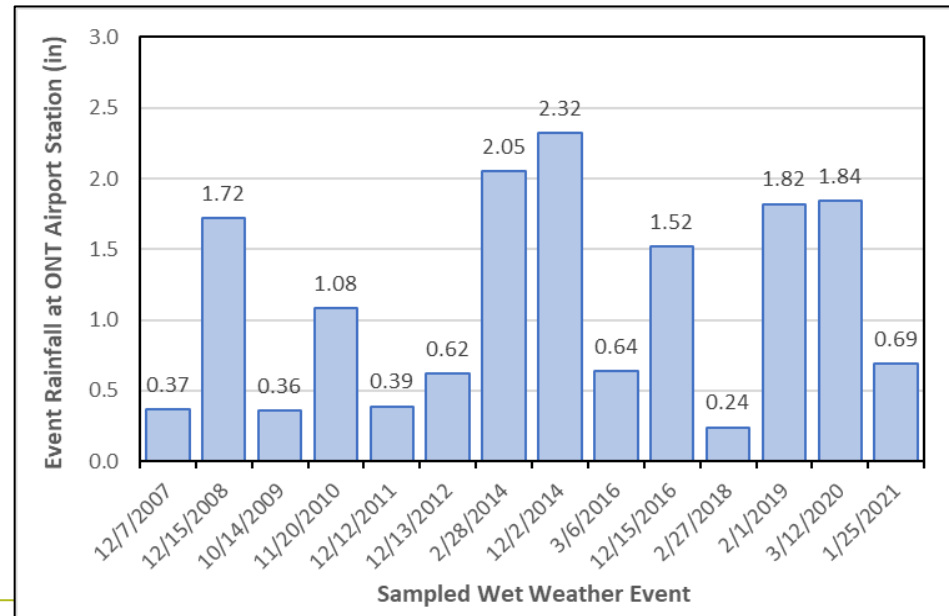
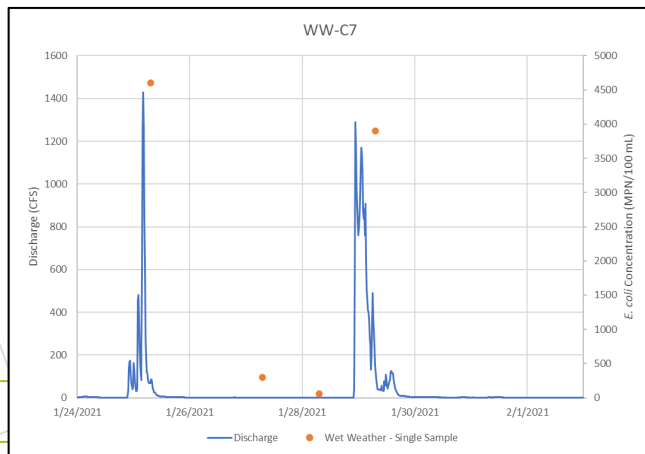
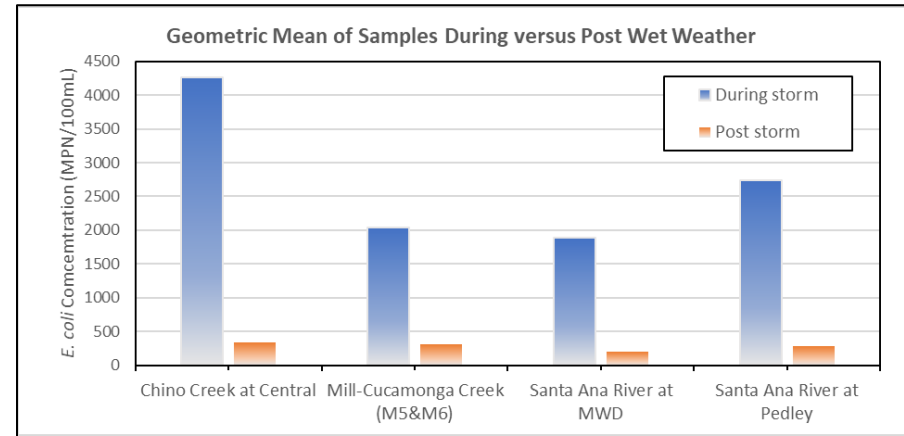
August 23, 2021



**CDM  
Smith**

# Existing Wet Weather Data in MSAR Watershed

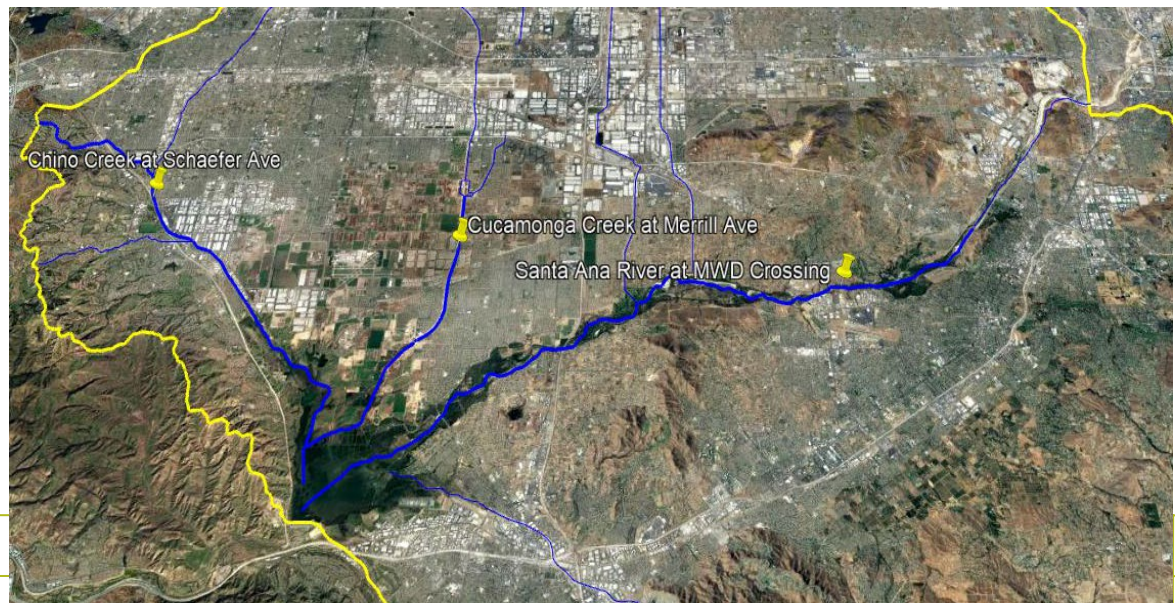
- Wet weather sampling in MSAR receiving waters from 14 storms (one per year since 2007-08)
- Stormwater program core monitoring
- USGS flow gauge on all three TMDL waters





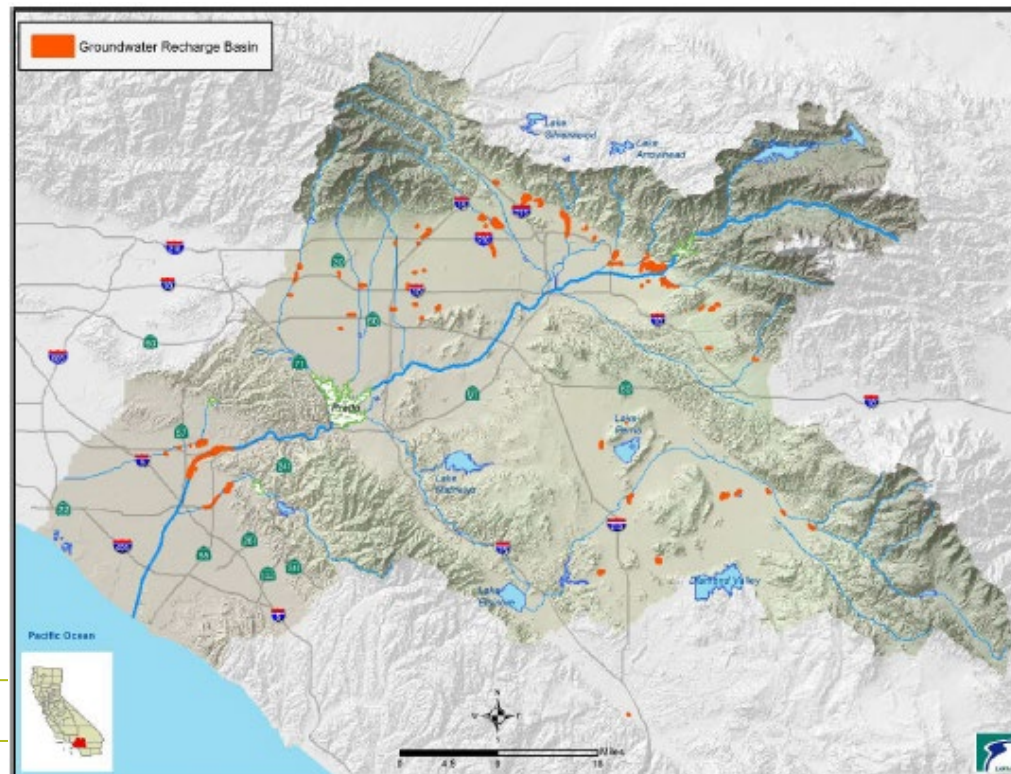
# Potential Elements of Wet Weather CBRPs

- High flow suspension (HFS)
  - Velocity > 10 feet/sec
  - Depth \* Velocity > 8 ft<sup>2</sup>/sec
  - Daily Rainfall > 0.5 inches in 24 hours (default if no site-specific data available to assess other criteria)
- Potential Task: Characterize channel hydraulics to find flowrate (cfs) that causes unsafe swimming conditions in the impaired waters



# Potential Elements of Wet Weather CBRPs

- Existing BMPs - extensive deployment of regional retention basins and distributed WQMPs since 2005 TMDL
- Potential Task: Quantify load removed with existing data and hydrologic models



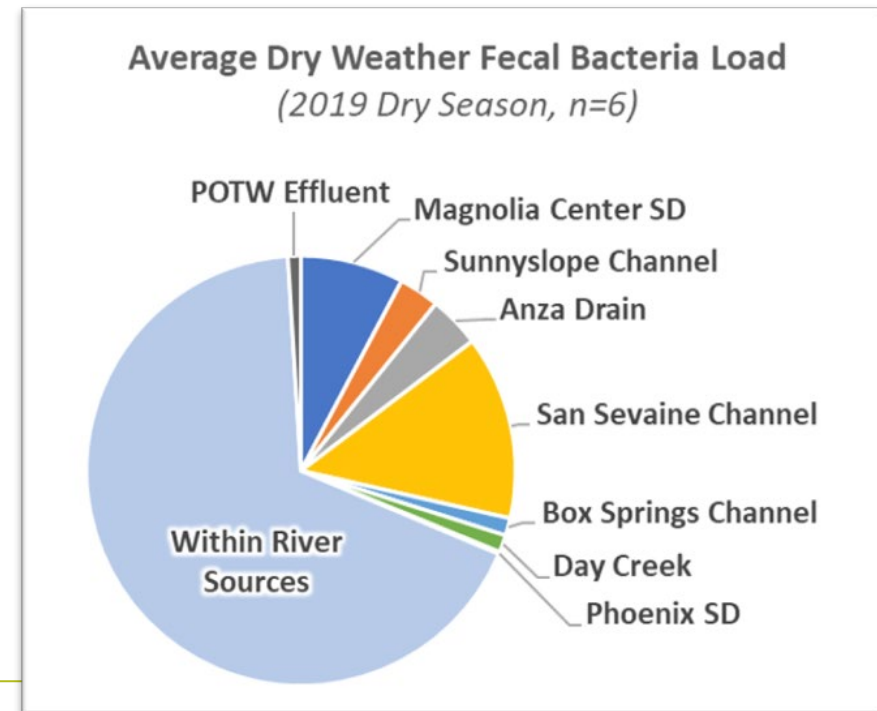
Source: OWOW  
Plan 2018 Update

# Potential Elements of Wet Weather CBRPs

- Human sources of fecal bacteria are most pathogenic, and DNA markers provide an alternative metric to demonstrated progress at MS4 outfalls
- Potential Task: Special study to characterize loads of human markers at MS4 outfalls during wet weather (focus on smaller storms that do not trigger HFS)

# Potential Elements of Wet Weather CBRPs

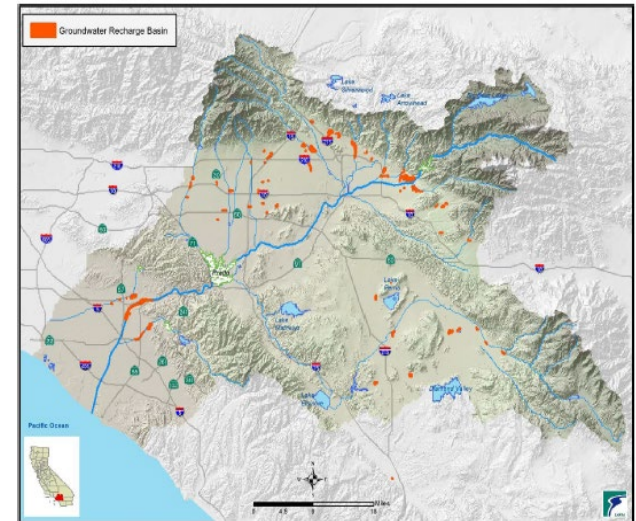
- In-stream non-MS4 source reduction – majority of fecal bacteria load in dry weather. Removal of non-MS4 sources (e.g., homeless encampments) in mainstem could serve as an offset to required MS4 reductions
- Potential Task: Collect needed wet weather data to quantify non-MS4 loads to level that would serve as basis for a potential offset program





# Watershed Planning

- BMPs could increase stormwater capture and groundwater basin recharge in the upper Santa Ana River watershed
- Potential Task: Mutual benefit analysis using existing models for TMDL compliance and local (upper watershed) groundwater basin storage volume, salts
- Large scale changes to stormwater management should fit within one water plan for region
  - Receiving water quality
  - Orange County groundwater
  - Downstream habitat
  - Socioeconomic impacts
  - Others



**Source: OWOW Plan 2018 Update,  
Groundwater Recharge Facilities in the  
Santa Ana River Watershed**



# Other Wet weather bacteria TMDLIPs in SoCAL



# Natural Source Exclusion in LA, San Diego Regions

- Frequency of REC1 objectives exceedance in a reference watershed estimated for LA region bacteria TMDLs
- Allowable wet weather exceedance days for Santa Monica Bay Beaches where risk of exposure is far greater than MSAR TMDL waters
  - 11 of 49 wet day samples exceed REC1 WQO (22%) from point zero (aka wave wash) of natural Arroyo Sequit canyon to Leo Carrillo State Beach
  - If applied to 90<sup>th</sup> percentile wet year, 1993 with 75 wet days, then **17** wet days could be expected to exceed (**22%**)
  - If beach data shows lower frequency of exceedance, then the actual frequency sets the anti-degradation threshold for allowable exceedance days

# EWMPs in LA Region

- Allowable exceedance days accounts for both high flow suspension and natural source exclusion
- Wet years controlled by high flow suspension
- Dry years controlled by natural source exclusion

Table 2. Calculation of critical bacteria storm depth for Ballona Creek TMDL for the most recent 10 water years with hourly ALERT Gage 482 (USC) in Ballona.

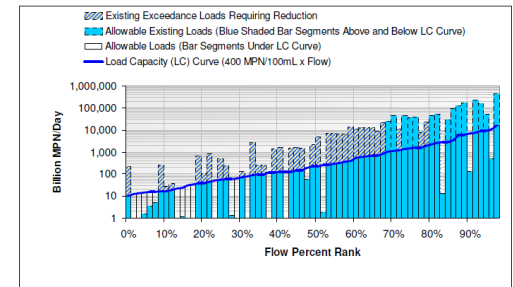
Day	2009		2010		2011		2012		2013		2014 <sup>1</sup>		2015		2016		2017		2018 <sup>1</sup>	
	Date	In.	Date	In.	Date	In.	Date	In.	Date	In.	Date	In.	Date	In.	Date	In.	Date	In.	Date	In.
1	12/15	1.34	2/6	1.57	3/20	2.84	10/5	0.94	1/24	0.63	2/28	1.81	9/15	2.14	1/5	1.4	1/22	1.76	1/9	1.48
2	11/26	1.26	10/14	1.14	12/19	2.53	3/25	0.79	5/6	0.63	2/27	0.86	12/12	1.48	1/6	0.68	2/17	1.67	3/21	0.62
3	2/16	0.67	1/20	0.95	12/22	2.44	11/20	0.78	3/8	0.51	3/1	0.83	12/2	0.88	2/17	0.56	1/20	1.38	3/22	0.5
4	2/5	0.59	1/18	0.90	12/20	1.4	3/17	0.63	1/25	0.11	3/2	0.2	5/14	0.73	3/6	0.55	12/23	1.15	1/10	0.01
5	2/6	0.55	1/21	0.87	12/18	1.18	4/11	0.59	3/9	0	11/21	0.24	2/22	0.62	3/11	0.53	12/16	1.06	3/23	0
6	2/17	0.31	12/7	0.79	12/21	0.96	12/12	0.59	5/7	0	4/2	0.19	12/3	0.25	3/7	0.35	1/12	0.93	3/10	0.4
7	12/16	0.04	12/12	0.75	12/29	0.71	1/21	0.55	12/18	0.43	11/29	0.16	5/15	0.03	1/7	0.26	1/19	0.77	3/2	0.31
8	11/27	0	4/12	0.63	3/21	0.59	12/13	0.12	12/29	0.4	2/2	0.12	2/23	0.01	2/18	0.17	2/6	0.68	1/8	0.27
9	2/7	0	2/27	0.63	2/19	0.59	3/18	0.08	11/30	0.36	11/22	0.03	12/13	0	3/12	0	1/9	0.63	3/15	0.15
10	12/17	0.47	4/5	0.55	2/25	0.56	11/21	0.04	12/24	0.32	11/23	0	9/16	0	1/31	0.36	1/23	0.43	3/16	0.1
11	2/9	0.43	2/5	0.51	2/16	0.52	3/26	0.04	12/26	0.31	11/24	0	1/11	0.47	10/5	0.34	2/7	0.19	3/3	0.04
12	2/13	0.28	1/19	0.47	2/26	0.45	10/6	0	11/17	0.24	11/30	0	3/1	0.46	12/19	0.26	12/24	0.17	3/11	0.03
13	11/25	0.24	1/22	0.35	2/20	0.05	1/22	0	2/19	0.16	12/1	0	1/10	0.41	12/13	0.14	1/10	0.05	3/13	0.02
14	3/4	0.20	12/13	0.28	12/23	0	4/12	0	11/29	0.15	12/2	0	12/16	0.38	4/8	0.13	2/18	0.05	1/11	0
15	12/25	0.16	10/15	0	12/30	0	1/23	0.47	12/3	0.15	2/3	0	11/1	0.38	12/22	0.06	12/17	0	1/12	0
16	1/23	0.16	12/8	0	2/17	0	4/13	0.43	1/6	0.12	2/4	0	3/2	0.37	4/9	0.03	1/13	0	3/4	0
17	6/5	0.12	2/7	0	3/22	0	11/6	0.32	12/1	0.04	2/5	0	7/18	0.34	3/14	0.02	1/21	0	3/5	0
18	11/4	0.12	2/28	0	12/25	0.49	4/26	0.27	12/2	0.04	3/3	0	11/30	0.26	12/21	0.01	12/21	0.47	3/12	0
19	1/24	0.08	4/6	0	2/18	0.48	11/4	0.16	1/26	0.04	3/4	0	5/8	0.16	10/6	0	11/20	0.43	3/17	0
20	11/5	0	4/13	0	1/2	0.47	4/25	0.16	1/27	0.04	3/5	0	12/17	0.13	10/7	0	1/11	0.39	3/18	0
21	11/6	0	12/11	0.47	3/23	0.46	11/12	0.12	11/18	0	4/3	0	12/30	0.13	10/8	0	2/10	0.3	3/19	0
# of HFS days in record	9		20		17		14		6		4		10		9		17		5	

# WQIP in South OC

- Watershed model to simulate downstream bacteria loads for all storms based on calibration to sampled events
- Flow gauge and WQO concentration (100 mpn/100ml EC) to draw allowable load duration curve
- Exceedances expected for a reference system removed from estimation of load reductions required
- Example for Aliso Creek in San Diego Region

Final Technical Report, Appendix I  
Methodology for Calculating and Allocating Bacteria Loads

February 10, 2010



Subwatershed 202 Fecal Coliform Loading Summary		Value	Units
Total Wet Days During Critical Wet Year		69	Days
Total Wet Exceedance Days (Number of Bars with Segment Above LC Curve)		49	Days
Allowable Wet Weather Exceedance Frequency		22	Percentage
Allowable Wet Exceedance Days (Total Wet Days x Exceedance Frequency)		15	Days
Non-Allowable Wet Exceedance Days Requiring Load Reduction		34	Days
Total Existing Load for Existing Condition (Sum of All Shaded Bar Segments)		1,732,709	Billion MPN/Year
Allowable Load (Sum of Solid Outline Bar Segments Under LC Curve)		83,999	Billion MPN/Year
Allowable Exceedance Load (Sum of Blue Shaded Bar Segments Above LC Curve)		1,476,595	Billion MPN/Year
Total Allowable Load (TMDL) (Sum of Allowable Load and Allowable Exceedance Load)		1,562,594	Billion MPN/Year
Exceedance Load Requiring Reduction (Total Existing Load - Total Allowable Load)		170,116	Billion MPN/Year

Figure I-2. Load Duration Curve for Aliso HSA Subwatershed #202  
Using Reference System Approach