Ventura Countywide Stormwater Quality Management Program

2015-2016 Permit Year

Ventura Countywide Stormwater Quality Management Program Annual Report

Attachment E - TMDL Reports Volume II

December 15, 2016

Camarillo
County of Ventura
Fillmore
Moorpark
Ojai
Oxnard
Port Hueneme
Santa Paula
Simi Valley
Thousand Oaks
Ventura
Ventura County Watershed Protection District

JUNE 2016

TOTAL MAXIMUM DAILY LOAD FOR ALGAE, EUTROPHIC CONDITIONS, AND NUTRIENTS IN VENTURA RIVER, INCLUDING THE ESTUARY, AND ITS TRIBUTARIES (VR ALGAE TMDL)

2016 ANNUAL REPORT

Submitted to

TMDL Responsible Parties Implementing Receiving Water Monitoring Requirements:

City of Ojai
City of Ventura
County of Ventura
Ojai Valley Sanitary District
California Department of Transportation
Ventura County Agricultural Irrigated Lands Group
Ventura County Watershed Protection District

Prepared by:

Ventura County Watershed Protection District
Stormwater Resources Section
June 1, 2016

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ATTACHMENTS (PROVIDED AS ELECTRONIC FILES)

Attachment A: Sampling event data in summary format, including water quality analytical results and field measurements.

EXECUTIVE SUMMARY

On behalf of the TMDL Responsible Parties, the Ventura County Watershed Protection District (District) began sampling in accordance with the VR Algae TMDL Comprehensive Monitoring Plan for Receiving Waters (CMP) on January 14, 2015. As required by the TMDL, the CMP prescribes year-round monthly water quality monitoring for nutrients and other water quality parameters at one site in the Ventura River Estuary, one site in each of the Ventura River reaches 1 – 4, and in two main tributaries, Cañada Larga and San Antonio Creek. Continuous monitoring of dissolved oxygen, pH, temperature, and conductivity are required at each site once a quarter. The CMP also requires monthly monitoring of algae during the dry season (May – September). This report covers the monitoring from May 2015 – April 2016, including monthly checks for flow at the observations sites and quarterly continuous data logging.

Access permission was requested and received for all sites, however TMDL-R2 is sampled approximately 200 meters upstream of the OVSD site (OVSD-R5) during the dry season in order to be entirely on permitted property.

All sites met the seasonal average numeric target for macroalgal cover and, with the exception of TMDL-R1, they also met the seasonal average numeric target for chlorophyll *a*. All grab measurements for pH were within the numeric target limits with the exception of high pH in some TMDL-Est samples during the wet season. However, dissolved oxygen (DO) levels below the numeric target were measured at several sites, and are mostly related to periods of low flow.

Seven Hydrolab HL4 water quality sondes were selected for quarterly two-week continuous monitoring and first deployed for this project in March 2015. The 2015 second, third, and fourth quarter deployments occurred in May, September, and November, respectively. The first quarter 2016 deployment occurred in February (four sites with water present) and March (after flow began at the previously dry site). The sondes were programmed to log dry season data from May 7-25 and September 1-15, 2015. The estuary DO sensor fouled during May so was re-deployed from June 2- 16, 2015. All sondes were returned to the factory after the September event to repair a false battery failure alarm, which had caused the timing to shift by a few minutes but did not otherwise affect the data quality. New replacement sondes were sent under warranty, as the repair required a circuit board replacement. The wet season deployments occurred November 2-16, 2015 and February 4-18, 2016 (March 14-29 for site TMDL-SA, which was dry in February). The DO sensor fouled at TMDL-R1 during the November 2015 deployment so the data set is truncated.

Southern California is currently experiencing drought conditions. The River was dry at the observation locations upstream of TMDL-R4 for this reporting period, however there was some evidence of recent flow during March following after a rain event. Flow variations between monitoring sites and events may be due to a combination of factors including geology, weather conditions, inputs, and extractions.

Sampling event data, including photos, water quality analytical results, field measurements, laboratory reports, chain of custody forms, field data sheets, and other raw data are provided as an attachment to this report as electronic files on the CDs provided to the Responsible Parties.

BACKGROUND

The Water Quality Control Plan for the Los Angeles Region was amended on December 6, 2012 to incorporate the Total Maximum Daily Load for Algae, Eutrophic Conditions, and Nutrients in the Ventura River, including the Estuary, and its Tributaries (VR Algae TMDL). The VR Algae TMDL became effective on June 28, 2013 and required the development and implementation a comprehensive monitoring plan (CMP) for receiving water monitoring to assess numeric attainment and measure in-stream nutrient concentrations. The CMP submitted by the Responsible Parties (Ojai Valley Sanitary District, Ventura County Watershed Protection District, County of Ventura, City of Ojai, City of San Buenaventura (Ventura), California Department of Transportation, and the Ventura County Agricultural Irrigated Lands Group (represented by the Farm Bureau of Ventura County)) was approved by the Los Angeles Regional Water Quality Control Board (Regional Board) on October 20, 2014.

On November 18, 2014, the Ventura County Watershed Protection District (District) was retained by the Responsible Parties to conduct the monitoring in accordance with the CMP for up to 5 years. The CMP required sampling to begin no later than 90 days after the Los Angeles Regional Water Quality Control Board approved the CMP, which equates to January 18, 2015. Monitoring began on January 14, 2015.

As required by the TMDL, the CMP prescribes year-round monthly water quality monitoring for nutrients and other water quality parameters at one site in the Ventura River Estuary, one site in each of the Ventura River reaches 1 – 4, and in two main tributaries, Cañada Larga and San Antonio Creek. Continuous monitoring of dissolved oxygen, pH, temperature, and conductivity are required at each site approximately quarterly. The CMP also requires monthly monitoring of algae during the dry season (May – September). This report is a summary of the monthly dry season monitoring data from May – September 2015, the monthly wet season monitoring from October 2015 – April 2016, and the quarterly continuous data logging conducted in May, September, and November 2015, and February/March 2016.

FIGURE 1. SAMPLING SITES AND FLOW OBSERVATION LOCATIONS

Note: Yellow site markers (black labels) are sampling locations. Blue site markers (blue labels) are flow observation locations.

ACCESS PERMISSION

Special access permission for wet season monitoring is not needed for TMDL-Est, TMDL-R1, TMDL-R4, TMDL-CL, and TMDL-SA due to public right-of-way and other agencies' land ownership, however access permission is required for dry season sampling (May – September) as the monitoring protocols utilize a 150 meter reach of the river. Access permission prior to wet season sampling was needed for TMDL-R2 and TMDL-R3. The District utilized the services of the County of Ventura's Real Estate Services Division (RES) to request access permission from the owners of the properties on which the monitoring sites as listed in the CMP are located. Five-year easements were sought from the property owners for the fee of $250 per term. The temporary easements will expire five years from the date of approval (early 2020). With the exception of site TMDL-R2, permission was granted by the property owners for all sites, however two property owners (TMDL-R2 upstream of the site listed in the CMP and TMDL-SA directly above the confluence with the Ventura River) declined the five year easement request but signed a revocable access permit instead. TMDL-R2 was sampled approximately 200 meters upstream of the OVSD site (OVSD-R5) in order to be entirely on permitted property.

MONTHLY MONITORING

Monitoring occurred monthly as required. There was no connectivity between the upper and lower watershed on the observation dates, as shown in Table 1. TMDL-CL was dry during the reporting period with the exception of March 2016, when sampling occurred a few days after rainfall. Sample dates and collecting agency are shown in Table 2 (sample sites that were dry are noted as such and shaded grey). Monthly field data is summarized in Table 3, monthly flow data is shown for comparison in Table 4, and nutrient data in Table 5. The District contracted with Aquatic Bioassay & Consulting Laboratories, Inc. (ABC) for assistance with the monthly monitoring of chlorophyll *a* (Table 7) and percent cover of algae (Table 8 and Table 9) during the dry season, May to September.

TABLE 1. MAY 2015 - APRIL 2016 OBSERVATION SITES

Date	Ventura River at Hwy 150	Ventura River at Santa Ana Blvd	Ventura River at Casitas Road
5/21/2015	DRY	DRY	Flowing east side 2-3 cfs, flowing west side ~1cfs
6/16/2015	DRY	DRY	Flowing 2-3 cfs
7/16/2015	DRY	DRY	Pond NW side at bridge, NE chanels flowing 2-3 cfs
8/12/2015	DRY	DRY	Ponded on east and west sides of riverbed, upstream and downstream of bridge
9/23/2015	DRY	DRY	Ponds on eastside of riverbed, dry on westside.
10/13/2015	DRY	DRY	Ponded east side, dry on west side
11/19/2015	DRY	DRY	Pond left (west) bank upstream of bridge
12/9/2015	DRY	DRY	Ponded under bridge at left (east) bank
1/20/2016	DRY	DRY	Small pond under bridge at left (east) bank
2/17/2016	DRY	DRY	Small pond under bridge at left (east) bank
3/9/2016	DRY (tributary with ponded water west bank)	Mostly dry (very small ponds/some evidence of recent flow)	Ponded on east and west of channel. <0.1 cfs flow on east side
4/6/2016	DRY	DRY	Small pond under bridge at left (east) bank

TABLE 2. MAY - SEPTEMBER 2015 WATER QUALITY SAMPLE COLLECTION DATE AGENCY

			Sample Date						
Sample Month	**Season**	**Collecting Agency**	**TMDL-Est**	**TMDL-R1**	**TMDL-R2**	**TMDL-R3**	**TMDL-R4**	**TMDL-SA**	**TMDL-CL**
MAY 2015	Dry	District/ABC	5/22	5/21	5/20	5/20	5/20	5/20	DRY (5/20)
JUN 2015	Dry	District/ABC	6/19	6/19	6/18	6/18	6/18	6/19	DRY (6/18)
JUL 2015	Dry	District/ABC	7/16	7/16	7/15	7/15	DRY (7/15)	DRY (7/15)	DRY (7/15)
AUG 2015	Dry	District/ABC	8/12	8/12	8/11	8/11	DRY (8/11)	DRY (8/11)	DRY (8/11)
SEP 2015	Dry	District/ABC	9/23	9/23	9/22	9/22	DRY (9/22)	DRY (9/22)	DRY (9/23)
OCT 2015	Wet	District	10/13	10/13	10/13	10/13	DRY (10/13)	DRY (10/13)	DRY (10/13)
NOV 2015	Wet	District	11/17	11/17	11/17	11/17	DRY (11/17)	DRY (11/17)	DRY (11/17)
DEC 2015	Wet	District	12/8	12/8	12/8	12/8	DRY (12/8)	DRY (12/8)	DRY (12/8)
JAN 2016	Wet	District	1/20	1/20	1/20	1/20	DRY (1/20)	DRY (1/20)	DRY (1/20)
FEB 2016	Wet	District	2/17	2/17	2/17	2/17	DRY (2/17)	DRY (2/17)	DRY (2/17)
MAR 2016	Wet	District	3/9	3/9	3/9	3/9	DRY (3/9)	3/9	3/9
APR 2016	Wet	District	4/6	4/6	4/6	4/6	4/6	4/6	DRY (4/6)

TABLE 3. MAY 2015 – APRIL 2016 FIELD DATA

Site	**Sample Date**	**Sample Time**	**Berm Status**	**Flow (cfs)**	**pH (pH Units)**	**DO (mg/L)**	**SC (µS/cm)**	**Salinity (ppt)**	**Water Temp (°C)**
					Numeric Target 6.5 - 8.5	***Numeric Target >7 mg/L***			
TMDL-Est	5/22/2015	8:40	Closed	NA	8.17	9.94	6240	3.34	19.4
TMDL-Est	6/19/2015	11:10	Closed	NA	8.24	9.66	2570	1.3	25.6
TMDL-Est	7/16/2015	11:20	Closed	NA	8.08	8.29	1733	0.9	25.1
TMDL-Est	8/12/2015	11:40	Closed	NA	8.29	9.78	3223	1.7	23.9
TMDL-Est	9/23/2015	11:10	Closed	NA	8.5	9.4	2405	1.2	25.3
TMDL-Est	10/13/2015	13:30	Closed	NA	8.27	11.29	2301	1.2	27.2
TMDL-Est	11/17/2015	12:35	Closed	NA	8.65	11.42	3807	2	11.9
TMDL-Est	12/8/2015	13:00	Closed	NA	9.06	16.17	5720	3.1	13.9
TMDL-Est	1/20/2016	15:00	Open-east end	NA	8.71	17.28	14230	8.3	17.4
TMDL-Est	2/17/2016	13:40	Closed	NA	8.64	13.1	8760	4.9	15.2
TMDL-Est	3/9/2016	15:20	Open-east end	NA	8.03	7.82	5090	2.7	19.6
TMDL-Est	4/6/2016	15:00	Open-east end	NA	8.62	19.09	2215	1.1	20.1

Site	Sample Date	Sample Time	Berm Status	Flow (cfs)	pH (pH Units)	DO (mg/L)	SC (µS/cm)	Salinity (ppt)	Water Temp (°C)
					Numeric Target 6.5 - 8.5	***Numeric Target >7 mg/L***			
TMDL-R1	5/21/2015	9:30	NA	2.09	8.00	8.65	1660	0.8	17.8
TMDL-R1	6/19/2015	8:25	NA	1.86	8.04	7.56	1660	0.8	19.9
TMDL-R1	7/16/2015	8:00	NA	1.84	8.13	6.55	1433	0.8	20.7
TMDL-R1	8/12/2015	8:00	NA	0.26*	7.97	7.19	1811	0.9	19.4
TMDL-R1	9/23/2015	7:45	NA	0.16*	7.81	6.46	1904	1	21.0
TMDL-R1	10/13/2015	12:50	NA	<0.1*	8.07	7.39	2154	1.1	NR
TMDL-R1	11/17/2015	11:35	NA	0.8	8.41	11.56	1896	1	11.1
TMDL-R1	12/8/2015	12:05	NA	0.75	8.48	10.7	1928	1	12.8
TMDL-R1	1/20/2016	13:45	NA	2.56	8.22	7.85	2278	1.2	16
TMDL-R1	2/17/2016	12:50	NA	1.61	8.3	9.12	2190	1.1	15.3
TMDL-R1	3/9/2016	14:10	NA	3.58	8.18	8.35	2327	1.2	15.9
TMDL-R1	4/6/2016	14:15	NA	2.35	8.29	9.01	2055	1.1	18.8
TMDL-R2	5/20/2015	14:00	NA	4.9	7.98	8.78	1309	NA	20.7
TMDL-R2	6/18/2015	13:10	NA	3.24	7.88	9.33	1300	NA	22.6
TMDL-R2	7/15/2015	11:25	NA	3.4	7.9	7.72	1218	NA	22.5
TMDL-R2	8/11/2015	11:20	NA	1.09	7.87	6.34	1343	NA	23.6
TMDL-R2	9/22/2015	11:25	NA	1.91	7.91	6.65	1256	NA	25.7
TMDL-R2	10/13/2015	11:30	NA	0.85	7.73	6.29	1257	NA	24.8
TMDL-R2	11/17/2015	10:15	NA	1.86	7.84	7.24	1262	NA	17.7
TMDL-R2	12/8/2015	10:45	NA	2.54	7.93	7.95	1305	NA	17.8
TMDL-R2	1/20/2016	10:45	NA	2.11	7.96	8.71	1399	NA	17.6
TMDL-R2	2/17/2016	11:10	NA	2.38	8.06	10.46	1399	NA	17.3
TMDL-R2	3/9/2016	12:05	NA	2.86	7.98	9.85	1225	NA	18.4
TMDL-R2	4/6/2016	13:00	NA	2.43	8.12	9.98	1382	NA	20.5
TMDL-R3	5/20/2015	11:35	NA	1.45	7.94	8.82	1219	NA	18
TMDL-R3	6/18/2015	11:00	NA	1.61	7.86	7.7	1228	NA	19.5
TMDL-R3	7/15/2015	9:15	NA	2.28	7.88	6.9	805	NA	19.6
TMDL-R3	8/11/2015	8:00	NA	<0.10*	7.64	6.75	1277	NA	19.3
TMDL-R3	9/22/2015	9:00	NA	0.13*	7.42	4.82	1320	NA	20.7
TMDL-R3	10/13/2015	10:35	NA	0.15*	7.48	4.76	1329	NA	20.8
TMDL-R3	11/17/2015	9:00	NA	0.11*	7.83	8.67	1300	NA	10
TMDL-R3	12/8/2015	9:50	NA	0.11*	7.83	8.72	1328	NA	11.4
TMDL-R3	1/20/2016	12:00	NA	0.2*	7.89	8.86	1459	NA	14.1
TMDL-R3	2/17/2016	10:00	NA	0.26	7.89	9.35	640	NA	12.8
TMDL-R3	3/9/2016	11:00	NA	5.6	7.79	9.75	1160	NA	15.5
TMDL-R3	4/6/2016	12:00	NA	0.43	8.08	12.05	1269	NA	18.2
TMDL-R4	5/20/2015	8:35	NA	0.04*	7.4	6.35	1059	NA	15.5
TMDL-R4	6/18/2015	8:25	NA	Ponded	7.16	3.86	1092	NA	17.5

Site	Sample Date	Sample Time	Berm Status	Flow (cfs)	pH (pH Units)	DO (mg/L)	SC (µS/cm)	Salinity (ppt)	Water Temp (°C)
					Numeric Target 6.5 - 8.5	***Numeric Target >7 mg/L***			
TMDL-R4	7/15/2015	8:00	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-R4	8/12/2015	8:30	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-R4	9/22/2015	7:30	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-R4	10/13/2015	9:40	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-R4	11/17/2015	8:15	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-R4	12/8/2015	9:00	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-R4	1/20/2016	10:10	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-R4	2/17/2016	9:45	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-R4	3/9/2016	10:00	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-R4	4/6/2016	10:35	NA	0.02*	7.26	5.7	1037	NA	16.7
TMDL-CL	5/20/2015	7:00	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-CL	6/18/2015	10:40	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-CL	7/16/2015	10:15	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-CL	8/12/2015	10:30	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-CL	9/23/2015	10:05	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-CL	10/13/2015	14:25	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-CL	11/17/2015	7:50	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-CL	12/8/2015	11:40	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-CL	1/20/2016	13:20	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-CL	2/17/2016	8:20	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-CL	3/9/2016	13:15	NA	0.03	8.24	9.31	4941	NA	23.5
TMDL-CL	4/6/2016	13:50	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-SA	5/20/2015	10:30	NA	0.03*	7.16	4.82	1034	NA	17.5
TMDL-SA	6/18/2015	9:40	NA	0.05*	7.24	4.53	1056	NA	17.3
TMDL-SA	7/15/2015	8:40	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-SA	8/12/2015	8:45	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-SA	9/22/2015	7:45	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-SA	10/13/2015	10:05	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-SA	11/17/2015	8:30	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-SA	12/8/2015	9:15	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-SA	1/20/2016	10:30	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-SA	2/17/2016	9:50	NA	DRY	DRY	DRY	DRY	NA	DRY
TMDL-SA	3/9/2016	10:10	NA	0.02*	7.02	3.23	1039	NA	15.9
TMDL-SA	4/6/2016	11:05	NA	0.05*	7.11	5.06	921	NA	17.6

* The flow during this event was below the threshold for accurate meter measurement. These results are estimated and subject to error.

NA: Not applicable. Berm status only applies to the estuary site TMDL-Est. Salinity is included for the TMDL-Est and TMDL-R1 sites to indicate the level of ocean influence at these sites. There was no ocean influence observed at TMDL-R1 during the reporting period.

All monthly field measurements for pH were within the numeric target limits, with the exception of the estuary during the dry season. Low levels of dissolved oxygen tended to occur during periods of low flow, possibly due to the ponding (and potential stagnation) of water observed upstream and/or at the measurement location. Flow (Table 4) at TMDL-R4 and above was minimal to none during this reporting period. Surface flow in the River began around Foster Park and is typically perennial at TMDL-R3 and below. The flow at TMDL-R2 is a combination of the flow in the Ventura River downstream of TMDL-R3 and the discharge from the Ojai Valley Sanitary District's wastewater treatment plant. Flow measurements taken during 2015 typically decreased between TMDL-R2 and TMDL-R1, however this trend changed in January – April 2016, where flow was similar or increased between TMDL-R2 and TMDL-R1. Potential causes for changes in flow include surface/subsurface flow, groundwater interaction, geology and infiltration rates, antecedent moisture, agricultural and urban inputs and extractions, etc. Ponded locations, and those with shallow and/or slow moving water appear to experience greater variation in measured levels of DO, so ponds were avoided where possible. Warmer temperatures combined with low flow conditions tended to correlate with low DO. The field measurement data is presented in graphical form in Appendices A and B.

TABLE 4. MAY 2015 – APRIL 2016 FLOW DATA

Sample Month	Season	TMDL-SA	TMDL-R4	TMDL-R3	TMDL-R2	TMDL-CL	TMDL-R1
MAY 2015	Dry	0.03*	Ponded	1.45	4.9	DRY	2.09
JUN 2015	Dry	0.05*	DRY	1.61	3.24	DRY	1.86
JUL 2015	Dry	DRY	DRY	2.28	3.4	DRY	1.84
AUG 2015	Dry	DRY	DRY	<0.10*	1.09	DRY	0.26
SEP 2015	Dry	DRY	DRY	0.13*	1.91	DRY	0.16
OCT 2015	Wet	DRY	DRY	0.15*	0.85	DRY	<0.1
NOV 2015	Wet	DRY	DRY	0.11*	1.86	DRY	0.8
DEC 2015	Wet	DRY	DRY	0.11*	2.54	DRY	0.75
JAN 2016	Wet	DRY	DRY	0.2	2.11	DRY	2.56
FEB 2016	Wet	DRY	DRY	0.26	2.38	DRY	1.61
MAR 2016	Wet	0.02*	0.02*	5.6	2.86	0.03*	3.58
APR 2016	Wet	0.05*	Ponded	0.43	2.43	DRY	2.35

Nutrient levels show some variations between sites and seasons (Appendix A). TMDL-CL, TMDL-SA, and TMDL-R4 were dry during most of the reporting period, with only 1, 4, and 3 (out of 12) sampleable monitoring events, respectively. Samples collected at these sites were low in phosphorus and low in nitrogen (particularly at TMDL-CL). TMDL-R3 was consistently low in nitrogen and phosphorus. Phosphorus was widely variable at TMDL-R2 during August – December, and nitrogen increased noticeably in the wet season. Phosphorus and nitrogen were both widely variable during the wet season at TMDL-R1.

TABLE 5. MAY - SEPTEMBER 2015 NUTRIENT DATA

Site	Sample Date	Sample Time	P Total EPA 365.1 (mg/L)	P Diss EPA 365.1 (mg/L)	TKN Total EPA 351.2 (mg/L)	TKN Diss EPA 351.2 (mg/L)	N Total Calculated (mg/L)	N Diss Calculated (mg/L)	NO3+ NO2-N EPA 353.2 (mg/L)
TMDL-Est	5/22/2015	8:40	0.063	0.032	0.33	0.35*	0.33	0.35	ND
TMDL-Est	6/19/2015	11:10	0.06	0.02	0.53	0.43	0.53	0.43	ND
TMDL-Est	7/16/2015	11:20	0.041	0.015	0.52	0.3	0.57	0.34	0.043
TMDL-Est	8/12/2015	11:40	0.4	0.015	0.61	0.51	0.63	0.54	0.023
TMDL-Est	9/23/2015	11:10	0.042	0.02	0.86	0.56	0.89	0.59	0.031
TMDL-R1	5/21/2015	9:30	0.12	0.059	0.51	0.3	0.55	0.35	0.0456
TMDL-R1	6/19/2015	8:25	0.088	0.067	0.43	0.24	0.49	0.3	0.06
TMDL-R1	7/16/2015	8:00	0.011	0.086	0.44	0.44	0.74	0.74	0.3
TMDL-R1	8/12/2015	8:00	0.18	0.15	0.62	0.6	0.81	0.79	0.19
TMDL-R1	9/23/2015	7:45	0.35	0.26	0.74	0.52	1.1	0.85	0.32
TMDL-R2	5/20/2015	14:00	0.22	0.18	0.34	0.42	1.1	1.1	0.71
TMDL-R2	6/18/2015	13:10	0.12	0.11	0.28	0.27	0.81	0.81	0.54
TMDL-R2	7/15/2015	11:25	0.17	0.15	0.22	0.15	0.86	0.89	0.63
TMDL-R2	8/11/2015	11:20	0.71	0.7	0.87	0.71	1.9	1.7	1
TMDL-R2	9/22/2015	11:25	1.2	1.1	0.76	0.74	2.6	2.6	1.9
TMDL-R3	5/20/2015	11:35	0.014	0.01	0.054	ND	ND	ND	0.061
TMDL-R3	6/18/2015	11:00	0.013	0.011	0.08	0.057	ND	ND	0.076
TMDL-R3	7/15/2015	9:15	0.013	0.0095	ND	ND	ND	ND	0.092
TMDL-R3	8/11/2015	8:00	0.022	0.015	0.19	ND	0.28	ND	0.088
TMDL-R3	9/22/2015	9:00	0.079	0.018	0.42	ND	0.51	ND	0.087
TMDL-R4	5/20/2015	8:35	0.0055	0.0046	0.075	0.055	1.4	1.4	1.4
TMDL-R4	6/18/2015	8:25	0.0047	0.0061	ND	ND	1.2	1.2	1.2
TMDL-R4	7/15/2015	8:00	DRY	DRY	DRY	DRY	DRY	DRY	DRY
TMDL-R4	8/12/2015	8:30	DRY	DRY	DRY	DRY	DRY	DRY	DRY
TMDL-R4	9/22/2015	7:30	DRY	DRY	DRY	DRY	DRY	DRY	DRY
TMDL-CL	5/20/2015	7:00	DRY	DRY	DRY	DRY	DRY	DRY	DRY
TMDL-CL	6/18/2015	10:40	DRY	DRY	DRY	DRY	DRY	DRY	DRY
TMDL-CL	7/16/2015	10:15	DRY	DRY	DRY	DRY	DRY	DRY	DRY
TMDL-CL	8/12/2015	10:30	DRY	DRY	DRY	DRY	DRY	DRY	DRY
TMDL-CL	9/23/2015	10:05	DRY	DRY	DRY	DRY	DRY	DRY	DRY
TMDL-SA	5/20/2015	10:30	0.0076	0.0073	0.24	ND	1.9	1.7	1.7
TMDL-SA	6/18/2015	9:40	0.019	0.0063	0.11	0.074	1.3	1.3	1.2
TMDL-SA	7/15/2015	8:40	DRY	DRY	DRY	DRY	DRY	DRY	DRY
TMDL-SA	8/12/2015	8:45	DRY	DRY	DRY	DRY	DRY	DRY	DRY
TMDL-SA	9/22/2015	7:45	DRY	DRY	DRY	DRY	DRY	DRY	DRY

Comparisons of monthly monitoring data during January - April in 2015 and 2016 (Appendix A and B) are summarized in Table 6, below. Low flow appears to be associated with low DO at TMDL-R4 and TMDL-SA.

TABLE 6. COMPARISON OF JANUARY - APRIL 2015 AND 2016

Site	Flow	pH	DO	Nutrients
TMDL-Est	NA	High	Good	N stable 2015, increase 2016 P similar 2015 and 2016
TMDL-R1	Pattern similar Mar: highest flow	Good	Good	P stable Jan-Apr 2015, more varied 2016 N decrease 2015, not 2016
TMDL-R2	Pattern similar Mar: highest flow	Good	Good	P pattern similar N decrease with increase flow
TMDL-R3	Mar: highest flow	Good	Good	Pattern similar
TMDL-R4	Jan-Mar: dry Apr: very low flow	Good	Low	Pattern similar
TMDL-SA	Jan-Feb: dry Mar-Apr: very low flow	Good	Low	Pattern similar
TMDL-CL	Single event March 2016 (after rain) therefore no comparison available			

NA: Not applicable. Flow not measured at TMDL-Est.
P: Phosphorus
N: Nitrogen

Algal data collected during the dry season are presented in the tables below and in graphical format in Appendix E. All riverine sites met the seasonal average numeric target for macroalgal cover and, with the exception of TMDL-R1, they also met the seasonal average numeric target for chlorophyll *a*.

TABLE 7. MAY – SEPTEMBER 2015 MONTHLY ALGAL BIOMASS (CHLOROPHYLL A) AND PERCENT MACROALGAL COVER (RIVER SITES)

Site	Date	Field Replicate	Number of Transects Collected	Chlorophyll *a*	Chlorophyll *a* units	Percent Presence Macroalgae (%)
TMDL-R1	5/21/2015	1	11	206.9	mg/m^2	13.59
TMDL-R1	6/19/2015	1	10	140	mg/m^2	6.19
TMDL-R1	6/19/2015	2	10	190	mg/m^2	NA
TMDL-R1	7/16/2015	1	10	170	mg/m^2	4.26
TMDL-R1	8/12/2015	1	11	520	mg/m^2	0.00
TMDL-R1	9/23/2015	1	10	300	mg/m^2	0.00
TMDL-R2	5/20/2015	1	9	61	mg/m^2	9.88
TMDL-R2	6/18/2015	1	11	75.9	mg/m^2	1.90
TMDL-R2	7/15/2015	1	11	63	mg/m^2	0.00
TMDL-R2	8/11/2015	1	7	110	mg/m^2	1.64
TMDL-R2	9/22/2015	1	11	138	mg/m^2	0.00
TMDL-R3	5/20/2015	1	11	51	mg/m^2	42.72
TMDL-R3	6/18/2015	1	11	75.5	mg/m^2	8.65
TMDL-R3	7/15/2015	1	11	68	mg/m^2	8.74
TMDL-R3	8/11/2015	1	11	100	mg/m^2	18.56

Site	Date	Field Replicate	Number of Transects Collected	Chlorophyll *a*	Chlorophyll *a* units	Percent Presence Macroalgae (%)
TMDL-R3	9/22/2015	1	11	54	mg/m^2	21.00
TMDL-R4	5/20/2015	1	11	21	mg/m^2	22.33
TMDL-R4	6/18/2015	1	5	26.3	mg/m^2	32.76
TMDL-R4	7/15/2015	1	DRY	DRY	mg/m^2	DRY
TMDL-R4	8/12/2015	1	DRY	DRY	mg/m^2	DRY
TMDL-R4	9/22/2015	1	DRY	DRY	mg/m^2	DRY
TMDL-SA	5/20/2015	1	3	97.4	mg/m^2	8.70
TMDL-SA	6/18/2015	1	3	30	mg/m^2	13.64
TMDL-SA	7/15/2015	1	DRY	DRY	mg/m^2	DRY
TMDL-SA	8/12/2015	1	DRY	DRY	mg/m^2	DRY
TMDL-SA	9/22/2015	1	DRY	DRY	mg/m^2	DRY
TMDL-CL	5/20/2015	1	DRY	DRY	mg/m^2	DRY
TMDL-CL	6/18/2015	1	DRY	DRY	mg/m^2	DRY
TMDL-CL	7/15/2015	1	DRY	DRY	mg/m^2	DRY
TMDL-CL	8/12/2015	1	DRY	DRY	mg/m^2	DRY
TMDL-CL	9/22/2015	1	DRY	DRY	mg/m^2	DRY

TABLE 8. 2015 DRY SEASON AVERAGE MACROALGAL BIOMASS AND COVER_RIVER SITES

Site	Seasonal Average Biomass (Chlorophyll a)	Seasonal Average Macroalgal Cover
	Numeric Target Seasonal Average 150 mg/m^2 (mg/m^2)	***Numeric Target Seasonal Average ≤ 30% (%)***
TMDL-R1	254.5	4.8
TMDL-R2	89.6	2.7
TMDL-R3	69.7	19.9
TMDL-R4	23.7	27.5
TMDL-SA	63.7	11.2
TMDL-CL	DRY	DRY

The SWAMP protocol for determining percent cover for the riverine sites only considers alive algae whereas the Bight '08 protocols do not specify whether dead or desiccated algae should be included with alive algae in the calculations. The Bight '08 study also includes measurements of floating algae at a depth of 0.3 meters for four quadrats per transect, in addition to measuring algal cover on the shoreline. All of these variables are included in Table 9, and all met the seasonal average numeric target.

TABLE 9. 2015 DRY SEASON AVERAGE MACROALGAL COVER_ESTUARY

Site	Date	Biomass Phytoplankton Chlorophyll *a* (µg/L)	Land-Based Percent Cover (%)			Floating Percent Cover (%)		
			Alive Algae	Dead Algae	All Algae	Alive Algae	Dead Algae	All Algae
Seasonal Average Numeric Target		***20 µg/L***	***≤ 15%***					
TMDL-Est	5/22/2015	6	2.31	0.20	2.04	0.75	0.00	0.75
TMDL-Est	6/19/2015	6	24.42	4.42	20.60	0.00	0.00	0.00
TMDL-Est	7/16/2015	7	9.32	16.73	18.61	0.00	0.00	0.00
TMDL-Est	8/12/2015	<2	6.46	0.00	4.62	0.00	0.00	0.00
TMDL-Est	9/23/2015	12	1.84	9.80	8.31	0.00	0.00	0.00
TMDL-Est	**Seasonal Average**	**6.4**	**8.87**	**6.23**	**10.84**	**0.15**	**0.00**	**0.15**

CONTINUOUS DATA LOGGING

Seven Hydrolab HL4 water quality data sondes (Figure 2) were selected and purchased for this program. The HL4 has the ability to accurately measure and log dissolved oxygen, conductivity, pH and temperature within a self-contained package that is 1.75" in diameter and just over two feet in length, which allows it to fit inside a short length protective housing of 2" diameter schedule 40 pipe. The data sonde installations are vulnerable to potential vandalism and theft and so need to be as inconspicuous as possible (i.e. below the water surface among rocks and tree roots). Each sonde is assigned to a particular TMDL site and is labeled with the site name for additional consistency between events. Pre and post calibrations and/or calibration checks are performed for each deployed sonde for each event (data included in attachments).

FIGURE 2. HYDROLAB HL4 SONDE

Continuous monitoring for pH, specific conductivity, temperature, and dissolved oxygen was conducted for a two week period at all wet sites in May, September, November, and February/March[1]. After the first deployment in March 2015 when the estuary breached and left the estuary sonde exposed to potential vandalism or theft, the placement was redesigned to prevent exposure in the event of future breaches. The deeper placement of the sonde likely contributed to the reduced

[1] The TMDL requires quarterly monitoring, including the months of May and September. Therefore, Quarter 2 (Q2) monitoring is conducted in May and Quarter 3 (Q3) monitoring is conducted in September. Quarter 1 (Q1) includes one event during January – March and Quarter 4 (Q4) includes one event during October – December.

diurnal variability in the estuary sonde temperature data observed during the May, September, and February continuous data logging events.

TABLE 10. MAY 2015 – APRIL 2016 SONDE DEPLOYMENT DATES

Site	2015 Quarter 2 (May*)	2015 Quarter 3 (September*)	2015 Quarter 4	2016 Quarter 1
TMDL-Est	5/7/2015 - 5/25/2015 [a] 6/2/2015 – 6/16/2015	9/1/2015 – 9/15/2015	11/2/2015 – 11/16/2015	2/4/2016 – 2/18/2016
TMDL-R1	5/7/2015 - 5/25/2015	9/1/2015 – 9/15/2015	11/2/2015 – 11/16/2015	2/4/2016 – 2/18/2016
TMDL-R2	5/7/2015 - 5/25/2015	9/1/2015 – 9/15/2015	11/2/2015 – 11/16/2015	2/4/2016 – 2/18/2016
TMDL-R3	5/7/2015 - 5/25/2015	9/1/2015 – 9/15/2015	11/2/2015 – 11/16/2015	2/4/2016 – 2/18/2016
TMDL-R4	5/7/2015 - 5/25/2015	DRY	DRY	DRY
TMDL-SA	5/7/2015 - 5/25/2015	DRY	DRY	3/14/2016 – 3/29/2016 [b]
TMDL-CL	DRY	DRY	DRY	DRY

* Month required by TMDL

[a] Dissolved oxygen sensor fouled so redeployed June 6-16, 2015.

[b] Site was dry during February deployment but started to flowed briefly in March due to seasonal rainfall, so sonde was able to be deployed.

Graphical representations of the 2015 dry season and 2015-16 wet season continuous monitoring data are presented together in Appendix C and D, including comparison graphs of the first quarter deployments in 2015 and 2016. The raw data is included in the attachments to this report.

2015 Q2 (May): Six Hydrolab HL4 water quality data sondes were installed on May 7, 2015 and were programmed to log data from May 7, 2015 at 21:00 to May 25, 2015 at 21:00. TMDL-CL was dry so the sonde could not be deployed. It is suspected that the TMDL-R2 specific conductance sensor fouled during the deployment as the results are far below expected and those measured above and below stream. The dissolved oxygen sensor on the estuary sonde also fouled and the sonde was calibrated and redeployed to log data from June 2, 2015 at 13:00 to June 16, 2015 at 13:00.

2015-Q3 (September): Three TMDL monitoring stations (R4, TMDL-SA, and TMDL-CL) were dry and so only four Hydrolab HL4 water quality data sondes were installed for continuous data logging. The sondes were installed on September 1, 2015 at TMDL-Est, TMDL-R1, TMDL-R2, and TMDL-R3 and programmed to log data from September 1, 2015 at 19:00 to September 15, 2015 at 19:00. The specific conductance and salinity at TMDL-R3 were lower than those typically seen in natural waters, however the pre and post calibration checks were within acceptable levels. Based on consultation with Hydrolab technicians, it is suspected that debris lodged in the sonde's conductivity chamber during deployment and was dislodged during sonde removal. A firmware bug in the TMDL-R1 sonde also caused a false battery alarm which shifted the data by a few minutes but did not otherwise affect the data. All sondes were returned to the factory under warranty after the September deployment and replaced with brand new sondes. The battery failure alarm required a change to the circuit board to rectify.

2015-Q4 (November): Sondes were installed at the TMDL-Est, TMDL-R1, TMDL-R2, and TMDL-R3 sites. The sondes were programmed to log from 11/2/2015 at 18:15 to 11/16/2015 at 18:00. The TMDL-R1 DO sensor appeared to become fouled on 11/10/2015 so the dissolved oxygen readings for the latter half of the deployment are in error. They are excluded from Appendix C but the raw data is included in the attachments. TMDL-R4, TMDL-SA, and TMDL-CL were dry so sondes were not installed at these locations.

2016-Q1 (February): TMDL-R4, TMDL-SA, and TMDL-CL were dry so sondes were not installed at these locations. Sondes were installed at the TMDL-Est, TMDL-R1, TMDL-R2, and TMDL-R3 sites. The sondes were programmed to log from 2/4/2016 at 18:00 to 2/18/2016 at 18:00. TMDL-SA began flowing following seasonal rainfall so the TMDL-SA sonde was deployed from 3/14/2016 at 19:00 to 3/29/2016 at 10:45. The data for both is shown in the Appendix C graphs.

OBSERVATIONS AND LESSONS LEARNED

Southern California is currently experiencing drought conditions. The Ventura River was dry at the observation locations upstream of TMDL-R4 for this reporting period, although there was evidence of recent flow shortly after a rain event in early March 2016 at the Santa Ana Boulevard Bridge, and evidence of flow from a tributary upstream of Highway 150, but not in the mainstream channel so connectivity with the upper watershed is highly unlikely during this reporting period. Flow variations between monitoring sites and events are likely due to a combination of factors, including geology, temperature, inputs, and extractions. Ponded locations, and those with shallow and/or slow moving water appear to experience greater variation in measured levels of DO and so ponds are avoided where possible, but may not be avoidable in all cases.

Siltation can be an issue in slow moving water and sondes are installed higher in the water column in areas where it is likely to occur. All sondes were checked and/or calibrated by monitoring staff before and after deployment, regardless of history. The equipment used to secure the estuary sonde has been modified to better accommodate the variations in water level associated with changes in berm status (i.e. open vs. closed).

All monthly grab measurements for pH were within the numeric target limits of 6.5-8.5 pH units, with the exception of the estuary site where pH was routinely above 8.5 during the 2015-2016 wet season. Similarly, the May, September, and November 2015 and February/March 2016 continuous data logger pH results were all within limits with the exception of TMDL-R1 in September, which experienced a period of high pH in combination with low conductivity and an increase in dissolved oxygen between 2 and 9 pm 9/10/2015. It is unknown if this was due to a discharge, a decrease in flow (exposing the sonde to air), or a sonde malfunction.

Low levels of dissolved oxygen were observed at some sites during the monthly grab monitoring, and appear to be associated with low flow, possibly due to the visible ponding of water upstream and/or at the measurement location. Dissolved oxygen levels below the numeric target of 7 mg/L were observed at least intermittently at all sites during both the May and September continuous data logger deployments, and were consistently low at TMDL-Est and TMDL-R2 in November, and TMDL-SA in March. Brief excursions below the numeric target were also seen at TMDL-R1 in November and TMDL-Est in February. Fouling of the TMDL-R1 DO sensor during the November deployment resulted in a truncated data set for that quarter.

Temperature displayed a diurnal pattern at most sites but the pattern was muted at the estuary, likely due to the deeper level of deployment.

Specific conductance remained relatively stable at most sites for the deployments during this reporting period, with the exception of TMDL-R2 in May and TMDL-R3 in September, which appear to have suspect readings, based on their comparison with nearby sites. These data sets are included in the attachments but excluded from the graphs in Appendix C. The estuary appears to have experienced a greater ocean influence in May 2015 and February 2016 (35,000 - 44,000 µS/cm) than in November 2015 (steady decrease from 13,000 to 3,500 µS/cm), and the least influence in September 2015 (average conductivity 2,800 µS/cm). The difference in conductivity may be related to the berm status (observed to be open during January, March, and April 2016) and tidal influence, however since it is infeasible to monitor the berm status for the entire duration of the sonde deployment, it is unknown when all breaches occur.

ATTACHMENTS TO DRY SEASON DATA SUMMARY

Sampling event data, including water quality analytical results and field measurements, in a summary format using MS Excel spreadsheet are provided as electronic files on the DVD provided to the Responsible Parties.

January 28, 2016

Renee Purdy
Los Angeles Regional Water Quality Control Board
320 W. 4th St., Suite 200
Los Angeles, CA 90013

Subject: Ventura River Estuary Trash TMDL Annual Monitoring Report

Dear Ms. Purdy,

Enclosed for your review and consideration is the Ventura River Estuary Trash TMDL Annual Monitoring Report for 2014-2015. This Annual Monitoring Report is being submitted per the requirements of the Ventura River Estuary Trash TMDL, Los Angeles Regional Water Quality Control Board Resolution No. R4-2007-008.

This document is being submitted on behalf of the following responsible parties: City of Ventura, County of Ventura, Ventura County Watershed Protection District, Ventura County Fairgrounds, California Department of Transportation, California Department of Parks and Recreation-Channel Coast District, and participants in the Ventura County Agricultural Irrigated Lands Group, which is a subdivision of the Farm Bureau of Ventura County.

During the 2013-2014 monitoring year, the responsible parties developed a revised Trash Monitoring and Reporting Plan (TMRP–Addendum No. 1) to include a new MFAC/BMP Program that utilizes visual trash assessments and targeted clean ups of the parcels located within the Estuary, coupled with BMPs implemented in the Estuary and on the land areas adjacent to the Estuary. The Addendum 1 dated October 22, 2014 was submitted by our consultant Larry Walker & Associates on November 11, 2014 reflective of the input received from Regional Board staff during the June 17, 2014 meeting between the Responsible Parties and Regional Board staff. The responsible parties are still waiting for approval of the Addendum No. 1; however, Regional Board staff indicated the responsible parties should implement the revised TMRP program while awaiting approval. This Annual Monitoring Report summarizes the results of the

second year of the revised TMRP and MFAC/BMP Program (October 2014 through September 2015).

If you have any comments or questions regarding the attached document, please contact me via email (Ewelina.Mutkowska@ventura.org) or by phone at (805) 645-1382.

Sincerely,

Ewelina Mutkowska
Stormwater Program Manager
Ventura County Public Works Agency

cc: Jenny Newman, Los Angeles Regional Water Quality Control Board
Stefanie Hada, Los Angeles Regional Water Quality Control Board
Jeff Pratt, Ventura County Public Works Agency Director
Tully Clifford, Ventura County Watershed Protection District Director
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Patrick Porteus, California Department of Transportation
Jai Thakur, California Department of Transportation
Ron Murphy, Ventura County Fairgrounds
Derek Poultney, Ventura Hillsides Conservancy

JANUARY 2016

Ventura River Estuary Trash TMDL 2014-2015 TMRP Annual Report

prepared by

VENTURA HILLSIDE CONSERVANCY

submitted to

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, LOS ANGELES REGION

submitted by

CITY OF VENTURA, COUNTY OF VENTURA, VENTURA COUNTY WATERSHED PROTECTION DISTRICT, PARTICIPANTS IN THE VENTURA COUNTY AGRICULTURAL IRRIGATED LANDS GROUP, CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE, CALIFORNIA DEPARTMENT OF STATE PARKS, AND CALIFORNIA DEPARTMENT OF TRANSPORTATION

Ventura Hillsides Conservancy

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Introduction

This Annual Report is being submitted to fulfill the compliance requirements of the Amendments to the Water Quality Control Plan – Los Angeles Region for the Ventura River Estuary Trash Total Maximum Daily Load (Trash TMDL), Resolution No. R4-2007-008 (effective March 6, 2008). The purpose of this report is to present the results of the monitoring efforts conducted in accordance with the Trash Monitoring Reporting Plan (TMRP) and Minimum Frequency Assessment Collection/Best Management Practice (MFAC/BMP) Program developed to meet the requirements of the Trash TMDL.

The initial TMRP, which was approved in 2009 by the California Regional Water Quality Control Board, Los Angeles Region (Regional Board), was revised in 2014 to more effectively target the disbandment of homeless encampments in the Ventura River Estuary (Estuary), which have been determined to be the primary source of trash in the TMDL compliance area. An Addendum No. 1 to the TMRP was submitted on April 30, 2014 and a revised Addendum was submitted on October 22, 2014 addressing comments from Regional Board staff. The TMRP and MFAC/BMP Program are designed to prioritize the use of resources to implement actions effective in reducing trash in the Estuary, while still providing a monitoring approach that will allow for an evaluation of the effectiveness of the MFAC/BMP Program and support identification of any needed adjustments to the MFAC/BMP Program. The responsible parties are still waiting for approval of the Addendum No. 1; however, Regional Board staff indicated the responsible parties should implement the revised TMRP program while awaiting approval.

In the responsible parties' TMRP revision request letter, dated October 9, 2013, the responsible parties stated additional time was needed to develop the details of the monitoring approach, particularly the most effective locations to implement the patrols and visual assessments. As such, the responsible parties proposed implementing an interim MFAC/BMP Program to begin in October 2014 while the responsible parties developed the revised MFAC/BMP Program and Regional Board staff reviewed and approved the revised MFAC/BMP Program. An interim MFAC/BMP Program was necessary to support development of some aspects of the monitoring approach, facilitate transition to a more effective clean-up and trash prevention program, and avoid the necessity of continuing to count pieces of trash while the responsible parties developed the detailed TMRP. The interim MFAC/BMP Program implemented by the responsible parties was as follows:

1. Conducted clean-up of all Estuary parcels within the TMDL compliance area by mid-November 2013 as the initial quarterly event.
2. Began initial patrols to determine the route(s) that will be used for visual assessments and identified the preferred routes by January 2014.
3. Formalized Memorandum of Agreement with Ventura Hillside Conservancy to organize and manage volunteer cleanup events and conduct trash monitoring activities.
4. Conducted regularly scheduled clean-up events in the Estuary beginning in March 2014, which were additional to the required collection events for the MFAC/BMP Program.

In addition, the responsible parties conducted several initial assessments in May and June 2014 and an initial collection event in May 2014 to test the applicability of the revised MFAC/BMP Program. The revised MFAC/BMP Program began in July 2014.

This Annual Report includes the following information from first-year monitoring conducted under the revised TMRP and MFAC/BMP Program:

- Monitoring Summary
- MFAC Events/BMP Implementation Summary
- MFAC/BMP Program Evaluation and Revision Recommendations

The efforts to implement the Trash TMDL are being completed on behalf of the responsible parties to the Trash TMDL as listed in **Table 1**. The efforts to implement the Trash TMDL requirements for nonpoint sources are focused within the Estuary and the parcels adjacent to the Estuary. **Table 2** presents the names of the parcels within the Estuary, which were grouped into four MFAC areas identified for the MFAC/BMP Program implementation. **Figure 1** shows the locations of the parcels within the Estuary. During this monitoring period, the cleanup and monitoring efforts were expanded to include the whole TMDL compliance area including areas that are not part of the eight parcels listed in **Table 2** and shown in **Figure 1** including the area under the Main Street Bridge, the area under the US 101 Bridge, and the area under the railroad bridge between MFAC Area 1 and MFAC Area 2. In addition, County of Ventura installed full trash capture devices within County unincorporated areas draining to the MS4 within the Trash TMDL Staff Report-defined Estuary Sub-watershed area.

Table 1. Responsible Parties Participating in the TMRP and MFAC/BMP Program

Responsible Party	Nonpoint Source (NPS)	Point Source (PS)
City of Ventura (City)	X	X
Ventura County (County)	X	X
Ventura County Watershed Protection District (VCWPD)	X	X
California Department of Food & Agriculture (Ventura Fairgrounds)	X	X
California Department of Transportation (Caltrans)	X[1]	X
California Department of Parks and Recreation	X	--
Participants in the VCAILG[2]	X	--

1. Caltrans was not assigned a Load Allocation, yet it is participating in the MFAC/BMP Program to meet the Trash TMDL goals.
2. Ventura County Agricultural Irrigated Lands Group.

Table 2. Estuary Parcels by MFAC Area

	MFAC Area 1	MFAC Area 2	MFAC Area 3	MFAC Area 4
Parcel Owner	State of California Department of Parks and Recreation	State of California Department of Parks and Recreation	Ventura Beach RV Resort, Inc.	Wood-Claeyssens Foundation
	City of San Buenaventura	State of California Department of Parks and Recreation	Ventura Hillside Conservancy	Ventura County Watershed Protection District

Figure 1. MFAC/BMP Program Monitoring Area and Assessment/Patrol Route

Monitoring Summary

ASSESSMENTS AND COLLECTION EVENTS

The responsible parties implemented the revised MFAC/BMP Program (as of July 2014) from the October 2014 to September 2015 reporting period. Upon implementation of the revised MFAC/BMP Program, the responsible parties conducted regular visual trash assessment surveys along a pre-defined route in the Estuary on a rotating schedule each month to ensure the entire Estuary, as defined in the Trash TMDL, was covered on a quarterly basis. The assessment route was designed to include historic in-Estuary TMRP monitoring locations in addition to other areas on all parcels of the Estuary to reflect the new MFAC/BMP Program. The assessment route is shown in **Figure 1**. The visual trash assessment surveys were conducted in accordance with the revised TMRP. However, the responsible parties conducted significantly more assessments than required in the revised TMRP, which is one assessment per quarter. This is due to this monitoring year being a transition year between the previous MFAC/BMP Program and the revised MFAC/BMP Program. Additional cleanups have been determined to be necessary to address legacy trash that has accumulated in the Estuary. After the legacy trash has been removed, the revised TMRP frequency will be implemented.

The responsible parties also conducted trash collection events utilizing information from the monitoring program and from the assessments to determine the locations to focus trash collection efforts.

In addition, the responsible parties conducted regularly scheduled patrols along the assessment route as shown in **Figure 1**. The patrols were conducted to eliminate existing homeless encampments and prevent the establishment of new homeless encampments and to assess trash levels, as homeless individuals and homeless encampments are the main nonpoint sources of trash for the Estuary. The responsible parties averaged up to two patrols per week in areas exhibiting large homeless populations and averaged up to two patrols per month in areas exhibiting small homeless populations. The responsible parties conducted 125 patrols from October 2014 to December 2015.

A summary of the assessment dates, the collection event dates, and the patrol dates is presented in **Table 3**. Assessment and Collection Worksheets contains the Trash Visual Survey Worksheets and the Collection Event Worksheets for all MFAC Events conducted during October 2014 to September 2015.

Table 3. Assessment, Collection, and Patrol Dates for October 2014-September 2015

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
	Q1			Q2			Q3			Q4		
Assessment Dates												
MFAC Area 1		11/5/14	12/1/14			3/9/15						8/30/15
MFAC Area 2	10/17/14	11/5/14		1/6/15	2/15/15	3/9/15	4/15/15	5/12/15			8/5/15	8/30/15
MFAC Area 3	10/17/14		12/1/14	1/6/15	2/15/15		4/15/15	5/12/15	6/16/15	7/1/15		8/30/15
MFAC Area 4	10/17/14						4/15/15	5/12/15	6/16/15			8/30/15
Collection Dates												
MFAC Area 1		11/3/14	12/20/14				4/16/15					9/19/15
		11/8/14										
MFAC Area 2	10/18/14	11/3/14	12/20/14	1/17/15	2/21/15	3/21/15	4/16/15	5/16/15			8/30/15	9/19/15
		11/8/14		1/19/15								
		11/15/14										
MFAC Area 3	10/18/14				2/21/15	3/21/15		5/16/15	6/20/15	7/3/15		9/19/15
MFAC Area 4	10/18/14					3/21/15		5/16/15	6/20/15			9/19/15

Patrol Dates

10/4/14	10/27/14	11/12/14	12/5/14	1/6/15	2/13/15	3/26/15	5/15/15	6/10/15	7/10/15	8/4/15	9/2/15	10/2/15	11/4/15
10/7/14	10/28/14	11/14/14	12/7/14	1/9/15	2/15/15	3/31/15	5/19/15	6/16/15	7/15/15	8/5/15	9/8/15	10/5/15	11/10/15
10/9/14	10/29/14	11/17/14	12/8/14	1/12/15	2/19/15	4/2/15	5/22/15	6/22/15	7/17/15	8/14/15	9/11/15	10/9/15	11/12/15
10/10/14	10/31/14	11/21/14	12/9/14	1/16/15	2/28/15	4/7/15	5/24/15	6/24/15	7/20/15	8/15/15	9/14/15	10/12/15	11/30/15
10/13/14	11/5/14	11/22/14	12/10/14	1/20/15	3/3/15	4/15/15	5/27/15	6/27/15	7/22/15	8/19/15	9/17/15	10/15/15	12/7/15
10/17/14	11/6/14	11/24/14	12/16/14	1/21/15	3/7/15	4/29/15	5/30/15	6/29/15	7/23/15	8/24/15	9/21/15	10/26/15	12/14/15
10/18/14	11/7/14	11/25/14	12/30/14	1/26/15	3/9/15	5/4/15	5/31/15	7/1/15	7/27/15	8/28/15	9/28/15	10/29/15	12/21/15
10/20/14	11/8/14	12/1/14	1/2/15	1/30/15	3/20/15	5/12/15	6/3/15	7/3/15	7/28/15	8/30/15	9/30/15	11/1/15	12/28/15
10/23/14	11/10/14	12/2/14	1/4/15	2/4/15	3/25/15	5/13/15	6/4/15	7/9/15	7/31/15	9/1/15	10/1/15	11/3/15	

ASSESSMENT FINDINGS

The goal of the MFAC/BMP Program is to ensure the parcels in the Estuary are at a Category 1 level of trash based on the information collected during Estuary visual assessments.

The three Trash Assessment Categories of the MFAC/BMP Program are:

- Category 1 – Represents the SWAMP Category "Optimal"
- Category 2 – Represents the SWAMP Category "Suboptimal"
- Category 3 – Represents the SWAMP Category "Poor"

The definition of Category 1 is:

- "On first glance, no trash is visible. Little or no trash (<10 pieces) evident when streambed and stream banks are closely examined for litter and debris, for instance by looking under leaves."

The definition of Category 2 is:

- "On first glance, low to medium levels of trash are evident (10 – 50 pieces). Stream, bank surfaces, and riparian zone contain some litter and debris. Possible evidence of site being used by people: scattered cans, bottles, food wrappers, blankets, clothing."

The definition of Category 3 is:

- "On first glance, medium to high levels of trash (51-100 pieces) are visible at stream, bank surfaces, and immediate riparian zone contain substantial levels of litter and debris. Evidence of site being used frequently by people: many cans, bottles, and food wrappers, blankets, clothing."

In addition, during Quarter 1 (October 2014 through December 2014) assessment was completed for additional "Category 4 – Represents the SWAMP Category "Very Poor", which is outside the scope of TMRP Addendum 1 dated October 22, 2014.

There were multiple locations on the parcels within the four MFAC Areas that were assessed during the MFAC Events. These areas were located along the assessment route and in other areas of the Estuary identified through the patrols. Based on the trash conditions at the multiple assessed locations, the Ventura Hillside Conservancy determined the overall percentage of the MFAC Areas that were in each of the Trash Assessment Categories. **Table 4** presents a summary of the Trash Assessment Categories for MFAC Areas resulting from the assessments conducted during 2014-2015. Assessment and Collection Worksheets contains the Trash Visual Survey Worksheets with all assessment locations for all MFAC Events conducted during 2014-2015.

Table 4. Percent of MFAC Area by Assessment Category

Quarter 1				
Assessment Area	**Category 1**	**Category 2**	**Category 3**	**Notes**
MFAC Area 1	92%	6%	1%	Category 4: 1% Clean except 2 consistent camp areas at base of levee and in middle of Parcel 1
MFAC Area 2	80%	8%	4%	Category 4: 8%
MFAC Area 3	99%	0.5%*	0.5%*	Category 4: 0% * random trash under Main St. bridge
MFAC Area 4	99.5%	0.5%	-	Category 4: 0%
Quarter 2				
Assessment Area	**Category 1**	**Category 2**	**Category 3**	**Notes**
MFAC Area 1	93%	6%	1%	
MFAC Area 2	95%	3%	2%	
MFAC Area 3	98%	1%*	1%*	
MFAC Area 4	99.5%	0.5%	-	
Quarter 3				
Assessment Area	**Category 1**	**Category 2**	**Category 3**	**Notes**
MFAC Area 1	94%	5%	1%	
MFAC Area 2	96%	3%	2%	
MFAC Area 3	99%	1%*	0%*	
MFAC Area 4	100%	0%	-	
Quarter 4				
Assessment Area	**Category 1**	**Category 2**	**Category 3**	**Notes**
MFAC Area 1	96%	2%	2%	
MFAC Area 2	96%	2%	3%	
MFAC Area 3	98%	1%*	1%*	
MFAC Area 4	99%	1%	-	

MFAC Events/BMP Implementation Summary

To ensure the parcels are all within Category 1, the MFAC/BMP Program is continuously evaluated and modified using the following adaptive management approach:

1. Estuary parcels in Category 1 for the monitoring event conducted prior to a scheduled MFAC Event are noted and any trash observed is collected during the visual survey. If no potential high trash generating areas are identified through the patrol of the parcel, the MFAC Event is not conducted. If potential high trash generating areas are identified by the patrols, then the MFAC Event focusing on those areas of the parcel that require clean-up.
2. Monitoring sites in Category 2 are evaluated to determine if additional BMPs are needed to reduce the accumulation of trash between monitoring events (i.e., visual surveys). The

types of trash, likely sources, and observed trends in trash amounts are considered in determining if modifications to the MFAC/BMP Program are necessary to move these sites to Category 1.

3. Monitoring sites in Category 3 for two (2) consecutive quarterly MFAC Events are targeted for more frequent patrols and/or more frequent clean-ups depending on the identified primary source of trash until the site reaches Category 1 for two (2) consecutive visual surveys.

This following section provides the results of the collection events and the results of the BMPs implemented related to reducing trash within the Estuary and from adjacent land areas.

MFAC COLLECTION EVENTS AND ADDITIONAL CLEAN-UP EVENTS

One facet of the MFAC/BMP Program is to clean up any trash found through the assessments. This is done to ensure zero pieces of trash are found after the assessment. **Table 5** presents the trash collected during the collection events during 2014-2015. Assessment and Collection Worksheets contains the Collection Event Worksheets for all MFAC Events conducted during 2014-2015 (**Appendix 1**). Another facet of the MFAC/BMP Program is to conduct additional clean-ups in the Estuary if it is found that trash is accumulating in deleterious amounts between assessments. The Ventura Hillsides Conservancy conducted 15 clean-ups in the Estuary to address high trash accumulation areas. Parcels 3 and 4 were known to have legacy trash issues, and therefore were targeted for additional clean-ups from the beginning of the 2014-2015 monitoring year. Clean-up provided in **Appendix 2** include photos of the types of trash removed during collection events and additional clean-up events.

Table 5. Summary of Trash Collected during the MFAC Collection and Additional Clean-up Events

Date	MFAC Area 1	MFAC Area 2	MFAC Area 3	MFAC Area 4
10/18/14		38 bags/950lbs	5 bags/125lbs	7 bags/175lbs
11/3/14		2 bags/50lbs		
11/8/14	90 bags/1/3rd 40cy dumpster	160/2/3rd 40cy dumpster		
11/15/14		120 bags/3000lbs		
12/20/14	20 bags/~500lbs	60 bags/1500lbs		
1/17/15		30 bags/750lbs		
1/19/15		100 bags/2500lbs		
2/21/15		12 bags/300	8 bags/200lbs	
3/21/15		24 bags/600lbs	4 bags/100lbs	5 bags/150lbs
4/16/15	60 bags/~1300lbs	60 bags/1500lbs		
5/16/15		5 bags/125lbs	6 bags/150lbs	4 bags/100lbs
6/20/15			6 bags/150lbs	8 bags/200lbs
7/3/15				2 bags/50lbs
8/15/15			60 bags/1500lbs	
9/19/15			22 bags/550lbs	

lbs=pounds (1 bag roughly equal to 25 lbs)

BMP IMPLEMENTATION

This section describes the BMPs implemented by the responsible parties within the Estuary and on land areas adjacent to the Estuary.

City of Ventura Litter Management Program BMPs

- Street Sweeping
    - Residential Streets swept at least once a month.
    - Commercial Streets swept two to four times per month.
    - Information encouraging residents/businesses to move parked cars for sweeping.
- Catch Basin Inlet-Cleaning and Placarding
    - City-maintained catch basin inlets are inspected and cleaned of trash and debris one to three times per year depending on the priority categorization of the catch basin.
    - Information encouraging residents/businesses to report trash filled inlets.
    - "Don't Dump – Drains to Oceans – Only Rain Down the Drain" stencils or placards placed on storm drain inlets.

- Trash Collection in Public Areas
    - Trash and recycling containers are installed at all transit shelters and maintained at least once per week to remove litter and to verify that containers are functioning properly.
    - Special event permit language requires additional trash and recycling containers to be set out during street fairs and art walks, along with litter clean-up following events.
    - Collection of trash from 18 public trash receptacles located within the watershed two or three times per week depending on the locations of the receptacles.
- Trash Collection and Bulky Item Pickup
    - Residents and businesses are provided with trash and recycling collection services.
    - Residential customers are allowed to set out two "bulky items" for free collection once per year as part of their regular trash collection service.
- Inspection, Planning and Enforcement Support
    - The City identifies and requires corrective measures for litter or litter sources found during commercial, industrial, and construction site inspections.
    - New development and redevelopment projects are required to install trash enclosures with doors and covers to reduce litter.
    - The Ventura Police Department conducts periodic "enforcement sweeps" through the portion of the Estuary that is adjacent to the City limits.
    - Litter laws that prohibit the accumulation of trash on private property are enforced by the City Code Enforcement and County Environmental Health Department. Private properties are required to remove all trash from their premises at least once every seven days.
- Outreach
    - Litter prevention outreach is included in classroom presentations and stormwater pollution prevention advertisements/announcements.
    - Several half-hour TV programs produced by the City encourage residents to prevent litter.
- Partners in Progress
    - Citywide volunteer program with a mission to preserve Ventura's natural environment by minimizing litter in water bodies and coastal areas.
- City-Initiated Clean-Up Events
    - The City will initiate clean-up events, as necessary, in response to observed elevated trash levels.
- City-Sponsored Clean-Up Events

- The City sponsors various clean-up events throughout the City that may include one or more of the following events during any given year: Martin Luther King Day; Earth Day Beach Clean-Up; Coastal Clean-Up Day; Backyard Collective; and Ventura Charter School Trash-a-thon.
- The City sponsored Westside Clean-Up (June 7, 2014) provided free disposal of solid waste from any west side (adjacent to the Ventura River) Ventura residents. Residents brought solid waste to a centralized location where it was sorted for recycling or disposal.
- An additional clean-up event conducted by the City in the Estuary occurred on July 28, 2014 (underneath the rail road bridge).

- Work Plan to Eliminate Homeless Encampments (Safe and Clean Program)
  - The Ventura City Council initiated the development of a work plan in September 2012 to eliminate encampments in the Estuary and to implement an on-going enforcement program. The work plan includes organizing stakeholder partners, conducting civil engagement, developing an action plan and corresponding follow-up steps, posting camps, conducting camp removal, and launching post-camp removal strategies.

County of Ventura and VCWPD Litter Management Program BMPs

- Installation of Full Capture Catch Basin Trash Excluders – Installation of certified Stormtek Full Capture Catch Basin Trash Excluder Devices (CPS Devices) to achieve 100% reduction of trash from Baseline WLA, for all Ventura County Unincorporated areas draining to the County's MS4 within the Ventura River Estuary subwatershed. Installation completed in October 2014. Certification Report was provided in the 2013-2014 Annual Report (Appendix 1).
- Development and Implementation of Connector Pipe Screen Trash Excluders Operation and Maintenance Plan and Manual – Developed an Operations and Maintenance Plan and Manual including schedule for regular maintenance and reporting of debris/trash removed for the 15 installed CPS devices. Training provided to maintenance staff in both the classroom and field to ensure proper cleanout and reporting methods and procedures.
- Catch Basin Cleaning – Catch basins are inspected at least once per year and cleaned when filled to 25% or more of the catch basin's capacity. During storm season, all drainage facilities are inspected and cleaned as necessary.
- Catch Basin Labeling – All County catch basins are labeled with "Don't Pollute, Flows to Waterways."
- Open Channel Storm Drain Maintenance – All VCWPD owned and maintained channels are cleared, inspected, and cleaned as required at least once per year.
- Trash and Sediment Channel Clean Out – In December 2014, VCWPD cleaned out 0.34 tons of trash from the lower Ventura River area and removed 24 cubic yards of sediment from the side drains within the Ventura River Estuary subwatershed.

- Trash Management at Public Events – A plan for the proper management of trash and litter is required when obtaining a permit for staging public events. This plan requires adequate facilities for trash collection and disposal.
- Trash Collection in Public Areas – Trash receptacles have been placed within high trash generation areas. These devices are cleaned and maintained regularly to prevent trash overflow.
- Ventura County Ordinance No. 4142 – County ordinance (Section 6923 "Litter" and Section 6955 "Watercourse Protection") prohibit the disposal and accumulation of trash in public areas, private driveways, parking areas, streets, alleys, sidewalks, or components of the storm drain or any watercourse.
- Inspections – The County conducts commercial, industrial, and construction facility/site inspections to ensure proper pollution prevention BMPs are being applied and to educate employees on the importance of pollution prevention.
- Anti-Littering Signage – The County has installed anti-dumping and anti-littering signage at key locations including high trash generating areas, as well as at known illegal dumping locations.
- Foster Park Trash Management – The County manages Foster Park, which is situated along the Ventura River upstream of the Estuary, to ensure that trash originating from the park does not enter the river and deposit in the Estuary. Management actions include:
    - Park host and rangers removing trash and enforcing litter ordinance
    - Increased enforcement and collection during high trash generating events (holidays)
    - Covered trash containers and frequent trash pick-up and removal
    - Continued evaluation of trash management practices to determine whether current practices are sufficient
    - Continued evaluation of existing litter-related signage to determine whether current signage is adequate
- Countywide Outreach – The County and VCWPD continue to participate in the Countywide Outreach Program retaining the services of The Agency, a professional advertisement group that designs and conducts countywide, bilingual outreach programs advocating proper trash disposal. The most recent addition to the outreach program is trash prevention and protection of storm water quality education using Facebook®, Twitter® and other forms of social media.
- Targeted Outreach – The County conducts targeted outreach to schools within the area covered by the Trash TMDL to educate students, staff, and faculty on the importance of pollution prevention specifically regarding trash.

California Department of Food and Agriculture BMPs

The California Department of Food and Agriculture implements trash control BMPs at the Ventura County Fairgrounds on a schedule that varies depending on the time of the year. When

the Ventura County Fair is being held at the Fairgrounds, the following BMPs are implemented daily and on an as needed basis:

- Litter pickup in the main parking lot, the beach parking lot, and the overflow parking lot
- Litter pickup in the areas surrounding the event locations
- Emptying of trash cans
- Emptying of recycle bins
- Diversion of storm drains to the sanitary sewer during the Fair (July – August)

When the Ventura County Fair is not in progress at the Fairgrounds, the above BMPs are still implemented, but on a daily, weekly, and/or as needed basis depending on the specific BMP.

Caltrans Litter Management Program BMPs

- Ventura River Estuary – State Highway 33, between Post Mile 0.0 and 5.55, has litter removed approximately twice per month and is mechanically swept approximately once per month, as needed. This highway is also open to 'Adopt-A-Highway' groups and there are groups who currently have adoptions and perform litter removal twice per month.

Additional Trash Management Plans/BMPs in place for Caltrans:

- Caltrans currently uses a variety of methods to educate the public about the importance of managing stormwater. These are intended to change public behavior regarding the release of potential pollutants (e.g., litter, spilled loads, and oil leaks).
    - The outreach program consists of a variety of written materials, monthly and quarterly bulletins, websites, workshops, and Caltrans's Adopt-a-Highway Program, as described below.
- Caltrans installs "No Dumping" and "Litter Fine" signs at selected locations on highways and freeways. Stenciled warnings prohibiting discharges to drain inlets at state-owned park-and-ride lots, rest areas, vista points, and other areas with pedestrian traffic are also used to increase public awareness.
- Litter and debris removal activities include sweeping of shoulders, paved medians, etc., and litter removal along the roadsides.
- Caltrans uses venues such as public schools, community-sponsored clean-up events, Bring Your Child to Work Day, and Earth Day to educate the public about the importance of excluding pollutants from stormwater.
- Caltrans's Adopt-A-Highway program is an opportunity for volunteers to make a tangible contribution to community and roadside aesthetics, and acts as a way to inform the public about the stormwater problems related to illegal dumping of litter and debris. As part of this program, signs are posted along roadways acknowledging groups that have volunteered to plant wildflowers, trees and/or shrubs, collect litter, or remove graffiti from structures.

- In the metropolitan portions of Los Angeles, San Diego, Orange, and Ventura Counties, storm drain inlets are inspected and cleaned annually prior to the rainy season. Those storm drain inlets that contain 12 inches or more of accumulated material will be cleaned.
- Litter and debris are periodically collected from Caltrans's rights-of-way and removed from drainage grates, trash racks, and ditch lines. Maintenance supervisors inspect highways in their assigned sections for the accumulation of litter. Signs may be installed where litter accumulation is a concern.
- "Don't Trash California" is a statewide Caltrans education and outreach trash reduction public program that has been conducted since 2005. The program uses public service announcements through various media such as television and radio broadcasts, billboards, newspapers, etc, and focuses on behavior changes. The program's surveys have shown changes in public perception on littering and results in reduced litter on the roadways.

In addition to local anti-litter ordinances, Caltrans relies on Sections 23112, 23113, 23114, and 23115 of the Vehicle Code as legal authority to prevent spills, dumping or disposal of materials on the highways and freeways under its jurisdiction, as enforced by the California Highway Patrol.

- Section 23112 states:

  No person shall throw or deposit, nor shall the registered owner or the driver, if such owner is not then present in the vehicle, aid or abet in the throwing or depositing upon any highway any bottle, can, garbage, glass, nail, offal, paper, wire, any substance likely to injure or damage traffic using the highway, or any noisome, nauseous, or offensive matter of any kind.

  No person shall place, deposit, or dump, or cause to be placed, deposited, or dumped, any rocks, refuse, garbage, or dirt in or upon any highway, including any portion of the right-of-way thereof, without the consent of the state or local agency having jurisdiction over the highway.

- Section 23113 states:

  Any person who drops, dumps, deposits, places or throws, or causes or permits to be dropped, dumped, deposited, placed or thrown, upon any highway or street any material described in Section 23112 or in subdivision (d) of Section 23114 shall immediately remove the material or cause the material to be removed.

  If the person fails to comply with subdivision (a), the governmental agency responsible for the maintenance of the street or highway on which the material has been deposited may remove the material and collect, by civil action, if necessary, the actual cost of the removal operation in addition to any other damages authorized by law from the person made responsible under subdivision (a).

- Section 23114 states (in pertinent part):

  No vehicle shall be driven or moved on any highway unless the vehicle is so constructed, covered, or loaded as to prevent any of its contents or load other than

clear water or feathers from live birds from dropping, sifting, leaking, blowing, spilling, or otherwise escaping from the vehicle.

- Section 23115 of the Vehicle Code states (in pertinent part):

  No vehicle loaded with garbage, swill, cans, bottles, waste papers, ashes, refuse, trash, or rubbish, or any other noisome, nauseous, or offensive matter, or anything being transported to a dump site for disposal shall be driven or moved upon any highway unless the load is totally covered in a manner which will prevent the load or any part of the load from spilling or falling from the vehicle.

California Department of Parks and Recreation (State Parks) BMPs

- Designated Public Use Areas
  - Trash containers are installed at all visitor activity areas. Containers are kept in good working order and are emptied as needed.
  - State Parks keeps one mixed use 40 yard roll-off container onsite to collect and dispose of approximately 20,000 lbs. of trash annually.
  - Park personnel and camp hosts routinely collect loose trash within developed park areas as a part of their daily duties. In addition, park personnel conduct weekly sweeps to identify, and remove trash accumulation in vegetated areas along the established trail system east of the campground.
- Undeveloped Areas
  - Litter and debris is periodically collected from park backcountry lands, water courses, and roadways. Maintenance supervisors inspect park roads in their assigned sections for the accumulation of litter.
  - Signs may be installed where litter concentration is repetitive and at known illegal dumping locations.
  - Catch basins are inspected and cleaned at least once per year. During storm season, drainage facilities are inspected before significant storm events.
- Volunteer Events and Public Outreach
  - State Parks sponsors various Earth Day and Coastal Cleanup events throughout the district and participates in special cleanup events to address observed elevated trash levels.
  - Routine and random river bottom patrols are conducted by law enforcement at a minimum of once per week to discourage establishment of illegal camp sites.
  - Camper outreach and education is implemented year-round in an effort to limit trash dispersal by wind and wildlife.
- Construction Projects and Special Events
  - All special events permits issued on State Park property require a plan for the proper management of trash. This plan requires adequate facilities and patrols for trash collection and disposal.

- All contractors that work on State property are required to implement BPMs to keep job site clean and litter free.

VCAILG Litter Management Program BMPs

- Conditional Waiver – The *Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands within the Los Angeles Region* ("Conditional Waiver", Order No. R4-2010-0186) requires VCAILG to provide educational classes focused on improving water quality, including identifying trash as an impairment of water quality.
- VCAILG members are required to document the trash control BMPs for agricultural areas that they employ. In a BMP survey completed in 2015, VCAILG members in the Ventura River watershed reported a 99% adoption rate for trash control BMPs, an 18% increase since 2010. In its role, VCAILG will continue to assist members with implementation of additional BMPs for trash control, as necessary, following the adaptive process identified in the group's Water Quality Management Plan (WQMP).
- Outreach – During VCAILG outreach activities, the Trash TMDL is highlighted and a connection made for the need to control trash in order to meet the requirements of the Trash TMDL. VCAILG's Management Practice Survey, used to determine the degree of implementation of BMPs and to provide targeted outreach, includes questions regarding trash control practices. As noted, this approach has been very effective as VCAILG members in the area have reported a very high adoption rate for trash BMPs.
- Ventura River Trash TMDL Fee – VCAILG members are assessed a fee, based on acreage farmed, to further reinforce through a fiscal measure that trash in the watershed needs addressing.
- Plastics Recycling – Community Recycling & Resource Recovery, Inc. and local farmers are collaborating to recycle agricultural plastic used to cover strawberry beds and used in some vegetable fields during the growing season. Community Recycling & Resource Recovery, Inc. estimates that it collects approximately 70 percent of the agricultural plastic used in Ventura County. Collection and recycling of plastic is an effective method for reducing plastic trash from entering the Ventura River and the Estuary.
- Taylor Ranch (Wood-Claeyssens Foundation), a VCAILG member with property beginning immediately upstream of the Ventura River Main Street bridge, is an active participant in the Trash TMDL program by regularly cleaning and patrolling their property. Through the efforts of the Wood-Claeyssens Foundation, it is estimated that approximately 55 tons of trash were removed from the Taylor Ranch Ventura River bottom from transient/homeless camps through March 2012. Since that time, 5 to 10 more tons have been collected – a rough estimate since the smaller batches are not always weighed and simply disposed of in local dumpsters. Taylor Ranch has been successful in maintaining the cleanliness of the property and protecting water quality by employing the following:
    - Regular monitoring and patrolling of the area adjacent to the river at approximately 3 week intervals. This has been established as the optimum frequency to intercept homeless camps and prevent the cycle of trash accumulation.

- As camps are discovered, clean-up is initiated as soon as possible in order to convey the message that the area is being actively monitored.
- Law enforcement assistance is requested, as needed. Both the Ventura Police Department and the Ventura County Sheriff's Department have responded in the past. In the future, Rangers from the California State Parks systems will also be helping with this effort.

MFAC/BMP Program Evaluation and Revision Recommendations

The TMRP states the responsible parties will: "Evaluate effectiveness of BMPs and recommended changes to TMRP Addendum No. 1 and MFAC/BMP Program, as necessary." Under the previous MFAC/BMP Program and TMRP, the following steps were used to assess MFAC/ BMP Program effectiveness:

1. A review of BMP implementation, including identification of BMPs, location of BMPs, and time frame (*e.g.*, when an activity was implemented or installed); and
2. A comparison of monitoring results between monitoring locations and between events before and after BMP implementation.
3. Comprehensive review and assessment of MFAC/BMP Program

Given the broad nature of most of the BMPs implemented (*e.g.*, education programs, ordinances, street sweeping), the highly variable amounts of trash collected, and the relatively short time frame that full capture devices were installed, the responsible parties could not identify trends in the monitoring data that could be used to determine effectiveness of individual BMPs implemented. Based on the results of the previous evaluation and the structure of the new MFAC/BMP Program, the responsible parties utilized an approach based on the visual assessments.

The responsible parties utilized parcel rankings by Category as a means to assess effectiveness of the MFAC/BMP Program. That is, if there was an overall trend of parcels starting out and remaining in Category 1, or parcels moving from Category 2 or Category 3 to Category 1, then no modifications to the MFAC/BMP Program are needed. Conversely, if there was an overall trend of parcels moving from Category 1 to Category 2 or Category 3 over the course of the implementation year, then modifications to the MFAC/BMP Program would be considered.

2013-14 was the first year of the revised TMRP and modified MFAC/BMP Program implementation. A large amount of legacy trash existed in the Ventura River Estuary and the bulk of the effort (including many additional clean-up events) during this monitoring year has gone towards cleaning up the legacy trash. While most of the parcels have been cleaned and legacy trash removed, the State Parks Parcel (MFAC Area 2) still contains legacy trash. This is due to a population of homeless individuals that are not receptive to relocating from the area, even after multiple citations from local law enforcement. Once the legacy trash is removed, the revised TMRP and MFAC/BMP Program will begin to be implemented at the frequency outlined in the TMRP (without the additional clean-ups).

As a result, the responsible parties are not conducting an assessment of the program or proposing any revisions to the MFAC/BMP Program during this annual report. The focus on removing

remaining legacy trash in the Estuary during the monitoring year does not allow for development of an assessment of the baseline MFAC/BMP Program this year. Once the legacy trash is removed and the MFAC/BMP Program has been implemented without the legacy trash, the responsible parties will have a clearer understanding of the effectiveness of the baseline MFAC/BMP Program. However, through the initial implementation of the revised MFAC/BMP Program, it is clear that the revised MFAC/BMP Program is a better use of resources and much more effective at removing trash from the Estuary compared to the previous MFAC/BMP Program. The responsible parties will provide any revisions that were made or will be made to the MFAC/BMP Program, in the third-year Annual Report, which will be submitted in January 2017.

Appendix 1

Assessment and Collection Worksheets

MFAC Event Worksheet

Parcel No.: 2- State Parks | Event Date: 10/3/14
Specific Cleanup Location: East of Estrada | Event Start/ End Time: 9:30 / 12:00
Field Technician name(s): DaShiell Dunkell, Derek Poultney
Current Weather Condition: warm, sunny
Antecedent Weather Condition: Rain two days prior

Types of Trash Observed (check all that apply):

- ☑ Plastic/ Styrofoam
- ☑ Landscape Materials
- ☐ Toxic/ Hazardous Materials
- ☑ Personal Effects
- ☑ Paper Products/ Biodegradable
- ☑ Aluminum/ metal
- ☑ Glass
- ☐ Sports Equipment
- ☑ Household Items
- ☑ Automotive
- ☐ Biohazardous
- ☑ Other

Notes: Mostly cut arundo to continue improving access to camps and trash areas. Picked up scattered trash found in area.

Potential Source(s) of Trash Collected: Illegal campers or other park users.

Hazardous/ Legacy Trash Requiring Follow-up: None Seen.

MFAC Event Actions for Follow-up: continue clearing arundo and maintaining trails to provide access during cleanup events. Coordinate with law enforcement to evict campers, clean up camps.

Additional Notes: State Parks interns came and treated arundo previously cut.

Trash Collected:
No. of Trash Bags Filled: 2 | Dumpster % Fill: N/A | Dumpster Size (cubic yds): N/A

Lead Field Technician Certification (sign/ print):
"Cleaned area is free of all visible trash." - DaShiell Dunkell

MFAC Event Worksheet

Parcel No.: 2 - State Parks 1 - City/state Parks Event Date: 11/8/14
Specific Cleanup Location: East Estuary, West Estuary Event Start/ End Time: 8:30 / 1:30
Field Technician name(s): Dashiell Dunkell, Derek Poultney, Lee Sherman
Current Weather Condition: Sunny warm
Antecedent Weather Condition: Dry

Types of Trash Observed (check all that apply):

- ☑ Plastic/ Styrofoam
- ☑ Landscape Materials
- ☑ Toxic/ Hazardous Materials
- ☑ Personal Effects
- ☑ Paper Products/ Biodegradable
- ☑ Aluminum/ metal
- ☑ Glass
- ☑ Sports Equipment
- ☑ Household Items
- ☑ Automotive
- ☑ Biohazardous
- ☑ Other

Notes: As part of "I Heart Ventura" events, we had approximately 120 volunteers arrive at the cleanup. We were able to clean at least 10 large encampments/ trash piles, plus large amounts of scattered trash throughout estuary.

Potential Source(s) of Trash Collected: Illegal encampments, wetlands runoff

Hazardous/ Legacy Trash Requiring Follow-up: None

MFAC Event Actions for Follow-up: Continue work on west edge of estuary, where a small "gator" type vehicle is needed to transport trash over long distances to Emma Wood Group Camp area.

Additional Notes: City property in Parcel #1 is mostly clear of any active camps, however State Parks property was found to contain many active / occupied illegal encampments.

Trash Collected:

No. of Trash Bags Filled: 250 Dumpster % Fill: 100% Dumpster Size (cubic yds): 40 yds^3

Lead Field Technician Certification (sign/ print):
"Cleaned area is free of all visible trash." - Dashiell Dunkell

MFAC Event Worksheet

Parcel No.: 2- State Parks Event Date: 11/15/14

Specific Cleanup Location: North of trestle east edge Event Start/ End Time: 8:30 / 12:30

Field Technician name(s): Dashiell Dunkell, Derek Poultney Lee Shannon

Current Weather Condition: Partly Cloudy

Antecedent Weather Condition: Cloudy mostly dry

Types of Trash Observed (check all that apply):

- ☑ Plastic/ Styrofoam
- ☐ Landscape Materials
- ☑ Toxic/ Hazardous Materials
- ☑ Personal Effects
- ☑ Paper Products/ Biodegradable
- ☑ Aluminum/ metal
- ☑ Glass
- ☑ Sports Equipment
- ☑ Household Items
- ☐ Automotive
- ☑ Biohazardous
- ☐ Other

Notes: Several areas cleaned up in previous event had been re-inhabitated by illegal campers. We cleaned those areas up, and cleared small amounts of invasive vegetation to discourage future illegal use.

Potential Source(s) of Trash Collected: Illegal encampments

Hazardous/ Legacy Trash Requiring Follow-up: None

MFAC Event Actions for Follow-up: Continue clearing sight lines and access to troubled areas. Continue push towards western estuary and beach areas

Additional Notes: A crew from Marine Corps Base Ventura County came and volunteered for the cleanup, providing a great source of labor and allowing us to clean a very large area

Trash Collected:

No. of Trash Bags Filled: 120 Dumpster % Fill: 75 Dumpster Size (cubic yds): 40

Lead Field Technician Certification (sign/ print):

"Cleaned area is free of all visible trash." - Dashiell Dunkell

MFAC Event Worksheet

Parcel No.: 1 & 2 Event Date: 12/20/14

Specific Cleanup Location: West Estuary Event Start/ End Time: 9:00 / 12:00

Field Technician name(s): Dashiell Dunkell, Derek Poultney

Current Weather Condition: sunny, cool

Antecedent Weather Condition: clear, sunny

Types of Trash Observed (check all that apply):

- ☑ Plastic/ Styrofoam
- ☐ Landscape Materials
- ☑ Toxic/ Hazardous Materials
- ☑ Personal Effects
- ☑ Paper Products/ Biodegradable
- ☑ Aluminum/ metal
- ☑ Glass
- ☑ Sports Equipment
- ☑ Household Items
- ☑ Automotive
- ☑ Biohazardous
- ☑ Other

Notes: Areas cleaned include the "Cypress Grove" and several camps along North edge of train tracks. Ten VPD officers and two state parks rangers participated and visited many other camps in the area. 25 volunteers attended over the course of the cleanup.

Potential Source(s) of Trash Collected: Homeless encampments appeared to be major source of trash collected

Hazardous/ Legacy Trash Requiring Follow-up: None in area cleaned.

MFAC Event Actions for Follow-up: Future events will continue to focus on west edge of estuary, moving north toward 101 bridge, as well as "the Island"

Additional Notes: Removing trash from western edge of estuary has been a logistical challenge due in part to unmaintained trail system on State Parks property.

Trash Collected:

No. of Trash Bags Filled: 80 Dumpster % Fill: 66% Dumpster Size (cubic yds): 40

Lead Field Technician Certification (sign/ print):

"Cleaned area is free of all visible trash." - Dashiell Dunkell

MFAC Event Worksheet

Parcel No.: 2 - State Parks Event Date: 1/17/15

Specific Cleanup Location: Near the Island Event Start/ End Time: 9:00am / 12:00pm

Field Technician name(s): Dashiell Dunkell, Derek Poultney

Current Weather Condition: sunny, warm

Antecedent Weather Condition: clear, sunny

Types of Trash Observed (check all that apply):

- ☑ Plastic/ Styrofoam
- ☐ Landscape Materials
- ☑ Toxic/ Hazardous Materials
- ☑ Personal Effects
- ☑ Paper Products/ Biodegradable
- ☑ Aluminum/ metal
- ☑ Glass
- ☑ Sports Equipment
- ☑ Household Items
- ☑ Automotive
- ☐ Biohazardous
- ☑ Other

Notes: Trash was cleaned from abandoned camps near the Island. A bridge was created from wood and assorted meterials and volunteers entered Island and started preparing for future cleanups. Several large items (broken surfboard, heat lamp, propane tanks) were taken from the Island

Potential Source(s) of Trash Collected: Illegal camps

Hazardous/ Legacy Trash Requiring Follow-up: Several areas on Island were found to contain makeshift trash dumps, were trash had been burned / buried. Retrieving this trash will be difficult.

MFAC Event Actions for Follow-up: Finish cleaning up Island

Additional Notes: State Park 4WD vehicle was very helpful in transporting trash. Rangers and VPD officers were also on scene to ensure participant safety.

Trash Collected:

No. of Trash Bags Filled: 30 Dumpster % Fill: 20 Dumpster Size (cubic yds): 40

Lead Field Technician Certification (sign/ print):

"Cleaned area is free of all visible trash." - Dashiell Dunkell

MFAC Event Worksheet

Parcel No.: 2 - State Parks
Event Date: 1/19/15
Specific Cleanup Location: The Island
Event Start/ End Time: 9:00am / 12:30pm
Field Technician name(s): Dashiell Dunkell
Current Weather Condition: sunny, warm
Antecedent Weather Condition: sunny

Types of Trash Observed (check all that apply):

- ☑ Plastic/ Styrofoam
- ☑ Landscape Materials
- ☑ Toxic/ Hazardous Materials
- ☑ Personal Effects
- ☑ Paper Products/ Biodegradable
- ☑ Aluminum/ metal
- ☑ Glass
- ☑ Sports Equipment
- ☑ Household Items
- ☑ Automotive
- ☑ Biohazardous
- ☑ Other

Notes: Despite rising water levels in estuary (due to river mouth closure), volunteers were able to access The Island. 3 large illegal camps were dismantled and trash was ferried to mainland in an inflatable raft. Close to 95% of trash was removed from Island.

Potential Source(s) of Trash Collected: Illegal campers. Drug users.

Hazardous/ Legacy Trash Requiring Follow-up: Some large bulky items (furniture) were left on Island due to time constraints. They will be removed in future cleanups

MFAC Event Actions for Follow-up: City property along bike path and in center of beach are some of last remaining trouble areas. Some areas in State Parks on west edge of Estuary are bad as well.

Additional Notes: State Park 4WD vehicle and Parks employee were instrumental in hanging so much trash out of a rugged area. Ranger and VPD presence were also very important.

Trash Collected:

No. of Trash Bags Filled: ~100 Dumpster % Fill: 80 Dumpster Size (cubic yds): 40

Lead Field Technician Certification (sign/ print):
"Cleaned area is free of all visible trash." - Dashiell Dunkell

MFAC Event Worksheet

Parcel No.: 243 - State Parks, main St Bridge, 101 Event Date: 2/21/15
Specific Cleanup Location: 101, main St Bridges, E Estuary Event Start/ End Time: 9:00am / 12:00pm
Field Technician name(s): Dashiell Dunkell, Derek Poultney
Current Weather Condition: Foggy, warm
Antecedent Weather Condition: Cloudy, cool, dry

Types of Trash Observed (check all that apply):

- ☑ Plastic/ Styrofoam
- ☐ Landscape Materials
- ☑ Toxic/ Hazardous Materials
- ☑ Personal Effects
- ☑ Paper Products/ Biodegradable
- ☑ Aluminum/ metal
- ☑ Glass
- ☐ Sports Equipment
- ☑ Household Items
- ☐ Automotive
- ☑ Biohazardous
- ☐ Other

Notes: Trash was cleaned from under Main Street and Highway 101 bridges, as well as from Tom Cucciwello's abandoned camp on East side of State Parks property. Arundo was cut to gain access to several overgrown areas with small amounts of legacy trash.

Potential Source(s) of Trash Collected: Illegal campers, graffiti artists, partyers under bridges, roadway trash.

Hazardous/ Legacy Trash Requiring Follow-up: Small amounts in several places deep in State Parks property east of Estuary.

MFAC Event Actions for Follow-up: When water levels lower in Estuary, last bit of trash from Island can be cleaned.

Additional Notes: State Parks Rangers scoured estuary for illegal campers ahead of cleanup. State Parks also provided truck to haul trash collected from cleanup. Attendees included volunteers from 3 local high schools as well as Ventura Rotary Club.

Trash Collected:
No. of Trash Bags Filled: 20 Dumpster % Fill: 50 Dumpster Size (cubic yds): 10

Lead Field Technician Certification (sign/ print):
"Cleaned area is free of all visible trash." - Dashiell Dunkell

MFAC Event Worksheet

Parcel No.: 2, 3, 4 Event Date: 3/21/15

Specific Cleanup Location: under Bridges Event Start/ End Time: 9:00am / 12:00pm

Field Technician name(s): Dashiell Duntell, Derek Poultney

Current Weather Condition: Foggy

Antecedent Weather Condition: sunny, dry

Types of Trash Observed (check all that apply):

- ☑ Plastic/ Styrofoam
- ☐ Landscape Materials
- ☑ Toxic/ Hazardous Materials
- ☑ Personal Effects
- ☑ Paper Products/ Biodegradable
- ☑ Aluminum/ metal
- ☑ Glass
- ☐ Sports Equipment
- ☑ Household Items
- ☑ Automotive
- ☑ Biohazardous
- ☑ Other

Notes: Due to high water conditions in the estuary, much of Parcel #1 and Parcel #2 were not accessible. Therefore we decided to go through previously cleaned areas and make sure things did not get dirty once again, mainly focusing on the main St and Hwy 101 bridges

Potential Source(s) of Trash Collected: Graffiti taggers, partyers, transients and roadway litter

Hazardous/ Legacy Trash Requiring Follow-up: None Seen

MFAC Event Actions for Follow-up: Continue on legacy trash in parcels #1 & #2 when water conditions in estuary allow.

Additional Notes: overall, parcels #3 and #4 were looking very good, with little trash seen except underneath bridges.

Trash Collected:

No. of Trash Bags Filled: 32 Dumpster % Fill: 25 Dumpster Size (cubic yds): 20

Lead Field Technician Certification (sign/ print):

"Cleaned area is free of all visible trash." - Dashiell Duntell

Appendix B – MFAC Event Worksheet

MFAC Event Worksheet

Parcel No.: 1 & 2 Event Date: 4/16/15

Specific Cleanup Location: Estuary Event Start/ End Time: 9:00am/12:00pm

Field Technician name(s): Derek Poultney

Current Weather Condition: sunny

Antecedent Weather Condition: sunny, Dry

Types of Trash Observed (check all that apply):

- ✓ Plastic/ Styrofoam
- ✓ Landscape Materials
- ✓ Toxic/ Hazardous Materials
- ✓ Personal Effects
- ✓ Paper Products/ Biodegradable
- ✓ Aluminum/ Metal
- ✓ Glass
- Sports Equipment
- ✓ Household Items
- ✓ Automotive
- ✓ Biohazardous
- Other

Notes: Cleaned 6 large homeless camps in lower estuary area

Potential Source(s) of Trash Collected: Illegal encampments, day users of estuary

Hazardous/ Legacy Trash Requiring Follow-up: None

MFAC Event Actions for Follow-up: when water level drops in estuary, more areas with trash will be exposed

Additional Notes: Volunteers from the Conservation Alliance (Patagonia, Deckers, Toad & Co, REI) spent a morning cleaning trash and cutting Arundo to clear access.

Trash Collected:
No. of Trash Bags Filled: 120 Dumpster % Fill: 50% Dumpster Size (cubic yds): 40

Lead Field Technician Certification (sign/ print):
"Cleaned area is free of all visible trash." -

Appendix B – MFAC Event Worksheet

MFAC Event Worksheet

Parcel No.: 2,3,4 Event Date: 5/16/15

Specific Cleanup Location: Main St. Bridge / 101 Bridge Event Start/ End Time: 9:00 AM 12:00

Field Technician name(s): Dashiell Dunkell

Current Weather Condition: Sunny, warm

Antecedent Weather Condition: Dry

Types of Trash Observed (check all that apply):

- ✓ Plastic/ Styrofoam
- Landscape Materials
- ✓ Toxic/ Hazardous Materials
- ✓ Personal Effects
- ✓ Paper Products/ Biodegradable
- ✓ Aluminum/ Metal
- ✓ Glass
- Sports Equipment
- ✓ Household Items
- ✓ Automotive
- ✓ Biohazardous
- Other

Notes: Lots of plastic bags / food wrappers, beer cans, bottles, spray paint cans, and old clothes. several areas with high amounts of human feces, toilet paper.

Potential Source(s) of Trash Collected: Partiers, illegal campers, graffiti artists, road litter

Hazardous/ Legacy Trash Requiring Follow-up: none

MFAC Event Actions for Follow-up: continue patrols under bridges to discourage illegal uses

Additional Notes: State Parks provided flat bed truck to pick up trash collected, which was very helpful. High water levels in estuary prevent access to parts of parcel 2 & 1.

Trash Collected:
No. of Trash Bags Filled: 15 Dumpster % Fill: N/A Dumpster Size (cubic yds): N/A

Lead Field Technician Certification (sign-print):
"Cleaned area is free of all visible trash." - Dashiell Dunkell / Dashiell Dunkell

Appendix B – MFAC Event Worksheet

MFAC Event Worksheet

Parcel No. 3, 4 Event Date: 6/20/15

Specific Cleanup Location: 101 Bridge main st Event Start/ End Time: 9:00am / 12:00pm

Field Technician name(s): Dashiell Dunkell, Derek Poultney

Current Weather Condition: Fog / sun

Antecedent Weather Condition: Dry

Types of Trash Observed (check all that apply):

- ✓ Plastic/ Styrofoam
- ✓ Landscape Materials
- ✓ Toxic/ Hazardous Materials
- ✓ Personal Effects
- ✓ Paper Products/ Biodegradable
- ✓ Aluminum/ Metal
- ✓ Glass
- Sports Equipment
- ✓ Household Items
- Automotive
- ✓ Biohazardous
- Other

Notes: Large amounts of soiled clothes, food wrappers, beer cans, and spray paint cans.

Potential Source(s) of Trash Collected: Illegal campers, parties, Graffiti artists, road litter

Hazardous/ Legacy Trash Requiring Follow-up: None

MFAC Event Actions for Follow-up: None

Additional Notes: State Parks flatbed truck was once again instrumental in hauling away trash bags. Large areas closer to estuary still inaccesible due to high water

Trash Collected:

No. of Trash Bags Filled: 12-14 Dumpster % Fill: N/A Dumpster Size (cubic yds): N/A

Lead Field Technician Certification (sign/print):

"Cleaned area is free of all visible trash." - Dashiell Dunkell / Dashiell Dunkell

MFAC Event Worksheet

Parcel No.: 3 Event Date: 7-3-15

Specific Cleanup Location: WHERE TRAIL STOPS AT RIVER Event Start/ End Time: 11:30A / 12:15P

Field Technician name(s): DEREK POULTNEY

Current Weather Condition: MIX OF FOG, SUN, + WIND

Antecedent Weather Condition: FOGGY

Types of Trash Observed (check all that apply):

- ☑ Plastic/ Styrofoam
- ☑ Paper Products/ Biodegradable
- ☑ Household Items
- ☐ Landscape Materials
- ☐ Aluminum/ metal
- ☐ Automotive
- ☐ Toxic/ Hazardous Materials
- ☐ Glass
- ☐ Biohazardous
- ☑ Personal Effects
- ☐ Sports Equipment
- ☐ Other

Notes: HOMELESS TRASH & PERSONAL BELONGINGS

Potential Source(s) of Trash Collected: HOMELESS DAY USE TRASH

Hazardous/ Legacy Trash Requiring Follow-up: NONE

MFAC Event Actions for Follow-up: MONTHLY VOLUNTEER GROUP WILL COLLECT REMAINING LIGHTLY-DISPERSED DAY TRASH UNDER THE MAIN ST. BRIDGE

Additional Notes: UNUSUAL TO SEE A KIDDIE-POOL IN THE AREA !!

Trash Collected:

No. of Trash Bags Filled: 2 Dumpster % Fill: NA Dumpster Size (cubic yds): NA

Lead Field Technician Certification (sign/ print):

"Cleaned area is free of all visible trash." - [signature]

MFAC Collection Worksheet

Parcel No.: 2 - State Parks
Event Date: 8/15/15
Specific Cleanup Location: The Island
Event Start/ End Time: 9:00 a.m. / 12:00pm
Field Technician name(s): Dashiell Dunkell, Derek Paulmey
Current Weather Condition: sunny, hot, windy
Antecedent Weather Condition: sunny

Types of Trash Observed (check all that apply):

- ☑ Plastic/ Styrofoam
- ☑ Landscape Materials
- ☑ Toxic/ Hazardous Materials
- ☑ Personal Effects
- ☑ Paper Products/ Biodegradable
- ☑ Aluminum/ Metal
- ☑ Glass
- ☑ Sports Equipment
- ☑ Household Items
- ☑ Automotive
- ☑ Biohazardous
- ☑ Other

Notes: Approx 20 volunteers showed up to help us tackle camps that had returned to "the Island". We completely cleaned up 2 large camps, including couches, dressers, stoves, shelving, batteries and much more. We also found a large stash of drugs and drug paraphenelia which we dropped off at the ranger station at state Parks.

Potential Source(s) of Trash Collected: Illegal camps, drug users, some incidental trash from sides of lesser road.

Hazardous/ Legacy Trash Requiring Follow-up: None.

MFAC Event Actions for Follow-up: Keep up patrols.

Additional Notes: VHC contracted with the CREW to clear cut arundo from trails and increase access prior to event. State Parks Ranger and maintenance staff helped with this event.

Trash Collected:
No. of Trash Bags Filled: 60 Dumpster % Fill: 50% Dumpster Size (cubic yds): 40

Lead Field Technician Certification (sign/ print):
"Cleaned area is free of all visible trash." - Dashiell Dunkell

Trash Visual Survey Worksheet

Parcel No.: 2 & 3 Survey Date: 10/17/14

Inspector: Dashiell Dunkell / Derek Poultney Survey Start/ End Time: 1:30 / 1:30

Current Weather Condition: Partly cloudy, dry

Antecedent Weather Condition: cloudy dry

Level of Trash Observed:

Refer to Program Monitoring Area Map as necessary. Note any substantial variation in levels of trash observed in different areas of the parcel. If necessary, categorize these areas individually.

KEY: Category 1 (<10 pcs), **Category 2** (10-50 pcs), **Category 3** (51-100 pcs), **Category 4** (>100 pcs)

Notes/ Parcel area:	Category:	Reason(s) for Category Rating:
2- near island, east estuary	4	2 large active camps
2- central, eastern edge	4	3 large active camps
2- island	?	Deemed unsafe to enter
2- near trestle	4	abandoned camp

Types of Trash Observed (check all that apply):

- ☑ Plastic/ Styrofoam
- ☑ Landscape Materials
- ☑ Toxic/ Hazardous Materials
- ☑ Personal Effects
- ☑ Paper Products/ Biodegradable
- ☑ Aluminum/ metal
- ☑ Glass
- ☑ Sports Equipment
- ☑ Household Items
- ☑ Automotive
- ☑ Biohazardous
- ☑ Other

Notes: We did a very thorough sweep of state Parks (parcel #2) to plan for upcoming cleanups and to serve notices to remaining illegal campers

Est. No. of Follow-up Cleanup Events Needed (describe why): unknown, due to unknown conditions on island, plus difficult access to several sites

Additional Notes: We have been working to enhance access to areas deep in State Parks property so upcoming cleanups can proceed smoothly.

Trash Visual Survey Worksheet

Parcel No.: 3, 2, 1 Survey Date: 11-5-14

Inspector: DEREK POULTNEY, LEE SHERMAN Survey Start/ End Time: 9:30a / 12:00p

Current Weather Condition: SUNNY, WARM

Antecedent Weather Condition: " "

Level of Trash Observed:

Refer to Program Monitoring Area Map as necessary. Note any substantial variation in levels of trash observed in different areas of the parcel. If necessary, categorize these areas individually.

KEY: Category 1 (<10 pcs), **Category 2** (10-50 pcs), **Category 3** (51-100 pcs), **Category 4** (>100 pcs)

Notes/ Parcel area:	Category:	Reason(s) for Category Rating:
UNDER MAIN ST BRIDGE	2	DAY-USE TRANSIENT LITTERING
#3	1	ONLY A BUCKET AND SOME TRASH THAT FLOWED DOWNSTREAM DURING RAIN ON 10-31-14
#2	4	AT LEAST THIRTEEN ACTIVE OR ABANDONED CAMPS AND HOMELESS TRASH PILES ALL EXCEEDING 100 PIECES (EASILY)
#1	4	EASTERN PORTION - 2-3 SIGNIFICANT TRASH AREAS WESTERN " - 3-4 →

Types of Trash Observed (check all that apply):

- ☒ Plastic/ Styrofoam
- ☒ Landscape Materials
- ☒ Toxic/ Hazardous Materials
- ☒ Personal Effects
- ☒ Paper Products/ Biodegradable
- ☒ Aluminum/ metal
- ☒ Glass
- ☒ Sports Equipment
- ☒ Household Items
- ☒ Automotive
- ☐ Biohazardous – NEEDLES
- ☐ Other

Notes: SOME CAMPS HAVE CARPENTERED STRUCTURES

Est. No. of Follow-up Cleanup Events Needed (describe why): 5-10 DEPENDING ON HOW MANY VOLUNTEERS WE GET

Additional Notes:


7.85 Acres
State HWY 33
APN: 060-0-320-284
Ventura Beach RV Resort Inc.
18.56 Acres
APN: 060-0-320-065
Ventura Hillside Conservancy
8.74 Acres
U.S. 101
APN: 060-0-320-215
State of California
Depart. of Parks & Recreation
35.87 Acres
APN: 060-0-320-075
State of California
Depart. of Parks & Recreation
18.34 Acres
APN: 060-0-320-225
State of California
Depart. of Parks & Recreation
21.44 Acres
APN: 060-0-320-090
City of San Buenaventura
19.66 Acres
APN: 073-0-231-010
31st District Agricultural Association
(Ventura County Fair)
11.48 Acres
N
Ventura Riv

Trash Visual Survey Worksheet

Parcel No.: 1, 2, 3, 4 Survey Date: 12/1/14
Inspector: Dashiell Dunkell Survey Start/ End Time: 9:30/ 10:30
Current Weather Condition: cloudy cool
Antecedent Weather Condition: Scattered showers

Level of Trash Observed:

Refer to Program Monitoring Area Map as necessary. Note any substantial variation in levels of trash observed in different areas of the parcel. If necessary, categorize these areas individually.

KEY: Category 1 (<10 pcs), **Category 2** (10-50 pcs), **Category 3** (51-100 pcs), **Category 4** (>100 pcs)

Notes/ Parcel area:	Category:	Reason(s) for Category Rating:
1 - cypress cove	4+	Multiple tents / trash piles
1 - Next to beach	4	Abandoned campsites
1 - East Estuary	3	old trash piles
2 - Island	2	unknown dangerous access
2 - East Estuary, large palm	2	Trash pile from camp
2 - East Estuary, Cottonwoods	3	Active camp, previously cleaned
Mainst. Bridge	2	Scattered trash, paint cans
101 Bridge	4	Beer bottles, many spray paint cans

Types of Trash Observed (check all that apply):

- ☑ Plastic/ Styrofoam
- ☐ Landscape Materials
- ☑ Toxic/ Hazardous Materials
- ☑ Personal Effects
- ☑ Paper Products/ Biodegradable
- ☑ Aluminum/ metal
- ☑ Glass
- ☐ Sports Equipment
- ☑ Household Items
- ☑ Automotive
- ☐ Biohazardous
- ☑ Other

Notes: Active camps in several areas made surveying difficult / unsafe

Est. No. of Follow-up Cleanup Events Needed (describe why): 3-5 depending on if we can easily access island, and whether we can borrow vehicle to gather trash from western side of estuary.

Additional Notes:

Appendix A – Trash Visual Survey Worksheet

Trash Visual Survey Worksheet

Parcel No: 1, 2, 3, 4 — Survey Date: 1/6/15
Inspector: DaShiell Dunkell — Survey Start/ End Time: 10:00 / 12:30
Current Weather Condition: sunny, warm
Antecedent Weather Condition: sunny, cool

Level of Trash Observed:

Refer to Program Monitoring Area Map as necessary. Note any categorical variation in levels of trash observed in different areas of the parcel. If necessary, categorize these areas individually.

KEY: **Category 1** (<10 pcs), **Category 2** (10-100 pcs), **Category 3** (>100 pcs)

	Notes/ Parcel Area:	Category:	Reason(s) for Category Rating:
4-1	county near bridge	2	scattered trash
	Main St Bridge - 2nd span	1	Food & Beer remnants
	main st Bridge - 4th span	2	Large pile of clothes + trash
3-1	willoughby near bridge	1	scattered food & drink containers
	101 Bridge - every span	3	clothes, trash, spray cans etc
2-1	St. Parks Cuccinello	2	remnants of old camp
2-2	St. Parks - Trash pile/old camp	3	Large old trash pile
2-3	St. Parks - Island trail	2	scattered trash

(next page continued →)

Types of Trash Observed (check all that apply):

- ✓ Plastic/ Styrofoam
- ✓ Landscape Materials
- ✓ Toxic/ Hazardous Materials
- ✓ Personal Effects
- ✓ Paper Products/Biodegradable
- ✓ Aluminum/ Metal
- ✓ Glass
- ✓ Sports Equipment
- ✓ Household Items
- ✓ Automotive
- ✓ Biohazardous
- ✓ Other

Notes: VPD officers accompanied inspector to Island, and city properties near beach to serve notices on camps and to survey trash

Est. No. of Follow-up Cleanup Events Needed (describe why): 5-6. Logistics of cleanup events get much more difficult as they move to areas such as "the Island", the West Estuary, and on the beach.

Additional Notes: Better access is needed in many areas of State Parks as well as city property near Bike trail. Properties in Northern part of TMDL area with exception of under 101 bridge.

notes/Parcel Area	category	Reason(s) for category rating
2-4 State Parks - Island	3+	very large established camp (generator, stove, etc)
2-5 State Parks - Island	3+	Large, established, spread out camp (solar panels)
2-6 State Parks - Island	2	trash pile on Island
2-7 State Parks - Island	2	Abandoned camp
2-8 State Parks - Island	3	Large trash pile on Island
2-9 State Parks - Fan Palm	2	Trash pile / former camp under palm
2-10 State Parks - near trestle	2	Random / scattered trash near trestle
1-1 City - near trestle	2	Trash pile
1-2 City - near bike path	3	Large old trash pile
1-3 City - near bike path	3+	Large new encampment - Agenda?
1-4 City - on beach	2	Small camp
1-5 City - on beach	3	Large camp w/ trash pile
2-11 St. Parks - below beach	3	Large trash pile
2-12 St Parks - tule reeds	3+	very large trash pile
2-13 St Parks - west Estuary	3	Abandoned camp + trash pile
2-14 St Parks - Burned camp	2	Abandoned, half-burned camp
2-15 St Parks - near West 101B	2	Old, small camp near 101 Bridge

Appendix A – Trash Visual Survey Worksheet

Trash Visual Survey Worksheet

Parcel No.: 1, 2, 3, 4 — Survey Date: 2/15/15

Inspector: Dashiell Dunkell — Survey Start/ End Time: 2:00pm/ 5:00pm

Current Weather Condition: sunny, cool

Antecedent Weather Condition: cloudy, dry

Level of Trash Observed:

Refer to Program Monitoring Area Map as necessary. Note any categorical variation in levels of trash observed in different areas of the parcel. If necessary, categorize these areas individually.

KEY: Category 1 (<10 pcs), Category 2 (10-100 pcs), Category 3 (>100 pcs)

Notes/ Parcel Area:	Category:	Reason(s) for Category Rating:
(1) Main St Bridge	2	Spread out trash from illegal camp
(2) Main St Bridge	1	Incidental trash under bridge
(3) 101 Bridge	2	lots of spray cans / beer cans
(4) 101 Bridge	3	large trash pile from illegal camp
(5) Island Bridge	2	small amount near base of Island
(6) City property	3	large illegal camp/trash piles
(7) City property	3	very large illegal camp/trash piles
(8) City Beach	3	large illegal camp
(9) Trail on State Parks	3	large trash pile
(10) West State Parks	3	abandoned camp
(11) West State Parks	2	trash pile
(12) West State Parks	2	abandoned camp

continued on reverse →

Types of Trash Observed (check all that apply):

Plastic/ Styrofoam ✓	Paper Products/Biodegradable ✓	Household Items ✓
Landscape Materials	Aluminum/ Metal ✓	Automotive ✓
Toxic/ Hazardous Materials ✓	Glass ✓	Biohazardous ✓
Personal Effects ✓	Sports Equipment ✓	Other ✓

Notes: The worst camps and associated trash areas seem to be on city property south of the trash Trestle

Est. No. of Follow-up Cleanup Events Needed (describe why): 3-5. Though trash levels are still fairly low, compared to previous years. The trash is now mostly in harder to access areas. Clearing access for trash removal will be important step in process.

Additional Notes: City of Ventura has been responsive to our concerns, and hopefully will be taking a hand in helping clean up their property in Parcel #1

	Parcel Area	Category	Reason
(13)	101 Bridge	3	large amounts of trash
(14)	101 Bridge	2	small camp
(15)	RV Park	1	random trash

Legend

- Parcels
- Ventura River Trash TMDL Subwatershed
- TMDL Defined Estuary
- Adjacent Properties

N

1 inch = 350 feet

0 190 380 760

Ventura River Trash TMDL Estuary Subwatersh

Appendix A – Trash Visual Survey Worksheet

Trash Visual Survey Worksheet

Parcel No.: 1 + 2 Survey Date: 3-9-15

Inspector: DERIK POURNEY Survey Start/ End Time: 10A / 12P

Current Weather Condition: SUNNY

Antecedent Weather Condition: SUNNY

Level of Trash Observed:

Refer to Program Monitoring Area Map as necessary. Note any categorical variation in levels of trash observed in different areas of the parcel. If necessary, categorize these areas individually.

KEY: Category 1 (<10 pcs), Category 2 (10-100 pcs), Category 3 (>100 pcs)

Notes/ Parcel Area:	Category:	Reason(s) for Category Rating:
1	3	3 BIG FORMER CAMPS
2	2	RANDOM TRASH UNDER BRIDGE (10)

Types of Trash Observed (check all that apply):

✓ Plastic/ Styrofoam	✓ Paper Products/Biodegradable	Household Items
Landscape Materials	Aluminum/ Metal	Automotive
Toxic/ Hazardous Materials	✓ Glass	Biohazardous
✓ Personal Effects	Sports Equipment	Other

Notes: FORMER CAMP - MISC TRASH

Est. No. of Follow-up Cleanup Events Needed (describe why): 1 - TAKE AN HOUR TO CLEAN UP NEXT SATURDAY

Additional Notes:

Appendix A – Trash Visual Survey Worksheet

Trash Visual Survey Worksheet

Parcel No.: 1, 2, 3, 4 Survey Date: 4/15/15
Inspector: Derek Poultney Survey Start/ End Time: 10:39 / 1:15pm
Current Weather Condition: sunny, dry
Antecedent Weather Condition: sunny

Level of Trash Observed:

Refer to Program Monitoring Area Map as necessary. Note any categorical variation in levels of trash observed in different areas of the parcel. If necessary, categorize these areas individually.

KEY: **Category 1** (<10 pcs), **Category 2** (10-100 pcs), **Category 3** (>100 pcs)

Notes/ Parcel Area:	Category:	Reason(s) for Category Rating:
1-trash under bridge	2	Scattered homeless trash
2- Beer bottles	1	Trash from party
3- Graffiti trash	2	Paint cans + rollers
4- spray cans + beer cans	2	Graffiti + beers
5- old clothes under bridge	1	Clothes
6- clothes + trash near island	1	small pile
7- Abandoned camp	3	lots of trash/personal items
8- Abandoned camps	3	several interconnected trash piles
9- very large trash pile	3	more empty camps
10- off beach camp	2	scattered camp trash
11- on trail trash pile	3	very large trash pile
12- old camp in willows	3	lots of scattered trash

Types of Trash Observed (check all that apply):

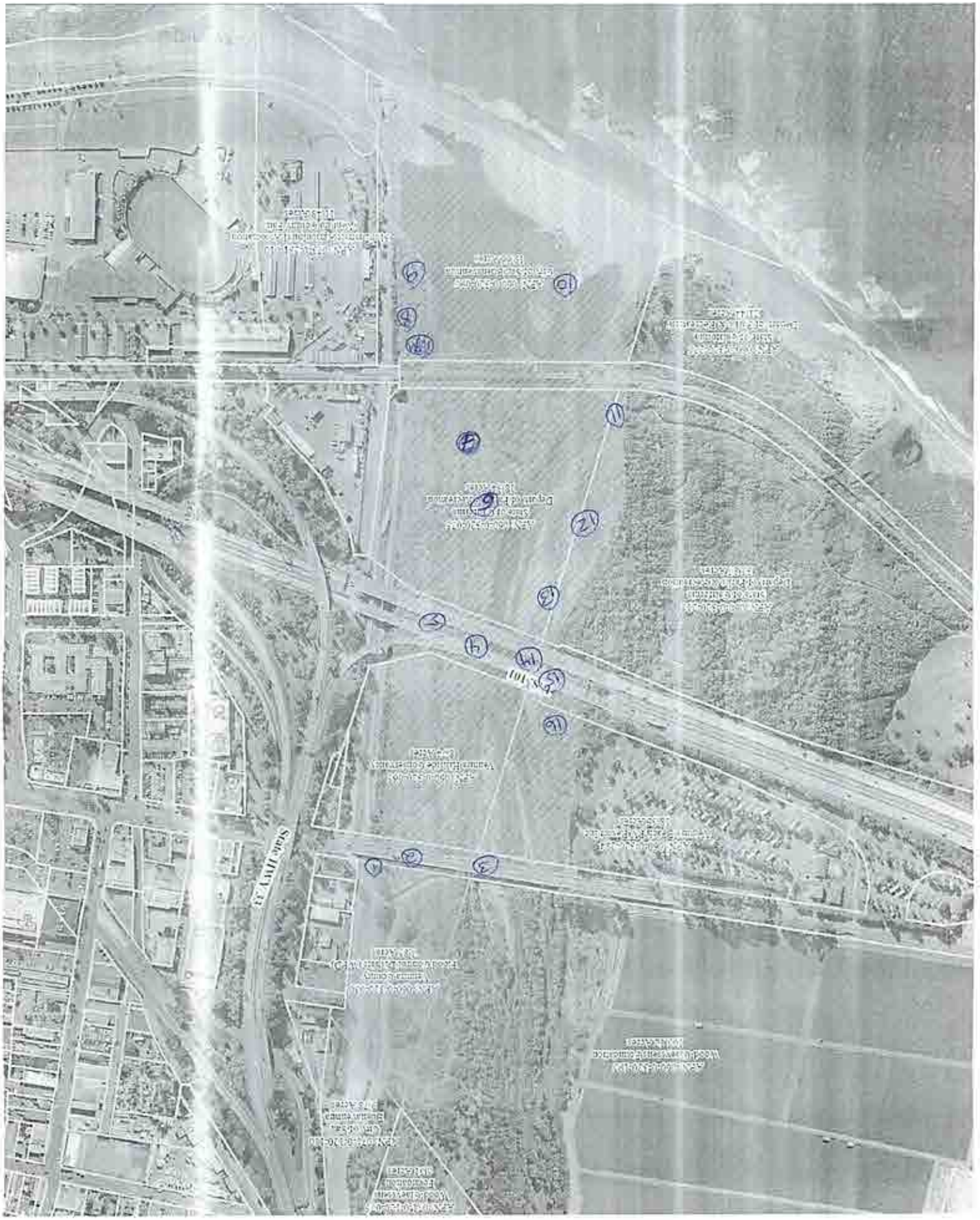
- ✓Plastic/ Styrofoam
- ✓Landscape Materials
- ✓Toxic/ Hazardous Materials
- ✓Personal Effects
- ✓Paper Products/Biodegradable
- ✓Aluminum/ Metal
- ✓Glass
- ✓Sports Equipment
- ✓Household Items
- ✓Automotive
- ✓Biohazardous
- ✓Other

Notes: The Island was inaccesible due to high water in estuary, though there was some evidence of illegal access by makeshift boat

Est. No. of Follow-up Cleanup Events Needed (describe why): 4-6 events due to large encampments on city (parcel 1) and state (parcel 2) properties. Also trash on west edge of estuary is much harder logistically to clean up.

Additional Notes: Parcel 1: 5% cat 3, 15% cat 2, 5% cat 1, 85% clean
Parcel 2: 5% cat 3, 5% cat 2, 10% cat 1, 80% clean
Parcel 3: 0% cat 3, 2% cat 2, 3% cat 1, 95% clean
Parcel 4: 0% cat 3, 1% cat 2, 1% cat 1, 98% clean

Notes/Parcel Area	Category	Reasons
13 - South of 101 bridge	2	small camp with tent
14 - under 101	3	lots of trash piles
15 - under 101 west	2	paint cans + trash
16 - Near RV Park	2	small trash pile


State Hwy 23

Appendix A – Trash Visual Survey Worksheet

Trash Visual Survey Worksheet

Parcel No.: 2,3,4 Survey Date: 5-12-15

Inspector: Dashiell Dunkell Survey Start/ End Time: 3:30 /5:15

Current Weather Condition: warm, breezy

Antecedent Weather Condition: warm, breezy

Level of Trash Observed:

Refer to Program Monitoring Area Map as necessary. Note any categorical variation in levels of trash observed in different areas of the parcel. If necessary, categorize these areas individually.

KEY: Category 1 (<10 pcs), **Category 2** (10-100 pcs), **Category 3** (>100 pcs)

Notes/ Parcel Area:	Category:	Reason(s) for Category Rating:
2	3	non-camp related trash dump
3	1	minimal trash only around the Main St. & HWY 101 bridges
4	1	less than 10 pieces randomly dispersed throughout drainage ditch

Types of Trash Observed (check all that apply):

- X Plastic/ Styrofoam
- Landscape Materials
- Toxic/ Hazardous Materials
- X Personal Effects
- X Paper Products/Biodegradable
- X Aluminum/ Metal
- Glass
- Sports Equipment
- X Household Items
- Automotive
- Biohazardous
- Other

Notes: Mostly discarded clothes and food trash/bottles, bags, wrappers, etc.

Est. No. of Follow-up Cleanup Events Needed (describe why): 1

Additional Notes:

Appendix A – Trash Visual Survey Worksheet

Trash Visual Survey Worksheet

Parcel No.: 3,4 Survey Date: 6-16-15

Inspector: Dashiell Dunkell Survey Start/ End Time: 10:45 11:45

Current Weather Condition: warm, breezy

Antecedent Weather Condition: warm, breezy

Level of Trash Observed:

Refer to Program Monitoring Area Map as necessary. Note any categorical variation in levels of trash observed in different areas of the parcel. If necessary, categorize these areas individually.

KEY: Category 1 (<10 pcs), **Category 2** (10-100 pcs), **Category 3** (>100 pcs)

Notes/ Parcel Area:	Category:	Reason(s) for Category Rating:
3	1	minimal trash only under HWY 101
4	1	minimal trash in drainage ditch

Types of Trash Observed (check all that apply):

X Plastic/ Styrofoam	X Paper Products/Biodegradable	Household Items
Landscape Materials	Aluminum/ Metal	Automotive
Toxic/ Hazardous Materials	Glass	Biohazardous
Personal Effects	Sports Equipment	Other

Notes:

Est. No. of Follow-up Cleanup Events Needed (describe why): 1-- can be done quickly at the beginning of next cleanup (half-hour)

Additional Notes:

Appendix A – Trash Visual Survey Worksheet

Trash Visual Survey Worksheet

Parcel No.: 3 Survey Date: 7-1-15

Inspector: Dashiell Dunkell Survey Start/ End Time: 8:35 /9:05

Current Weather Condition: cool, breezy

Antecedent Weather Condition: cool, breezy

Level of Trash Observed:

Refer to Program Monitoring Area Map as necessary. Note any categorical variation in levels of trash observed in different areas of the parcel. If necessary, categorize these areas individually.

KEY: Category 1 (<10 pcs), **Category 2** (10-100 pcs), **Category 3** (>100 pcs)

Notes/ Parcel Area:	Category:	Reason(s) for Category Rating:
3	1	few pieces of trash under Main St. bridge

Types of Trash Observed (check all that apply):

X Plastic/ Styrofoam	X Paper Products/Biodegradable	Household Items
Landscape Materials	Aluminum/ Metal	Automotive
Toxic/ Hazardous Materials	X Glass	Biohazardous
Personal Effects	Sports Equipment	Other

Notes: _____

Est. No. of Follow-up Cleanup Events Needed (describe why): easy pick up at beginning of next clean up

Additional Notes: _____

Appendix A – Trash Visual Survey Worksheet

Trash Visual Survey Worksheet

Parcel No.: 2 Survey Date: 8-5-15

Inspector: Dashiell Dunkell Survey Start/ End Time: 2:15 /3:30

Current Weather Condition: hot

Antecedent Weather Condition: hot

Level of Trash Observed:

Refer to Program Monitoring Area Map as necessary. Note any categorical variation in levels of trash observed in different areas of the parcel. If necessary, categorize these areas individually.

KEY: Category 1 (<10 pcs), **Category 2** (10-100 pcs), **Category 3** (>100 pcs)

Notes/ Parcel Area:	Category:	Reason(s) for Category Rating:
2	3	several new areas of active camp trash on island and on west side of river

Types of Trash Observed (check all that apply):

- X Plastic/ Styrofoam
- Landscape Materials
- Toxic/ Hazardous Materials
- X Personal Effects
- X Paper Products/Biodegradable
- X Aluminum/ Metal
- X Glass
- Sports Equipment
- X Household Items
- X Automotive
- X Biohazardous
- Other

Notes:

Est. No. of Follow-up Cleanup Events Needed (describe why): 2-4 depending on how much State Parks is able to clean up in between our monthly clean-ups -- island clean up scheduled August 15

Additional Notes:

Appendix A – Trash Visual Survey Worksheet

Trash Visual Survey Worksheet

Parcel No.: 1, 2, 3, 4 Survey Date: 8/20/15

Inspector: Fleming Bertelsen Survey Start/ End Time: 1400 1700

Current Weather Condition: Clear 85°

Antecedent Weather Condition: Clear

Level of Trash Observed:

Refer to Program Monitoring Area Map as necessary. Note any categorical variation in levels of trash observed in different areas of the parcel. If necessary, categorize these areas individually.

KEY: Category 1 (<10 pcs), Category 2 (10-100 pcs), Category 3 (>100 pcs)

Notes/ Parcel Area:	Category:	Reason(s) for Category Rating:
1 Trash under bridge	1	Scattered Trash
2 Abandoned Camp	3	Personal Items, trash piles
3 Abandoned Personal items	2	Personal Items
4 Old camp items	2	clothes, bedding
5 Trash pile	3	scattered camp trash
6 Old Camp	3	interconnected trash piles
7 beer cans	1	trash from gatherings
8 graffiti	1	paint cans
9 abandoned items	3	personal belongings
10 active camp	3	Tents, bedding, Tarps
11 active camp	2	Tarped shelters
12 old camp	3	large amounts of trash

Types of Trash Observed (check all that apply):

- ✓ Plastic/ Styrofoam
- ✓ Landscape Materials
- ✓ Toxic/ Hazardous Materials
- ✓ Personal Effects
- ✓ Paper Products/Biodegradable
- ✓ Aluminum/ Metal
- ✓ Glass
- ✓ Sports Equipment
- ✓ Household Items
- ✓ Automotive
- ✓ Biohazardous
- Other

Notes: Under Pass of Hwy 101 (N side) developed into camp sites, Elaborate Bamboo/tarp walls & enclosures built

Est. No. of Follow-up Cleanup Events Needed (describe why): Regularly scheduled cleanups needed

Additional Notes: Made contact w roughly 20 vagrants and instructed them to remove their trash and belongings from the area and that there will be a large-scale clean up event this Sat.

Appendix 2

Clean Up Photos

October 18, 2014

November 15, 2014

November 15, 2014

November 15, 2014

November 15, 2014

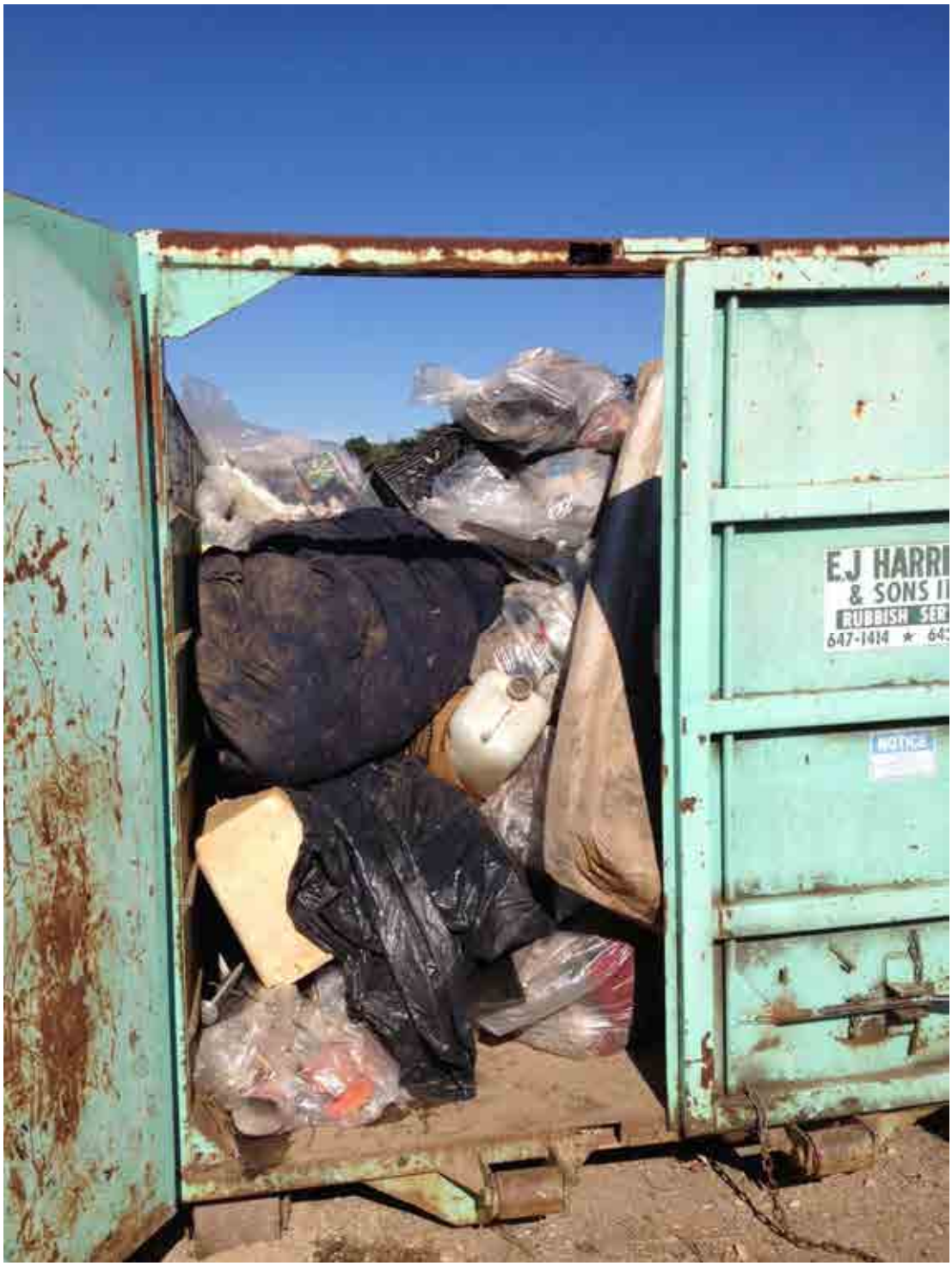
November 15, 2014

December 20, 2014

December 20, 2014

January 19, 2015

January 19, 2015



January 19, 2015

February 21, 2015

February 21, 2015

March 25, 2015

May 13, 2015

May 13, 2015

May 13, 2015

May 13, 2015

May 13, 2015

June 20, 2015

July 18, 2015

July 18, 2015

July 18, 2015

August 1, 2015

August 15, 2015

August 15, 2015

August 15, 2015

August 15, 2015

Prepared for

County of Ventura
800 South Victoria Avenue
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MCW Source ID Study
REPORT

Prepared by

Geosyntec consultants

924 Anacapa Street, Suite 4A
Santa Barbara, CA 93101

Project Number LA0343

November 30, 2015

Geosyntec consultants

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Appendix D: Human Marker Data
Appendix E: Continuous Flow Monitoring
Appendix F: CCTV Results

1. INTRODUCTION

The County of Ventura (County) and Geosyntec Consultants conducted a follow-up dry weather bacterial source identification study (Follow-up Study) in the Upper Medea Creek and Upper Lindero Creek drainage areas of the Malibu Creek Watershed (MCW). This Follow-up Study was performed based on the recommendations (summarized in section 1.2) of The Upper MCW Dry Weather Source Identification Study (2013 Study), performed by the County in 2013 (Ventura County Watershed Protection District (VCWPD), 2014). The goals of this Follow-up Study and 2013 Study were to identify dry weather sources of flow and fecal bacteria within the unincorporated area of upper MCW in response to elevated bacteria results at Total Maximum Daily Load (TMDL) monitoring locations (LARWQCB, 2004).

This report summarizes the results and conclusions of the Follow–up Study, and provides recommendations for the County based on these results. The information on sources of flow and bacteria will help guide management actions, such as selection of bacteria source control measures and Best Management Practices (BMPs), selection of priority areas for bacteria source controls and BMPs and additional research.

1.1 Study Area

The Upper Medea Creek and Upper Lindero Creek subwatersheds are within the MCW, which is located approximately 35 miles west of Los Angeles. The 109 square mile watershed (Figure 1) drains areas of both Los Angeles and Ventura Counties into the Malibu Lagoon and ultimately into the Santa Monica Bay. The MCW can be divided into eight subwatersheds, five of which are fully or partially contained within the unincorporated areas of Ventura County. Of these five, only the Upper Lindero Creek and Upper Medea Creek subwatersheds contain developed areas with substantial County-owned municipal separate storm sewer systems (MS4s). Receiving water quality in these two drainages is being characterized under the MCW TMDL Compliance Monitoring Plan through sampling at sites MCW-14B and MCW-12, which are located downstream of County areas (Figure 2). Land use within these subwatersheds is predominantly comprised of single family and multi-family residential with some commercial areas.

1.2 Summary of 2013 Dry Weather Source Identification Study

The 2013 Study had the following objectives:

1. Identify sub-drainages in the Upper Medea and Lindero Creek subwatersheds contributing the highest loads of *E. coli*,

2. Identify anthropogenic inputs of fecal bacteria and nutrients
3. Estimate relative contributions of natural vs. anthropogenic sources of fecal pollution

The results of the 2013 Study showed that bacterial concentrations in the Medea Creek subwatershed were highest at outfalls M02, M05 and M08, which flow to receiving water compliance monitoring location MCW-12. Bacterial concentrations were also found to be elevated at outfall L03 in the Lindero Creek subwatershed, which drains nearly all of the County area in the Lindero Creek subwatershed and flows to receiving water compliance monitoring location MCW-14B. The overall conclusions of the 2013 Study were:

- Non-MS4 sources (i.e. birds) are contributing *E. coli* to receiving waters
- Human sources are contributing fecal bacteria to the MS4[1]

Recommendations based on the results of the 2013 Study were:

- Due to the potential presence of human fecal contamination, a natural source exclusion request cannot be supported in these two subwatersheds at this time
- More comprehensive monitoring and/or special studies are needed to link *E. coli* in urban outfalls with *E. coli* exceedances in receiving waters, and to determine compliance with water quality objectives (WQOs)
- Better estimates of diurnal flow patterns and average flows are needed to assist with BMP selection to meet TMDL objectives at selected outfalls

Based on these recommendations and in response to public comments received, it was determined that further study was required to quantify MS4 flows and *E. coli* concentrations in MS4 discharges during dry weather.

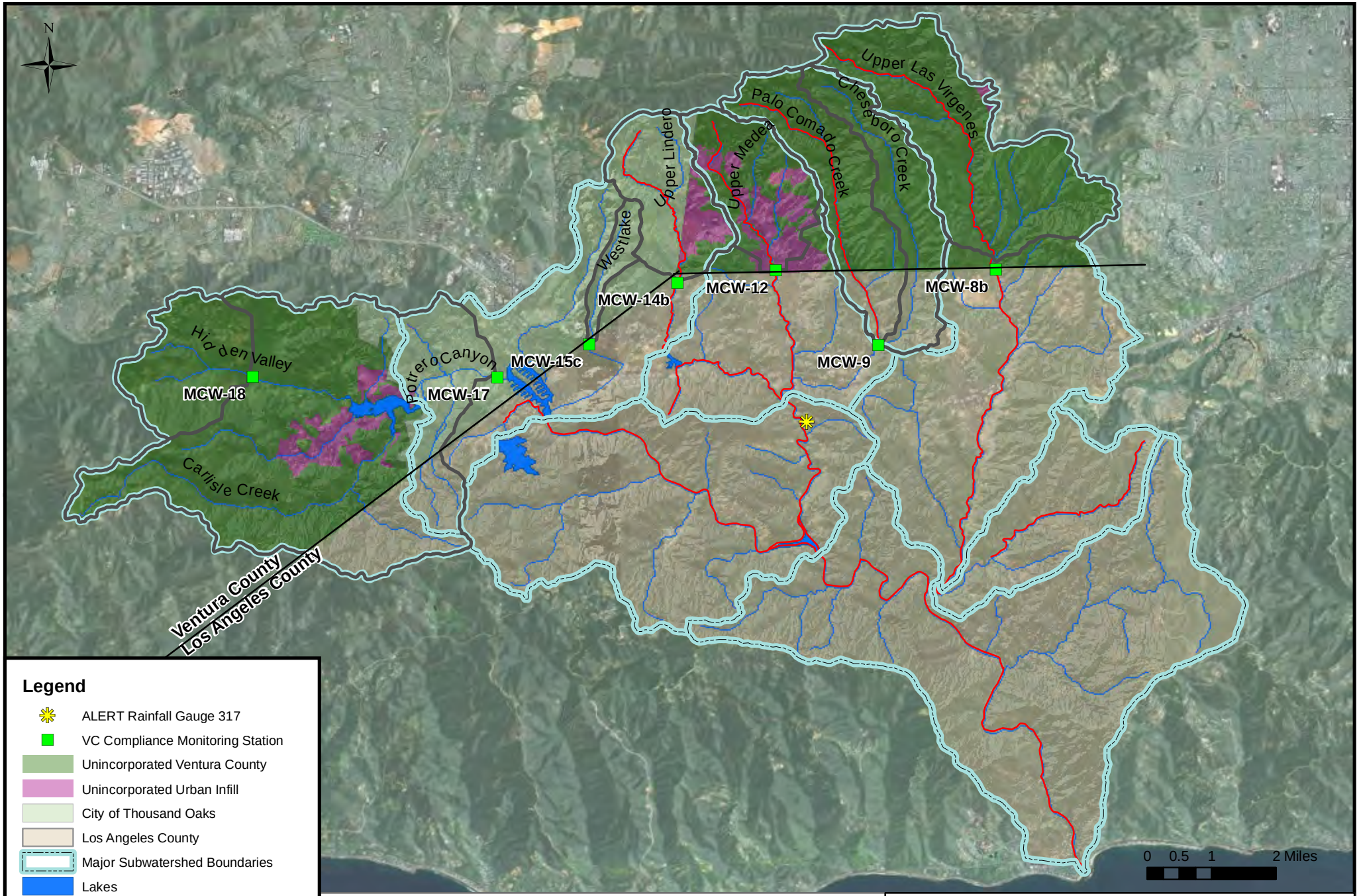
1.3 Follow-up Study Approach

Based on the findings of the 2013 Study and to fulfill the previously mentioned goal of identifying dry weather sources of flow and fecal bacteria, a work plan was developed and adhered to for the Follow-up Study (Appendix A). The work plan followed a tiered approach to microbial source tracking, as recommended in the California Microbial Source Identification Manual (SCCWRP, 2013). This approach included initial field

[1] Results from the Follow-Up Study provide additional information and interpretation of this conclusion.

surveys of outfalls to inform sample site selection, followed by field sampling and analyses, using bacterial indicators first then more expensive host-specific methods as potential source locations were identified, and continuous flow monitoring to identify dry weather flow patterns.

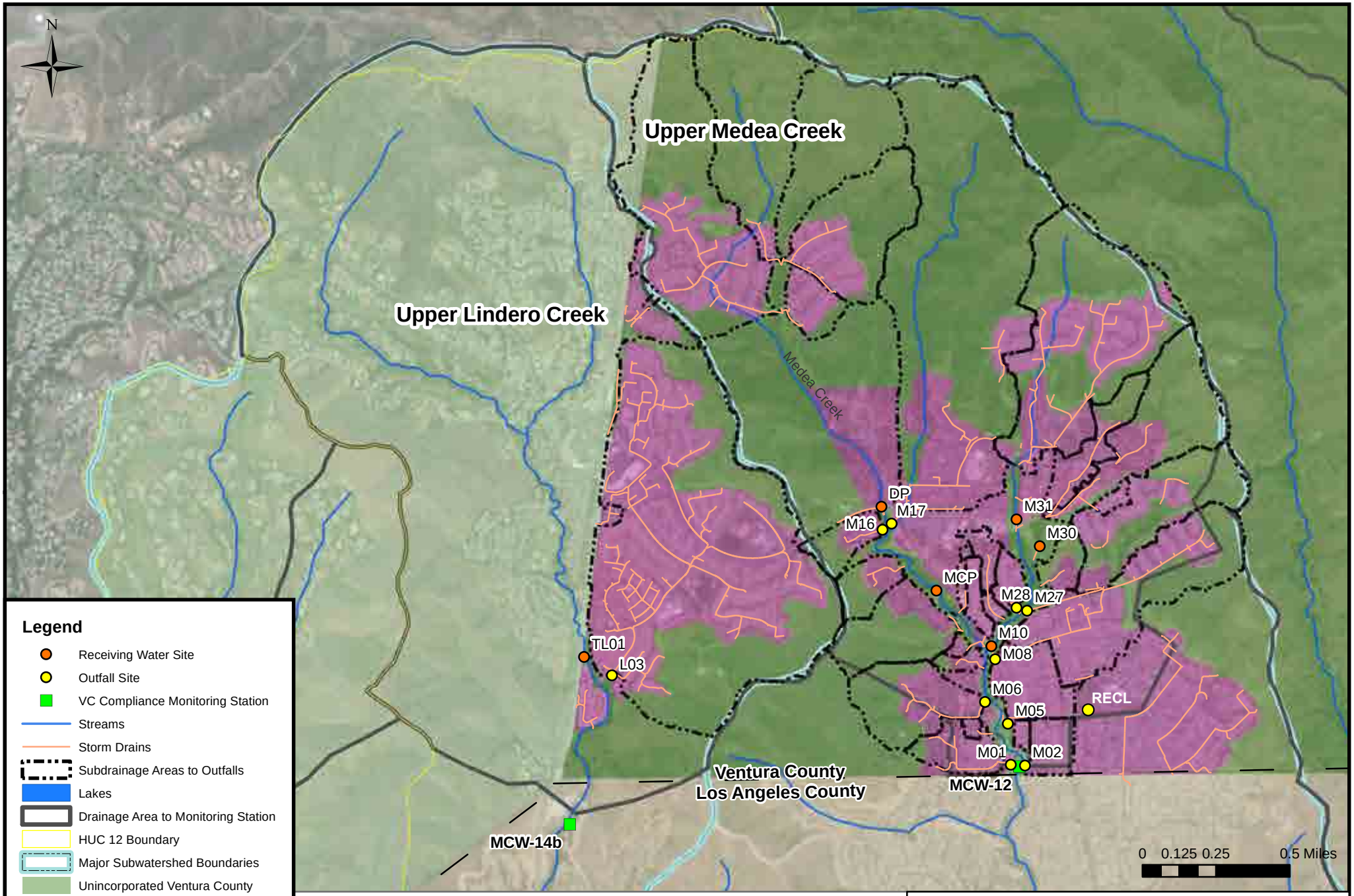
In addition to the steps outlined in the work plan, additional investigations of prioritized MS4 networks were completed using above ground visual flow tracking and closed-circuit television (CCTV) to locate potential illicit connections and track other sources of dry weather flows to the County MS4 network.



MCW Source ID Study
County of Ventura

Figure 1. Malibu Creek Watershed Major Subwatershed Delineations

Data Sources: County of Ventura, SWRCB, ESRI



MCW Source ID Study
County of Ventura

Figure 2. Malibu Creek Watershed Sampling and Flow Monitoring Locations

Data Sources: County of Ventura, SWRCB, ESRI

2. STUDY IMPLEMENTATION AND RESULTS

In accordance with the Study Plan, site locations were selected based on flow surveys conducted at 24 outfalls on three dates in May of 2015, as well as previous bacteria and source marker results. Then sampling and field observations were conducted at 18 locations (nine outfalls, eight receiving waters, and reclaimed water) on ten dates in July and August of 2015. The bacteria (*E. coli*) concentrations were measured in all samples and filters were stored for Tier 2 analysis. A subset of the samples were selected from outfall sites and in reclaimed water and analyzed using human-specific DNA markers. Continuous flow monitoring was conducted in all outfalls sampled. To further identify sources of flows to the County MS4, above ground visual flow tracking and CCTV were performed in several of the MS4 networks sampled. The sections below describe in detail the implementation of the study and the results.

2.1 Study Site Locations

A total of 18 sampling locations were identified for investigation in the Follow-up Study (nine outfall locations, eight receiving water locations and one reclaimed water location). These sites are shown in Figure 1 and summarized in Table 1. Sampling locations were selected by conducting flow surveys and reviewing the 2013 Study results.

Table 1. Locations selected for sampling in this study.

Sample ID	Type	Description
MCW-12*	Receiving Water	Receiving water compliance monitoring station
M01	Outfall	Outfall with persistent dry weather flows
M02	Outfall	Outfall with persistent dry weather flows
M05	Outfall	Outfall with persistent dry weather flows
M08	Outfall	Outfall with persistent dry weather flows
M10	Receiving Water	Flow from east branch of Medea Creek
M14B	Receiving Water	Flow from west branch of Medea Creek
M14C	Outfall	Newly identified outfall
M17	Outfall	Outfall with persistent dry weather flows
M27	Outfall	Outfall with persistent dry weather flows
M28	Outfall	Outfall with persistent dry weather flows
M30	Receiving Water	Upstream flow to Medea Creek
M31	Receiving Water	Upstream flow to Medea Creek
DP	Receiving Water	Duck pond
MCW-14B	Receiving Water	Receiving water compliance monitoring station
TL01	Receiving Water	Upstream flow from the City of Thousand Oaks
L03	Outfall	Outfall with persistent dry weather flows
RECL	Reclaimed Water	Reclaimed water from pump house at Mae Boyar Park
*Study sampling site was located upstream of the compliance station.		

Flow surveys of 24 outfalls in the Medea Creek subwatershed were conducted on three dates in May of 2015 to determine where persistent dry weather MS4 flows were occurring. The results of these flow surveys are shown in Table 2, along with the results from a survey of many of the same outfalls conducted in the 2013 Study. All sites that were flowing (not including sites noted as trickling) during the previous flow survey, were also flowing on at least one date during the follow-up flow survey. All outfalls found to be flowing in the follow-up flow surveys were considered for sampling as they could be a source of bacteria to receiving waters and the downstream compliance monitoring stations.

Table 2. Medea Creek subwatershed outfall flow survey findings.

Outfall ID	5/14/15	5/18/15	5/21/15	2013
M01	**Yes**	**Yes**	**Yes**	**Yes**
M02	No (wet)	**Yes**	**Yes**	**Yes**
M03	No (wet)	No (wet)	No (wet)	Trickle
M04	No	No (wet)	No	No
M05	**Yes**	**Yes**	**Yes**	**Yes**
M06	No	No	No	No
M07	-	No	No	No
M08	**Yes**	**Yes**	**Yes**	**Yes**
M09	No	No (wet)	No (wet)	Trickle
M11	**Yes**	**Yes**	**Yes**	**Yes**
M11B	**Yes**	**Yes**	**Yes**	-
M12	No (wet)	No (wet)	No (wet)	No
M13	No	No	No (wet)	No
M14	No	No	No	No
M15	-	No (wet)	No (wet)	No
M15B	No (wet)	No (wet)	No (wet)	-
M16	No (wet)	No	No (wet)	Trickle
M17	No (wet)	No (wet)	**Yes**	**Yes**
M26	No (wet)	No (wet)	No (wet)	-
M27	**Yes**	**Yes**	**Yes**	**Yes**
M28	**Yes**	**Yes**	**Yes**	**Yes**
M34	**Yes**	No	No (wet)	No
"-" = Survey was not conducted for this date at this site.				

In addition to the flow survey data, which showed where sufficient flows were present to allow sampling in 2015, results for bacteria and source specific markers from the 2013 Study (Table 3) were also considered in the selection of sampling locations. MS4 outfalls in which high concentrations of *E. coli* and/or human marker detections were previously found were given the highest priority when selecting sampling locations for this study. All of the Upper Medea Creek subwatershed outfall and receiving water sites that were

sampled and analyzed for bacteria and source specific markers in the 2013 Study were also selected for sampling in the Follow-up Study. For the Upper Lindero Creek subwatershed, only sites within the County unincorporated area were selected for sampling.

Table 3. Summary of bacteria and source marker results from the 2013 Study.

Sample ID	Type	High *E. coli*?[a]	Human Marker Detected?	Non-human Markers Detected?[b]
MCW-12*	Receiving Water	No	No	Bird
M01	Outfall	**Yes**	No	No
M02	Outfall	**Yes**	**Yes**	Dog
M05	Outfall	**Yes**	**Yes**	No
M08	Outfall	**Yes**	No	No
M10	Receiving Water	No	-	Bird
M30	Outfall	No	-	-
M31	Outfall	No	-	-
DP	Receiving Water	**Yes**	No	Bird and Dog
MCW-14B	Receiving Water	No	No	Bird
L03	Outfall	**Yes**	No	Dog
TL01	Receiving Water	**Yes**	No	Bird and Dog
RECL	Reclaimed Water	No	No	Bird

a. Based on a median value of greater than 235 MPN/100mL
b. Bird and dog markers were analyzed on a subset of samples
"-" = Sample was not analyzed
*Study sampling site was located upstream of the compliance station.

2.1.1 Outfall Locations

Based on the flow survey results (Table 2), ten outfalls in the Upper Medea Creek subwatershed were identified for potential sampling in this study (i.e., flowing on at least one of the survey dates in 2015). Four of these outfalls (M01, M02, M05 and M08) were also sampled in the 2013 Study and had high *E. coli* concentrations and/or human markers detected (Table 3). Based on this, these four outfalls were selected as the highest priority for sampling in this study. Outfalls M17, M27 and M28 were not sampled in the 2013 Study, but were selected for sampling in this study due to persistent dry weather flows observed. Although not included in the flow surveys, one additional outfall site (M14C) was also selected for sampling based on field reconnaissance data indicating persistent dry weather flows. This outfall was identified during field reconnaissance conducted after flow surveys had been completed. Outfalls M11, M11B, and M34 were not selected for sampling due to flows that were too low to collect the required volume for bacterial and source-specific marker analysis. In the Upper Lindero Creek subwatershed, outfall L03 was selected for sampling based on persistent dry weather flows observed in both 2013

and 2015, as well as elevated bacteria concentrations found in the 2013 Study. No manhole sites were sampled in this study. In total nine outfalls were selected for sampling in this study (Table 1). Outfall sampling locations are shown in Figure 2.

2.1.2 Receiving Water Locations

To monitor instream bacteria concentrations, receiving water sampling locations were also identified. Six receiving water sites were selected for sampling in the Upper Medea Creek subwatershed and two receiving water sites were selected in the Upper Lindero Creek subwatershed (Table 1). In addition to the two downstream compliance monitoring stations (MCW-12 and MCW-14B), receiving water locations were selected to determine if receiving waters were conveying bacteria from upstream outfalls (M10 and M14B) and to quantify bacteria concentrations coming from upstream receiving waters (DP, M30, M31 and TL01). As noted in Table 1, receiving water location MCW-12 was moved slightly upstream from the compliance monitoring station. This move was made because flow was not consistently present at this location during sampling, whereas sufficient trickling flow for sample collection was present just upstream (<100 feet). No sources of flow were present between where location MCW-12 was sampled and the compliance monitoring station. Receiving water sampling locations are shown in Figure 2. Locations M06 and M16 were not sampling locations, but are included in Figure 2 as continuous flow monitoring control sites (discussed in section 2.5).

2.1.3 Reclaimed Water Location

Reclaimed water from the Tapia Water Reclamation Facility is used for irrigation throughout the Upper Medea and Lindero Creek subwatersheds. A reclaimed water sampling location was selected because irrigation runoff from reclaimed water is an ongoing potential source of dry weather flow to the County's MS4, and unlike potable water, reclaimed water has the potential to contain human DNA markers, thus potentially causing misleading human marker results in discharge or receiving water samples containing reclaimed water runoff. Reclaimed water samples were collected from the distribution system at a pumping facility located in Mae Boyar Park (Figure 2). This sampling location allowed for convenient access to the reclaimed water system, while also being representative of the water just prior to being used for irrigation in the Upper Medea Creek subwatershed.

2.2 Field Sampling and Flow Observations

Sampling was conducted at 18 locations (Table 1) on ten dry weather (<0.1" rain in the previous 72 hours)[2] dates in July and August of 2015. Sample collection was timed to occur in the morning on allowed irrigation days (Mondays and Thursdays) to capture the highest potential flow rates. Preliminary flow data from leveloggers installed at M01, M05 and M10 (described in Section 2.5) were also analyzed to assist with determining optimal sampling times. During sample collection, field observations were noted at each site including weather and site conditions, estimated flow, and flow characteristics (e.g., color, odor). A summary of field sampling observations is included in Appendix B.

Flow was surveyed at 24 outfalls during each sampling event (Table 2). Flow observations from the outfalls sampled in the Upper Medea Creek subwatershed are shown spatially in Figure 3. Flow rates were estimated during sampling by measuring the depth, width, and velocity of the flowing water. Because flow rates were too low to use a velocity probe, velocity was estimated by recording the time it took a floating object, such as a small leaf, to travel a known distance. Results from this estimation of flow rate are shown in Table 4 and Table 5. Outfalls M01, M02, M05, M08 and L03 were all trickling or flowing on all ten sampling days and estimated flow rates were calculated. The estimated flow rate was highest at outfall L03, which drains the largest MS4 network in either subwatershed. Outfall M08 had the highest estimated flow rate in the Upper Medea Creek subwatershed. Flow at other surveyed outfalls was not estimated due to low flow rates. Level loggers were installed at all outfalls that were sampled, as well as outfalls M06 and M16 to further investigate flow patterns (see section 2.5).

Flow observations were also made and flow rates were estimated at the eight receiving water locations during each sampling event (Table 5). All locations except the duck pond (DP) were flowing or trickling on most sampling days. Samples were collected from ponded areas on days when sufficient flow could not be collected from flowing or trickling water at each site. The median estimated flow rate was highest at M31 in the Medea Creek subwatershed and at MCW-14B in the Lindero Creek subwatershed. Flow rates at the compliance monitoring stations were lower than that of upstream outfalls in both subwatersheds (outfalls M01 and M08 in Medea and outfall L03 in Lindero),

[2] Due to 0.8" of rainfall on July 19th, 2015, sampling was not performed on Tuesday, July 21st. Sampling was resumed on Thursday, July 22nd, more than 72 hours after this rain event.

showing that flow reduction is occurring in these creeks between the upstream outfalls and the compliance monitoring stations.

Table 4. Outfall flow observations and estimated flow rates (10 visits).

Outfall ID	% Flowing	% Trickling	% Damp / Ponded	% Dry	Median Flow (CFS)	Maximum Flow (CFS)
L03	100	0	0	0	0.31	0.48
M01	80	20	0	0	0.024	0.063
M02	80	20	0	0	0.007	0.045
M03	0	10	60	30	-	-
M04	0	0	0	100	-	-
M05	50	50	0	0	0.006	0.021
M06	0	0	10	90	-	-
M07	0	0	80	20	-	-
M08	100	0	0	0	0.098	0.19
M09	0	60	20	20	-	-
M11	0	0	100	0	-	-
M11B	0	0	90	10	-	-
M12	0	20	10	70	-	-
M13	0	0	0	100	-	-
M14	0	50	0	50	-	-
M14C	0	80	20	0	-	-
M15	0	0	20	80	-	-
M15B	0	0	90	10	-	-
M16	0	0	40	60	-	-
M17	70	10	20	0	-	-
M26	0	0	30	70	-	-
M27	0	0	100	0	-	-
M28	20	70	10	0	-	-
M34	0	0	0	100	-	-

CFS = Cubic feet per second, "-" = Flow was not estimated

Table 5. Receiving water flow observations and estimated flow rates (10 visits).

Location	% Flowing	% Trickling	% Damp / Ponded	% Dry	Median Flow (CFS)	Maximum Flow (CFS)
TL01	30	70	0	0	0.011	0.021
MCW-12*	40	50	10	0	0.014	0.12
M10	40	20	40	0	0.017	0.045
M14B	50	40	10	0	-	-
M30	50	50	0	0	0.024	0.35
M31	80	20	0	0	0.18	0.61
DP	0	0	100	0	-	-
MCW-14B	100	0	0	0	0.18	0.66

CFS = Cubic feet per second, "-" = Flow was not estimated
*Study sampling site was located upstream of the compliance station.

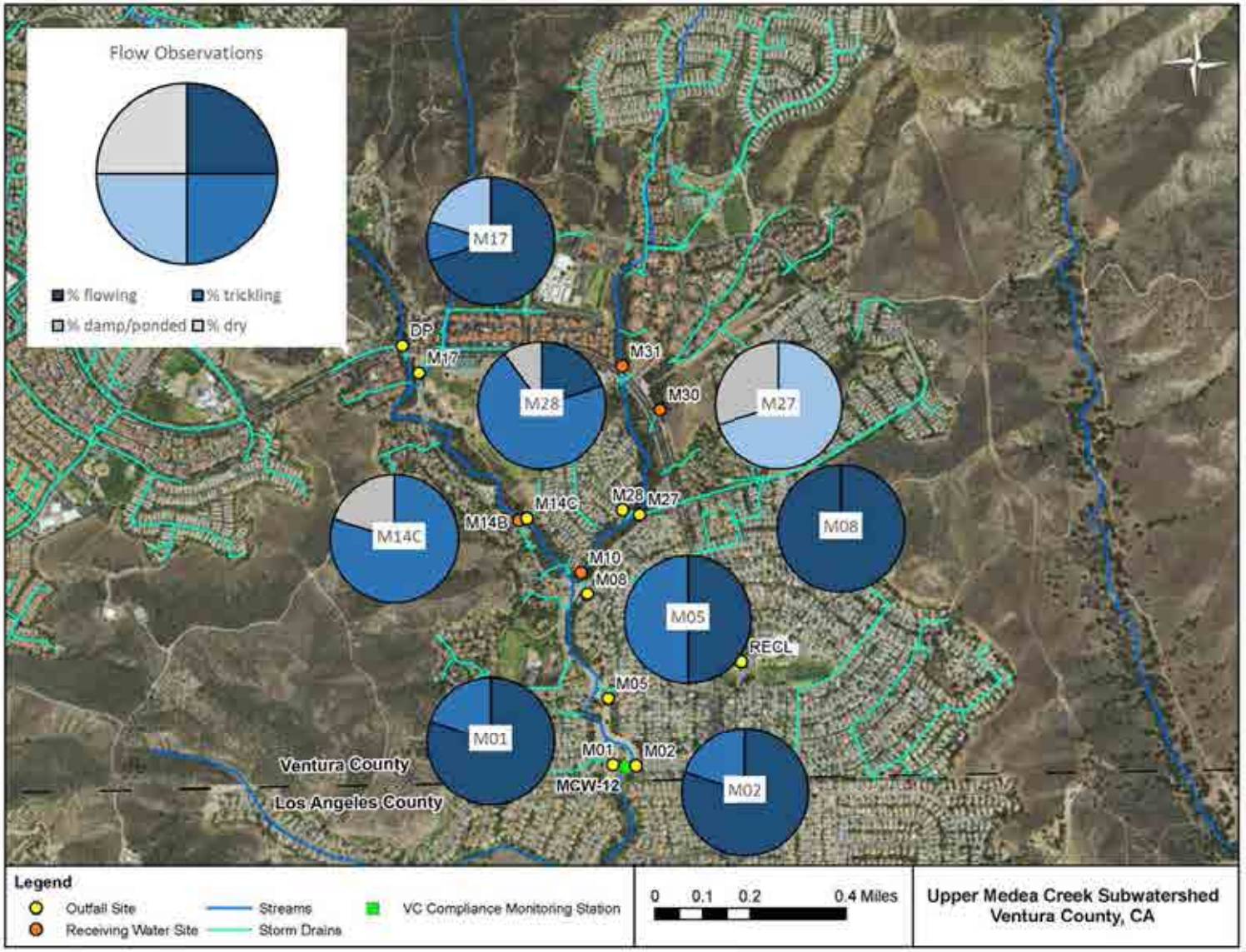


Figure 3. Flow observations at outfalls sampled in the Medea Creek subwatershed.

2.3 Fecal Indicator Bacteria Analysis Results

Fecal indicator bacteria (*E. coli*) were analyzed in samples collected from the 18 locations on ten dates in July and August of 2015. Bacterial results for all samples collected are included in Appendix C. Sample results, as well as the median concentration at each site are shown graphically in Figure 4 relative to the TMDL water quality objective (WQO) for *E. coli* of 235 MPN/100mL.

In the Upper Medea Creek subwatershed, outfalls M02 and M14C were both below the WQO a majority of the time, while all other outfalls sampled were consistently above the WQO (Figure 4 & Figure 5). Outfalls M01, M08, M17 and M28 and the Duck Pond were all above the WQO in all ten samples collected. Outfalls M01 and M08 had the highest median concentrations, with some measurements greater than 100,000 MPN/100mL. These two outfalls also had the highest estimated flow rates in this subwatershed (Table 4), resulting in the highest estimated bacterial loads[3] of 380,000 and 2,600,000 MPN/s in M01 and M08, respectively (Figure 6). This represents a potentially significant load of bacteria to downstream Medea Creek and compliance site MCW-12. However, flow was only observed at the compliance monitoring site on one of the ten sampling events. Bacterial concentrations shown in Figure 4 at site MCW-12 represent samples collected upstream of the compliance monitoring station. Trickling flows were consistently observed at this location and sufficient volume could be collected for bacterial analysis. All results from MCW-12 were below the WQO. Therefore, based on flow observations at MCW-12 and nearby upstream samples analyzed during the study period, bacterial loads from upstream outfalls and the Duck Pond did not impact downstream water quality at the compliance site or at the nearby location where samples were collected in this study. However, bacteria concentration results at the compliance monitoring site during the 2013 Study, as well as in recent compliance monitoring, were frequently above the WQO. Therefore, it is likely that the cumulative upstream discharges are effecting flow magnitudes and concentrations at the compliance monitoring site during other periods.

In Lindero Creek, flow was observed at TL01 from the City of Thousand Oaks during all ten sampling events, with 80 percent of the results exceeding the WQO. The median estimated flow at this site was 0.011 CFS (Table 5), resulting in an estimated bacterial load of 4,800 MPN/s (Figure 6). This represents a bacterial load from upstream Lindero Creek that could result in bacterial concentrations above the WQO at the downstream

[3] Bacterial loads were calculated by multiplying the median flow rate shown in Tables 4 and 5 by the median bacterial concentration (see Appendix C).

compliance site (MCW-14B). The median concentration at site MCW-14B was lower than at location TL01, but was still above the WQO in eight of the ten samples collected. A majority of the observed flow at this site was from outfall L03 during this study (estimated 0.31 CFS, Table 2). *E. coli* concentrations in outfall L03 were highly variable, ranging from 52 to 20,000 MPN/100mL. The load from this outfall is estimated to be 107,000 MPN/s (Figure 6). This represents a greater load to downstream Lindero Creek and compliance site MCW-14B compared to that measured at receiving water site TL01 (20X greater).

Bacterial results from samples of reclaimed water (RECL) were all below the WQO (Figure 4). However, *E. coli* were detected in eight of the ten samples collected, with a maximum concentration of 75 MPN/100mL. These results suggest that bacteria may be entering reclaimed water in the distribution system or viable but non-culturable (VBNC) bacteria may be present in the reclaimed water that regrow either in the distribution system or after sample collection.

In both the Upper Medea Creek and Upper Lindero Creek subwatersheds, downstream receiving water bacteria concentrations were lower than concentrations measured in upstream outfalls. These results show that FIB concentration reduction was occurring in these creeks between upstream outfalls and the compliance monitoring stations.

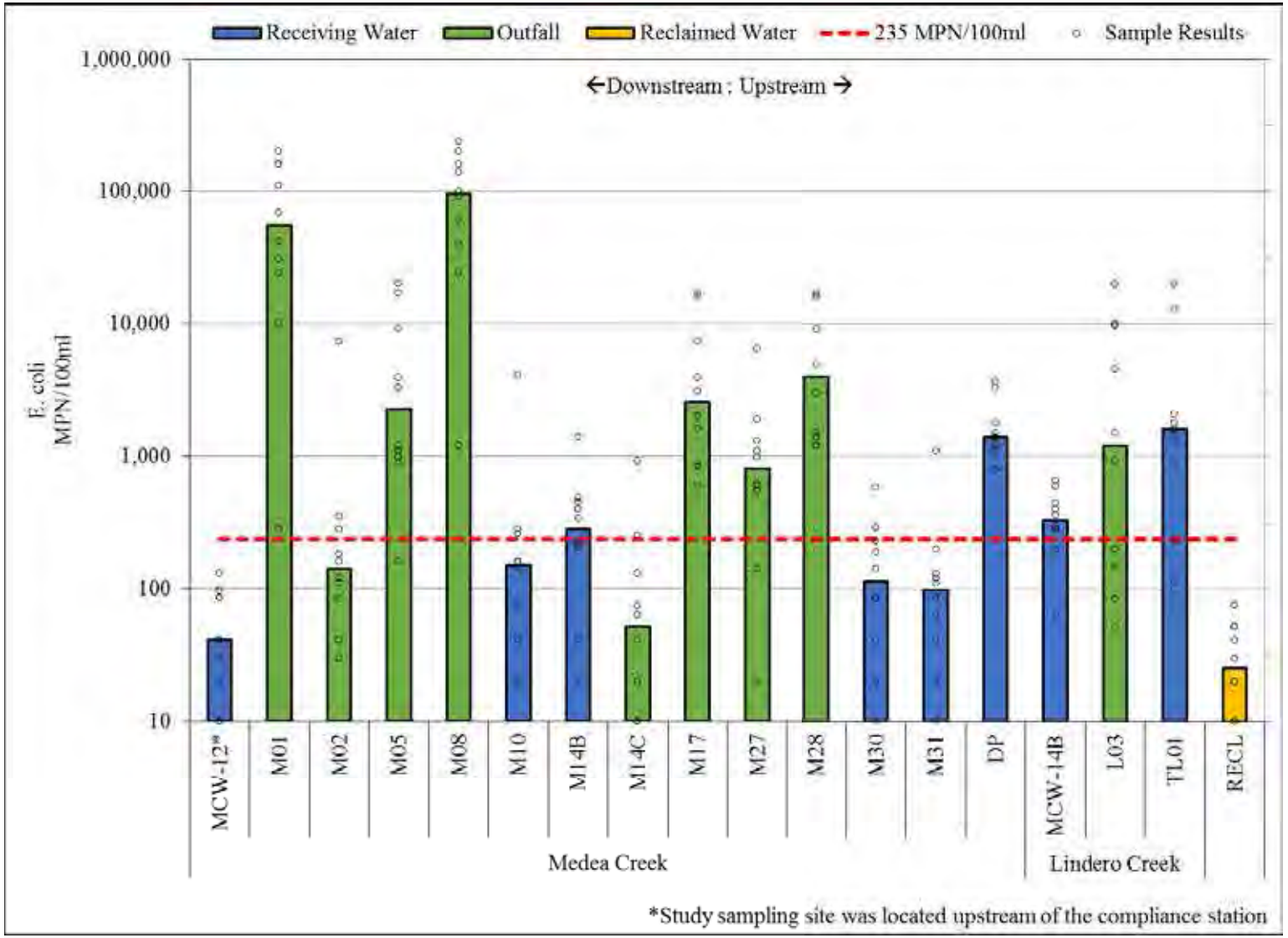


Figure 4. *E. coli* concentrations in receiving waters, outfalls, and reclaimed water (RECL). Colored bars represent the median concentration and open circles show individual data points.

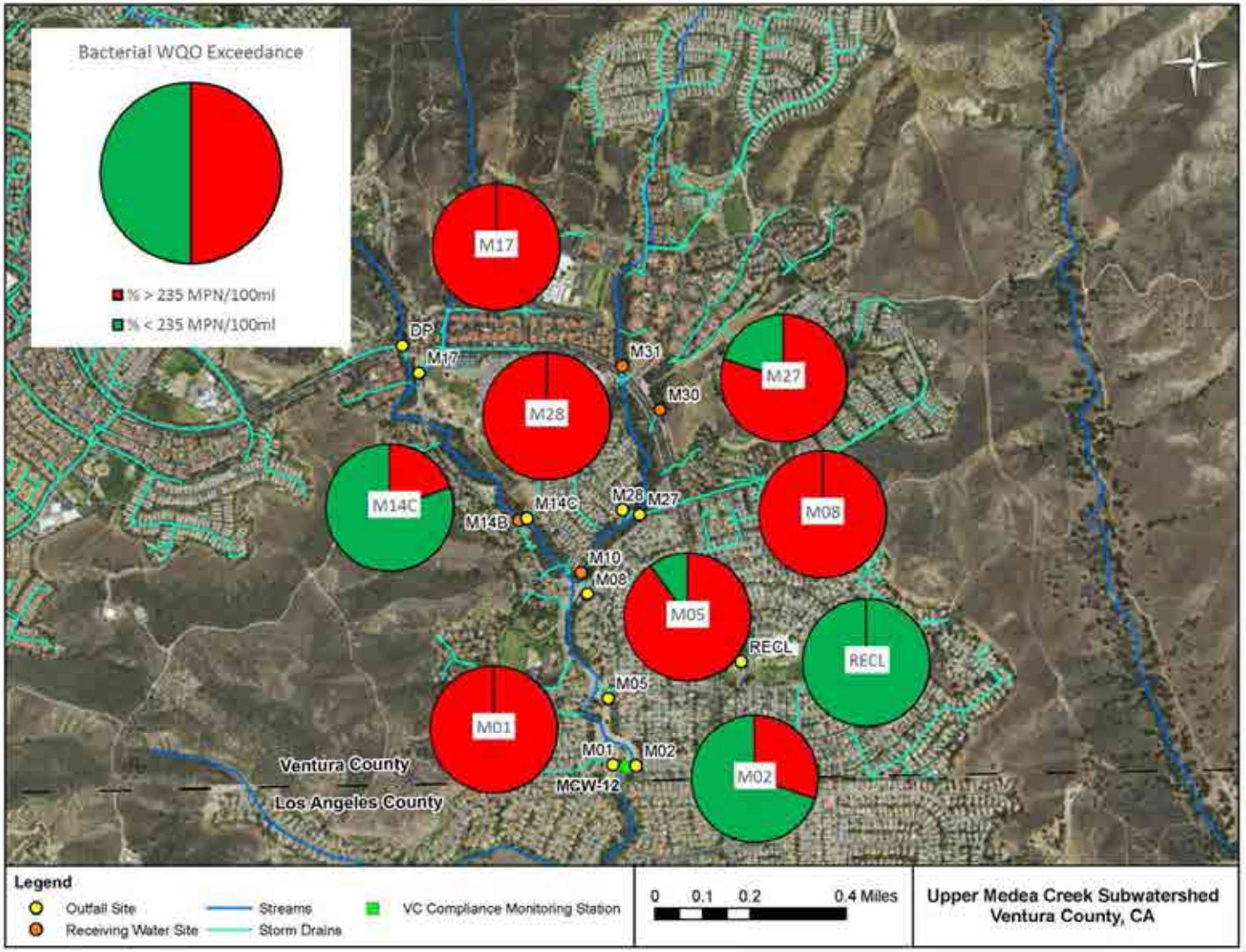


Figure 5. Bacterial concentrations exceeding the WQO at outfalls in the Medea Creek subwatershed and in reclaimed water (RECL).

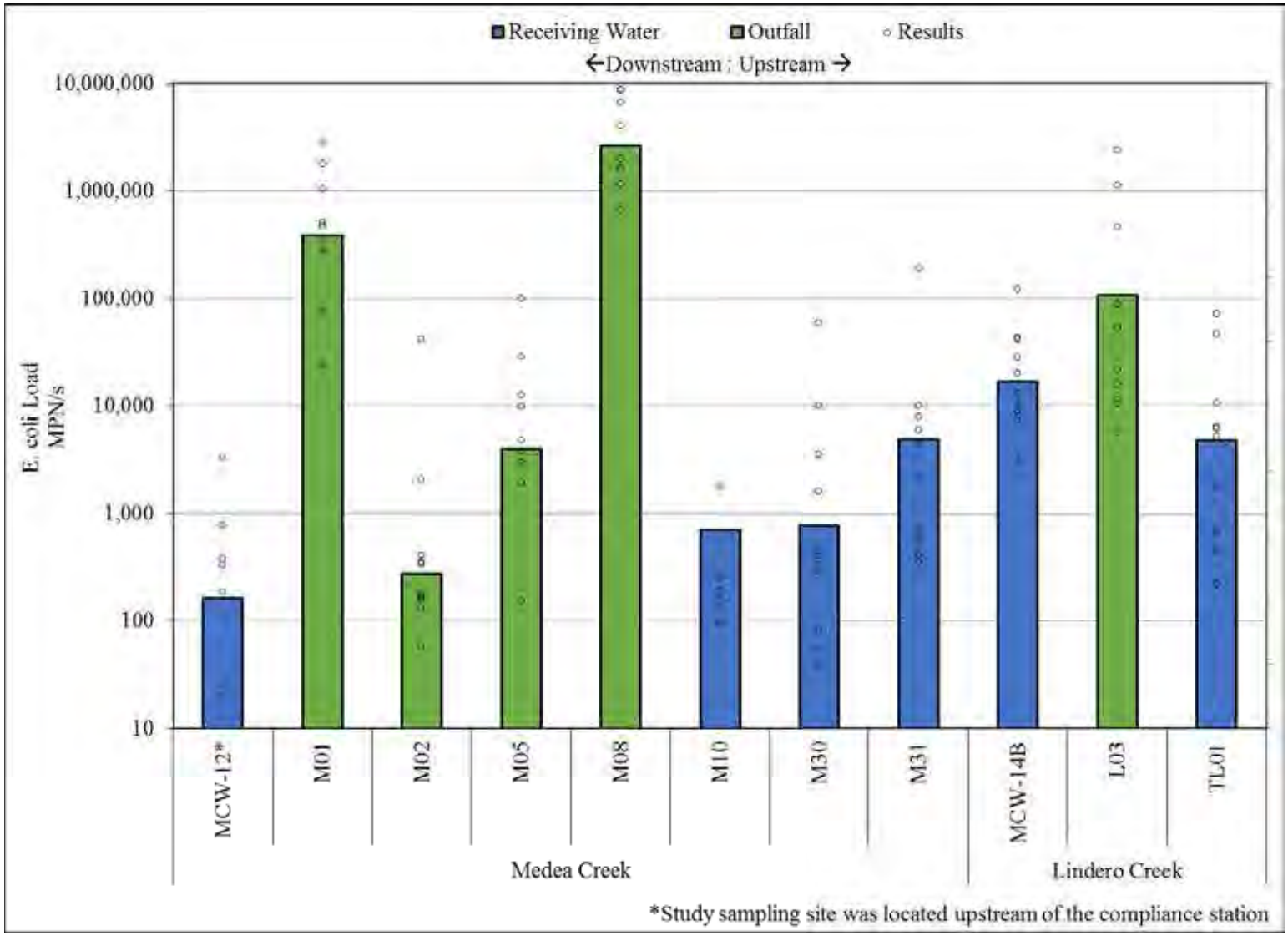


Figure 6. Estimated bacterial loads at outfall and receiving water locations. Colored bars represent the calculated load across all events (median concentration x median flow rate) and open circles show the load calculated for each sampling event.

2.4 Human Marker Analysis Results

Samples collected at all 18 locations were filtered and filters were frozen and archived for potential DNA analysis with source specific markers. Two human markers (HF183Taqman and HumM2) were analyzed for samples collected from the nine outfall locations on five of the ten dates sampled. Reclaimed water was also analyzed for these markers on the same five dates. Dates were selected to capture a variety of flow conditions measured across the ten sampling events. Complete quantitative human marker results are included in Appendix D.

Results for the detection (presence/absence) of both human markers analyzed are shown graphically in Figure 7 and spatially in Figure 8. At least one human marker was detected in all but one of the outfall locations (M14C). This outfall drains the area from sports fields at Oak Park High School. Outfalls M01, M05, M08, M17 and L03 all showed detections of both human markers in at least one sample, with detections of at least one human marker at outfalls M08 and M17 in four of five samples analyzed. Additionally, both markers were present at concentrations high enough to be quantified in three of five samples from M08 and four of the five samples from M17 (see Appendix D). Only the HF183 marker was detected in outfalls M02, M27 and M28. The HF183 marker detections were too low to be quantified for both M02 and M27 (Appendix D). Detection with the HF183 marker and not the HumM2 marker is expected at low human fecal bacteria concentrations, as the HF183 marker is more sensitive (SCCWRP, 2013). However, without confirmation by the second marker at these outfalls, cross-reaction with high concentrations of non-human fecal sources cannot be ruled out.

Both human markers were detected in reclaimed water in four of five samples analyzed. Marker concentrations were high enough to be quantified for both markers in three of five samples (Table D-1, Appendix D). The highest concentration of marker quantified in reclaimed water was 35,900 MPN/100mL for the HF183Taqman marker. Only one outfall sample analyzed resulted in a higher marker concentration (59,700 MPN/100mL at outfall M01 on 7/23/15). Human marker was not detected in three samples of reclaimed water analyzed in the 2013 Study. This may be due to variability in the presence and concentration of human markers in reclaimed water, or improved sensitivity in the human marker analysis methods used in the Follow-Up Study. **Results from the Follow-Up Study suggest that reclaimed water in irrigation runoff is a source of human markers to the County's MS4 and the presence of human fecal contamination in these discharges remains unknown.**

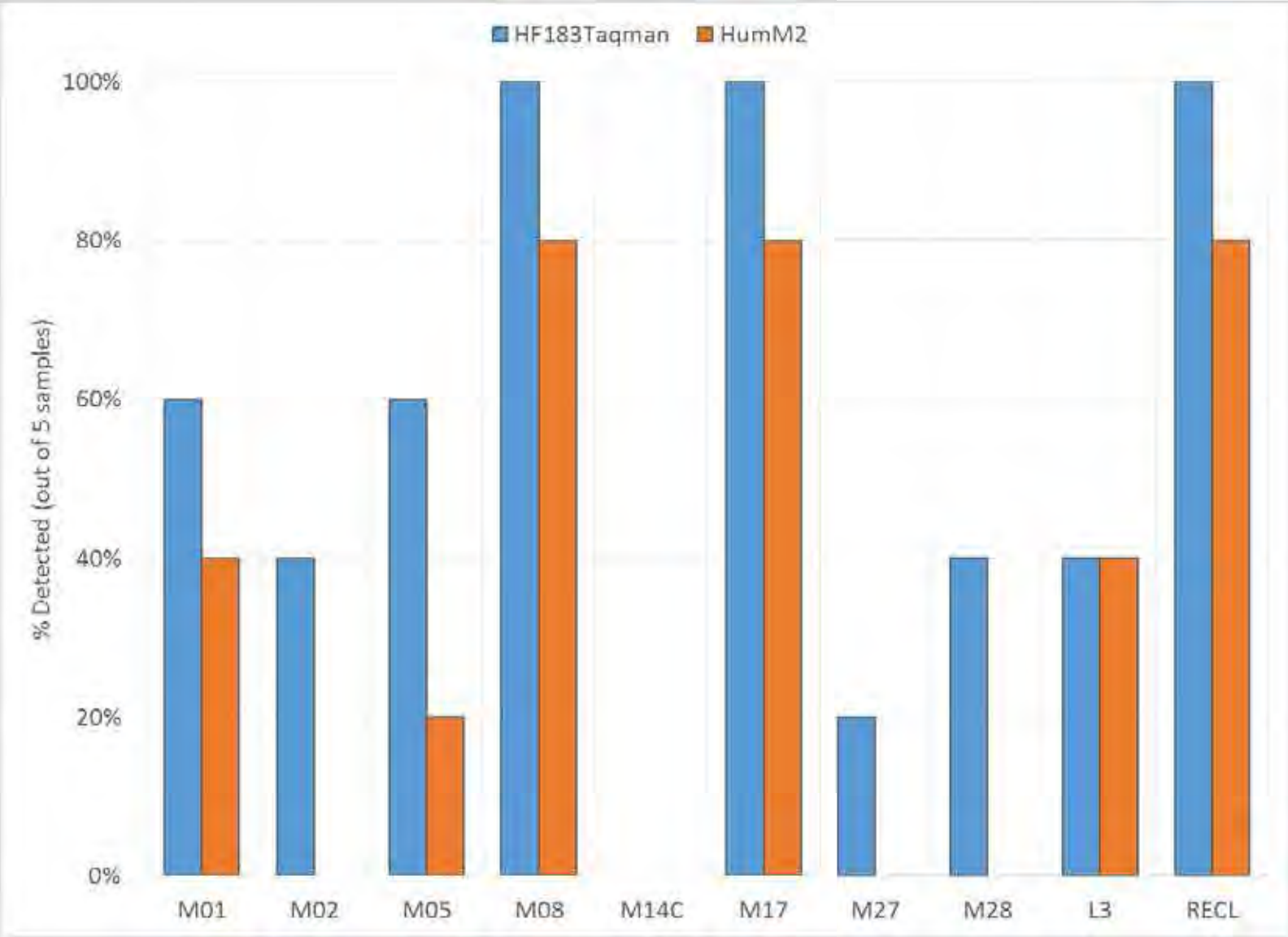


Figure 7. Human marker detections at outfalls and in reclaimed water (RECL).

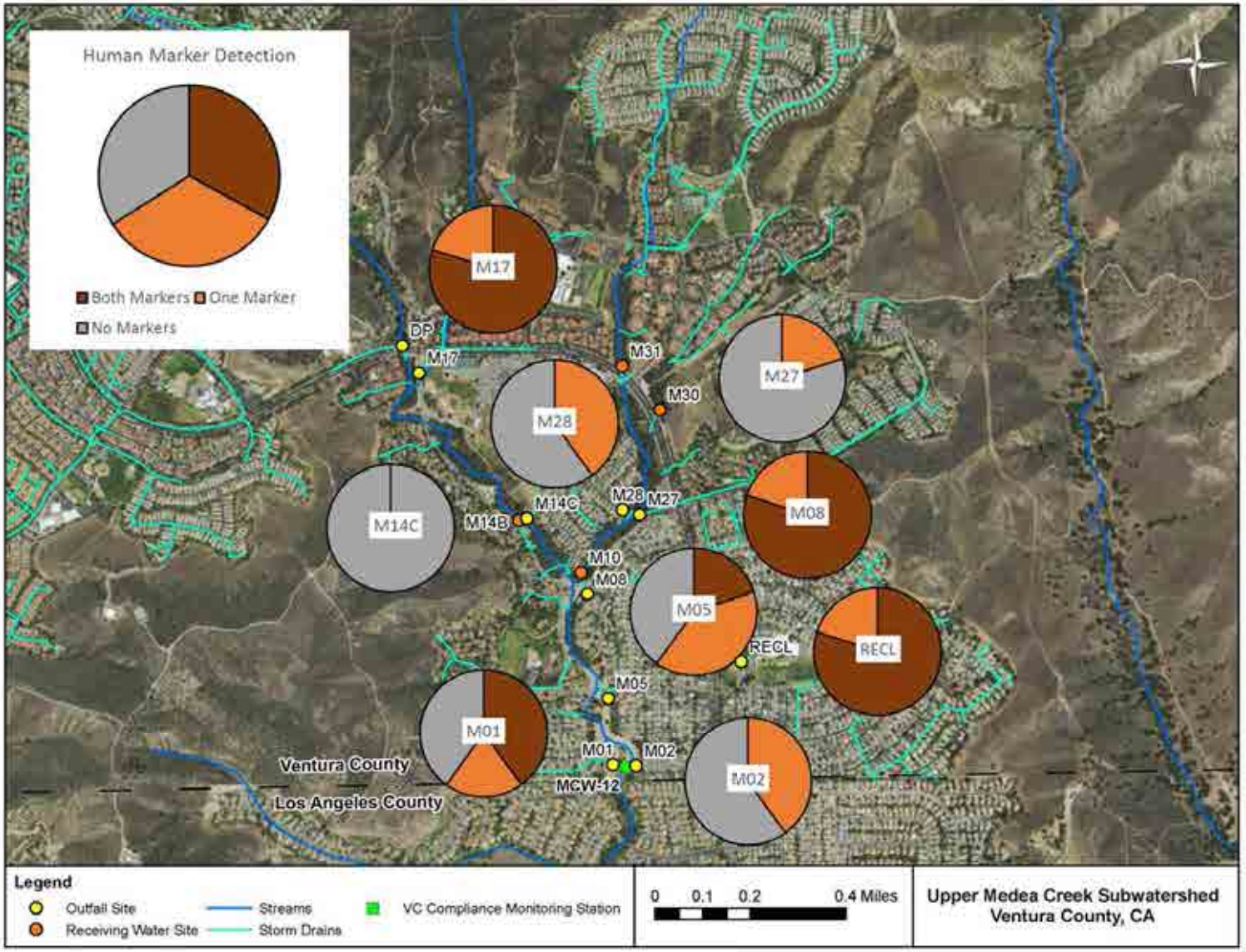


Figure 8. Human marker detections at outfalls in the Medea Creek subwatershed and in reclaimed water (RECL).

2.5 Continuous Flow Depth Monitoring

Continuous flow depth monitoring was performed in all nine outfalls that were sampled in this study, as well as two control outfalls. Level loggers were installed in five outfalls (M01, M05, M06, M27 and L03) on 7/8/15. Outfall M06 was dry during flow surveys, but was included as a dry control outfall to determine if intermittent flows were occurring. Level loggers were removed on 7/24/15, reinstalled in six different outfalls (M02, M08, M14C, M16, M17 and M28) the same day and removed on 8/17/15. M16 was included as a dry control outfall. A third deployment of level loggers was performed in outfalls M05 and M08 from 9/1/15 to 9/17/15 after it was determined that initial data obtained from these outfalls were not accurate[4]. A barologger was also installed during all level logger deployments and data were used to adjust readings for atmospheric pressure. An example of the level logger data collected at outfall M01 plotted over time is shown in Figure 9 with allowed irrigation days highlighted. Level logger plots for all outfalls monitored are include in Appendix E.

Continuous flow depth monitoring results showed daily flow peaks in nearly all outfalls that were investigated. Although these peaks varied from day to day, a visual analysis of the data provided estimated times for the flow peaks captured in each outfall (Table 6). Only outfalls M06 and M27 did not have clear daily flow peaks recorded by the level loggers. Fluctuations in water level were captured at both dry outfall control locations (M06 and M16), suggesting that intermittent flows may be occurring in outfalls that were not flowing during flow survey and field sampling observations. Daily flow peaks at other outfalls in the Medea Creek subwatershed did not correspond to allowed irrigation days, but were observed almost daily. Daily flow patterns were particularly evident in outfalls M01 (Figure 9) and M17 (Figure E-7). Outfall M16 showed a weekly flow peak each Tuesday (Figure E-6). Flow at Lindero Creek outfall L03 was relatively consistent with a small daily increase during the morning and several larger flow peaks, one of which corresponded to the rain event on 7/18/15 (Figure E-10).

Overall, continuous flow monitoring results showed that flows were consistently occurring in nearly all of the outfalls that were investigated, and that these flows did not correspond with allowed irrigation days (Mondays and Thursdays). These results suggest that irrigation runoff is occurring daily throughout these subwatersheds.

[4] A calibration test was performed by the County staff to check the accuracy of level loggers used. One of the loggers was found to be malfunctioning. The data from the other loggers were zero'd based on the results of this calibration test.

Table 6. Continuous flow depth monitoring summary at outfall locations.

Outfall ID	Date Range[a]	Average Level (in)	Maximum Level (in)	Daily Flow Peaks?	Approximate Days & Times of Flow Peaks
M01	7/10 to 7/23[b]	1.6	4.2	YES	Daily, 5-7am Daily, 8pm-12am
M02	7/25 to 8/16	1.6	2.6	YES	Daily, 6-7am Daily, 2-4pm
M05	9/2 to 9/16[b]	2.8	3.7	YES	Daily, 3-4pm
M06[c]	7/10 to 7/23[b]	0.7	1.0	NO	
M08	9/2 to 9/16[b]	4.2	5.5	YES	Daily, 1-2am Daily, 4-6pm
M14C	7/25 to 8/16	< 0[d]	1.8	YES	Daily, 3-7am Daily, 2-5pm
M16[c]	7/25 to 8/16	0.3	1.6	YES	Tue, 4am Daily, 2-6pm
M17	7/25 to 8/16	6.2	8.3	YES	Daily, 2-7am
M27	7/10 to 7/23[b]	< 0[d]	1.9	NO	
M28	7/25 to 8/16	0.1[d]	1.6	YES	Daily, 4-7am Daily, 2-5pm
L03	7/10 to 7/23[b]	3.0	12.4	YES	Daily, 12-10am

a. Only dates with a full 24 hours of data are included in this summary.
b. Excluding rain events on July 19th, 2015 and September 15th, 2015.
c. Dry control outfall location.
d. Negative values were recorded by the level logger.

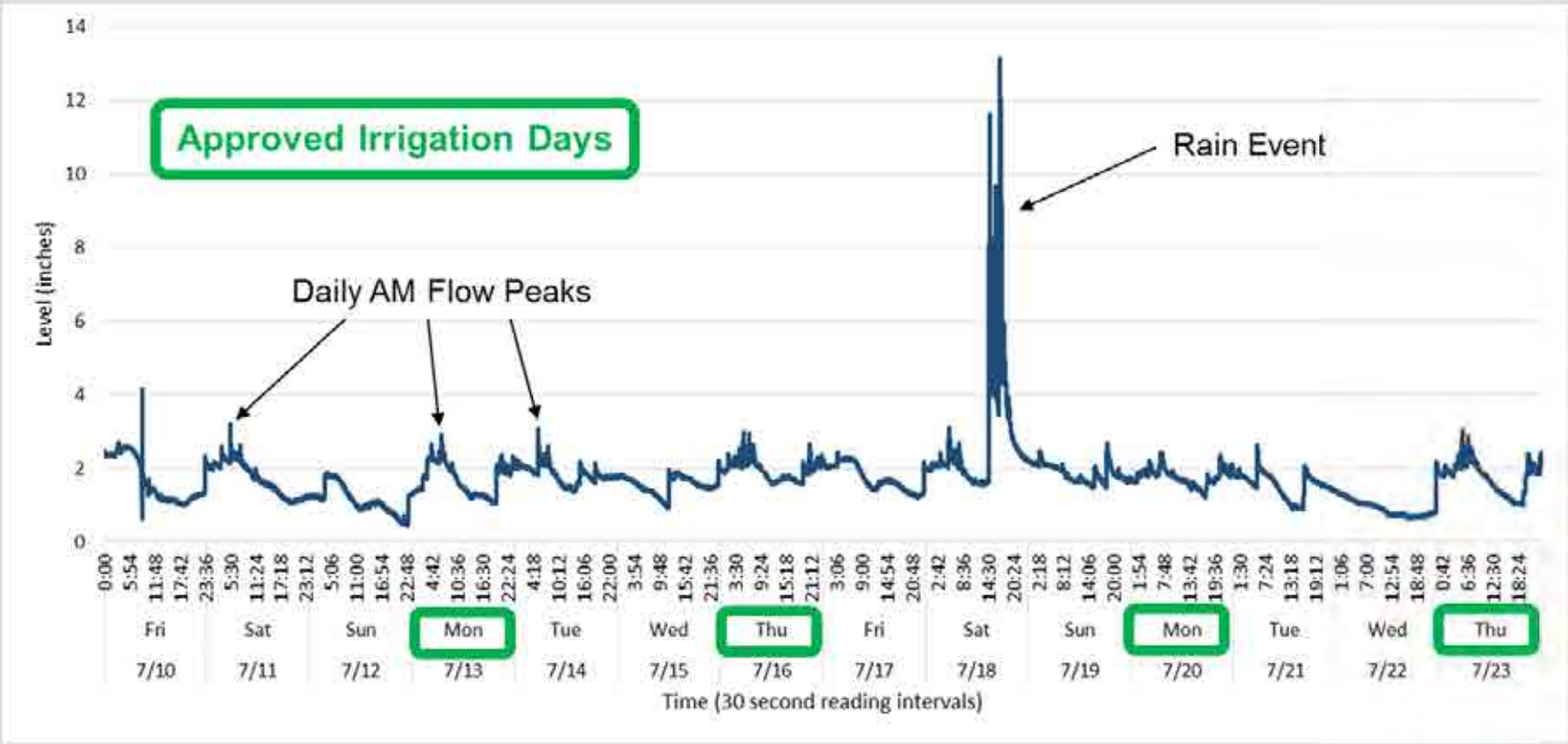


Figure 9. Level logger data plot from outfall M01.

2.6 Visual Flow Tracking and CCTV of Storm Drains

To aide in the prioritization of storm drain networks for closed-circuit television (CCTV) analysis, visual flow tracking was performed on 8/20/15 at outfalls sampled in the Upper Medea Creek subwatershed. Flow was tracked from each outfall through the MS4 network by opening manholes and making observations as to the source(s) of flow. Key observations from this visual flow tracking were: 1) flows appeared to be primarily from irrigation runoff and 2) animal feces were observed in the MS4 system and were pervasive throughout many of the networks. A complete summary of visual flow tracking observations is included in Table F-1 (Appendix F).

Flow survey and visual flow tracking observations, *E. coli* concentration results, previous detection of human markers, and at-risk areas for sanitary sewer to storm drain exfiltration (VCWPD, 2014) were all considered when prioritizing storm drain networks for CCTV analysis (Table 7). CCTV was not initially included in the work plan for this study (Appendix A). However, support was provided as part of this study in the prioritization and selection of outfalls and visual flow tracking. CCTV was conducted by the Ventura Regional Sanitation District. To date, CCTV has been performed on all or part of the stormdrain networks draining to outfalls M01, M02, M05 and M08. Reports generated during CCTV analysis including observations and photos are included in Appendix F.

Table 7. Outfall CCTV prioritization and summary of investigation completed to date

Priority	Outfall ID	Investigated Length (ft)	% of Network
1	M05	400	100
2	M02	80	100
3	M08	500	10
4	L03	-	-
5	M01	1,000	50
6	M17	-	-
7	M28	-	-
8	M27	-	-
9	M14C	-	-

CCTV revealed two locations with animal feces in the flow path in the outfall M01 network. No unusual observations were recorded for the M02 network. Two pipe sags were found in the M05 network where water was pooled. An illegal dump was also found in the M05 network, which appeared to be concrete construction debris. In the M08 network, an illicit connection was discovered, as well as infiltration stains in four different areas. It is unknown whether the illicit connection is a potential source of FIB and/or human markers. No flow or evidence of recent flow was observed from this connection

during CCTV. Further investigation is currently being conducted into the illegal connection found in the M08 network.

3. CONCLUSIONS

Dry weather flow patterns were identified at key outfalls in the Upper MCW. Irrigation overflow appears to be the primary source of flow to the County MS4 in both the Upper Medea and Lindero Creek subwatersheds. Drainage area observations throughout this study, including the above ground flow tracking observations and CCTV results, support this conclusion. Flow patterns observed using continuous flow depth monitoring at outfalls did not correspond to allowed irrigation days, and showed that irrigation may be occurring daily in many areas. Irrigation with reclaimed water, which does not have the same restrictions as potable water[5], could also be a source of irrigation overflow to the County MS4, and further investigation is required to determine the prevalence of reclaimed water irrigation runoff to the County MS4 system. It is important to note that the Oak Park Green Streets Retrofit project is planning to install biofilters and modular wetlands to remove the dry weather runoff in the drainage networks of the outfalls contributing the greatest runoff volume (M01, M02, M05, M08, M14C, and M28).

Concentrations of *E. coli* were quantified in receiving waters and MS4 outfalls throughout the Upper Medea and Lindero Creek subwatersheds on ten dates in July and August of 2015. Bacteria concentrations were consistently elevated (above the TMDL WQO) in most of the outfall sites investigated, suggesting that the County MS4 is conveying bacteria to receiving waters including downstream compliance monitoring stations. Visual flow tracking and CCTV results identified animal feces as a source of bacteria within the MS4 network. Wild animals either living in storm drains or using the network to move around could represent a major source of fecal bacteria to receiving waters during dry weather in areas where persistent flows are present. Pet waste that is not properly disposed of could also represent a source of bacteria if washed into the MS4 by irrigation runoff or if waste bags are dumped in the MS4. Instream concentrations of bacteria were generally lower than at outfalls, but were still often above the WQO. Bacteria concentrations measured at the compliance monitoring station in the Lindero Creek subwatershed were frequently above the WQO. Bacterial loads were quantified from both

[5] The 2015 State mandated reduction in urban water usage of 25% (32% for the Oak Park area based on gallons per capita per day water use) applied only to potable water.

the upstream creek flowing from the City of Thousand Oaks and the MS4 network associated with outfall L03. Both were found to be contributing elevated bacteria concentrations to the downstream compliance monitoring site. The bacterial load from outfall L03 was greater than that from the upstream creek, which is consistent with previous findings (VCWPD, 2014). The compliance monitoring station in the Upper Medea Creek subwatershed was dry throughout the majority of this study. Bacteria concentrations in samples collected from the nearest flowing location were all below the WQO during this study. However, outfall discharges may impact downstream bacteria concentrations at the compliance site during higher flow conditions (bacterial concentrations were frequently above the WQO during past monitoring periods).

Results from human marker analysis of reclaimed water support flow results indicating that reclaimed water could be a source of flows to the County MS4. Elevated concentrations of both human markers were found in reclaimed water samples and similar concentrations of these markers were detected in many of the outfalls investigated. These detections suggest that reclaimed water may be a source of human markers, and that positive human marker results at the outfalls could be due to reclaimed water runoff and not necessarily human fecal contamination in the MS4. While a large input of human fecal contamination would be expected to result in higher concentrations of human markers, small human inputs or those that are highly diluted or aged would not be distinguishable from the marker concentrations seen in the reclaimed water samples tested. The input of reclaimed water must be ruled out or eliminated for these markers to be effectively used for the identification of human fecal sources. Non-human sources of fecal contamination were not investigated (e.g., using gull and/or dog DNA markers), but this analysis could be performed at a later date on archived samples, if desired. Reclaimed water should also be tested for any non-human markers being used, but would not be expected to interfere with these results.

4. RECOMMENDATIONS

- Further investigate sources of dry weather irrigation flows in MS4s in both the Upper Medea and Lindero Creek subwatersheds, including reclaimed water irrigation runoff.

- Coordinate with Oak Park water providers on enforcement of irrigation restrictions to reduce illicit flows to the MS4 from irrigation overflow.

- Investigate alternative chemical or other sewage indicators capable of discriminating reclaimed water from raw sewage.

- Complete CCTV of storm drain networks to investigate sources of dry weather flows such as sanitary sewer leaks and illicit connections.

- Use dye tracer testing in areas identified as at-risk for sanitary sewer exfiltration to the MS4 based on GIS analysis.

- Implement structural BMPs to eliminate dry weather MS4 discharges (e.g. diversion, infiltration, capture and use) in outfalls where the planned Green Streets Retrofit project will not address dry weather flows (e.g., L03). Alternatively, structural BMPs could be implemented to treat dry weather flows for bacteria (e.g., UV disinfection) prior to creek discharge in areas where non-structural flow reduction measures are not capable of eliminating dry weather discharges.

5. REFERENCES

LARWQCB, 2004. Malibu Creek and Lagoon Bacteria TMDL. Los Angeles Regional Water Quality Control Board. Resolution No. 2004-019. Adopted January 29th, 2004.

SCCWRP, 2013. The California Microbial Source Identification Manual: A Tiered Approach to Identifying Fecal Pollution Sources to Beaches. Southern California Coastal Water Research Project. Technical Report 804. December 2013.

VCWPD, 2014. Upper Malibu Creek Watershed Dry Weather Source Identification Study - Memorandum Report. November 2014.

Geosyntec
consultants

Appendix A:

MCW Source Identification Work Plan

Malibu Creek Watershed
Dry Weather Source Identification
Special Study Work Plan

Ventura County
Watershed Protection District
July 2015

A. Introduction

The County of Ventura has six receiving water monitoring locations in the Malibu Creek Watershed (MCW), four of which sometimes exceed the *E. coli* single sample standard during dry weather. A dry-weather bacteria source identification study was performed in 2013. Results from this study identified sub-drainages with high concentrations of E. coli, as well as potential sources to MS4s and directly to receiving waters. However, further sampling is required in the Upper Medea and Upper Lindero drainage areas to quantify loads of E. coli and identify major contributing sources. Therefore, additional dry weather sampling and analysis will be performed in 2015 with an increased sampling frequency and continuous flow monitoring at selected locations. This source identification study will provide additional information to help determine if the Ventura County MS4 is causing or contributing to receiving water exceedances, and for planning and prioritizing BMP implementation.

B. Goals and Management Actions

This study is designed to help identify dry weather sources of human and non-human fecal bacteria in the Upper Medea Creek and Upper Lindero Creek drainage areas within the Ventura County unincorporated area of the Malibu Creek Watershed. The study goals are:

- Continuously monitor flow at key locations.
- Quantify loads of *E. coli* from County MS4.
- Identify sources of fecal pollution including humans, dogs and birds.
- Estimate relative contributions of human and non-human sources of fecal pollution at key locations in each drainage area.

The study seeks to fulfill the special studies requirement of the MS4 permit for the MCW Bacteria TMDL. The information on sources and loads of bacteria will guide future management actions, such as selection of type of bacteria source control measures and BMPs, selection of priority areas for bacteria source controls and BMPs and additional research.

C. Scope of Work

This source identification study will use the tiered approach recommended in the California Microbial Source Identification Manual[1]. The steps used include an initial field survey followed by field sampling and sample analysis, increasingly focusing on host-specific but more expensive methods as the source locations are narrowed down.

The sampling plan includes 3 sampling sites in the Upper Lindero drainage area and 13 sites in the Upper Medea drainage area, as well as a sample of reclaimed water (Table 1 and Figure 1). Sampling locations include receiving water and outfall compliance sites in both drainage areas as well as all other outfalls observed to be flowing during flow surveys conducted in May 2015.

[1] The California Microbial Source Identification Manual: A Tiered Approach to Identifying Fecal Pollution Sources to Beaches. Technical Report 804, December 2013, SCCWRP.

The strengths of this proposed study include:

- Greater frequency of sampling targeting identified sub-drainages with flowing drains in the two most urbanized drainage areas.
- Use of DNA-based fecal markers to maximize accuracy in identifying human and non-human sources of fecal pollution.
- Archiving of all samples for analysis of DNA-based markers, allowing for selected samples to be analyzed before samples collected further upstream.

D. Source Identification Study Steps

Step 1: Flow Mapping & Site Selection

- Survey MS4 outfalls in the Lindero and Medea drainage areas to determine where flows are observed. Completed May 2015.
- Select sampling locations based on flow patterns, access, previous results and potential sources. Completed June 2015. Sampling locations are shown in Table 1 & Figure 1.
- Select locations and deploy continuous flow monitoring in the Upper Lindero and Medea drainage areas. Completed July 2015. Initial continuous flow monitoring sites will include:
    - Receiving water sites: MCW-12, M10 & MCW-14B
    - Flowing outfall sites: L03*, M01*, M05* & M27*
      (Additional flow monitoring was added at newly identified outfall location M14C)
    - Outfall sites with little or no flow: M06*
      *The flowing outfall sites will be rotated to sites M02, M08, M17 & M28, and the outfall site with little or no flow will be rotated to M16 after the first two weeks of sampling to capture flow patterns in all flowing outfalls.

Step 2: Field Sampling & Tier 1 Bacteria Analysis

- Sample selected locations twice weekly for five weeks (10 samples per site).
- Measure or estimate flow at each location to allow for load calculations.
- Analyses:
    - *E. coli*
    - Archive filters (1 per sample) for DNA analysis
    - Archive filter blanks (1 per sampling event) for QAQC

Step 3: Tier 2 Source-specific Marker Analysis

- Select samples for molecular analyses based on the sample location and marker priorities shown in the table below.
    - High priority: 50% of samples collected at these locations (i.e. 5 samples per site) will be selected for analysis with 2 human markers. If there are outfalls that are consistently below the *E. coli* single sample maximum objective, these locations may not be excluded.

- Medium priority: High priority samples that were negative for human markers will then be analyzed for non-human (dog and gull) markers.
- Low priority: These samples will not be selected for analysis with source-specific markers.

- Analyze samples for host-specific markers.
  - Analyze high priority samples for two human markers. DNA extracted for this analysis will be saved for potential analysis with additional markers at a later time.
  - Analyze medium priority samples for 2 non-human markers.

  *Filter blanks, prepared each sampling day by filtering sterile water, will be extracted and analyzed along with high and medium priority samples.

Sampling Locations	Human Markers (HF183Taqman and HumM2)	Non-Human Markers (DogBact and Gull2Taqman)
Outfalls	High Priority	Medium Priority
Reclaimed Water	High Priority	Low Priority
Receiving Water	Low Priority	Low Priority

E. Cost and Personnel Summary

Category	Amount	Total
WPD Staff Time	XX hours	
Geosyntec Staff Time	XX hours	
Analytical	$XX,XXX	$XX,XXX
Equipment	$XX,XXX	

F. Schedule

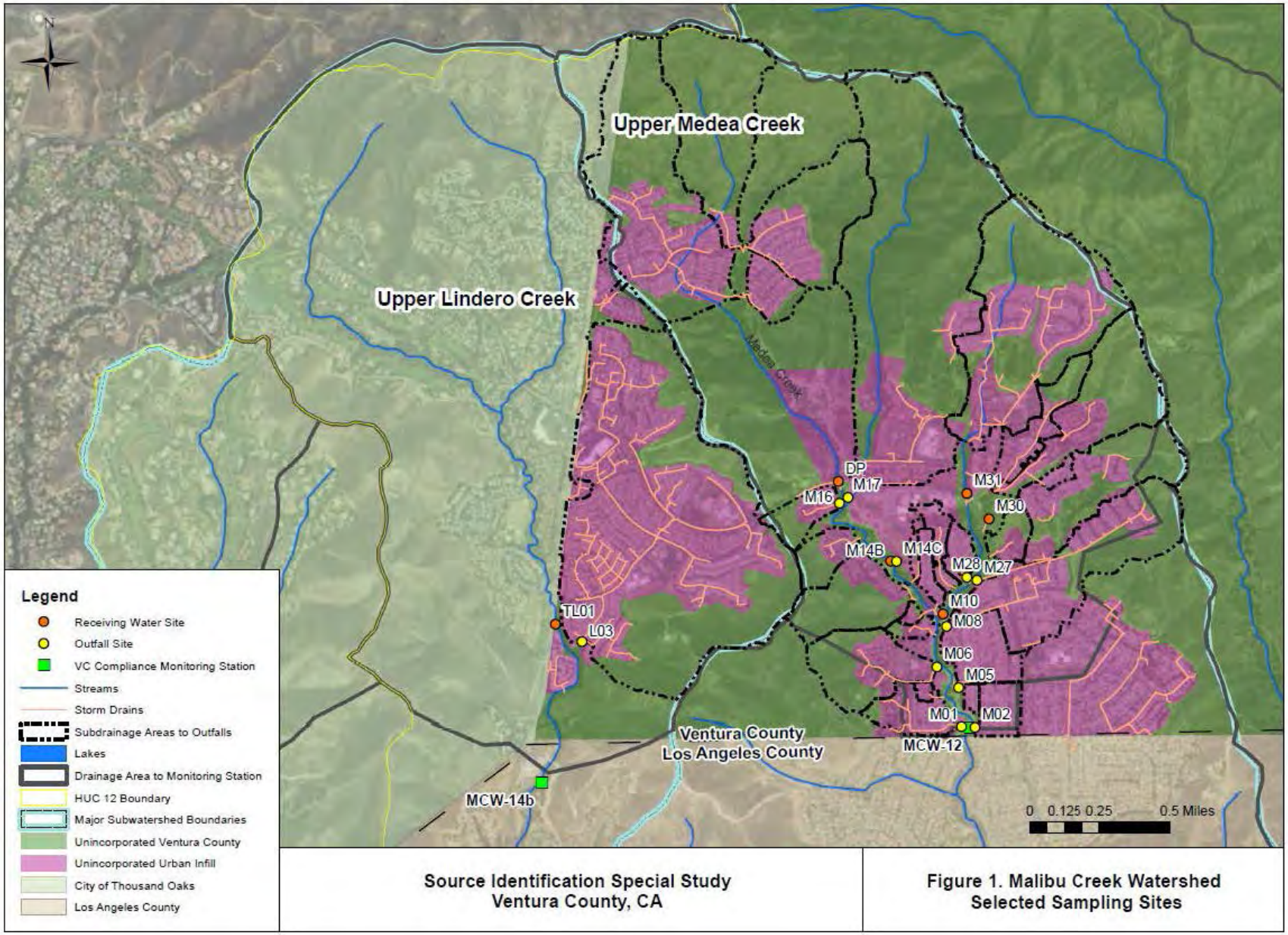
Task	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Flow Survey Lindero & Medea										
Sampling Lindero & Medea										
Continuous Flow Monitoring										
Source-Specific Markers Analysis										
Data Analysis										
Final Report										

Table 1. Sampling and Flow Monitoring Locations in the Upper Medea and Lindero drainage areas.

	Site ID	Type	2013 Result				Notes
			Sampled	High *E. coli**	Human Markers	Other Markers	
Medea	MCW -12	Receiving Water	Yes	No	ND	Bird	Receiving Water Compliance Site
	M01	Outfall	Yes	Yes	ND		
	M02	Outfall	Yes	Yes	Yes^	Dog	Outfall Compliance Site, ^1 of 2 Samples Quantified for Human
	M05	Outfall	Yes	Yes	Yes^		^1 of 3 Samples Quantified for Human
	M06	Outfall	No				Flow Monitoring Only
	M08	Outfall	Yes	Yes	ND		
	M10	Receiving Water	Yes	No	NA	Bird	
	M14B	Receiving Water	No				New Receiving Water Site (34°10'38.0"N, 118°45'59.6"W)
	M14C	Outfall	No				New Outfall Site, Near M14B
	M16	Outfall	No				Flow Monitoring Only
	M17	Outfall	No				
	M27	Outfall	No				
	M28	Outfall	No				
	M30	Receiving Water	Yes	No	NA		
	M31	Receiving Water	Yes	No	NA		
	DP	Receiving Water	Yes	Yes	ND	Bird & Dog	Duck Pond Outflow
Lindero	MCW -14B	Receiving Water	Yes	No	ND	Bird	Receiving Water Compliance Site
	L03	Outfall	Yes	Yes	ND	Dog	Outfall Compliance Site
	TL1	Receiving Water	Yes	Yes	ND	Bird & Dog	At the jurisdictional boundary with the City of Thousand Oaks
	REC	Reclaimed Water	Yes	No^	ND	Bird	^1 of 3 sample high in *E. coli*

ND = Not Detected, NA = Not Analyzed

*Based on a median value of greater than 235 MPN/100mL.



Source Identification Special Study
Ventura County, CA

Figure 1. Malibu Creek Watershed
Selected Sampling Sites

Appendix B:

Summary of Field Sampling Observations

Monday, July 13, 2015

ID	WEATHER CONDITIONS	RAINFALL	SITE CONDITIONS	FLOW PRESENT IN OUTFALL?	FLOW DEPTH, WIDTH & VELOCITY	ESTIMATED FLOWRATE	FLOW CHARACTERISTICS	OTHER
M01	60° F ; Cool	N/A	DEBRIS U/S	TRICKLE	N/A	N/A	CLEAR	
M02	60° F ; Cool	N/A	N/a	MODERATE	0.25 inches x 5 inches x 1.58 ft/sec	0.0137 CFS	CLEAR	
M03	Clear; Cool ; 67° F	N/A	Wet , No flow pooled water	No flow but wet water ooled in CMP	N/A	N/A	N/a	
M04	Clear; Cool ; 63° F	N/A	Dry, Leaves, Debris	N/A	N/A	N/A	N/A	
M05	Clear; Cool ; 67° F	N/A	D/S of outfall leaves, debris & algae	TRICKLE	0.10 inches x 4 inches x 1.26 ft/sec	0.0034 CFS	No distinguishing odor. Flowpath of trickle is greensish brown but samples apears clear	
M06	Clear; Cool ; 63° F	N/A	Cry, channel bottom dry	N/A	N/A	N/A	N/A	
M07	Clear; Sunny ; 64° F	N/A	Wet, No Flow	N/A	N/A	N/A	N/A	
M08	Clear; Cool ; 66° F	N/A	Trash, Algae	Substantial Flow/Depth				
M09	Sunny clear 70°F	N/A	Leaves, Totally dry	N/A	N/A	N/A	N/A	
M10	Clear / 72°F	N/A	Dry	Damp with small ponded pockets	N/A	N/A	N/A	Sample taken behind level logger
M11b	Clear / 71°F	N/A	Slight amount of trash	Ponded	N/A	N/A	N/A	
M11	Clear / 71°F	N/A	Slight amount of trash	Ponded	N/A	N/A	N/A	
M12	Clear / 63°F	N/A	N/A	Trickle at outfall mouth	N/A	N/A	N/A	
M13	Clear / 70°F	N/A	Decent amount of trash	None	N/A	N/A	N/A	
M14	Clear / 63°F	N/A	Overgrowth	None	N/A	N/A	N/A	
M14c	Cool	N/A	Unknown Outfall	Trickle	N/A	N/A	N/A	

Monday, July 13, 2015

ID	WEATHER CONDITIONS	RAINFALL	SITE CONDITIONS	FLOW PRESENT IN OUTFALL?	FLOW DEPTH, WIDTH & VELOCITY	ESTIMATED FLOWRATE	FLOW CHARACTERISTICS	OTHER
M14b - RW	Clear / 64°F	N/A	Built up leaves	slight trickle from outfall to creek	N/A	N/A	N/A	
M15	Clear / 64°F	N/A	Fallen trees, built up branches, mailbox	Dam at outfall mouth	N/A	N/A	N/A	
M15b	Clear / 66°F	N/A	Dry and overgrown	None	N/A	N/A	N/A	Pond under over pass 10x6ft
M16	Clear / 67°F	N/A	Buildup of dry leaves at mouth. Dampl slightly past outfall	None	N/A	N/A	N/A	
M17	Cool	N/A	Trash	Trickle D/S, Ponded U/S	0.50 inches x 2 inches x 0.3356 ft/sec	0.002 CFS	CLEAR	
DP	Cool	N/A	Ducks	N/A	N/A	N/A	N/A	
M26	Clear/ 72°F	N/A	Bag of dog feces, slight amount of trash	N/A	N/A	N/A	N/A	
M27	Sunny clear	N/A	Normal heavy calcium deposite; water looks yellow	Flow, substantial depth	2 inches x 21.25 inches x Not Measurable	N/A	Looks yellow, very slow	
M28	Sunny clear 68°F	N/A	Wet - very little flow	Yes, less than a trickle	Not Measurable	N/A	Normal	Sample sucked into syringe from CMP. Water for only one bottle. 30 min - later still not enough water
M30	Clear	N/A	N/A	Moderate	2 inches x 27 inches x 0.9346 ft/sec	0.3505 CFS	Clear; Algae	Recommend moving location across Kanan Road to capture any extra runoff
M31	Clear	N/A	N/A	MODERATE	2 inches x 26 inches x 1.6854 ft/sec	0.6086 CFS	CLEAR	Recommend moving location across Kanan Road to capture any extra runoff
M34	Sunny clear 73°F	N/A	Moist channel bottom, not wet	N/A	N/A	N/A	N/A	
L3	Cool	N/A	Dog poop bags; plastic bottle	MODERATE	3.25 inches x 1.5 " x 0.50 ft/sec	0.0169 CFS	CLEAR	
TL1	Cool	N/A	N/A	200 Feet D/S of outfall, Sampled were flow was present	1 inch x 3 inches x 0.3504 ft/sec	0.0072 CFS	N/A	Measured flow 300 feet D/S
MCW-14b	Cool; Cloudy	N/A	Trash	Substantial	3 inches x 8 inches x 1.4218 ft/sec	0.0789 CFS	Brownish	

Thursday, July 16, 2015

ID	WEATHER CONDITIONS	RAINFALL	SITE CONDITIONS	FLOW PRESENT IN OUTFALL?	FLOW DEPTH, WIDTH & VELOCITY	ESTIMATED FLOWRATE	FLOW CHARACTERISTICS	OTHER
M01	Foggy Cool	N/A	Leaves at outfall	Significant flow	3/8 inches x 8 inches x 1.1111 ft/sec	0.0231 CFS	Normal	
M02	Foggy Cool ; 64° F	N/A	Leaves & trash at outfall	Yes, significant	0.50 inches x 6 inches x 2.1429 ft/sec	0.0446 CFS	Normal	
M03	Foggy Cool ; 64° F	N/A	Wet , No flow pooled water	No flow but wet water ooled in CMP	N/A	N/A	N/a	
M04	Foggy Cool ; 65° F	N/A	Normal	Wet but not flowing	N/A	N/A	N/A	
M05	Foggy Cool ; 65° F	N/A	Normal	Yes, 4/TRICKLE	1/16 inches x 4 inches x 1 ft/sec	0.0034 CFS	No distinguishing odor. Flowpath of trickle is greensish brown but samples apears clear	
M06	Cool foggy ; 65° F	N/A	Dry normal	None	N/A	N/A	N/A	
M07	Cool foggy ; 65° F	N/A	Normal	No - moist but no flow	N/A	N/A	N/A	
M08	Cool foggy ; 65° F	N/A	Styrofoam trash in outfall, Algae build-up in ponded area	Yes Substantial	9 inches x 44 inches x 0.024 ft/sec	0.066 CFS	Film on top of water	Sample bottle submerged at outfall to take sample
M09	Cool foggy ; 65° F	N/A	Normal leaves	Yes trickle	1/32 inches x 2 inches x 1 ft/sec	0.0004 CFS	normal	
M10	Cool foggy ; 66° F	N/A	Orange residue on right culvert (Looking U/S)	Dry - Both; Pond u/s of weir @ level logger	N/A	N/A	N/A	Sample taken with syringe at weir/level logger
M11b	Cloudy / 64°F	N/A	Small amount of trash	No flow	N/A	N/A	N/A	
M11	Cloudy / 64°F	N/A		Ponded	N/A	N/A	N/A	
M12	Cloudy / 64°F	N/A	Damp about a foot out from outfall. Large amount of dead leaves.	No flow	N/A	N/A	N/A	
M13	Cloudy / 64°F	N/A	Small amount of trash	Dry	N/A	N/A	N/A	
M14	Cloudy / 64°F	N/A	Trash, Overgrowth	Very small trickle	N/A	N/A	N/A	
M14c	Cloudy / 64°F	N/A	Dead leaf build-up	Trickle	N/A	N/A	N/A	

Thursday, July 16, 2015

ID	WEATHER CONDITIONS	RAINFALL	SITE CONDITIONS	FLOW PRESENT IN OUTFALL?	FLOW DEPTH, WIDTH & VELOCITY	ESTIMATED FLOWRATE	FLOW CHARACTERISTICS	OTHER
M14b - RW	Cloudy / 64°F	N/A		Ponded	N/A	N/A	N/A	
M15	Cloudy / 64°F	N/A	Small amount of trash, Large amount of fallen debris	Damp, no flow	N/A	N/A	N/A	
M15b	Cloudy / 64°F	N/A	Small amount of trash	Ponded	N/A	N/A	N/A	
M16	Cloudy / 65°F	N/A	Small amount of trash	No flow, damp from base of outfall to fall off.	N/A	N/A	N/A	
M17	Cloudy / 65°F	N/A	Large amount of trash	Ponded	N/A	N/A	N/A	
DP	64°F; Cool; Cloudy	N/A	Ducks	N/A	N/A	N/A	N/A	Sampled inside the pond
M26	Clear/ 72°F	N/A	Bag of dog feces, slight amount of trash	N/A	N/A	N/A	N/A	
M27	Cloudy / 63°F	N/A	Normal	Ponded	N/A	N/A	N/A	
M28	Cloudy / 63°F	N/A	Small amount of leaf build up	Slight trickle	Not Measurable	N/A	Normal	Sample sucked into syringe from CMP. Water for only one bottle. 30 min - later still not enough water
M30	64°F; Cool; Cloudy	N/A	Algae	Trickle/Moderate	1.5 inches x 6 inches x 0.1883 ft/sec	0.0118 CFS	N/A	New location across Kanan Road
M31	67°F; Cool; Cloudy	N/A	Algae build U/S	TRICKLE/MODERATE	1 inch x 2 inches x 0.9479 ft/sec	0.0132 CFS	N/A	New location across Kanan Road approx 400 ft D/S
M34	64°F; Cool; Cloudy	N/A	N/A	N/A	N/A	N/A	N/A	Dry
L3	63°F; Cool; Cloudy	N/A	Trash (Dog bags, plastic bottles)	MODERATE	3 inches x 24 inches x 0.3293 ft/sec	0.1647 CFS	CLEAR	
TL1	64°F; Cool; Cloudy	N/A	N/A	N/A	1 inch x 3 inches x 0.5050 ft/sec	0.0105 CFS	Clear	Measured flow 300 feet D/S
MCW-14b	60°F; Cool	N/A	Trash (Bottles)	Moderate	3 inches x 8 inches x 1.0381 ft/sec	0.1730 CFS	Clear	
MCW-12	Foggy , 64°F	N/A	Normal	Adequate flow	2 inches x 7 inches x 0.3333 ft/sec	0.0324 CFS	Normal	Sample taken 10' D/S of confluence

Thursday, July 23, 2015

ID	WEATHER CONDITIONS	RAINFALL	SITE CONDITIONS	FLOW PRESENT IN OUTFALL?	FLOW DEPTH, WIDTH & VELOCITY	ESTIMATED FLOWRATE	FLOW CHARACTERISTICS	OTHER
M01	Cool, foggy	N/A	Normal	Substantial flow	3/8 inches x 8 inches x 1.5 ft/sec	0.0313	Clear	
M02	Cool, foggy	N/A	Normal	Yes Substantial	3/8 inches x 4.5 inches x 1.7647 ft/sec	0.0201 CFS	Clear	
M03	Cool, foggy	N/A	Normal	Trickle	Not Measurable	N/A	Normal color, clear	
M04	Cool, foggy	N/A	Plastic trash, see pictures	No flow	N/A	N/A	N/A	Not wet, not dry but moist. Evidence of flow, see 4th picture
M05	Cool, foggy	N/A	Normal	A little more than a trickle	0.09375 inches x 5 inches x 1.4286 ft/sec	0.005 CFS	Normal, clear	
M06	Cool, foggy	N/A	Normal	No flow but evidence of recent flow - moist see 4th picture	N/A	N/A	N/A	
M07	Cool, foggy	N/A	Normal	No flow but evidence of recent flow - moist see 4th picture	N/A	N/A	N/A	
M08	Cool, foggy	N/A	Nasty looking film on top of water	Substantial flow	5 inches x 21 inches x 0.1333 ft/sec	0.0970 CFS	Normal, clear	Sample taken 20' D/S of outfall
M09	Cool, foggy	N/A	Normal	Slight trickle	1/16 inches x 2 inches x 1 ft/sec	0.0104 CFS	Normal	No sample taken
M10	Cool, foggy	N/A	Normal, reddish yellow color at base of outfall	Substantial flow	0.75 inches x 11.5 inches x 0.75 ft/sec	0.0449 CFS	Clear, normal	Foam in ponded area 20' D/S of outfall
M11b	64° F / Cloudy	N/A	Slight amount of trash. Large build up of dead trees	Ponded	N/A	N/A	N/A	
M11	64° F / Cloudy	N/A	Slight amount of trash. Large build up of dead trees	Ponded	N/A	N/A	N/A	
M12	64° F / Cloudy	N/A	Slight amount of trash. Build up of dead trees	small trickle	N/A	N/A	Murky	Spill out 2ft into ground
M13	64° F / Cloudy	N/A	Large amount of trash	No flow	N/A	N/A	N/A	
M14	64° F / Cloudy	N/A	Overgrown, Dead leaf build-up, good amount of trash	Dripping	N/A	N/A	N/A	
M14b - RW	64° F / Cloudy	N/A		Trickle	1.9685 inches x 1 foot	N/A	N/A	

Thursday, July 23, 2015

ID	WEATHER CONDITIONS	RAINFALL	SITE CONDITIONS	FLOW PRESENT IN OUTFALL?	FLOW DEPTH, WIDTH & VELOCITY	ESTIMATED FLOWRATE	FLOW CHARACTERISTICS	OTHER
M14c	64° F / Cloudy	N/A		Trickle	N/A	N/A	Clear	
M15	64° F / Cloudy	N/A	Slight amount of trash	No flow	N/A	N/A	N/A	
M15b	64° F / Cloudy	N/A	Small amount of trash. Dead tree build up	Ponded	N/A	N/A	N/A	
M16	64° F / Cloudy	N/A	Slight amount of trash	No flow	N/A	N/A	N/A	Wet with small pool 3ft out from outfall
M17	64° F / Cloudy	N/A	Large amount of trash. Dead tree build up	Ponded	N/A	N/A	N/A	Water is very murky
DP	64° F / Cloudy	N/A	Duck	N/A	N/A	N/A	N/A	
M26	Cool, humid, clearing of fog	N/A	Normal. Ponded water at base of outfall	N/A	N/A	N/A	N/A	
M27	64° F / Cloudy	N/A	None		None	N/A	N/A	
M28	64° F / Cloudy	N/A	None	N/A	Trickle	N/A	Clear	
M30	64° F / Cloudy	N/A	None	Trickle/Moderate	1.75 inches x 1 inch x 0.8230 ft/sec	0.001 CFS	Clear	
M31	64° F / Cloudy	N/A	Trash	Moderate	4 inches x 10 inches x 0.8427 ft/sec	0.2341 CFS	Clear	
M34	64° F / Cloudy	N/A	N/A	None	N/A	N/A	N/A	
L3	64° F / Fog	N/A	N/A	Moderate	4 inches x 20 inches x 0.7299 ft/sec	0.4055 CFS		
TL1	64° F / Fog	N/A	Trash	Trickle	1 inch x 3 inches x 0.4739 ft/sec	0.001 CFS	Cloudy	
MCW-14b	64° F / Cloudy	N/A	Trash build up at fallen tree	Moderate	5 inches x 12 inches x 1.5873 ft/sec	0.6614 CFS	Clear	Horse manure smell
MCW-12	Cool, foggy	N/A	Normal, duck D/S	Substantial flow	1.75 inches x 27 inches x 0.3636 ft/sec	0.1193 CFS	Clear	inge to extract sample 10' D/S of co

Monday, July 27, 2015

ID	WEATHER CONDITIONS	RAINFALL	SITE CONDITIONS	FLOW PRESENT IN OUTFALL?	FLOW DEPTH, WIDTH & VELOCITY	ESTIMATED FLOWRATE	FLOW CHARACTERISTICS	OTHER
M01	64° F / Cloudy	N/A	Normal	No flow at 0547, No flow at 0614, Huge flow at 0652	0.50 inches x 9 inches x 1.3333 ft/sec	0.0417 CFS	Normal, clear	
M02	64° F / Cloudy	N/A	Normal	Trickle	0.25 inches x 4 inches x 1 ft/sec	0.0069 CFS	Clear	Flow increased significantly between arrival and 0600
M03	64° F / Cloudy	N/A	N/A					
M04	Cool, foggy	N/A						
M05	Cool, foggy	N/A	Normal	Moderate			Normal, clear	
M06	Cool, foggy	N/A						
M07	Cool, foggy	N/A						
M08	Cool, foggy	N/A	Normal except oily layer on top of water surface	Moderate	4 inches x 1.5 feet x 0.2857 ft/sec	0.1429 CFS	Normal, clear	Sample dipped 20' D/S of outfall
M09	Cool, foggy	N/A						
M10	Cool, foggy	N/A	Normal	Moderate - Both culverts flowing	1 (*Left): 0.375 inches x 10 inches x 0.75 ft/sec 2 (Right): 0.0938 inches x 6 inches x 0.60 ft/sec	1 (Left*): 0.0196 CFS 2 (Right): 0.0023 CFS	Orange deposite at Outfall	
M11b	64° F / Cloudy	N/A						
M11	64° F / Cloudy	N/A						
M12	64° F / Cloudy	N/A						
M13	64° F / Cloudy	N/A						
M14	64° F / Cloudy	N/A						
M14b - RW	64° F / Cloudy	N/A		Moderate	1.9685 inches x 7 inches		Slightly murky	

Monday, July 27, 2015

ID	WEATHER CONDITIONS	RAINFALL	SITE CONDITIONS	FLOW PRESENT IN OUTFALL?	FLOW DEPTH, WIDTH & VELOCITY	ESTIMATED FLOWRATE	FLOW CHARACTERISTICS	OTHER
M14c	64° F / Cloudy	N/A		Trickle				
M15	64° F / Cloudy	N/A						
M15b	64° F / Cloudy	N/A						
M16	64° F / Cloudy	N/A						Small amount of water pooled at exit of outfall
M17	69° F / Cloudy	N/A			2.3622 inches x 3 inches		Clear	
DP	64° F / Cloudy	N/A	Ducks	None				
M26	Cool, humid, clearing of fog	N/A						
M27	64° F / Cloudy	N/A						
M28	63° F / Cloudy	N/A		Moderate	1.1811 inches x 5.6 inches		Clear	
M30	64° F / Cloudy	N/A	Ponded	Moderate	2.5 inches x 8 inches x 0.4706 ft/sec	0.0654 CFS		
M31	64° F / Cloudy	N/A	Ponded/ With heavy algae U/S	Trickle/Moderate	2.5 inches x 3 inches x 1.2195 ft/sec	0.0635 CFS		
M34	66° F / Cloudy	N/A		None				
L3	64° F / Fog	N/A	Light Trash	Moderate	2.5 inches x 7 inches x 1.0381 ft/sec	0.1261 CFS		
TL1	64° F / Fog	N/A	N/A	Moderate	1.5 inches x 2 inches x 0.5190 ft/sec	0.0108 CFS		
MCW-14b	64° F / Cloudy	N/A	N/A	Moderate	3.5 inches x 14 inches x 0.6920 ft/sec	0.2355 CFS	Ponded U/S	Manuer Smell
MCW-12	Cool, foggy	N/A	Normal	Trickle	0.50 inches x 4 inches x 1ft/sec	0.0139 CFS	Normal, clear	

Thursday, July 30, 2015

ID	WEATHER CONDITIONS	RAINFALL	SITE CONDITIONS	FLOW PRESENT IN OUTFALL?	FLOW DEPTH, WIDTH & VELOCITY	ESTIMATED FLOWRATE	FLOW CHARACTERISTICS	OTHER
M01	Cool, clear	N/A	Normal	Substantial	0.75 inches x 9 inches x 1.3333 ft/sec	0.0625 CFS	Clear	
M02	Cool, clear	N/A	Normal	Moderate	0.1875 inches x 4 inches x 0.75 ft/sec	0.0039 CFS	Normal, Clear	
M03	Cool, clear	N/A	N/A	N/A	N/A	N/A	N/A	
M04	Cool, clear	N/A	N/A	N/A	N/A	N/A	N/A	
M05	Cool, clear	N/A	Normal	Moderate	0.25 inches x 5.5 inches x 1.4286 ft/sec	0.0136 CFS	Normal, Clear	
M06	Cool, clear	N/A	N/A	N/A	N/A	N/A	N/A	
M07	Cool, clear	N/A	N/A	N/A	N/A	N/A	N/A	
M08	Cool, clear	N/A	Normal	Substantial flow	5.5 inches x 24 inches x 0.1667 ft/sec	0.1528 CFS	Normal, Clear	
M09	Cool, clear	N/A	Normal	Trickle	0.0625 inches x 2 inches x 1.3636 ft/sec	0.0011 CFS	Normal, Clear	
M10	Cool, clear	N/A	Normal, pond D/S is milky	Moderate	0.375 inches x 8 inches x 0.4286 ft/sec	0.0089 CFS	Yellow color	
M11b	72° F / Partly Cloudy	N/A	N/A	N/A	N/A	N/A	N/A	
M11	72° F / Partly Cloudy	N/A	N/A	N/A	N/A	N/A	N/A	
M12	72° F / Partly Cloudy	N/A	N/A	N/A	N/A	N/A	N/A	
M13	72° F / Partly Cloudy	N/A	N/A	N/A	N/A	N/A	N/A	
M14	72° F / Partly Cloudy	N/A	Large amount of trash	Trickle, dripping	N/A	N/A	N/A	
M14b - RW	72° F / Partly Cloudy	N/A	N/A	Trickle/Moderate	N/A	N/A	N/A	

Thursday, July 30, 2015

ID	WEATHER CONDITIONS	RAINFALL	SITE CONDITIONS	FLOW PRESENT IN OUTFALL?	FLOW DEPTH, WIDTH & VELOCITY	ESTIMATED FLOWRATE	FLOW CHARACTERISTICS	OTHER
M14c	72° F / Partly Cloudy	N/A	N/A	Trickle	N/A	N/A	N/A	
M15	74° F / Partly Cloudy	N/A	N/A	No flow	N/A	N/A	N/A	
M15b	74° F / Partly Cloudy	N/A	Small amount of trash	Ponded	N/A	N/A	N/A	
M16	74° F / Partly Cloudy	N/A	N/A	N/A	N/A	N/A	N/A	Water ponded at outfall
M17	74° F / Partly Cloudy	N/A	N/A	Moderate	9 centimeters x 6 inches	N/A	Clear	
DP	70° F / Clear	N/A	Ducks	N/A	N/A	N/A	N/A	
M26	Cool, clear	N/A	N/A	N/A	N/A	N/A	N/A	
M27	67° F / Clear	N/A	N/A	No, flow. Ponded	N/A	N/A	N/A	
M28	67° F / Clear	N/A	N/A	Moderate	3.14961 inches x 4.8 inches	N/A	Clear	
M30	74° F	N/A	N/A	Moderate	3.5 inches x 2 inches x 0.5952 ft/sec	0.0289 CFS	N/A	
M31	72° F / Clear	N/A	N/A	Moderate	3.5 inches x 6 inches x 1.2346 ft/sec	0.1800 CFS	N/A	
M34	74° F	N/A	N/A	N/A	N/A	N/A	N/A	
L3	62° F / Clear	N/A	N/A	Moderate	7 inches x 8 inches x 1.0830 ft/sec	0.4212 CFS	N/A	
TL1	72° F / Clear	N/A	Trash	Trickle	1 inch x 1.5 inches x 0.7937 ft/sec	0.0083 CFS	N/A	N/A
MCW-14b	71° F / Clear	N/A	Trash (Plastic bottles, plastic bags)	Moderate	4 inches x 6 inches x 1.1278 ft/sec	0.1880 CFS	N/A	
MCW-12	Cool, clear	N/A	N/A	Moderate	0.50 inches x 3 inches x 1 ft/sec	0.0104 CFS	Normal, Clear	

Monday, August 3, 2015

ID	WEATHER CONDITIONS	RAINFALL	SITE CONDITIONS	FLOW PRESENT IN OUTFALL?	FLOW DEPTH, WIDTH & VELOCITY	ESTIMATED FLOWRATE	FLOW CHARACTERISTICS	OTHER
M01	Sunny clear	N/A	Normal	Moderate	0.25 inches x 6 inches x 0.8108 ft/sec	0.0084 CFS	Normal, clear	N/A
M02	Cool, clear	N/A	N ormal	Trickle	0.1875 inches x 3.5 inches x 0.75 ft/sec	0.0034 CFS	Clear normal	N/A
M03	Cool, clear	N/A	N/A	No flow, wet	N/A	N/A	N/A	N/A
M04	Cool, clear	N/A	N/A	No Flow	N/A	N/A	N/A	N/A
M05	Cool, clear	N/A	N/A	Substantial	0.25 inches x 5 inches x 1.3636 ft/sec	0.01184 CFS	N/A	N/A
M06	Cool, clear	N/A	N/A		N/A	N/A	N/A	N/A
M07	Cool, clear	N/A	N/A	No flow, wet	N/A	N/A	N/A	N/A
M08	Cool, clear	N/A	N/A	Substantial	8.75 inches x 43 inches x 0.0156 ft/sec	0.0408 CFS	N/A	N/A
M09	Cool, clear	N/A	N/A	Trickle	0.0625 inches x 2 inches x 2.4 ft/sec	0.0020 CFS	N/A	N/A
M10	Cool, foggy	N/A	N/A	Moderate	0.50 inches x 9.5 inches 0.50 ft/sec	0.0165 CFS	Clear normal, Yellow deposite DS of culvert	N/A
M11b	Cool, clear	N/A	N/A	Ponded	N/A	N/A	N/A	N/A
M11	64° F / Cloudy	N/A	N/A	Ponded	N/A	N/A	N/A	N/A
M12	64° F / Cloudy	N/A	N/A		N/A	N/A	N/A	N/A
M13	64° F / Cloudy	N/A	N/A		N/A	N/A	N/A	N/A
M14	72° F / Partly Cloudy	N/A	N/A		N/A	N/A	N/A	N/A
M14b - RW	60° F / Clear	N/A	N/A	Trickle/Moderate	3.54 inches x 11 inches	N/A	Clear	N/A

Monday, August 3, 2015

ID	WEATHER CONDITIONS	RAINFALL	SITE CONDITIONS	FLOW PRESENT IN OUTFALL?	FLOW DEPTH, WIDTH & VELOCITY	ESTIMATED FLOWRATE	FLOW CHARACTERISTICS	OTHER
M14c	60° F / Clear	N/A	N/A	Trickle	N/A	N/A	Clear	N/A
M15	60° F / Clear	N/A	N/A		N/A	N/A	N/A	N/A
M15b	60° F / Clear	N/A	N/A	Ponded	N/A	N/A	N/A	N/A
M16	59° F / Clear	N/A	N/A		N/A	N/A	N/A	N/A
M17	61° F / Clear	N/A	Large amount of trash. Dead tree build up	Moderate	1 inch x 11.5 inches	N/A	Clear	N/A
DP	64° F / Clear	N/A	Ducks		N/A	N/A	Heavy feather debris	N/A
M26	61° F / Clear	N/A	N/A	No flow	N/A	N/A	N/A	N/A
M27	59° F / Clear	N/A	N/A	No flow	N/A	N/A	N/A	N/A
M28	59° F / Clear	N/A	N/A	Trickle	N/A	N/A	Clear	N/A
M30	64° F / Clear	N/A	N/A	Trickle	2 inches x 2 inches x 0.7042 ft/sec	0.0196 CFS	N/A	N/A
M31	64° F / Clear	N/A	N/A	Moderate	3 inches x 7 inches x 1.7045 ft/sec	0.2486 CFS	N/A	N/A
M34	64° F / Clear	N/A	N/A		N/A	N/A	N/A	N/A
L3	64° F / Clear	N/A	Light trash (plastic bags)	Moderate	7 inches x 6.5 inches x 1.0676 ft/sec	0.3373 CFS	Clear	N/A
TL1	64° F / Clear	N/A	N/A	Trickle	1 inch x 1.5 inches x 0.6455 ft/sec	0.0067 CFS	Cloudy	N/A
MCW-14b	61° F / Clear	N/A	Trash (Bottles, Plastic, Chair, Doggie Bags)	Moderate	3.5 inches x 6 inches x 1.13636 ft/sec	0.1657 CFS	N/A	N/A
MCW-12	61° F / Clear	N/A	N/A	Moderate	0.50 inches x 3 inches x 0.7143 CFS	0.0159	N/A	N/A

Thursday, August 6, 2015

ID	WEATHER CONDITIONS	RAINFALL	SITE CONDITIONS	FLOW PRESENT IN OUTFALL?	FLOW DEPTH, WIDTH & VELOCITY	ESTIMATED FLOWRATE	FLOW CHARACTERISTICS	OTHER
M01	Clear, cool	N/A	Normal	Super abundant flow	0.625 inches x 9 inches x 1.5 ft/sec	0.0586 ft/sec	Clear	
M02	Clear, cool	N/A	Normal	Moderate	0.125 inches x 4 inches x 1.5 ft/sec	0.0052 ft/sec	Clear	
M03	Clear, cool	N/A	plastic trash	No flow, wet	N/A	N/A	N/A	N/A
M04	Clear, cool	N/A	N/A	No flow, dry	N/A	N/A	N/A	N/A
M05	Clear, cool	N/A	N/A	Moderate	0.125 inches x 4 inches x 1.0909 ft/sec	0.0038 CFS	Clear	
M06	Clear, cool	N/A	N/A	No flow, dry	N/A	N/A	N/A	N/A
M07		N/A	N/A	No flow, wet	N/A	N/A	N/A	N/A
M08	Clear, cool	N/A	N/A	Substantial	9 inches x 44 inches x 0.0278 ft/sec	0.0765 CFS	Normal	N/A
M09	Clear, cool	N/A	Normal	Trickle	0.03125 inches x 2 inches x 1 ft/sec	0.0004 CFS	Normal	N/A
M10	Clear, cool	N/A	Normal	Trickle	0.25 inchse x 6 inches x 0.20 ft/sec	0.0021 CFS	Clear	N/A
M11b	70° F / Clear	N/A	N/A	Ponded	N/A	N/A	N/A	N/A
M11	68° F / Clear	N/A	N/A	Ponded	N/A	N/A	N/A	N/A
M12	66° F / Clear	N/A	N/A	No flow	N/A	N/A	N/A	N/A
M13	65° F / Clear	N/A	N/A	No flow	N/A	N/A	N/A	N/A
M14	66° F / Clear	N/A	N/A	Trickle	N/A	N/A	N/A	N/A
M14b - RW	63° F / Clear	N/A	Dead tree build up	Moderate	3.54 inches x 7.10 inches x	N/A	N/A	N/A

Thursday, August 6, 2015

ID	WEATHER CONDITIONS	RAINFALL	SITE CONDITIONS	FLOW PRESENT IN OUTFALL?	FLOW DEPTH, WIDTH & VELOCITY	ESTIMATED FLOWRATE	FLOW CHARACTERISTICS	OTHER
M14c	63° F / Clear	N/A	N/A	Trickle	N/A	N/A	N/A	N/A
M15		N/A	N/A	N/A	N/A	N/A	N/A	N/A
M15b		N/A	N/A	Ponded	N/A	N/A	N/A	N/A
M16		N/A	N/A	N/A	N/A	N/A	N/A	N/A
M17	60° F / Clear	N/A	N/A	Moderate	3.14 inches x 7 inches	N/A	N/A	N/A
DP	70° F / Clear	N/A	Ducks	N/A	N/A	N/A	N/A	N/A
M26		N/A	N/A	No flow	N/A	N/A	N/A	N/A
M27	61° F / Clear	N/A	N/A	Ponded	N/A	N/A	N/A	N/A
M28	61° F / Clear	N/A	N/A	Trickle	1.18 inches x 3.6 inches	N/A	N/A	N/A
M30	72° F / Clear	N/A	Trash	Trickle	2 inches x 1.5 inches x 0.4808 ft/sec	0.0100 CFS	Clear	N/A
M31	70° F / Clear	N/A	N/A	Moderate	2.5 inches x 6 inches x 1.5707 CFS	0.1636 CFS	Clear	N/A
M34	64° F / Clear	N/A	N/A	None	N/A	N/A	N/A	N/A
L3	68° F / Clear	N/A	N/A	Moderate	6.5 inches x 6 inches x 0.9090 ft/sec	0.2462 CFS	N/A	N/A
TL1	70° F / Clear	N/A	N/A	Trickle	1 inch x 2 inches x 0.9804 ft/sec	0.0136 CFS	N/A	N/A
MCW-14b	65° F / Clear	N/A	Trash	Moderate	2 inches x 7 inches x 0.9646 ft/sec	0.0937 CFS	N/A	N/A
MCW-12	Cool, clear	N/A	N/A	Trickle	0.25 inches x 2 inches x 1 ft/sec	0.0035 CFS	Clear	Flow began increasing at 0600 from M02

Monday, August 10, 2015

ID	WEATHER CONDITIONS	RAINFALL	SITE CONDITIONS	FLOW PRESENT IN OUTFALL?	FLOW DEPTH, WIDTH & VELOCITY	ESTIMATED FLOWRATE	FLOW CHARACTERISTICS	OTHER
M01	Cool, foggy	N/A	Normal	Substantial	0.50 inches x 7 inches x 1 ft/sec	0.0243 CFS	Clear	N/A
M02	Cool, foggy	N/A	Normal	Moderate	0.1875 inches x 4 inches x 1.1111 ft/sec	0.0058 CFS	Clear	N/A
M03	Cool, foggy	N/A	N/A	N/A	N/A	N/A	N/A	N/A
M04	Cool, foggy	N/A	N/A	N/A	N/A	N/A	N/A	N/A
M05	Cool, foggy	N/A	Normal	Trickle	0.25 inches x 6 inches x 1.3636 ft/sec	0.0142 CFS	Light yellow	N/A
M06	Cool, foggy	N/A	N/A	N/A	N/A	N/A	N/A	N/A
M07	Cool, foggy	N/A	N/A	No flow, wet	N/A	N/A	N/A	N/A
M08	Cool, foggy	N/A	Normal	Substantial	10 inches x 44 inches x 0.0625 ft/sec	0.1910 CFS	Clear	Surface is free of oil
M09	Cool, foggy	N/A	N/A	Less than a trickle	N/A	N/A	N/A	N/A
M10	Cool, foggy	N/A	Normal	Less than a trickle	Not Measurable		Yellow/Orange water	N/A
M11b	57° F / Cloudy	N/A	N/A	Ponded	N/A	N/A	N/A	N/A
M11	57° F / Cloudy	N/A	N/A	Ponded	N/A	N/A	N/A	N/A
M12	57° F / Cloudy	N/A	N/A	No Flow	N/A	N/A	N/A	N/A
M13	57° F / Cloudy	N/A	N/A	No Flow	N/A	N/A	N/A	N/A
M14	56° F / Cloudy	N/A	N/A	No Flow	N/A	N/A	N/A	N/A
M14b - RW	57° F / Cloudy	N/A	N/A	Moderate	N/A	N/A	N/A	N/A

Monday, August 10, 2015

ID	WEATHER CONDITIONS	RAINFALL	SITE CONDITIONS	FLOW PRESENT IN OUTFALL?	FLOW DEPTH, WIDTH & VELOCITY	ESTIMATED FLOWRATE	FLOW CHARACTERISTICS	OTHER
M14c	59° F / Cloudy	N/A	N/A	No flow	N/A	N/A	N/A	N/A
M15	59° F / Cloudy	N/A	N/A	No flow	N/A	N/A	N/A	N/A
M15b	59° F / Cloudy	N/A	N/A	Ponded	N/A	N/A	N/A	N/A
M16	59° F / Cloudy	N/A	N/A	No flow	N/A	N/A	N/A	N/A
M17	59° F / Cloudy	N/A	Large amount of trash. Dead tree build up	Moderate	1.10 inches x 12 inches	Clear	N/A	N/A
DP	63° F / Foggy	N/A	N/A	N/A	N/A	N/A	Feather buildup on surface	N/A
M26	Cool, foggy	N/A	N/A	N/A	N/A	N/A	N/A	N/A
M27	56° F / Cloudy	N/A	N/A	Ponded	N/A	N/A	N/A	N/A
M28	56° F / Cloudy	N/A	N/A	Trickle	N/A	N/A	N/A	N/A
M30	64° F	N/A	Trash	Trickle	2.5 inches x 2 inches x 0.5348 CFS	0.0186 CFS	N/A	N/A
M31	64° F	N/A	N/A	Moderate	3 inches x 7 inches x 1.25 ft/sec	0.1823 CFS	N/A	N/A
M34	60° F / Clear	N/A	N/A	N/A	N/A	N/A	N/A	N/A
L3	60° F / Cloudy(Foggy)	N/A	Trash Bags	Moderate	6 inches x 7 inches 0.9677 ft/sec	0.2822 CFS	Clear	N/A
TL1	63° F / Foggy	N/A	N/A	Trickkle/Moderate	2 inches x 2 inches x 0.4739 ft/sec	0.0132 CFS	Cloudy surface	N/A
MCW-14b	60° F / Foggy	N/A	Trash U/S	Moderate	3 inches x 6 inches x 1.3453 ft/sec	0.1682 CFS	Cloudy/Muddy	N/A
MCW-12	Cool, clear	N/A	Oil film on surface of water	Trickle	0.25 inches x 1 inch x 0.50 ft/sec		Milky	Such little flow - Had to extract samples from small pond area got under surface but most likely extracted some debris from bottom

Thursday, August 13, 2015

ID	WEATHER CONDITIONS	RAINFALL	SITE CONDITIONS	FLOW PRESENT IN OUTFALL?	FLOW DEPTH, WIDTH & VELOCITY	ESTIMATED FLOWRATE	FLOW CHARACTERISTICS	OTHER
M01	Cool, clear	N/A	Normal	Moderate	0.25 inches x 7.5 inches x 0.8571 ft/sec	0.0111 CFS	Light yellow	N/A
M02	Cool, clear	N/A	Normal	Moderate	0.1875 inches x 4 inches x 1.3043 ft/sec	0.0068 CFS	Clear	N/A
M03	Cool, clear	N/A	Normal	Slight trickle	Not measurable	N/A	Dark yellow	Syringe off bottom of left culvert. Very hard to get sample
M04	Cool, clear	N/A	N/A	N/A	N/A	N/A	N/A	N/A
M05	Cool, clear	N/A	Normal	Trickle	0.25 inches x 6 inches x 2 ft/sec	0.0208 CFS	Light yellow	N/A
M06	Cool, clear	N/A	N/A	N/A	N/A	N/A	N/A	N/A
M07	Cool, clear	N/A	N/A	N/A	N/A	N/A	N/A	N/A
M08	Cool, clear	N/A	Normal	Substantial	8 inches x 44 inches x 0.04 ft/sec	0.0978 CFS	Clear	Sample taken 20' D/S of outfall (culvert)
M09	Cool, clear	N/A	N/A	No flow, wet	N/A	N/A	N/A	N/A
M10	Cool, clear	N/A	N/A	N/A	N/A	N/A	N/A	N/A
M11b	Cool, clear	N/A	N/A	Ponded	N/A	N/A	N/A	N/A
M11	60° F / Clear	N/A	N/A	Ponded	N/A	N/A	N/A	N/A
M12	60° F / Clear	N/A	N/A	No flow	N/A	N/A	N/A	N/A
M13	60° F / Clear	N/A	N/A	No flow	N/A	N/A	N/A	N/A
M14	60° F / Clear	N/A	Large amount of trash. Dead tree build up	Trickle	N/A	N/A	Clear	N/A
M14b - RW	60° F / Clear	N/A	N/A	Moderate	8 inches x 6.8 inches	N/A	N/A	N/A

Thursday, August 13, 2015

ID	WEATHER CONDITIONS	RAINFALL	SITE CONDITIONS	FLOW PRESENT IN OUTFALL?	FLOW DEPTH, WIDTH & VELOCITY	ESTIMATED FLOWRATE	FLOW CHARACTERISTICS	OTHER
M14c	60° F / Clear	N/A	N/A	Trickle	N/A	N/A	N/A	N/A
M15	65° F / Clear	N/A	N/A	N/A	N/A	N/A	N/A	N/A
M15b	60° F / Clear	N/A	N/A	Ponded	N/A	N/A	N/A	N/A
M16	67° F / Clear	N/A	Small amount of trash. Dead leaf build up	No flow	N/A	N/A	N/A	N/A
M17	67° F / Clear	N/A	Large amount of trash. Dead leaf build up	Moderate	1 inch x 7.7 inches		Clear	
DP	65° F / Clear	N/A	Ducks	N/A	N/A	N/A	N/A	N/A
M26	67° F / Clear	N/A	N/A	N/A	N/A	N/A	N/A	N/A
M27	67° F / Clear	N/A	N/A	Ponded	N/A	N/A	N/A	N/A
M28	67° F / Clear	N/A	N/A	No flow	N/A	N/A	N/A	N/A
M30	66° F / Clear	N/A	Trash (Plastic bags)	Trickle/ Moderate	3 inches x 1.5 inches x 1.0256 ft/sec	0.0321 CFS	N/A	N/A
M31	65° F / Clear	N/A	None	Moderate	4.5 inches x 6 inches x 0.9375 ft/sec	0.1758 CFS	N/A	N/A
M34	60° F / Clear	N/A	N/A	N/A	N/A	N/A	N/A	N/A
L3	64° F / Clear	N/A	Trash (Doggie Bags)	Moderate	7 inches x 11.5 inches x 0.8621 ft/sec	0.4819 CFS	Clear	N/A
TL1	64° F / Clear	N/A	N/A	Trickle	2 inches x 2 inches x 0.7042 ft/sec	0.0196 CFS	N/A	N/A
MCW-14b	64° F / Clear	N/A	Trash (Plastic bottle, bags)	Moderate	5 inches x 8.5 inches x 1.3762 ft/sec	0.4062 CFS	Clear	N/A
MCW-12	Cool, clear	N/A	Normal	Slight trickle	0.50 inches x 2 inches x 0.25 ft/sec	0.0017 CFS	Clear	N/A

Monday, August 17, 2015

ID	WEATHER CONDITIONS	RAINFALL	SITE CONDITIONS	FLOW PRESENT IN OUTFALL?	FLOW DEPTH, WIDTH & VELOCITY	ESTIMATED FLOWRATE	FLOW CHARACTERISTICS	OTHER
M01	Clear sky, sunny moderatly warm	N/A	Normal	Trickle	0.25 inches x 6 inches x 0.60 ft/sec	0.0062 CFS	Clear	N/A
M02	Cool, clear	N/A	Normal	Moderate	0.1875 inches x 4 inches x 1.3636 ft/sec	0.0071 CFS	Clear	N/A
M03	Cool, clear	N/A	Normal	No flow, wet	N/A	N/A	N/A	N/A
M04	Cool, clear	N/A	Normal	No flow, dry	N/A	N/A	N/A	N/A
M05	Cool, clear	N/A	Normal	Moderate	0.1875 inches x 4 inches x 1.2 ft/sec	0.0062 CFS	Clear	N/A
M06	Cool, clear	N/A	Normal	No flow, dry	N/A	N/A	N/A	N/A
M07	Cool, clear	N/A	Normal	No flow, dry	N/A	N/A	N/A	N/A
M08	Cool, clear	N/A	Normal	Plastic bottle	8 inches x 41 inches x 0.0625 ft/sec	0.1424 CFS	Clear	N/A
M09	Cool, clear	N/A	Normal	Leafs at base of culvert	No flow, wet	N/A	N/A	N/A
M10	Cool, clear	N/A	Normal	No flow, dry	N/A	N/A	N/A	Sample taken at logger dam
M11b	Cool, clear	N/A	Decent amount of trash.	Ponded	N/A	N/A	N/A	N/A
M11	Cool, clear	N/A	Small amount of trash	Ponded	N/A	N/A	N/A	N/A
M12	69° F / Clear	N/A	Small amount of trash	No Flow	N/A	N/A	N/A	N/A
M13	70° F / Clear	N/A	Decent amount of trash.	No Flow	N/A	N/A	N/A	N/A
M14	68° F / Clear	N/A	Decent amount of trash.	No Flow	N/A	N/A	N/A	N/A
M14b - RW	70° F / Clear	N/A	N/A	Moderate	8 inches x 5.2 inches	N/A	Clear	N/A

Monday, August 17, 2015

ID	WEATHER CONDITIONS	RAINFALL	SITE CONDITIONS	FLOW PRESENT IN OUTFALL?	FLOW DEPTH, WIDTH & VELOCITY	ESTIMATED FLOWRATE	FLOW CHARACTERISTICS	OTHER
M14c	70° F / Clear	N/A	N/A	No flow	N/A	N/A	N/A	N/A
M15	73° F / Clear	N/A	N/A	No flow	N/A	N/A	N/A	N/A
M15b	73° F / Clear	N/A	N/A	Ponded	N/A	N/A	N/A	N/A
M16	73° F / Clear	N/A	N/A	No flow	N/A	N/A	N/A	N/A
M17	73° F / Clear	N/A	Large amount of trash	Moderate	1.6 inches x 12 inches	N/A	Clear	N/A
DP	70° F / Clear	N/A	Ducks	N/A	N/A	N/A	Cloudy	*DPb - 20150817 Outfall undeneath road flowing 0705
M26	Warm clear sky	N/A	N/A	No flow, dry	N/A	N/A	N/A	N/A
M27	66° F / Clear	N/A	N/A	Ponded	N/A	N/A	N/A	N/A
M28	66° F / Clear	N/A	N/A	Trickle	N/A	N/A	Clear	
M30	70° F / Clear	N/A	N/A	Moderate	4 inches x 7 inches x 0.7979 ft/sec	0.1551 CFS	N/A	N/A
M31	70° F / Clear	N/A	Trash (Plastic bags)	Trickle	2 inches x 2 inches x 1.1429 ft/sec	0.0317 CFS	N/A	N/A
M34	72° F / Clear	N/A	N/A	None	N/A	N/A	N/A	N/A
L3	70° F / Clear	N/A	Trash	Moderate	6 inches x 10 inches x 0.9346 ft/sec	0.3894 CFS	Clear	N/A
TL1	70° F / Clear	N/A	Trash (Dog Bags)	Trickle	2 inches x 2 inches x 0.7463 ft/sec	0.0207 CFS	Murky	N/A
MCW-14b	70° F / Clear	N/A	Trash (plastic, bottles, chair)	Moderate	4.5 inches x 8 inches x 1.3825 ft/sec	0.3456 CFS	Clear	Giant Oak fell 100' U/S of sampling location
MCW-12	Cool, clear	N/A	Normal	No flow, moist	N/A	N/A	N/A	Sample taken in different spot than usual normal spot 15' D/S of Culv Line. No flow, so sample taken from small pond inline w/ culvert line

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Appendix C:

Bacteria & Flow Data

Table C-1. *E. coli* results from receiving water and outfall locations sampled in 2015. Concentrations are given in MPN/100mL.

Sub-watershed	Sample Type	Site ID	7/13	7/16	7/23	7/27	7/30	8/3	8/6	8/10	8/13	8/17	Median
Medea Creek	Receiving Water	MCW-12*	ND	85	97	85	130	41	20	31	ND	41	41
		M10	41	4,100	140	41	75	20	260	160	280	160	150
		M14B	1,400	41	220	340	490	210	400	450	20	210	280
		M30	590	86	140	190	ND	290	20	85	41	230	113
		M31	1,100	110	120	20	41	10	130	86	200	63	98
		DP	3,300	1,200	1,800	1,400	1,400	1,500	1,400	1,100	3,700	810	1,400
	Outfall	M01	280	160,000	200,000	24,000	160,000	10,000	31,000	69,000	110,000	42,000	55,500
		M02	41	160	7,300	180	120	350	280	110	30	84	140
		M05	160	3,900	20,000	980	3,300	890	9,200	1,200	17,000	1,100	2,250
		M08	1,200	61,000	240,000	100,000	200,000	140,000	91,000	160,000	24,000	40,000	95,500
		M14C	10	74	20	250	130	930	20	10	41	63	52
		M17	17,000	1,600	840	3,900	3,100	7,300	2,000	830	16,000	600	2,250
		M27	20	6,500	140	1,300	1,900	550	620	610	980	1,100	800
		M28	17,000	4,900	9,200	3,000	1,500	16,000	1,200	1,400	16,000	1,200	3,950
Lindero Creek	Receiving Water	MCW-14B	400	63	660	300	200	600	280	280	360	440	330
		TL01	110	230	1,600	2,100	20,000	930	1,600	1,400	13,000	1,800	1,600
	Outfall	L03	4,600	10,000	9,800	1,500	20,000	930	150	200	84	52	1,215
Reclaimed Water (RECL)					10	ND	41	52	75	30	52	20	25

DP = Duck Pond, ND = Not Detected, *Study sampling site was located upstream of the compliance station.

Table C-2. Estimated flow (depth x width x velocity) from measurements taken during sampling in 2015. Flows are given in CFS, Loads are in MPN/s.

Sub-watershed	Sample Type	Site ID	7/13	7/16	7/23	7/27	7/30	8/3	8/6	8/10	8/13	8/17	Median	Estimated Load
Medea Creek	Receiving Water	MCW-12*	NE	0.032	0.119	0.014	0.010	0.016	0.0035	NE	0.0017	NE	0.014	161
		M10	NE	NE	0.045	0.022	0.0089	0.017	0.0021	NE	NE	NE	0.017	701
		M14B	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	N/A
		M30	0.351	0.012	0.0010	0.065	0.029	0.020	0.010	0.019	0.032	0.155	0.024	776
		M31	0.609	0.013	0.234	0.064	0.18	0.249	0.164	0.182	0.176	0.032	0.178	4,937
		DP	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	N/A
	Outfall	M01	NE	0.023	0.031	0.042	0.063	0.0084	0.059	0.024	0.011	0.0062	0.024	381,895
		M02	0.014	0.045	0.020	0.0069	0.0039	0.0034	0.0052	0.0058	0.0068	0.0071	0.0069	272
		M05	0.0034	0.0034	0.0050	NE	0.014	0.012	0.0038	0.014	0.021	0.0062	0.0062	3,950
		M08	NE	0.066	0.097	0.143	0.153	0.041	0.077	0.191	0.098	0.142	0.098	2,644,763
		M14C	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	N/A
		M17	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	N/A
		M27	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	N/A
		M28	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	N/A	N/A
Lindero Creek	Receiving Water	MCW-14B	0.079	0.173	0.661	0.236	0.188	0.166	0.094	0.168	0.406	0.346	0.181	16,867
		TL01	0.0072	0.011	0.0010	0.011	0.0083	0.0067	0.014	0.013	0.020	0.021	0.011	4,825
	Outfall	L03	0.017	0.165	0.406	0.126	0.421	0.337	0.246	0.282	0.482	0.389	0.310	106,569

DP = Duck Pond, NE = Not Estimated, N/A = Not Applicable, *Study sampling site was located upstream of the compliance station.

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Appendix D:

Human Marker Data

Table D-1. Human Marker results from outfall locations sampled in 2015. Concentrations are given in copies/100mL.

Subwatershed	Site ID	7/23		7/30		8/3		8/6		8/13	
		HF183	HumM2	HF183	HumM2	HF183	HumM2	HF183	HumM2	HF183	HumM2
Medea Creek	M01	59,700	4,340	2,640	ND	ND	ND	12,200	929	ND	ND
	M02	<LOQ	ND	<LOQ	ND	ND	ND	ND	ND	ND	ND
	M05	2,490	ND	ND	ND	984	ND	ND	ND	17,200	855
	M08	<LOQ	ND	993	<LOQ	673	12,100	2,990	1,520	1,580	2,230
	M14C	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	M17	<LOQ	ND	2,860	680	2,440	2,570	1,130	1,070	17,500	1,410
	M27	ND	ND	ND	ND	<LOQ	ND	ND	ND	ND	ND
	M28	ND	ND	667	ND	1,910	ND	ND	ND	ND	ND
Lindero Creek	L03	ND	ND	1,900	<LOQ	ND	ND	7,390	<LOQ	ND	ND
Reclaimed Water	RECL	35,600	2,240	7,450	ND	4,200	<LOQ	11,600	535	35,900	2,120
Filter Blank	BLANK	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

HF183 = HF183Taqman human marker, HumM2 = EPA human marker, <LOQ = Detected below the limit of quantification, ND = Not detected

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Appendix E:

Continuous Flow Monitoring

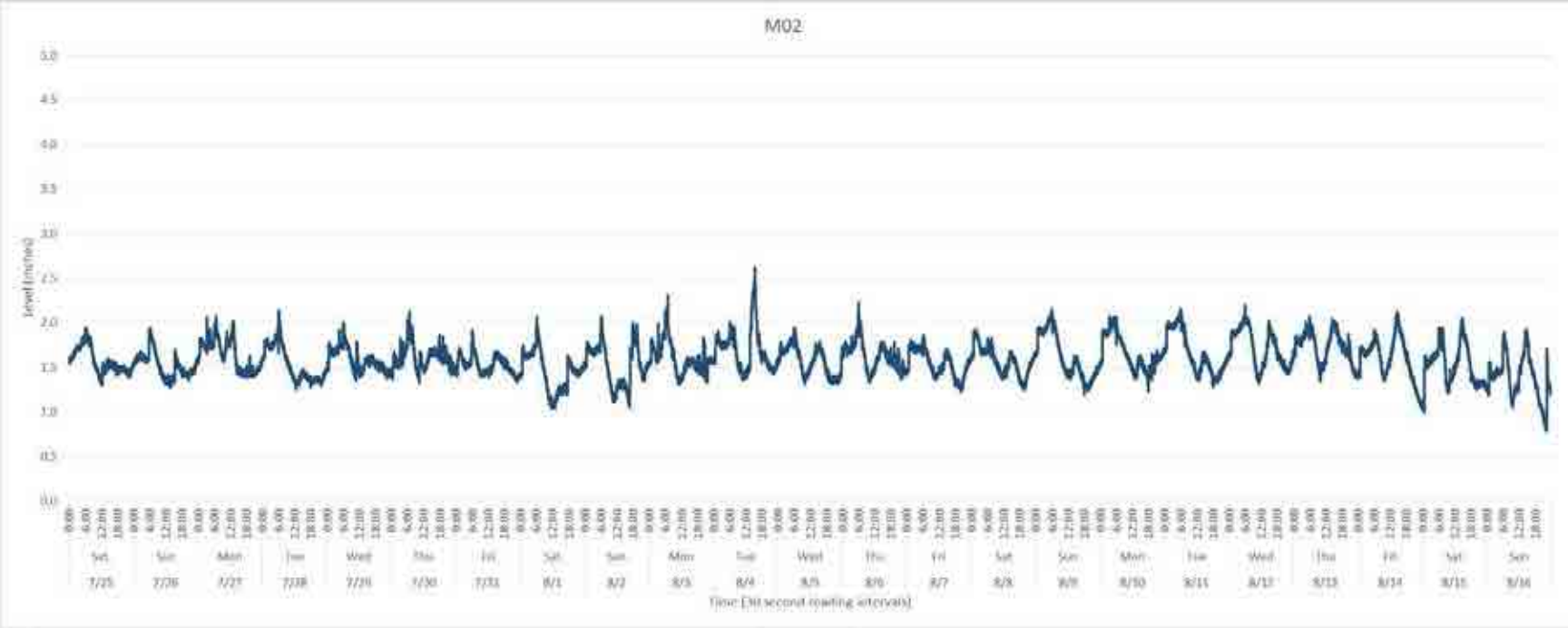

Figure E-1. Level logger data plot for outfall M02.

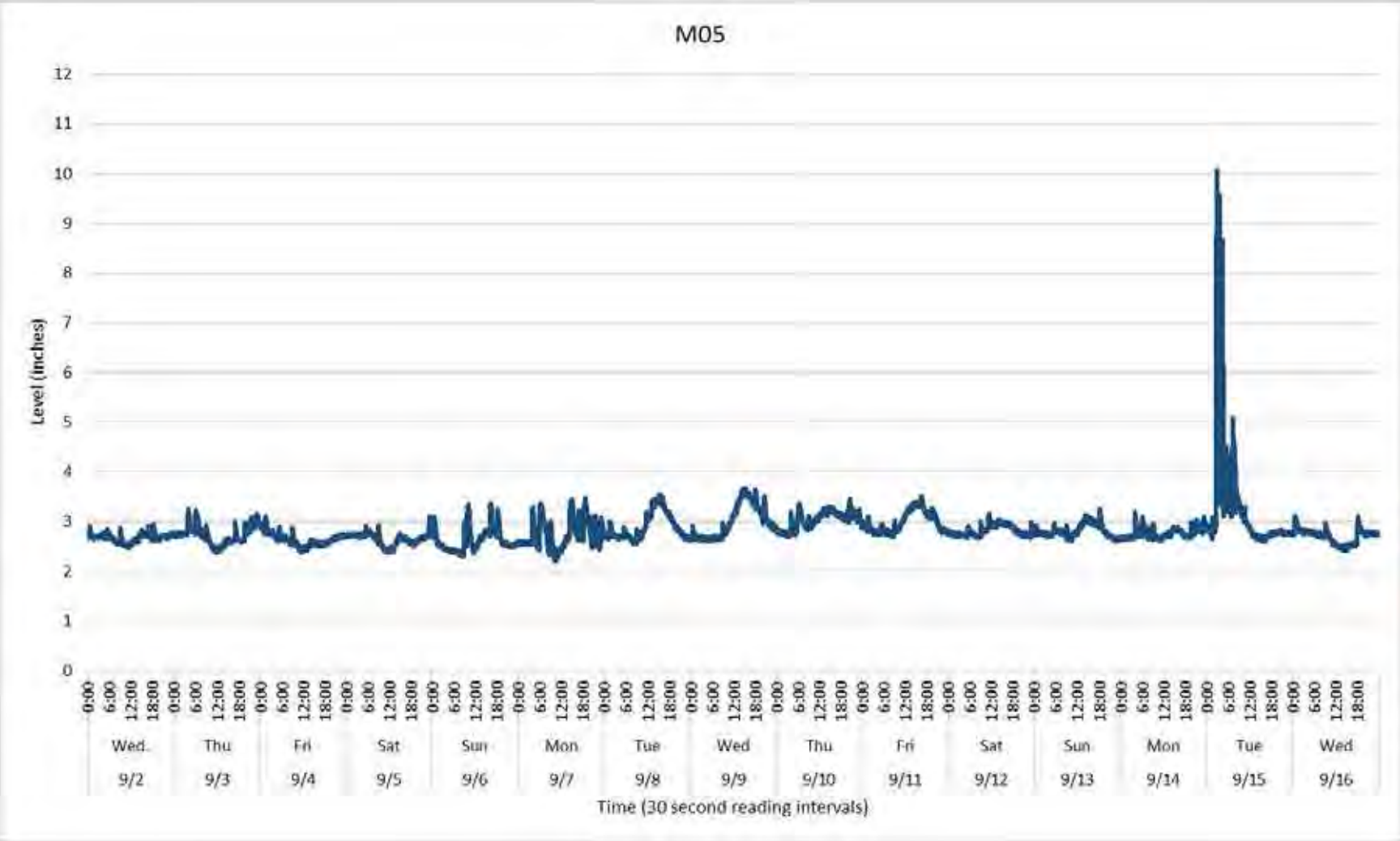

Figure E-2. Level logger data plot for outfall M05.

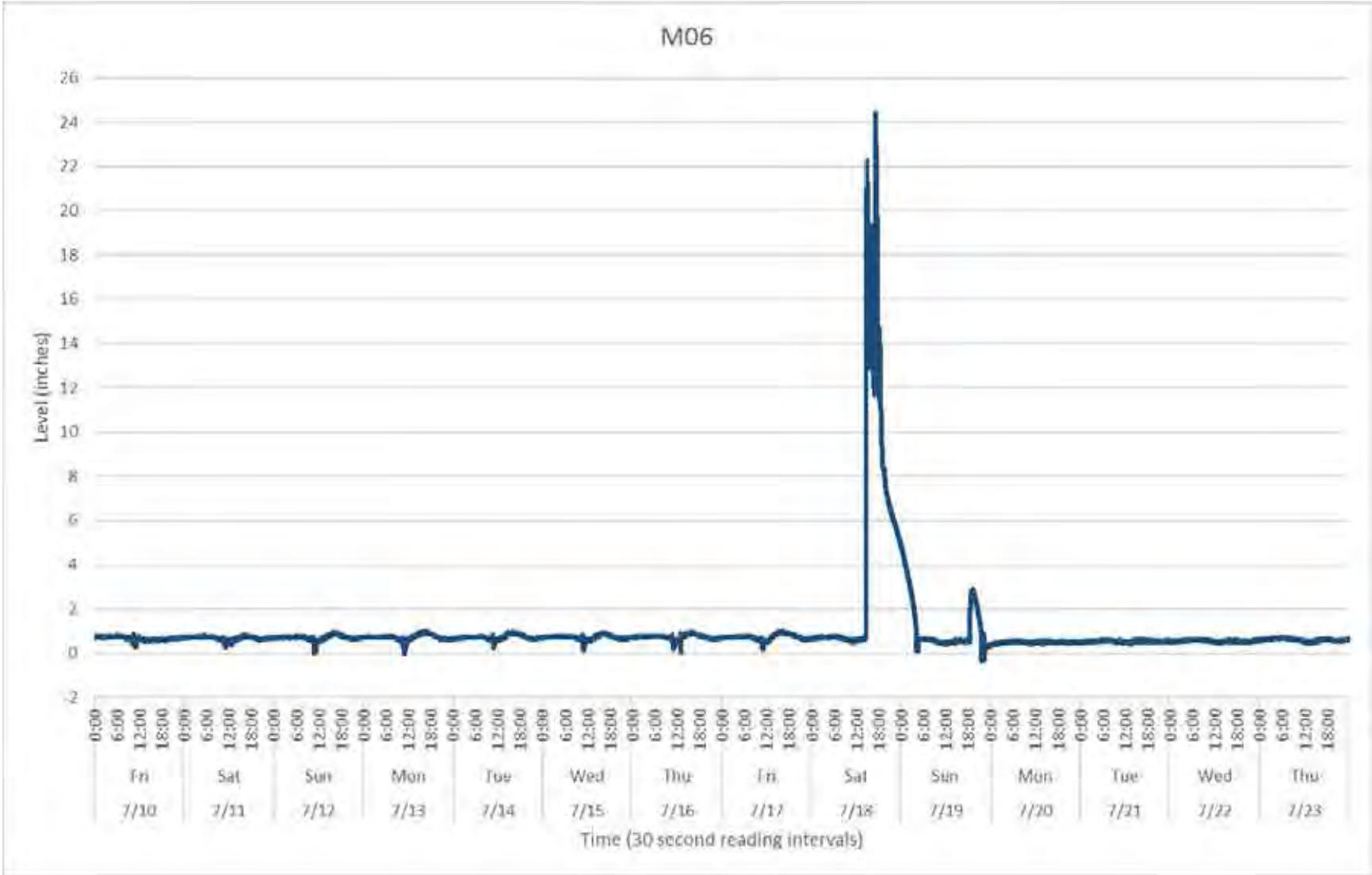

Figure E-3. Level logger data plot for outfall M06.

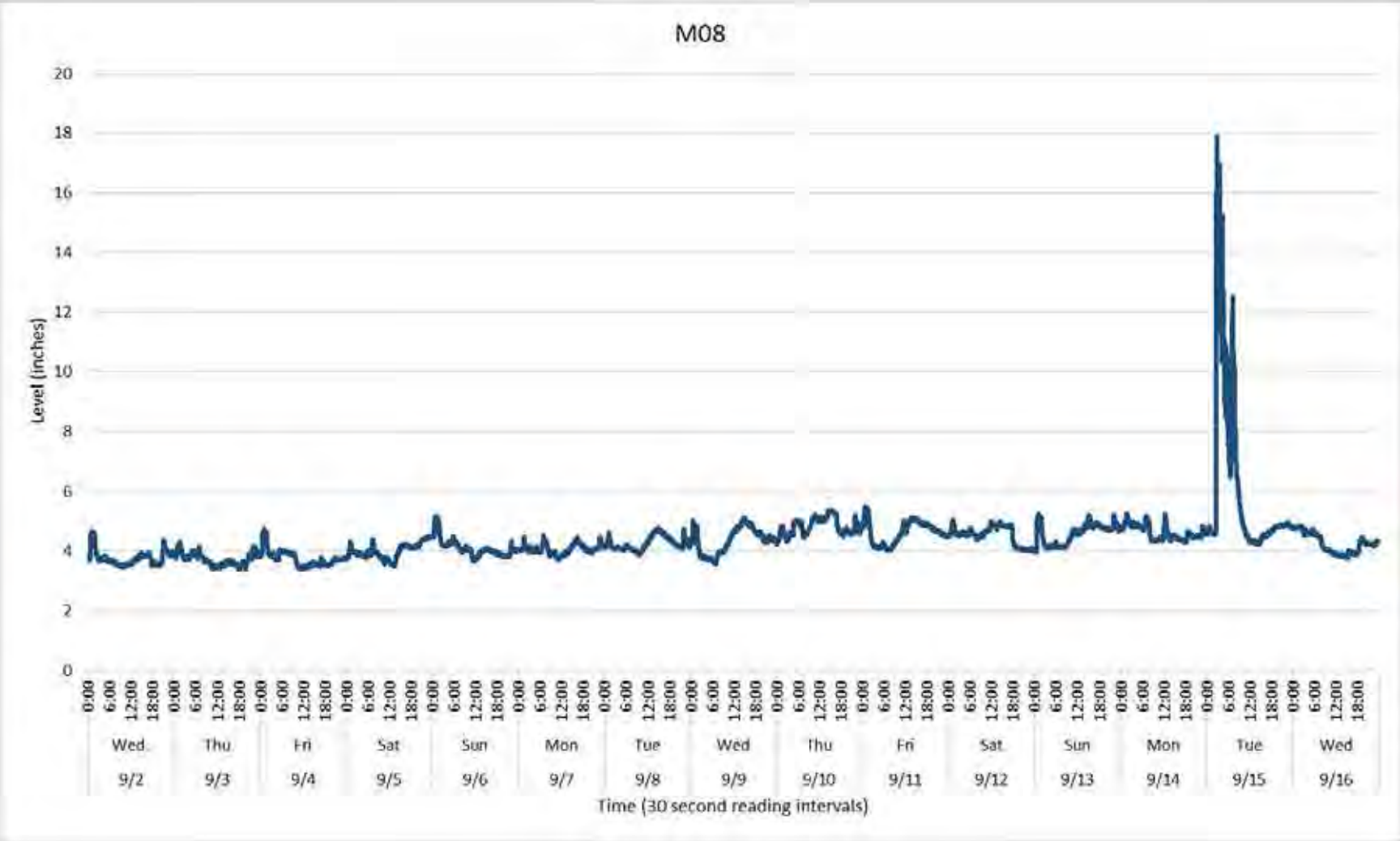

Figure E-4. Level logger data plot for outfall M08.

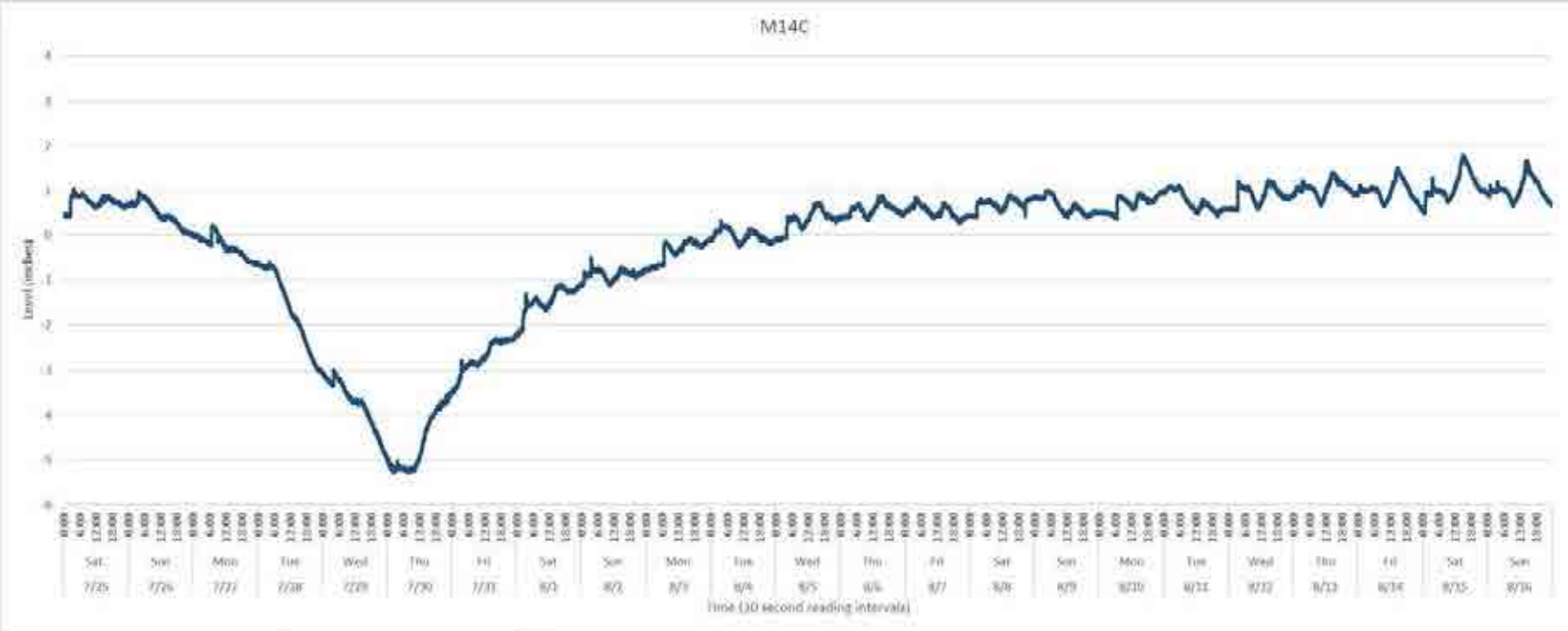

Figure E-5. Level logger data plot for outfall M14C. *Data indicates the level logger malfunctioned during deployment.

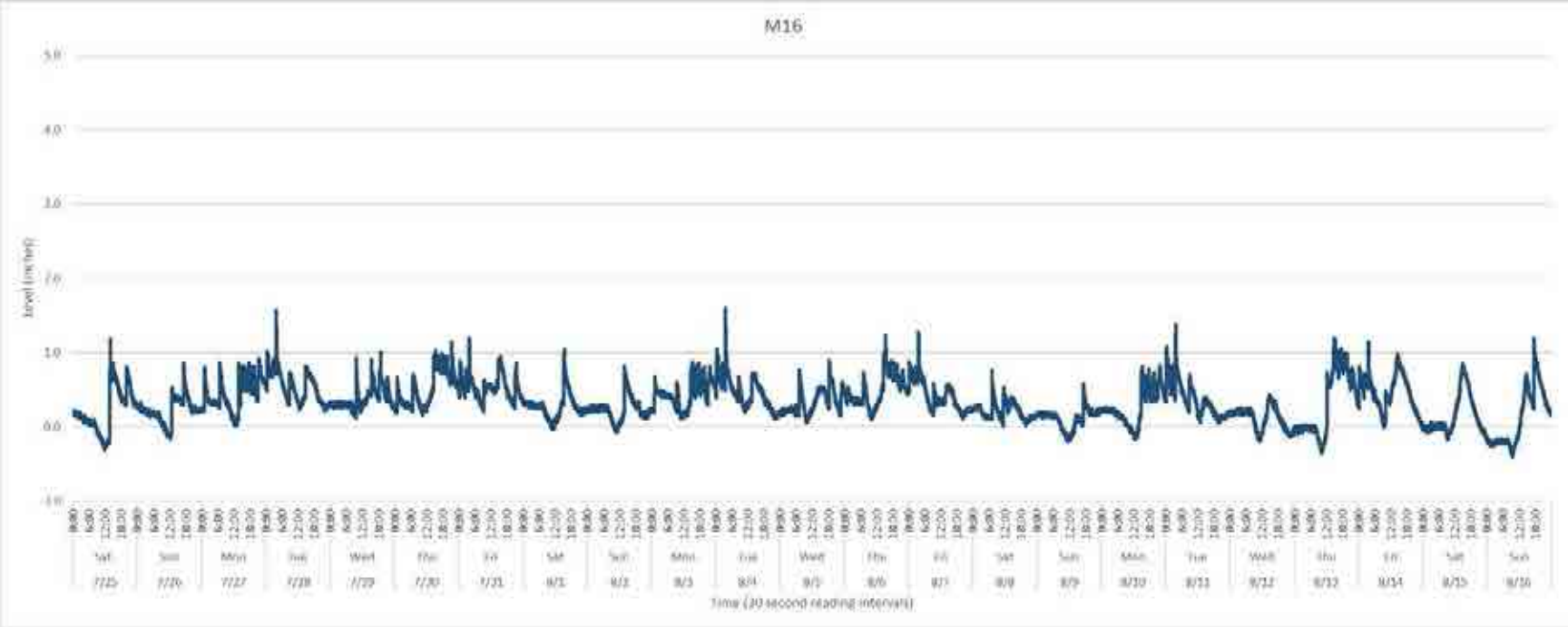

Figure E-6. Level logger data plot for outfall M16.

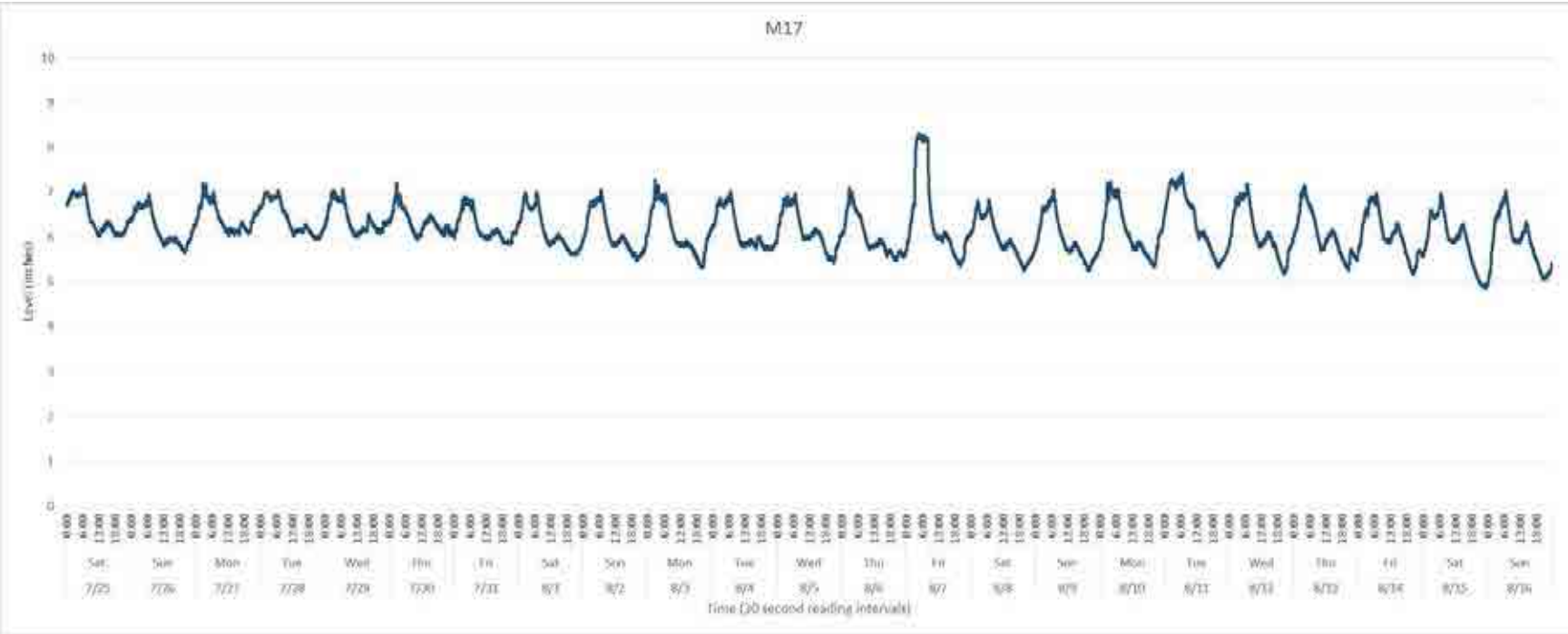

Figure E-7. Level logger data plot for outfall M17.

Figure E-8. Level logger data plot for outfall M27. *Data indicates the level logger malfunctioned during deployment.

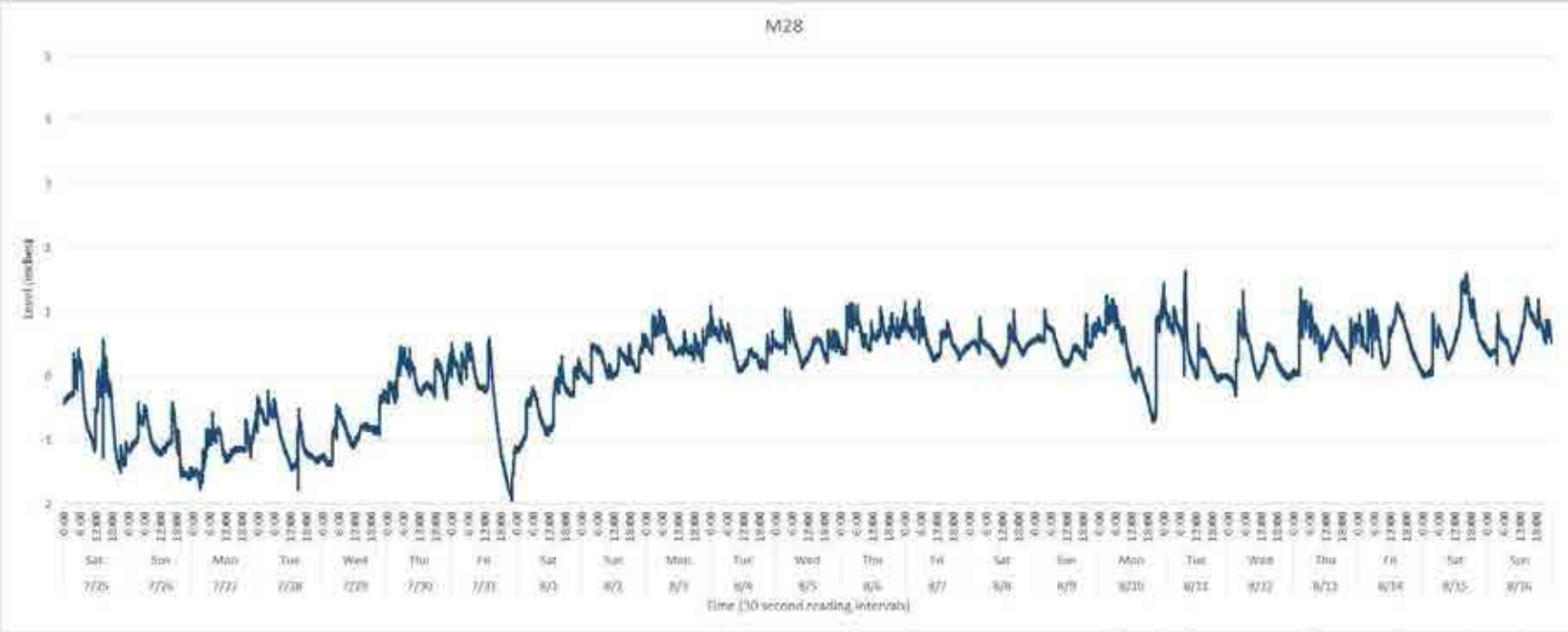

Figure E-9. Level logger data plot for outfall M28.

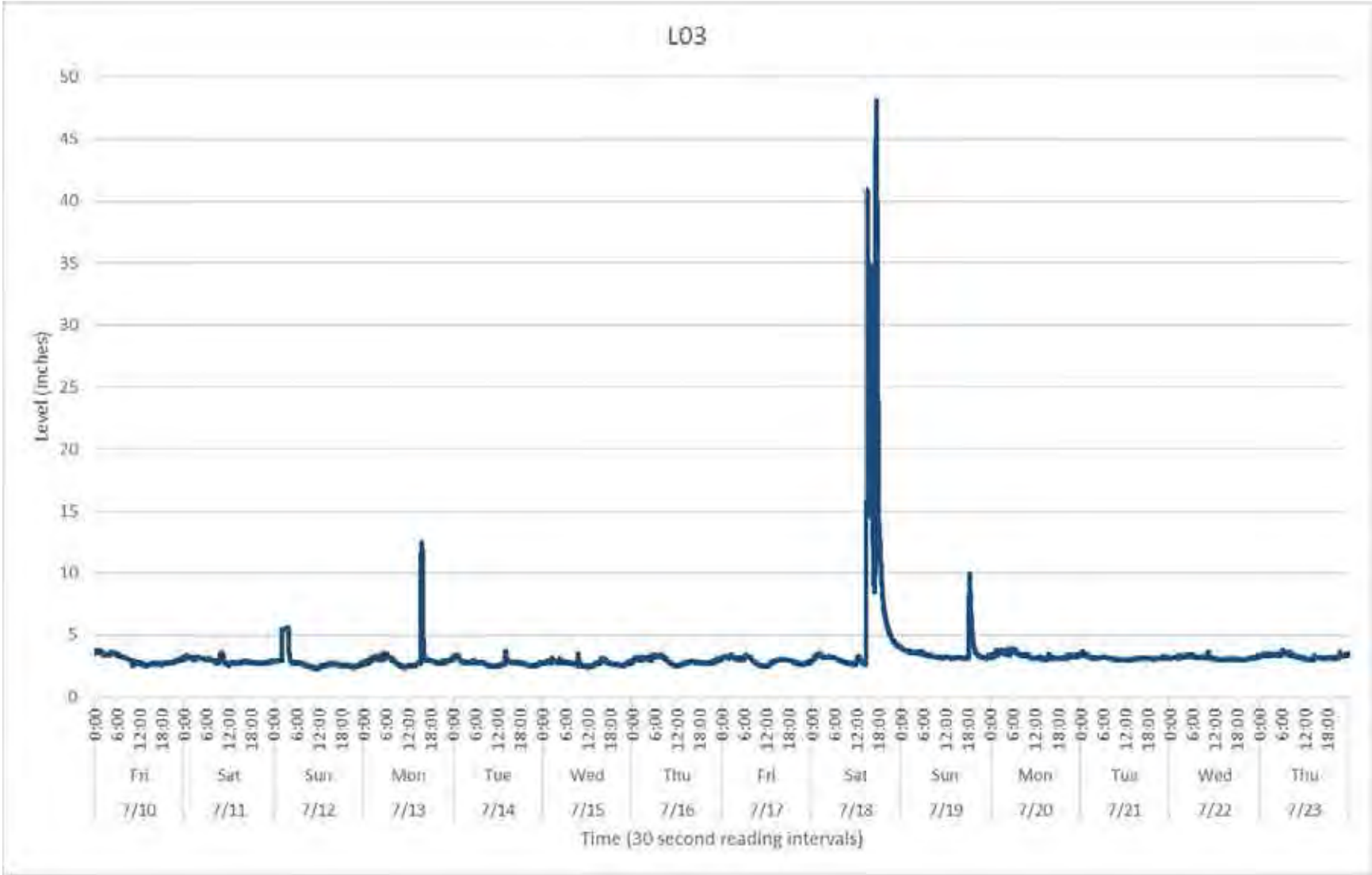

Figure E-10. Level logger data plot for outfall L03.

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Appendix F:
CCTV Results

Table F-1. Visual flow tracking observations.

Outfall ID	Observations
M01	• CCTV accessible from the outfall for only the first segment of the network • The rest of the network could be accessed from the manhole at the corner of Medea Creek lane and Sunnyvista Ave. • Animal feces was observed in the manhole in the middle of Sunnyvista Ave. • Flow was observed in most of the network • Irrigation runoff was observed entering the network all throughout the area
M02	• CCTV accessible from the outfall • A significant amount of irrigation runoff was observed enter the stormdrain, coming from the home on the corner of Locust Ave. and East Tamarind
M03	• Outfall is 1.5' corrugated metal pipe, may be difficult to get the camera in • Significant irrigation runoff coming from 69 Smoketree Ave.
M05	• Irrigation runoff observed entering network • Lots of sediment observed in upstream grates, this may inhibit the progress of the camera
M08	• Difficult to access the lower half of the network (e.g., lack of manholes, manholes in major roads, and manholes lids too heavy) • May be easier to access outfall by pumping ponded water • Able to open a manhole on Alder Springs Dr. (halfway up the network), significant flow observed • In the network on Sunnycrest Dr., the flow decreased noticeably between the manholes at Oak Haven Ct. and Sunny Brook Ct. • Animal feces was observed in multiple manholes near the top of the network • CCTV would be important to identify sources of flow
M14C	• Network comes from the high school athletic fields and track stadium
M17	• CCTV access from the outfall and manhole in Hollytree Dr. • Additional unmapped drains contributing flow within the Shadow Ridge community, maybe difficult to access
M27	• Outfall and network were damp but not flow, appeared to be from morning irrigation • CCTV access from manhole in Sunnycrest Dr. and Sprucewood Ave. • Animal feces observed in manhole
M28	• CCTV access from the outfall and manhole in Sunnycrest Dr. and Countryside Rd. • Outfall had a trickle of flow • Irrigation runoff was observed entering the stormdrain • Animal feces observed in manhole in Sunnycrest Dr. and Countryside Rd.

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Defect Listing

Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Medea Creek lane	Asbestos Cement		Creek	Stormwater
Upstream MH	**Total Length**	**Year Laid**	**Shape**		**Location Details**	
Medea MH4			Circular			
DS Manhole	**Length surveyed**	**Year Renewed**	**Height**	**Width**	**Pipe Joint...**	
M01 Outfall	113.9		24	24		

SPR	N/A	MPR	N/A	PO Number	Customer
SPRI	N/A	MPRI	N/A	Work Order	Purpose: Routine Assessment
QSR	N/A	QMR	N/A		

OPR	Surveyed By	Direction	Date	Media label
N/A	George_C	Downstream	20150915	
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**
N/A	1234	Not Known	13:30	
Date Cleaned			**End Time**	**Additional Info**
			13:44	

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0.0 ft.	Access Point Manhole					☐			
Remarks:	Medea MH4								
0.0 ft.	Water Level				0	☐			
90.7 ft.	Tap Factory Made Active		24			☐	8		
Remarks:	Catch Basin								
113.9 ft.	Survey Abandoned					☐			
Remarks:	Manhole drop								

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Defect Listing Plot

Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Medea Creek lane	Asbestos Cement		Creek	Stormwater
Upstream MH	**Total Length**	**Year Laid**	**Shape**		**Location Details**	
Medea MH4			Circular			
DS Manhole	**Length surveyed**	**Year Renewed**	**Height**	**Width**	**Pipe Joint...**	
M01 Outfall	113.9		24	24		

				PO Number	Customer
SPR	N/A	MPR	N/A		
SPRI	N/A	MPRI	N/A	Work Order	Purpose
QSR	N/A	QMR	N/A		Routine Assessment

OPR	Surveyed By	Direction	Date	Media label
N/A	George_C	Downstream	20150915	
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**
N/A	1234	Not Known	13:30	
Date Cleaned			**End Time**	**Additional Info**
			13:44	

Medea MH4

0.0 ft.	Access Point Manhole	Medea MH4
0.0 ft.	Water Level	
90.7 ft.	Tap Factory Made Active	Catch Basin
113.9 ft.	Survey Abandoned	Manhole drop

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Image Report 4/Page

Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Medea Creek lane	Asbestos Cement		Creek	Stormwater
Upstream MH	Total Length	Year Laid	Shape		Location Details	
Medea MH4			Circular			
DS Manhole	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
M01 Outfall	113.9		24	24		

Distance: 0.0 ft. Grade: 0
Condition: Access Point Manhole
Remarks: Medea MH4

Distance: 0.0 ft. Grade: 0
Condition: Water Level
Remarks: N/A

Distance: 90.7 ft. Grade: 0
Condition: Tap Factory Made Active
Remarks: Catch Basin

Distance: 113.9 ft. Grade: 0
Condition: Survey Abandoned
Remarks: Manhole drop

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PACP Conditions

Pipe Segment Refere...	City	Street	Material	Location C...	Sewer Use
	Oak Park	Medea Creek lane	Asbestos Cement	Creek	Stormwater

Upstream MH	Total Length	Year Laid	Shape	Location Details
Medea MH4			Circular	

DS Manhole	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
M01 Outfall	113.9		24	24		

SPR	N/A	MPR	N/A	PO Number	Customer
SPRI	N/A	MPRI	N/A	Work Order	Purpose: Routine Assessment
QSR	N/A	QMR	N/A		

OPR	Surveyed By	Direction	Date	Media label	
N/A	George_C	Downstream	20150915		
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**	
N/A	1234	Not Known	13:30		
Date Cleaned			End Time: 13:44	Additional Info	

Normal Defects	Structural Ratings			O & M Ratings			Combined Ratings		
	Grade Rating	No. Occur.	Rating	Grade Rating	No. Occur.	Rating	Grade Rating	No. Occur.	Rating
	1	0	0	1	0	0	1	0	0
	2	0	0	2	0	0	2	0	0
	3	0	0	3	0	0	3	0	0
	4	0	0	4	0	0	4	0	0
	5	0	0	5	0	0	5	0	0
Continuous Defects									
Code / ID / Length									
	Subtotals	0		Subtotals	0		Subtotals	0	
SUMMARY	Pipe Rating		0	Pipe Rating		0	Overall Pipe Rating		0
	Structural Index		0	O&M Index		0	Overall Index		0
	Str. Quick Rating		0000	O&M Quick Rating		0000	Ovrl. Quick Rating		0000

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Defect Listing

Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Sunnyvista Ave	Asbestos Cement		Creek	Stormwater
Upstream MH	**Total Length**	**Year Laid**	**Shape**		**Location Details**	
Sunnyvista MH2			Circular			
DS Manhole	**Length surveyed**	**Year Renewed**	**Height**	**Width**	**Pipe Joint...**	
Sunnyvista MH3	518		24	24		

SPR	3	MPR	N/A	PO Number	Customer
SPRI	3	MPRI	N/A	Work Order	Purpose: Infiltration/Inflow Investigat...
QSR	3100	QMR	N/A		

OPR	Surveyed By	Direction	Date	Media label
3	George_C	Downstream	20150915	Hard Drive
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**
3	1234	Not Known	12:40	Light Rain
Date Cleaned			**End Time**	**Additional Info**
			13:00	

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0.0 ft.	Access Point Manhole					☐			
Remarks:	Sunnyvista MH2								
0.0 ft.	Water Level				5	☐			
222.8 ft.	Surface Aggregate Projecting Unknown					☐	3		3
467.3 ft.	Tap Factory Made Active		24			☐	3		
Remarks:	Catch basin								
482.0 ft.	Tap Factory Made Active		24			☐	9		
Remarks:	Carch basin								
518.0 ft.	Survey Abandoned					☐			
Remarks:	Couldnt pass the sweep								

Ventura Regional Sanitation District
1001 Partrdige Drive, Suite 150
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Defect Listing Plot

Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Sunnyvista Ave	Asbestos Cement		Creek	Stormwater
Upstream MH	Total Length	Year Laid	**Shape**		Location Details	
Sunnyvista MH2			Circular			
DS Manhole	Length surveyed	Year Renewed	**Height**	Width	Pipe Joint...	
Sunnyvista MH3	518		24	24		

SPR	3	MPR	N/A	PO Number	Customer
SPRI	3	MPRI	N/A	Work Order	Purpose: Infiltration/Inflow Investigat...
QSR	3100	QMR	N/A		

OPR	Surveyed By	Direction	Date	Media label
3	George_C	Downstream	20150915	Hard Drive
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**
3	1234	Not Known	12:40	Light Rain
Date Cleaned			**End Time**	**Additional Info**
			13:00	

Sunnyvista MH2

0.0 ft.	Access Point Manhole	Sunnyvista MH2
0.0 ft.	Water Level	
222.8 ft.	Surface Aggregate Projecting Unknown	
467.3 ft.	Tap Factory Made Active	Catch basin
482.0 ft.	Tap Factory Made Active	Carch basin
518.0 ft.	Survey Abandoned	Couldnt pass the sweep

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Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Sunnyvista Ave	Asbestos Cement		Creek	Stormwater
Upstream MH	Total Length	Year Laid	Shape		Location Details	
Sunnyvista MH2			Circular			
DS Manhole	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
Sunnyvista MH3	518		24	24		

Distance:	0.0 ft.	Grade:	0
Condition:	Access Point Manhole		
Remarks:	Sunnyvista MH2		

Distance:	0.0 ft.	Grade:	0
Condition:	Water Level		
Remarks:	N/A		

Distance:	222.8 ft.	Grade:	3
Condition:	Surface Aggregate Projecting Unknown		
Remarks:	N/A		

Distance:	467.3 ft.	Grade:	0
Condition:	Tap Factory Made Active		
Remarks:	Catch basin		

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Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Sunnyvista Ave	Asbestos Cement		Creek	Stormwater
Upstream MH	Total Length	Year Laid	Shape		Location Details	
Sunnyvista MH2			Circular			
DS Manhole	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
Sunnyvista MH3	518		24	24		

Distance:	482.0 ft.	Grade:	0
Condition:	Tap Factory Made Active		
Remarks:	Carch basin		

Distance:	518.0 ft.	Grade:	0
Condition:	Survey Abandoned		
Remarks:	Couldnt pass the sweep		

Ventura Regional Sanitation District
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PACP Conditions

Pipe Segment Refere...	City	Street	Material	Location C...	Sewer Use
	Oak Park	Sunnyvista Ave	Asbestos Cement	Creek	Stormwater

Upstream MH	Total Length	Year Laid	Shape	Location Details
Sunnyvista MH2			Circular	

DS Manhole	Length surveyed	Year Renewed	Height	Width	Pipe Joint...
Sunnyvista MH3	518		24	24	

SPR	3	MPR	N/A	PO Number	Customer
SPRI	3	MPRI	N/A	Work Order	Purpose: Infiltration/Inflow Investigat...
QSR	3100	QMR	N/A		

OPR	Surveyed By	Direction	Date	Media label
3	George_C	Downstream	20150915	Hard Drive

OPRI	Certificate Number	Pre-Cleaning	Time	Weather
3	1234	Not Known	12:40	Light Rain

Date Cleaned	End Time	Additional Info
	13:00	

Normal Defects	Structural Ratings			O & M Ratings			Combined Ratings		
	Grade Rating	No. Occur.	Rating	Grade Rating	No. Occur.	Rating	Grade Rating	No. Occur.	Rating
	1	0	0	1	0	0	1	0	0
	2	0	0	2	0	0	2	0	0
	3	1	3	3	0	0	3	1	3
	4	0	0	4	0	0	4	0	0
	5	0	0	5	0	0	5	0	0
Continuous Defects									
Code / ID / Length									
	Subtotals	1		Subtotals	0		Subtotals	1	
SUMMARY	Pipe Rating		3	Pipe Rating		0	Overall Pipe Rating		3
	Structural Index		3.0	O&M Index		0	Overall Index		3.0
	Str. Quick Rating		3100	O&M Quick Rating		0000	Ovrl. Quick Rating		3100

Ventura Regional Sanitation District
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Defect Listing

Pipe Segment Refere...	City	Street	Material	Location C...	Sewer Use
	Oak Park	Sunnyvista Ave	Asbestos Cement		

Upstream MH	Total Length	Year Laid	Shape	Location Details
Sunnyvista MH1			Circular	

DS Manhole	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
Sunnyvista MH2	345.3		24	24		

SPR	N/A	MPR	4	PO Number	Customer
SPRI	N/A	MPRI	2	Work Order	Purpose: Routine Assessment
QSR	N/A	QMR	3111		

OPR	Surveyed By	Direction	Date	Media label
4	George_C	Upstream	20150915	

OPRI	Certificate Number	Pre-Cleaning	Time	Weather	
2	1234	Not Known	11:31	Light Rain	

Date Cleaned	End Time	Additional Info
	11:51	

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0.0 ft.	Access Point Manhole					☐			
Remarks:	Sunnyvista MH2								
0.0 ft.	Water Level				5	☐			
255.5 ft.	Alignment Right				10	☐			1
Remarks:	storm drain line sweeps right								
333.9 ft.	Deposits Settled Compacted				15	☐	3	7	3
345.3 ft.	Access Point Manhole					☐			
Remarks:	Sunnyvista MH1								

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Defect Listing Plot

Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Sunnyvista Ave	Asbestos Cement			
Upstream MH	Total Length	Year Laid	**Shape**		Location Details	
Sunnyvista MH1			Circular			
DS Manhole	Length surveyed	Year Renewed	**Height**	Width	Pipe Joint...	
Sunnyvista MH2	345.3		24	24		

				PO Number	Customer
SPR	N/A	MPR	4		
SPRI	N/A	MPRI	2	Work Order	Purpose
QSR	N/A	QMR	3111		Routine Assessment

OPR	Surveyed By	Direction	Date	Media label
4	George_C	Upstream	20150915	
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**
2	1234	Not Known	11:31	Light Rain
Date Cleaned			**End Time**	**Additional Info**
			11:51	

Sunnyvista MH2

0.0 ft.	Access Point Manhole	Sunnyvista MH2
0.0 ft.	Water Level	
255.5 ft.	Alignment Right	storm drain line sweeps right
333.9 ft.	Deposits Settled Compacted	
345.3 ft.	Access Point Manhole	Sunnyvista MH1

Sunnyvista MH1

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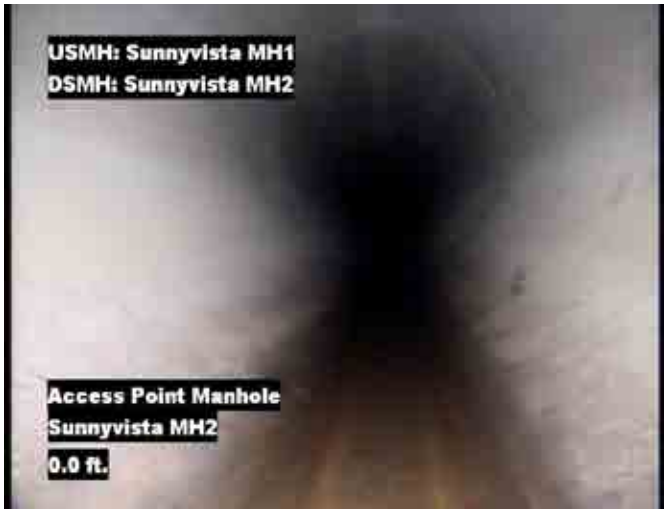
Image Report 4/Page

Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Sunnyvista Ave	Asbestos Cement			
Upstream MH	Total Length	Year Laid	Shape		Location Details	
Sunnyvista MH1			Circular			
DS Manhole	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
Sunnyvista MH2	345.3		24	24		



Distance: 0.0 ft. Grade: 0
Condition: Access Point Manhole
Remarks: Sunnyvista MH2

Distance: 0.0 ft. Grade: 0
Condition: Water Level
Remarks: N/A

Distance: 255.5 ft. Grade: 1
Condition: Alignment Right
Remarks: storm drain line sweeps right

Distance: 333.9 ft. Grade: 3
Condition: Deposits Settled Compacted
Remarks: N/A

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Image Report 4/Page

Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Sunnyvista Ave	Asbestos Cement			
Upstream MH	Total Length	Year Laid	Shape		Location Details	
Sunnyvista MH1			Circular			
DS Manhole	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
Sunnyvista MH2	345.3		24	24		

Distance:	345.3 ft.	Grade:	0
Condition:	Access Point Manhole		
Remarks:	Sunnyvista MH1		

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PACP Conditions

Pipe Segment Refere...	City	Street	Material	Location C...	Sewer Use
	Oak Park	Sunnyvista Ave	Asbestos Cement		

Upstream MH	Total Length	Year Laid	Shape	Location Details
Sunnyvista MH1			Circular	

DS Manhole	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
Sunnyvista MH2	345.3		24	24		

				PO Number	Customer
SPR	N/A	MPR	4		
SPRI	N/A	MPRI	2	Work Order	Purpose
QSR	N/A	QMR	3111		Routine Assessment

OPR	Surveyed By	Direction	Date	Media label
4	George_C	Upstream	20150915	

OPRI	Certificate Number	Pre-Cleaning	Time	Weather	
2	1234	Not Known	11:31	Light Rain	

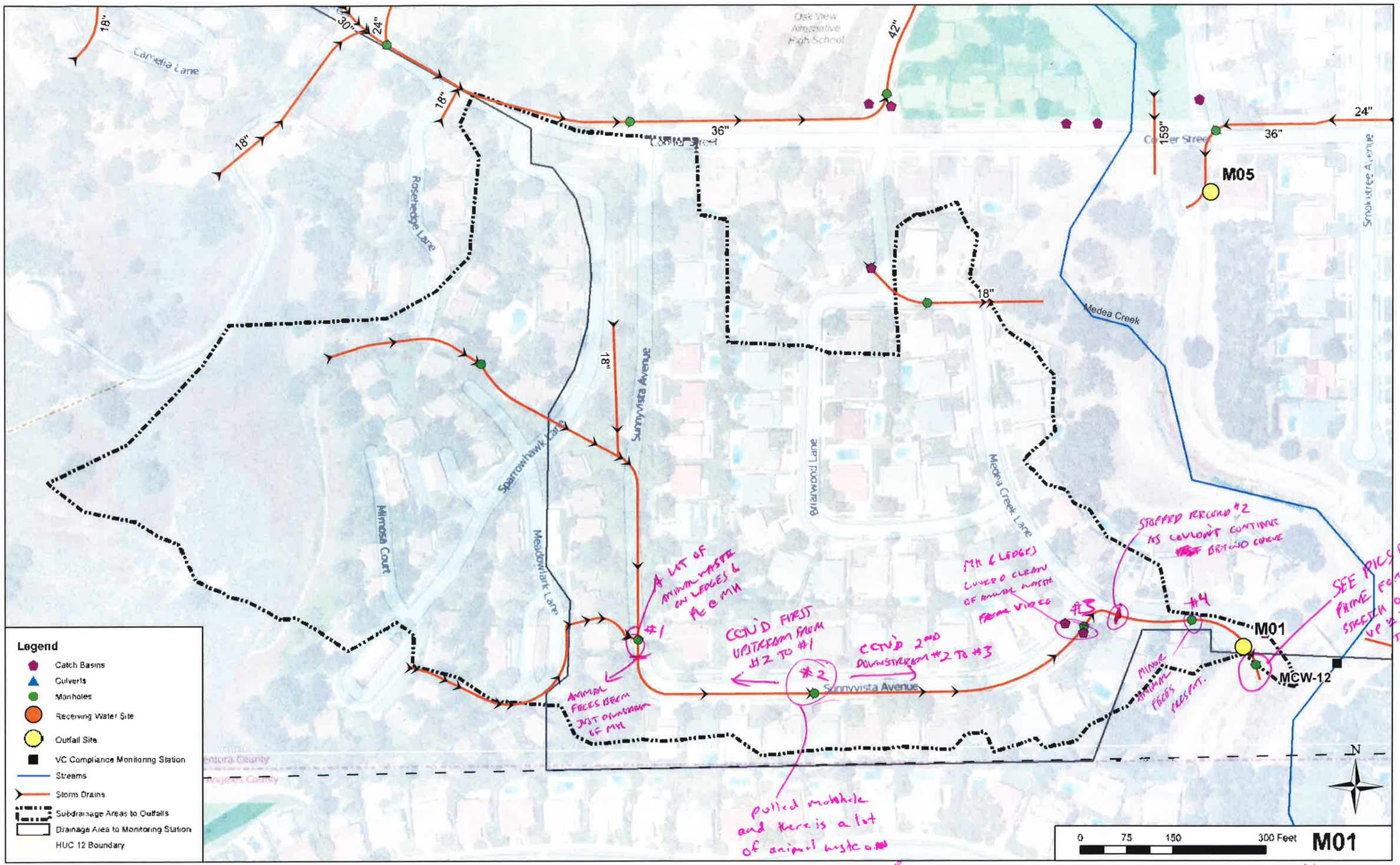
Date Cleaned	End Time	Additional Info
	11:51	

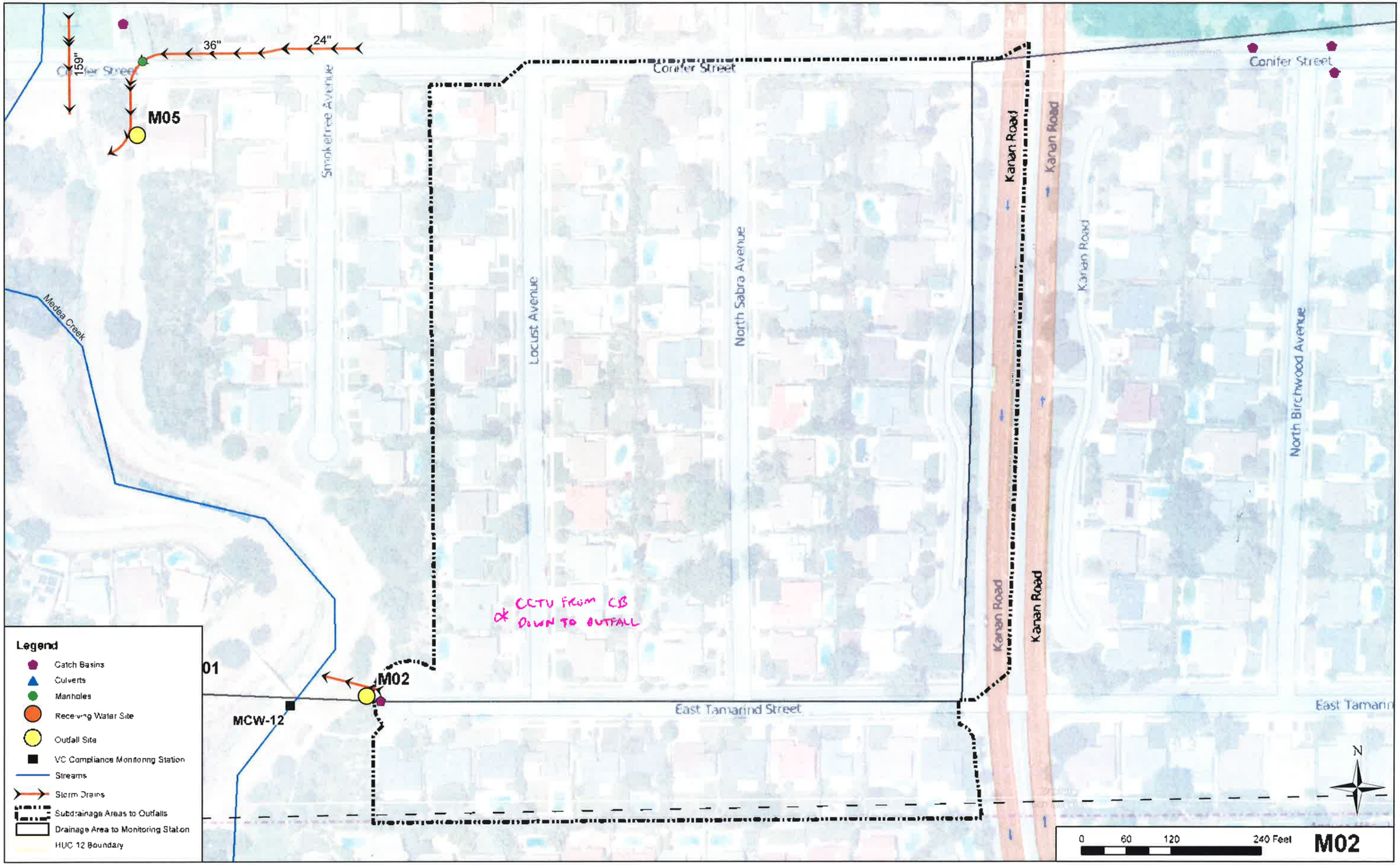
Normal Defects	Structural Ratings			O & M Ratings			Combined Ratings		
	Grade Rating	No. Occur.	Rating	Grade Rating	No. Occur.	Rating	Grade Rating	No. Occur.	Rating
	1	0	0	1	1	1	1	1	1
	2	0	0	2	0	0	2	0	0
	3	0	0	3	1	3	3	1	3
	4	0	0	4	0	0	4	0	0
	5	0	0	5	0	0	5	0	0

Continuous Defects

Code	ID	Length

	Structural Ratings			O & M Ratings			Combined Ratings		
	Subtotals	0		Subtotals	2		Subtotals	2	
SUMMARY	Pipe Rating		0	Pipe Rating		4	Overall Pipe Rating		4
	Structural Index		0	O&M Index		2.0	Overall Index		2.0
	Str. Quick Rating		0000	O&M Quick Rating		3111	Ovrl. Quick Rating		3111


18"
30"
24"
18"
18"
Carmelita Lane
Rosehedge Lane
Oak View Integrative High School
42"
36"
Cramer Street
159"
Cramer Street
24"
36"
M05
Smoketree Avenue
18"
Medea Creek
18"
Sunnyvista Avenue
Briarwood Lane
Medea Creek Lane
Sparrowhawk Lane
Meadowlark Lane
Mimosa Court
A LOT OF ANIMAL WASTE ON LEDGES & IN MH
#1
CCTV'D FIRST UPSTREAM FROM #2 TO #1
#2
CCTV'D 2ND DOWNSTREAM #2 TO #3
Sunnyvista Avenue
ANIMAL FECES BEEN JUST DOWNSTREAM OF MH
MH & LEDGES LOADED CLEAN OF ANIMAL WASTE FROM VIDEO
#3
STOPPED RECORD #2 AS COULDN'T CONTINUE BEYOND CURVE
#4
M01
MCW-12
SEE PICS FROM PHONE FOR SMALL SCREEN OUTFALL UP & 20FT TO DESP MH
MINOR ANIMAL FECES PRESENT.
Pulled manhole and there is a lot of animal waste and EGGS forward from mh (Feed & Fresh)
Legend
Catch Basins
Culverts
Manholes
Receiving Water Site
Outfall Site
VC Compliance Monitoring Station
Streams
Storm Drains
Subdrainage Areas to Outfalls
Drainage Area to Monitoring Station
HUC 12 Boundary
N
0
75
150
300 Feet
M01
CCTV #2 TO #1 11:30 AM STREET 9/15/15
CCTV #2 TO #3 PAST #3 12:30pm 9/15/15
CCTV #4 TO OUTFALL → 1:30pm 9/15/15



CCTV 9:30AM START 9/15/15

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Defect Listing

Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Conifer	Asbestos Cement		Creek	
Upstream MH	**Total Length**	**Year Laid**	**Shape**		**Location Details**	
CB E Smoketree			Circular			
DS Manhole	**Length surveyed**	**Year Renewed**	**Height**	**Width**	**Pipe Joint...**	
M05 Outfall	N/A		24	24		

SPR N/A	MPR N/A	PO Number		Customer	
SPRI N/A	MPRI N/A	Work Order		Purpose	Infiltration/Inflow Investigat...
QSR N/A	QMR N/A				
OPR	Surveyed By	Direction	Date	Media label	
N/A	George_C	Downstream	20150915	Hard drive	
OPRI	Certificate Number	Pre-Cleaning	Time	Weather	
N/A	1234	Not Known	09:59	Light Rain	
Date Cleaned			End Time	Additional Info	
			10:04		

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0.0 ft.	Access Point Manhole					☐			
Remarks: CB E Smoketree									
0.0 ft.	Water Level				5	☐			

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Defect Listing Plot

Pipe Segment Refere...	City	Street	Material	Location C...	Sewer Use
	Oak Park	Conifer	Asbestos Cement	Creek	

Upstream MH	Total Length	Year Laid	Shape	Location Details
CB E Smoketree			Circular	

DS Manhole	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
M05 Outfall	N/A		24	24		

				PO Number	Customer
SPR	N/A	MPR	N/A		
SPRI	N/A	MPRI	N/A	Work Order	Purpose
QSR	N/A	QMR	N/A		Infiltration/Inflow Investigat...

OPR	Surveyed By	Direction	Date	Media label
N/A	George_C	Downstream	20150915	Hard drive

OPRI	Certificate Number	Pre-Cleaning	Time	Weather	
N/A	1234	Not Known	09:59	Light Rain	

Date Cleaned	End Time	Additional Info
	10:04	

CB E Smoketree

CB E Smoketree

0.0 ft. Access Point Manhole

0.0 ft. Water Level

M05 Outfall

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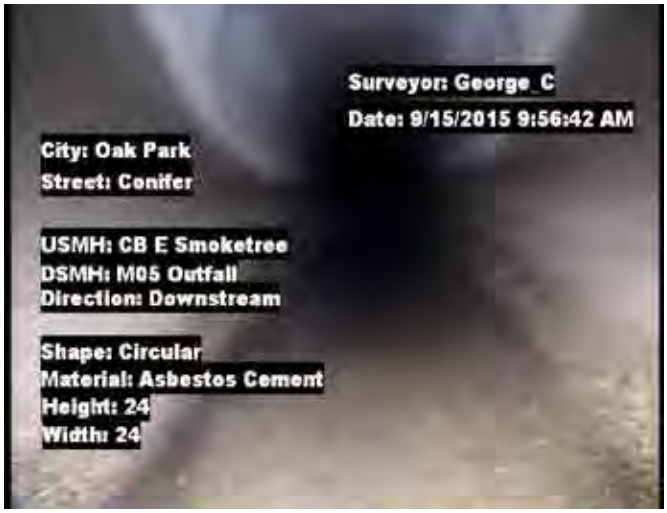
Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Conifer	Asbestos Cement		Creek	
Upstream MH	Total Length	Year Laid	Shape		Location Details	
CB E Smoketree			Circular			
DS Manhole	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
M05 Outfall	N/A		24	24		



Distance:	0.0 ft.	Grade:	0
Condition:	Access Point Manhole		
Remarks:	CB E Smoketree		

Distance:	0.0 ft.	Grade:	0
Condition:	Water Level		
Remarks:	N/A		

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PACP Conditions

Pipe Segment Refere...	City	Street	Material	Location C...	Sewer Use
	Oak Park	Conifer	Asbestos Cement	Creek	

Upstream MH	Total Length	Year Laid	Shape	Location Details
CB E Smoketree			Circular	

DS Manhole	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
M05 Outfall	N/A		24	24		

SPR	N/A	MPR	N/A	PO Number	Customer
SPRI	N/A	MPRI	N/A	Work Order	Purpose: Infiltration/Inflow Investigat...
QSR	N/A	QMR	N/A		

OPR	Surveyed By	Direction	Date	Media label
N/A	George_C	Downstream	20150915	Hard drive

OPRI	Certificate Number	Pre-Cleaning	Time	Weather	
N/A	1234	Not Known	09:59	Light Rain	

Date Cleaned	End Time	Additional Info
	10:04	

Normal Defects	Structural Ratings			O & M Ratings			Combined Ratings		
	Grade Rating	No. Occur.	Rating	Grade Rating	No. Occur.	Rating	Grade Rating	No. Occur.	Rating
	1	0	0	1	0	0	1	0	0
	2	0	0	2	0	0	2	0	0
	3	0	0	3	0	0	3	0	0
	4	0	0	4	0	0	4	0	0
	5	0	0	5	0	0	5	0	0

Continuous Defects

Code	ID	Length

	Subtotals	0		Subtotals	0		Subtotals	0	
SUMMARY	Pipe Rating		0	Pipe Rating		0	Overall Pipe Rating		0
	Structural Index		0	O&M Index		0	Overall Index		0
	Str. Quick Rating		0000	O&M Quick Rating		0000	Ovrl. Quick Rating		0000

Ventura Regional Sanitation District
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Defect Listing

Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Conifer	Asbestos Cement		Creek	
Upstream MH	**Total Length**	**Year Laid**	**Shape**		**Location Details**	
CB E Smoketree			Circular			
DS Manhole	**Length surveyed**	**Year Renewed**	**Height**	**Width**	**Pipe Joint...**	
M05 Outfall	86.6		24	24		

SPR	N/A	MPR	12	PO Number	Customer
SPRI	N/A	MPRI	2.4	Work Order	Purpose: Infiltration/Inflow Investigat...
QSR	N/A	QMR	5123		

OPR	Surveyed By	Direction	Date	Media label
12	George_C	Downstream	20150915	Hard drive
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**
2.4	1234	Not Known	10:08	Light Rain
Date Cleaned			**End Time**	**Additional Info**
			10:20	

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0.0 ft.	Access Point Manhole					☐			
Remarks:	CB E Smoketree								
0.0 ft.	Water Level				5	☐			
47.4 ft.	Vermin Cockroach					☐			1
71.6 ft.	Water Level Sag	S01			10	☐			2
86.6 ft.	Water Level Sag	F01			10	☐			2
86.6 ft.	Obstacle Construction Debris				35	☐	5	7	5
86.6 ft.	Survey Abandoned					☐			
Remarks:	Obstruction								

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Defect Listing Plot

Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Conifer	Asbestos Cement		Creek	
Upstream MH	**Total Length**	**Year Laid**	**Shape**		**Location Details**	
CB E Smoketree			Circular			
DS Manhole	**Length surveyed**	**Year Renewed**	**Height**	**Width**	**Pipe Joint...**	
M05 Outfall	86.6		24	24		

				PO Number	Customer
SPR	N/A	MPR	12		
SPRI	N/A	MPRI	2.4	Work Order	Purpose
QSR	N/A	QMR	5123		Infiltration/Inflow Investigat...

OPR	Surveyed By	Direction	Date	Media label
12	George_C	Downstream	20150915	Hard drive
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**
2.4	1234	Not Known	10:08	Light Rain
Date Cleaned			**End Time**	**Additional Info**
			10:20	

0.0 ft.	Access Point Manhole
0.0 ft.	Water Level
47.4 ft.	Vermin Cockroach
71.6 ft.	Water Level Sag - S01
86.6 ft.	Water Level Sag - F01
86.6 ft.	Obstacle Construction Debris
86.6 ft.	Survey Abandoned

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Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Conifer	Asbestos Cement		Creek	
Upstream MH	Total Length	Year Laid	Shape		Location Details	
CB E Smoketree			Circular			
DS Manhole	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
M05 Outfall	86.6		24	24		

Distance: 0.0 ft. Grade: 0
Condition: Access Point Manhole
Remarks: CB E Smoketree

Distance: 0.0 ft. Grade: 0
Condition: Water Level
Remarks: N/A

Distance: 47.4 ft. Grade: 1
Condition: Vermin Cockroach
Remarks: N/A

Distance: 71.6 ft. Grade: 2
Condition: Water Level Sag
Remarks: N/A

Ventura Regional Sanitation District
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Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Conifer	Asbestos Cement		Creek	
Upstream MH	Total Length	Year Laid	Shape		Location Details	
CB E Smoketree			Circular			
DS Manhole	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
M05 Outfall	86.6		24	24		

Distance: 86.6 ft. Grade: 2
Condition: Water Level Sag
Remarks: N/A

Distance: 86.6 ft. Grade: 5
Condition: Obstacle Construction Debris
Remarks: N/A

Distance: 86.6 ft. Grade: 0
Condition: Survey Abandoned
Remarks: Obstruction

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PACP Conditions

Pipe Segment Refere...	City	Street	Material	Location C...	Sewer Use
	Oak Park	Conifer	Asbestos Cement	Creek	

Upstream MH	Total Length	Year Laid	Shape	Location Details
CB E Smoketree			Circular	

DS Manhole	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
M05 Outfall	86.6		24	24		

				PO Number	Customer
SPR	N/A	MPR	12		
SPRI	N/A	MPRI	2.4	Work Order	Purpose
QSR	N/A	QMR	5123		Infiltration/Inflow Investigat...

OPR	Surveyed By	Direction	Date	Media label
12	George_C	Downstream	20150915	Hard drive

OPRI	Certificate Number	Pre-Cleaning	Time	Weather	
2.4	1234	Not Known	10:08	Light Rain	

Date Cleaned	End Time	Additional Info
	10:20	

Normal Defects	Structural Ratings			O & M Ratings			Combined Ratings		
	Grade Rating	No. Occur.	Rating	Grade Rating	No. Occur.	Rating	Grade Rating	No. Occur.	Rating
	1	0	0	1	1	1	1	1	1
	2	0	0	2	0	0	2	0	0
	3	0	0	3	0	0	3	0	0
	4	0	0	4	0	0	4	0	0
	5	0	0	5	1	5	5	1	5
Continuous Defects									
Code ID Length									
MWLS F01 15.0	0	0	0	2	3	6	2	3	6
	Subtotals	0		Subtotals	5		Subtotals	5	
SUMMARY	Pipe Rating		0	Pipe Rating		12	Overall Pipe Rating		12
	Structural Index		0	O&M Index		2.4	Overall Index		2.4
	Str. Quick Rating		0000	O&M Quick Rating		5123	Ovrl. Quick Rating		5123

Ventura Regional Sanitation District
1001 Partrdige Drive, Suite 150
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Defect Listing

Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Conifer	Asbestos Cement		Creek	Stormwater
Upstream MH	**Total Length**	**Year Laid**	**Shape**		**Location Details**	
CB W Smoketree			Circular			
DS Manhole	**Length surveyed**	**Year Renewed**	**Height**	**Width**	**Pipe Joint...**	
M05 Outfall	311.5		36	36		

SPR	3	MPR	4	PO Number	Customer
SPRI	3	MPRI	4	Work Order	Purpose: Infiltration/Inflow Investigat...
QSR	3100	QMR	4100		

OPR	Surveyed By	Direction	Date	Media label
7	George_C	Downstream	20150915	Hard Drive
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**
3.5	1234	Not Known	10:39	Light Rain
Date Cleaned			**End Time**	**Additional Info**
			11:02	

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0.0 ft.	Access Point Manhole					☐			
Remarks:	CB W Smoketree								
0.0 ft.	Water Level				5	☐			
180.5 ft.	Alignment Left				30	☐			4
Remarks:	Storm Drain connection sweeping left								
183.5 ft.	Crack Multiple					☐	12	1	3
Remarks:	Manhole connection								
311.5 ft.	Access Point Manhole					☐			
Remarks:	M05 Outfall								

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Defect Listing Plot

Pipe Segment Refere...	City	Street	Material	Location C...	Sewer Use
	Oak Park	Conifer	Asbestos Cement	Creek	Stormwater

Upstream MH	Total Length	Year Laid	Shape	Location Details
CB W Smoketree			Circular	

DS Manhole	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
M05 Outfall	311.5		36	36		

				PO Number	Customer
SPR	3	MPR	4		
SPRI	3	MPRI	4	Work Order	Purpose
QSR	3100	QMR	4100		Infiltration/Inflow Investigat...

OPR	Surveyed By	Direction	Date	Media label
7	George_C	Downstream	20150915	Hard Drive

OPRI	Certificate Number	Pre-Cleaning	Time	Weather	
3.5	1234	Not Known	10:39	Light Rain	

Date Cleaned	End Time	Additional Info
	11:02	

CB W Smoketree

0.0 ft.	Access Point Manhole	CB W Smoketree
0.0 ft.	Water Level	
180.5 ft.	Alignment Left	Storm Drain connection sweeping left
183.5 ft.	Crack Multiple	Manhole connection
311.5 ft.	Access Point Manhole	M05 Outfall

M05 Outfall

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Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Conifer	Asbestos Cement		Creek	Stormwater
Upstream MH	Total Length	Year Laid	Shape		Location Details	
CB W Smoketree			Circular			
DS Manhole	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
M05 Outfall	311.5		36	36		

Distance:	0.0 ft.	Grade:	0
Condition:	Access Point Manhole		
Remarks:	CB W Smoketree		

Distance:	0.0 ft.	Grade:	0
Condition:	Water Level		
Remarks:	N/A		

Distance:	180.5 ft.	Grade:	4
Condition:	Alignment Left		
Remarks:	Storm Drain connection sweeping left		

Distance:	183.5 ft.	Grade:	3
Condition:	Crack Multiple		
Remarks:	Manhole connection		

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Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Conifer	Asbestos Cement		Creek	Stormwater
Upstream MH	Total Length	Year Laid	Shape		Location Details	
CB W Smoketree			Circular			
DS Manhole	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
M05 Outfall	311.5		36	36		

Distance:	311.5 ft.	Grade:	0
Condition:	Access Point Manhole		
Remarks:	M05 Outfall		

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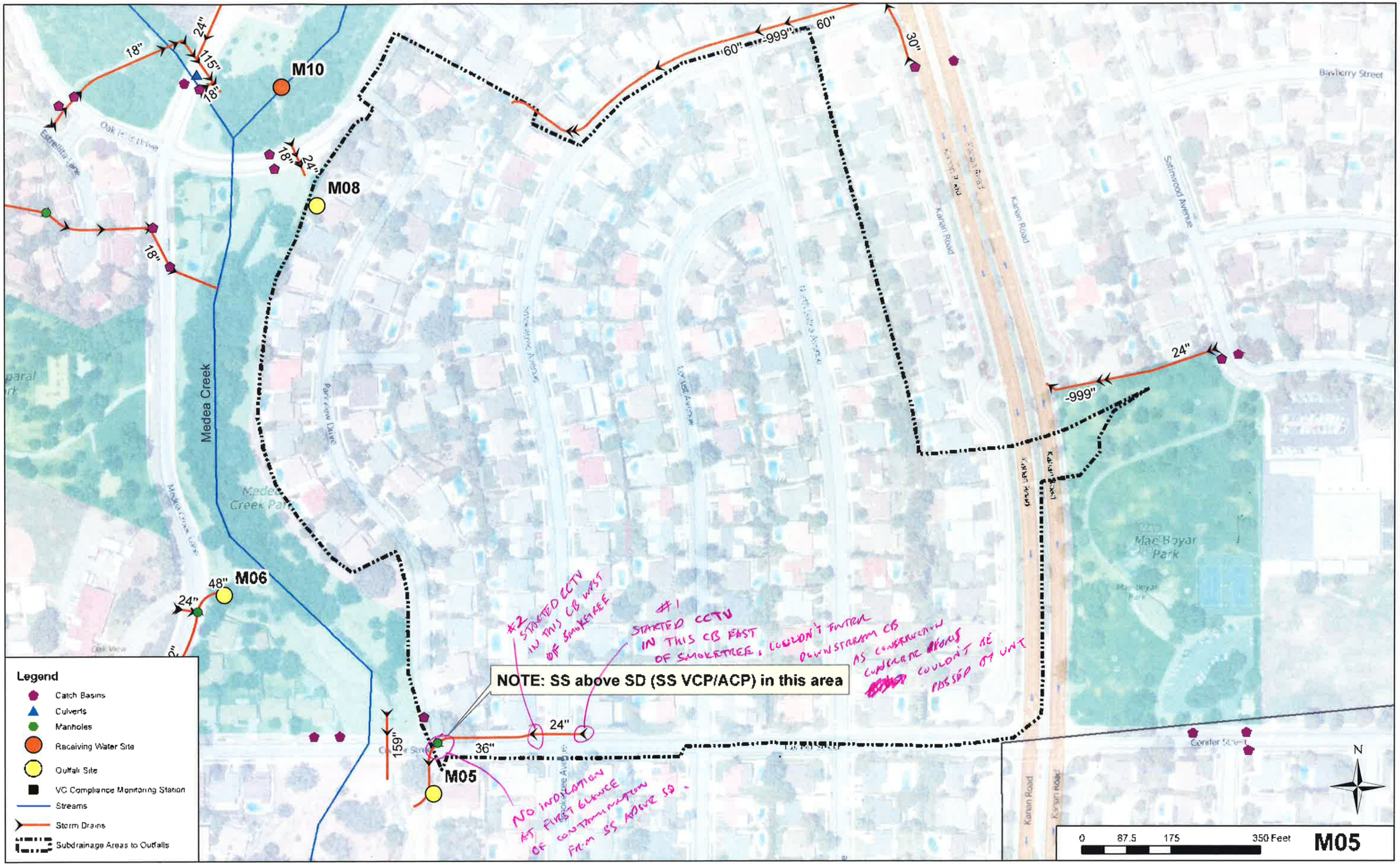
PACP Conditions

Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Conifer	Asbestos Cement		Creek	Stormwater
Upstream MH	**Total Length**	**Year Laid**	**Shape**		**Location Details**	
CB W Smoketree			Circular			
DS Manhole	**Length surveyed**	**Year Renewed**	**Height**	**Width**	**Pipe Joint...**	
M05 Outfall	311.5		36	36		

SPR	3	MPR	4	PO Number	Customer
SPRI	3	MPRI	4	Work Order	Purpose: Infiltration/Inflow Investigat...
QSR	3100	QMR	4100		

OPR	Surveyed By	Direction	Date	Media label
7	George_C	Downstream	20150915	Hard Drive
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**
3.5	1234	Not Known	10:39	Light Rain
Date Cleaned			**End Time**	**Additional Info**
			11:02	

Normal Defects	Structural Ratings			O & M Ratings			Combined Ratings		
	Grade Rating	No. Occur.	Rating	Grade Rating	No. Occur.	Rating	Grade Rating	No. Occur.	Rating
	1	0	0	1	0	0	1	0	0
	2	0	0	2	0	0	2	0	0
	3	1	3	3	0	0	3	1	3
	4	0	0	4	1	4	4	1	4
	5	0	0	5	0	0	5	0	0
Continuous Defects									
Code / ID / Length									
	Subtotals	1		Subtotals	1		Subtotals	2	
SUMMARY	Pipe Rating		3	Pipe Rating		4	Overall Pipe Rating		7
	Structural Index		3.0	O&M Index		4.0	Overall Index		3.5
	Str. Quick Rating		3100	O&M Quick Rating		4100	Ovrl. Quick Rating		4131



#1 CCTV 10 AM START 9/15/15
#2 CCTV 10:45 AM START 9/15/15

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Defect Listing

Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Smoketree	Asbestos Cement			
Upstream MH	**Total Length**	**Year Laid**	**Shape**		**Location Details**	
UNK M08 Branch			Circular			
DS Manhole	**Length surveyed**	**Year Renewed**	**Height**	**Width**	**Pipe Joint...**	
Oak Hills MH	344.8		60	60		

SPR	5	MPR	8	PO Number	Customer
SPRI	5	MPRI	2.7	Work Order	Purpose: Infiltration/Inflow Investigat...
QSR	5100	QMR	4122		

OPR	Surveyed By	Direction	Date	Media label
13	George_C	Upstream	20150915	Hard Drive
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**
3.3	1234	Not Known	14:37	Dry
Date Cleaned			**End Time**	**Additional Info**
			14:53	

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0.0 ft.	Access Point Manhole					☐			
Remarks:	Oak Hills MH								
0.0 ft.	Water Level				10	☐			
125.8 ft.	Deposits Settled Other				5	☐	3		2
Remarks:	settlement								
328.9 ft.	Infiltration Stain					☐	9		
328.9 ft.	Infiltration Stain					☐	3		
337.4 ft.	Infiltration Runner					☐	9		4
337.4 ft.	Infiltration Stain					☐	3		
344.8 ft.	Hole Void Visible					☐	11		5
344.8 ft.	Alignment Right				20	☐			2
Remarks:	Stormdrain line sweeps right								
344.8 ft.	Survey Abandoned					☐			
Remarks:	end of surrvey								

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Defect Listing Plot

Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Smoketree	Asbestos Cement			
Upstream MH	Total Length	Year Laid	**Shape**		Location Details	
UNK M08 Branch			Circular			
DS Manhole	Length surveyed	Year Renewed	**Height**	Width	Pipe Joint...	
Oak Hills MH	344.8		60	60		

SPR	5	MPR	8	PO Number	Customer
SPRI	5	MPRI	2.7		
QSR	5100	QMR	4122	Work Order	Purpose: Infiltration/Inflow Investigat...

OPR	Surveyed By	Direction	Date	Media label
13	George_C	Upstream	20150915	Hard Drive
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**
3.3	1234	Not Known	14:37	Dry
Date Cleaned			**End Time**	**Additional Info**
			14:53	

Oak Hills MH

0.0 ft.	Access Point Manhole	Oak Hills MH
0.0 ft.	Water Level	
125.8 ft.	Deposits Settled Other	settlement
328.9 ft.	Infiltration Stain	
328.9 ft.	Infiltration Stain	
337.4 ft.	Infiltration Runner	
337.4 ft.	Infiltration Stain	
344.8 ft.	Hole Void Visible	
344.8 ft.	Alignment Right	Stormdrain line sweeps right
344.8 ft.	Survey Abandoned	end of surrvey

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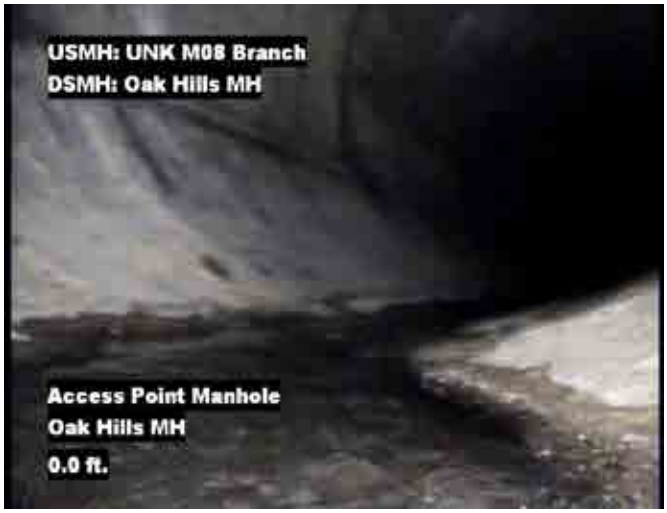
Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Smoketree	Asbestos Cement			
Upstream MH	Total Length	Year Laid	Shape		Location Details	
UNK M08 Branch			Circular			
DS Manhole	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
Oak Hills MH	344.8		60	60		



Distance:	0.0 ft.	Grade:	0
Condition:	Access Point Manhole		
Remarks:	Oak Hills MH		

Distance:	0.0 ft.	Grade:	0
Condition:	Water Level		
Remarks:	N/A		

Distance:	125.8 ft.	Grade:	2
Condition:	Deposits Settled Other		
Remarks:	settlement		

Distance:	328.9 ft.	Grade:	0
Condition:	Infiltration Stain		
Remarks:	N/A		

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Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Smoketree	Asbestos Cement			
Upstream MH	Total Length	Year Laid	Shape		Location Details	
UNK M08 Branch			Circular			
DS Manhole	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
Oak Hills MH	344.8		60	60		

Distance:	328.9 ft.	Grade:	0
Condition:	Infiltration Stain		
Remarks:	N/A		

Distance:	337.4 ft.	Grade:	4
Condition:	Infiltration Runner		
Remarks:	N/A		

Distance:	337.4 ft.	Grade:	0
Condition:	Infiltration Stain		
Remarks:	N/A		

Distance:	344.8 ft.	Grade:	5
Condition:	Hole Void Visible		
Remarks:	N/A		

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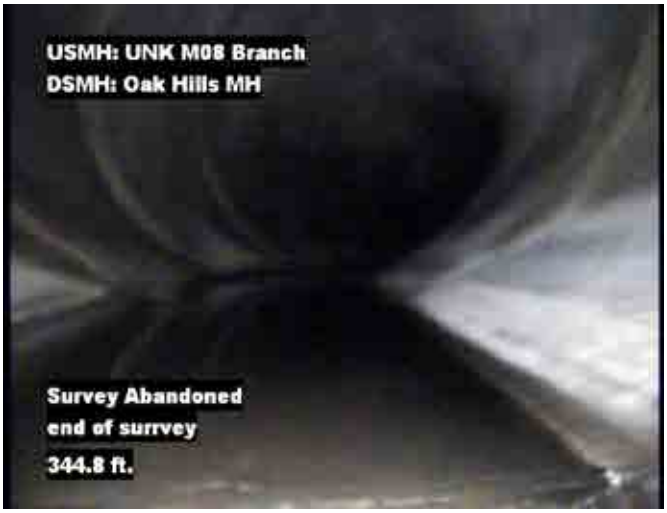
Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Smoketree	Asbestos Cement			
Upstream MH	Total Length	Year Laid	Shape		Location Details	
UNK M08 Branch			Circular			
DS Manhole	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
Oak Hills MH	344.8		60	60		

Distance: 344.8 ft. Grade: 2
Condition: Alignment Right
Remarks: Stormdrain line sweeps right



Distance: 344.8 ft. Grade: 0
Condition: Survey Abandoned
Remarks: end of surrvey

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PACP Conditions

Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Smoketree	Asbestos Cement			
Upstream MH	Total Length	Year Laid	Shape		Location Details	
UNK M08 Branch			Circular			
DS Manhole	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
Oak Hills MH	344.8		60	60		

SPR	5	MPR	8	PO Number	Customer
SPRI	5	MPRI	2.7	Work Order	Purpose: Infiltration/Inflow Investigat...
QSR	5100	QMR	4122		

OPR	Surveyed By	Direction	Date	Media label
13	George_C	Upstream	20150915	Hard Drive
OPRI	Certificate Number	Pre-Cleaning	Time	Weather
3.3	1234	Not Known	14:37	Dry
Date Cleaned			End Time	Additional Info
			14:53	

Normal Defects	Structural Ratings			O & M Ratings			Combined Ratings		
	Grade Rating	No. Occur.	Rating	Grade Rating	No. Occur.	Rating	Grade Rating	No. Occur.	Rating
	1	0	0	1	0	0	1	0	0
	2	0	0	2	2	4	2	2	4
	3	0	0	3	0	0	3	0	0
	4	0	0	4	1	4	4	1	4
	5	1	5	5	0	0	5	1	5
Continuous Defects									
Code / ID / Length									
	Subtotals	1		Subtotals	3		Subtotals	4	
SUMMARY	Pipe Rating		5	Pipe Rating		8	Overall Pipe Rating		13
	Structural Index		5.0	O&M Index		2.7	Overall Index		3.3
	Str. Quick Rating		5100	O&M Quick Rating		4122	Ovrl. Quick Rating		5141

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Defect Listing

Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Smoketree	Asbestos Cement		Creek	
Upstream MH	Total Length	Year Laid	Shape		Location Details	
Oak Hills MH			Circular			
DS Manhole	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
M08 Outfall	142.5		24	24		

SPR N/A	MPR N/A	PO Number		Customer	
SPRI N/A	MPRI N/A	Work Order		Purpose	
QSR N/A	QMR N/A			Routine Assessment	
OPR	Surveyed By	Direction	Date	Media label	
N/A	George_C	Downstream	20150915	Hard Drive	
OPRI	Certificate Number	Pre-Cleaning	Time	Weather	
N/A	1234	No Pre-Cleaning	14:16	Dry	
Date Cleaned			End Time	Additional Info	
			14:31		

Distance	Condition	Cont. Dfct.	Values			Joint	Clock Position		Grade
			1st	2nd	%		At/From	To	
0.0 ft.	Access Point Manhole					☐			
Remarks:	Oak Hills MH								
0.0 ft.	Water Level				10	☐			
142.5 ft.	Access Point Manhole					☐			
Remarks:	M08 Outfall								

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Defect Listing Plot

Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Smoketree	Asbestos Cement		Creek	
Upstream MH	**Total Length**	**Year Laid**	**Shape**		**Location Details**	
Oak Hills MH			Circular			
DS Manhole	**Length surveyed**	**Year Renewed**	**Height**	**Width**	**Pipe Joint...**	
M08 Outfall	142.5		24	24		

				PO Number	Customer
SPR	N/A	MPR	N/A		
SPRI	N/A	MPRI	N/A	Work Order	Purpose
QSR	N/A	QMR	N/A		Routine Assessment

OPR	Surveyed By	Direction	Date	Media label
N/A	George_C	Downstream	20150915	Hard Drive
OPRI	**Certificate Number**	**Pre-Cleaning**	**Time**	**Weather**
N/A	1234	No Pre-Cleaning	14:16	Dry
Date Cleaned			**End Time**	**Additional Info**
			14:31	

Oak Hills MH

0.0 ft. Access Point Manhole — Oak Hills MH

0.0 ft. Water Level

142.5 ft. Access Point Manhole — M08 Outfall

M08 Outfall

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Pipe Segment Refere...	City	Street	Material		Location C...	Sewer Use
	Oak Park	Smoketree	Asbestos Cement		Creek	
Upstream MH	Total Length	Year Laid	Shape		Location Details	
Oak Hills MH			Circular			
DS Manhole	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
M08 Outfall	142.5		24	24		

Distance: 0.0 ft. Grade: 0
Condition: Access Point Manhole
Remarks: Oak Hills MH

Distance: 0.0 ft. Grade: 0
Condition: Water Level
Remarks: N/A

Distance: 142.5 ft. Grade: 0
Condition: Access Point Manhole
Remarks: M08 Outfall

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PACP Conditions

Pipe Segment Refere...	City	Street	Material	Location C...	Sewer Use
	Oak Park	Smoketree	Asbestos Cement	Creek	

Upstream MH	Total Length	Year Laid	Shape	Location Details
Oak Hills MH			Circular	

DS Manhole	Length surveyed	Year Renewed	Height	Width	Pipe Joint...	
M08 Outfall	142.5		24	24		

SPR	N/A	MPR	N/A	PO Number	Customer
SPRI	N/A	MPRI	N/A	Work Order	Purpose: Routine Assessment
QSR	N/A	QMR	N/A		

OPR	Surveyed By	Direction	Date	Media label
N/A	George_C	Downstream	20150915	Hard Drive

OPRI	Certificate Number	Pre-Cleaning	Time	Weather	
N/A	1234	No Pre-Cleaning	14:16	Dry	

Date Cleaned	End Time	Additional Info
	14:31	

Normal Defects	Structural Ratings			O & M Ratings			Combined Ratings		
	Grade Rating	No. Occur.	Rating	Grade Rating	No. Occur.	Rating	Grade Rating	No. Occur.	Rating
	1	0	0	1	0	0	1	0	0
	2	0	0	2	0	0	2	0	0
	3	0	0	3	0	0	3	0	0
	4	0	0	4	0	0	4	0	0
	5	0	0	5	0	0	5	0	0

Continuous Defects

Code	ID	Length

	Structural Ratings			O & M Ratings			Combined Ratings		
	Subtotals	0		Subtotals	0		Subtotals	0	
SUMMARY	Pipe Rating		0	Pipe Rating		0	Overall Pipe Rating		0
	Structural Index		0	O&M Index		0	Overall Index		0
	Str. Quick Rating		0000	O&M Quick Rating		0000	Ovrl. Quick Rating		0000

CREEK FLOW WAS UNDETECTED
UNTIL WE GOT ON SITE BECAUSE IT WAS SO

M31
M30
M14B M14C
M28
M27
M10
M08
M07

NOTE: SS above SD (SS VCP/ACP) in this area

NOTE: SS above SD (SS VCP/ACP) in this area

CRACKED UNKNOWN MOS BRANCH

CRACKED MH HERE & DID SHORT SHOT TO OUTFALL THEN LONG HOSE OTHER WAY (AS FARAS COULD GO)

1) ≈328.9 FT UPSTREAM OF OAK HILLS MH IS AREA OF WATER INFILTRATING STRMS (CREEK SAYS AS WATER SIMILAR TO INFILTRATION IN SAMPLE CLM)

2) SAME THING = 337.4 FT

3) 344.8 ILLEGAL CONNECTION? CMP (RCP) TOP OF PIPE & INFILTRATION @ SAME LEVEL

4) PIPE STARTS SLEEPING RIGHT @ 350 FT

& STOPPED VIDEO HERE AS WE SO MUCH LEAVE OF

AT PIPE JOINTS

OAK HILLS MH TO M10 OUTFALL STARTS 2 INCHES FROM THIS MH
OAK HILLS MH TO UPSTREAM UNKNOWN STARTS @ 9.5 FT

Legend
- Catch Basins
- Culverts
- Manholes
- Receiving Water Site
- Outfall Site
- VC Compliance Monitoring Station
- Streams
- Storm Drains
- Subdrainage Areas to Outfalls

0 185 370 740 Feet

M08

December 16, 2015

Ms. Jenny Newman
TMDL Section Chief
Los Angeles Regional Water Quality Control Board
320 W. 4th St., Suite 200
Los Angeles, California 90013

SUBJECT: MALIBU CREEK TRASH TMDL ANNUAL REPORT (UPPER MEDEA CREEK AND UPPER LINDERO CREEK) BASELINE AND ANNUAL REPORT DATED DECEMBER 2015

Dear Ms. Newman:

Enclosed for your review is the Third Malibu Creek Trash TMDL Annual Monitoring Report for 2013-2014. This Annual Monitoring Report is being submitted by the County of Ventura (the County), Ventura County Watershed Protection District (the District), and City of Thousand Oaks (the City) per the requirements of the Malibu Creek Trash TMDL, Los Angeles Regional Water Quality Control Board Resolution No. R4 2008-007. It documents third year implementation of the Malibu Creek Watershed Trash Monitoring and Reporting Plan and Minimum Frequency of Assessment and Collection (TMRP/MFAC) program, submitted by the County, the District, and the City on April 30, 2010.

This annual summary report presents the data and analysis of trash loading patterns from the defined assessment areas during normal and critical weather events, an evaluation of the effectiveness of existing Best Management Practices (BMPs), and comparison against the project defined baseline trash Waste Load Allocations.

If you have any comments or question regarding the attached document, please contact Ewelina Mutkowska at (805) 645-1382 or Paul Jorgensen at (805) 449-2424.

Sincerely,

Gerhardt Hubner
Ventura County Watershed Protection District
Deputy Director

Jay T. Spurgin
City of Thousand Oaks
Public Works Director

CC: Renee Purdy, Regional Water Quality Control Board, Regional Program Chief
Stefanie Hada, Regional Water Quality Control Board, Environmental Scientist
Jeff Pratt, County of Ventura, Public Works Agency, Director
Tully Clifford, Ventura County Watershed Protection District, Director
Ewelina Mutkowska, Ventura County Public Works Agency, Stormwater Manager
Ron Manwill, City of Thousand Oaks, Environmental Program Coordinator

City of Thousand Oaks
County of Ventura and
Ventura County Watershed Protection District

Annual Trash Monitoring and Reporting Plan Report for the Malibu Creek Watershed

December 2015

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Introduction

This Annual Report for the third year of Trash Total Maximum Daily Load (TMDL) implementation (July 2013-June 2014) is submitted by and for the City of Thousand Oaks (the City), the County of Ventura (the County), and the Ventura County Watershed Protection District (the District). This report fulfills requirements specified by the Los Angeles Region Water Quality Control Plan with regard to the Malibu Creek Watershed Trash TMDL, Resolution No. R4-2008-007 (effective July 7, 2009). The trash monitoring results and compliance assessments are reported for point and non-point source waste load allocations (WLAs). The monitoring efforts that generated these evaluated data were conducted according to the Trash Monitoring and Reporting Plan (TMRP) for the Malibu Creek Trash TMDL submitted to Regional Water Quality Control Board (RWQCB) on April 30, 2010.

Additionally, the monitoring data were evaluated to discern trends and factors that may help explain trash loading such as:

- Variation in monthly and yearly trash accumulation data,
- Effects of extreme weather on trash and litter transport,
- Possible loading sources, and
- Effectiveness of Minimum Frequency of Assessment and Collection and Best Management Practice (MFAC/BMP) program.

Based on a review of these factors, recommendations for modifications to improve BMP effectiveness or revisions to the MFAC/BMP program are made.

Overview

To monitor and take steps to prevent watershed impairment caused by transport of trash in Lindero and Medea Creeks, a proposed TMRP was devised with representative locations so that trash accumulation within creek areas could be estimated. Compliance with point source WLAs is also determined. Non-point source trash is evaluated by visual checks and controlled by scheduled crew and ad hoc volunteer clean ups.

The assessment locations were selected at the lowest point of flow from each subwatershed where creek morphology is conducive to accumulate trash deposits. This provides a measure of the level of trash that could move between subwatersheds. These locations were also judged to be accessible and safe for entry.

The contribution of trash and litter transported by critical events (high winds and sufficiently intense rainstorms) has been estimated. This allows the trash loading impacts of these events to be considered as part of a trash and litter loading evaluation.

As specified in the TMRP, a minimum of one collection per month was to be done at each site. All collections were completed as indicated in Table 1.

Table 1. Collection Date Summary

Monitoring Date	Lindero Creek Reach 2, LC-1	Medea Creek Reach 2, MC-1
7/25/13	X	X
8/27/13	X	X
9/24/13	X	X
10/29/13	X	X
11/25/13	X	X
12/19/13	X	X
1/30/14	X	X
2/12/14	X	X
3/12/14	X	X
4/28/14	X	X
5/29/14	X	X
6/19/14	X	X

Assessment Area Characteristics

A detailed review of land uses in a drainage area offers another view of potential trash sources and activities responsible for inappropriate disposal of trash. For example, visual inspections have shown that popular recreation areas and areas close to schools have a high potential for litter generation. This is partly due to a high incidence of snack and packaged convenience food being consumed in these areas.

Lindero Creek Subwatershed

The area within the City of Thousand Oaks jurisdiction with drainage to Reach 2 of Lindero Creek is 2.08 square miles. A breakdown of land uses in this area is: 49.03% open space, 44.71% residential; 6.25% public and institutional lands (includes a golf course and parks); and 1.29% commercial. Population is estimated to be 1,970 persons. Areas in unincorporated Ventura County also have drainage to Lindero Creek. This area is 0.9 square miles. The land uses of this area are 9.5% commercial; 49.7% residential; and 40.8% open space. Population data for this area is not yet available.

The Lindero Creek assessment site is a part of the private debris basin that receives braided flow that converges at a perforated stand pipe for below flood-stage discharges that bypass the overflow structure. A reduction in hydraulic gradient at the debris basin, in addition to the standpipe's size restriction, promotes trash and debris accumulation in the flood plain after storm-level flows recede. The location of the Lindero Creek assessment area is shown in Figure 1.

Figure 1. Lindero Creek Assessment Site (LC-1) Map

Medea Creek Subwatershed

The area within unincorporated Ventura County (Oak Park) with drainage to Reach 2 of Medea Creek is 3.32 square miles. A breakdown of land uses for this area is: 6.93% commercial and community facilities; 30.08% residential; and 62.98% open space. Oak Park population is about 13,800.

Medea Creek follows a single flow path as it moves through the assessment area. When flow levels rise due to a storm event, the stream configuration causes bank overflow and deposition of transported trash and debris into an existing flood plain. The Medea Creek assessment site is shown in Figure 2.

Figure 2. Medea Creek Assessment Site (MC-1) Map

Evaluation of Trash Loading

Comparison of monthly piece counts helps identify temporal patterns such as increases due to seasonal usage, weather events, or isolated incidents each of which could be a cause for a spike in trash levels. Additionally, each of the metrics can reveal something different about the sources and activities causing loading, as well as the modes of trash transport. Figure 3 shows the monthly trash levels for the current and prior year at Lindero Creek.

Lindero Creek

As seen in the Figure 3, there was a trend toward a general decrease in piece count in the current year compared with the previous year. May 2014 was an exception. It had an unusually high increase. Plastic bottles, bags, and wrappers alone accounted for nearly 40% of the pieces in that month. The timing suggests that warm May weather may have spurred activity, raising the potential for waste materials to be discarded carelessly.

Continuing the evaluation for the volume metric, trash volume increases were observed in December and May relative to the prior year's data for these months. For weight measurement, October, December, February, March, and May oppose the trend of decreasing numbers of pieces by having weight increases. Reviewing the data sheets for specific trash description, October was abnormally impacted by brick fragments. Such material may be used for constructing temporary ramps for skateboarding. The source of the volume increase in May was less certain. The bottles, cans, and lumber pieces found in that month increasing trash volume may be contributed during recreational or skating activities.

Another tool for considering long-term trends in trash accumulation is to compare trash loading annual averages with the baseline year's loading. Table 2 shows such a comparison.

In year 1, the average annual loading at Lindero Creek was 74% of that determined in the baseline year. Year 2 extended this reduction to 84%. This additional improvement may be partly attributable to the volunteer cleanup events held at this location.

Figure 3. Comparison of Lindero Creek Trash Loading in 2012-2013 and 2013-2014 Monitoring Seasons

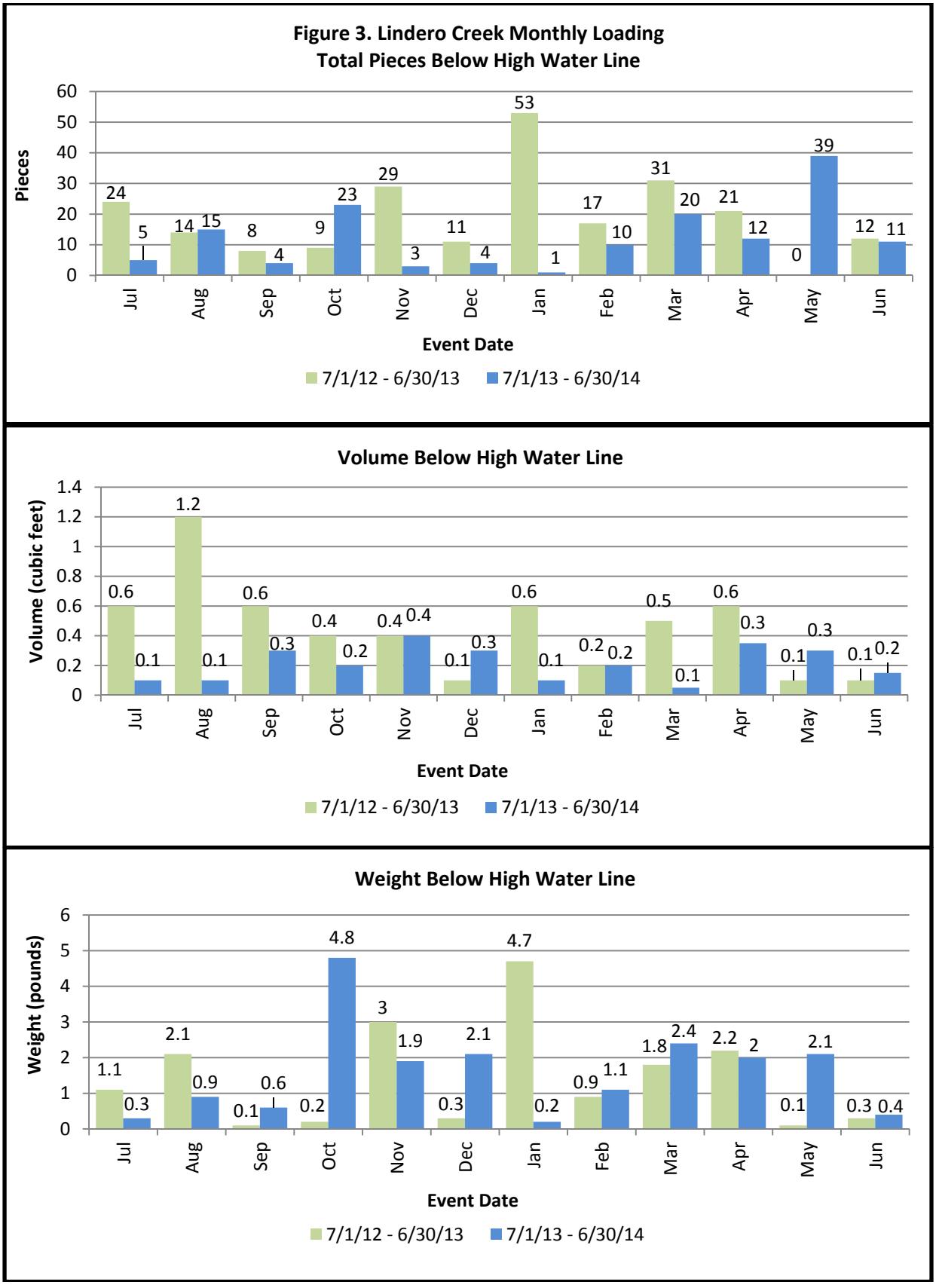


Table 2. Yearly Loading Comparison at Lindero Creek

Current Year*	Pieces Collected at Lindero Creek		
Date	Baseline (2011-12)	Year 1 (2012-2013)	Year 2 (2013-2014)
7/25/13	94	24	5
8/27/13	125	14	15
9/24/13	43	8	4
10/29/13	69	9	23
11/25/13	245	29	3
12/19/13	16	11	4
1/30/14	0	53	1
2/12/14	24	17	10
3/12/14	15	31	20
4/28/14	112	21	12
5/29/14	91	0	39
6/19/14	36	12	11
Average Pieces	**73**	**19**	**12**
Average Percent Reduction from Baseline		**74**	**84**

*Previous year's collection occurs in the same month but not on the same date.

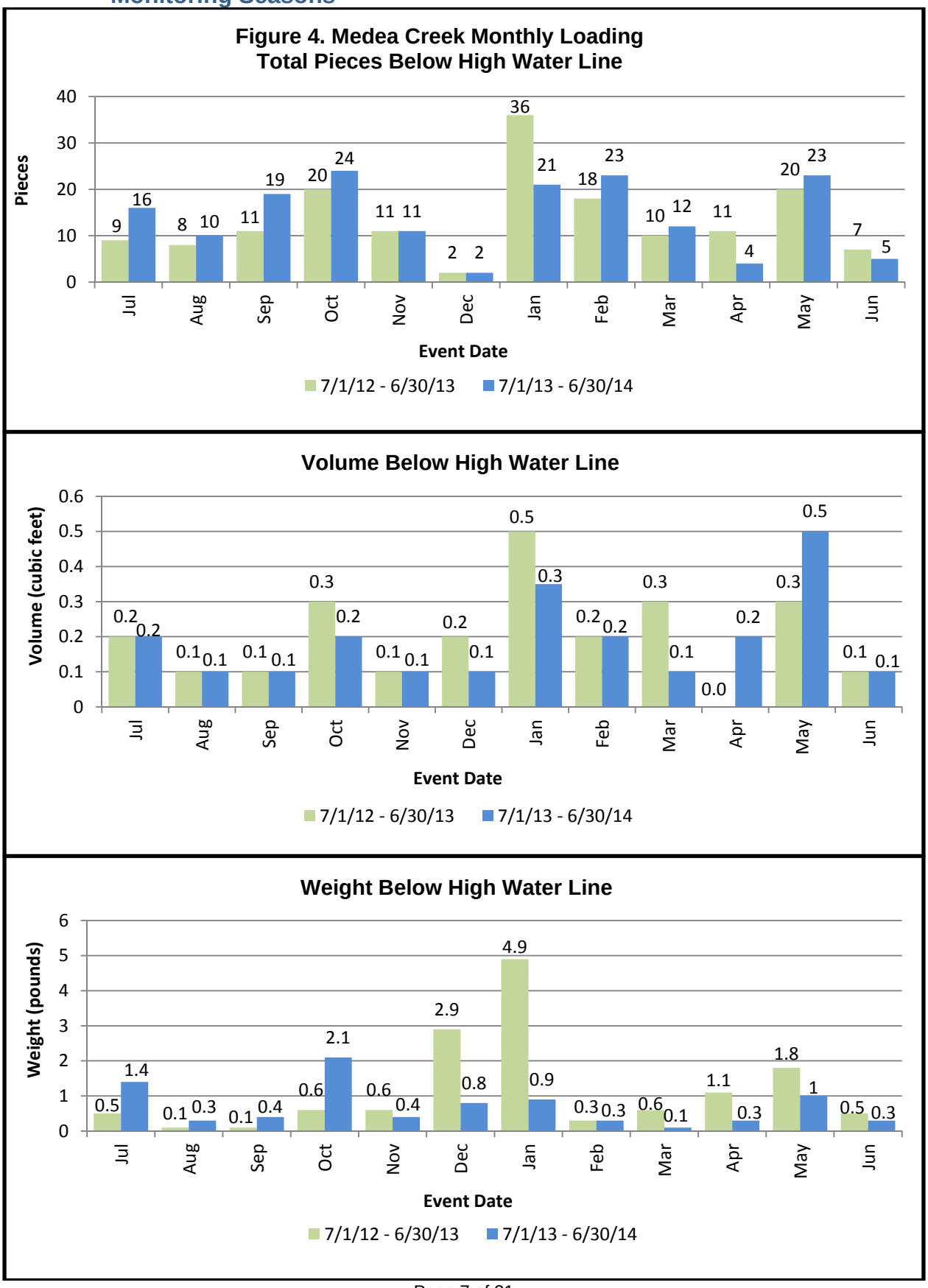
Medea Creek

The general trend in piece count shows a small increase in loading with respect to the previous year. No month had excessively abnormal piece counts, considering the usual magnitude of random fluctuations.

There was a general decrease in the volume metric, except for April and May, with May having the highest volume collected for the year (Figure 4). An inspection of the data sheets revealed that 4 plastic bottles accounted for the increased volume. As there are conveniently placed refuse containers at many trail locations, carelessness or disregard could be factors for the presence of the bottles.

For weight measurement, only October had a spike. A review of the data sheets found that bottles and cans were responsible. No explanation is known that would account for this.

Figure 4. Comparison of Medea Creek Trash Loading in 2012-2013 and 2013-2014 Monitoring Seasons



A longer term loading trend at Medea Creek is shown in Table 3.

Table 3. Yearly Loading Comparison at Medea Creek

Current Year*	Pieces Collected at Medea Creek		
Date	Baseline (2011-12)	Year 1 (2012-2013)	Year 2 (2013-2014)
7/25/13	44	9	16
8/27/13	130	8	10
9/24/13	88	11	19
10/29/13	270	20	24
11/25/13	299	11	11
12/19/13	12	2	2
1/30/14	5	36	21
2/12/14	15	18	32
3/12/14	0	10	12
4/28/14	34	11	4
5/29/14	28	20	23
6/19/14	21	7	5
Average Pieces	**79**	**14**	**15**
Average Percent Reduction from Baseline		**82**	**81**

*Previous year's collection occurs in the same month but not on the same date.

The table shows that year 2 lost 1% in the average load reduction value compared to the prior year. This is a very slight reduction and could be the result of many factors. Random negligence is among these. Additional BMPs will be considered, to increase annual loading reductions with respect to baseline.

What is evident at both of these assessment sites is that occasional vandalism or careless behavior can negate extensive efforts to maintain integrity of the watershed. For example, one shattered bottle could add 20 or more pieces. This amount alone would be high loading that defeats the conscientious behavior of a sizeable portion of the community.

Trash Profile: High Frequency Categories

The types of litter found at a higher rate often reflect the nature and habits of the people who may frequent a particular area. For example, the high number of sporting goods found at LC1 reflects the high usage of the park and participation in games using balls that can be hit beyond the park perimeter. Figures 5 and 6 depict the relative amounts of annual trash by category for Lindero Creek and Malibu Creek, respectively. Wrappers and plastic bags were two predominant trash categories at both monitoring locations. Bottles were the highest trash category found at Lindero Creek (47%) while wrappers at

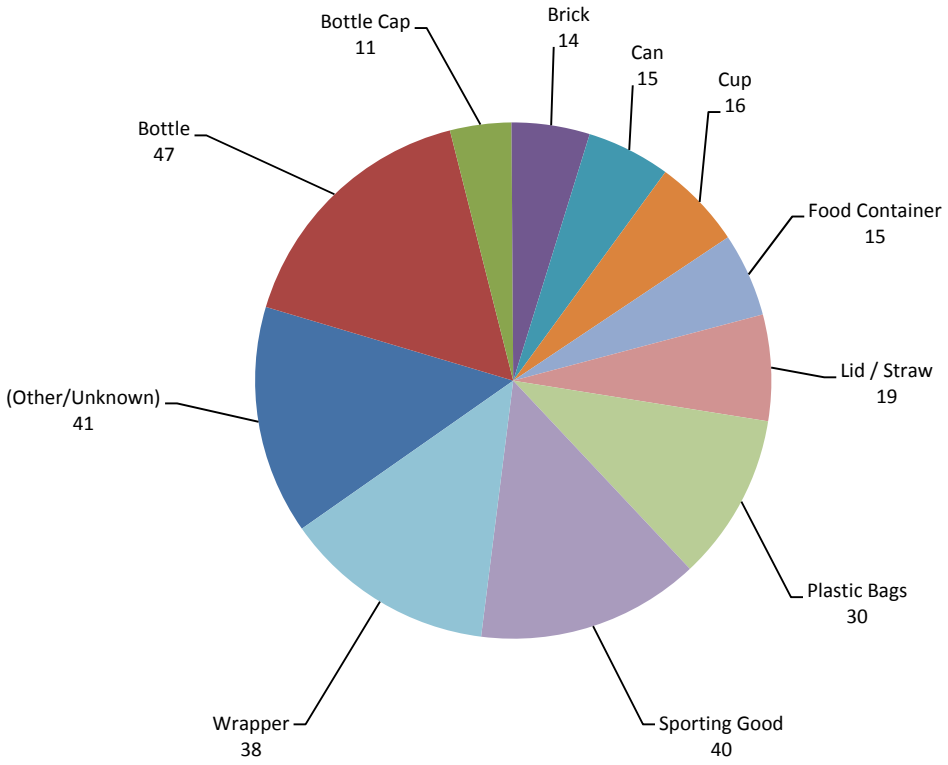
Malibu Creek (43%). The second highest category at Lindero Creek were sporting good (40%) with golf balls observed at large quantities during field monitoring event.

Lindero Creek

The bulk of litter at this site essentially came from two categories: 1) Convenience packaging for food and snacks, and 2) materials used for recreational activities such as tennis and golf balls and water bottles. The materials called “other unknown” in Figure 5 could be the result of weather-induced breakdown of convenience packaging. Alternatively, these could be little torn pieces that people consider insignificant as litter and a nuisance to tote around. Plastic bags were a continued presence because they are used for nearly every retail purchase, whether needed or not. Their rife presence in the subwatersheds suggests that they are seen as an encumbrance after use. Anything less than general ban (proposed by California) on single-use plastic bags probably would not be effective for diminishing the incessant supply of this litter component.

Smaller contributions come from residential areas including candy wrapper and plastic water bottles. In addition, field personnel observed abandoned lunch packaging, beer cans and soft drink cans suggesting trash generation during landscaping or other jobs conducted in the residential area.

Figure 5. Lindero Creek Trash Composition



Further information about littering can be obtained by looking at the temporal trend of litter by categories. Table 4 evaluates annual pieces in each category for year 1 and year 2 and makes a percent comparison of those categories with the baseline year.

Based on completed baseline and 2 years of trash monitoring, shattered glass, cans, and others trash categories were successfully reduced over time with over 80% reduction during the 2nd evaluation year. On the other hand, presence of some categories varies. For example, there was a 71% reduction in food containers in year 1. In year 2, however, the percent difference with the baseline loading was less, only 12%. The ochre-colored cells indicate those trash categories that were not continuing a trend of reduction with respect to the baseline year. Looking at the increasing categories as a whole, convenience food packaging was responsible for increasing accumulation in the second year of implementation. Even if these categories were not only among the largest loading contributors for the year, they were increasing with respect to the baseline year levels.

Table 4. Annual Pieces Comparison by Category, Lindero Creek

Trash Category	**Baseline** (2011-2012)	**Year 1** (2012-2013)	**% Reduction** Year 1 and Baseline	**Year 2** (2013-2014)	**% Reduction** Year 2 and Baseline
Lid/Straw	32	15	53	19	41
Cans	86	20	77	15	83
Plastic Bags	62	28	55	30	52
Bottle Caps	18	4	78	11	39
Other/Unknown	400	62	85	41	90
Wrapper	124	44	65	38	69
Shattered Glass	16	0	100	0	100
Sporting Goods	142	46	68	40	72
Plastic Bottle	125	66	47	47	62
Cups	72	24	67	16	78
Food Container	17	5	71	15	12
Brick		0	N/A	14	N/A

Note: Blue color indicates trash percent reductions over 80% and ochre color shows mixed reduction and increase trends.

Medea Creek

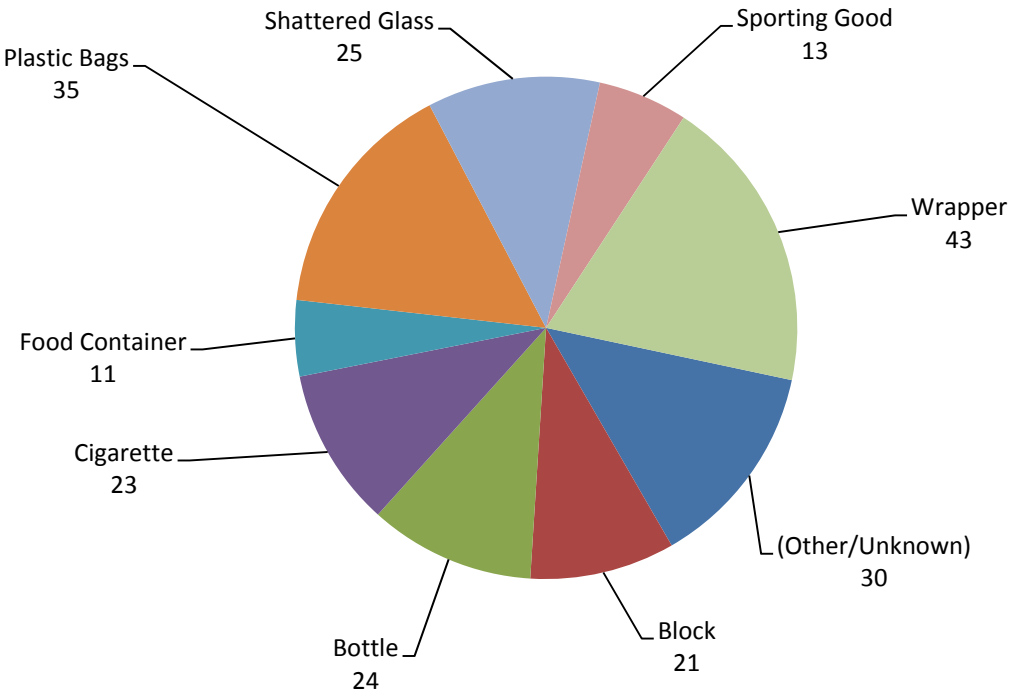
Reviewing the relative contribution of litter by category indicates the types that are most responsible for the year's loading (Figure 6). Within this monitoring period, plastic wrappers including candy packaging, was found at the highest amount at this site (43%) following by plastic bags (35%) and other/miscellaneous category (30%).

Plastic bags are a type of litter that has the greatest potential to be transported by the wind. Their presence is immense because they are involved with nearly every purchase.

A plastic bag ban is pending a vote in November 2016. Passage of this measure would likely reduce the presence of this category. The new presence of styrofoam block fragments appeared to not be random because they were found over several months.

Despite having similar demographics, the presence of shattered glass at Medea Creek routinely exceeds that found at Lindero Creek. The reason perhaps lies in the difference between the prominent features of the sites. Medea Creek has rip-rap banks and Lindero Creek has a concrete spillway. Based on our trash monitoring data, unlike concrete spillway, rip-rap appears to attract glass shattering activities.

Figure 6. Medea Creek Trash Composition



A temporal evaluation of litter by category, similar to that described for Lindero Creek, reveals that piece counts of most types of trash continue to show reductions into implementation year 2 with respect to baseline loading (Table 5). Specifically, lid/straw, cans, bottle caps, and ammo categories achieved 100% reduction with no single piece found at Medea Creek location during twelve monthly monitoring events in year 2. On the other hand, two exceptions were cigarettes and sporting equipment. As shown by the ochre-colored cells in Table 5, these categories have not continued to decrease with respect to the baseline loading. These materials are not thought to be part of an identifiable pattern. Rather, they are likely from random occurrences. Even though wrappers and shattered glass were among the largest contributors of this year's loading, this evaluation shows that they are decreasing with respect to the baseline year levels.

Table 5. Medea Creek Trash Category Evaluation

Trash Category	Baseline (2011-2012)	Year 1 (2012-2013)	% Reduction Year 1 and Baseline	Year 2 (2013-2014)	% Reduction Year 2 and Baseline
Lid/straw	18	5	72	0	100
Cigarettes	38	4	89	23	39
Cans	21	5	76	0	100
Plastic Bags	37	37	0	35	5
Bottle Caps	18	5	72	0	100
Other/Unknown	577	54	91	30	95
Wrapper	132	54	59	43	67
Shattered Glass	520	38	93	25	95
Sporting Good	19	11	42	13	32
Ammo	343	5	99	0	100
Styrofoam Block	0	N/A	N/A	21	N/A

Note: Blue color indicates trash percent reductions over 80% and ochre color shows mixed reduction and increase trends.

Extreme Weather Events

All extreme weather events were tracked so that a comparison could be made with monthly loading values to determine if correlations exist between them. The threshold level of wind considered as “high” was lessened to 15 mph due to a paucity of higher intensities available during the assessment period. There was still an opportunity to examine if such wind intensities could still impact accumulations at the assessment sites. Similarly rain events at or above 0.1” were considered to help explain trends in loading. Table 6 summarizes the significant weather events so defined.

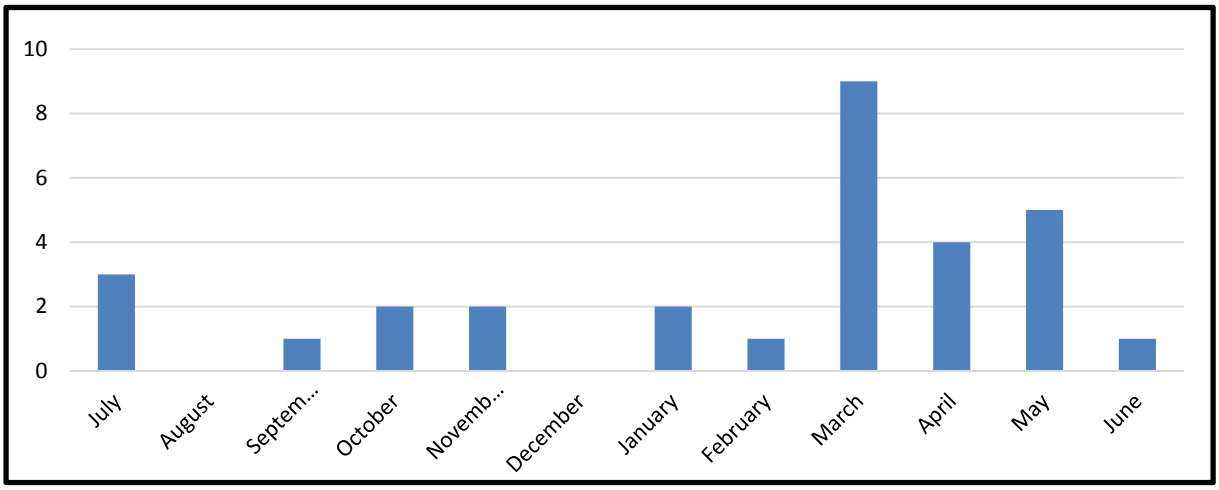
The months that had multiple inclement days in the current year were October, November, December, January, February, March and May. In addition, December and January had the most high-wind days. Peak rains occurred in February. These months were compared to peak loading in the three metrics.

Table 6. Extreme Wind and Rain Events

Wind Events		Rain Events	Wind Events		Rain Events
Date	Speed, ≥ 15 mph	Volume ≥0.10"	Date	Speed, ≥ 15 mph	Volume ≥0.10"
10/4/13	20		2/6/14		0.22
10/5/13	21		2/20/14	16	
11/21/13		0.15	2/26/14		0.25
11/22/13		0.15	2/27/14		0.25
11/23/13	15		2/28/14		2.15
12/2/13	16		3/1/14		1.40
12/6/13		0.22	3/2/14		0.12
12/7/13		0.18	3/12/14	15	
12/9/13	19		3/31/14		0.11
12/25/13	15		3/31/14	15	
1/12/14	16		4/1/14	15	0.17
1/15/14	16		5/6/14	18	
1/16/14	16		5/20/14	15	

Plastic bags could be used as one indicator that there is weather transport because they are light weight and they available as a consistent presence at the assessment sites. To test the validity of plastic bags as an indicator, frequency plots of plastic bags were constructed (Figures 7 and 8).

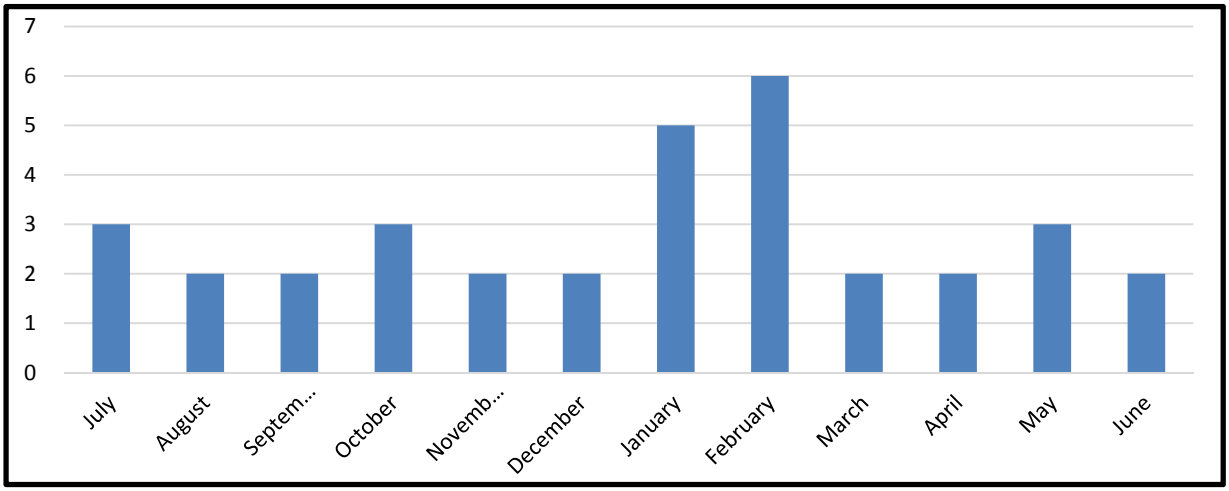
Figure 7. Plastic Bag Frequency at Lindero Creek (July 2013 through June 2014)



With respect to Lindero Creek, the peak months when bags occur are March and the early months of the spring. The intense rains in February appear to have caused the highest amount of bags found during the March collection. This timing suggests that high activity can be an important factor when deciphering litter patterns. The lack of transport

and hence the lesser numbers of bags found during the winter season suggests that stores of accumulated bags may have been diminished by collection events and volunteer cleanup efforts and new pieces were not being added.

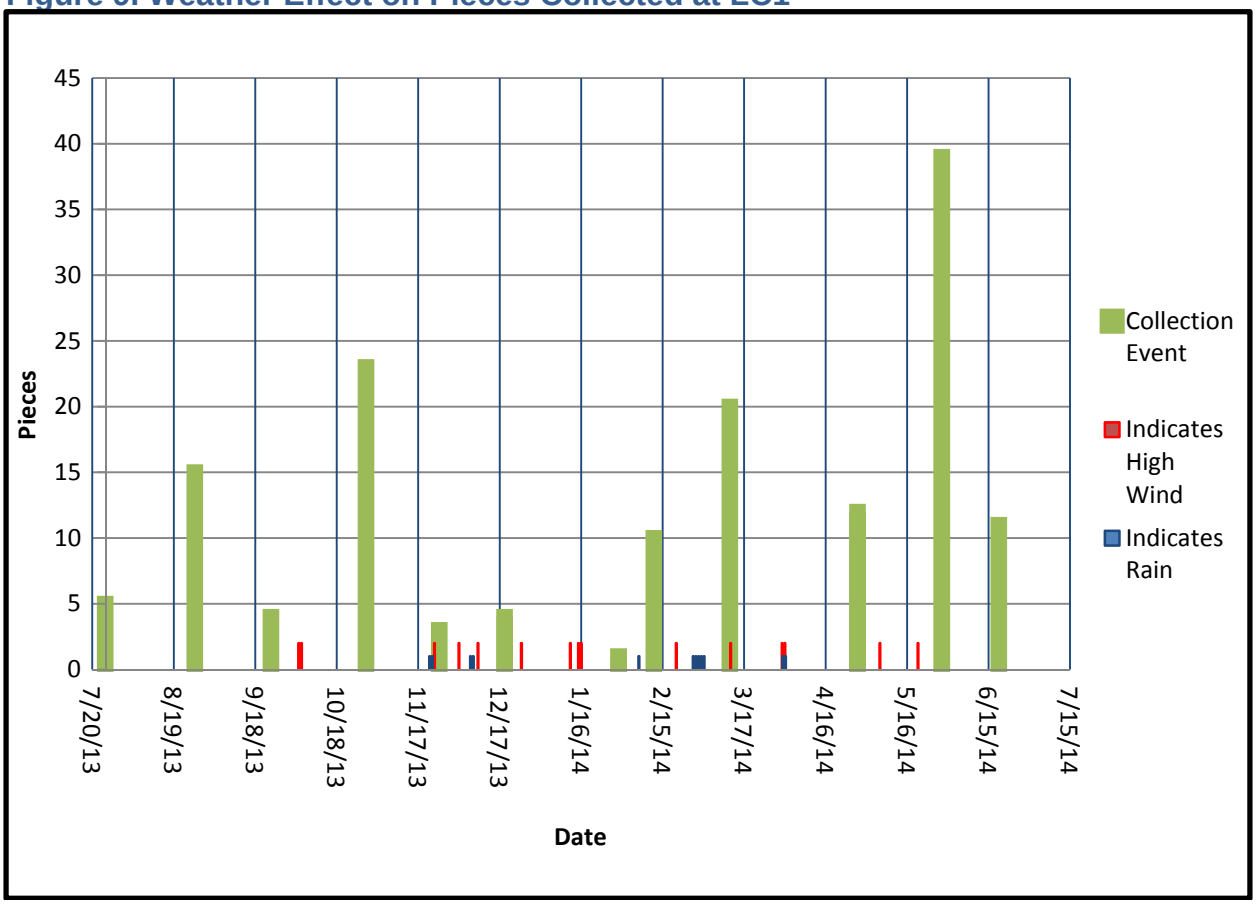
Figure 8. Plastic Bag Frequency at Medea Creek (July 2013 through June 2014)



At Medea Creek, greater amounts of bags were found in January and February coinciding with two of the peak weather months. This suggests that three factors important to transport were at play: an available source, enough motive force, and freedom from transport barriers.

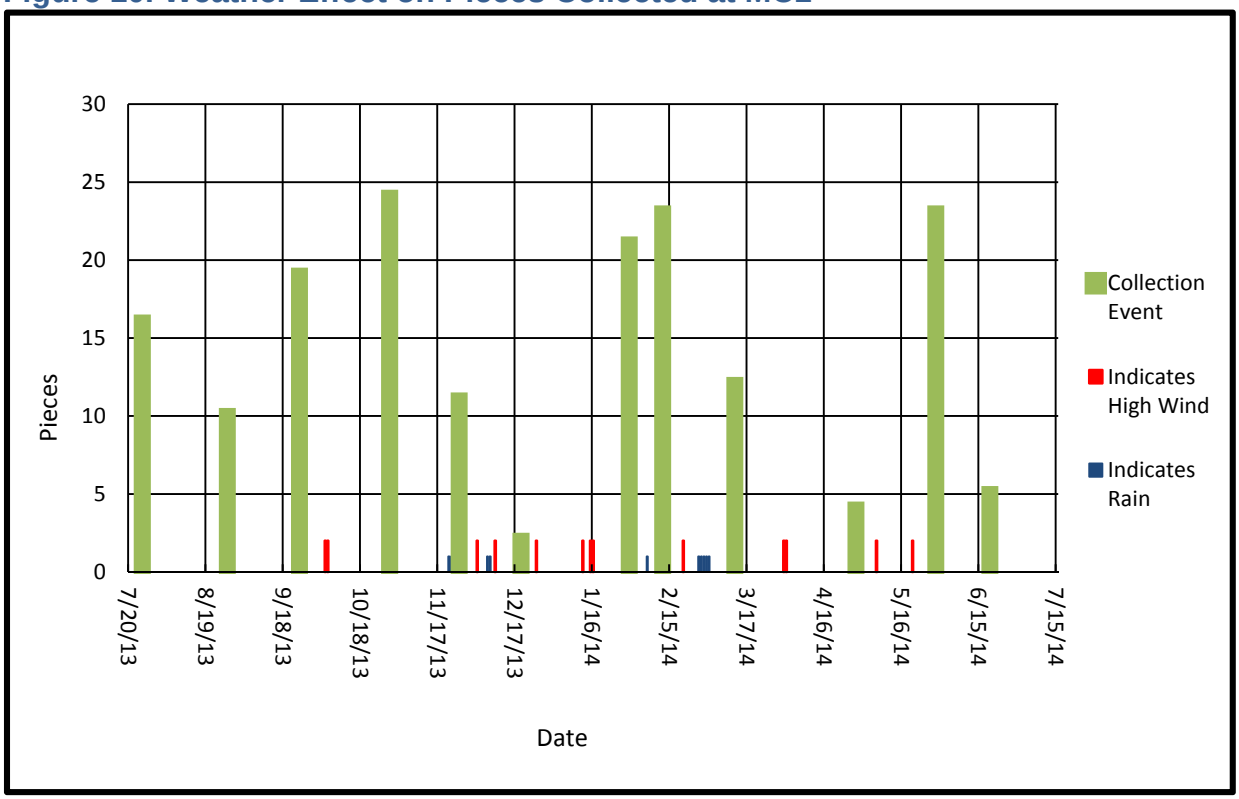
To further examine the possibility that extreme weather transports litter and trash to the MS4, Figures 9 and 10 juxtapose pieces from all categories collected during each month with when weather these events occurred. Note that the indicators for weather events merely show a date. Their shape and size make no statement about the intensity of an event.

Figure 9. Weather Effect on Pieces Collected at LC1



As with plastic bags, there is a moderate correspondence between increased loading levels and the timing of intense weather events at the Lindero Creek assessment area. For example, high wind and rains in November, December, and January registered little to no impact on the level of trash and litter collected. The greatest intensity rains in February did result in a relative peak loading, but it was the 3rd largest. Compare these correlations with May's loading, the largest of the year. This major peak was preceded by two high-wind days. A review of the data sheets clarified that the composition of material was a near even split between light-weight, transportable trash and heavier materials unlikely to be transported. At the Lindero Creek site, weather appears to be a moderate factor that must be combined with human activities, source locations, activity levels and random acts.

Figure 10. Weather Effect on Pieces Collected at MC1



Similar to Lindero Creek, the Medea Creek accumulation pattern does not fully substantiate that intense storm events alone result in high trash loading. In some months, such as December and April, wind and rain events appeared to have little effect on trash levels. In contrast, the highest monthly levels occurring in October, February, and May were preceded by wind and rain events. This inconsistent correlation of weather event to trash loading again implies that there are numerous factors that cause its supply and movement in the watershed.

The fact that the winds were weaker and the rains less intense undoubtedly lessened the impact of weather as a factor in loading patterns at both locations. The strength of correlation between adverse weather and loading should also be expected to be weakened.

Annual Trash and Debris Loading

The amount of litter collected at the assessment sites each month is summarized in Table 7. Annual totals are included so that these values can be compared to the point source WLAs in effect at each site.

Table 7. Annual Trash Loading at Lindero and Medea Creeks Assessment Sites

Site	LC1			MC1		
Date	Count pieces	Vol., c.f.	Weight lbs.	Count pieces	Vol., c.f.	Weight lbs.
7/25/13	5	0.1	0.3	16	0.2	1.4
8/27/13	15	0.1	0.9	10	0.1	0.3
9/24/13	4	0.3	0.6	19	0.1	0.4
10/29/13	23	0.2	4.8	24	0.2	2.1
11/25/13	3	0.4	1.9	11	0.1	0.4
12/19/13	4	0.3	2.1	2	0.1	0.8
1/30/14	1	0.1	0.2	21	0.35	0.9
2/12/14	10	0.2	1.1	32	0.2	0.3
3/12/14	20	0.05	2.4	12	0.1	0.1
4/28/14	12	0.35	2.0	4	0.2	0.3
5/29/14	39	0.3	2.1	23	0.5	1.0
6/19/14	11	0.15	0.4	5	0.05	0.3
TOTAL	**147**	**2.8**	**18.8**	**170**	**2.2**	**8.3**

Waste Load Allocation Compliance

Annual loading values at the assessment sites were compared with the point source WLA values for each of the three metrics at the Lindero and Medea Creek assessments sites (Table 8).

Table 8. WLA versus Trash Loading

Lindero Creek	Pieces	Vol., c.f.	Weight, pounds	Medea Creek	Pieces	Vol., c.f.	Weight, pounds
Baseline WLA	902	13.4	69	Baseline WLA	970	7.2	16.3
40% Reduction due 7/7/2014	541	8.0	41.4	40% Reduction due 7/7/2014	582	4.32	9.8
2013-14 Annual Loading	147	2.8	18.8	2013-14 Annual Loading	170	2.2	8.3

Data in Table 8 show that assessment sites LC1 and MC1 meet the point source WLAs for all trash and litter metrics. Ongoing trash BMPs in the vicinity of LC1 and MC1 include street sweeping, receptacle placement, and regular trash collection by crews. In all cases,

there is zero trash in areas with proximity to the assessment area after an MFAC event. Therefore, non-point sources meet load allocations and TMDL responsible parties are in compliance.

BMP Evaluation

Existing BMPs are done over the course of the year and are reasonably effective at preventing an accumulation of trash in most areas. The BMPs currently in use in areas surrounding and including assessment sites LC-1 and MC-1 are itemized as follows:

City of Thousand Oaks Litter Reduction Measures:

- Catch basin cleaning - Catch basins are inspected annually. If trash has accumulated to 25% or more of the unit's capacity, it is cleaned by a vactor truck.
- Street sweeping - All residential areas (public and private) are swept 19 times per year and commercial areas are swept once per week.
- Open channel storm drain maintenance: All city-maintained channels are inspected and cleaned as required once per year, prior to the wet season.
- Public Event - A recycling plan is required when obtaining a permit for staging public events. This plan requires adequate facilities for trash collection and disposal and reclamation of recyclable materials.
- Public areas - Trash receptacles have been placed at public use areas. These devices are monitored and emptied regularly.
- Freeway Ramp and Interchange Collection Program - The City pays for trash and debris collection at freeway on-ramps and exits and from the freeway interchange.
- Free Landfill Day - The City sponsors two days one in April and one in September when residents may take waste and recyclables, including electronics, to the Simi Valley Landfill for free disposal.
- The City-sponsored "Neighborhood Cleanup Program" provides 40-yard dumpsters and free disposal to residential neighborhoods desiring to organize and conduct cleanup events.

- Residents may safely and legally dispose of household hazardous waste at the City's Hazardous Waste Collection Facility on Fridays and Saturdays. In addition, the City provides household battery collection services at twelve locations.

- Thousand Oaks residents may dispose of up to four "bulky items" per year, such as appliances, mattresses and old furniture, simply by calling their trash company and arranging for free pickup.

- Thousand Oaks Municipal Code Sec.7-8.201 (7) prohibits the disposal and accumulation of trash in public and private areas.

- Catch basins are labeled "Drains to Creek, Do Not Dump" or "Drains to Lake, Do Not Dump."

- Public outreach/education addressing trash pollution is conducted at multiple public events, through radio and newspapers ads, and on the City's website.

- Utility bill inserts - Promotional inserts are used to advertise for Coastal Clean-up Day, Community Clean-up Day, Free Landfill Day, and other City-sponsored trash reduction/clean-up programs.

<u>County of Ventura and VCWPD Litter Management Program:</u>

- On July 31, 2012 the County of Ventura Board of Supervisors received and filed a draft model Single-Use Bag Ordinance referred to the County by the Beach Erosion Authority for Clean Oceans and Nourishment (BEACON). The County endorsed the use of up to $8,000 as the County's pro-rata share of a regional Environmental Impact Report (EIR) to be prepared by BEACON, which is required to be completed under the California Environmental Quality Act (CEQA) before the model single-use bag ban can be adopted. This is the first step for the County to move forward with the consideration of adoption of a single-use plastic bag ban.
- Catch basin cleaning - Catch basins are inspected at least once a year and cleaned when filled to 25% or more of the catch basin's capacity. During storm season, all drainage facilities are inspected and cleaned as necessary.
- Ventura County's catch basins are labeled, "Don't Pollute, Flows to Waterways."
- Open channel storm drain maintenance - All channels owned and maintained by VCWPD are cleared, inspected, and cleaned as required at least once per year.
- Trash Management at Public Events - A proper management of trash and litter plan is required when obtaining a permit for staging public events. This plan requires adequate facilities for trash collection and disposal.

- Public areas - Trash receptacles have been placed within high trash generation areas. These devices are cleaned and maintained regularly to prevent trash overflow.
- The amended Ventura County Stormwater Quality Management Ordinance for Unincorporated Areas (Ventura County Ordinance No. 4450) has been in effect since August 2012. It includes litter and trash specific prohibitions (§ 6942) on the discharge or deposition of trash that may enter the County storm drain system or receiving waters. The revised ordinance also includes increased civil penalties for violations and provisions for issuing administrative fines, recovery of costs, and misdemeanor violations.
- The County and VCWPD continue to participate in the Countywide Stormwater Program to provide outreach and education retaining the services of "The Agency", a professional advertisement group that designs and conducts Countywide, bilingual outreach programs advocating proper trash disposal. Social media outreach includes messages about litter prevention and protection of stormwater quality.
- The County conducts commercial, industrial, and construction facility/site inspections to ensure proper pollutant prevention BMPs are being applied and to educate the employees on the importance of pollution prevention.

Recommended BMP Modifications

Even though the current PS and NPS allocations are being met for littered trash, additional reductions to meet the final WLAs are needed. To continue to meet more stringent requirements, additional steps are recommended. Note that the recommendations are only in the consideration stage as other avenues to control loading may become available.

Lindero Creek

- Remind trash haulers to collect materials spilled when operating a truck's conveyor.
- Install full-capture and screen devices at catch basins that have been found to have a higher accumulation near the North Ranch Playfield.
  In response, the City has installed 35 full-capture systems in the Lindero Creek subdrainage area
- Develop a relationship with schools so that they will present information to students that stigmatizes littering.
  To improve youths' understanding of trash pollution, the City sponsored after school presentations including information about the harmful aspects of trash and litter.

Medea Creek

- Youth outreach efforts have been ramped up in 2014-2015 within the Oak Park community. This outreach included stormwater pollution prevention presentations with emphasis on California Coastal Cleanup Day to after school programs at Red Oak Elementary and Oak Hills Elementary. Over 170 children attended these interactive presentations.

- The County is in the process of evaluating installation needs for full trash capture devices at catch basins in areas determined as high trash generating areas.

MFAC Program Changes

No changes to the MFAC plan currently recommended.

CALLEGUAS CREEK

Watershed Management Plan

A COOPERATIVE STRATEGY FOR
RESOURCE MANAGEMENT & PROTECTION

December 15, 2015

Renee Purdy
Los Angeles Regional Water Quality Control Board
320 W. 4th St., Suite 200
Los Angeles, CA 90013

Subject: Revolon Slough and Beardsley Wash Trash TMDL 2014-2015 Annual Monitoring Report

Dear Ms. Purdy,

Enclosed for your review and consideration is the Revolon Slough and Beardsley Wash Trash total maximum daily load (TMDL) Annual Monitoring Report (AMR) for 2014-2015. The AMR is being submitted per the requirements of the Revolon Slough and Beardsley Wash Trash TMDL, Los Angeles Regional Water Quality Control Board (Regional Board) Resolution No. R4-2007-007 on behalf of the following responsible parties: City of Camarillo, City of Oxnard, County of Ventura, Ventura County Watershed Protection District, California Department of Transportation (Caltrans), and participants in the Ventura County Agricultural Irrigated Lands Group (VCAILG), which is a subdivision of the Farm Bureau of Ventura County.

The AMR provides a summary of the monitoring conducted, a summary of the monitoring results, and proposed revisions to the minimum frequency of collection and assessment/best management practice program (MFAC/BMP Program). During the reporting year, the monitoring program changed in July 2015 from a quantitative-based assessment program to visual-based assessment program. The visual-based assessment program was detailed in the Regional Board-approved Addendum No. 1 to the Trash Monitoring and Reporting Program (TMRP). As such, the AMR provides the information listed above for both assessment programs; the

quantitative-based assessment program for October 2014 to June 2015 and the visual-based assessment program from July 2015 to September 2015.

If you have any comments or questions regarding the attached document, please contact Anita Kuhlman via email (akuhlman@cityofcamarillo.org) or by phone at (805) 312-2239.

Sincerely,

Lucia McGovern, Chair
Stakeholders Implementing TMDLs in the Calleguas Creek Watershed

cc: Stefanie Hada, Regional Board
Jeff Pratt, Ventura County PWA Director
Tully Clifford, Ventura County WPD Director
Gerhardt Hubner, Ventura County WPD
Ewelina Mutkowska, Ventura County PWA
David Laak, Ventura County PWA
Anita Kuhlman City of Camarillo
Jeremy Grant, City of Oxnard
John Krist, Farm Bureau of Ventura County
Nancy Broschart, Farm Bureau of Ventura County
Maria Agustin, California Department of Transportation
Chen Pei Yu, California Department of Transportation
Ashli Desai, Larry Walker Associates

DECEMBER 2015

Revolon Slough/Beardsley Wash Trash TMDL TMRP/MFAC 2014-2015 Annual Report

submitted to

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD LOS ANGELES REGION

on behalf of the

COUNTY OF VENTURA,
VENTURA COUNTY WATERSHED PROTECTION DISTRICT,
CITY OF CAMARILLO,
CITY OF OXNARD,
PARTICIPANTS IN THE VENTURA COUNTY AGRICULTURAL IRRIGATED LANDS GROUP,
AND CALIFORNIA DEPARTMENT OF TRANSPORTATION

LARRY WALKER ASSOCIATES

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Executive Summary

The purpose of this report is to present the results of the sixth-year (2014-2015) monitoring efforts conducted in accordance with the Revolon Slough and Beardsley Wash Trash TMDL (Trash TMDL), which is effective as of March 6, 2008, and the Trash Monitoring and Reporting Plan (TMRP) Minimum Frequency of Assessment and Collection/Best Management Practice (MFAC/BMP) Program. The Los Angeles Regional Water Quality Control Board (Regional Board) approved Addendum No. 1 to the TMRP in June 2015, which revised the monitoring program from a quantitative program to a visual program. As such, from October 2014 to June 2015, the responsible parties implemented a quantitative MFAC Program and from July 2015 to September 2015, the responsible parties implemented a visual MFAC Program. In addition, the City of Oxnard joined the responsible parties to implement the Trash TMDL, and site 10 was added to the MFAC Program, which is located in the 5th Street Drain near Del Norte Boulevard.

The responsible parties are complying with the non-point source requirements of the Trash TMDL through the implementation of a MFAC/BMP Program and complying with the point source requirements through the installation of certified trash full capture devices on all responsible parties' conveyances discharging to Revolon Slough and Beardsley Wash.

Based on non-point source trash data collected from October 2014 to June 2015 and from October 2013 to June 2014, the weight of trash was 30 percent less during 2014-2015 and the amount of trash (pieces) was 68 percent less. The visual monitoring program utilizes a three-category scoring system to determine Program effectiveness. Visual monitoring data indicated that trash conditions improved during the three-month implementation period. The non-point source-responsible parties are in compliance with the requirements of the Trash TMDL as the MFAC Program resulted in zero trash in-stream immediately after all monitoring events.

Non-point source-responsible parties will continue to conduct all required MFAC events and implement BMPs at high trash generating areas as well as watershed-wide to reduce the discharge of trash from their jurisdictions to minimize the impact of trash in the watershed per the Regional Board-approved June 2015 Addendum No. 1 to the TMRP.

To address point sources, the responsible parties, where feasible, will install full capture devices on conveyances discharging to Revolon Slough and Beardsley Wash and/or install full capture devices in high trash generating areas and employ a point source-specific MFAC/BMP Program in other areas of their jurisdictions. The goal is to meet the required phased percent reductions as listed in Table 7-24.2a of the Trash TMDL by March 2016.

The City of Camarillo proposed to focus installation of full capture devices in priority land uses defined in the Proposed Final Amendment to the Water Quality Control Plan for Ocean Waters of California (Ocean Plan) and the Proposed Final Part 1 Trash Provisions of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California (ISWEBE Plan) (together, "Statewide Trash Policies"). The City of Camarillo believes addressing trash via the requirements of the Statewide Trash Policies will be an effective and efficient way of managing trash and will satisfy the point source requirements of the Trash TMDL. In May 2015, the City of Camarillo submitted a letter to the Regional Board staff detailing the proposed compliance option and requesting Regional Board approval. Subsequently, in July 2015 the City of Camarillo met with Regional Board staff to discuss the City of Camarillo's May 2015 letter.

In October 2015, per the Regional Board staff request at the July meeting, the City of Camarillo submitted additional data on the City of Camarillo's catch basin maintenance program. As of the submittal date of this annual report, the City of Camarillo has not received approval of the proposed point source compliance option.

The City of Oxnard is in the process of reviewing options for funding the installation of full capture devices and hopes to prepare a request for proposal to complete this project once a funding source is secured.

The County of Ventura has a very limited storm drain system within the TMDL responsibility area and therefore, certified full capture device installation will be completed for 100 percent of the County's conveyances discharging to Revolon Slough and Beardsley Wash.

The California Department of Transportation (Caltrans) conducted a Corridor Study in which the installation of 15 gross solid removal devices (GSRDs) was planned by 2016 or following years subject to funding availability and the TMDL Reach Prioritization.

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1 Overview

This Annual Report is being submitted to fulfill the compliance requirements of the Amendments to the Water Quality Control Plan – Los Angeles Region for the Revolon Slough and Beardsley Wash Trash TMDL (Trash TMDL), Resolution No. R4-2007-007 (effective March 6, 2008). The purpose of this Annual Report is to present the results of sixth-year (2014-2015) monitoring efforts associated with the Trash TMDL Trash Monitoring Reporting Plan (TMRP) and associated Minimum Frequency of Assessment and Collection/Best Management Practice (MFAC/BMP) Program.

The Annual Report includes:

- Data summary and analysis;
- Data evaluation;
- Compliance strategy; and
- Proposed revisions to MFAC/BMP Program.

This effort is being completed on behalf of the responsible parties to the Trash TMDL as listed in **Table 1**.

Table 1. Responsible Parties Participating in this TMRP and MFAC/BMP Program

Responsible Party	Nonpoint Source	Point Source[1]
City of Camarillo	X	X
City of Oxnard	X	X
Ventura County	X	X
Ventura County Watershed Protection District	X	X
Participants in the VCAILG[2, 3]	X	
Caltrans[4]		X

1. These Responsible Parties are complying with the point source requirements through installation of certified trash full capture devices on all conveyances discharging to Revolon Slough and Beardsley Wash.
2. Ventura County Agricultural Irrigated Lands Group.
3. These Responsible Parties are not listed as point sources in the Trash TMDL.
4. Caltrans was not given a non-point source Load Allocation (LA) in the TMDL yet is voluntarily participating in the MFAC to meet the TMDL goals.

To complete this effort, the responsible parties hired the California Conservation Corps (CCC) to conduct field monitoring efforts and Larry Walker Associates (LWA) to oversee and conduct monitoring efforts as well as complete reporting requirements. The monitoring efforts during 2014-2015 were conducted according to a TMRP, which is based on a modified version of the Rapid Trash Assessment Protocol (RTAP) developed by members of the San Francisco Bay Regional Board's Surface Water Ambient Monitoring Program (SWAMP). The RTAP was modified to better suit the goals of the TMRP. The responsible parties have revised the TMRP throughout the implementation period based on experience gained during implementation of the TMRP and MFAC/BMP Program. The previous Annual Reports submitted to the Regional Board document these revisions.

Furthermore, the responsible parties submitted Addendum No. 1 to the Regional Board in June 2015, which further revised the TMRP updating the MFAC Program. Addendum No. 1 addressed comments from the Regional Board when they conditionally approved the revised

MFAC Program in December 2014. The MFAC Program was revised from a quantitative assessment-based program to a visual assessment-based program. A TMRP update was necessary to improve the effectiveness of the MFAC/BMP Program to more efficiently assess trash levels in Revolon Slough and Beardsley Wash, target actions towards reducing trash quantities, and better utilize available resources. The revised MFAC Program was initiated in July 2015 and was conducted through September 2015 (end of the monitoring year). As such, this Annual Report provides the results from the two MFAC Programs for the 2014-2015 monitoring year: (1) quantitative MFAC Program (October 2014-June 2015) and (2) visual MFAC Program (July 2015-September 2015).

1.1 ASSESSMENT SITE LOCATIONS

The initial TMRP included nine assessment locations including set assessment sites and rotating assessment sites. However, after the first-year monitoring effort, Site 7 was dropped from the MFAC/BMP Program due to safety issues and the rotating assessment sites were changed to set assessment sites because monitoring these sites on a consistent basis, rather than on a rotating basis, provided a better understanding of the trash found in the watershed.

Five visual assessment sites were included in TMRP Addendum No. 1, with four of the sites comprised of previous assessment sites (Sites 1, 3a, 5 and 8) and one site comprised of a new assessment location in the City of Oxnard (Site 10). The assessment sites listed below are also depicted in **Figure 1** and detailed in **Appendix 1.**

Assessment Sites:

- Site 1: Revolon Slough and its adjacent land areas at Wood Road (the end of the concrete-lined channel). (MFAC-required)
- Site 2: Beardsley Wash at Wright Road and adjacent land areas. (MFAC-required)
- Site 3: Four drain outlets on the north side of Camarillo Hills Drain between Las Posas Road and Wood Road identified as 3a, 3b, 3c, and 3d from east to west. (MFAC-required)
- Site 4: Las Posas Estate Drain between Central Avenue and the 101 Freeway. (MFAC-required)
- Site 5: Agriculture Drain – East of Wood Road on Etting Road.
- Site 6: Inlet to the North Ramona Place drain debris basin. (MFAC-required)
- Site 8: Caltrans Site at 101 Freeway Bridge at Revolon Slough.
- Site 9: Revolon Slough at Pleasant Valley Road.
- Site 10: 5th Street Drain in the City of Oxnard. (MFAC-required)

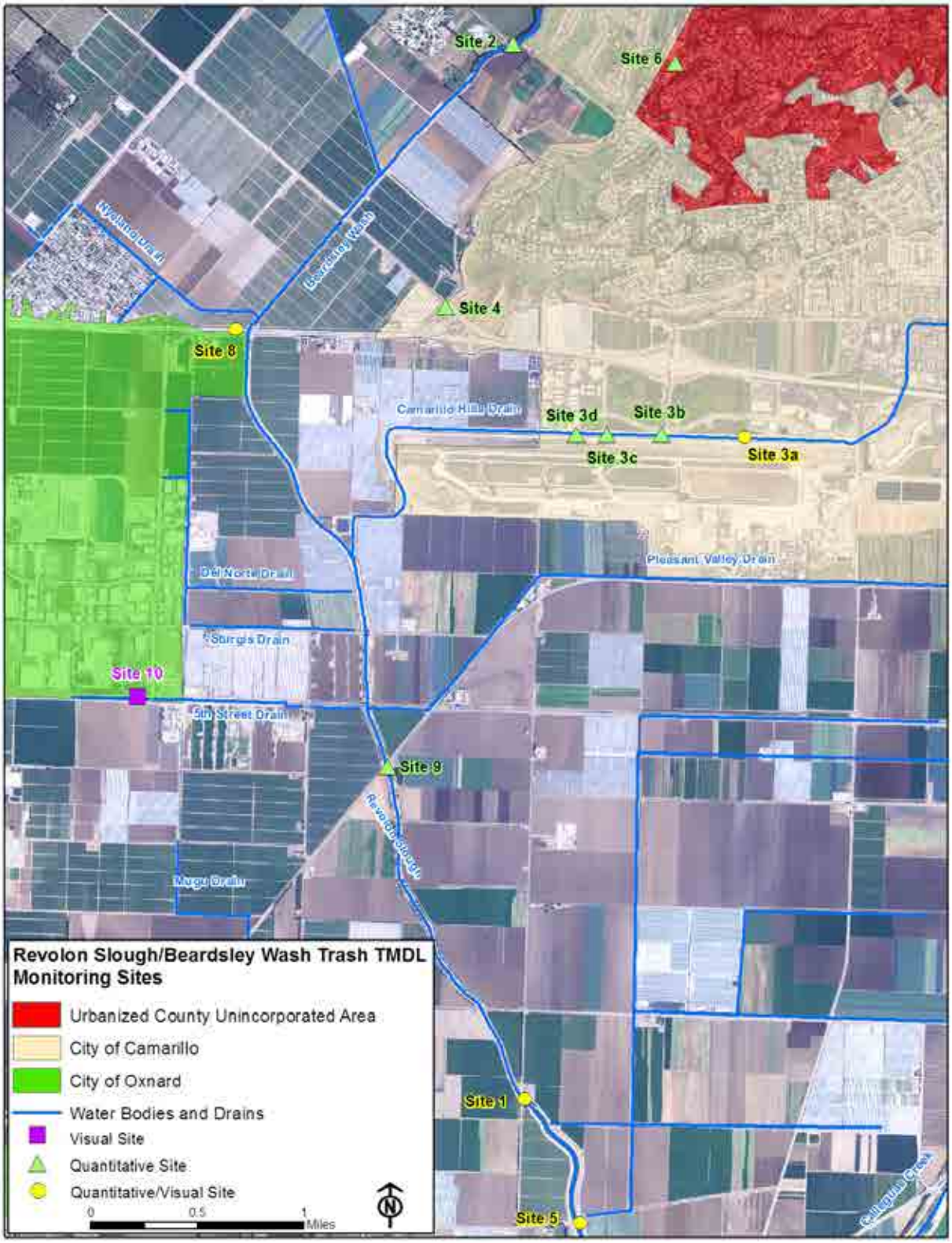

Figure 1. TMRP/MFAC Program Sites

2 Quantitative MFAC Program

This section provides background information, a summary of monitoring conducted, and the results of the monitoring for the quantitative monitoring program implemented October 2014 to June 2015.

2.1 COMPLETED MONITORING EVENTS

Sixth-year monitoring for trash pieces and trash weight was conducted from October 2014 to June 2015. The TMRP was revised in May 2015, changing the monitoring approach for the MFAC/BMP Program from a quantitative assessment approach based on trash pieces and trash weight, to a visual assessment approach. Starting in July 2015, the monitoring for the Trash TMDL transitioned to this visual assessment approach as required by the revised TMRP. Quantitative trash monitoring occurred at the frequencies detailed in **Table 2** through June 2015. See **Table 3** for a schedule of the completed monitoring events and **Appendix 2** for example photos from a typical MFAC Event.

Table 2. TMRP Sixth-Year Monitoring Event Frequency

Site	Frequency
Site 1 - Revolon Slough At Wood Road	Once Monthly[1]
Site 2 - Beardsley Wash at Wright Road	Once Monthly[1]
Site 3 - Four storm drain outlets on the north side of Camarillo Hills Drain between Las Posas Road and Wood Road identified as 3a, 3b, 3c, and 3d from east to west	Once Monthly[1]
Site 4 - Las Posas Estate Drain between Central Avenue and the 101 Freeway	Once Monthly[1]
Site 5 - Agricultural Drain East of Etting Road	Once Monthly[2]
Site 6 - Inlet to the North Ramona Place drain debris basin	Once Monthly[1]
Site 8 - Caltrans Site	Once Monthly[2]
Site 9 - Revolon Slough at Pleasant Valley Road	Once Monthly[2]
Site 10 – 5th Street Drain at Del Norte Boulevard	Quarterly[3]

1. The Trash TMDL specifically required these sites to be included in the MFAC Program.
2. The Trash TMDL did not require these sites; they were included to better characterize trash in the watershed.
3. Only one quarterly event was conducted during the monitoring year due to unforeseen incorrect monitoring by the hired monitoring crew.

Table 3. Completed Monitoring Events (October 2014 – September 2015)

Site	Month											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	Q	Q	Q	Q	Q	Q	Q	Q	Q	V	V	V
2[1]	Q	Q	Q	Q	Q	Q	Q	Q	Q	--	--	--
3a	Q	Q	Q	Q	Q	Q	Q	Q	Q	V	V	V
3b[1]	Q	Q	Q	Q	Q	Q	Q	Q	Q	--	--	--
3c[1]	Q	Q	Q	Q	Q	Q	Q	Q	Q	--	--	--
3d[1]	Q	Q	Q	Q	Q	Q	Q	Q	Q	--	--	--
4[1]	Q	Q	Q	Q	Q	Q	Q	Q	Q	--	--	--
5	Q	Q	Q	Q	Q	Q	Q	Q	Q	V	V	V
6[1]	Q	Q	Q	Q	Q	Q	Q	Q	Q	--	--	--
8	Q	Q	Q	Q	Q	Q	Q	Q	Q	V	V	V
9[1]	Q	Q	Q	Q	Q	Q	Q	Q	Q	--	--	--
10[2]	--	--	--	Q	--	--	--	--	--	V	V	V

Q = Quantitative assessment monitoring event completed per the previous TMRP and City of Oxnard monitoring.

V = Visual assessment monitoring event completed per the revised TMRP.

1. The revised TMRP includes five visual assessment sites: Site 1, Site 3a, Site 5, Site 8, and Site 10. Visual assessments were not conducted at Site 2, Sites 3b-d, Site 4, Site 6, and Site 9.
2. Only one quarterly event was conducted during the monitoring year due to unforeseen incorrect monitoring by the hired monitoring crew.

2.2 DATA SUMMARY AND ANALYSIS

This section presents the quantities and locations of trash collected during the sixth year quantitative monitoring events (October 2014-June 2015) at Sites 1-9. The CCC collected or accounted for all trash greater than five millimeters. Trash collected in the field is weighed at the conclusion of each site cleanup.

As Site 10 was monitored at a different frequency than Sites 1-9 under a different monitoring program, the data from Site 10 are not included in the following sections. For the quarterly monitoring event completed in January 2015 at Site 10, 98 pieces of trash were collected with 35 pieces of plastic/cellophane, 37 pieces of paper products, and 26 pieces of metal/Styrofoam/glass/etc.

2.2.1 Trash Weight

During the sixth year of monitoring, approximately 158 pounds of trash were collected. Elevated levels of trash were generally observed in December 2014 and January and May 2015. In October 2014 through January 2015, as well as in May and June 2015, there were legacy trash issues and evidence of illegal dumping. In addition, Site 1, Site 3a, and Site 5 had the highest amounts of trash compared with the other sites. **Table 4** lists the total weight of trash collected per month and per site during the quantitative monitoring events for the 2014-2015 monitoring year. **Table 5** lists the total weight of trash collected per site and per month for the previous monitoring year (2013-2014), and is provided for comparison with the 2014-2015 results. **Figure 2** shows the total weight of trash collected per month at each site during the quantitative monitoring events that took place in 2014-2015.

Comparing the total weights of trash collected during period of October through June during the fifth and sixth monitoring years, as shown in **Table 4** and **Table 5**, the total weight of trash collected appears to have decreased (by 31 percent) between the fifth and sixth monitoring years (158.3 pounds compared to 230.8 pounds). However, it is important to note that trash levels, non-point source contributions, and weather patterns are highly variable and that trash weight is dependent on the types of trash present. The sites with the highest amounts of trash on average in October through June were different this year (sites 1, 3a, 5) compared to 2013-2014 (sites 1, 2, and 8), with the exception of Site 1.

Table 4. Total Weight of Trash Collected per Site and per Month (October 2014 – June 2015)

Site	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Weight per site (lb)
Site 1	0.3	0.2	6.0[1]	17.1	3.3	2.1	0.5	35.1[1]	0.1[1]	**64.8**
Site 2	3.4	0.3	2.2	0.5	0.1	0.1	0.0	0.0	0.0	**6.6**
Site 3a	0.0	1.0	2.1	1.3	0.1	0.6	0.2	0.8	2.3	**8.4**
Site 3b	0.0	0.1	0.0	0.7	1.3	2.1	0.5	0.2	1.1	**6.0**
Site 3c	0.0	0.3	0.0	0.3	0.1	0.1	0.0	0.1	1.1	**2.0**
Site 3d	0.0	0.0	0.4	0.6	2.4	0.6	0.1	3.1	0.1	**7.4**
Site 4	0.0	0.0	0.3	0.0	0.4	0.6	0.2	0.3	1.2	**3.0**
Site 5	2.4[1]	2.0[1]	4.3	18.0[1]	7.1	2.1	6.4	2.8[1]	0.0	**45.2**
Site 6	0.0	0.4	0.0	0.0	1.4	0.1	0.4	0.0	0.3	**2.6**
Site 8	0.8	0.1	1.9	0.9	0.1	0.2	0.5	0.8	1.4	**6.6**
Site 9	0.7[1]	0.6	4.2	0.0	0.0	0.0	0.0	0.1	0.0	**5.6**
Weight per month (lb)	**7.6**	**5.1**	**21.4**	**39.4**	**16.3**	**8.6**	**8.8**	**43.3**	**7.7**	**158.3**

1. Weight values include trash that was legacy trash or the result of illegal dumping.

Table 5. Total Weight of Trash Collected per Site and per Month (October 2013 – September 2014)

Site	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Weight per site (Oct-Jun) (lb)	Weight per site (Oct-Sep) (lb)
Site 1	0.3	13.3	15	6.2	3.3	9.5	1.4	0	24.8	21.1	1.5	1.2	**73.6**	**97.4**
Site 2	2	5	5.5	2.1	6.9	1.4	5.5	0.8	0	12.1	0	0	**29.2**	**41.3**
Site 3a	0.9	1.3	0.4	0.2	2.2	0.4	0	0	0.6	0.1	0	0.1	**6**	**6.2**
Site 3b	0.4	1.6	39	0.3	1.3	0.2	0	0	0.7	0	0	0	**43.3**	**43.3**
Site 3c	1.3	2.6	1.4	0.1	0.5	0.3	0	0	2.1	5.8	0	0.4	**8.3**	**14.5**
Site 3d	1.1	1.7	0.7	0.1	1.1	0.6	0	0	0.2	0.2	0	0	**5.5**	**5.7**
Site 4	0.2	0.6	0.3	1.1	0.3	0.5	0.2	0.4	0	2	0.1	0	**3.6**	**5.7**
Site 5	0.3	1.5	3.5	2.9	5.4	4.1	0	1.1	3.3	8	0.4	0.2	**22.1**	**30.7**
Site 6	0.4	1.7	1.1	0.9	0.9	4	0.3	1.7	0	0	0	0	**11**	**11**
Site 8	2.3	1.5	1.1	11.9	4	0.5	1.2	0	0.9	0.7	0.4	0.3	**23.4**	**24.8**
Site 9	0	0	0	0.4	0.4	3.4	0.8	0.3	0.4	0	0.2	0.1	**5.7**	**6**
Weight per month (lb)	**9.2**	**30.8**	**68**	**26.2**	**26**	**25**	**9.4**	**4.3**	**33**	**50**	**2.6**	**2.3**	**230.8**	**286.7**

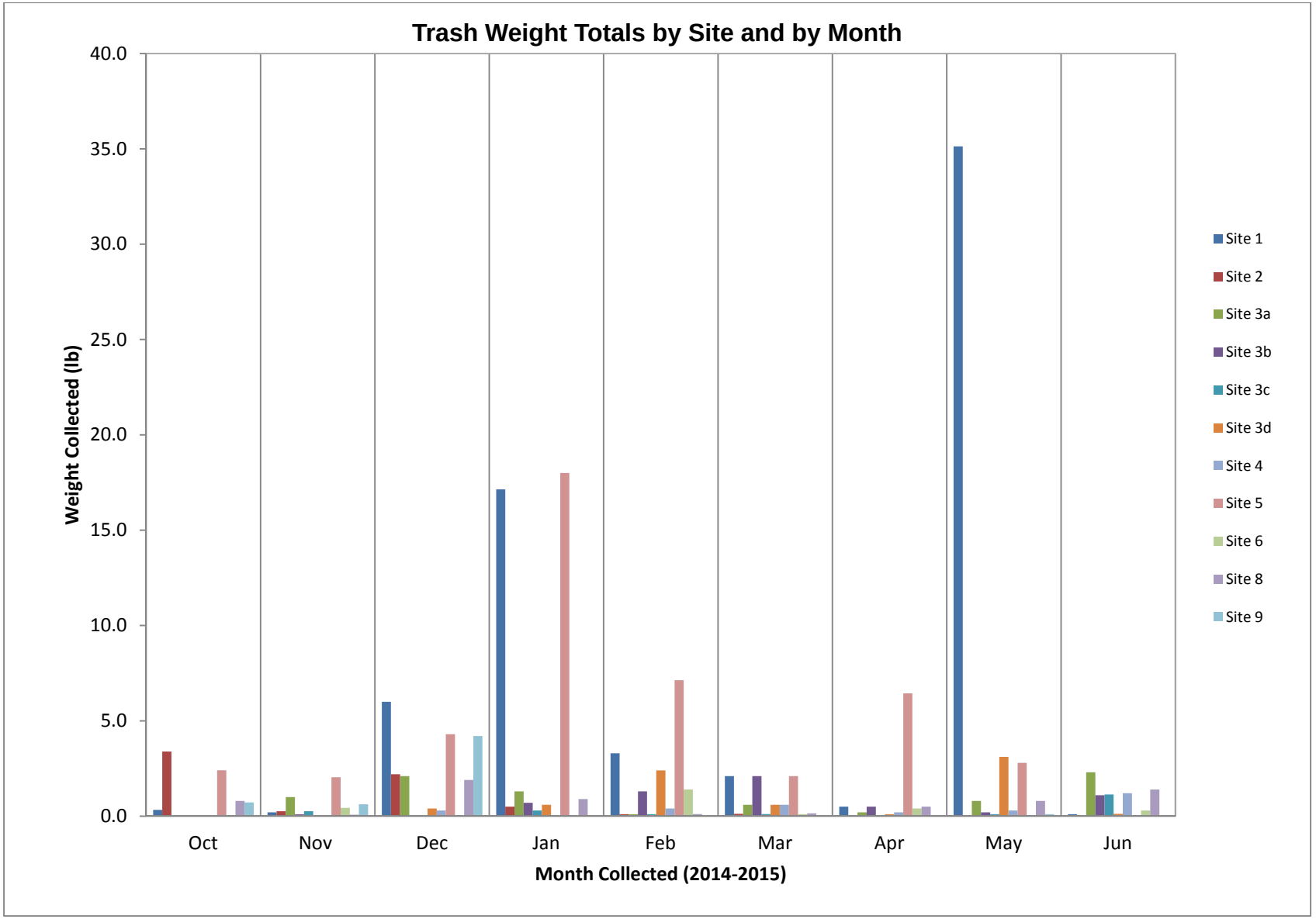

Figure 2. Total Weight of Trash Collected per Site and per Month (October 2014 – June 2015)

2.2.2 Trash Pieces

During the sixth year of monitoring, approximately 1,206 pieces of trash were collected. The sites with the highest number of trash pieces were Site 8, Site 1, and Site 3a with 303, 199, and 148 pieces, respectively. In addition, the months with the highest amount of trash pieces were March 2015, June 2015, February 2015 and November 2014, respectively. **Table 6** lists the total pieces of trash collected per site and per month for the 2014-2015 monitoring year. **Figure 3** compares monthly totals for trash weight and number of pieces, and **Figure 4** compares trash totals by site.

It is important to note that trash levels, non-point source contributions, and weather patterns are highly variable and that trash pieces and weight are also dependent on the types of trash present (*e.g.*, numerous, tiny fragments vs. a few heavy objects). Trash weight and pieces do not always show a strong correlation due to the variety in types of trash collected as shown in **Figure 3** and **Figure 4**.

Table 6. Total Pieces of Trash Collected per Site and per Month (October 2014 – June 2015)

Site	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total pieces per site
Site 1	5	17	8	51	42	22	10	41	3	**199**
Site 2	22	7	6	9	2	7	0	0	0	**53**
Site 3a	0	15	7	9	11	41	2	4	59	**148**
Site 3b	0	17	0	12	20	29	5	2	41	**126**
Site 3c	0	11	0	4	1	19	0	4	26	**65**
Site 3d	0	13	3	5	16	24	4	7	15	**87**
Site 4	0	8	2	0	5	14	12	3	11	**55**
Site 5	17	16	8	21	40	16	10	17	0	**145**
Site 6	0	0	0	0	7	1	3	0	2	**13**
Site 8	61	52	42	21	16	28	28	16	39	**303**
Site 9	7	3	1	0	0	0	0	1	0	**12**
Total pieces per month	**112**	**159**	**77**	**132**	**160**	**201**	**74**	**95**	**196**	**1,206**

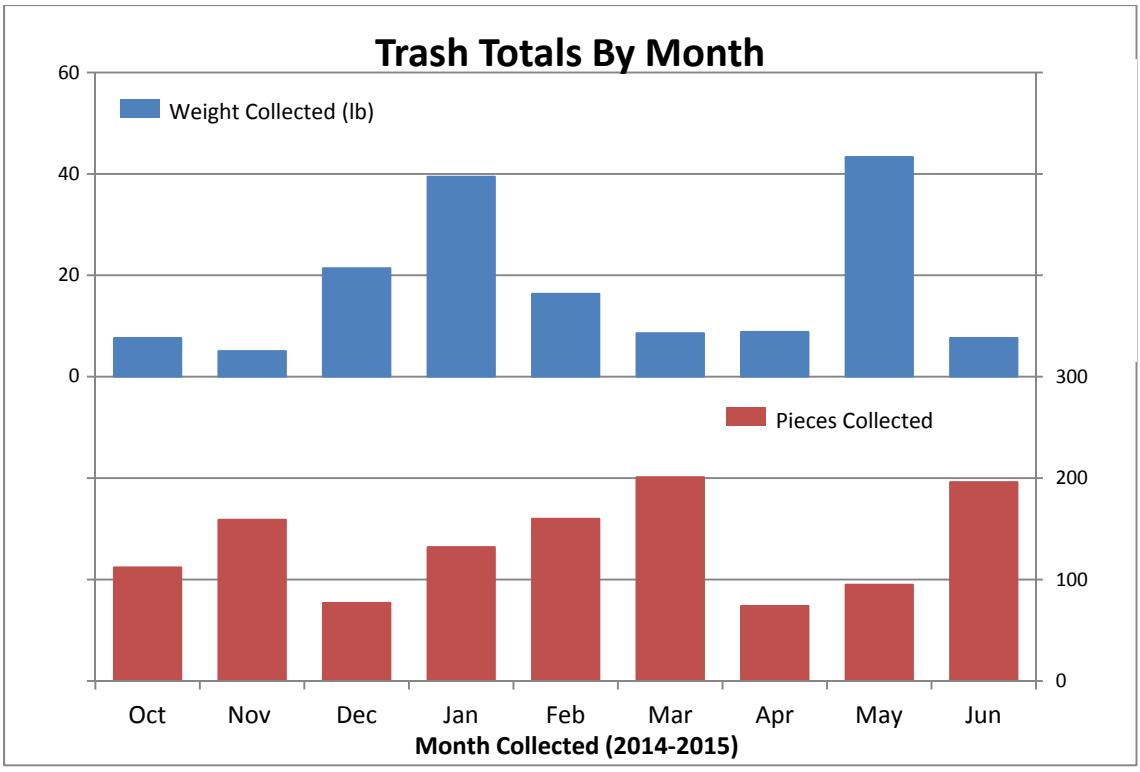

Figure 3. Total Trash Collected Per Month (October 2014 – June 2015)

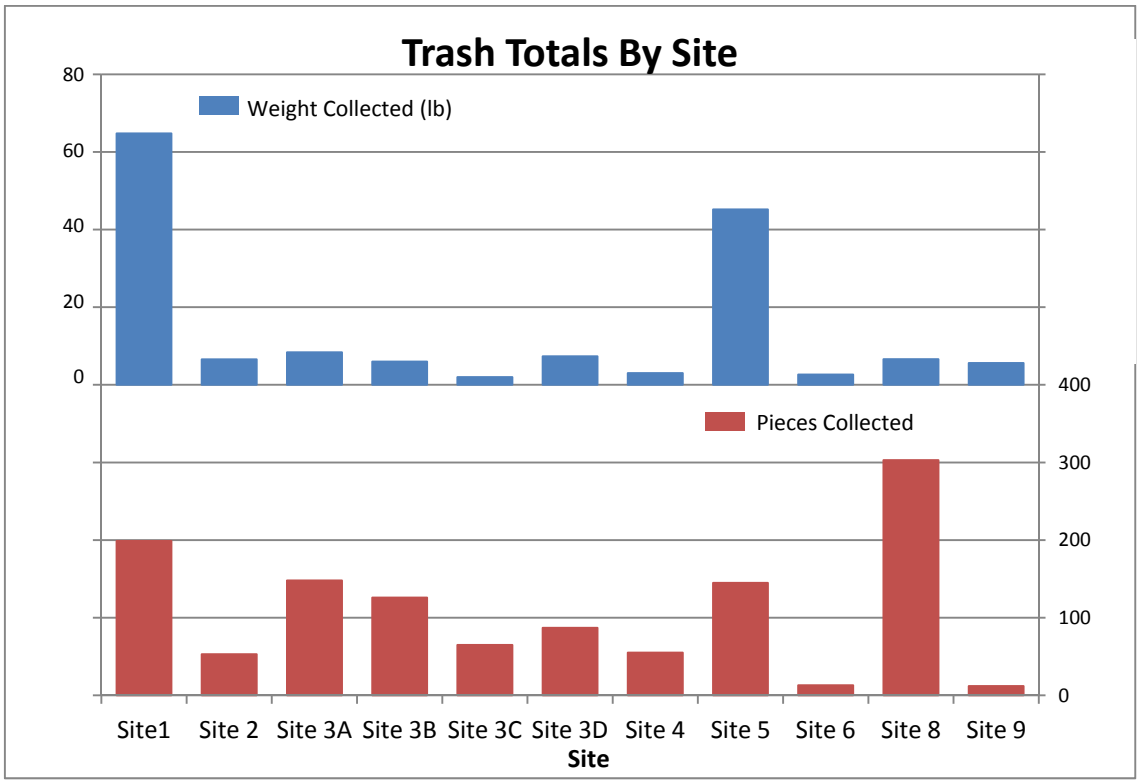

Figure 4. Total Trash Collected Per Site (October 2014 – June 2015)

2.3 DATA EVALUATION

Trash data collected from the sixth year of monitoring were evaluated to identify high trash generating areas where implementation actions may be focused and were also evaluated to determine MFAC/BMP Program effectiveness. The following sections provide information about high trash generating areas and MFAC/BMP Program effectiveness.

2.3.1 High Trash Generating Areas

During the monitoring period (October 2014-June 2015), Site 1, Site 5, and Site 3a had the highest trash weight totals, respectively. Site 8, Site 1, and Site 3a had the highest trash pieces totals, respectively. **Table 4** lists the trash weight totals and **Table 6** lists the trash pieces totals for all of the assessment sites. High trash generating areas will continue to be addressed through prioritized BMP implementation to minimize the impacts of trash in these areas as identified by data collected during the MFAC events.

2.3.2 MFAC/BMP Program Effectiveness

As outlined in the TMRP, a further assessment of MFAC/BMP Program effectiveness is to be conducted after each year of monitoring. The following steps were used to assess MFAC/BMP Program effectiveness:

1. A review of BMP implementation, including identification of BMPs, location of BMPs, and time frame (*e.g.*, when an activity was implemented or installed); and
2. A comparison of monitoring results between monitoring locations and between events before and after BMP implementation.

Given the broad nature of most of the BMPs implemented to date (*e.g.*, education programs, ordinances, street sweeping), the highly variable amounts of trash collected over the four years, and the relatively short time frame that full capture devices have been installed, trends were not identified in the monitoring data that could be used to determine effectiveness of individual BMPs. In addition, trash monitoring from the past six years indicates that trash levels are highly variable. During the second monitoring year, implementation of the MFAC/BMP Program appeared to result in significant trash reductions. However, during the third year, the trash levels increased at the same time that additional BMPs were being implemented and full capture devices were being installed. During the fourth monitoring year, trash levels decreased slightly and increased slightly, based on trash weight and trash pieces, respectively, despite additional BMPs that were implemented. During the fifth year of monitoring, trash weight and pieces decreased compared to trash collected during the third and fourth years of monitoring. Fifth-year trash pieces are similar to those collected during the second year of monitoring. During the sixth year of monitoring, the number of trash pieces decreased compared to the period from October through June for all previous monitoring years. **Table 7** lists the trash pieces collected per monitoring year from 2009-2015.

Despite legacy trash issues, the MFAC Program resulted in zero trash in-stream immediately after all monitoring events as required by the Trash TMDL for non-point sources. The quantitative MFAC/BMP Program was therefore effective for meeting the non-point source requirements.

Based on trash data collected over the past six years, it is apparent the implementation of the MFAC/BMP Program is not clearly reflected in the quantitative trash monitoring results. To address this, the MFAC/BMP Program was updated in May 2015 to more effectively assess trash levels in Revolon Slough and Beardsley Wash. The updates made to the MFAC/BMP program to utilize visual assessments rather than quantitative assessments are intended to generate reproducible results that can be compared over time, which will be more useful in evaluating BMP effectiveness. The results of visual monitoring events conducted from July through September 2015 are presented in the **Visual MFAC Program Section**.

Table 7. Trash Pieces Collected 2009-2015[1]

Monitoring Year	Pieces of Trash Collected October – June[2]	Pieces of Trash Collected October – September
2009-2010[3]	4,979	5,718
2010-2011	3,418	4,613
2011-2012	5,386	6,238
2012-2013	5,127	6,313
2013-2014	3,805	4,731
2014-2015	1,206	--[4]

1. Trash pieces data are provides as trash weight data have not been collected during the entire time frame.
2. Quantitative monitoring was only conducted from October through June during 2014-2015, so totals from the same period are provided for previous monitoring years for comparison.
3. During the 2009-2010 monitoring year, MFAC Events at Sites 3a-3d were performed on a rotating basis (one site per month).
4. Quantitative monitoring was not conducted for July – September 2015.

3 Visual MFAC Program

This section provides a summary of the visual monitoring program implemented beginning in July 2015 and continuing through September 2015 of this monitoring year.

3.1 MFAC/BMP PROGRAM APPROACH

The goal of the MFAC/BMP program is to clean-up nonpoint sources of trash in the Revolon Slough and Beardsley Wash watershed. The MFAC/BMP program includes implementing BMPs as outlined in the TMRP and conducting monitoring to assess the effectiveness of BMP implementation.

The revised MFAC/BMP Program includes the following elements:

1. **Conduct monthly assessments and trash collection events**

   MFAC events are conducted monthly at the monitoring sites. The collection aspect of the MFAC utilizes information from the assessments (visual surveys) to determine the locations where trash collection efforts should be focused for the event.

2. **Conduct regular cleanups**

3. Although the TMRP outlined quarterly cleanups, the responsible parties have been conducting monthly cleanups to reduce the amount of trash entering the Revolon Slough and Beardsley Wash.

4. **Employ additional BMPs**

   Information gathered during the MFAC events are used to inform the responsible parties as to the level and frequency of BMP implementation, including special trash cleanups, needed to achieve a Category 1 level of trash, as detailed below.

3.2 MONITORING APPROACH

The monitoring approach is a streamlined visual survey of trash levels at select sites within Revolon Slough and Beardsley Wash and sites within conveyances that discharge to Revolon Slough and Beardsley Wash. The visual survey uses a component of the Surface Water Ambient Monitoring Program Rapid trash Assessment Protocol (SWAMP Protocol) and visual assessment approaches being utilized by the City of Ventura, the Santa Clara Valley Urban Runoff Pollution Prevention Program in the San Francisco Bay Area, and a number of cities and municipalities throughout the country.

The visual survey utilizes a three-point scoring system based on the “Level of Trash” scoring category discussed in the SWAMP Protocol to estimate the presence of litter in a specific area. Individuals performing the visual surveys are trained on how to properly conduct these assessments to ensure consistency across multiple entities performing such surveys and are trained score each assessed area by rating the amount of litter observed, using the following categories:

- Category 1 – Represents the SWAMP Category “Optimal”
- Category 2 – Represents the SWAMP Category “Suboptimal”
- Category 3 – Represents the SWAMP Category “Poor”

The definition of Category 1 is:

> "On first glance, no trash visible. Little or no trash (<10 pieces) evident when streambed and stream banks are closely examined for litter and debris, for instance by looking under leaves."

The definition of Category 2 is:

> "On first glance, low to medium levels of trash are evident (10 – 100 pieces). Stream, bank surfaces, and riparian zone contain some litter and debris. Possible evidence of site being used by people: scattered cans, bottles, food wrappers, blankets, clothing."

The definition of Category 3 is:

> "Trash distracts the eye on first glance. Stream, bank surfaces, and immediate riparian zone contain substantial levels of litter and debris (>100 pieces). Evidence of site being used frequently by people: many cans, bottles, and food wrappers, blankets, clothing."

Visual monitoring is conducted monthly for each designated site (**Table 8**).

3.3 MFAC/BMP PROGRAM ASSESSMENT APPROACH

As stated above, the goal of the MFAC/BMP Program is to clean-up nonpoint sources of trash in Revolon Slough and Beardsley Wash. This is accomplished by ensuring the monitoring sites are classified in Category 1. Results of the monitoring are used to evaluate the effectiveness of the proposed MFAC/BMP Program and to support any necessary modifications. The MFAC/BMP Program is continuously evaluated and modified using an adaptive management approach consistent with the procedures outlined in the Ventura Estuary Trash TMDL Revised TMRP as summarized below:

1. Monitoring sites classified in Category 1 during the visual monitoring event are noted and any trash observed is collected during the visual monitoring event.
2. Monitoring sites classified in Category 2 are evaluated to determine if and what type of additional BMPs are needed to reduce the accumulation of trash between visual monitoring events with intent to move these sites to Category 1.
3. Monitoring sites classified in Category 3 for four (4) consecutive monthly visual monitoring events are targeted with more frequent cleanups with the intent to move the site to Category 2 and then to Category 1.

3.4 COMPLETED MONITORING EVENTS

Sixth-year visual monitoring for the Trash TMDL was conducted from July 2015 to September 2015 at the frequencies detailed in **Table 8.** The completed monitoring events are shown in **Table 9** and **Appendix 2** contains example photos from a typical MFAC Event.

Table 8. TMRP Sixth-Year Visual Assessment Monitoring Event Frequency

Site	Frequency
Site 1 – Revolon Slough At Wood Road	Once Monthly[1]
Site 3a – Storm drain outlet on the north side of Camarillo Hills Drain just downstream of Las Posas Road	Once Monthly[1]
Site 5 – Agricultural Drain East of Etting Road	Once Monthly[2]
Site 8 – Caltrans Site on side of US101 just west of Revolon Slough	Once Monthly[2]
Site 10 – 5th Street Drain at Del Norte Boulevard	Once Monthly[1]

1. The Trash TMDL specifically required these sites to be included in the MFAC Program.
2. The Trash TMDL did not require these sites; they were included to better characterize trash in the watershed.

Table 9. Completed Visual Assessment Monitoring Events (October 2014 – September 2015)

Site	Month											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	Q	Q	Q	Q	Q	Q	Q	Q	Q	V	V	V
3a	Q	Q	Q	Q	Q	Q	Q	Q	Q	V	V	V
5	Q	Q	Q	Q	Q	Q	Q	Q	Q	V	V	V
8	Q	Q	Q	Q	Q	Q	Q	Q	Q	V	V	V
10	--	--	--	Q	--	--	--	--	--	V	V	V

Q = Quantitative assessment monitoring event completed per the previous TMRP and City of Oxnard monitoring.
V = Visual assessment monitoring event completed per the revised TMRP.

3.5 MFAC/BMP PROGRAM ASSESSMENT

The site categories for each monthly MFAC event using Visual Assessment monitoring, which was implemented in July 2015, are presented in **Table 10**. Site category data are not available for MFAC events from October 2014 - June 2015 as trash quantities and weight were measured during this time period.

The County of Ventura's Watershed Protection District (VCWPD) conducts periodic vegetation removal, typically in preparation of winter storm season, within the storm drain system and channelized water bodies. In early August 2015, nearly all vegetation was cleared from the banks of the majority of the monitoring sites allowing monitoring crews to access the monitoring sites more efficiently and to locate and remove legacy trash. The monitoring results, along with the vegetation clearing effort, have successfully allowed the clean-up crews to target areas of concern, and have improved the trash conditions in just three months (**Table 10**).

As the MFAC/BMP Program was only implemented for three months during the sixth monitoring year, a robust program assessment was not completed. However, as stated above, trash conditions at each site improved over the three-month implementation period. The responsible parties will conduct a full program assessment following the seventh year of monitoring and first full year of visual monitoring.

Table 10. Visual Assessment Trash Categories by Monitoring Site

Site	Visual Assessment Trash Category[1]											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1	Q	Q	Q	Q	Q	Q	Q	Q	Q	3	3	2
3a	Q	Q	Q	Q	Q	Q	Q	Q	Q	2	2	2
5	Q	Q	Q	Q	Q	Q	Q	Q	Q	1	1	1
8	Q	Q	Q	Q	Q	Q	Q	Q	Q	2	2	1
10	--	--	--	Q	--	--	--	--	--	2	1	2

1. Number indicates trash category. Sites falling in between categories are denoted so.
Q = Quantitative assessment monitoring event completed.

4 Compliance Strategy

The Trash TMDL requires all annual reports to include proposals to enhance BMPs, revise the MFAC (if needed), and prioritize the installation of full capture devices or other compliance measures, including structural BMPs or trash collection events for high trash generating areas. Additionally, the Trash TMDL requires point source-responsible parties to achieve a 100 percent reduction from the baseline WLA by March 2016. This section describes the proposed compliance strategies to be utilized to meet the non-point source and point source Trash TMDL requirements and to further reduce trash discharges into Revolon Slough and Beardsley Wash.

Non-point source-responsible parties will continue complying with the Trash TMDL through a MFAC/BMP Program that includes a combination of MFAC events and BMPs including structural and non-structural BMPs. The information gathered from the MFAC/BMP Program will guide BMP implementation and selection to ensure efficient and effective compliance with the Trash TMDL. The responsible parties will also utilize adaptive management to allow for flexibility in determining the correct BMPs to implement and the correct locations to implement the BMPs. The proposed adaptive management compliance strategy is as follows:

1. Continue implementation of the approved MFAC Program using the visual assessment method.
2. Continue to implement the current suite of BMPs identified in the TMRP with the additions described in the **Current Best Management Practices Section**;
3. Implement BMPs in the future based on information generated from the MFAC/BMP Program focusing on the high trash generating areas as discussed in the **Future Potential Best Management Practices Section**; and
4. Evaluate the effectiveness and needs for additional BMPs and/or MFAC revisions semi-annually based on the results of the MFAC/BMP Program. The evaluation will consider the results of the visual assessments, on a site-by-site and watershed basis, to prioritize the areas where additional BMP implementation may be most effective in reducing trash levels. Proposed revisions to the MFAC/BMP Program and full capture device or other measure installation/implementation prioritization will be included in each annual report.

To address point sources, the responsible parties, where feasible, will install full capture devices on conveyances discharging to Revolon Slough and Beardsley Wash and/or install full capture devices in high trash generating areas and employ a point source-specific MFAC/BMP Program in other areas of their jurisdictions. The goal is to meet the required phased percent reductions as listed in Table 7-24.2a of the Trash TMDL by March 2016.

The following sections outline the jurisdictional BMPs currently being implemented, the additional BMPs to be implemented in prioritized areas, other BMPs being considered for implementation throughout the watershed, and a BMP implementation schedule.

4.1 CURRENT BEST MANAGEMENT PRACTICES

The TMRP listed a suite of BMPs that each responsible party was implementing in their respective jurisdictions. The BMPs listed in the TMRP are still relevant, but there have been several revisions and/or additions to the suite of BMPs listed in the TMRP to update the MFAC/BMP Program in response to the monitoring results.

One of the primary modifications to the MFAC/BMP Program in response to the monitoring results was to add additional trash cleanups at the high trash generating sites identified during the monitoring. Initially, the City of Camarillo, County of Ventura and the VCWPD contracted with the CCC to conduct monthly, trash cleanups near Sites 1, 3a-d, and 5 from October 2014 through July 2015. During this time, approximately 730 pounds (or 102 40-gallon bags) of trash were removed from 247,612 square feet of channel at those sites. Beginning in August 2015, Sites 8 and 10 were added to the monthly special cleanups. Approximately 98 pounds of trash in 30 40-gallon bags were removed during August and September 2015 from Sites, 1, 3a-3d, 5, 8, and 10. Example photos taken during these special cleanups are presented in **Appendix 3**.

In addition to the trash cleanups, the responsible parties implemented the following BMPs to address trash:

4.1.1 City of Camarillo Litter Management Program

TMRP BMP list for the City:

1. Catch basin cleaning - all City catch basins are inspected at least once per year and those in high-trash generating areas are inspected four times per year and all are cleaned when filled with trash to 25 percent or more of the catch basin's capacity.
2. Open channel maintenance - all City-maintained channels are inspected and cleaned at least once before the wet season and at least once after the wet season.
3. Trash Management at Public Events - All special use permits for events in the public right of way require proper management of trash and litter.

The following are enhancements/revisions made to the non-point source BMPs listed in the TMRP for the City:

1. Trash removal was also performed along City fence lines near city stormwater system structures in the watershed.
2. The City performs annual debris and trash removal from city-maintained ditches/channels and detention basins. Approximately 144,000 pounds of materials were removed from the structures.
3. City arterial streets are swept weekly and residential streets are swept monthly in an attempt to reduce trash accumulating in deleterious amounts on streets within the City.
4. The City requires conditions pertaining to trash to be met for all new development and redevelopment projects within the watershed, including:
    A. Trash full capture devices and post-construction treatment devices for other pollutants of concern must be installed in drain inlets;
    B. Trash enclosures and/or recycling areas must be properly installed (e.g., covered and including structures to direct stormwater away from entering the enclosures/areas);
    C. All property areas must be maintained free of litter/debris;
    D. Onsite storm drains must be cleaned at least twice per year, including once before the beginning of the wet season; and

E. Private roads and parking lots must be swept at a minimum of once per month, with two sweepings occurring in October before the beginning of the wet season.

5. The City requires private owners to provide proof of maintenance of their post construction treatment devices annually.
6. The City hosts household hazardous waste collection events two days per month to provide residents a place to properly dispose of their materials. This reduces the amount of illegal dumping. In addition, Camarillo successfully diverted 3.7 lbs/person of solid waste in 2014 which is equivalent to a 76 percent division rate.
7. The City adopted Stormwater Ordinance No. 1032 in December 2012 which includes trash specific prohibitions and fines and penalties for violations of the prohibitions.
8. The City imposed additional measures to its Water Conservation Ordinance in 2014 limiting lawn watering to three days per week, no washing of hard surfaces (i.e., driveways, sidewalks), and imposing penalties for runoff. These measures will reduce dry weather flows to the storm drain system thereby reducing trash transport.
9. The City engages in several outreach and education campaigns including:
    A. The City includes a litter prevention message, at least annually, in its quarterly Cityscene Newsletter, which is distributed to all residents.
    B. The City includes an insert with all utility bills soliciting volunteers to remove trash in the City on Coastal Cleanup Day and which also educates residents on pollution prevention.
    C. The City conducts commercial and industrial facility inspections to ensure proper pollutant prevention BMPs are being applied and to educate the employees on the importance of pollution prevention. The City inspected 85 facilities during 2014-2015.
    D. The City sends out letters to all commercial, industrial, and high-density residential property managers requesting assistance in controlling trash on their property.
    E. The City inspects all construction sites to ensure application of proper pollution prevention BMPs. The City inspected 133 sites in 2014-2015.
    F. The City mails construction site BMP brochures to contractors and developers annually, during fall, to ensure proper pollutant prevention BMPs are being applied especially before the wet season.
    G. The City participates in the Countywide Stormwater Public Outreach Program that includes litter outreach, which can be reviewed at www.cleanwatershed.org. In 2014-2015, over 11 million impressions were made via this program with 10 percent of those in Spanish.

The following are enhancements/revisions made to the point source BMPs listed in the TMRP for the City:

1. The City has installed 44 trash full capture devices in City storm drain catch basins in high trash generating areas throughout the City including 33 devices within the Revolon Slough and Beardsley Wash watershed. For the 2014-2015 monitoring year, the devices in the Revolon Slough Beardsley Wash Watershed removed 3,560 pounds of debris, of which, trash comprised only approximately 1,307 pounds; the remaining debris was primarily landscape material. The installation of the 33 devices resulted in approximately fourteen percent of City conveyances discharging to Revolon Slough and Beardsley Wash being addressed through full capture.

4.1.2 City of Oxnard Litter Management Program

1. Catch basin cleaning - all City of Oxnard catch basins are inspected at least once per year and those in high-trash generating areas are inspected four times per year and all are cleaned when filled with trash to 25 percent or more of the catch basin's capacity.
2. Open channel maintenance - all City of Oxnard-maintained channels are inspected and cleaned at least once per year before the wet season and at least once per year after the wet season.
3. City of Oxnard arterial streets are swept weekly and residential streets are swept monthly in an attempt to reduce trash accumulating in deleterious amounts on streets within the City of Oxnard.
4. Trash Management at Public Events - All special use permits for events in the public right of way require proper management of trash and litter.
5. The City of Oxnard requires conditions pertaining to trash to be met for all new development and redevelopment projects within the watershed, including:
    A. Trash full capture devices and post-construction treatment devices for other pollutants of concern must be installed in drain inlets;
    B. Trash enclosures and/or recycling areas must be properly installed (e.g., covered and including structures to direct stormwater away from entering the enclosures/areas);
    C. All property areas must be maintained free of litter/debris;
    D. Onsite storm drains must be cleaned at least twice per year, including once before the beginning of the wet season; and
    E. Private roads and parking lots must be swept at a minimum of once per month, with two sweepings occurring in October before the beginning of the wet season.
6. The City of Oxnard requires private owners to provide proof of maintenance of their post construction treatment devices annually.
7. The City of Oxnard accepts household hazardous wastes at the Del Norte Regional Recycling Station Monday - Saturday to provide residents a place to properly dispose of their materials. This reduces the amount of illegal dumping.

8. The City of Oxnard adopted Stormwater Ordinance No. 2876 in November 2013 which includes trash specific prohibitions and fines and penalties for violations of the prohibitions.
9. The City of Oxnard imposed additional measures to its Water Conservation Ordinance in 2014 by prohibiting lawn watering except between 4 PM and 9 AM or 6 PM and 9AM during daylight savings, no washing of hard surfaces (i.e., driveways, sidewalks), and imposing penalties for runoff. These measures will reduce dry weather flows to the storm drain system thereby reducing trash transport.
10. The City catch basins are labeled, "Don't pollute, Flows to Waterways".
11. The City of Oxnard engages in several outreach and education campaigns including:
    A. The City of Oxnard has established the www.oxnardnews.org website which disseminates information regarding pollution prevention, household hazardous waste roundups, Coastal Clean-up day and water conservation.
    B. The City of Oxnard includes an insert with all utility bills soliciting volunteers to remove trash in the City of Oxnard on Coastal Cleanup Day which also educates residents on pollution prevention.
    C. The City of Oxnard conducts commercial, industrial, and construction facility/site inspections to ensure proper pollutant prevention BMPs are being applied and to educate the employees on the importance of pollution prevention.
    D. The City of Oxnard sends out letters to all commercial, industrial, and high-density residential property managers requesting assistance in controlling trash on their property.
    E. The City of Oxnard inspects all construction sites to ensure application of proper pollution prevention BMPs.
    F. The City of Oxnard participates in the Countywide Stormwater Public Outreach Program that includes litter outreach, which can be reviewed at www.cleanwatershed.org.

4.1.3 County of Ventura and VCWPD Litter Management Program

1. The County has a very limited storm drain system within the TMDL responsibility area. To date, eight StormTek® connector pipe screen full capture devices have been installed. The final inspection of the eight full capture devices was completed in October 2014 towards 100 percent TMDL compliance. However, additional storm drain system analysis indicated the installed devices are insufficient to meet TMDL compliance. In May 2015, the County issued a contract for a site suitability analysis for installation of additional full capture devices within the Revolon Slough/Beardsley Wash watershed. The results of this study showed that 51 additional full capture devices are required to meet the 100 percent full capture requirement. The County is currently finalizing a contract for the creation of plans, specifications, and bid documents for the design and installation of approved full capture devices for the additional 51 locations to meet TMDL compliance.

2. Catch basin cleaning - Catch basins are inspected at least once a year and cleaned when filled to 25 percent or more of the catch basin's capacity. During storm season, all drainage facilities are inspected and cleaned as necessary.
3. Open channel storm drain maintenance - All VCWPD-owned and -maintained channels are cleared, inspected, and cleaned as required at least once per year. During the annual 2014-2015 channel sediment cleaning of Revolon Slough and Beardsley Wash, a total of 2,948 tons of combined plant material, sediment and trash were removed. Trash accounted for approximately 568 pounds of the removed material.
4. Trash Management at Public Events - A proper Management of Trash and Litter Plan is required when obtaining a permit for staging public events. This Plan requires adequate facilities for trash collection and disposal.
5. Public areas - Trash receptacles have been placed within high trash generation areas. These devices are cleaned and maintained regularly to prevent trash overflow.
6. The Stormwater Quality Management Ordinance for Unincorporated Areas (Ventura County Ordinance No. 4450) includes litter and trash specific prohibitions for the discharge or deposition of trash that may enter the County storm drain system or receiving waters (Section 6942). The ordinance also includes civil penalties for violations and provisions for issuing administrative fines, recovery of costs and misdemeanor violations.
7. County catch basins are labeled, "Don't pollute, Flows to Waterways".
8. New watershed awareness signs have been installed at key locations at major roadway crossings of Revolon Slough and Beardsley Wash, stating "Calleguas Creek Watershed, Keep It Clean!"
9. In October 2013, an anti-littering billboard space was leased from ClearChannel with a message posted for a month along Highway 101 (near the Del Norte overcrossing) stating "Our Oceans are Drowning in Plastic", encouraging proper disposal of waste and recyclable materials. This location was seen by 97,000 people per day (estimated at 64,000 Ventura County residents and 33,000 others travelling through the area) for the entire month of October.
10. On July 31, 2012 the County of Ventura Board of Supervisors received and filed a draft model Single-Use Bag Ordinance referred to the County by the Beach Erosion Authority for Clean Oceans and Nourishment (BEACON). The County endorsed the use of up to $8,000 as the County's pro-rata share of a regional Environmental Impact Report (EIR) to be prepared by BEACON, which is required to be completed under the California Environmental Quality Act (CEQA) before the model single-use bag ban can be adopted. This was the first step for the County to move forward with the consideration of adoption of a single-use plastic bag ban.
11. On June 24, 2014 the County of Ventura Board of Supervisors approved a motion directing the County of Ventura Executive Officer to have staff prepare a Single-Use Bag Ordinance modeled on the BEACON Ordinance.

12. The County and VCWPD continue to participate in the Countywide Stormwater Program to provide outreach and education retaining the services of "The Agency", a professional advertisement group that designs and conducts Countywide, bilingual outreach programs advocating proper trash disposal. The most recent addition to the outreach program is trash prevention and protection of stormwater quality education using Facebook®. This program has had made over 11 million countywide media impressions (TV, radio, internet, transit shelters) in Fall 2014 and Spring 2015.
13. The County conducts commercial, industrial, and construction facility/site inspections to ensure proper pollutant prevention BMPs are being applied and to educate the employees on the importance of pollution prevention. The County inspects the 362 businesses at least twice during the Ventura County MS4 Permit Term.
14. The County requires private owners to provide proof of maintenance of their post construction treatment devices annually.

4.1.4 VCAILG Litter Management Program

During the 2014-2015 monitoring year, VCAILG provided education and outreach to a diverse group of owners and growers throughout Ventura County. Certain aspects of the education and outreach discuss trash BMPs for agricultural areas and information regarding the Trash TMDL.

Both Community Recycling & Resource Recovery, Inc. (Community Recycling) and E.J. Harrison & Sons, Inc. provide recycling services to local farmers. Recycling efforts are focused on drip tape and agricultural plastic used to cover strawberry beds and used in some vegetable fields during growing. Community Recycling estimates they collect approximately 70 percent of the agricultural plastic in Ventura County. The used plastic is cleaned, processed, and turned into pellets to be used in new products. Researchers are testing the use of recycled plastic in the fields and determining the percent recycled material that will still stretch and maintain the necessary strength. Collection and recycling of the plastic is an effective method for reducing plastic trash from entering Revolon Slough and Beardsley Wash.

4.1.5 Caltrans Litter Management Program

Caltrans implements a variety of BMPs in the watershed along the freeways and highways. These BMPs are a suite of programs done to reduce trash as follows.

1. Street Sweeping
2. Trash Collection
3. Adopt-a-Highway Program

Caltrans (District 7, serving Los Angeles and Ventura Counties) uses a variety of methods to educate the public about the importance of managing stormwater. This consists of a variety of written materials, bulletins, and websites. A few venues the District uses to accomplish this are public schools and community sponsored clean up events, Bring Your Child to Work Day, and Earth Day. The written material is designed to appeal to the public while providing technical information on selected Caltrans projects and activities. Caltrans continues to install stenciled warnings prohibiting discharges to drain inlets at park and ride lots, rest areas, vista points and other areas with pedestrian traffic. Additionally, Caltrans installed four new Biofiltration Swales

and one Detention Basin at locations on or adjacent to the Rice Avenue on-ramp and off-ramp to Highway 101.

4.2 FUTURE POTENTIAL BEST MANAGEMENT PRACTICES

Future potential BMPs specific to each responsible party are detailed below.

4.2.1 City of Camarillo Litter Management Program

To address non-point sources, the City will focus BMP efforts at the high trash generating areas identified through the MFAC Program and continue watershed-wide BMP activities as a means to further reduce the discharge of trash to Revolon Slough and Beardsley Wash.

For point sources, the City has been installing full capture systems on conveyances, which it has jurisdiction over, that discharge into Revolon Slough and Beardsley Wash. In addition, the City conducted an analysis in 2013-2014 to determine the most appropriate and effective manner of installing the full capture systems to ensure compliance with the 100 percent installation requirement by 2016. The results of the analysis indicated addressing all conveyances through the installation of full capture devices would not be an efficient and effective means of eliminating trash discharging to Revolon Slough and Beardsley Wash. This is due to many areas within the City's jurisdiction rarely generating trash, yet the Trash TMDL requires these areas to be addressed by full capture devices. For example, installing a full capture device in a catch basin, which in the last five years has not been cleaned per the Storm Drain Operation and Management requirements of the Ventura County Municipal Separate Storm Sewer System (MS4) Permit (Order No. R4-2010-0108), would be a waste of resources and contradictory to the MS4 Permit.

The City recommends that the most effective and efficient manner for eliminating trash discharging to Revolon Slough and Beardsley Wash from the City is to install and maintain full capture devices in the storm drain system that serves the priority land uses defined in the Proposed Final Amendment to the Water Quality Control Plan for Ocean Waters of California (Ocean Plan) and the Proposed Final Part 1 Trash Provisions of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California (ISWEBE Plan) (together, "Statewide Trash Policies"). The City believes addressing trash via the requirements of the Statewide Trash Policies will be an effective and efficient way of managing trash within the City and will satisfy the point source requirements of the Trash TMDL.

In May 2015, the City submitted a letter to the Regional Board staff detailing the proposed compliance option and requesting Regional Board approval. Subsequently, in July 2015 the City met with Regional Board staff to discuss the City's May 2015 letter. In October 2015, per the Regional Board staff request at the July meeting, the City submitted additional data on the City's catch basin maintenance program. As of the submittal date of this annual report, the City has not received approval of the proposed point source compliance option.

4.2.2 City of Oxnard Litter Management Program

In an effort to address non-point sources, the City of Oxnard will continue to promote the City's Green Sustainability Programs with robust outreach focused on pollution prevention and environmental sustainability. The City of Oxnard has started a new "On the Road to Zero Waste"

campaign which encourages community participation through a series of workshops designed to educate the public and garner community input. The program has vision of zero waste with a guiding principle to protect the environment and public health.

Additionally, the City of Oxnard has joined efforts with the Calleguas Creek Stakeholder Group and will participate in the approved Addendum No. 1 to the TRMP and MFAC/BMP Program for trash monitoring and BMP implementation. The City of Oxnard will focus BMP efforts at the high trash generating areas identified through the MFAC Program and continue watershed-wide BMP activities as a means to further reduce the discharge of trash to Revolon Slough and Beardsley Wash.

For point sources, the City of Oxnard has not yet been able to install full capture devices for the catch basins in the drainage basins leading to Revolon Slough and Beardsley Wash. The City of Oxnard is in the process of reviewing options for funding the installation of full capture devices and hopes to prepare a request for proposal to complete this project once a funding source is secured.

4.2.3 County of Ventura and VCWPD Litter Management Program

The County of Ventura and VCWPD will continue to install and implement structural and non-structural BMPs to address non-point source trash to minimize the discharge of trash from their jurisdictions as part of the MFAC/BMP Program. BMPs will include monthly trash cleanups at high trash generating areas. Additionally, the County will install anti-dumping and anti-littering signage at key locations including high trash generating areas as well as at known illegal dumping locations, and will conduct targeted outreach to schools within the area covered by the Trash TMDL to educate the students, staff, and faculty on the importance of pollution prevention specifically regarding trash. The scale of BMP implementation will depend on the trash data collected during the 2014-2015 monitoring year. The County will also continue installing full capture devices in conveyances they are responsible for with the intention of meeting the 2016 requirement of 100 percent of the conveyances addressed by full capture devices.

4.2.4 VCAILG Litter Management Program

As part of the current Conditional Waiver, VCAILG will provide educational classes focused on improving water quality, including identifying trash as an impairment of water quality. Furthermore, based on 2014-2015 monitoring results, VCAILG will assist its members with the implementation of additional BMPs as necessary by following the adaptive process identified in the WQMP. In addition, VCAILG members will continue to be billed separately for Trash TMDLs to further reinforce the idea, through a fiscal measure, that there are trash problems in the watershed.

4.2.5 Caltrans Litter Management Program

Caltrans will continue to implement its current suite of BMPs as outlined in the TMRP as well as study the maintenance impact for installing a full capture device, and when it is possible, implement future potential full trash capture devices, subject to funding availability and TMDL Reach Prioritization as completed under the new Caltrans MS4 Permit. The continued implementation of current BMPs and the implementation of future potential BMPs will be directed by results obtained from future monitoring events as part of the adaptive management

compliance approach. Caltrans conducted a Corridor Study in which the installation of 15 gross solid removal devices (GSRDs) was planned by 2016 or following years subject to funding availability and the TMDL Reach Prioritization.

4.3 BEST MANAGEMENT PRACTICES IMPLEMENTATION SCHEDULE

Non-point source-responsible parties intend to continue complying with the Trash TMDL through the MFAC/BMP Program, which may include the installation or implementation of structural or non-structural BMPs. The initial MFAC/BMP Program, included in Addendum No. 1 to the TMRP, will continue to be implemented. Additional BMP implementation will be scheduled as appropriate to address the identified high trash generating areas.

Point source-responsible parties will install full capture devices on conveyances discharging to Revolon Slough and Beardsley Wash and/or install full capture devices in high trash generating areas and employ a point source-specific MFAC/BMP Program in other areas of their jurisdictions. The goal is to meet the required phased percent reductions as listed in Table 7-24.2a of the Trash TMDL.

5 MFAC Revisions

As the responsible parties have just recently begun implementing the revised MFAC/TMRP program, there are no proposed revisions at this time. Any proposed revisions identified during the implementation of the 2015-2016 monitoring year will be provided in the seventh-year monitoring annual report in December 2016.

Appendix 1. Assessment Site Descriptions

Site 1 – Revolon Slough at Wood Road

This site consists of Revolon Slough and its adjacent land areas. It begins at the end of a concrete channel and includes the 100 foot downstream portion of Revolon Slough and the banks on both sides of the water body.

GPS Coordinates:
Lat: 34.169771
Lon: -119.095591

Site 2 – Beardsley Wash at Wright Road

This site is located in Beardsley Wash and includes the Wash itself as well as the banks on both sides. This site was retired from the MFAC Program in July 2015.

GPS Coordinates:
Lat: 34.241681
Lon: -119.099658

Site 3a – Camarillo Hills Drain Outlet

This site begins at the upstream end of a drain outlet and includes the in-stream portions of the Camarillo Hills Drain and the banks on either side of the drain.

GPS Coordinates:
Lat: 34.215486
Lon: -119.076388

Site 3b – Camarillo Hills Drain Outlet	
This site is located approximately 0.6 miles downstream of Site 3a and has similar characteristics. This site begins at the downstream end of a drain outlet and includes in-stream and bank areas. This site was retired from the MFAC Program in July 2015. GPS Coordinates: Lat: 34.215491 Lon: -119.079224	

Site 3c – Camarillo Hills Drain Outlet	
This site is located in close proximity downstream of Site 3b and begins at the end of a drain outlet and includes in-stream and bank areas. This site was retired from the MFAC Program in July 2015. GPS Coordinates: Lat: 34.215593 Lon: -119.090810	

Site 3d - Camarillo Hills Drain Outlet	
This site is the most downstream location of Sites 3a-d and begins at the upstream end of a drain outlet and includes in-stream and banks areas. This site was retired from the MFAC Program in July 2015. GPS Coordinates: Lat: 34.215596 Lon: -119.092864	

Site 4 – Las Posas Estates Drain	
This site is located within the Las Posas Estates Drain between Central Avenue and U.S. 101 Freeway. The site consists of the in-stream portion of the drain south of Central Avenue as well as the land area above the drain on the northwest side. This site was retired from the MFAC Program in July 2015. GPS Coordinates: Lat: 34.224121 Lon: -119.104421	

Site 5 – Revolon Slough at Etting Road	
This site begins at the downstream end of an agricultural drain that discharges into Revolon Slough and includes the in-stream portions of Revolon Slough as well as the land areas within the slough and the banks. GPS Coordinates: Lat: 34.161731 Lon: -119.091460	

Site 6 – North Ramona Place Drain Debris Basin	
This site is within a debris basin at the end of North Ramona Place. The site consists of a flat vegetated area in the middle of the debris basin. This site was retired from the MFAC Program in July 2015. GPS Coordinates: Lat: 34.241553 Lon: -119.085723	

Site 8 – Caltrans Site on U.S. 101 Freeway	
This site is located on the south side of U.S. 101 Freeway near Revolon Slough. The site begins at the end of the guard rail and ends at the fence surrounding Revolon Slough. GPS Coordinates: Lat: 34.221799 Lon: -119.120400	

Site 9 – Revolon Slough at Pleasant Valley Road	
This site is located within the Revolon Slough and includes the east side of the slough near an access point off of Pleasant Valley Road. This site was retired from the MFAC Program in July 2015. GPS Coordinates: Lat: 34.191006 Lon: -119.107392	

Site 10 – 5th Street Drain at Del Norte Blvd.	
This site is located within the 5th Street Drain near the intersection of Del Norte Boulevard and 5th Street. This site was added to the MFAC Program in July 2015. GPS Coordinates: Lat: 34.191006 Lon: -119.107392	

Appendix 2. MFAC Event Photos

Site 1 – Revolon Slough at Wood Road

Figure 1: Site 1 before a MFAC event in September, 2015

Figure 2: Site 1 after a MFAC event in September, 2015

Site 3a – Camarillo Hills Drain Outlet

Figure 3: Site 3A before a MFAC event in September, 2015

Figure 4: Site 3A after a MFAC event in September, 2015

Site 5 – Revolon Slough at Etting Road

Figure 5: Site 5 before a MFAC event in September, 2015

Figure 6: Site 5 after a MFAC event in September, 2015

Site 8 – Caltrans Site on U.S. 101 Freeway

Figure 7: Site 8 before a MFAC event in September, 2015

Figure 8: Site 8 after a MFAC event in September, 2015

Site 10 – Revolon Slough at Del Norte Blvd.

Figure 9. Site 10 before a MFAC event in September, 2015

Figure 10. Site 10 before a MFAC event in September, 2015

Appendix 3. Special Clean-Up Photos

Site 1 – Revolon Slough at Wood Road

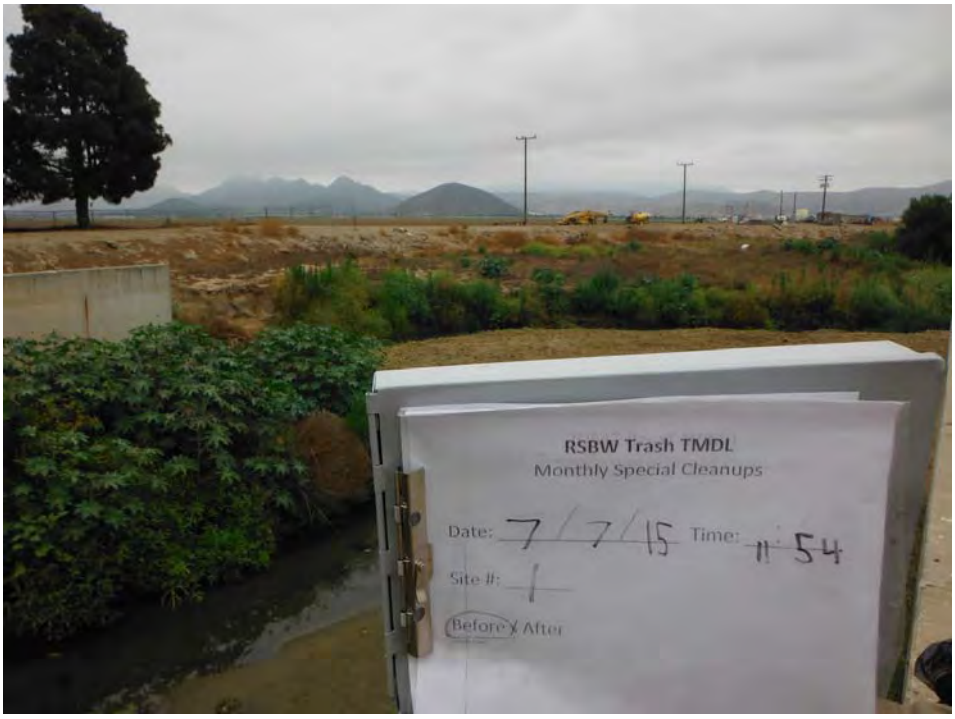

Figure 11: Site 1 before a special cleanup event in July, 2015

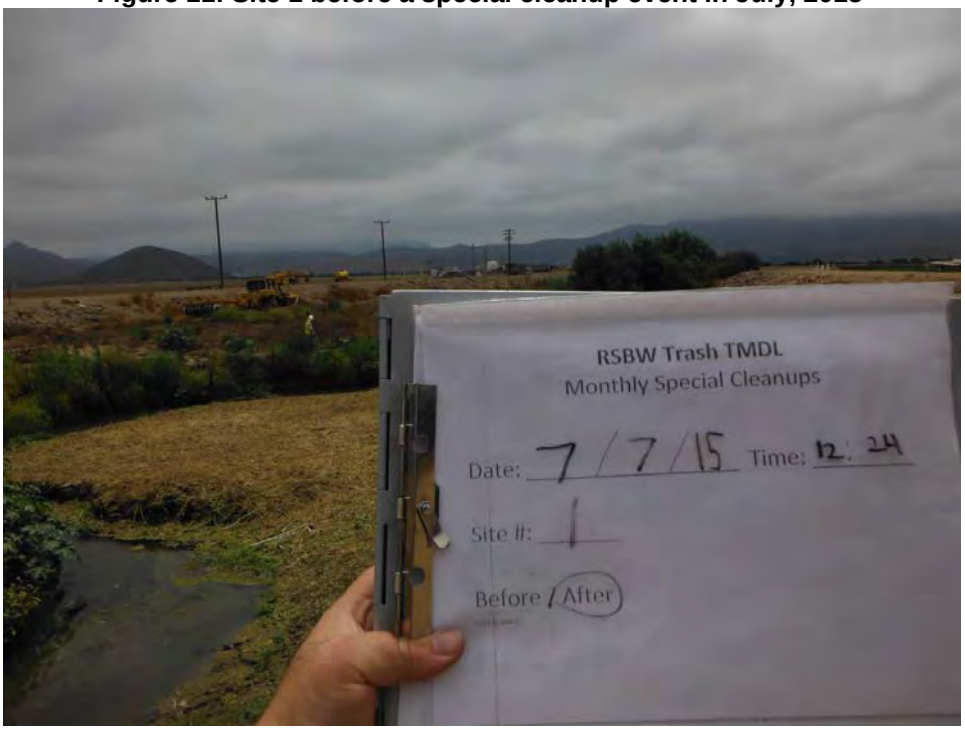

Figure 12: Site 1 after a special cleanup event in July, 2015

Site 3a-Camarillo Hills Drain Outlet

Figure 13: Site 3A before a special cleanup event in July, 2015

Figure 14: Site 3A after a special cleanup event in July, 2015

Site 5 – Revolon Slough at Etting Road

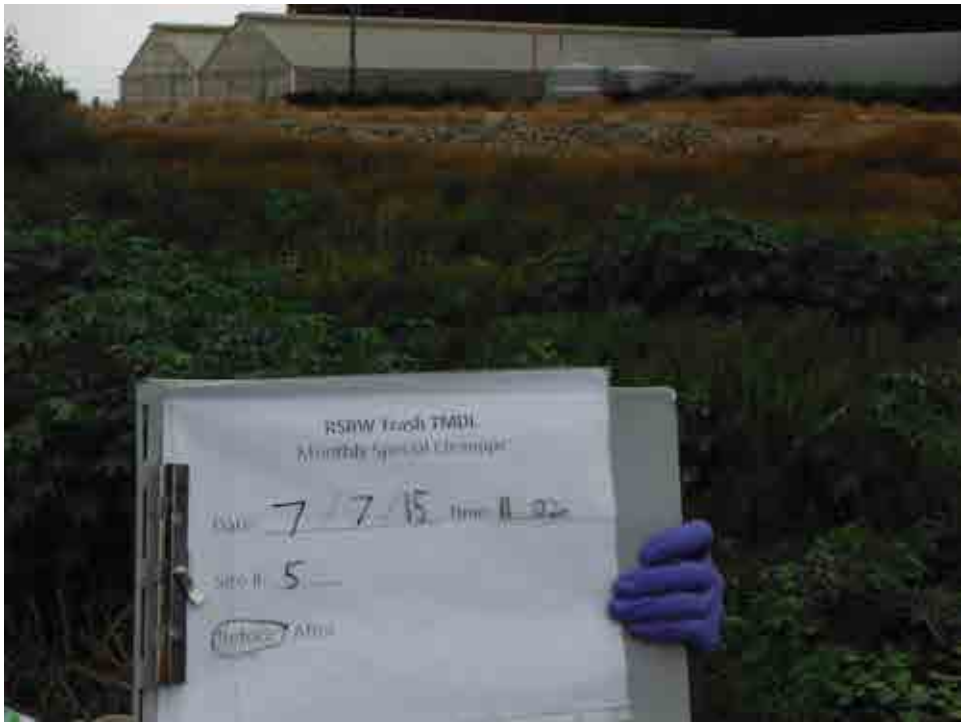

Figure 15: Site 5 before a special cleanup event in July, 2015

Figure 16: Site 5 after a special cleanup event in July, 2015

Site 8 – Caltrans Site on U.S. 101 Freeway

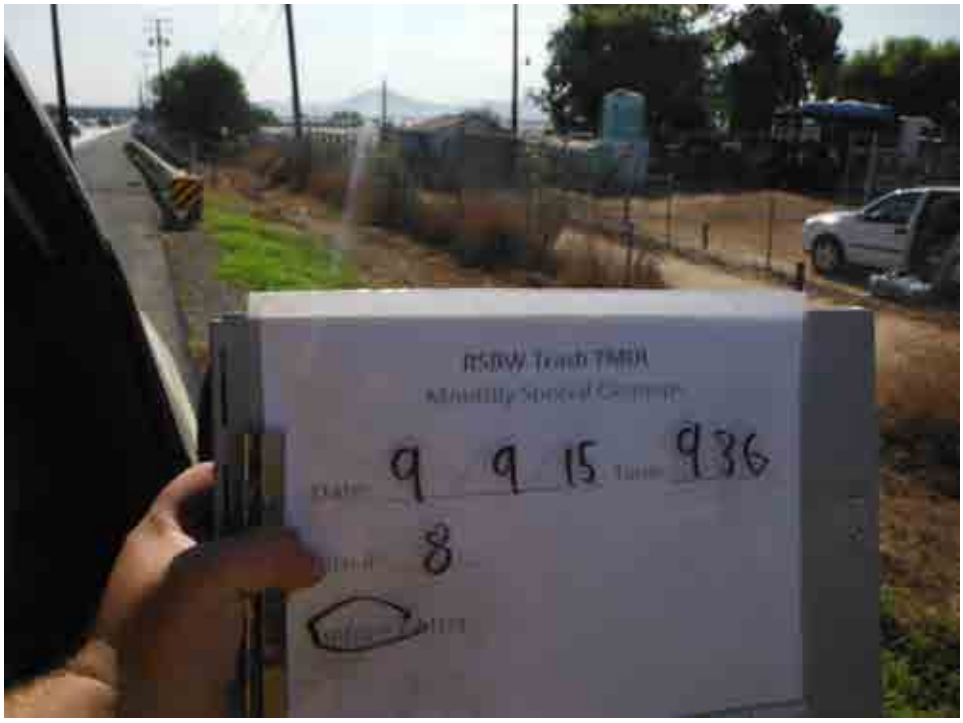

Figure 17. Site 8 before a special cleanup event in September, 2015

Figure 18. Site 8 after a special cleanup event in September, 2015

Site 10 – Revolon Slough at Del Norte Blvd.

Figure 19. Site 10 before a special cleanup event in July, 2015

Figure 20. Site 10 after a special cleanup event in July, 2015