

appendix B

SUPPORTING DATA

Table B-1. Comparison of surfzone total coliform bacterial data to the 30-day median California Ocean Plan benchmark, July 2009 through June 2010.

Orange County Sanitation District, California.

B.1

Month	Number of Times the 30-Day Median of Total Coliform Bacteria Exceeded the California Ocean Plan Benchmark at Surfzone Sampling Stations																	(A) Total Number of 30-Day Median Calculations With MPN>70	(B)* Total Number of 30-Day Median Calculations	(A/B)X100 Monthly Percentage			
	39N	33N	27N	21N	15N	9N	6N	3N	0	3S	6S	9S	15S	21S	27S	29S	39S						
2009																							
July	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0
August	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	527	0.4
September	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	7	510	1.4
October	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0
November	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	510	0.0
December	0	0	0	0	0	0	0	5	1	0	1	0	0	0	0	0	0	0	0	0	7	527	1.3
2010																							
January	0	2	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	7	527	1.3
February	0	0	0	0	0	0	19	0	25	26	22	23	0	0	0	0	0	0	0	0	115	476	24.2
March	0	0	0	0	0	1	14	0	17	14	2	16	0	0	10	0	0	0	0	0	74	527	14.0
April	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	2	510	0.4
May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0
June	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	510	0.0
Annual Totals																							
Totals	0	2	0	0	0	1	40	8	44	40	30	39	0	0	10	0	0	0	0	0	214	6205	3.4

Note: For stations 39N through 39S, the more restrictive shellfish standard (median of the total coliform organisms over a 30-day period shall not exceed an MPN of 70/100 mL) was used. Samples influenced by rain runoff, flood control channel flows, or the Santa Ana River are excluded; see monthly District's Discharge Monitoring Reports.

* Days in the month X number of surfzone sampling stations.

Table B-2. Comparison of surfzone total coliform bacterial data to the 30-day 10% California Ocean Plan benchmark, July 2009 through June 2010.

Orange County Sanitation District, California.

B-2

Month	Number of Times the 30-Day 10% Limit for Total Coliform Bacteria Exceeded the California Ocean Plan Benchmark at Surfzone Sampling Stations																	(A) Monthly Total Number Exceeding the 30-Day 10% Limit	(B)* Total Number of Monthly 30-Day 10% Limit Calculations	(A/B)X100 Monthly Percentage		
	39N	33N	27N	21N	15N	9N	6N	3N	0	3S	6S	9S	15S	21S	27S	29S	39S					
2009																						
July	0	0	0	0	0	9	9	0	0	0	0	0	0	0	0	0	0	18	527	3.4		
August	0	0	0	0	0	16	31	28	3	0	0	0	0	0	0	0	0	78	527	14.8		
September	0	0	0	0	0	16	30	30	0	0	0	0	0	0	0	0	0	76	510	14.9		
October	0	0	0	0	0	0	3	6	0	0	0	0	0	0	0	0	0	9	527	1.7		
November	0	3	0	0	3	0	28	0	0	0	0	0	0	0	0	0	0	34	510	6.7		
December	0	0	0	0	0	0	2	20	0	0	0	0	0	0	0	0	0	22	527	4.2		
2010																						
January	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0		
February	0	0	0	0	0	0	0	0	13	0	0	11	0	0	0	0	0	24	476	5.0		
March	0	0	0	0	0	0	0	0	2	0	0	3	0	0	0	0	0	5	527	0.9		
April	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0	10	510	2.0		
May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0		
June	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	510	0.0		
Annual Totals																						
Totals	0	3	0	0	3	41	103	94	18	0	0	14	0	0	0	0	0	276	6205	4.4		

Note: For stations 39N through 39S, the more restrictive shellfish standard (not more than 10% of the samples in a 30-day period shall exceed a total coliform MPN of 230/100 mL) was used. Samples influenced by rain runoff, flood control channel flows, or the Santa Ana River are excluded; see monthly District's Discharge Monitoring Reports.

* Days in the month X number of surfzone sampling stations.

Table B-3. Comparison of surfzone fecal coliform bacterial data to the monthly geometric mean California Ocean Plan benchmark, July 2009 through June 2010.

Orange County Sanitation District, California.

B.3

Month	Number of Times the Monthly Geometric Mean of Fecal Coliform Bacteria Exceeded the California Ocean Plan Benchmark at Surfzone Sampling Stations																	(A) Total Number of Geometric Mean Calculations with MPN >200	(B)* Total Number of Monthly Geometric Mean Calculations	(A/B)X100 Monthly Percentage		
	39N	33N	27N	21N	15N	9N	6N	3N	0	3S	6S	9S	15S	21S	27S	29S	39S					
2009																						
July	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0
August	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0
September	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	510	0.0
October	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0
November	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	510	0.0
December	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0
2010																						
January	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0
February	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	476	0.0
March	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0
April	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	510	0.0
May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0
June	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	510	0.0
Annual Totals																						
Totals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6205	0

Note: For stations 39N through 39S, the geometric mean of the fecal coliform organisms over a one-month period shall not exceed an MPN of 200/100 mL. Samples influenced by rain runoff, flood control channel flows, or the Santa Ana River are excluded; see monthly District's Discharge Monitoring Reports.

* Days in the month X number of surfzone sampling stations.

Table B-4. Comparison of surfzone fecal coliform bacterial data to the 60-day 10% California Ocean Plan benchmark*, July 2009 through June 2010.

Orange County Sanitation District, California.

B.4

Month	Number of Times the 60-Day 10% Limit for Fecal Coliform Bacteria Exceeded the California Ocean Plan Benchmark at Surfzone Sampling Stations																	(A) Monthly Total Number Exceeding the 60-Day 10% Limit	(B)* Total Number of Monthly 60-Day 10% Limit Calculations	(A/B)X100 Monthly Percentage		
	39N	33N	27N	21N	15N	9N	6N	3N	0	3S	6S	9S	15S	21S	27S	29S	39S					
2009																						
July	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0
August	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0
September	0	0	0	0	0	0	30	27	0	0	0	0	0	0	0	0	0	0	0	57	510	11.2
October	0	0	0	0	0	0	30	18	0	0	0	0	0	0	0	0	0	0	0	48	527	9.1
November	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	510	0.0
December	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0
2010																						
January	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0
February	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	476	0.0
March	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0
April	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	510	0.0
May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0
June	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	510	0.0
Annual Totals																						
Totals	0	0	0	0	0	0	60	45	0	0	0	0	0	0	0	0	0	0	0	105	6205	1.7

Note: For stations 39N through 39S, not more than 10% of the samples in a 60-day period shall exceed a fecal coliform MPN of 400/100 mL. Samples influenced by rain runoff, flood control channel flows, or the Santa Ana River are excluded; see monthly District's Discharge Monitoring Reports.

* Days in the month X number of surfzone sampling stations.

Table B-5. Comparison of surfzone enterococci bacteria data to the 30-day geometric mean California Ocean Plan benchmark, July 2009 through June 2010.

Orange County Sanitation District, California.

B.5

Month	Number of Times the 30-Day Geometric Mean for Enterococci Bacteria Exceeded the California Ocean Plan Benchmark at Surfzone Sampling Stations																	(A) Total Number of 30-Day Geometric Mean Calculations >24 CFU/100 mL	(B)* Total Number of 30-Day Geometric Mean Calculations	(A/B)X100 Monthly Percentage			
	39N	33N	27N	21N	15N	9N	6N	3N	0	3S	6S	9S	15S	21S	27S	29S	39S						
2009																							
July	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0		
August	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0		
September	0	0	0	0	0	0	13	3	0	0	0	0	0	0	0	0	0	0	16	510	3.1		
October	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0		
November	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	510	0.0		
December	0	12	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	20	527	3.8		
2010																							
January	0	7	0	1	1	25	0	0	0	0	1	0	0	0	0	0	0	0	35	527	6.6		
February	0	0	0	0	0	5	27	0	0	23	0	0	0	0	0	0	0	0	55	476	11.6		
March	0	0	1	6	0	0	14	0	0	6	0	0	0	0	0	0	0	0	27	527	5.1		
April	0	0	23	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	510	4.9		
May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0		
June	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	510	0.0		
Annual Totals																							
Totals	0	19	24	9	1	30	54	11	0	29	1	0	0	0	0	0	0	0	178	6205	2.9		

Note: For stations 39N through 39S, the geometric mean of the enterococci organisms over a 30-day period shall not exceed 24 CFU/100 mL. Samples influenced by rain runoff, flood control channel flows, or the Santa Ana River are excluded; see monthly District's Discharge Monitoring Reports.
 * Days in the month X number of surfzone sampling stations.

Table B-6. Comparison of surfzone enterococci bacteria data to the six-month geometric mean California Ocean Plan benchmark, July 2009 through June 2010.

Orange County Sanitation District, California.

B.6

Month	Number of Times the Six-Month Geometric Mean of Enterococci Bacteria Exceeded the California Ocean Plan Benchmark at Surfzone Sampling Stations																	(A) Total Number of Six-Month Geometric Mean Calculations >12 CFU/100 mL	(B)* Total Number of Six-Month Geometric Mean Calculations	(A/B)X100 Monthly Percentage			
	39N	33N	27N	21N	15N	9N	6N	3N	0	3S	6S	9S	15S	21S	27S	29S	39S						
2009																							
July	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0
August	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0
September	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	510	0.0
October	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0
November	0	0	0	0	0	0	22	0	0	0	0	0	0	0	0	0	0	0	0	0	22	510	4.3
December	0	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0	30	527	5.7
2010																							
January	0	0	0	0	0	0	31	0	0	0	0	0	0	0	0	0	0	0	0	0	31	527	5.9
February	0	0	0	0	0	0	28	0	0	0	0	0	0	0	0	0	0	0	0	0	28	476	5.9
March	0	0	0	0	0	0	31	0	0	0	0	0	0	0	0	0	0	0	0	0	31	527	5.9
April	0	0	0	0	0	0	30	25	0	0	0	0	0	0	0	0	0	0	0	0	55	510	10.8
May	0	0	2	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	10	527	1.9
June	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	510	0.0
Annual Totals																							
Totals	0	0	2	0	0	0	176	29	0	0	0	0	0	0	0	0	0	0	0	0	207	6205	3.3

Note: For stations 39N through 39S, the geometric mean of the enterococci organisms over a six-month period shall not exceed 12 CFU/100 mL. Samples influenced by rain runoff, flood control channel flows, or the Santa Ana River are excluded; see monthly District's Discharge Monitoring Reports.
* Days in the month X number of surfzone sampling stations.

Table B-7. Total coliform bacteria (MPN/100 mL) collected in offshore waters and used for comparison with REC-1 compliance criteria, July 2009 through June 2010.

Orange County Sanitation District, California.

Station	Date					Geometric Mean	Meets 20% of samples less than 1,000/100mL	Meets single sample max of <10,000/100 mL
	8/3/09	8/4/09	8/6/09	8/10/09	8/11/09			
C2	<10	10	<10	<10	<10	<10	Yes	Yes
2103	10	<10	<10	<10	<10	<10	Yes	Yes
2104	<10	<10	<10	<10	<10	<10	Yes	Yes
2183	<10	<10	<10	<10	<10	<10	Yes	Yes
2203	<10	<10	<10	<10	<10	<10	Yes	Yes
2223	<10	<10	<10	<10	<10	<10	Yes	Yes
2303	<10	<10	<10	<10	<10	<10	Yes	Yes
2351	<10	<10	<10	<10	<10	<10	Yes	Yes
2403	<10	<10	<10	<10	<10	<10	Yes	Yes
	10/28/09	10/29/09	11/2/09	11/4/09	11/5/09			
C2	<10	13	<10	<10	<10	<10	Yes	Yes
2103	<10	<10	<10	<10	<10	<10	Yes	Yes
2104	<10	<10	<10	<10	<10	<10	Yes	Yes
2183	<10	<10	<10	<10	<10	<10	Yes	Yes
2203	<10	<10	<10	<10	<10	<10	Yes	Yes
2223	<10	30	<10	<10	<10	<10	Yes	Yes
2303	<10	78	<10	<10	<10	12	Yes	Yes
2351	11	137	<10	<10	<10	15	Yes	Yes
2403	42	137	<10	<10	<10	19	Yes	Yes
	02/02/10	02/03/10	02/08/10	02/09/10	02/17/10			
C2	126	31	549	353	12	99	Yes	Yes
2103	16	17	68	36	12	24	Yes	Yes
2104	22	33	47	81	13	32	Yes	Yes
2183	30	10	287	50	18	38	Yes	Yes
2203	16	15	229	49	<10	29	Yes	Yes
2223	13	<10	245	33	11	24	Yes	Yes
2303	10	15	236	15	<10	21	Yes	Yes
2351	21	<10	116	53	<10	24	Yes	Yes
2403	13	<10	154	42	<10	22	Yes	Yes
	05/04/10	05/12/10	05/13/10	05/18/10	05/26/10			
C2	<10	<10	<10	<10	<10	<10	Yes	Yes
2103	<10	<10	<10	<10	<10	<10	Yes	Yes
2104	<10	<10	12	12	<10	<10	Yes	Yes
2183	<10	<10	<10	<10	<10	<10	Yes	Yes
2203	<10	<10	<10	<10	<10	<10	Yes	Yes
2223	<10	<10	<10	<10	<10	<10	Yes	Yes
2303	<10	<10	<10	<10	<10	<10	Yes	Yes
2351	<10	<10	<10	13	<10	<10	Yes	Yes
2403	<10	<10	<10	<10	<10	<10	Yes	Yes

California Ocean Plan Recreational Water Standards

Total Coliform: No single sample shall exceed >10,000 organisms/100 mL when verified by a repeat sample taken within 48 hours; not more than 20% of the samples in any 30-day period shall exceed 1,000 organisms/100 mL.

Table B-8. Fecal coliform bacteria (MPN/100 mL) collected in offshore waters and used for comparison with REC-1 compliance criteria, July 2009 through June 2010.

Orange County Sanitation District, California.

Station	Date					Geometric Mean	Meets geometric mean less than 200/100 mL	Meets 10% of samples less than 400/100 mL
	08/03/09	08/04/09	08/06/09	08/10/09	08/11/09			
C2	<10	<10	<10	<10	<10	<10	Yes	Yes
2103	<10	<10	<10	<10	<10	<10	Yes	Yes
2104	<10	<10	<10	<10	<10	<10	Yes	Yes
2183	<10	<10	<10	<10	<10	<10	Yes	Yes
2203	<10	<10	<10	<10	<10	<10	Yes	Yes
2223	<10	<10	<10	<10	<10	<10	Yes	Yes
2303	<10	<10	<10	<10	<10	<10	Yes	Yes
2351	<10	<10	<10	<10	<10	<10	Yes	Yes
2403	<10	<10	<10	<10	<10	<10	Yes	Yes
	10/28/09	10/29/09	11/02/09	11/04/09	11/05/09			
C2	<10	<10	<10	<10	<10	<10	Yes	Yes
2103	<10	<10	<10	<10	<10	<10	Yes	Yes
2104	<10	<10	<10	<10	<10	<10	Yes	Yes
2183	<10	<10	<10	<10	<10	<10	Yes	Yes
2203	<10	<10	<10	<10	<10	<10	Yes	Yes
2223	<10	13	<10	<10	<10	<10	Yes	Yes
2303	<10	19	<10	<10	<10	<10	Yes	Yes
2351	<10	30	<10	<10	<10	<10	Yes	Yes
2403	14	36	<10	<10	<10	12	Yes	Yes
	02/02/10	02/03/10	02/08/10	02/09/10	02/17/10			
C2	<10	<10	17	14	<10	10	Yes	Yes
2103	<10	<10	<10	<10	<10	<10	Yes	Yes
2104	10	<10	<10	<10	<10	<10	Yes	Yes
2183	<10	<10	12	<10	<10	<10	Yes	Yes
2203	10	<10	<10	<10	<10	<10	Yes	Yes
2223	<10	<10	<10	<10	<10	<10	Yes	Yes
2303	<10	<10	10	<10	<10	<10	Yes	Yes
2351	<10	<10	<10	<10	<10	<10	Yes	Yes
2403	<10	<10	<10	<10	<10	<10	Yes	Yes
	05/04/10	05/12/10	05/13/10	05/18/10	05/26/10			
C2	<10	<10	<10	<10	<10	<10	Yes	Yes
2103	<10	<10	<10	<10	<10	<10	Yes	Yes
2104	<10	<10	<10	<10	<10	<10	Yes	Yes
2183	<10	<10	<10	<10	<10	<10	Yes	Yes
2203	<10	<10	<10	<10	<10	<10	Yes	Yes
2223	<10	<10	<10	<10	<10	<10	Yes	Yes
2303	<10	<10	<10	<10	<10	<10	Yes	Yes
2351	<10	<10	<10	<10	<10	<10	Yes	Yes
2403	<10	<10	<10	<10	<10	<10	Yes	Yes

California Ocean Plan Recreational Water Standards

Fecal Coliform: Fecal coliform density based on not less than five samples for any 30-day period shall not exceed a geometric mean of 200/100 mL, nor shall more than 10% of the total samples during any 60-day period exceed 400/100 mL.

Table B-9. Enterococci bacteria (MPN/100 mL) collected in offshore waters, July 2009 through June 2010.

Orange County Sanitation District, California.

Station	Date					Geometric Mean	Comment
	08/03/09	08/04/09	08/06/09	08/10/09	08/11/09		
C2	<10	<10	<10	<10	<10	<10	MONITORING ONLY. No offshore zone compliance limits apply at this time
2103	<10	<10	<10	<10	<10	<10	
2104	<10	<10	<10	<10	<10	<10	
2183	<10	<10	<10	<10	<10	<10	
2203	<10	<10	<10	<10	<10	<10	
2223	<10	<10	<10	<10	<10	<10	
2303	<10	<10	<10	<10	<10	<10	
2351	<10	<10	<10	<10	<10	<10	
2403	<10	<10	<10	<10	<10	<10	
	10/28/09	10/29/09	11/02/09	11/04/09	11/05/09		
C2	<10	<10	<10	<10	<10	<10	MONITORING ONLY. No offshore zone compliance limits apply at this time
2103	<10	<10	<10	<10	<10	<10	
2104	<10	<10	<10	<10	<10	<10	
2183	<10	<10	<10	<10	<10	<10	
2203	<10	<10	<10	<10	<10	<10	
2223	<10	<10	<10	<10	<10	<10	
2303	<10	<10	<10	<10	<10	<10	
2351	<10	10	<10	<10	<10	<10	
2403	<10	12	<10	<10	<10	<10	
	02/02/10	02/03/10	02/08/10	02/09/10	02/17/10		
C2	12	17	67	25	11	21	MONITORING ONLY. No offshore zone compliance limits apply at this time
2103	<10	12	17	<10	<10	<10	
2104	11	13	<10	<10	12	<10	
2183	<10	<10	18	<10	<10	<10	
2203	<10	<10	<10	<10	11	<10	
2223	<10	<10	<10	<10	<10	<10	
2303	<10	<10	<10	<10	<10	<10	
2351	<10	<10	<10	<10	<10	<10	
2403	<10	<10	<10	<10	<10	<10	
	05/04/10	05/12/10	05/13/10	05/18/10	05/26/10		
C2	<10	<10	<10	<10	<10	<10	MONITORING ONLY. No offshore zone compliance limits apply at this time
2103	<10	<10	11	<10	<10	<10	
2104	<10	<10	<10	<10	<10	<10	
2183	<10	<10	<10	<10	<10	<10	
2203	<10	<10	<10	<10	<10	<10	
2223	<10	<10	<10	<10	12	<10	
2303	<10	<10	<10	<10	<10	<10	
2351	<10	<10	<10	<10	<10	<10	
2403	<10	<10	<10	<10	<10	<10	

Table B-10. Comparison of surfzone particulate grease data, July 2009 through June 2010.

Orange County Sanitation District, California.

B.10

Month	Number of Times the Monthly Percentage of Grease Particles Exceeded the NPDES Permit Standard at Surfzone Sampling Stations																	(A) Total Number of Visible Grease Particles	(B)** Total Number of Grease Particle Calculations	(A/B)X100 Monthly Percentage			
	39N	33N	27N	21N	15N	9N	6N	3N	0	3S	6S	9S	15S	21S	27S	29S	39S						
2009																							
July	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0		
August	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0		
September	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	510	0.0		
October	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0		
November	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	510	0.0		
December	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0		
2010																							
January	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0		
February	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	476	0.0		
March	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0		
April	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	510	0.0		
May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0		
June	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	510	0.0		
Annual Totals																							
Totals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6205	0.0		

* Compliance Criteria: For stations 39N through 39S, floating particles and oil and grease shall not be visible.

** Days in the month X number of surfzone sampling stations.

Table B-11. Summary of floatable material by station group (station) observed during 29-station grid water quality surveys, July 2009 through June 2010. Individual stations may have multiple types of debris.

Orange County Sanitation District, California.

Surface Observation	Station Group								Totals
	Downcoast Nearshore	Downcoast Offshore	Upcoast Nearshore	Upcoast Offshore	Newport Canyon	Nearfield Nearshore	Nearfield Offshore	Within ZID	
	2103, 2104, 2183, 2184	2105, 2106, 2185, 2186	2223, 2224, 2303, 2304, 2351, 2352, 2403, 2404	2225, 2226, 2305, 2306, 2353, 2354, 2405, 2406	C2	2203,2204	2206	2205	
Trash/Debris (black tar, ash from brush fires) ¹	2	2	3	1	0	1	1	0	10
Biological Material (kelp)	4	4	2	0	0	1	1	0	12
NFMO ²	44	44	91	95	12	23	11	12	332
Totals	50	50	96	96	12	25	13	12	354

¹ Concluded to be not of sewage origin.

² No floatable material observed.

Table B-12. Summary of floatable material by station group (station) observed during REC-1 water quality surveys, July 2009 through June 2010. Individual stations may have multiple types of debris.

Orange County Sanitation District, California.

Surface Observation	Station Group					Totals
	Downcoast Nearshore	Upcoast Nearshore	Newport Canyon	Nearfield Nearshore	Within ZID	
	2103, 2104, 2183	2223, 2303 2351, 2403	C2	2203	2205	
Trash/Debris (black tar, ash from brush fires) ¹	1	0	0	0	0	1
Biological Material (kelp)	0	0	0	0	0	0
NFMO ²	23	32	8	8	8	79
Totals	24	32	8	8	8	80

¹ Concluded to be not of sewage origin.

² No floatable material observed.

Table B-13. Total abundance of demersal fish by family and species sampled in summer (July 2009) and winter (January 2010). Fish length data (cm) is reported for minimum, maximum, and median size.

Orange County Sanitation District

Family	Species	T2	T6	T3	T1	T12	T13	T11	T10	T14	Total Abundance By Species	Total Abundance By Family	Fish Length Data (cm)		
		# Reps	4	4	6	6	6	6	6	4			4	46	Min
Cottidae (Sculpins)												8,589			
	<i>Icelinus quadriseriatus</i>	204	203	730	211	1,174	1,301	3,658	178		7,659		4	9	6
	<i>Chitonotus pugetensis</i>	42	67	175	67	64	142	372	1		930		6	13	9
Paralichthyidae (Sand Flounders)												5,315			
	<i>Citharichthys sordidus</i>	25	82	509	596	212	165	409	1,066	1,033	4,097		3	25	12
	<i>Citharichthys xanthostigma</i>	35	32	27	309	262	161	111	1		938		6	21	15
	<i>Hippoglossina stomata</i>	6	4	38	4	4	2	46	16	3	123		7	31	17
	<i>Citharichthys stigmaeus</i>	42	37								79		3	9	7
	<i>Xystreurus liolepis</i>	2	16	4	45			7			74		5	24	16
	<i>Paralichthys californicus</i>				4						4		29	40	40
Synodontidae (Lizardfish)												4,165			
	<i>Synodus lucioceps</i>	778	619	380	202	639	834	695	5	13	4,165		7	26	11
Pleuronectidae (Righteye flounders)												1,367			
	<i>Parophrys vetulus</i>	1		26	519	5	33	32	19	8	643		8	29	18
	<i>Pleuronichthys verticalis</i>	5	6	52	120	15	30	50	2		280		6	25	16
	<i>Lyopsetta exilis</i>								109	139	248		3	18	13
	<i>Microstomus pacificus</i>			9		2			53	132	196		4	23	12
Hexagrammidae (Greenlings)												1,203			
	<i>Zaniolepis latipinnis</i>	56	23	51	220	292	73	109	93		917		6	17	14
	<i>Zaniolepis frenata</i>			5		1			116	162	284		7	18	12
	<i>Ophiodon elongatus</i>					1		1			2		14	16	15
Soleidae (Soles)												671			
	<i>Symphurus atricaudus</i>	23	11	28	222	162	91	78	36	20	671		5	20	15

Table B-13 continues.

Table B-13 continued.

Family	Species	T2	T6	T3	T1	T12	T13	T11	T10	T14	Total Abundance By Species	Total Abundance By Family	Fish Length Data (cm)		
# Reps		4	4	6	6	6	6	6	4	4	46		Min	Max	Median
Embiotocidae (Surfperches)												573			
	<i>Zalemnius rosaceus</i>	27	27	35	87	68	81	240	4	2	571		3	14	8
	<i>Cymatogaster aggregata</i>							2			2		8	11	10
Scorpaenidae (Scorpionfishes)												457			
	<i>Sebastes saxicola</i>			154		2			148	62	366		3	17	8
	<i>Sebastes semicinctus</i>			1			2	1	21	6	31		3	16	12
	<i>Sebastes dallii</i>			14	1	2		1			18		2	16	12
	<i>Scorpaena guttata</i>	1		9	2		1	1	1		15		14	24	19
	<i>Sebastes elongatus</i>								10	4	14		6	17	9
	<i>Sebastes eos</i>								2	1	3		12	19	17
	<i>Sebastes serriceps</i>									3	3		6	8	7
	<i>Sebastes levis</i>								1	1	2		8	11	10
	<i>Sebastes miniatus</i>					2					2		14	20	17
	<i>Sebastes nigrocinctus</i>			1							1		6	6	6
	<i>Sebastes crameri</i>								1		1		12	12	12
	<i>Sebastes rubrivinctus</i>			1							1		7	7	7
Batrachoididae (Toadfishes)												251			
	<i>Porichthys notatus</i>	1	1	39		75	23	4	57	51	251		6	23	14
Zoarcidae (Eelpouts)												213			
	<i>Lycodes pacificus</i>								82	128	210		3	27	15
	<i>Lycinema barbatum</i>									3	3		16	16	16
Agonidae (Poachers)												90			
	<i>Odontopyxis trispinosa</i>	2	5	9	21	21	7	10			75		4	10	8
	<i>Agonopsis sterletus</i>			1			1		5	1	8		12	14	14
	<i>Agonopsis vulsa</i>			1					5		6		10	14	14
	<i>Xeneretmus latifrons</i>								1		1		14	14	14
Sciaenidae (Drums)												32			
	<i>Genyonemus lineatus</i>				30	2					32		16	20	17

B.13

Table B-13 continues.

Table B-13 continued.

Family	Species	T2	T6	T3	T1	T12	T13	T11	T10	T14	Total Abundance By Species	Total Abundance By Family	Fish Length Data (cm)		
# Reps		3	3	6	6	6	6	6	3	3	42		Min	Max	Median
Rajidae (Skates)												21			
	<i>Raja inornata</i>	2	2	1		1	7	8			21		15	56	34
Ophidiidae (Cusk-eels)												6			
	<i>Chilara taylori</i>								2	4	6		12	19	15
Scyliorhinidae (Cat sharks)												3			
	<i>Cephaloscyllium ventriosum</i>			3							3		22	39	33
Gobiidae (Gobies)												3			
	<i>Rhinogobiops nicholsii</i>			3							3		8	8	8
Stichaeidae (Pricklebacks)												3			
	<i>Plectobranchus evides</i>								1	2	3		10	11	11
Anoplopomatidae (Sablefish)												2			
	<i>Anoplopoma fimbria</i>			2							2		12	16	14
Anarhichadidae (Wolffishes)												1			
	<i>Anarrhichthys ocellatus</i>			1							1		132	132	132
Bathymasteridae (Ronquils)												1			
	<i>Rathbunella alleni</i>			1							1		21	21	21
Chimaeridae (Chimaeras)												1			
	<i>Hydrolagus colliei</i>									1	1		33	33	33
Gadidae (Cods)												1			
	<i>Merluccius productus</i>								1		1		26	26	26
Regalecidae (Oarfishes)												1			
	<i>Regalecus glesne</i>			1							1		7	7	7
Total Abundance		1,048	932	1,581	2,449	1,832	1,653	2,177	1,859	1,779	22,969				
Total No. of Species		17	15	31	17	21	17	20	29	22	50				

Data for each family are ranked by number of species and abundance for all stations and surveys combined.

Table B-14. Mean community indices and diversity indices values for demersal fish by station and season.

Orange County Sanitation District, California.

B.15

Station	# of Species		Abundance		Biomass		H'		Margalef's SR		DOM75	
	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range
Summer												
T2	13	13	447	423–470	5.6	5.3–6.0	1.27	1.26–1.27	1.97	1.95–1.98	2.0	2
T6	10	9–11	292	243–340	4.2	3.7–4.8	1.53	1.44–1.63	1.60	1.37–1.82	3.0	3
T3	21	20–21	585	459–709	17.1	15.2–19.7	1.99	1.85–2.17	3.10	2.89–3.26	4.0	3–5
T1	13	12–13	478	375–549	22.1	15.1–28.6	2.05	2.01–2.10	1.89	1.86–1.92	5.0	5
T12	14	13–15	562	552–580	9.0	8.2–10.2	1.76	1.69–1.83	2.00	1.90–2.20	3.3	3–4
T13	13	12–14	470	330–587	9.7	7.3–11.6	1.77	1.67–1.87	1.96	1.77–2.07	3.7	3–4
T11	13	13	546	463–597	8.9	6.2–10.5	1.49	1.44–1.56	1.91	1.88–1.96	3.0	3
T10	16	13–19	481	469–493	17.3	17.2–17.3	1.59	1.35–1.83	2.43	1.95–2.90	3.0	2–4
T14	15	14–16	436	426–446	12.0	11.8–12.2	1.55	1.51–1.60	2.30	2.13–2.48	3.0	3
Mean	14.1		477.4		11.8		1.67		2.13		3.3	
Winter												
T2	10	10	180	171–188	1.9	2.0	1.33	1.33	1.73	1.72–1.75	2.0	2
T6	13	13	276	252–300	3.9	3.0–4.8	1.41	1.29–1.53	2.14	2.10–2.17	2.5	2–3
T3	13	12–15	185	158–224	3.6	2.1–6.5	1.50	1.40–1.56	2.36	2.17–2.59	2.7	2–3
T1	13	12–14	408	389–419	21.7	19.9–22.6	1.95	1.88–2.01	2.00	1.82–2.15	4.7	4–5
T12	11	11–12	440	396–474	8.5	7.2–9.4	1.69	1.65–1.77	1.70	1.62–1.84	4.0	4
T13	13	11–14	515	399–684	5.3	4.0–6.9	1.24	1.15–1.29	1.87	1.67–1.99	2.0	2
T11	16	15–16	1399	1317–1493	12.4	11.0–13.2	1.18	1.12–1.24	2.03	1.94–2.09	2.0	2
T10	17	16–18	538	443–632	10.0	8.3–11.7	1.62	1.60–1.65	2.55	2.46–2.64	3.0	3
T14	13	11–14	454	435–472	8.9	8.3–9.5	1.42	1.38–1.46	1.88	1.65–2.11	3.0	3
Mean	13.2		488.2		8.5		1.48		2.03		2.9	

Table B-15. Total abundance of epibenthic macroinvertebrates by species and station sampled in summer (July 2009) and winter (January 2010).

Orange County Sanitation District, California.

Species	Inner Shelf		Middle Shelf					Outer Shelf		Total	
	depth station replicate	36 m		55 m					137 m		
		T2	T6	T3	T1	T12	T13	T11	T10		T14
		4	4	6	6	6	6	6	4		4
<i>Sicyonia ingentis</i>	273	43	4	5	104	870	207	321	324	2,151	
<i>Lytechinus pictus</i>		325	554	137	12	24	138	7	1	1,198	
<i>Acanthoptilum</i> sp	1	2	139	374	480	5	1	8		1,010	
<i>Ophiura luetkenii</i>		40	29	4	671	16	18			778	
<i>Thesea</i> sp	96	201	26	60	86	25	84		1	579	
<i>Astropecten verrilli</i>		20	5	143	8	10	13	1		200	
<i>Hamatoscalpellum californicum</i>	58	23	19	11	30	1	35		3	180	
<i>Luidia foliolata</i>		7	1	11	48	4	11	8	10	100	
<i>Ophiothrix spiculata</i>	4	8	5	1	3	46	6			73	
<i>Neocrangon zacaе</i>		1						11	54	66	
<i>Sicyonia penicillata</i>		11				5	35			51	
<i>Dendronotus frondosus</i>	5	25			2		4			36	
<i>Parastichopus californicus</i>		1	15	9	1	5	4		1	36	
<i>Rossia pacifica</i>								8	14	22	
<i>Acanthodoris brunnea</i>	1	1	4	1	2			8	3	20	
<i>Amphichondrius granulatus</i>			13		2		1			16	
<i>Luidia asthenosoma</i>		1	1		1	4	2		6	15	
<i>Stylatula elongata</i>	12			3						15	
<i>Pleurobranchaea californica</i>	2	2	1					4	4	13	
<i>Octopus rubescens</i>	1					1		8	2	12	
<i>Neocrangon resima</i>								2	9	11	
<i>Crangon alaskensis</i>					1	2	1	5		9	
<i>Heterogorgia</i> sp	4	1		1	2					8	
<i>Barbarofusus barbarensis</i>			7							7	
<i>Pandalus platyceros</i>								7		7	
<i>Strongylocentrotus fragilis</i>			1				1	3	2	7	
Tunicate	1			2	2		2			7	
<i>Neocrangon</i> sp									5	5	

Table B-15 continues.

B.16

Table B-15 continued.

Species	Inner Shelf		Middle Shelf					Outer Shelf		Total	
	depth station replicate	36 m		55 m					137 m		
		T2	T6	T3	T1	T12	T13	T11	T10		T14
		4	4	6	6	6	6	6	4		4
<i>Tritonia diomedea</i>		3		2						5	
<i>Armina californica</i>	1	1	2							4	
<i>Heptacarpus stimpsoni</i>	4									4	
<i>Virgularia californica</i>			1	2				1		4	
<i>Baptodoris mimetica</i>			1				2			3	
<i>Calliostoma turbinum</i>	1					1	1			3	
<i>Hemisquilla californiensis</i>	2	1								3	
<i>Loxorhynchus crispatus</i>		1	1				1			3	
<i>Loxorhynchus grandis</i>	1					2				3	
<i>Orthopagurus minimus</i>			3							3	
<i>Paguristes bakeri</i>			3							3	
<i>Peltodoris nobilis</i>			3							3	
<i>Philine auriformis</i>	1	1		1						3	
<i>Randallia ornata</i>			3							3	
<i>Silicea</i>				1			1	1		3	
<i>Virgularia sp</i>				2					1	3	
<i>Amphipholis squamata</i>			2							2	
<i>Doris montereyensis</i>							2			2	
<i>Doryteuthis opalescens</i>								2		2	
<i>Metacarcinus anthonyi</i>					1				1	2	
<i>Amphioda psara</i>		1								1	
<i>Dendronotus albus</i>					1					1	
<i>Diaulula sandiegensis</i>		1								1	
<i>Dromalia alexandri</i>								1		1	
<i>Flabellina pricei</i>		1								1	
<i>Heptacarpus tenuissimus</i>		1								1	
<i>Metacrangon spinosissima</i>									1	1	
<i>Parastichopus sp</i>			1							1	
<i>Pisaster brevispinus</i>	1									1	
<i>Podochela hemphillii</i>		1								1	
<i>Pteropurpura macroptera</i>			1							1	
<i>Pyromaia tuberculata</i>	1									1	
Total Abundance	470	724	845	770	1,457	1,021	570	406	442	6,705	
Total No. of Species	20	27	26	19	19	16	22	18	17	58	

B.17

Table B-16. Mean community indices and diversity indices values for epibenthic macroinvertebrates by station and season.

Orange County Sanitation District, California.

Station	# of Species		Abundance		Biomass		H'		Margalef's SR		DOM75	
	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range
Summer												
T2	8	7–8	70	60–79	0.1	0.1	1.37	1.34–1.41	1.54	1.37–1.71	2.0	2
T6	12	11–13	209	163–254	0.7	0.3–1.0	1.32	1.11–1.53	2.07	1.93–2.17	2.5	2–3
T3	14	12–15	256	221–274	2.3	1.8–3.3	1.06	0.96–1.22	2.29	1.96–2.59	1.3	1–2
T1	10	8–12	185	135–214	1.6	0.9–2.8	1.46	1.28–1.62	1.72	1.43–2.07	3.0	3
T12	9	8–10	361	291–437	1.0	0.8–1.3	1.21	0.88–1.50	1.42	1.15–1.59	2.0	1–3
T13	9	9	46	25–82	0.8	0.7–1.1	1.58	1.35–1.82	2.21	1.82–2.49	3.0	2–4
T11	10	9–13	104	61–137	0.9	0.5–1.5	1.67	1.53–1.84	2.04	1.63–2.53	3.3	3–4
T10	10	9–10	51	47–54	0.9	0.9	1.46	1.42–1.50	2.17	2.01–2.34	3.0	3
T14	11	8–14	58	52–64	1.0	0.7–1.3	1.64	1.43–1.84	2.45	1.77–3.13	2.5	2–3
Mean	10.3		148.7		1.0		1.42		1.99		2.5	
Winter												
T2	11	10–11	166	154–177	2.1	1.0–3.2	0.97	0.73–1.21	1.86	1.79–1.93	1.5	1–2
T6	14	12–15	154	136–171	0.3	0.3–0.3	1.86	1.77–1.95	2.48	2.24–2.72	4.0	4
T3	10	5–20	26	11–55	0.6	0.1–0.8	1.74	1.23–2.58	2.81	1.61–4.74	5.3	2–10
T1	7	6–8	72	42–128	1.1	0.3–1.7	1.30	0.92–1.62	1.49	1.03–1.84	2.3	2–3
T12	9	7–10	125	93–161	0.2	0.0–0.5	0.95	0.73–1.38	1.60	1.25–1.99	1.3	1–2
T13	7	6–9	294	220–436	1.7	0.3–4.2	0.34	0.26–0.42	1.13	0.93–1.48	1.0	1
T11	9	8–9	86	85–87	0.3	0.2–0.6	1.21	1.01–1.37	1.72	1.57–1.80	2.0	2
T10	10	9–10	153	91–214	2.0	0.6–3.3	0.79	0.53–1.05	1.74	1.49–2.00	1.0	1
T14	9	8–9	163	147–179	3.6	3.3–3.9	0.69	0.65–0.73	1.48	1.35–1.60	1.0	1
Mean	9.3		137.5		1.3		1.10		1.81		2.2	

B.18

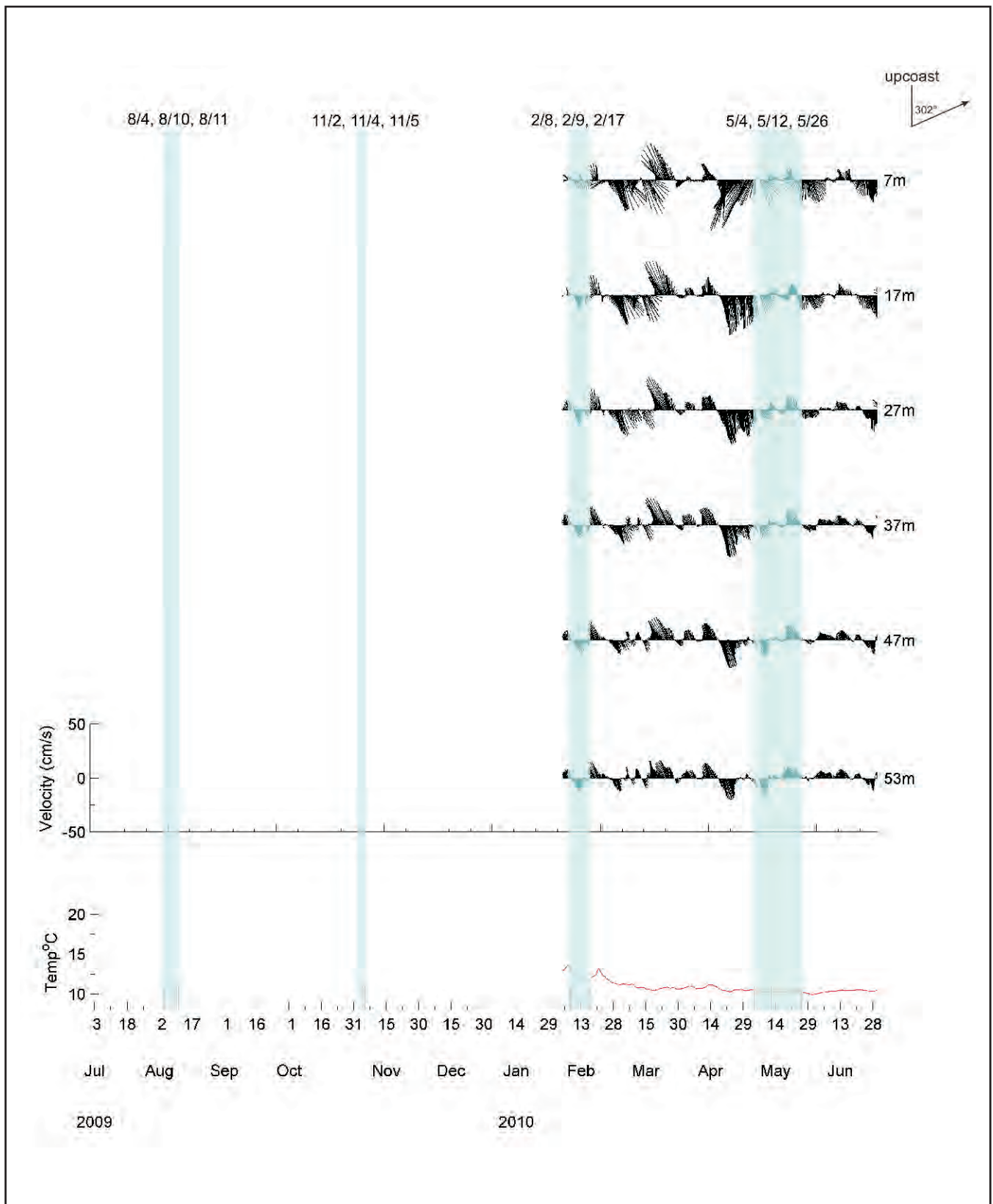


Figure B-1. Bottom temperature (°C) and current speed (cm/s) and direction by depth for mooring M-18, July 2009–June 2010. Blue lines denote water quality sampling events.

Orange County Sanitation District, California.

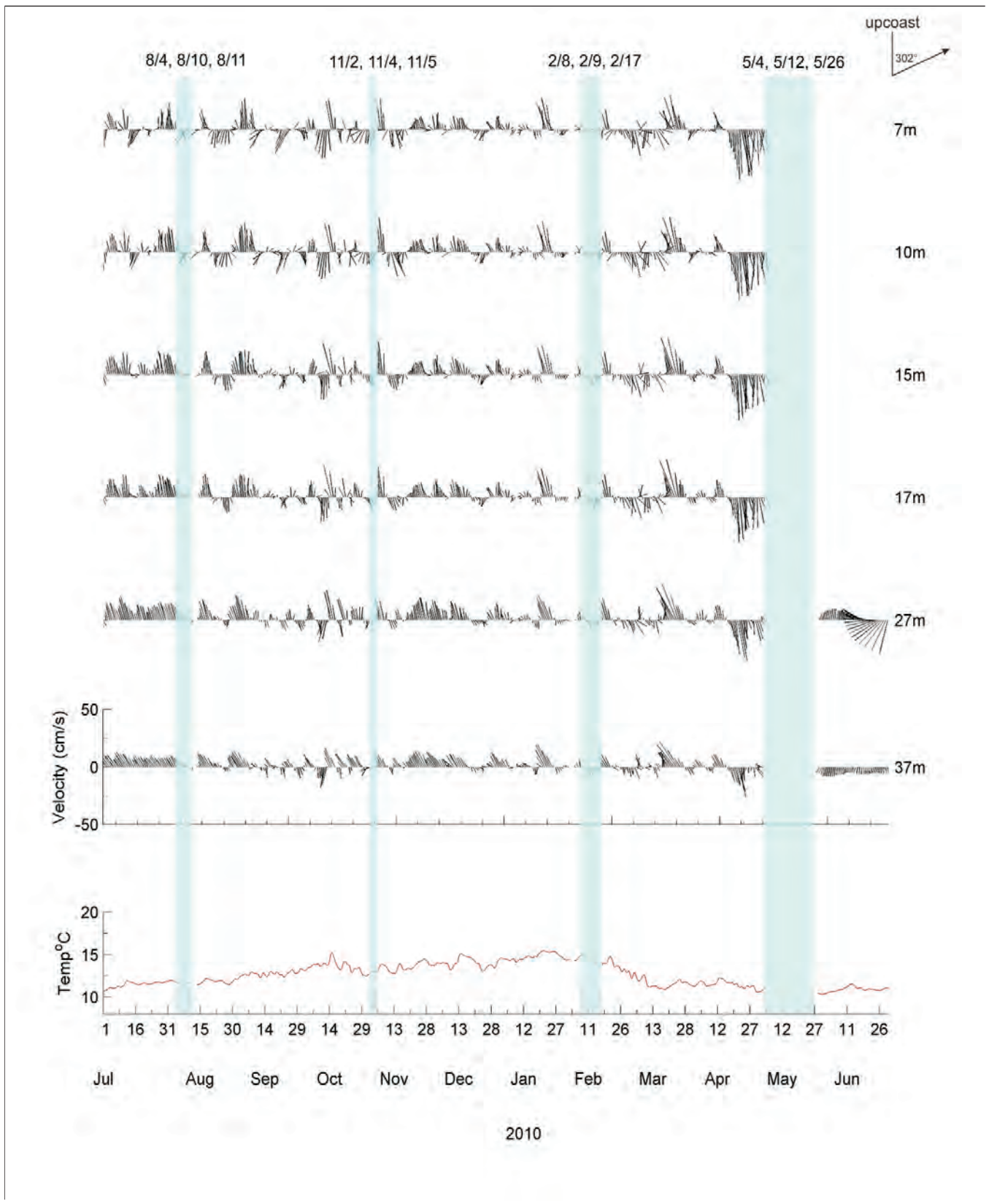


Figure B-2. Bottom temperature (°C) and current speed (cm/s) and direction by depth for mooring M19, July 2009–June 2010. Blue lines denote water quality sampling events.

Orange County Sanitation District, California.

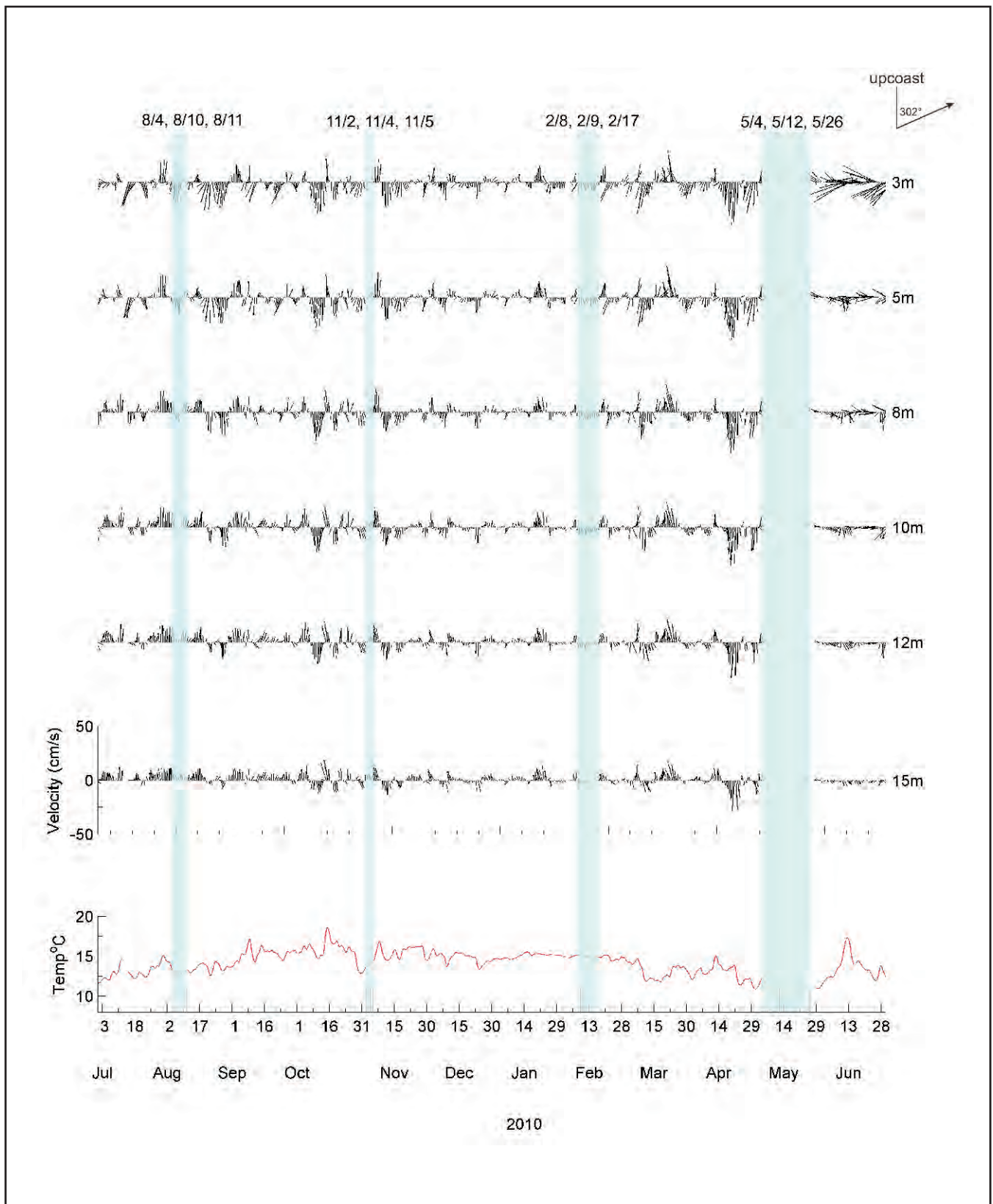


Figure B-3. Bottom temperature (°C) and current speed (cm/s) and direction by depth for mooring M-20, July 2009–June 2010. Blue lines denote water quality sampling events.

Orange County Sanitation District, California.

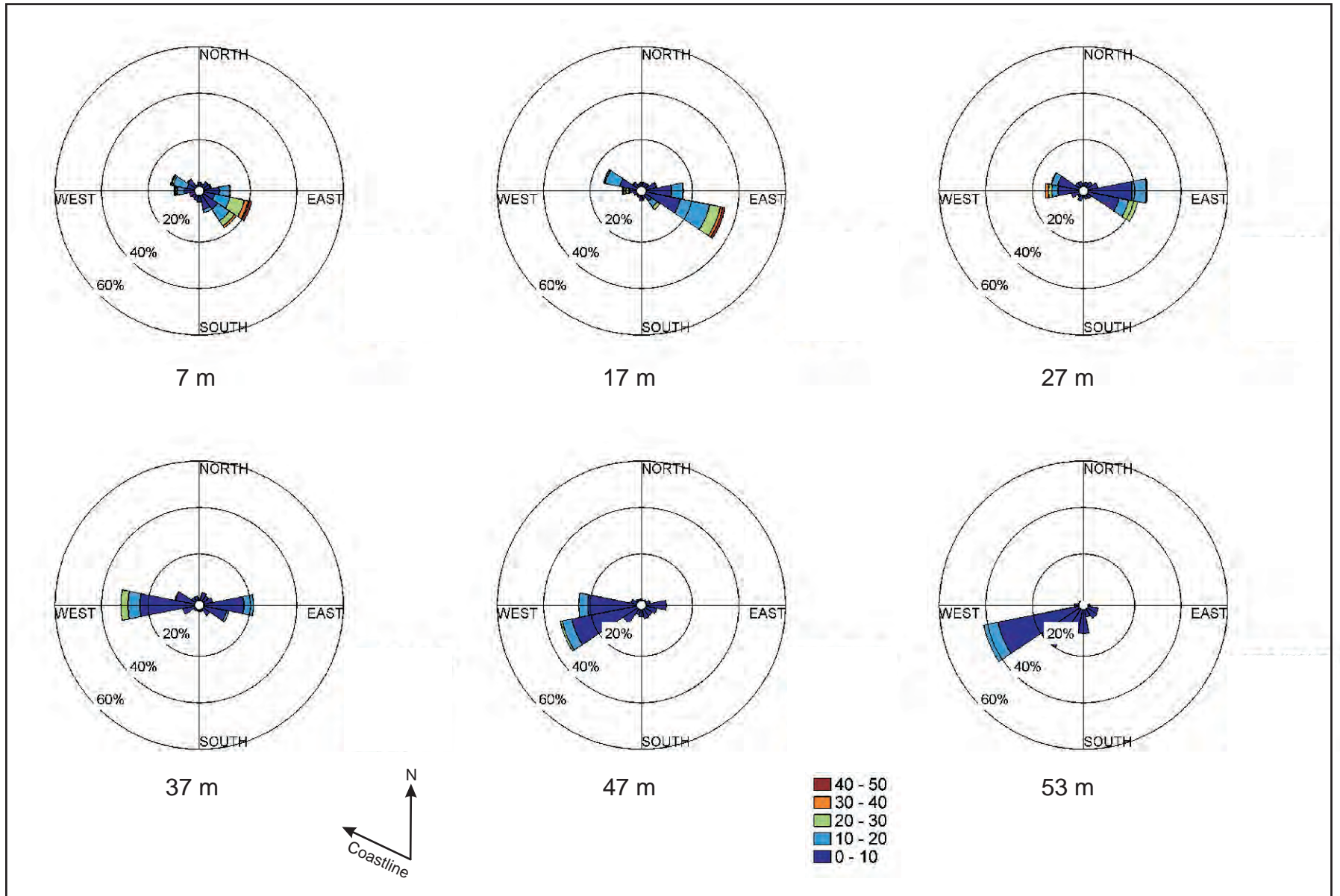


Figure B-4. Average current speed (cm/s) and direction by depth for mooring M-18, July 2009–June 2010.

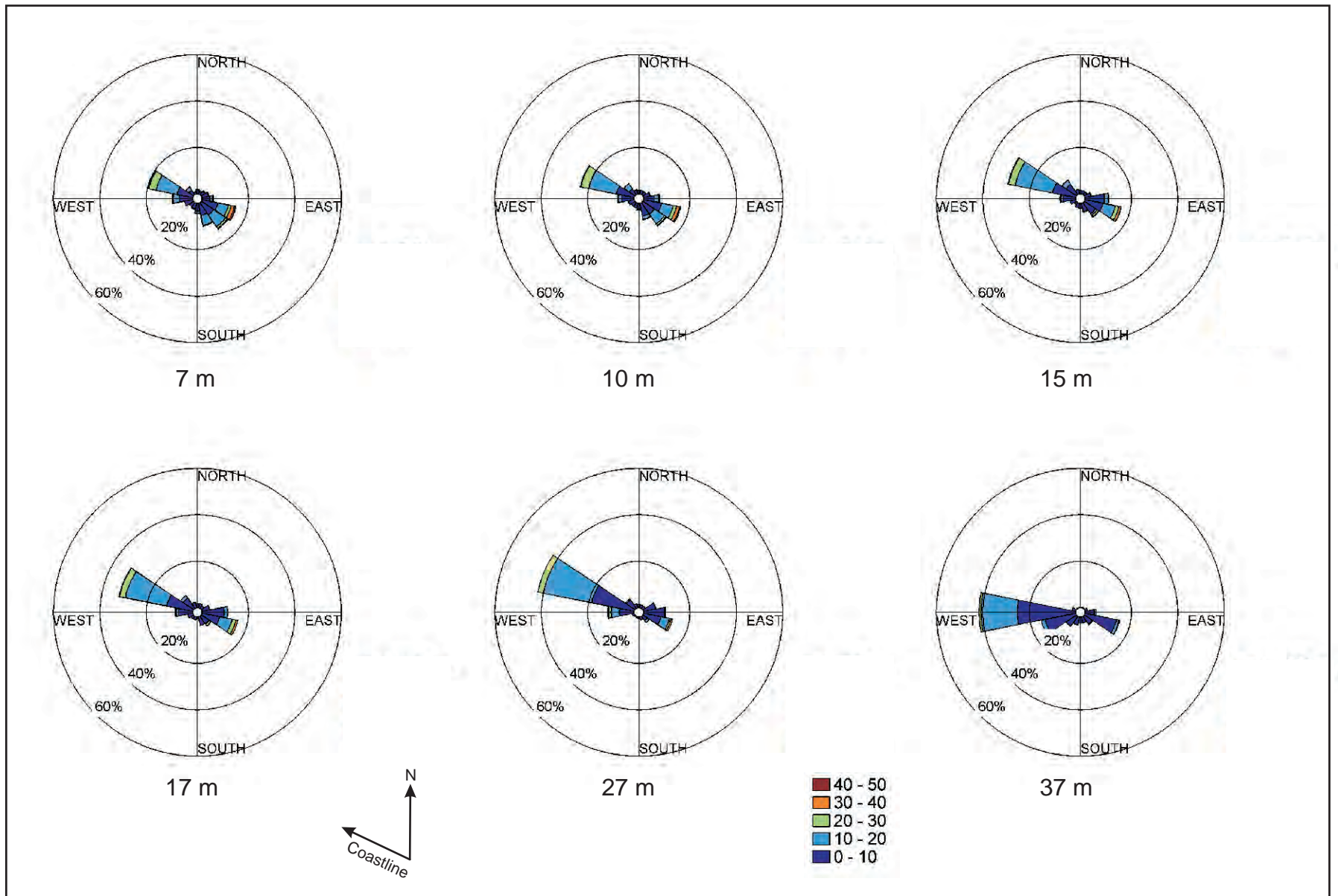


Figure B-5. Average current speed (cm/s) and direction by depth for mooring M-19, July 2009–June 2010.

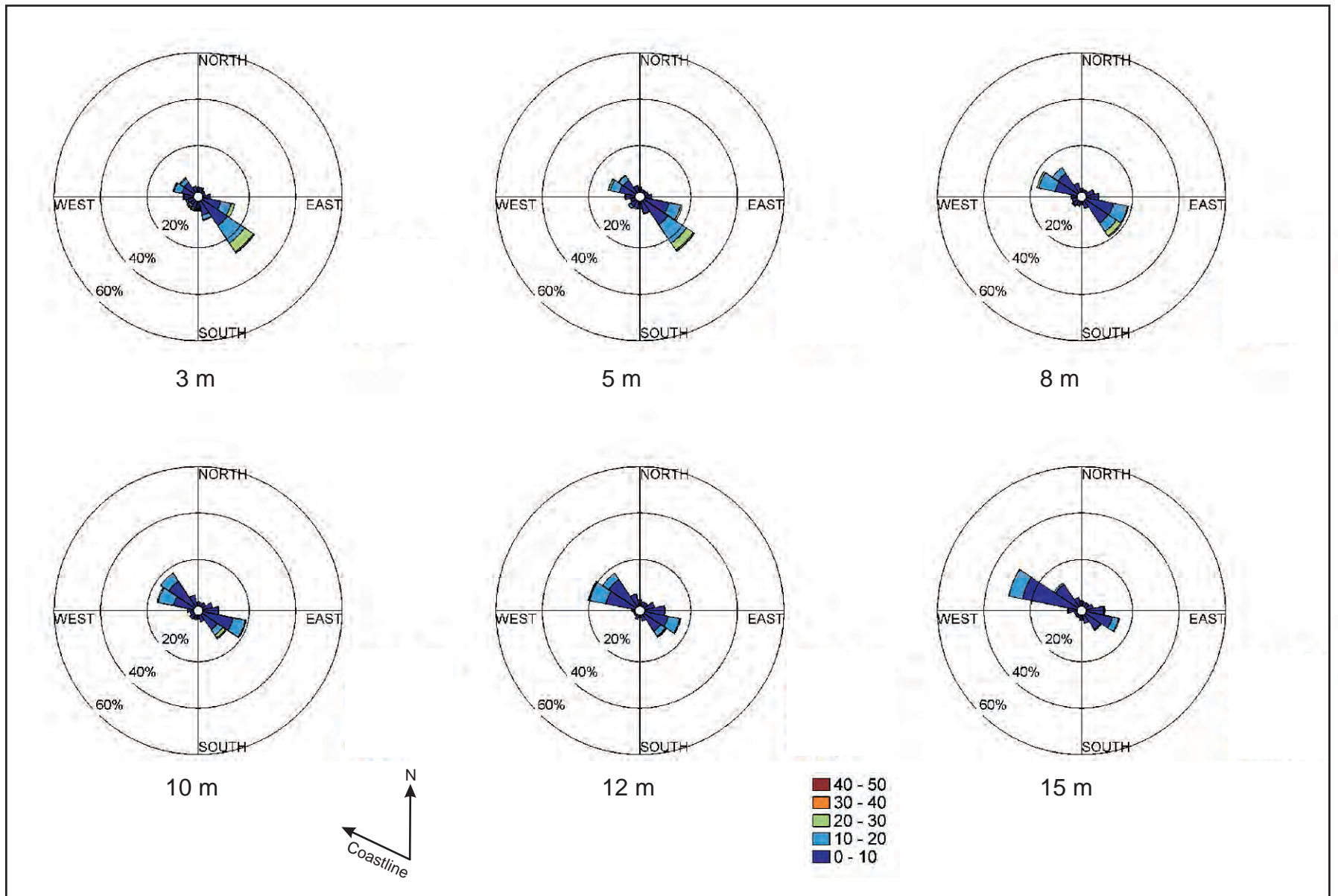


Figure B-6. Average current speed (cm/s) and direction by depth for mooring M-20, July 2009–June 2010. Current speed in cm/s.

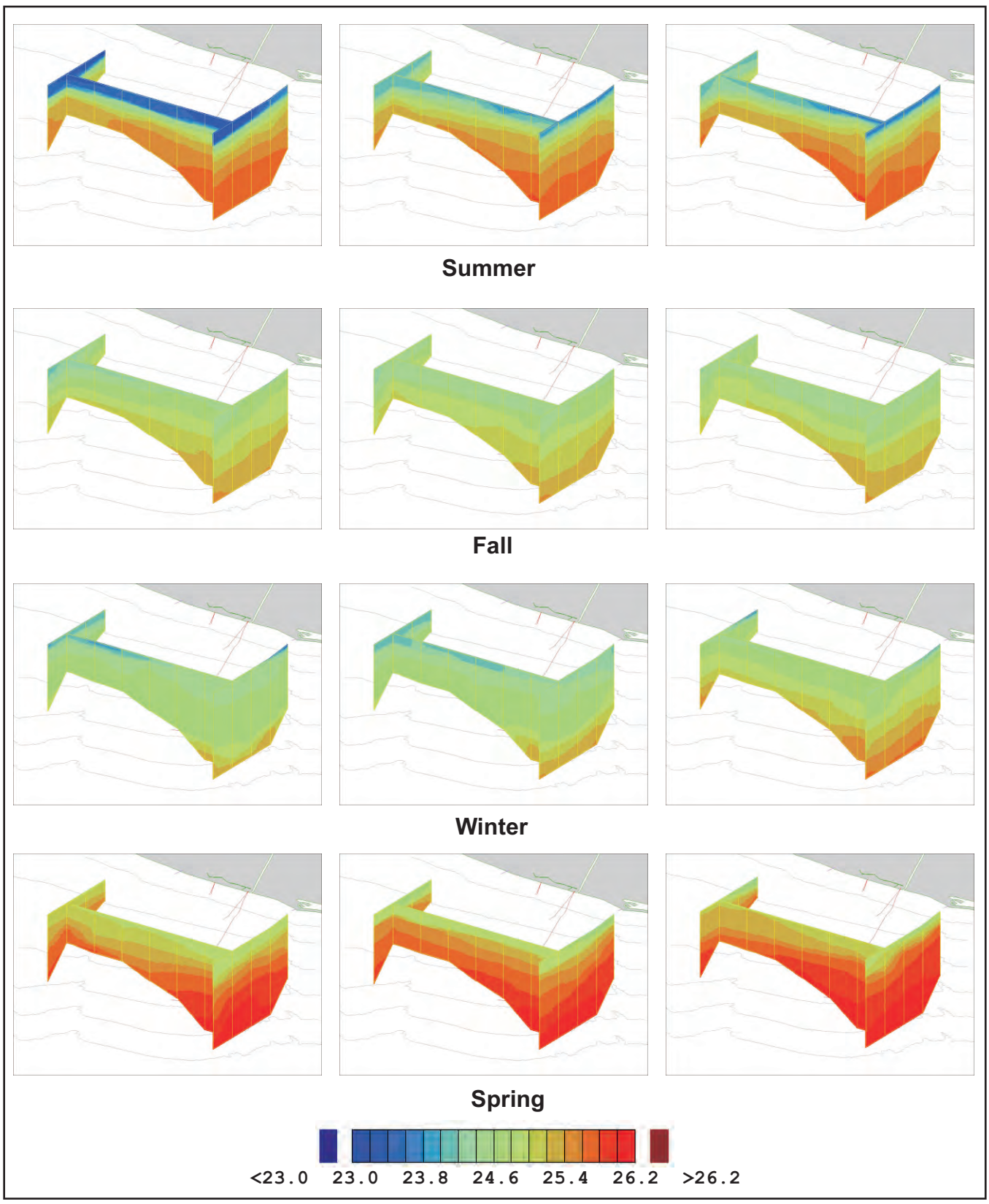


Figure B-7. Seasonal patterns of density (kg/m^3) for summer (August 4, 10, 11, 2009), fall (November 2, 4, 5, 2009), winter (February 8, 9, 17, 2010), and spring (May 4, 12, 26, 2010).

Orange County Sanitation District, California.

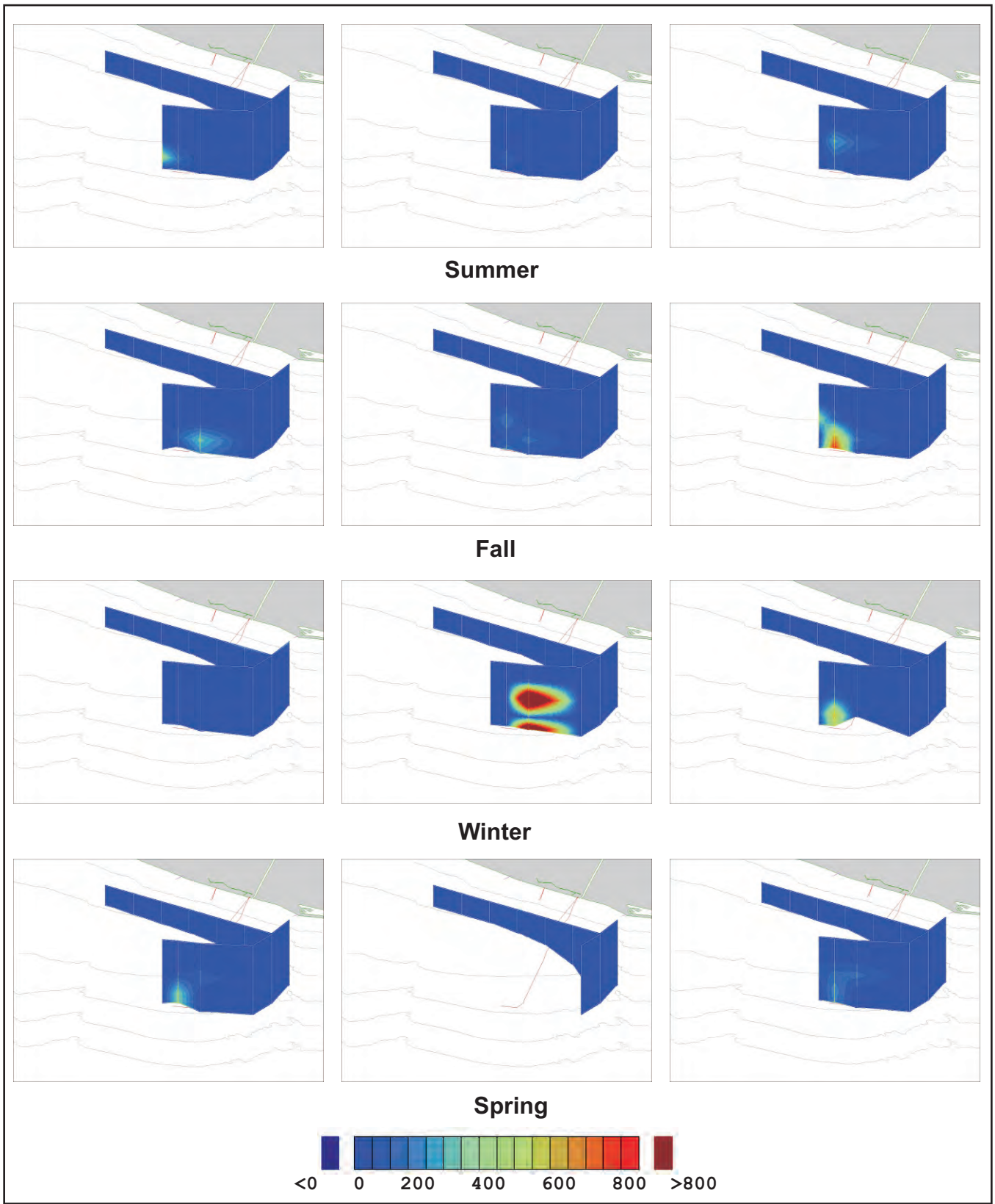


Figure B-8. Seasonal patterns of fecal coliforms (MPN/100mL) for Summer 2009 (August 4, 10, 11), Fall 2009 (November 2, 4, 5), Winter 2010 (February 8, 9, 17), and Spring 2010 (May 4, 12, 26).

Orange County Sanitation District, California.

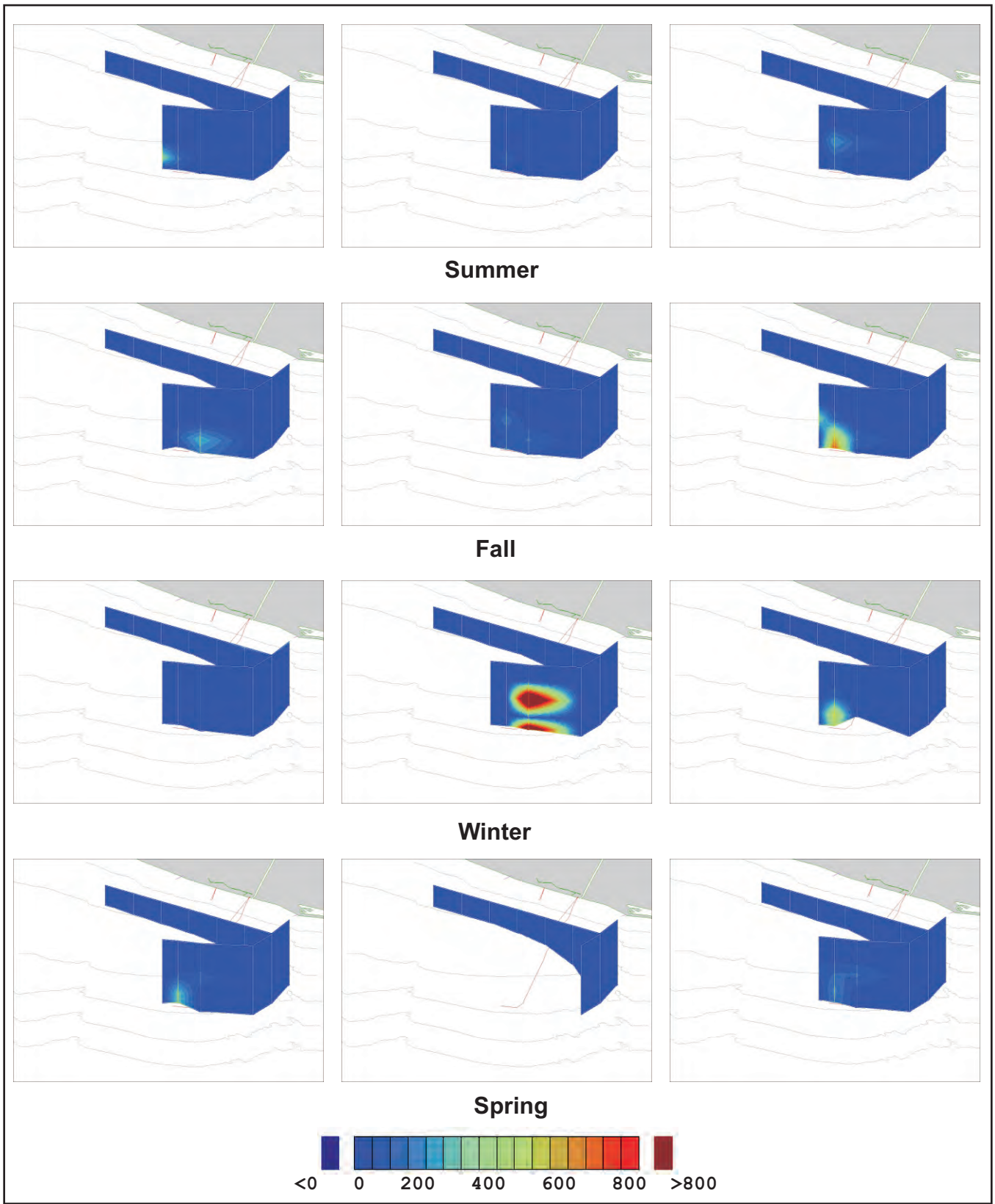


Figure B-9. Seasonal patterns of *Escherichia coli* (MPN/100mL) for Summer 2009 (August 4, 10, 11), Fall 2009 (November 2, 4, 5), Winter 2010 (February 8, 9, 17), and Spring 2010 (May 4, 12, 26).

Orange County Sanitation District, California.

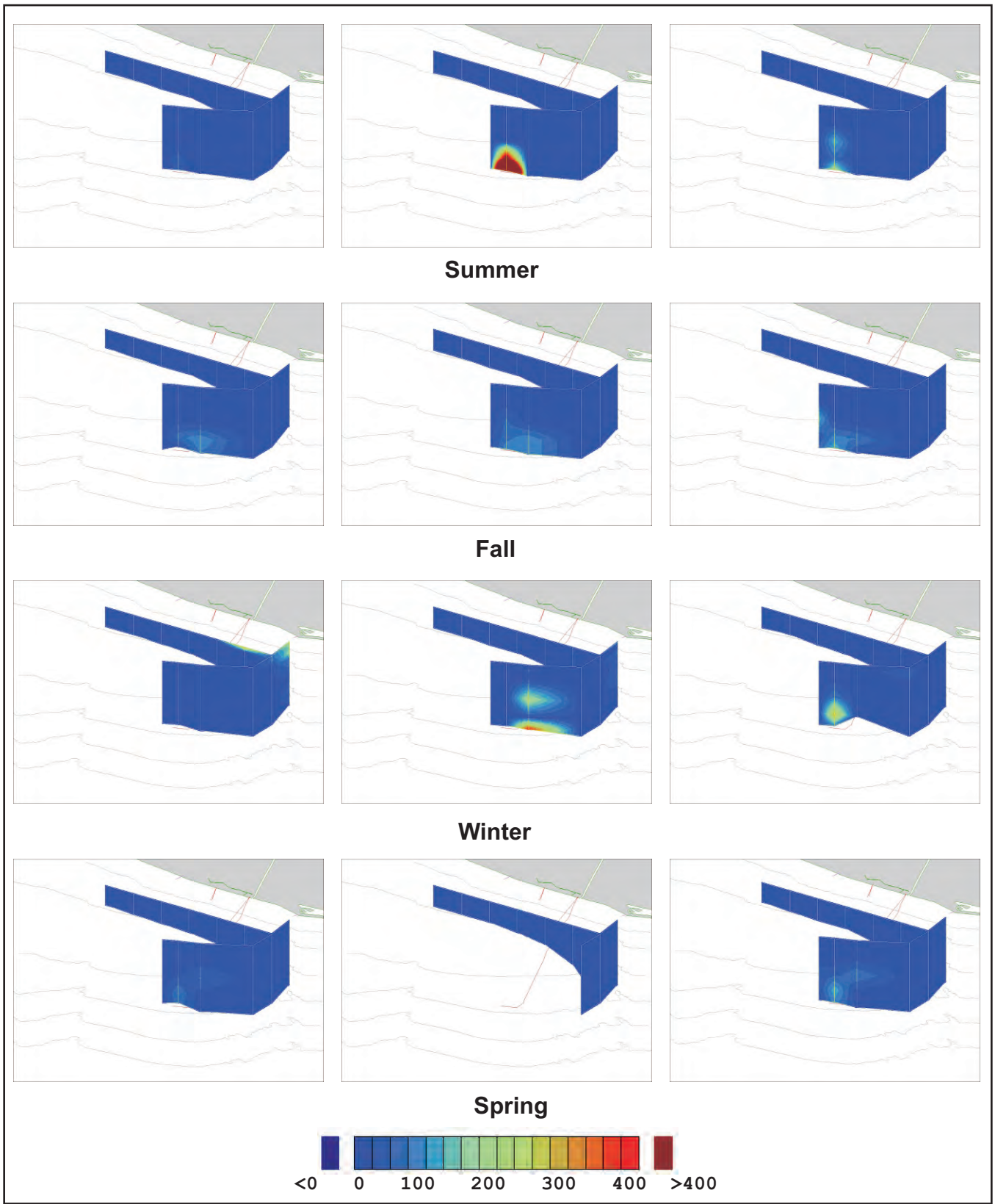


Figure B-10. Seasonal patterns of enterococcus (MPN/100mL) for Summer 2009 (August 4, 10, 11), Fall 2009 (November 2, 4, 5), Winter 2010 (February 8, 9, 17), and Spring 2010 (May 4, 12, 26).

Orange County Sanitation District, California.

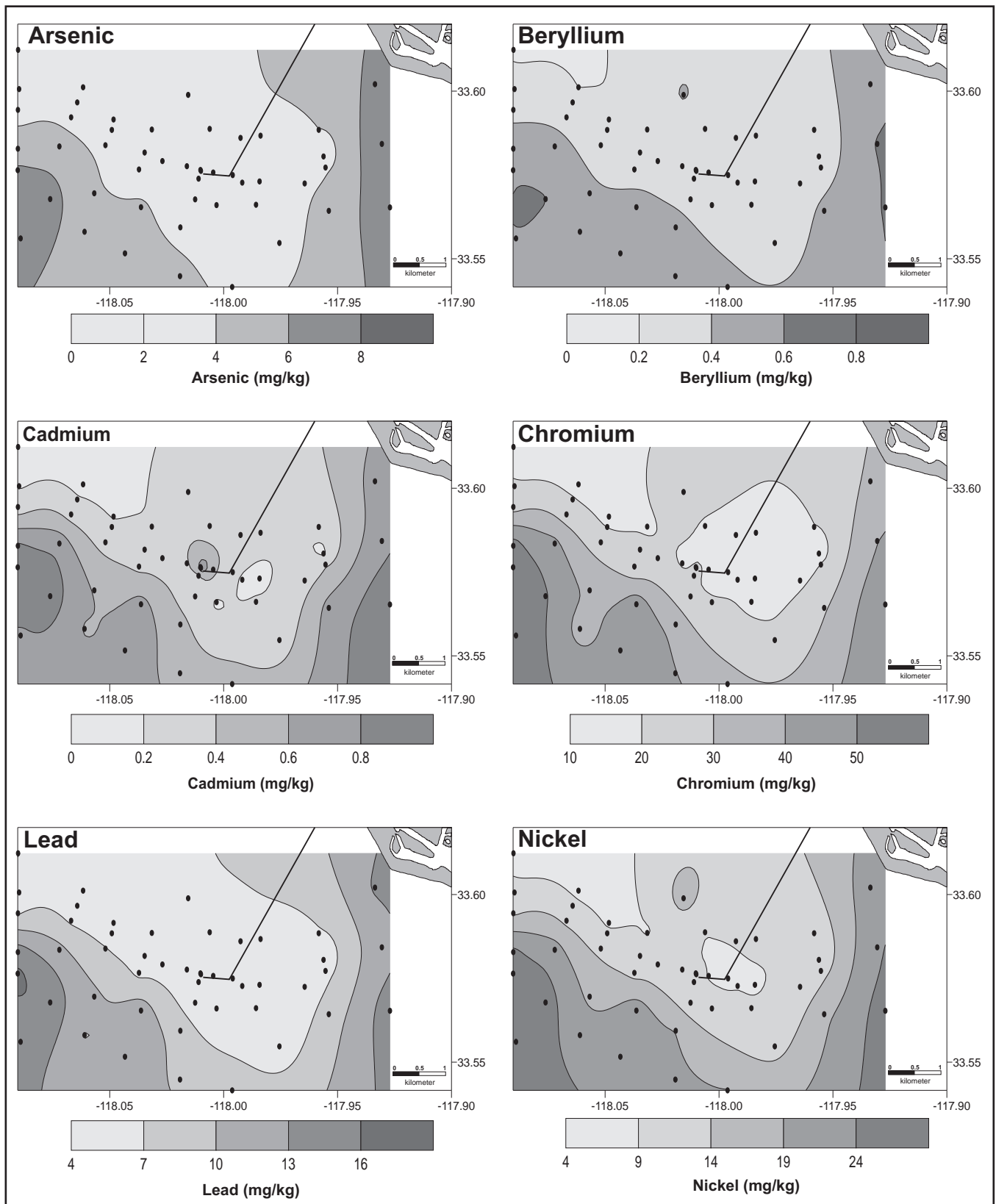


Figure B-11. Spatial distributions of Group A and Group B metals concentrations (mg/kg) in sediments during July 2009. Group A metals included arsenic, beryllium, chromium, lead, nickel, selenium, and zinc. Group B included cadmium and silver.

Orange County Sanitation District, California.

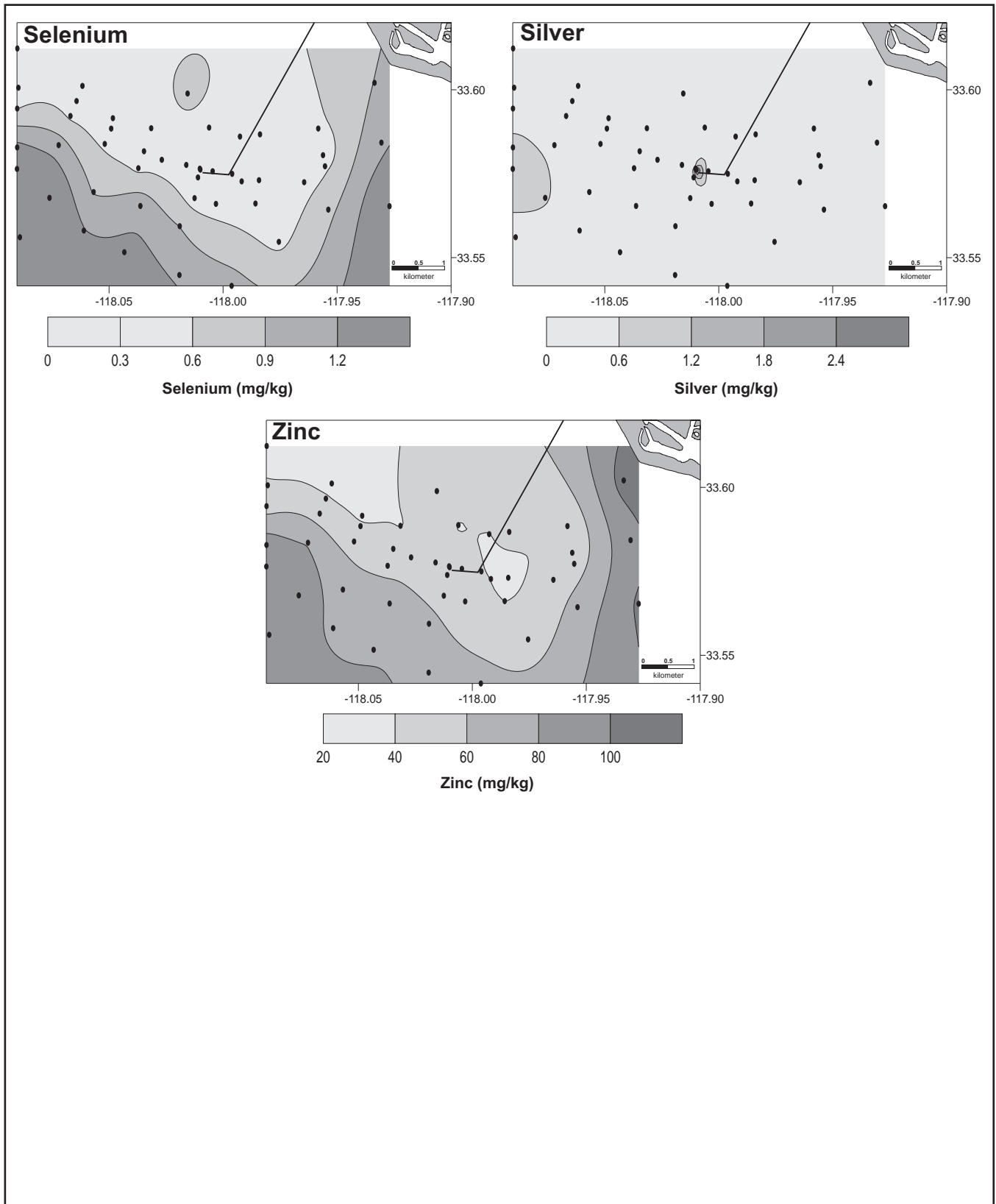


Figure B-11 continued.