

appendix B

SUPPORTING DATA

Table B-1. Comparison of surfzone total coliform bacterial data to the 30-day median California Ocean Plan benchmark, July 2010 through June 2011.

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						
2010																							
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	8	0	0	0	0	0	0	0	0	0	0	0	0	8	527	1.5
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	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	510	1.2
December	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0
2011																							
January	0	0	0	0	7	0	0	20	21	21	22	15	0	0	0	0	0	0	0	0	106	527	20.1
February	0	0	0	0	0	0	0	2	9	9	8	0	0	0	0	0	0	0	0	0	28	476	5.9
March	0	0	0	0	0	0	2	0	26	19	2	0	0	0	0	0	0	0	0	0	49	527	9.3
April	0	0	0	0	1	4	6	0	0	1	5	0	2	0	0	0	0	0	0	0	19	510	3.7
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	0	6	0	8	4	8	30	56	50	37	15	2	0	0	0	0	0	0	0	216	6205	3.5

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 2010 through June 2011.

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					
2010																						
July	0	0	0	0	0	0	22	6	0	0	0	0	0	0	0	0	0	28	527	5.3		
August	0	0	0	0	0	0	14	31	0	0	0	0	0	0	0	0	0	45	527	8.5		
September	0	0	0	0	0	0	0	23	0	0	0	0	0	0	0	0	0	23	510	4.5		
October	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	510	0.0		
December	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	527	0.0		
2011																						
January	0	0	0	0	0	0	0	20	21	21	18	10	0	0	0	0	0	90	527	17.1		
February	0	0	0	0	0	0	0	5	20	16	12	0	0	0	0	0	0	53	476	11.1		
March	0	0	0	0	0	0	0	2	28	18	3	5	0	0	0	0	0	56	527	10.6		
April	0	0	0	0	0	0	0	0	0	0	0	1	1	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	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	0	0	0	0	0	36	87	69	55	33	16	1	0	0	0	0	297	6205	4.8		

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 2010 through June 2011.

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					
2010																						
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
2011																						
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	0.0

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 2010 through June 2011.

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					
2010																						
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
2011																						
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 2010 through June 2011.

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						
2010																							
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	20	0	0	0	0	0	0	0	0	0	0	0	0	20	527	3.8
September	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	8	510	1.6
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	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17	510	3.3
December	0	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	527	3.6
2011																							
January	0	2	6	0	3	0	2	9	20	13	0	0	0	0	0	0	0	0	0	0	55	527	10.4
February	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	3	476	0.6
March	0	0	30	0	7	0	0	0	26	5	0	0	0	0	0	0	0	0	0	0	68	527	12.9
April	0	0	16	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	19	510	3.7
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	88	0	12	0	2	37	50	18	0	0	0	0	0	0	0	0	0	0	209	6205	3.4

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 2010 through June 2011.

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						
2010																							
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	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	1	0	0	0	0	0	0	0	0	0	0	0	0	1	527	0.2
2011																							
January	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0	0	0	0	0	0	22	527	4.2
February	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	476	0.4
March	0	0	31	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	40	527	7.6
April	0	0	30	8	0	0	0	0	30	0	0	0	0	0	0	0	0	0	0	0	68	510	13.3
May	0	0	31	0	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	0	40	527	7.6
June	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	510	1.4
Annual Totals																							
Totals	0	0	101	8	0	0	0	23	48	0	0	0	0	0	0	0	0	0	0	0	180	6205	2.9

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 2010 through June 2011.

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
	07/15/10	08/3/10	08/10/10	08/11/10	08/12/10			
C2	13	<10	<10	<10	<10	<10	Yes	Yes
2103	40	13	<10	<10	<10	12	Yes	Yes
2104	21	14	<10	<10	<10	11	Yes	Yes
2183	23	13	<10	<10	<10	10	Yes	Yes
2203	14	<10	<10	11	<10	<10	Yes	Yes
2223	14	<10	<10	<10	<10	<10	Yes	Yes
2303	<10	<10	13	<10	<10	<10	Yes	Yes
2351	<10	<10	<10	<10	<10	<10	Yes	Yes
2403	<10	<10	<10	17	<10	<10	Yes	Yes
	10/21/10	10/26/10	10/27/10	11/2/10	11/4/10			
C2	32	27	11	<10	<10	14	Yes	Yes
2103	<10	25	17	<10	10	12	Yes	Yes
2104	10	13	<10	<10	<10	<10	Yes	Yes
2183	10	15	<10	<10	12	10	Yes	Yes
2203	18	11	<10	<10	<10	<10	Yes	Yes
2223	16	<10	<10	<10	<10	<10	Yes	Yes
2303	47	<10	<10	<10	<10	11	Yes	Yes
2351	41	<10	<10	<10	11	11	Yes	Yes
2403	<10	<10	<10	19	<10	<10	Yes	Yes
	01/26/11	01/27/11	02/01/11	02/02/11	02/08/11			
C2	<10	<10	16	<10	11	<10	Yes	Yes
2103	<10	<10	12	<10	<10	<10	Yes	Yes
2104	<10	<10	12	<10	13	<10	Yes	Yes
2183	<10	11	<10	<10	<10	<10	Yes	Yes
2203	<10	<10	<10	18	<10	<10	Yes	Yes
2223	<10	<10	<10	16	<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
	04/26/11	04/27/11	05/03/11	05/04/11	05/10/11			
C2	11	<10	11	11	<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	16	12	<10	<10	Yes	Yes
2203	<10	<10	11	<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

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 2010 through June 2011.

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
	07/15/10	08/3/10	08/10/10	08/11/10	08/12/10			
C2	<10	<10	<10	<10	<10	<10	Yes	Yes
2103	14	<10	<10	<10	<10	<10	Yes	Yes
2104	11	<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
	10/21/10	10/26/10	10/27/10	11/2/10	11/4/10			
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	12	<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
	01/26/11	01/27/11	02/01/11	02/02/11	02/08/11			
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
	04/26/11	04/27/11	05/03/11	05/04/11	05/10/11			
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 2010 through June 2011.

Orange County Sanitation District, California.

Station	Date					Geometric Mean	Comment
	07/15/10	08/3/10	08/10/10	08/11/10	08/12/10		
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	
	10/21/10	10/26/10	10/27/10	11/2/10	11/4/10		
C2	<10	<10	<10	<10	<10	<10	MONITORING ONLY. No offshore zone compliance limits apply at this time
2103	13	<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	15	<10	<10	<10	<10	<10	
2351	<10	<10	<10	<10	<10	<10	
2403	<10	<10	<10	<10	<10	<10	
	01/26/11	01/27/11	02/01/11	02/02/11	02/08/11		
C2	11	<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	11	<10	<10	<10	<10	
2303	11	<10	<10	<10	<10	<10	
2351	<10	<10	<10	<10	<10	<10	
2403	<10	<10	<10	<10	<10	<10	
	04/26/11	04/27/11	05/03/11	05/04/11	05/10/11		
C2	<10	<10	<10	12	<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	11	<10	
2403	<10	<10	<10	<10	<10	<10	

Table B-10. Comparison of surfzone particulate grease data, July 2010 through June 2011.

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				
2010																					
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
2011																					
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 2010 through June 2011. 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	0	0	0	0	0	0	0	0	0
Biological Material (kelp)	2	2	0	1	0	2	0	0	7
NFMO ²	46	46	96	95	12	22	12	12	341
Totals	48	48	96	96	12	24	12	0	348

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 2010 through June 2011. 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	0	0	0	0	0	0
Biological Material (kelp)	0	1	0	0	0	1
NFMO ²	33	43	11	11	10	108
Totals	33	44	11	11	10	109

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 (August 2010) and winter (January 2011). 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
Scorpaenidae (Scorpionfishes)												18,371			
	<i>Sebastes semicinctus</i>			15,136	2,484		6	1	6	23	17,656		5	16	9
	<i>Sebastes saxicola</i>			287	1		14	26	159	67	554		3	15	9
	<i>Sebastes elongatus</i>		1						31	51	83		3	15	7
	<i>Scorpaena guttata</i>		1	24	2	2	6	9		1	45		14	28	19.5
	<i>Sebastes levis</i>			5					2	2	9		5	12	7
	<i>Sebastes dallii</i>			6	1	1					8		11	14	12
	<i>Sebastes miniatus</i>	2		1	1	1		2			7		8	20	11.5
	<i>Sebastes rubrivinctus</i>									2	2		8	11	9.5
	<i>Sebastes paucispinis</i>			1							1		11	11	11
	<i>Sebastes eos</i>					1					1		6	6	6
	<i>Sebastes (UI) *</i>	2				1	2				5		3	4	3
Paralichthyidae (Sand Flounders)												7,946			
	<i>Citharichthys sordidus</i>	49	143	1,086	977	466	489	783	1,659	1,770	7,422		3	27	13
	<i>Citharichthys xanthostigma</i>	102	72	7	22	20	39	52			314		6	21	16
	<i>Hippoglossina stomata</i>	3	21	13	4	8	5	19	8	3	84		5	29	16
	<i>Citharichthys stigmaeus</i>	10	65								75		4	10	7
	<i>Xystreureys liolepis</i>	1	1		45			3			50		15	22	18
	<i>Paralichthys californicus</i>			1							1		38	38	38
Synodontidae (Lizardfish)												4,459			
	<i>Synodus lucioceps</i>	793	902	117	154	855	855	737	5	41	4,459		9	32	14
Cottidae (Sculpins)												4,277			
	<i>Icelinus quadriseriatus</i>	135	312	907	79	652	578	1,287	1		3,951		4	8	7
	<i>Chitonotus pugetensis</i>	22	27	113	8	14	33	108		1	326		6	13	9

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
Pleuronectidae (Righteye flounders)												2,621			
	<i>Parophrys vetulus</i>	1	3	11	1,002	67	155	192	13	3	1,447		9	46	19
	<i>Lyopsetta exilis</i>								184	411	595		3	18	13
	<i>Pleuronichthys verticalis</i>	12	13	35	121	15	42	55	4	2	299		5	27	16
	<i>Microstomus pacificus</i>			31	1	12	7	3	97	120	271		5	25	11
	<i>Pleuronichthys decurrens</i>			2	1			1			4		14	17	15
	<i>Eopsetta jordani</i>				1					1	2		19	23	21
	<i>Pleuronichthys guttulatus</i>				2						2		21	21	21
	<i>Glyptocephalus zachirus</i>								1		1		15	15	15
Hexagrammidae (Greenlings)												2,491			
	<i>Zaniolepis latipinnis</i>	21	10	320	221	688	620	262	26	13			6	16	11
	<i>Zaniolepis frenata</i>			58		6	5		125	109			3	18	13
	<i>Ophiodon elongatus</i>			4	1			2					13	26	20
Soleidae (Soles)												574			
	<i>Symphurus atricaudus</i>	37	33	33	277	67	63	63	1		574		9	19	14
Embiotocidae (Surfperches)												406			
	<i>Zalembeius rosaceus</i>	35	48	51	35	72	86	74	3	2	406		3	20	10
Zoarcidae (Eelpouts)												164			
	<i>Lycodes pacificus</i>								81	81	162		5	27	19
	<i>Lyconema barbatum</i>									2	2		13	13	13
Batrachoididae (Toadfishes)												120			
	<i>Porichthys notatus</i>	1		29		19	36	15	10	8	118		8	23	15
	<i>Porichthys myriaster</i>	1	1								2		22	29	25.5
Agonidae (Poachers)												64			
	<i>Odontopyxis trispinosa</i>	2	5	2	15	13	4	14	1		56		5	14	8
	<i>Agonopsis sterletus</i>			4					2	2	8		9	15	14

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
Rajidae (Skates)											27				
	<i>Raja inornata</i>	6	9	2			3	7			27		18	59	40
Ophidiidae (Cusk-eels)											18				
	<i>Chilara taylori</i>				3	1			1	13	18		13	23	17
Argentinidae (Argentines)											5		4	8	5.5
	<i>Argentina sialis</i>									5	5				
Sciaenidae (Drums)											5		17	19	17
	<i>Genyonemus lineatus</i>			1		2			2		5				
Gadidae (Cods)											4		21	31	22.5
	<i>Merluccius productus</i>								1	3	4				
Stichaeidae (Pricklebacks)											4		9	12	11.5
	<i>Plectobranchnus evides</i>									4	4				
Gobiidae (Gobies)											3		4	6	5
	<i>Rhinogobiops nicholsii</i>	2					1				3				
Malacanthidae (Tilefishes)											3		4	4	4
	<i>Caulolatilus princeps</i>						3				3				
Moridae (Codlings)											3		15	15	15
	<i>Physiculus rastrelliger</i>									3	3				
Bathymasteridae (Ronquils)											1		19	19	19
	<i>Rathbunella alleni</i>			1							1				
Syngnathidae (Pipefish)											1		19	19	19
	<i>Syngnathus exilis</i>									1	1				
	Total Abundance	1,237	1,667	18,288	5,458	2,983	3,052	3,715	2,423	2,744	41,567				
	Total No. of Species	20	18	29	24	21	21	22	24	28	49				

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

UI = Unidentified

* Unidentified species were not included in the total number of species calculations.

Table B-14. Mean community indices and diversity indices values for demersal fish by station and season for the summer (August 2010) and winter (January 2011) surveys.

Orange County Sanitation District, California.

B.15

Station	n	# of Species		Abundance		Biomass		H'		Margalef's SR		DOM75	
		Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range
Summer													
T2	2	13	11–14	339	255–423	5.9	3.7–8.1	1.42	1.33–1.52	2.06	1.80–2.32	3	2–3
T6	2	14	12–15	494	277–711	10.1	6.2–14	1.46	1.15–1.77	2.04	1.96–2.13	3	2–4
T3	3	20	19–22	839	654–960	19.4	17.3–23.0	1.86	1.81–1.95	2.84	2.62–3.24	4	3–4
T1	3	14	12–17	424	385–469	24.9	20.4–29.6	1.82	1.77–1.88	2.15	1.82–2.69	4	4
T12	3	13	13–14	533	192–850	11.2	5.3–16.6	1.72	1.64–1.82	2.05	1.78–2.47	3	3
T13	3	16	15–18	589	230–885	13.9	6.1–20.1	1.91	1.81–2.05	2.51	2.32–2.65	4	3–5
T11	3	15	13–16	728	667–786	17.0	15.5–18.7	1.70	1.6–1.87	2.08	1.80–2.31	3	3–4
T10	2	16	15–17	821	333–1,309	14.8	7.1–22.5	1.06	0.99–1.13	2.32	2.23–2.41	2	1–2
T14	2	21	20–22	1159	1,077–1,241	15.9	15.6–16.2	1.31	1.09–1.54	2.84	2.67–3.01	2	1–2
Mean		15.7		658.3		14.8		1.59		2.32		3	2–3
Winter													
T2	2	11	11–11	280	268–291	7.4	6.6–8.2	1.18	1.09–1.28	1.78	1.76–1.79	2	2
T6	2	12	11–13	340	293–386	5.7	4.7–6.7	1.45	1.41–1.49	1.89	1.76–2.01	2	2
T3	3	17	16–18	5257	1,145–12,274	54.6	13.0–135.6	0.43	0.14–0.67	1.97	1.59–2.19	1	1
T1	3	12	11–14	1395	448–3,227	43.9	22.9–78.7	1.35	0.91–1.64	1.67	1.61–1.76	2	1–3
T12	3	15	14–16	462	201–618	8.6	4.4–11.2	1.69	1.6–1.77	2.28	2.02–2.45	3	3–4
T13	3	14	13–16	429	368–538	11.7	8.7–15.4	1.71	1.55–1.82	2.21	2.03–2.53	3	3–4
T11	3	13	11–15	511	432–566	12.4	11.4–13.6	1.85	1.77–1.9	1.93	1.59–2.21	4	3–4
T10	2	15	11–18	391	308–473	8.4	6.0–10.8	1.62	1.61–1.62	2.25	1.75–2.76	3	3
T14	2	12	11–12	213	166–260	2.6	2.5–2.6	1.19	0.92–1.46	1.98	1.80–2.15	2	1–3
Mean		13.3		1030.7		17.3		1.39		1.99		2	

Table B-15. Total abundance of epibenthic macroinvertebrates by species and station sampled in summer (August 2010) and winter (January 2011).

Orange County Sanitation District, California.

Species	Inner Shelf		Middle Shelf					Outer Shelf		Total	
	depth station replicate	36 m		60 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>	61	10	38		54	50	19	415	804	1,451	
<i>Lytechinus pictus</i>	6	514	149	16	3	9	26	4	6	733	
<i>Thesea</i> sp	102	196	12	55	61	34	92		1	553	
<i>Ophiura luetkenii</i>	1	122	48	2	36	86	93	3	2	393	
<i>Hamatoscalpellum californicum</i>	74	38	5		34	8	109			268	
<i>Pleurobranchaea californica</i>	4	28	24	17	47	43	42	13	3	221	
<i>Astropecten verrilli</i>	14	11	4	158	3	11	4		2	207	
<i>Ophiothrix spiculata</i>	1	13	4		95	34	1		3	151	
<i>Luidia foliolata</i>		2	14	21	19	25	24	12	9	126	
<i>Acanthoptilum</i> sp	8	2		66				2	2	80	
<i>Parastichopus californicus</i>		2	41	11	4	6	2			66	
<i>Acanthodoris brunnea</i>	1		2	25	2		15	2	3	50	
<i>Neocrangon zacaе</i>						1		3	38	42	
<i>Luidia asthenosoma</i>	1	1	7	1	7	12	9		3	41	
<i>Octopus rubescens</i>	1	7	8		7	4		3	8	38	
<i>Heterogorgia</i> sp	4	1			4	3	1			13	
<i>Tritonia diomedea</i>			2	8						10	
<i>Amphichondrius granulatus</i>			7			1	1			9	
<i>Megasurcula carpenteriana</i>	2		5			1	1			9	
<i>Cancellaria crawfordiana</i>						1		5	2	8	
<i>Loxorhynchus crispatus</i>	1	2	2			1	1			7	
<i>Sicyonia penicillata</i>	1	5				1				7	
<i>Calliostoma turbinum</i>			1		1	1	2			5	
<i>Neocrangon resima</i>								1	4	5	
<i>Podochela hemphillii</i>		4	1							5	
<i>Rossia pacifica</i>								1	4	5	
Tunicate		1			1		3			5	

Table B-15 continues.

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>Baptodoris mimetica</i>	1			1			2			4	
<i>Philine auriformis</i>	1	1			1			1		4	
<i>Stylatula elongata</i>	4									4	
<i>Crangon alaskensis</i>							3			3	
<i>Heterocrypta occidentalis</i>		2								2	
<i>Metacarcinus anthonyi</i>	1		1							2	
<i>Peltodoris nobilis</i>			1	1						2	
<i>Pisaster brevispinus</i>	1	1								2	
<i>Platymera gaudichaudii</i>			1			1				2	
<i>Podochela lobifrons</i>			1						1	2	
Silicea								2		2	
<i>Spatangus californicus</i>								2		2	
<i>Amphioda psara</i>					1					1	
<i>Antiplanes catalinae</i>								1		1	
<i>Aphrodita japonica</i>									1	1	
<i>Barbarofusus barbarendis</i>			1							1	
<i>Boreotrophon bentleyi</i>								1		1	
<i>Crossata californica</i>							1			1	
<i>Diaulula sandiegensis</i>		1								1	
<i>Doryteuthis opalescens</i>					1					1	
<i>Loxorhynchus grandis</i>							1			1	
<i>Octopus californicus</i>									1	1	
<i>Paguristes turgidus</i>			1							1	
<i>Pagurus spilocarpus</i>			1							1	
<i>Pandalus platyceros</i>	1									1	
<i>Pinnixa</i> sp							1			1	
<i>Pteropurpura macroptera</i>			1							1	
<i>Strongylocentrotus</i> sp					1					1	
<i>Triopha catalinae</i>						1				1	
Total Abundance	291	964	382	382	382	334	453	471	897	4,556	
Total No. of Species	22	22	27	13	20	22	23	17	19	56	

Table B-16. Mean community indices and diversity indices values for epibenthic macroinvertebrates by station and season for the summer (August 2010) and winter (January 2011) surveys.

Orange County Sanitation District, California.

B.18

Station	n	# of Species		Abundance		Biomass		H'		Margalef's SR		DOM75	
		Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range
Summer													
T2	2	13	11–14	73	69–76	0.6	0.15–0.98	1.64	1.61–1.67	2.69	2.31–3.07	3	3
T6	2	14	13–14	150	149–150	0.8	0.74–0.79	1.55	1.53–1.57	2.50	2.40–2.59	3	3
T3	3	14	13–15	88	60–105	8.8	2.77–12.07	1.92	1.68–2.28	2.87	2.58–3.42	4	3–5
T1	3	8	7–10	89	82–101	3.1	1.69–4.23	1.55	1.51–1.60	1.64	1.30–2.04	3	3
T12	3	10	6–14	56	35–90	0.9	0.19–2.00	1.83	1.56–2.16	2.14	1.41–2.89	4	3–5
T13	3	10	6–13	53	31–77	1.3	0.29–2.05	1.83	1.36–2.10	2.34	1.46–2.80	4	2–6
T11	3	13	10–14	92	43–140	1.9	0.57–4.45	2.08	1.89–2.23	2.72	1.82–3.46	5	4–6
T10	2	10	8–11	131	21–241	2.7	0.37–5.10	1.05	0.31–1.79	2.28	1.28–3.28	4	1–6
T14	2	12	11–13	370	256–483	4.6	4.27–4.98	0.48	0.45–0.51	1.89	1.62–2.16	1	1–1
Mean		11		122		2.7		1.55		2.34		3.4	
Winter													
T2	2	9	8–10	73	70–76	0.3	0.16–0.34	1.24	1.23–1.26	1.87	1.62–2.12	2	2
T6	2	11	9–13	333	316–349	0.8	0.52–1.01	1.33	1.30–1.37	1.73	1.37–2.08	3	2–3
T3	3	12	9–15	40	24–54	0.7	0.39–0.86	1.91	1.23–2.29	3.08	2.01–3.77	5	2–7
T1	3	6	6–7	39	27–49	1.0	0.27–1.68	1.48	1.40–1.52	1.47	1.36–1.54	3	3
T12	3	9	6–11	71	30–141	1.0	0.53–1.45	1.64	1.38–2.08	2.06	1.47–2.68	3	2–5
T13	3	12	8–15	58	54–66	2.2	1.96–2.63	1.87	1.49–2.36	2.62	1.75–3.49	4	3–7
T11	3	9	8–11	59	49–65	0.6	0.23–0.88	1.76	1.62–1.87	2.04	1.80–2.40	3	3–4
T10	2	10	8–11	105	103–106	2.1	1.87–2.27	0.74	0.65–0.83	1.83	1.50–2.16	1	1
T14	2	7	4–10	79	44–114	1.2	0.48–2.01	0.55	0.54–0.56	1.35	0.79–1.90	1	1
Mean		9		95		1.1		1.39		2.00		2.8	

Table B-17. Total biomass (kg) of epibenthic macroinvertebrates by species and station sampled in summer (August 2010) and winter (January 2011).

Orange County Sanitation District, California.

Species	Inner Shelf		Middle Shelf					Outer Shelf		Total	
	depth station replicate	36 m		60 m					137 m		
		T2	T6	T3	T1	T12	T13	T11	T10		T14
		4	4	6	6	6	6	6	4		4
<i>Parastichopus californicus</i>		0.925	22.690	7.015	2.140	3.275	0.880			36.925	
<i>Sicyonia ingentis</i>	0.252	0.033	0.534		0.327	0.251	0.119	4.974	9.835	16.325	
<i>Pleurobranchaea californica</i>	0.007	0.206	1.681	0.523	2.687	5.788	0.348	1.675	0.426	13.341	
<i>Luidia foliolata</i>		0.005	1.853	0.775	0.457	0.579	1.900	2.696	0.890	9.155	
<i>Loxorhynchus grandis</i>							3.995			3.995	
<i>Astropecten verrilli</i>	0.040	0.046	0.002	2.360	0.031	0.046	0.010		0.007	2.542	
<i>Tritonia diomedea</i>			0.178	1.630						1.808	
<i>Pisaster brevispinus</i>	0.765	0.565								1.330	
<i>Metacarcinus anthonyi</i>	0.250		0.895							1.145	
<i>Lytechinus pictus</i>	0.029	0.623	0.263	0.037	0.004	0.013	0.011	0.006	0.016	1.002	
<i>Octopus rubescens</i>	0.072	0.293	0.068		0.093	0.131		0.081	0.119	0.857	
<i>Thesea</i> sp	0.119	0.210	0.006	0.089	0.077	0.035	0.113		0.001	0.650	
<i>Octopus californicus</i>									0.305	0.305	
<i>Ophiura luetkenii</i>	0.001	0.065	0.031	0.002	0.021	0.060	0.081	0.003	0.002	0.266	
<i>Platymera gaudichaudii</i>			0.001			0.145				0.146	
<i>Ophiothrix spiculata</i>	0.001	0.009	0.005		0.073	0.038	0.001		0.004	0.131	
<i>Spatangus californicus</i>								0.120		0.120	
<i>Sicyonia penicillata</i>	0.024	0.050				0.019				0.093	
<i>Hamatoscalpellum californicum</i>	0.021	0.011	0.003		0.012	0.003	0.031			0.081	
<i>Megasurcula carpenteriana</i>	0.018		0.037			0.011	0.006			0.072	
<i>Aphrodita japonica</i>									0.071	0.071	
<i>Luidia asthenosoma</i>	0.002	0.006	0.009	0.001	0.007	0.022	0.011		0.003	0.061	
<i>Rossia pacifica</i>								0.025	0.018	0.043	
<i>Neocrangon zacaе</i>						0.001		0.003	0.033	0.037	
<i>Acanthodoris brunnea</i>	0.002		0.002	0.008	0.003		0.011	0.002	0.003	0.031	
<i>Acanthoptilum</i> sp	0.004	0.002		0.022				0.002	0.001	0.031	
<i>Loxorhynchus crispatus</i>	0.002	0.003	0.002			0.002	0.020			0.029	

Table B-17 continues.

Table B-17 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>Cancellaria crawfordiana</i>						0.004		0.012	0.003	0.019	
<i>Peltodoris nobilis</i>			0.012	0.001						0.013	
Tunicate		0.004			0.001		0.007			0.012	
<i>Barbarofusus barborensis</i>			0.010							0.010	
<i>Heterogorgia</i> sp	0.003	0.001			0.003	0.002	0.001			0.010	
<i>Pteropurpura macroptera</i>			0.010							0.010	
<i>Stylatula elongata</i>	0.009									0.009	
<i>Amphichondrius granulatus</i>			0.004			0.001	0.001			0.006	
<i>Philine auriformis</i>	0.002	0.001			0.002			0.001		0.006	
<i>Calliostoma turbinum</i>			0.001		0.001	0.001	0.002			0.005	
<i>Neocrangon resima</i>								0.001	0.004	0.005	
Silicea								0.005		0.005	
<i>Heterocrypta occidentalis</i>		0.004								0.004	
<i>Baptodoris mimetica</i>	0.001			0.001			0.001			0.003	
<i>Podochela hemphillii</i>		0.002	0.001							0.003	
<i>Podochela lobifrons</i>			0.002						0.001	0.003	
<i>Amphioda psara</i>					0.002					0.002	
<i>Crangon alaskensis</i>							0.002			0.002	
<i>Diaulula sandiegensis</i>		0.002								0.002	
<i>Doryteuthis opalescens</i>					0.002					0.002	
<i>Pagurus spilocarpus</i>			0.002							0.002	
<i>Pandalus platyceros</i>	0.002									0.002	
<i>Triopha catalinae</i>						0.002				0.002	
<i>Antiplanes catalinae</i>								0.001		0.001	
<i>Boreotrophon bentleyi</i>								0.001		0.001	
<i>Crossata californica</i>							0.001			0.001	
<i>Paguristes turgidus</i>			0.001							0.001	
<i>Pinnixa</i> sp							0.001			0.001	
<i>Strongylocentrotus</i> sp					0.001					0.001	
Total Biomass	1.626	3.066	28.303	12.464	5.944	10.429	7.553	9.608	11.742	90.735	

B.20

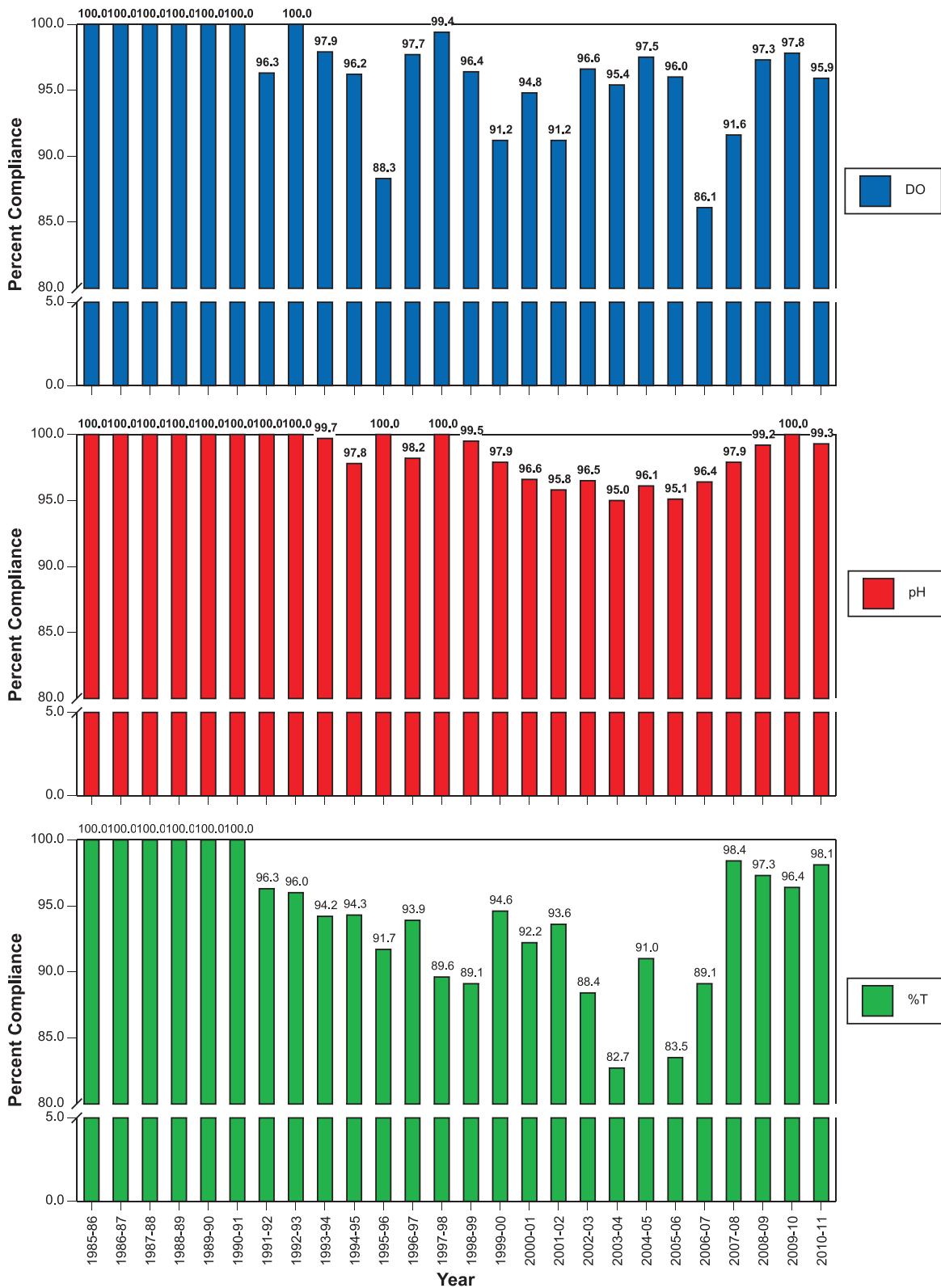


Figure B-1. Summary of mean percent compliance for dissolved oxygen, pH, and light transmissivity for all stations compared to reference stations, 1985–2011.

Orange County Sanitation District, California.

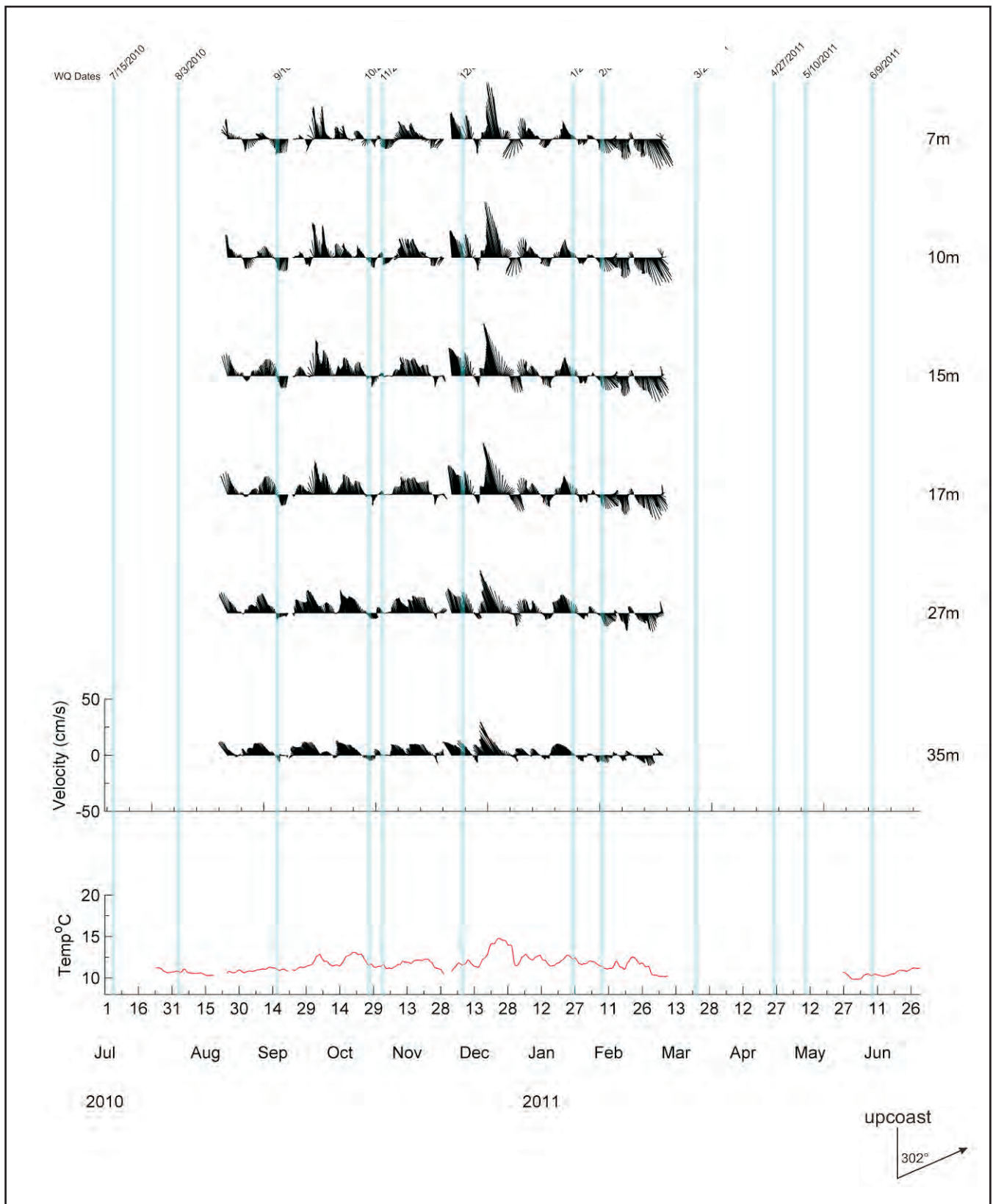


Figure B-2. Bottom temperature (°C) and current speed (cm/s) and direction by depth for mooring M-19, July 2010–June 2011. Blue lines denote water quality sampling events.

Orange County Sanitation District, California.

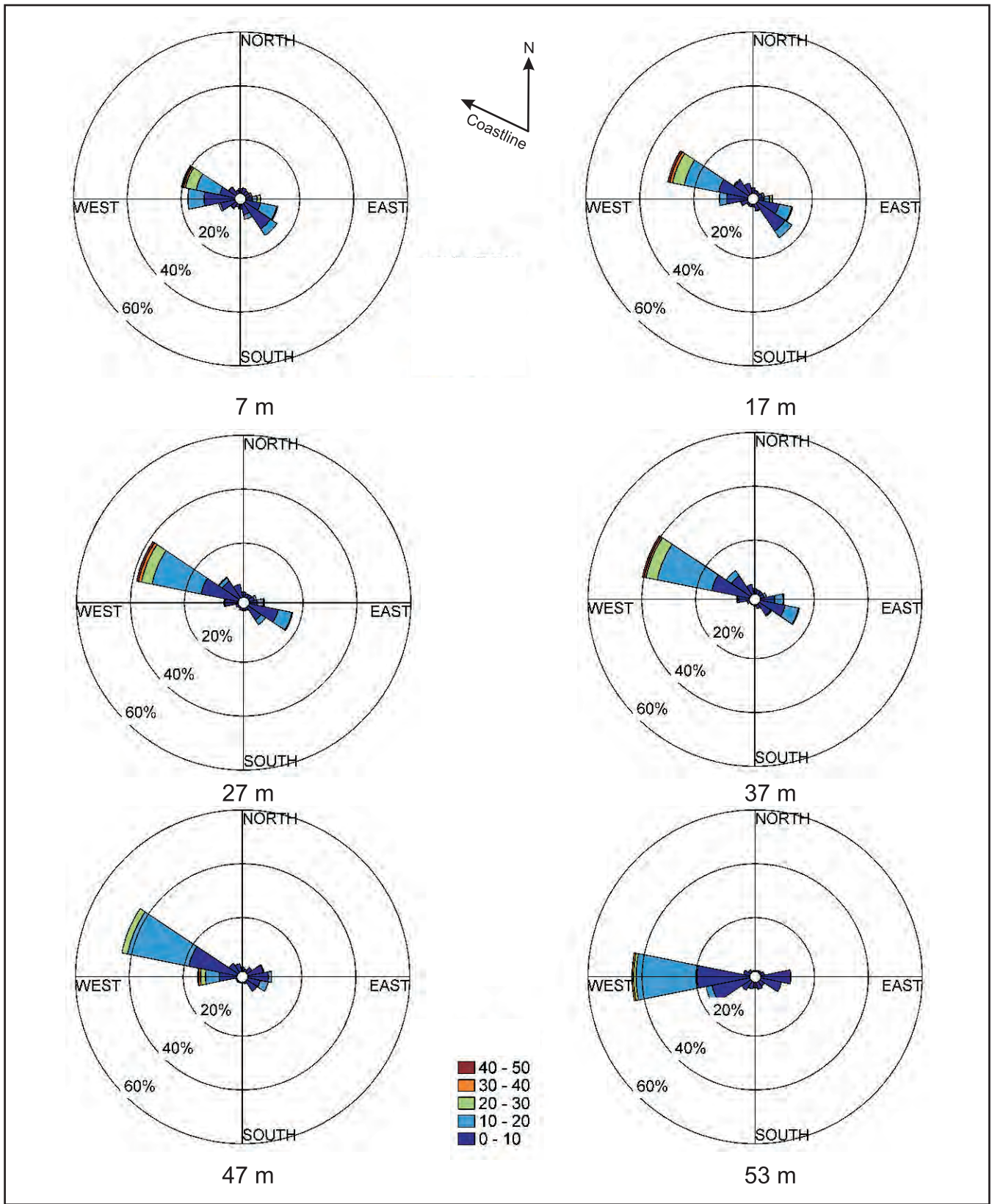


Figure B-3. Average current speed (cm/s) and direction by depth for mooring M-19, July 2010–June 2011.

Orange County Sanitation District, California.

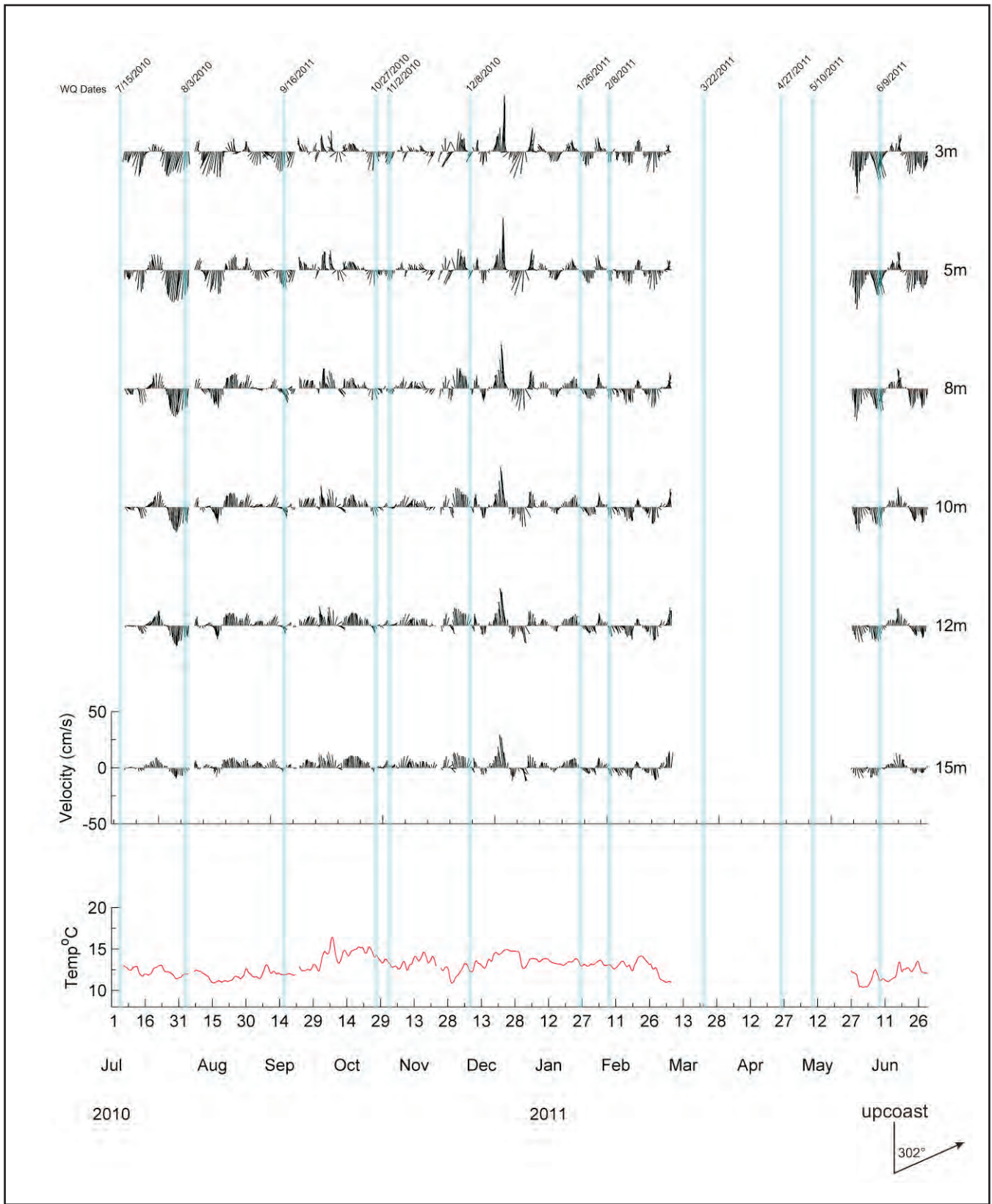


Figure B-4. Bottom temperature (°C) and current speed (cm/s) and direction by depth for mooring M-20, July 2010–June 2011. Blue lines denote water quality sampling events.

Orange County Sanitation District, California.

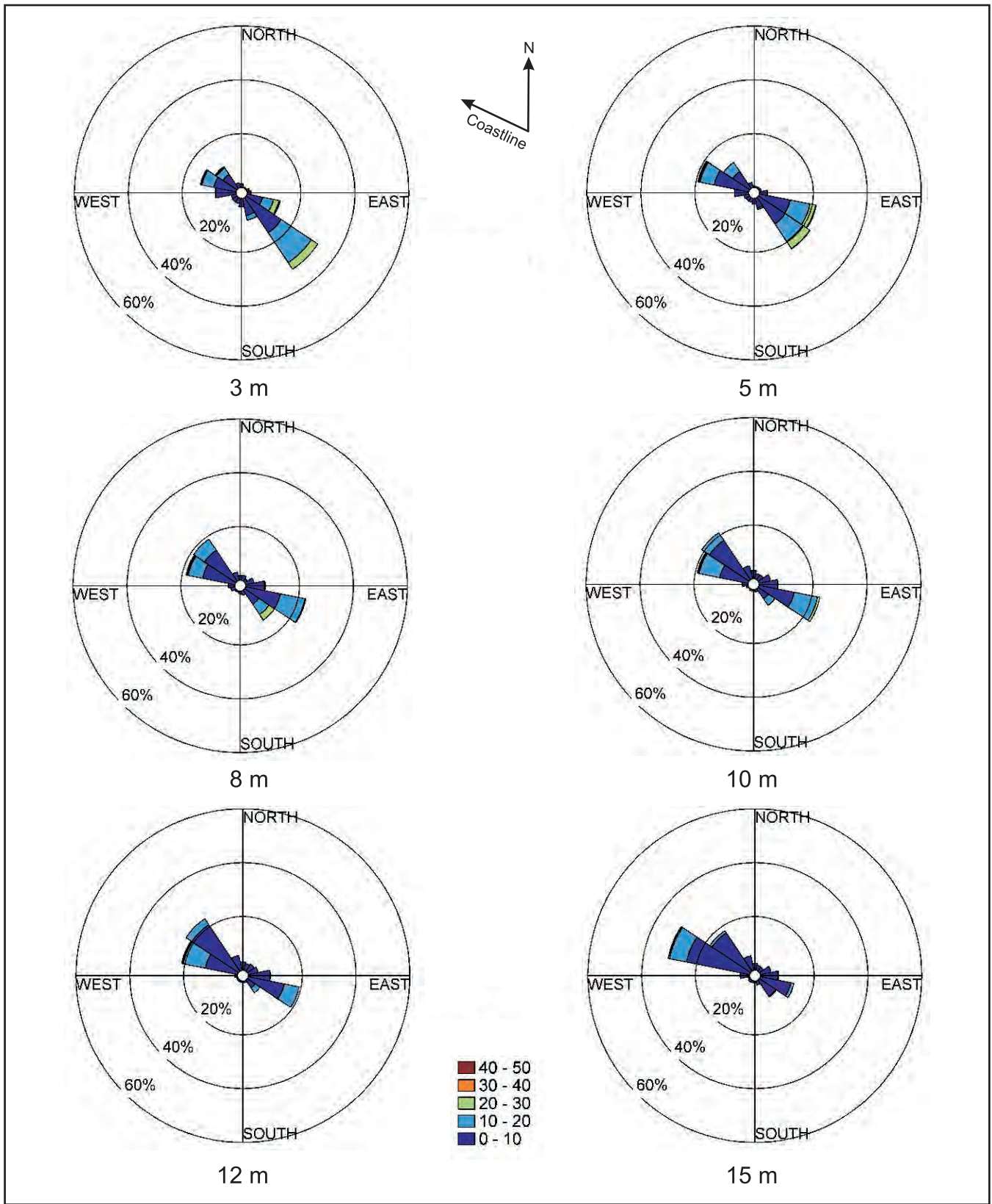


Figure B-5. Average current speed (cm/s) and direction by depth for mooring M-20, July 2010–June 2011.

Orange County Sanitation District, California.

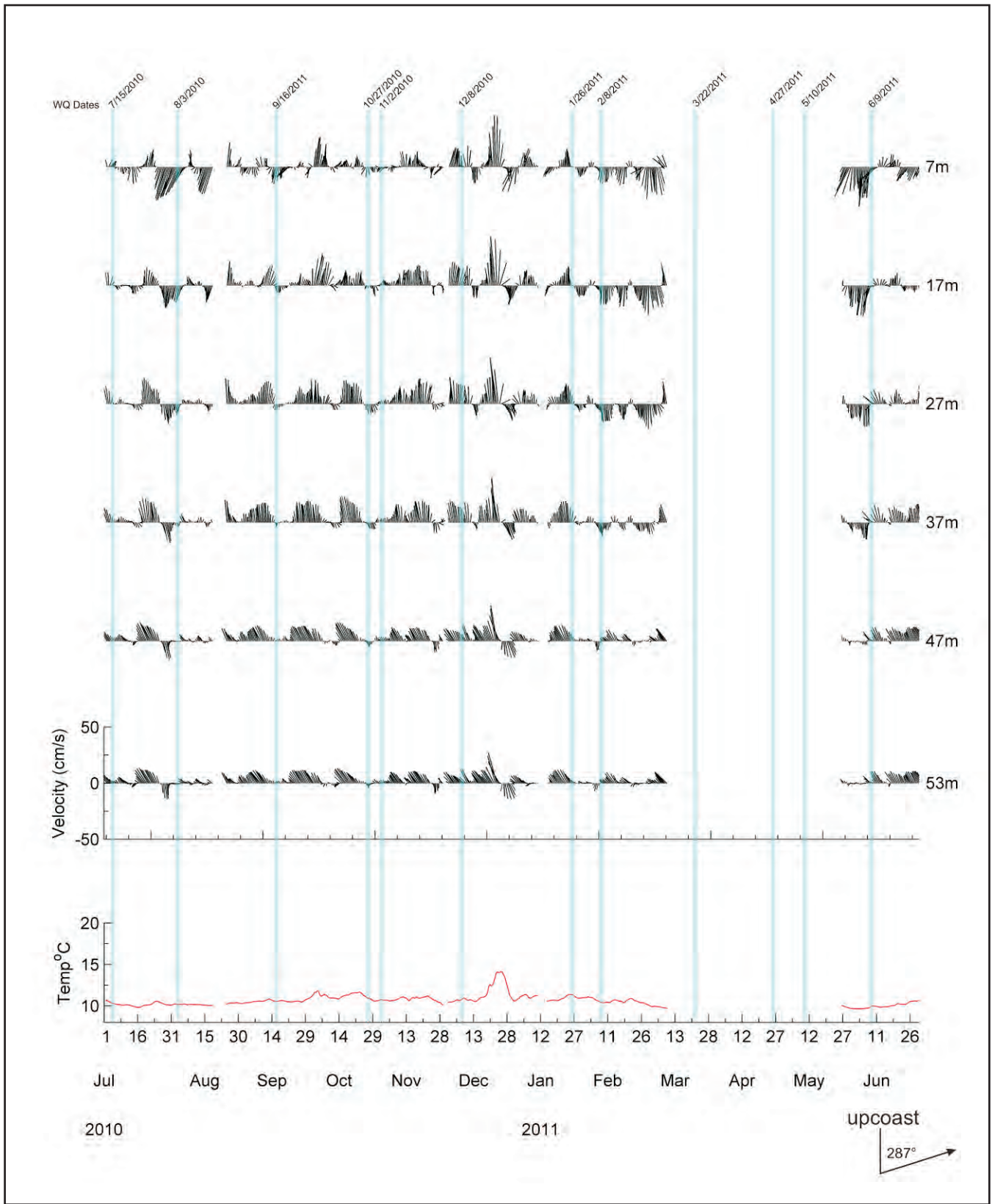


Figure B-6. Bottom temperature (°C) and current speed (cm/s) and direction by depth for mooring M21, July 2010–June 2011. Blue lines denote water quality sampling events.

Orange County Sanitation District, California.

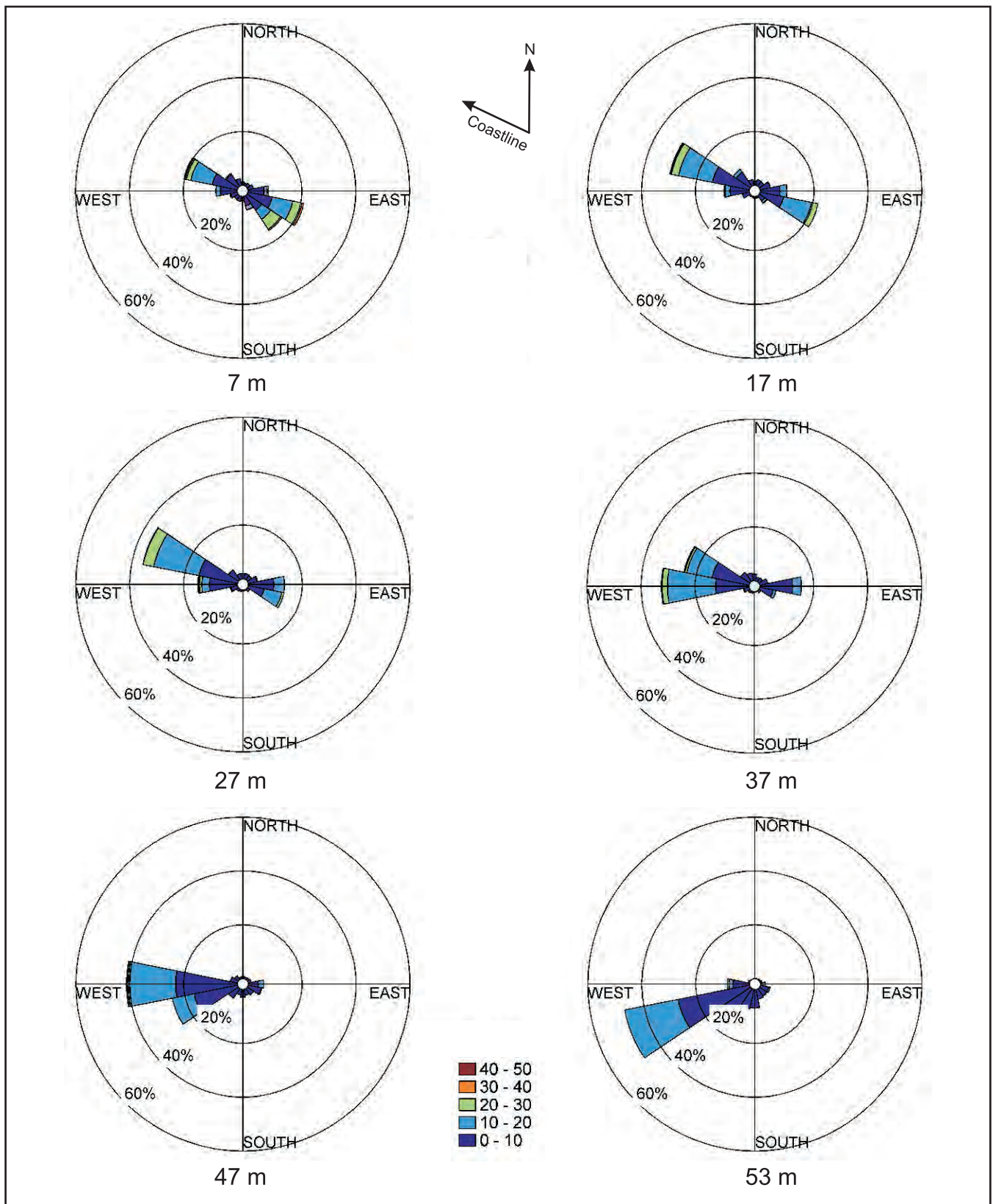


Figure B-7. Average current speed (cm/s) and direction by depth for mooring M-21, July 2010–June 2011.

Orange County Sanitation District, California.

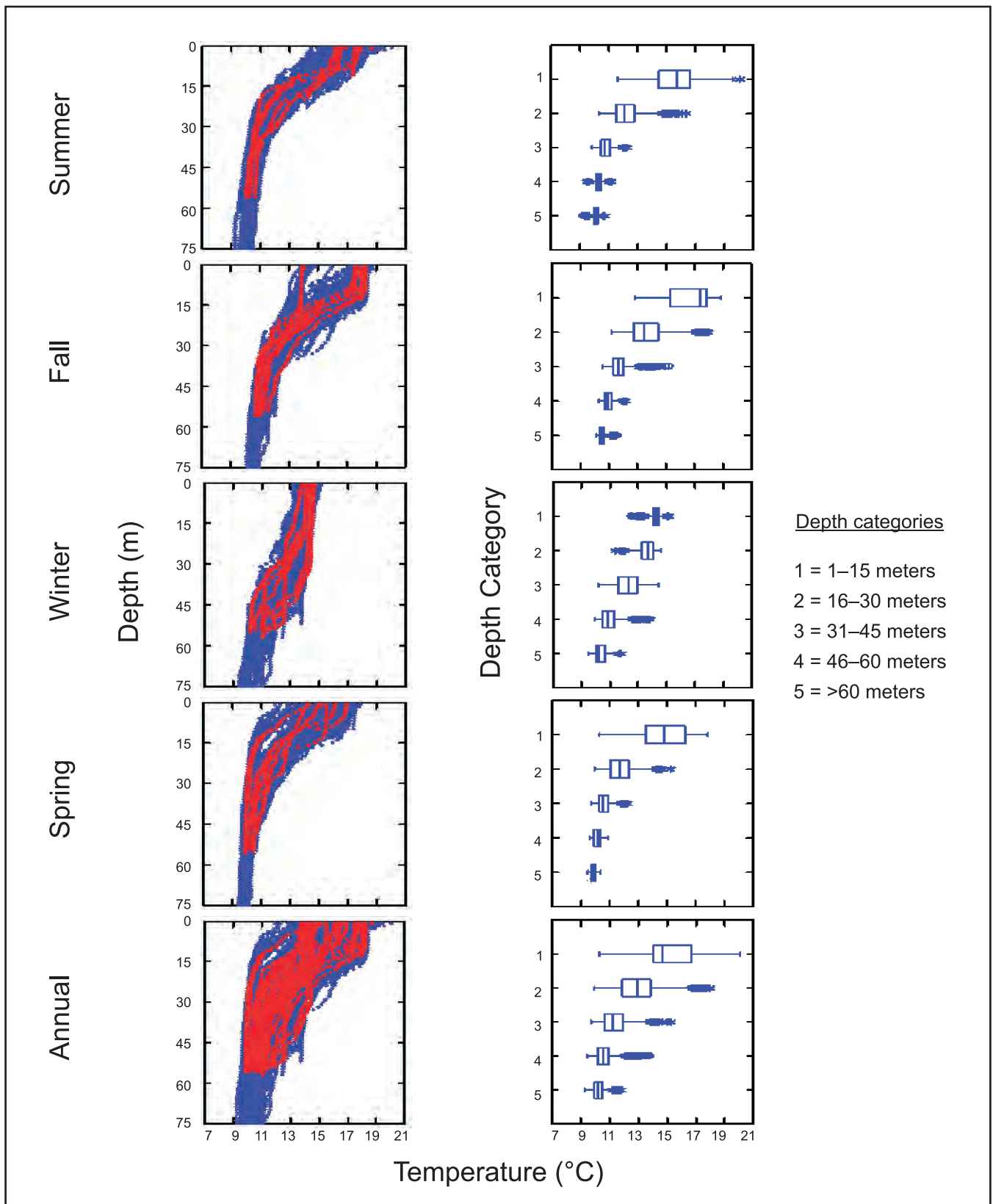


Figure B-9. Seasonal scatter plots of temperature (°C) for all stations (blue) with overlay of outfall Station 2205 (red), and box plots of temperature (°C) for all stations, July 2010 through June 2011.

Orange County Sanitation District, California.

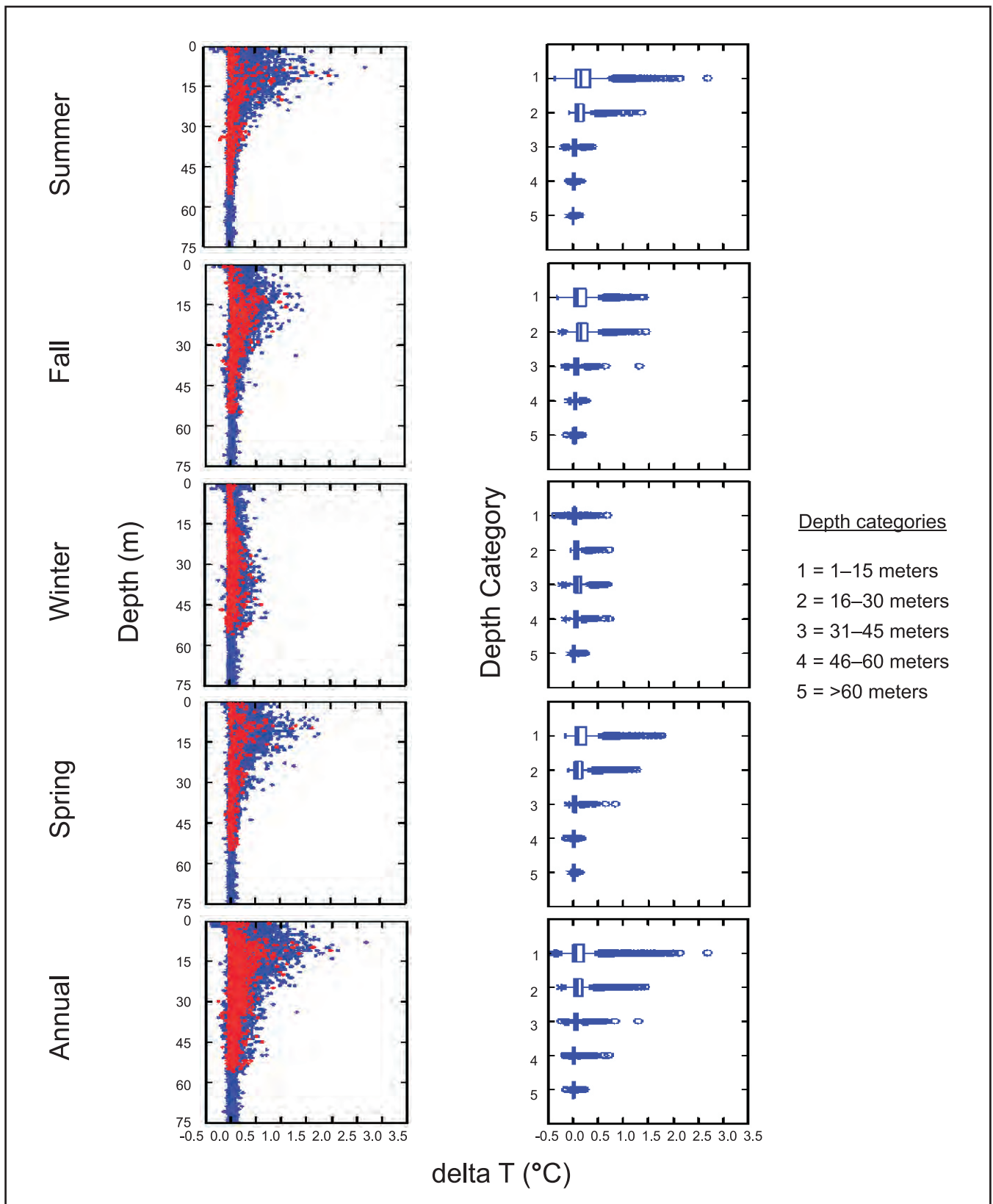


Figure B-10. Seasonal scatter plots of delta T (°C) for all stations (blue) with overlay of outfall Station 2205 (red), and box plots of delta T (°C) for all stations, July 2010 through June 2011.

Orange County Sanitation District, California.

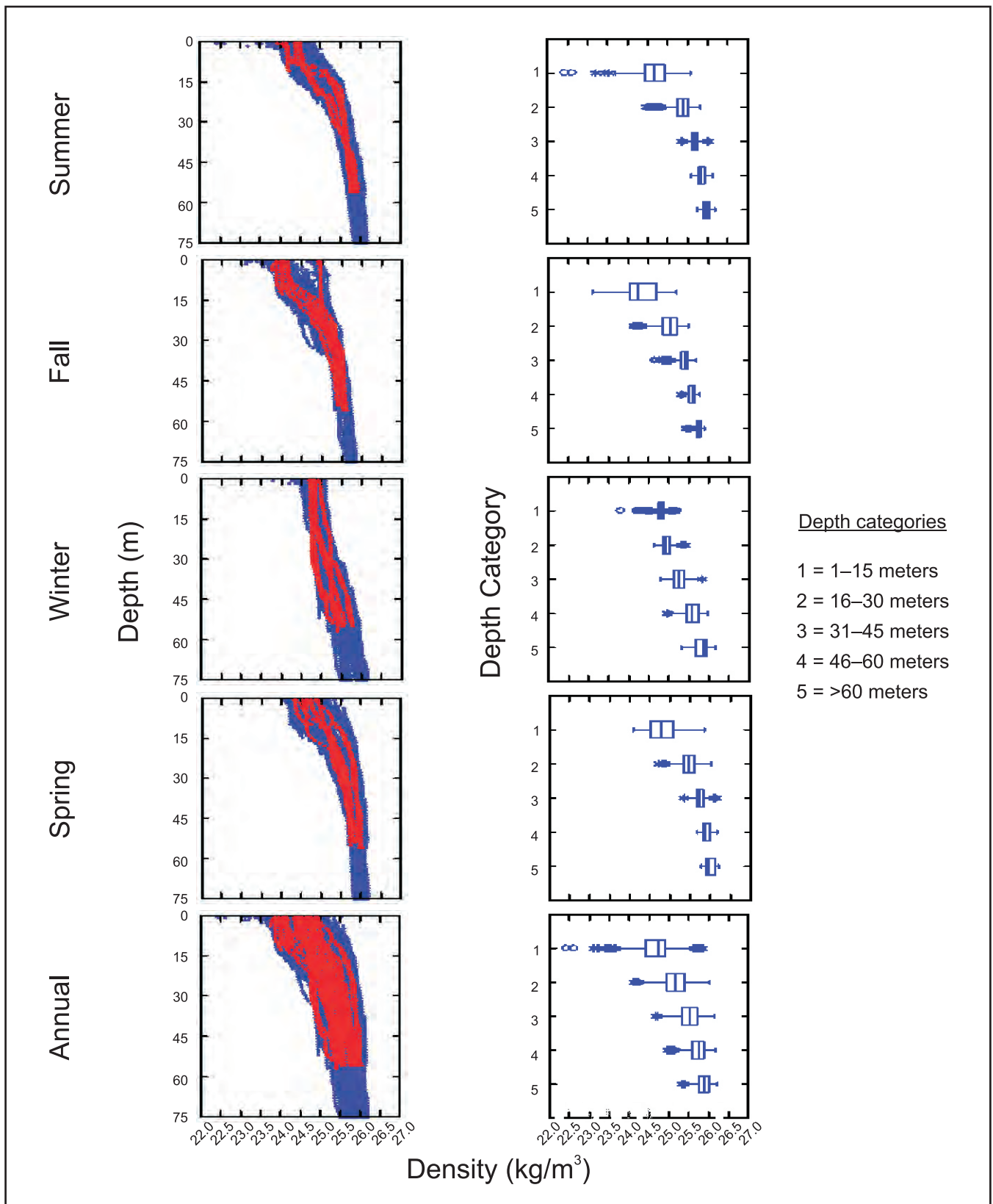


Figure B-11. Seasonal scatter plots of density (kg/m³) for all stations (blue) with overlay of outfall Station 2205 (red), and box plots of density (kg/m³) for all stations, July 2010 through June 2011.

Orange County Sanitation District, California.

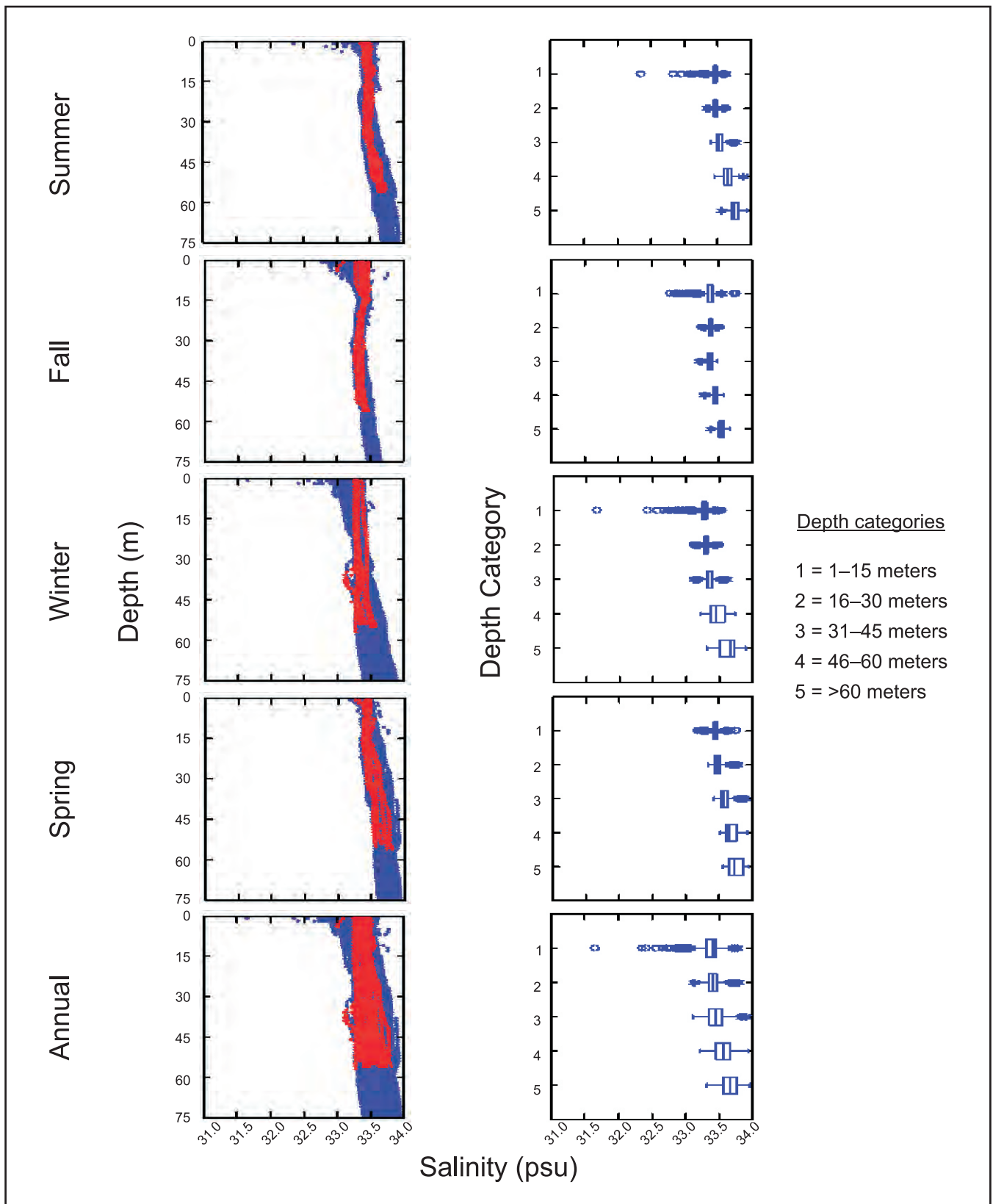


Figure B-12. Seasonal scatter plots of salinity (psu) for all stations (blue) with overlay of outfall Station 2205 (red), and box plots of salinity (psu) for all stations, July 2010 through June 2011.

Orange County Sanitation District, California.

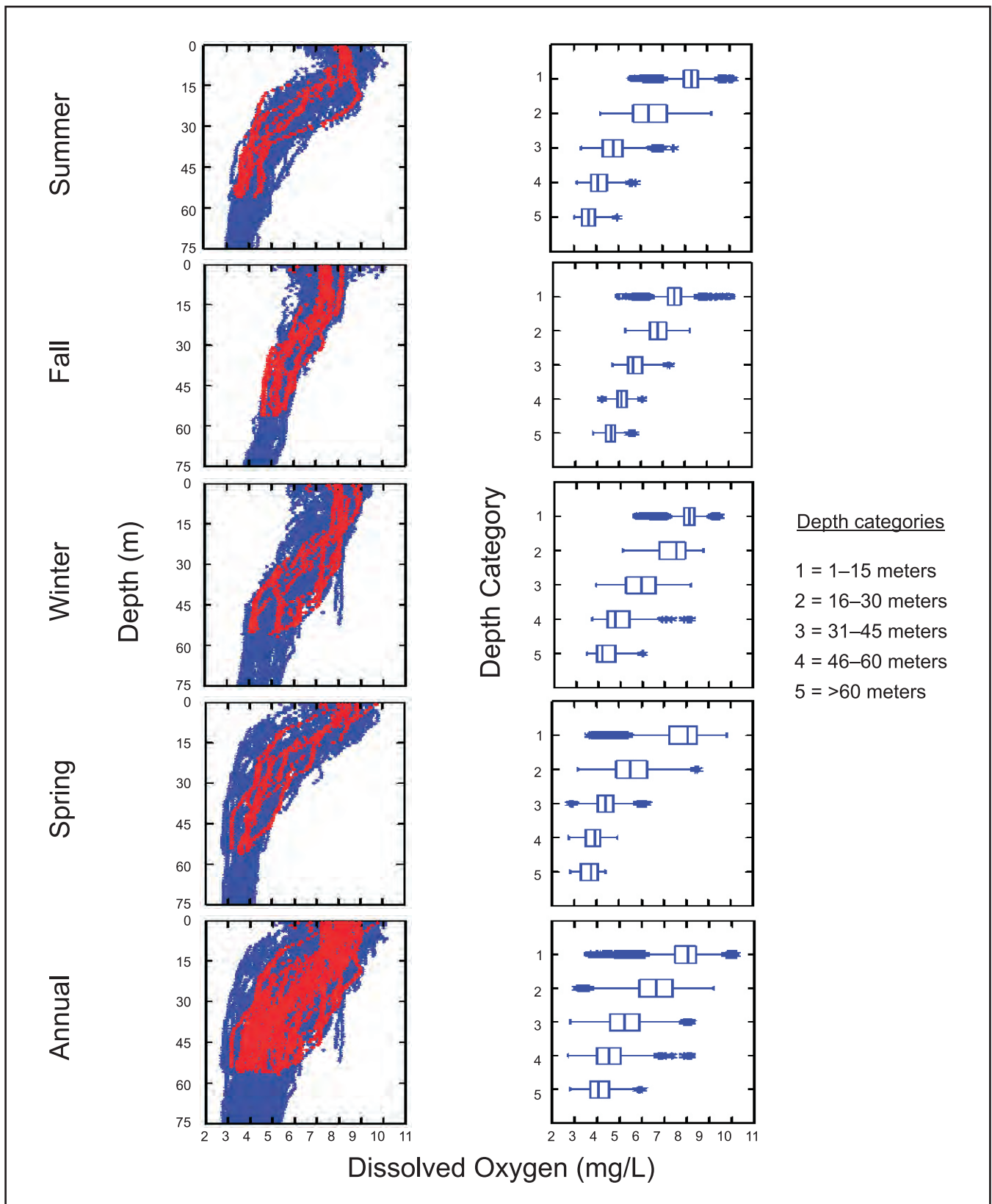


Figure B-13. Seasonal scatter plots of dissolved oxygen (mg/L) for all stations (blue) with overlay of outfall Station 2205 (red), and box plots of dissolved oxygen (mg/L) for all stations, July 2010 through June 2011.

Orange County Sanitation District, California.

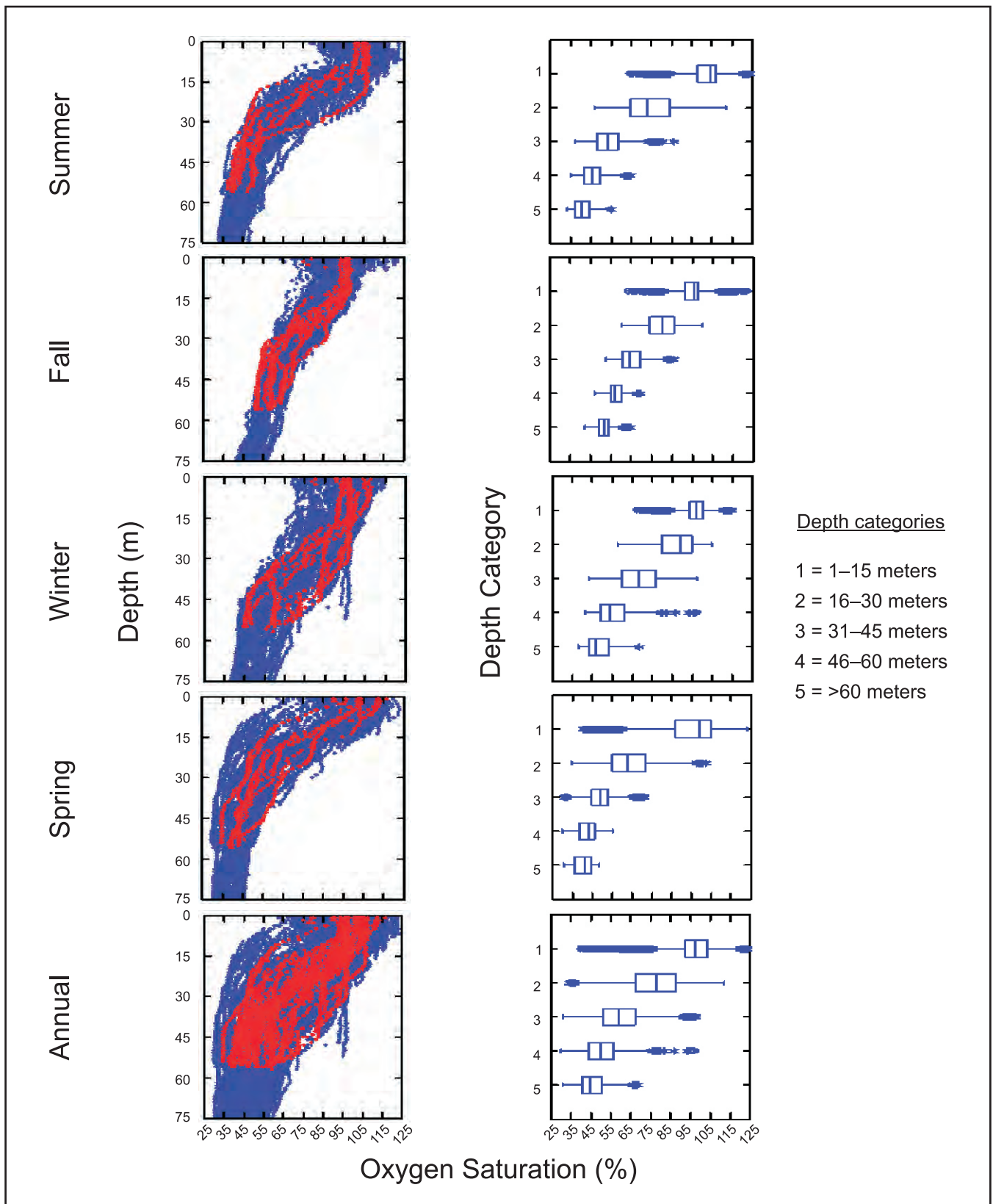


Figure B-14. Seasonal scatter plots of oxygen saturation (%) for all stations (blue) with overlay of outfall Station 2205 (red), and box plots of oxygen saturation (%) for all stations, July 2010 through June 2011.

Orange County Sanitation District, California.

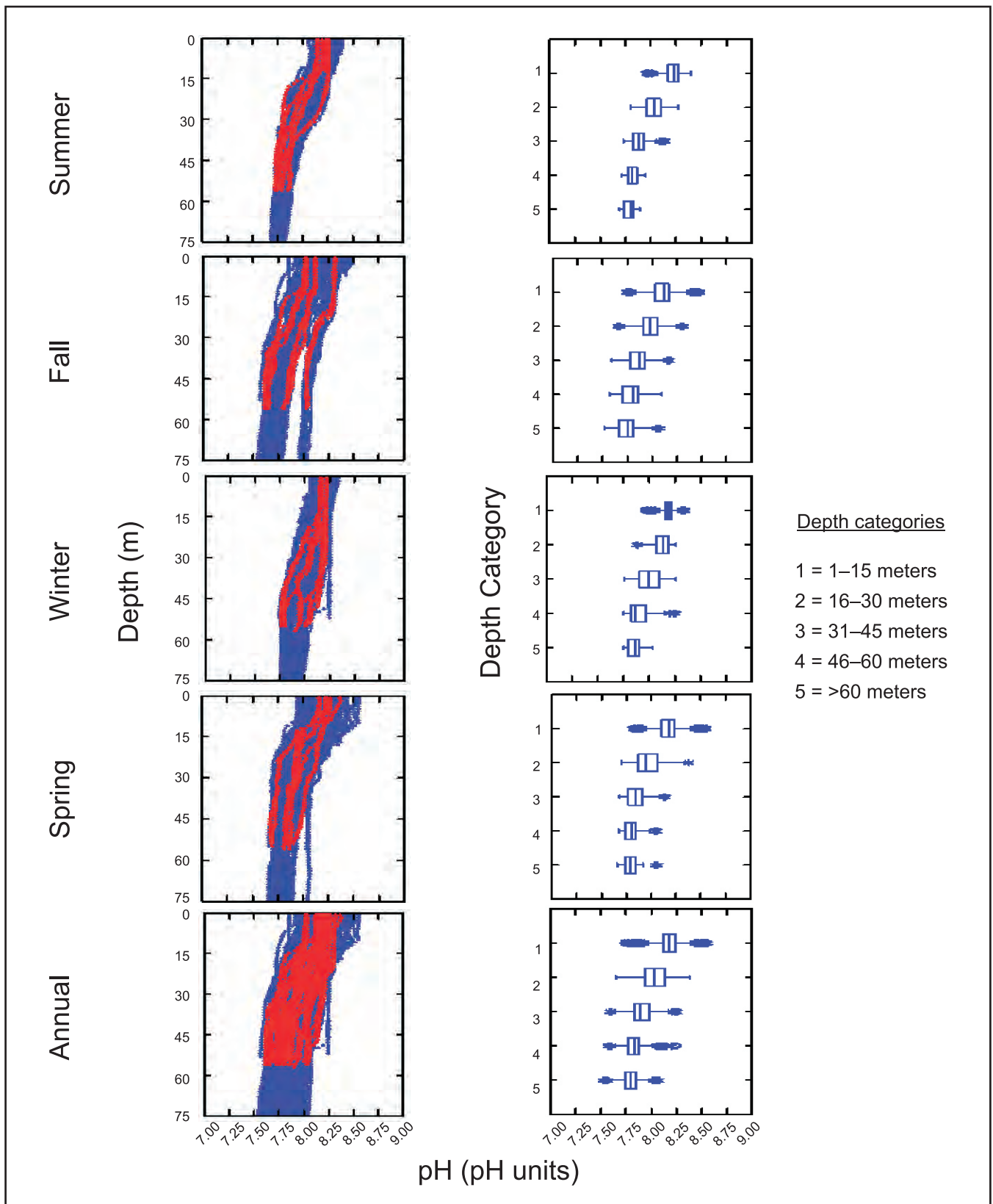


Figure B-15. Seasonal scatter plots of pH (pH units) for all stations (blue) with overlay of outfall Station 2205 (red), and box plots of pH (pH units) for all stations, July 2010 through June 2011.

Orange County Sanitation District, California.

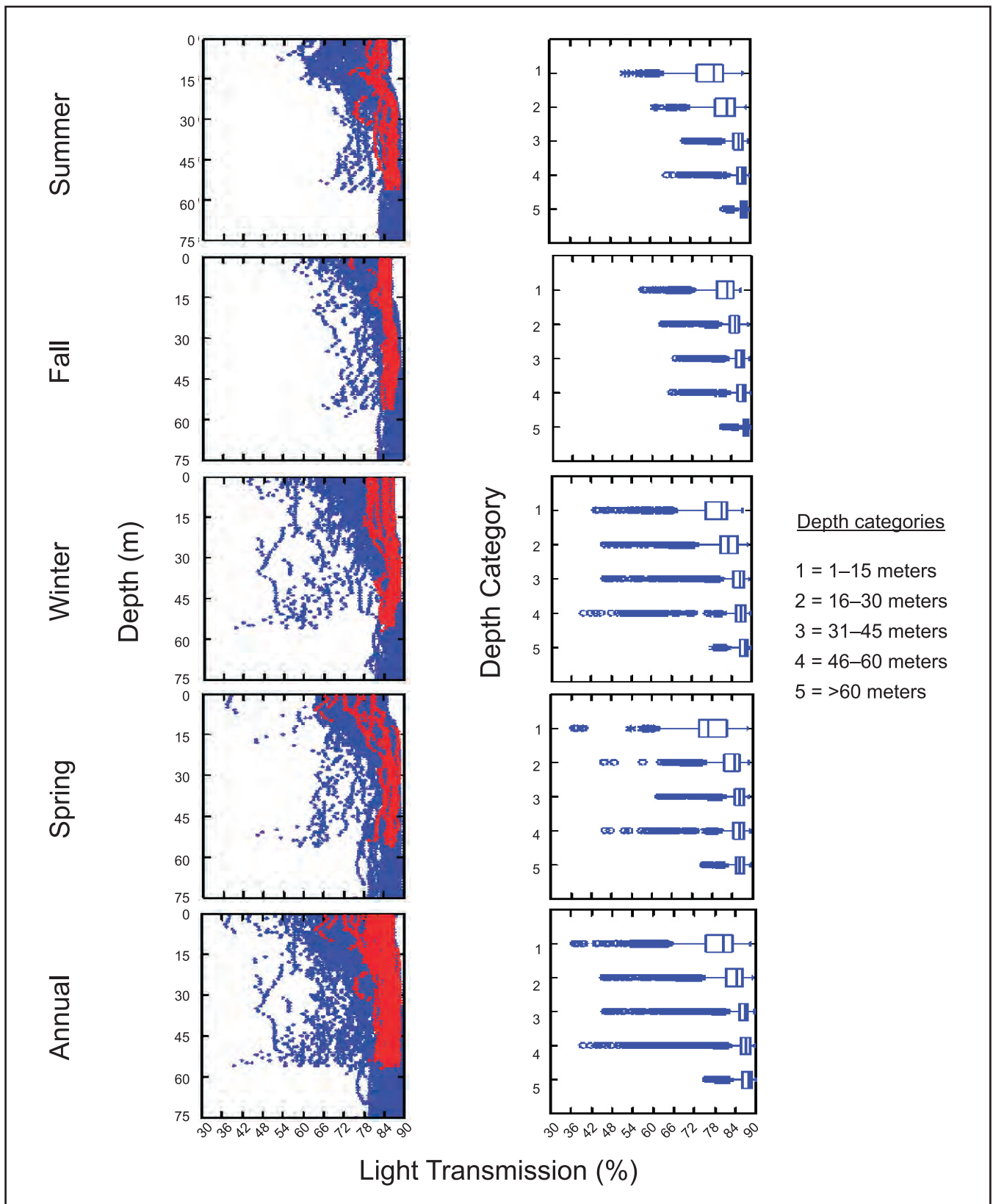


Figure B-16. Seasonal scatter plots of light transmission (%) for all stations (blue) with overlay of outfall Station 2205 (red), and box plots of light transmission (%) for all stations, July 2010 through June 2011.

Orange County Sanitation District, California.

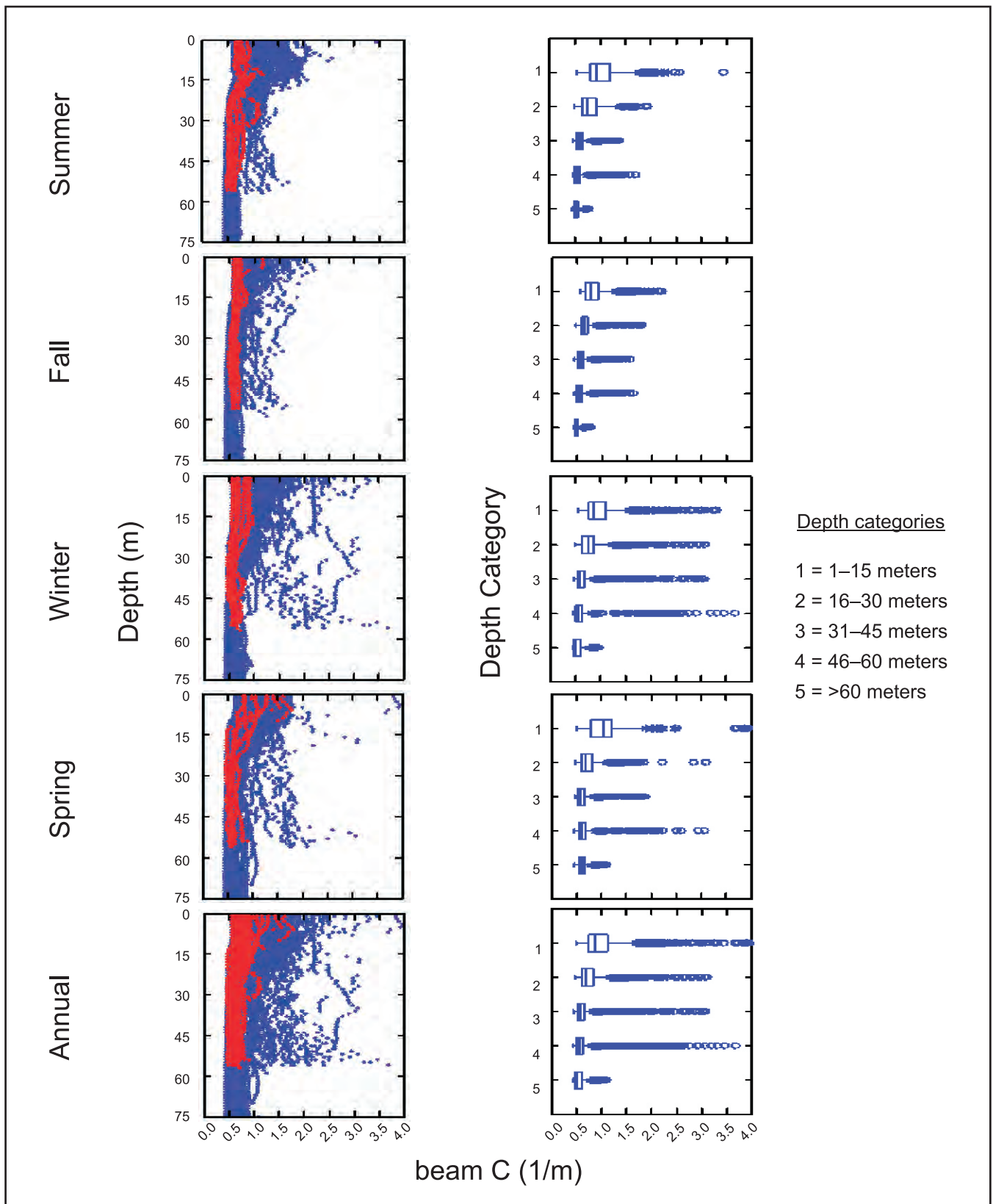


Figure B-17. Seasonal scatter plots of beam C (1/m) for all stations (blue) with overlay of outfall Station 2205 (red), and box plots of beam C (1/m) for all stations, July 2010 through June 2011.

Orange County Sanitation District, California.

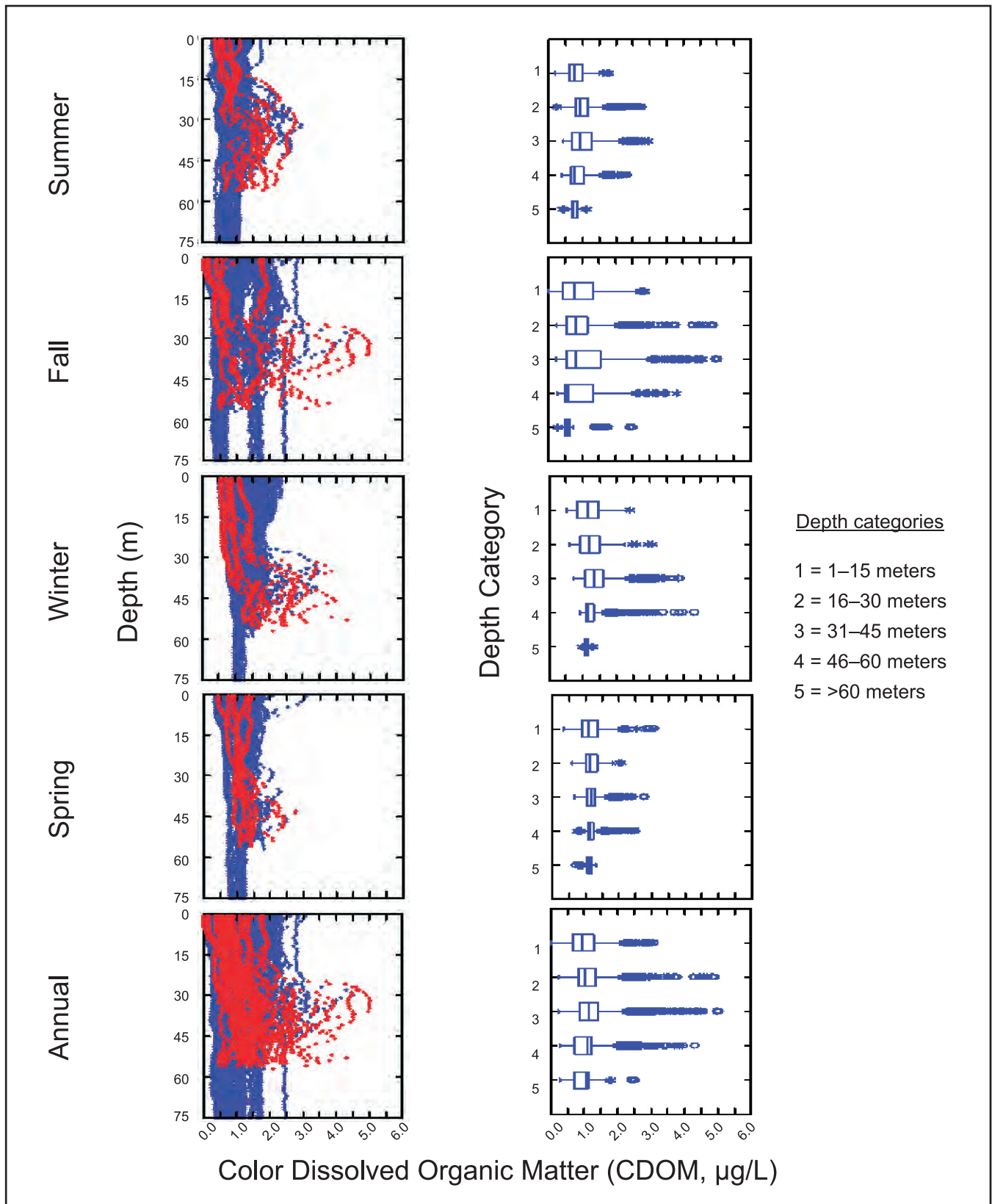


Figure B-18. Seasonal scatter plots of color dissolved organic matter (CDOM, $\mu\text{g/L}$) for all stations (blue) with overlay of outfall Station 2205 (red), and box plots of CDOM ($\mu\text{g/L}$) for all stations, July 2010 through June 2011.

Orange County Sanitation District, California.

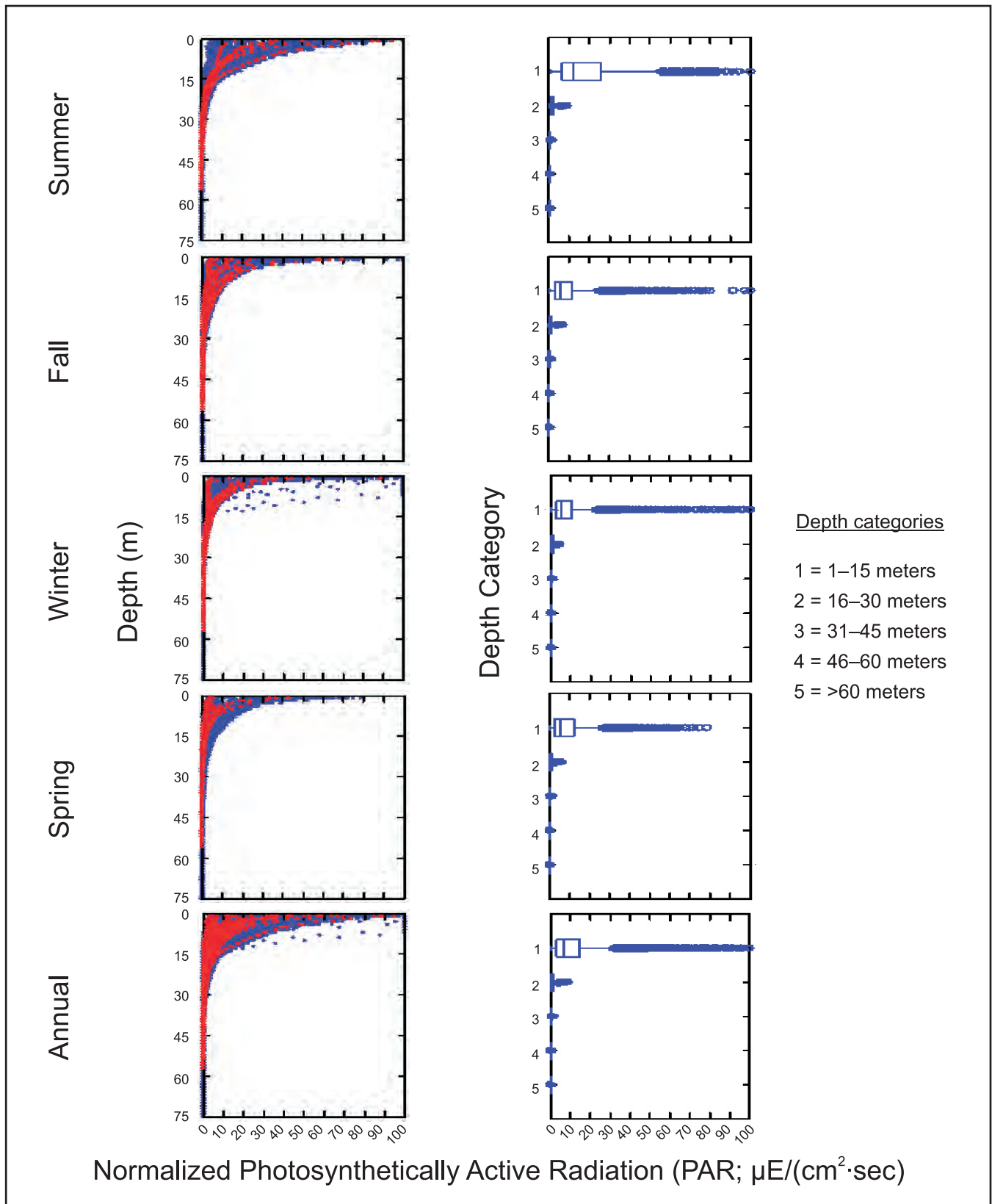


Figure B-19. Seasonal scatter plots of normalized photosynthetically active radiation (PAR; $\mu\text{E}/(\text{cm}^2 \cdot \text{sec})$) for all stations (blue) with overlay of outfall Station 2205 (red), and box plots of PAR ($\mu\text{E}/(\text{cm}^2 \cdot \text{sec})$) for all stations, July 2010 through June 2011.
 Water column PAR data is normalized to surface PAR data.
 Orange County Sanitation District, California.

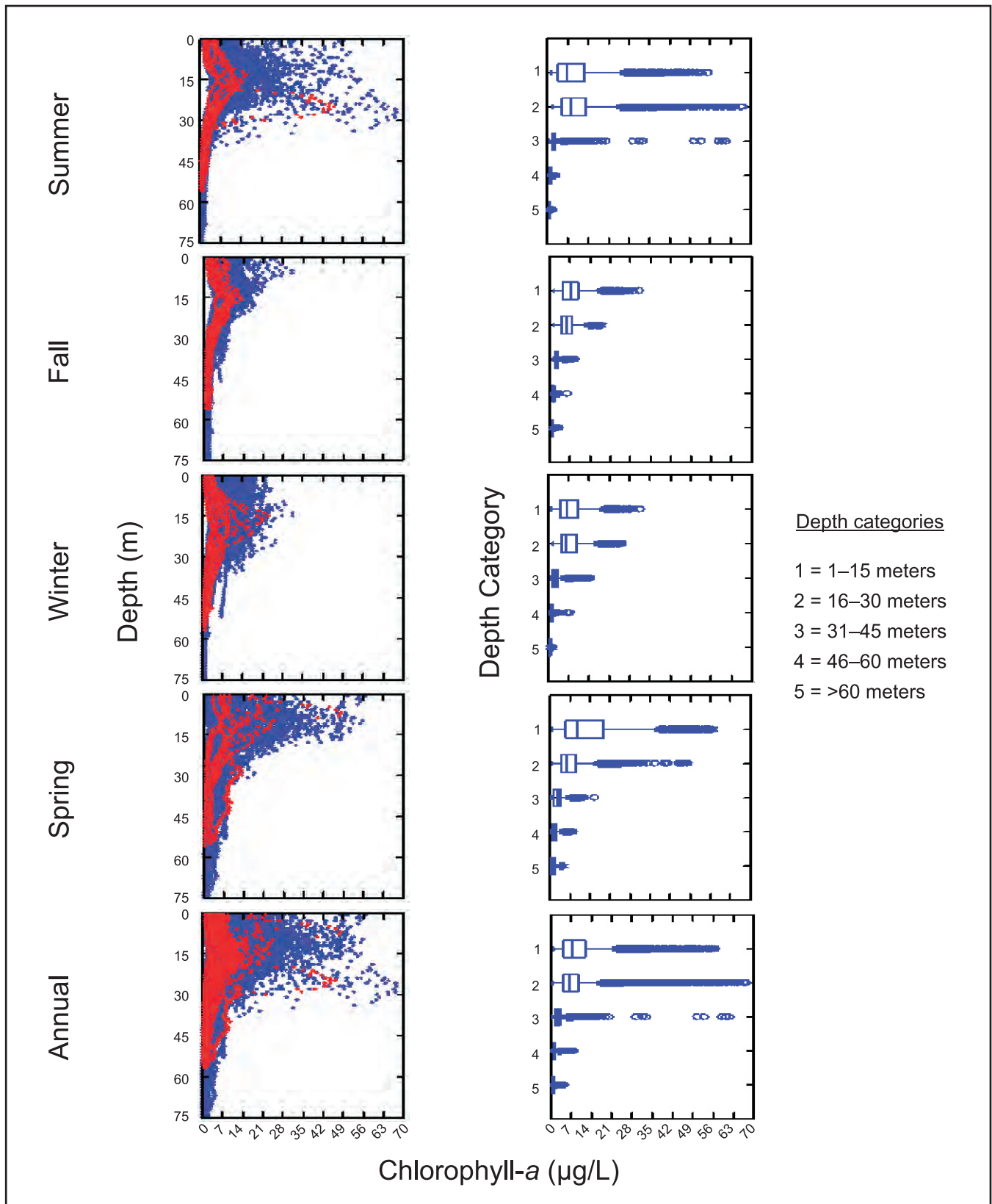


Figure B-20. Seasonal scatter plots of chlorophyll-a ($\mu\text{g/L}$) for all stations (blue) with overlay of outfall Station 2205 (red), and box plots of chlorophyll-a ($\mu\text{g/L}$) for all stations, July 2010 through June 2011.

Orange County Sanitation District, California.

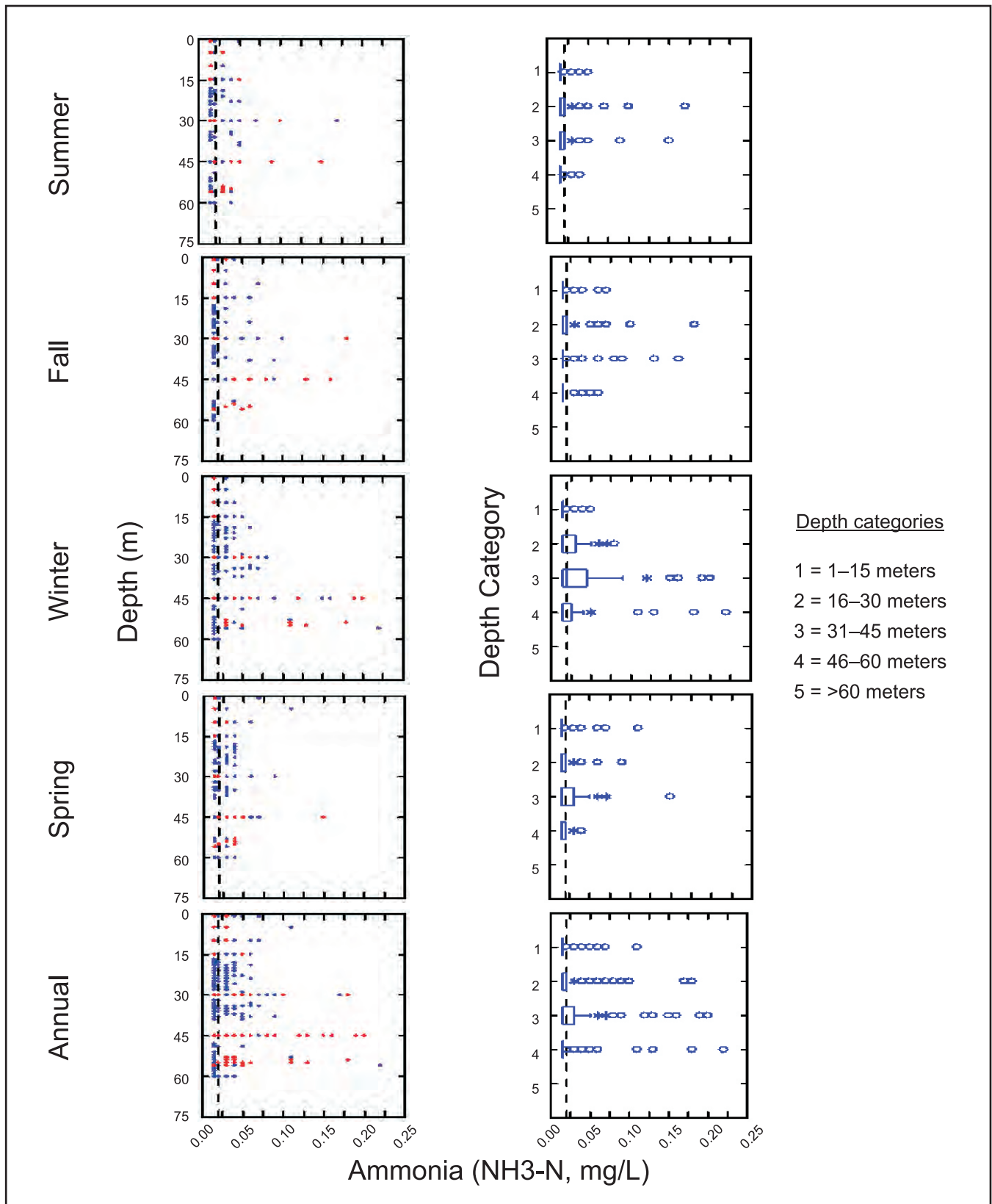


Figure B-21. Seasonal scatter plots of ammonia (NH₃-N, mg/L) for all stations (blue) with overlay of outfall Station 2205 (red), and box plots of ammonia (NH₃-N, mg/L) for all stations, July 2010 through June 2011.

Orange County Sanitation District, California.

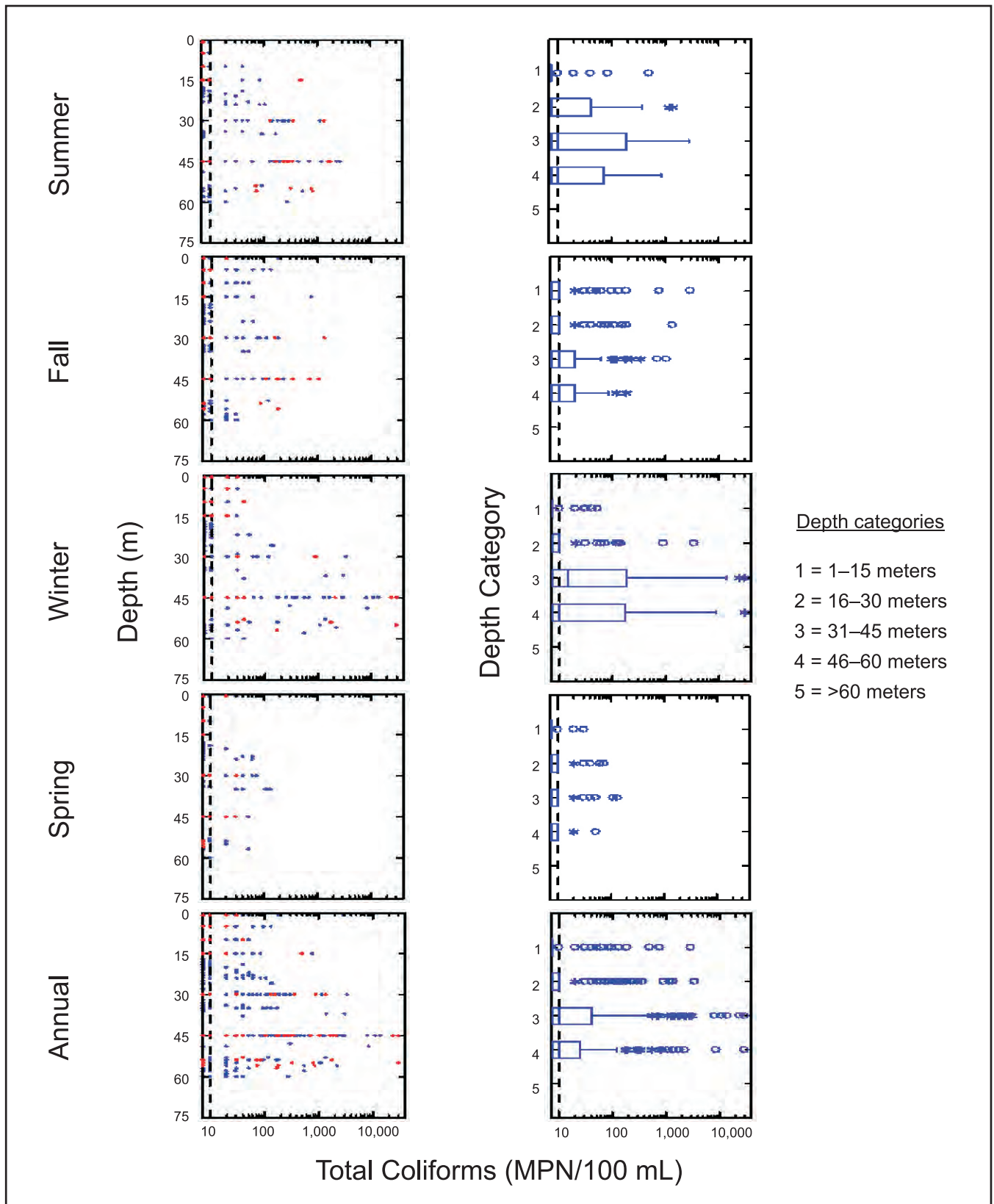


Figure B-22. Seasonal scatter plots of total coliforms (MPN/100 mL) for all stations (blue) with overlay of outfall Station 2205 (red), and box plots of total coliforms (MPN/100 mL) for all stations, July 2010 through June 2011.

Orange County Sanitation District, California.

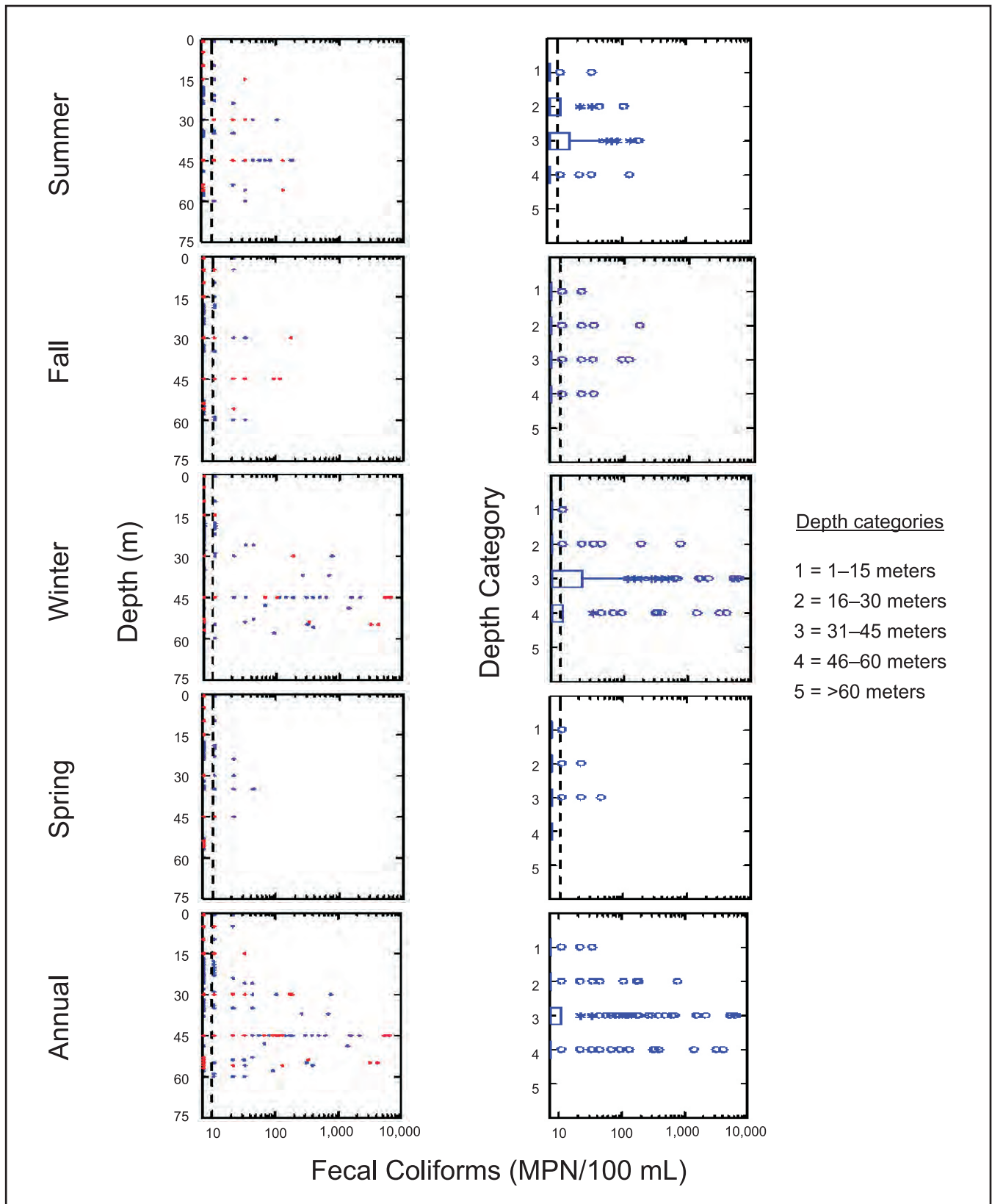


Figure B-23. Seasonal scatter plots of fecal coliforms (MPN/100 mL) for all stations (blue) with overlay of outfall Station 2205 (red), and box plots of fecal coliforms (MPN/100 mL) for all stations, July 2010 through June 2011.

Orange County Sanitation District, California.

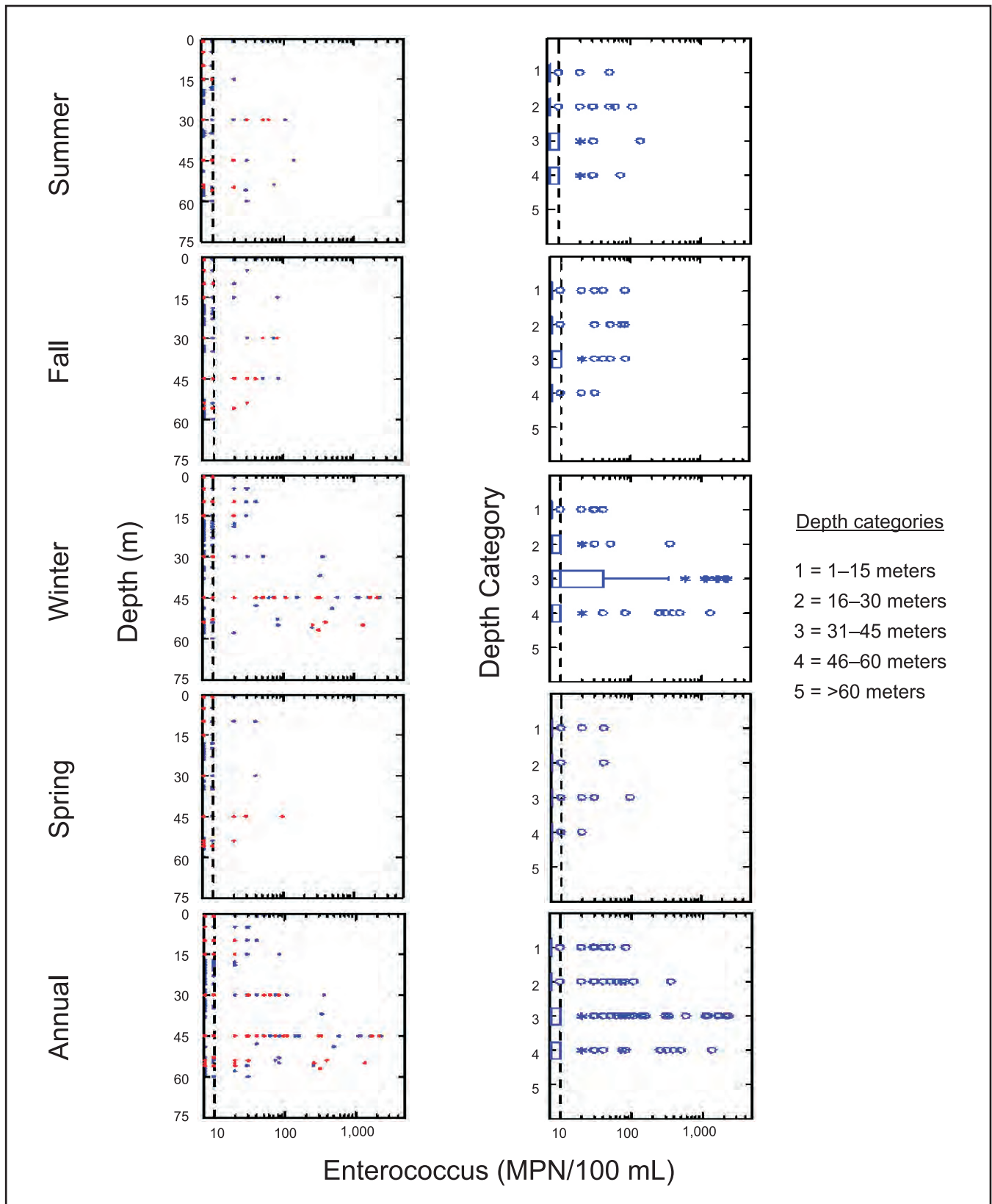


Figure B-24. Seasonal scatter plots of enterococcus (MPN/100 mL) for all stations (blue) with overlay of outfall Station 2205 (red), and box plots of enterococcus (MPN/100 mL) for all stations, July 2010 through June 2011.

Orange County Sanitation District, California.



Figure B-25. Seasonal patterns of fecal coliforms (MPN/100mL) for summer (July 15, August 3, 10, 11, 12, 2010), fall (October 21, 26, 27, November 2, 4, 2010), winter (January 26, 27, February 1, 2, 8, 2011), and spring (April 26, 27, May 3, 4, 10, 2011).

Orange County Sanitation District, California.



Figure B-26. Seasonal patterns of enterococci (MPN/100mL) for summer (July 15, August 3, 10, 11, 12, 2010), fall (October 21, 26, 27, November 2, 4, 2010), winter (January 26, 27, February 1, 2, 8, 2011), and spring (April 26, 27, May 3, 4, 10, 2011).

Orange County Sanitation District, California.

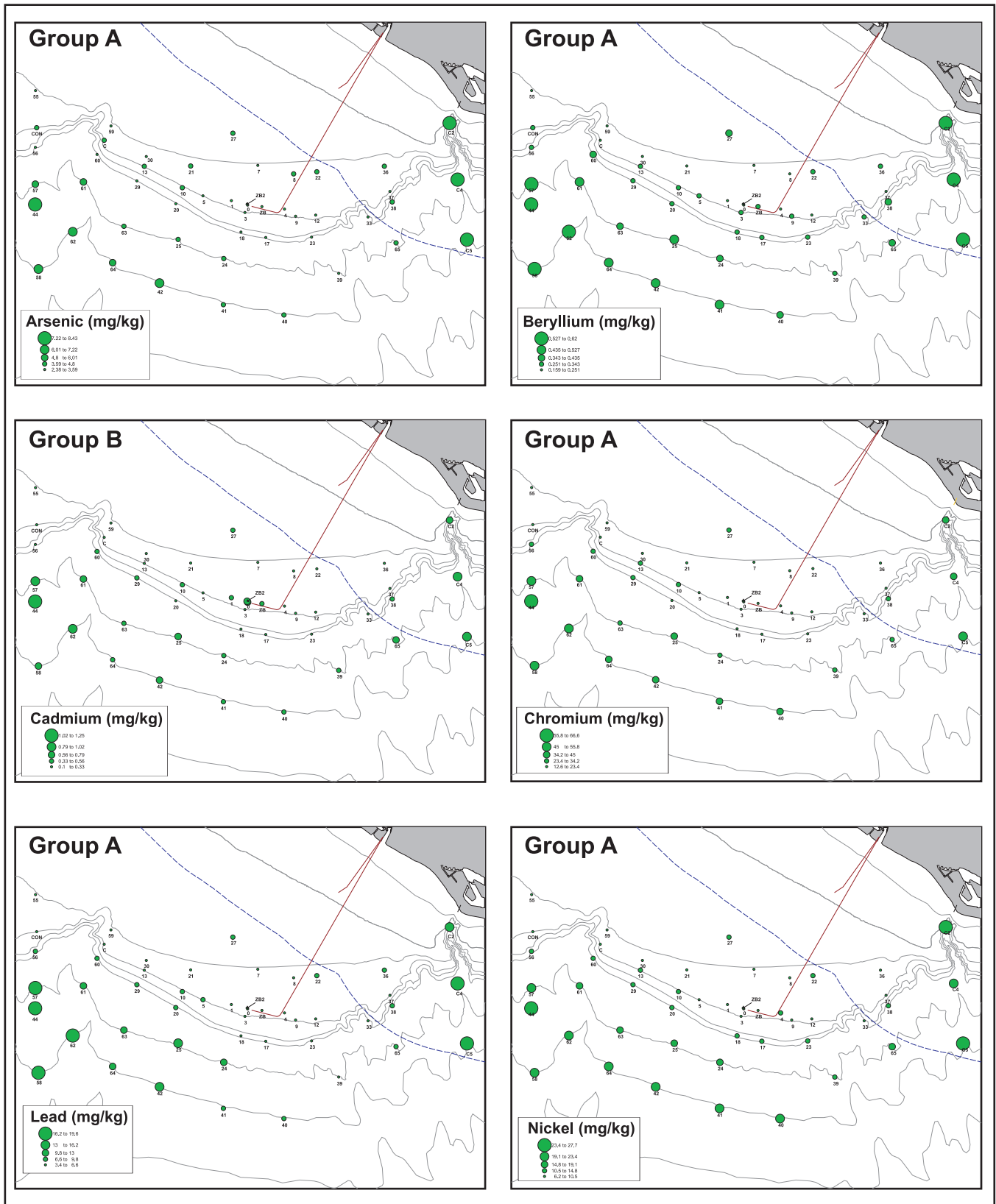


Figure B-27. Spatial distributions of Group A and Group B metals concentrations (mg/kg) in sediments during July 2010. Group A metals included arsenic, beryllium, chromium, lead, nickel, selenium, and zinc. Group B included cadmium and silver.

Orange County Sanitation District, California.

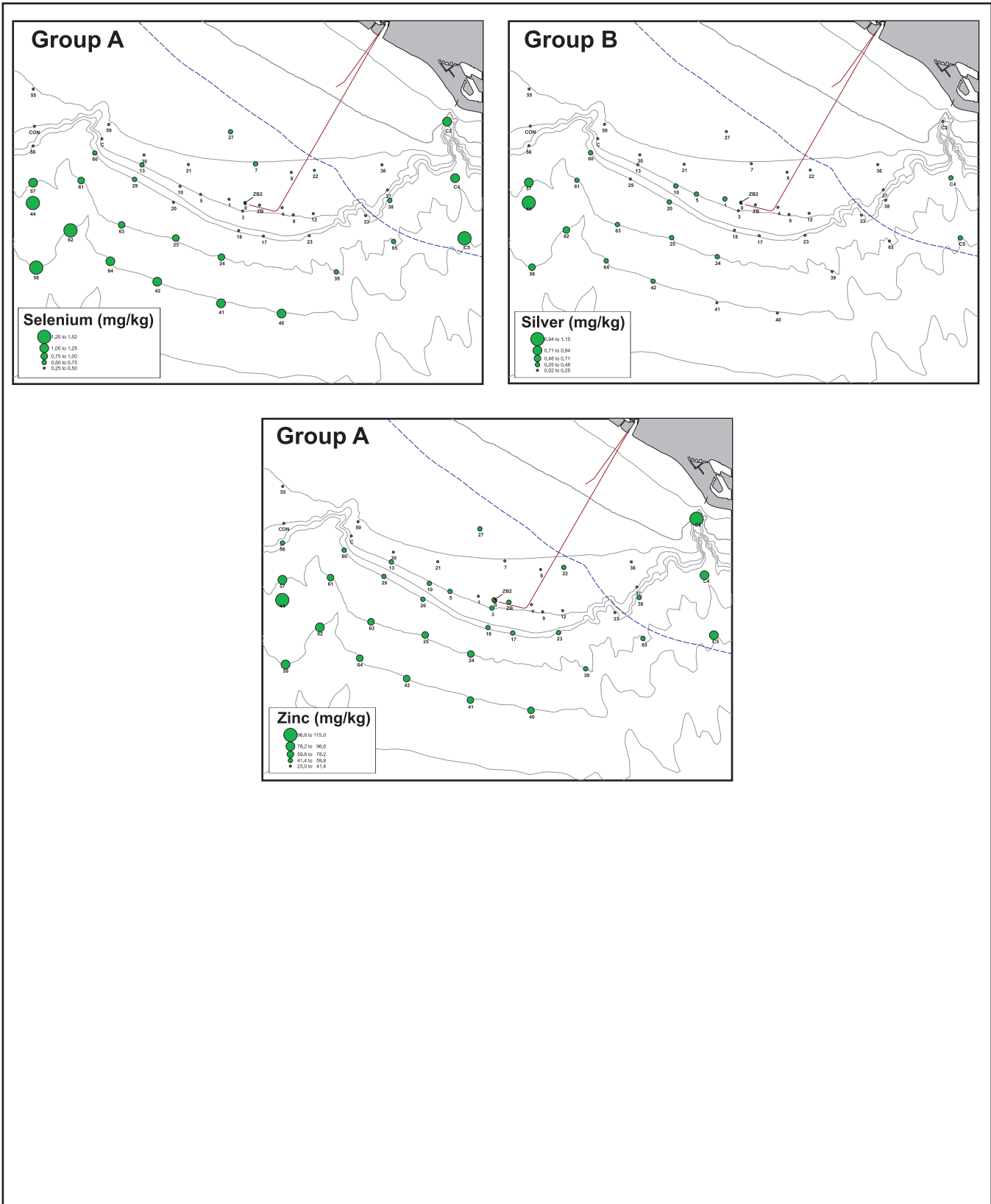


Figure B-27 continued.