

appendix B

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## **SUPPORTING DATA**

**Table B-1. Total coliform bacteria (MPN/100 mL) collected in offshore waters and used for comparison with REC-1 compliance criteria, July 2012 through June 2013.**

Orange County Sanitation District, California.

Station	Date					Meets 30-day Geometric Mean	Meets single sample standard of <10,000/100 mL	TC <1000 when FC:TC Ratio >0.1
	7/19/2012	8/2/2012	8/6/2012	8/7/2012	8/9/2012			
2103	<10	<10	<10	<10	<10	YES	YES	YES
2104	<10	<10	<10	<10	<10	YES	YES	YES
2183	<10	<10	<10	<10	<10	YES	YES	YES
2203	<10	<10	<10	<10	<10	YES	YES	YES
2223	<10	<10	<10	<10	<10	YES	YES	YES
2303	<10	<10	<10	<10	<10	YES	YES	YES
2351	<10	<10	<10	<10	<10	YES	YES	YES
2403	<10	<10	<10	<10	<10	YES	YES	YES
	10/30/2012	11/6/2012	11/8/2012	11/13/2012	11/14/2012			
2103	<10	<10	<10	<10	12	YES	YES	YES
2104	<10	11	<10	<10	<10	YES	YES	YES
2183	13	13	<10	10	12	YES	YES	YES
2203	<10	<10	<10	10	<10	YES	YES	YES
2223	<10	<10	<10	<10	<10	YES	YES	YES
2303	<10	<10	<10	<10	<10	YES	YES	YES
2351	<10	10	<10	<10	<10	YES	YES	YES
2403	<10	<10	<10	<10	<10	YES	YES	YES
	2/14/2013	2/26/2013	2/27/2013	2/28/2013	3/11/2013			
2103	14	23	12	11	10	YES	YES	YES
2104	28	26	12	23	<10	YES	YES	YES
2183	24	<10	14	16	<10	YES	YES	YES
2203	20	15	<10	<10	12	YES	YES	YES
2223	<10	10	<10	<10	<10	YES	YES	YES
2303	<10	<10	<10	<10	<10	YES	YES	YES
2351	<10	<10	<10	<10	<10	YES	YES	YES
2403	17	<10	<10	<10	<10	YES	YES	YES
	4/24/2013	4/29/2013	5/7/2013	5/9/2013	5/20/2013			
2103	<10	<10	<10	<10	15	YES	YES	YES
2104	<10	<10	<10	<10	26	YES	YES	YES
2183	<10	<10	<10	<10	<10	YES	YES	YES
2203	11	<10	<10	<10	<10	YES	YES	YES
2223	13	<10	<10	12	<10	YES	YES	YES
2303	<10	<10	<10	<10	<10	YES	YES	YES
2351	<10	<10	<10	<10	<10	YES	YES	YES
2403	<10	<10	<10	25	<10	YES	YES	YES

**California Ocean Plan Recreational Water Standards**

30-day geometric mean: Density less than 1000 per 100 mL

Singles sample: Density less than 10,000 per 100 mL and less than 1,000 per 100 mL when FC:TC ratio >0.1

**Table B-2. Fecal coliform bacteria (MPN/100 mL) collected in offshore waters and used for comparison with REC-1 compliance criteria, July 2012 through June 2013.**

Orange County Sanitation District, California.

Station	Date					Meets 30-day Geometric Mean	Meets single sample standard of <400/100 mL
	7/19/2012	8/2/2012	8/6/2012	8/7/2012	8/9/2012		
2103	<10	<10	<10	<10	<10	YES	YES
2104	<10	<10	<10	<10	<10	YES	YES
2183	<10	<10	<10	<10	<10	YES	YES
2203	<10	<10	<10	<10	<10	YES	YES
2223	<10	<10	<10	<10	<10	YES	YES
2303	<10	<10	<10	<10	<10	YES	YES
2351	<10	<10	<10	<10	<10	YES	YES
2403	<10	<10	<10	<10	<10	YES	YES
	10/30/2012	11/6/2012	11/8/2012	11/13/2012	11/14/2012		
2103	<10	<10	<10	<10	10	YES	YES
2104	<10	<10	<10	<10	<10	YES	YES
2183	<10	12	<10	10	<10	YES	YES
2203	<10	<10	<10	<10	<10	YES	YES
2223	<10	<10	<10	<10	<10	YES	YES
2303	<10	<10	<10	<10	<10	YES	YES
2351	<10	<10	<10	<10	<10	YES	YES
2403	<10	<10	<10	<10	<10	YES	YES
	2/14/2013	2/26/2013	2/27/2013	2/28/2013	3/11/2013		
2103	<10	14	<10	<10	<10	YES	YES
2104	14	16	<10	11	<10	YES	YES
2183	13	<10	<10	<10	<10	YES	YES
2203	<10	10	<10	<10	<10	YES	YES
2223	<10	<10	<10	<10	<10	YES	YES
2303	<10	<10	<10	<10	<10	YES	YES
2351	<10	<10	<10	<10	<10	YES	YES
2403	18	<10	<10	<10	<10	YES	YES
	4/24/2013	4/29/2013	5/7/2013	5/9/2013	5/20/2013		
2103	<10	<10	<10	<10	<10	YES	YES
2104	<10	<10	<10	<10	<10	YES	YES
2183	<10	<10	<10	<10	<10	YES	YES
2203	<10	<10	<10	<10	<10	YES	YES
2223	<10	<10	<10	<10	<10	YES	YES
2303	<10	<10	<10	<10	<10	YES	YES
2351	<10	<10	<10	<10	<10	YES	YES
2403	<10	<10	<10	<10	<10	YES	YES

**California Ocean Plan Recreational Water Standards**

30-day geometric mean: Density less than 200 per 100 mL

Singles sample: Density less than 400 per 100 mL

**Table B-3. Enterococci bacteria (MPN/100 mL) collected in offshore waters and used for comparison with REC-1 compliance criteria, July 2012 through June 2013.**

Orange County Sanitation District, California.

Station	Date					Meets 30-day Geometric Mean	Meets single sample standard of <104/100 mL	Meets EPA single sample standard of <501/100 mL
	7/19/2012	8/2/2012	8/6/2012	8/7/2012	8/9/2012			
2103	<10	<10	<10	<10	<10	YES	YES	NS
2104	<10	<10	<10	<10	<10	YES	YES	NS
2183	<10	<10	<10	<10	<10	YES	YES	NS
2203	<10	<10	10	11	<10	YES	YES	NS
2223	<10	<10	<10	<10	<10	YES	YES	NS
2303	<10	<10	<10	<10	<10	YES	YES	NS
2351	<10	29	<10	<10	<10	YES	YES	NS
2403	<10	<10	<10	<10	<10	YES	YES	NS
	<b>10/30/2012</b>	<b>11/6/2012</b>	<b>11/8/2012</b>	<b>11/13/2012</b>	<b>11/14/2012</b>			
2103	<10	<10	10	<10	<10	YES	YES	NS
2104	<10	<10	12	<10	<10	YES	YES	NS
2183	<10	<10	<10	<10	<10	YES	YES	NS
2203	<10	<10	<10	<10	<10	YES	YES	NS
2223	<10	<10	<10	<10	<10	YES	YES	NS
2303	<10	<10	13	<10	<10	YES	YES	NS
2351	<10	<10	<10	<10	<10	YES	YES	NS
2403	<10	15	21	<10	<10	YES	YES	NS
	<b>2/14/2013</b>	<b>2/26/2013</b>	<b>2/27/2013</b>	<b>2/28/2013</b>	<b>3/11/2013</b>			
2103	<10	11	<10	<10	<10	YES	YES	NS
2104	<10	10	<10	<10	11	YES	YES	NS
2183	<10	<10	10	<10	<10	YES	YES	NS
2203	<10	10	<10	<10	11	YES	YES	NS
2223	<10	<10	<10	<10	16	YES	YES	NS
2303	<10	<10	<10	<10	<10	YES	YES	NS
2351	<10	<10	<10	<10	<10	YES	YES	NS
2403	<10	<10	<10	<10	<10	YES	YES	NS
	<b>4/24/2013</b>	<b>4/29/2013</b>	<b>5/7/2013</b>	<b>5/9/2013</b>	<b>5/20/2013</b>			
2103	<10	<10	<10	<10	<10	YES	YES	NS
2104	<10	<10	<10	10	<10	YES	YES	NS
2183	<10	<10	<10	<10	<10	YES	YES	NS
2203	<10	<10	<10	<10	<10	YES	YES	NS
2223	<10	<10	<10	<10	<10	YES	YES	NS
2303	<10	<10	<10	<10	<10	YES	YES	NS
2351	10	<10	<10	<10	<10	YES	YES	NS
2403	10	<10	<10	<10	<10	YES	YES	NS

**California Ocean Plan Recreational Water Standards**

30-day geometric mean: Density less than 35 per 100 mL

Singles sample: Density less than 104 per 100 mL

**USEPA Primary Recreation Criteria in Federal Waters**

30-day geometric mean: Density less than 35 per 100 mL

Singles sample: Density less than 501 per 100 mL for infrequent use.

NS = Not sampled



**Table B-4. Summary of floatable material by station group (station) observed during 28-station grid water quality surveys, July 2012 through June 2013. 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	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	2203, 2204	2206	2205	
Trash/Debris (black tar, ash from brush fires) <sup>1</sup>	0	0	0	0	0	0	0	0
Biological Material (kelp)	0	0	3	0	0	0	0	3
NFMO <sup>2</sup>	0	0	0	0	0	0	0	0
<b>Totals</b>	0	0	0	0	0	0	0	0

<sup>1</sup> Concluded to be not of sewage origin.

<sup>2</sup> No floatable material observed.

**Table B-5. Summary of floatable material by station group (station) observed during REC-1 water quality surveys, July 2012 through June 2013. Individual stations may have multiple types of debris.**

Orange County Sanitation District, California.

Surface Observation	Station Group				Totals
	Downcoast Nearshore	Upcoast Nearshore	Nearfield Nearshore	Within ZID	
	2103, 2104, 2183	2223, 2303 2351, 2403	2203	2205	
Trash/Debris (black tar, ash from brush fires) <sup>1</sup>	0	0	0	0	0
Biological Material (kelp)	0	0	0	0	0
NFMO <sup>2</sup>	0	0	0	0	0
<b>Totals</b>	0	0	0	0	0

<sup>1</sup> Concluded to be not of sewage origin.

<sup>2</sup> No floatable material observed.

**Table B-6. Demersal fish abundance by station, family, and species collected by trawl in summer (July/August 2012) and winter (March/April 2013) OSCD monitoring surveys.**

Orange County Sanitation District

Family	Species	T0	T2	T24	T6	T18	T23	T22	T1	T12	T17	T11	T10	T25	T14	T19	Total Abundance By Species	Total Abundance By Family
<b>Nominal Depth</b>		18	35	36	36	36	58	60	55	57	60	60	137	137	137	137		
<b># Hauls</b>		1	1	1	1	1	2	2	2	2	2	2	1	1	1	1		
<b>Paralichthyidae (Sand Flounders)</b>																		6,060
	<i>Citharichthys sordidus</i>		17	145	96	28	522	704	405	541	162	277	767	258	886	680	5,488	
	<i>Citharichthys stigmæus</i>	81	37	44	51	134											347	
	<i>Citharichthys xanthostigma</i>		26	28	2				1	3	6	1					67	
	<i>Hippoglossina stomata</i>		8	15	6		24	33	12	36	2	10	8		2		156	
	<i>Xystreureys liolepis</i>									2							2	
<b>Hexagrammidae (greenlings)</b>																		1,694
	<i>Ophiodon elongatus</i>						4	2	3	3			4	4		3	23	
	<i>Zaniolepis frenata</i>						10	4					16	13	15	7	65	
	<i>Zaniolepis latipinnis</i>		35	3	4		285	59	122	289	227	567	2	7		6	1,606	
<b>Synodontidae (Lizardfish)</b>																		1,439
	<i>Synodus lucioceps</i>	28	16	62	139	30	76	32	24	221	272	253	1	13	13	259	1,439	
<b>Pleuronectidae (righteye flounders)</b>																		863
	<i>Eopsetta jordani</i>													1	1		2	
	<i>Lyopsetta exilis</i>												31	6	41	30	108	
	<i>Microstomus pacificus</i>						10	8	2	20	9	9	14	8	28	18	126	
	<i>Parophrys vetulus</i>	1	3	7	1	1	4	10	64	50	118	130	14	18	10	24	455	
	<i>Pleuronichthys decurrens</i>						1										1	
	<i>Pleuronichthys verticalis</i>	1	2	12	3	2	35	7	31	8	12	53	3		1	1	171	
<b>Cottidae (sculpins)</b>																		755
	<i>Chitonotus pugetensis</i>		8	4	4	1	20	9	5	11	4	15					81	
	<i>Icelinus quadriseriatus</i>		48	48	17	1	33	73	45	167	140	102					674	

Table B-6 continues.

Table B-6 continued.

Family	Species	T0	T2	T24	T6	T18	T23	T22	T1	T12	T17	T11	T10	T25	T14	T19	Total Abundance By Species	Total Abundance By Family
Nominal Depth		18	35	36	36	36	58	60	55	57	60	60	137	137	137	137		
# Hauls		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
<b>Scorpaenidae (Scorpionfishes)</b>																		319
	<i>Scorpaena guttata</i>						16	5	1			2						24
	<i>Sebastes dallii</i>						3		7	2	2	2						16
	<i>Sebastes elongatus</i>												4	3	3			10
	<i>Sebastes eos</i>						1						1					2
	<i>Sebastes levis</i>													2				2
	<i>Sebastes miniatus</i>									1								1
	<i>Sebastes saxicola</i>									1			87	27	42	28		185
	<i>Sebastes semicinctus</i>						10	1	1		4	30	5	2				53
	<i>Sebastes serriceps</i>						1					2						3
	<i>Sebastes sp.</i>						11	1	10	1								23
<b>Embiotocidae (surfperches)</b>																		220
	<i>Cymatogaster aggregata</i>								1									1
	<i>Zalemnius rosaceus</i>						31	11	33	43	1	100						219
<b>Cynoglossidae (tonguefishes)</b>																		207
	<i>Symphurus atricaudus</i>		6	5	6		85	36	33	10	4	22						207
<b>Batrachoididae (Toadfishes)</b>																		132
	<i>Porichthys notatus</i>	1	1				18	12	17	44	23	12	1	3				132
<b>Zoarcidae (eelpouts)</b>																		52
	<i>Lycodes pacificus</i>						1						13	9	16	13		52
<b>Agonidae (Poachers)</b>																		45
	<i>Agonopsis sterletus</i>							1							1			2
	<i>Odontopyxis trispinosa</i>			3			8	7	8	12	3	1	1					43
<b>Rajidae (skates)</b>																		18
	<i>Raja inornata</i>			1		1	3	3	2	7	1							18
<b>Ophidiidae (cusk-eels)</b>																		11
	<i>Chilara taylori</i>						3				1		2	2	1	2		11

Table B-6 continues.

Table B-6 continued.

Family	Species	T0	T2	T24	T6	T18	T23	T22	T1	T12	T17	T11	T10	T25	T14	T19	Total Abundance By Species	Total Abundance By Family
<b>Nominal Depth</b>		18	35	36	36	36	58	60	55	57	60	60	137	137	137	137		
<b># Hauls</b>		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
<b>Sciaenidae (drums and croakers)</b>																		2
	<i>Genyonemus lineatus</i>							1		1							2	
<b>Argentinidae (argentinids)</b>																		1
	<i>Argentina sialis</i>														1		1	
<b>Merlucciidae (merlucciid hakes)</b>																		1
	<i>Merluccius productus</i>														1		1	
<b>Moridae (codlings)</b>																		1
	<i>Physiculus rastrelliger</i>														1		1	
<b>Serranidae (sea basses and groupers)</b>																		1
	<i>Paralabrax nebulifer</i>	1															1	
<b>Torpedinidae (torpedo electric rays)</b>																		1
	<i>Torpedo californica</i>															1	1	
<b>Total Abundance</b>		113	207	377	329	198	1,215	1,019	827	1,473	991	1,588	974	376	1,063	1,072	11,822	
<b>Total No. of Species</b>		6	12	13	11	8	25	21	21	22	18	18	18	16	17	13	42	

B.7

**Table B-7. Total biomass (kg) of demersal fish by station and species collected by trawl in summer (July/August 2012) and winter (March/April 2013) OCSD monitoring surveys.**

Orange County Sanitation District, California.

Species	T0	T2	T24	T6	T18	T23	T22	T1	T12	T17	T11	T10	T25	T14	T19	Total	%
Nominal Depth	18	35	36	36	55	55	60	57	60	60	60	137	137	137	137		
# Hauls	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1		
<i>Citharichthys sordidus</i>		0.100	6.008	2.638	0.871	21.372	45.042	31.940	20.054	6.249	5.879	9.625	7.202	9.254	3.186	169.420	52.2
<i>Parophrys vetulus</i>	0.080	0.430	0.763	0.150	0.280	0.357	0.742	7.087	3.721	8.806	9.854	2.036	1.694	1.015	2.161	39.176	12.1
<i>Synodus lucioceps</i>	0.721	0.250	0.795	1.394	0.339	1.452	0.551	0.502	3.421	3.375	3.127	0.082	0.216	0.365	4.201	20.791	6.4
<i>Zaniolepis latipinnis</i>		0.261	0.036	0.024		4.100	0.668	1.764	1.630	1.081	4.116	0.077	0.037		0.054	13.848	4.3
<i>Pleuronichthys verticalis</i>	0.160	0.515	0.344	0.280	0.206	2.986	1.180	2.433	0.513	0.894	3.420	0.428		0.080	0.095	13.534	4.2
<i>Hippoglossina stomata</i>		0.246	0.784	0.222		0.686	1.800	0.571	1.483	0.055	0.392	0.898		0.195		7.332	2.3
<i>Scorpaena guttata</i>						4.244	1.275	0.435			0.523					6.477	2.0
<i>Symphurus atricaudus</i>		0.121	0.101	0.185		2.544	0.980	1.454	0.263	0.105	0.549					6.302	1.9
<i>Citharichthys xanthostigma</i>		1.965	2.221	0.038				0.148	0.235	0.842	0.093					5.542	1.7
<i>Microstomus pacificus</i>						0.511	0.448	0.210	1.097	0.359	0.197	0.600	0.436	1.250	0.228	5.336	1.6
<i>Porichthys notatus</i>	0.085	0.018				0.522	0.469	0.776	1.369	0.461	0.284	0.091	0.229			4.304	1.3
<i>Citharichthys stigmaeus</i>	0.902	0.388	0.365	0.539	1.901											4.095	1.3
<i>Raja inornata</i>			0.185		0.280	0.902	0.920	1.430	0.236	0.034						3.987	1.2
<i>Lyopsetta exilis</i>												1.633	0.187	1.167	0.658	3.645	1.1
<i>Sebastes saxicola</i>									0.002			1.755	0.459	0.989	0.380	3.585	1.1
<i>Icelinus quadriseriatus</i>		0.210	0.204	0.082	0.003	0.205	0.406	0.247	0.907	0.754	0.556					3.574	1.1
<i>Torpedo californica</i>															2.400	2.400	0.7
<i>Zalembius rosaceus</i>						0.419	0.325	0.340	0.346	0.038	0.601					2.069	0.6
<i>Lycodes pacificus</i>						0.041						0.446	0.326	0.574	0.588	1.975	0.6
<i>Zaniolepis frenata</i>						0.303	0.144					0.207	0.235	0.227	0.105	1.221	0.4
<i>Ophiodon elongatus</i>						0.580	0.075	0.098	0.121			0.121	0.110		0.098	1.203	0.4
<i>Chitonotus pugetensis</i>		0.076	0.021	0.018	0.005	0.279	0.138	0.074	0.165	0.048	0.190					1.014	0.3
<i>Eopsetta jordani</i>													0.360	0.500		0.860	0.3
<i>Sebastes semicinctus</i>						0.221	0.005	0.003		0.004	0.305	0.146	0.043			0.727	0.2
<i>Paralabrax nebulifer</i>	0.425															0.425	0.1
<i>Sebastes dallii</i>						0.075		0.210	0.030	0.029	0.023					0.367	0.1
<i>Sebastes elongatus</i>												0.097	0.094	0.109		0.300	0.1

B.8

Table B-7 continues.

Table B-7 continued.

Station	T0	T2	T24	T6	T18	T23	T22	T1	T12	T17	T11	T10	T25	T14	T19	Total	%
Nominal Depth	18	35	36	36	55	55	60	57	60	60	60	137	137	137	137		
# Hauls	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1		
<i>Chilara taylori</i>						0.045				0.014		0.061	0.082	0.027	0.039	0.268	0.1
<i>Merluccius productus</i>														0.230		0.230	0.1
<i>Genyonemus lineatus</i>							0.095		0.110							0.205	0.1
<i>Xystreurys liolepis</i>									0.159							0.159	< 0.1
<i>Odontopyxis trispinosa</i>			0.005			0.017	0.017	0.024	0.031	0.004	0.002	0.003				0.103	< 0.1
<i>Pleuronichthys decurrens</i>						0.058										0.058	< 0.1
<i>Physiculus rastrelliger</i>														0.044		0.044	< 0.1
<i>Sebastes eos</i>						0.034						0.006				0.040	< 0.1
<i>Sebastes levis</i>													0.024			0.024	< 0.1
<i>Sebastes sp</i>						0.011	0.001	0.010	0.001							0.023	< 0.1
<i>Cymatogaster aggregata</i>								0.018								0.018	< 0.1
<i>Sebastes miniatus</i>									0.018							0.018	< 0.1
<i>Agonopsis sterletus</i>								0.013						0.004		0.017	< 0.1
<i>Sebastes serriceps</i>						0.002					0.011					0.013	< 0.1
<i>Argentina sialis</i>														0.001		0.001	< 0.1
<b>Total Biomass</b>	<b>2.373</b>	<b>4.580</b>	<b>11.832</b>	<b>5.570</b>	<b>3.885</b>	<b>41.966</b>	<b>55.294</b>	<b>49.774</b>	<b>35.912</b>	<b>23.152</b>	<b>30.122</b>	<b>18.312</b>	<b>11.734</b>	<b>16.031</b>	<b>14.193</b>	<b>324.730</b>	<b>100</b>

B.9

**Table B-8. Total abundance of epibenthic macroinvertebrates by station and species collected by trawl in summer (July/August 2012) and winter (March/April 2013) OCSD monitoring surveys.**

Orange County Sanitation District, California.

Species	T0	T2	T24	T6	T18	T23	T22	T1	T12	T17	T11	T10	T25	T14	T19	Total
Nominal Depth	18	35	36	36	36	58	60	55	57	60	60	137	137	137	137	
# Hauls	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	
<i>Ophiura luetkenii</i>	11	9	313	2,219	776	37	163	366	133	20	11		1	1		4,060
<i>Lytechinus pictus</i>			4	300	237	628	46	510	37	153	190	116	414	78	4	2,717
<i>Thesea</i> sp.	1	4	48	21	2	144	137	69	31	12	86				1	556
<i>Sicyonia ingentis</i>		3	1	1		4	4	3	13	63	25	84	64	78	18	361
<i>Hamatoscalpellum californicum</i>	2	19	49	12	3	43	31	31	40	4	88			5		327
<i>Pleurobranchaea californica</i>		6	27	18	1	20	12	10	7	5	7	6	9	7	3	138
<i>Luidia foliolata</i>		5	6	3	3	18	11	7	2	10	10	5	5	4	5	94
<i>Astropecten californicus</i>	4			3		9	11	31	6							64
<i>Acanthoptilum</i> sp.						11	13	13	14	4	1					56
<i>Acanthodoris brunnea</i>			4			10	6	6	4	1	1	7	7	7		53
<i>Philine auriformis</i>		1	4	2		3	7	2	2		1					22
<i>Luidia asthenosoma</i>			1	3		2		4	3	2	2	1	2		1	21
<i>Ophiothrix spiculata</i>				1		4	1	1	5				5	1		18
<i>Octopus rubescens</i>						3			3			3	1	3	2	15
<i>Parastichopus californicus</i>						5	3	3			1					12
<i>Parastichopus</i> sp. A															10	10
<i>Heterocrypta occidentalis</i>			7	1		1										9
<i>Ceratostoma nuttalli</i>				5												5
<i>Neocrangon resima</i>												1			4	5
<i>Neosimnia</i> sp.							4				1					5
<i>Platymera gaudichaudii</i>			1		1		1		2							5
<i>Romaleon antennarius</i>	5															5
<i>Crangon nigromaculata</i>	4															4
<i>Loxorhynchus crispatus</i>			1	2					1							4
<i>Pyromaia tuberculata</i>	2		1				1									4
<i>Rossia pacifica</i>									1	1					2	4
<i>Amphichondrius granulatus</i>						1					1					2

B.10

Table B-8 continues.

Table B-8 continued.

Station	T0	T2	T24	T6	T18	T23	T22	T1	T12	T17	T11	T10	T25	T14	T19	Total
Nominal Depth	18	35	36	36	36	58	60	55	57	60	60	137	137	137	137	
# Hauls	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	
<i>Amphiodia psara</i>								1			1					2
<i>Erileptus spinosus</i>			1	1												2
<i>Luidia</i> sp.										2						2
<i>Octopus californicus</i>												1		1		2
<i>Orthopagurus minimus</i>							1	1								2
<i>Ptilosarcus gurneyi</i>							1	1								2
<i>Strongylocentrotus fragilis</i>								1							1	2
<i>Antiplanes catalinae</i>														1		1
<i>Boreotrophon bentleyi</i>												1				1
<i>Calliostoma turbinum</i>											1					1
<i>Crangon alaskensis</i>														1		1
<i>Dendronotus albus</i>									1							1
<i>Dendronotus</i> sp.						1										1
<i>Euspira draconis</i>							1									1
<i>Heptacarpus brevirostris</i>	1															1
<i>Leptogorgia chilensis</i>	1															1
<i>Metacarcinus gracilis</i>		1														1
<i>Muricea californica</i>	1															1
<i>Podochela hemphilli</i>	1															1
<i>Podochela lobifrons</i>									1							1
Porcellanidae	1															1
<i>Stylasterias forreri</i>						1										1
<b>Total Abundance</b>	<b>34</b>	<b>48</b>	<b>468</b>	<b>2,592</b>	<b>1,023</b>	<b>945</b>	<b>454</b>	<b>1,060</b>	<b>306</b>	<b>277</b>	<b>427</b>	<b>225</b>	<b>508</b>	<b>187</b>	<b>51</b>	<b>8,605</b>
<b>Total No. of Species</b>	<b>12</b>	<b>8</b>	<b>15</b>	<b>15</b>	<b>7</b>	<b>19</b>	<b>19</b>	<b>18</b>	<b>19</b>	<b>12</b>	<b>16</b>	<b>10</b>	<b>9</b>	<b>12</b>	<b>11</b>	<b>49</b>

B.11



**Table B-9. Total biomass (kg) of epibenthic macroinvertebrates by station and species collected by trawl in summer (July/August 2012) and winter (March/April 2013) OCSD monitoring surveys.**

Orange County Sanitation District, California.

Species	T0	T2	T24	T6	T18	T23	T22	T1	T12	T17	T11	T10	T25	T14	T19	Total
Nominal Depth	18	35	36	36	36	58	60	55	57	60	60	137	137	137	137	
# Hauls	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	
<i>Pleurobranchaea californica</i>		0.405	0.410	0.450	0.010	2.055	1.445	1.120	1.225	0.870	1.515	0.221	1.135	0.786	0.270	11.917
<i>Lytechinus pictus</i>			0.090	0.545	0.395	2.833	0.072	0.715	0.078	0.355	0.243	0.083	0.371	0.097	0.002	5.879
<i>Sicyonia ingentis</i>		0.016	0.003	0.002		0.005	0.027	0.009	0.085	1.125	0.097	0.860	0.885	1.698	0.418	5.230
<i>Muricea californica</i>	5.170															5.170
<i>Ophiura luetkenii</i>	0.014	0.015	0.442	2.330	0.970	0.028	0.157	0.745	0.150	0.005	0.012		0.001	0.001		4.870
<i>Parastichopus californicus</i>						2.185	0.875	1.305			0.480					4.845
<i>Luidia foliolata</i>		0.038	0.250	0.037	0.014	0.028	0.098	0.336	0.003	0.975	0.738	0.562	0.283	0.345	0.315	4.022
<i>Octopus californicus</i>												0.431		0.471		0.902
<i>Thesea</i> sp.	0.001	0.007	0.075	0.030	0.001	0.098	0.134	0.086	0.034	0.012	0.058				0.001	0.537
<i>Astropecten californicus</i>	0.023			0.017		0.036	0.026	0.365	0.015							0.482
<i>Platymera gaudichaudii</i>			0.165		0.091		0.002		0.205							0.463
<i>Octopus rubescens</i>						0.135			0.105			0.051	0.010	0.091	0.029	0.421
<i>Parastichopus</i> sp. A															0.248	0.248
<i>Metacarcinus gracilis</i>		0.190														0.190
<i>Ptilosarcus gurneyi</i>							0.117	0.045								0.162
<i>Strongylocentrotus fragilis</i>								0.001							0.155	0.156
<i>Hamatoscalpellum californicum</i>	0.001	0.002	0.026	0.010	0.001	0.012	0.011	0.012	0.006	0.001	0.015			0.002		0.099
<i>Leptogorgia chilensis</i>	0.060															0.060
<i>Acanthoptilum</i> sp.						0.012	0.014	0.019	0.009	0.002	0.001					0.057
<i>Rossia pacifica</i>									0.015	0.011					0.027	0.053
<i>Luidia asthenosoma</i>			0.004	0.005		0.002		0.008	0.010	0.006	0.004	0.001	0.007		0.001	0.048
<i>Acanthodoris brunnea</i>			0.001			0.014	0.003	0.002	0.002	0.001	0.001	0.003	0.003	0.003		0.033
<i>Ophiothrix spiculata</i>				0.001		0.004	0.001	0.001	0.005				0.016	0.001		0.029
<i>Heterocrypta occidentalis</i>			0.013	0.002		0.001										0.016
<i>Crangon nigromaculata</i>	0.011															0.011
<i>Philine auriformis</i>		0.001	0.002	0.001		0.001	0.003	0.001	0.001		0.001					0.011
<i>Loxorhynchus crispatus</i>			0.001	0.002					0.007							0.010

Table B-9 continues.

Table B-9 continued.

Station	T0	T2	T24	T6	T18	T23	T22	T1	T12	T17	T11	T10	T25	T14	T19	Total
Nominal Depth	18	35	36	36	36	58	60	55	57	60	60	137	137	137	137	
# Hauls	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	
<i>Antiplanes catalinae</i>														0.008		0.008
<i>Neosimnia</i> sp.							0.005				0.001					0.006
<i>Romaleon antennarius</i>	0.005															0.005
<i>Pyromaia tuberculata</i>	0.002		0.001					0.001								0.004
<i>Ceratostoma nuttalli</i>				0.003												0.003
<i>Neocrangon resima</i>												0.001			0.002	0.003
<i>Amphichondrius granulatus</i>						0.001					0.001					0.002
<i>Amphiodia psara</i>								0.001			0.001					0.002
<i>Dendronotus albus</i>									0.002							0.002
<i>Dendronotus</i> sp.						0.002										0.002
<i>Erileptus spinosus</i>			0.001	0.001												0.002
<i>Orthopagurus minimus</i>							0.001	0.001								0.002
<i>Boreotrophon bentleyi</i>												0.001				0.001
<i>Calliostoma turbinum</i>											0.001					0.001
<i>Crangon alaskensis</i>														0.001		0.001
<i>Euspira draconis</i>							0.001									0.001
<i>Heptacarpus brevis</i>	0.001															0.001
<i>Luidia</i> sp.										0.001						0.001
<i>Podochela hemphilli</i>	0.001															0.001
<i>Podochela lobifrons</i>									0.001							0.001
Porcellanidae	0.001															0.001
<i>Stylasterias forreri</i>						0.001										0.001
<b>Total Biomass</b>	5.290	0.674	1.484	3.436	1.482	7.453	2.993	4.772	1.958	3.364	3.169	2.214	2.711	3.504	1.468	45.972

B.13

**Table B-10. Results of muscle tissue contaminant analysis of sport fish collected at outfall (Zone 1) and reference (Zone 2)\* areas in July, 2012.**

Orange County Sanitation District, California.

Station	Species	Common Name	Std. Length (mm)	Lipids (%)	Hg (mg/kg)	Total DDT** (ng/g)	Total PCB** (ng/g)
RF1-EGRS	<i>Sebastes dallii</i>	Calico Rockfish	145	0.629	0.061	15.48	0.00
RF1-EGRS	<i>Sebastes dallii</i>	Calico Rockfish	145	1.340	0.042	15.40	0.00
RF1-EGRS	<i>Sebastes dallii</i>	Calico Rockfish	153	0.533	0.096	23.08	9.94
RF1-BEND	<i>Sebastes dallii</i>	Calico Rockfish	135	0.647	0.049	10.03	0.00
RF1-BEND	<i>Sebastes dallii</i>	Calico Rockfish	129	0.699	0.098	29.18	0.00
RF1-BEND	<i>Sebastes eos</i>	Pink Rockfish	175	0.659	0.095	19.12	0.00
RF1-BEND	<i>Sebastes auriculatus</i>	Brown Rockfish	220	0.313	0.065	44.73	0.00
RF1-BEND	<i>Sebastes dallii</i>	Calico Rockfish	150	0.357	0.094	21.46	0.00
RF1-BEND	<i>Sebastes eos</i>	Pink Rockfish	153	0.490	0.062	26.33	0.00
RF1-BEND	<i>Sebastes eos</i>	Pink Rockfish	162	0.277	0.083	23.57	0.00
<b>Mean</b>			<b>157</b>	<b>0.594</b>	<b>0.074</b>	<b>22.84</b>	<b>0.99</b>
<b>Standard deviation</b>			<b>25.7</b>	<b>0.303</b>	<b>0.021</b>	<b>9.55</b>	<b>3.14</b>
California No Consumption Advisory Tissue Level (ATL)					0.44***	2100	120
FDA Action Level for edible tissue					1.0***	5000	2000****

\* No target species were collected in the reference area (Zone 2) during 2012.

\*\* Data for total DDT, total PCB, and total other chlorinated pesticides are lipid-normalized

\*\*\* Methyl mercury can be measured as total mercury; Mercury ATL is level of methylmercury for women (18-45 yrs. of age) and children (1-17 yrs. of age); FDA mercury action level is for methylmercury.

\*\*\*\* FDA PCBs level is listed as a tolerance level as no action level exists as yet.

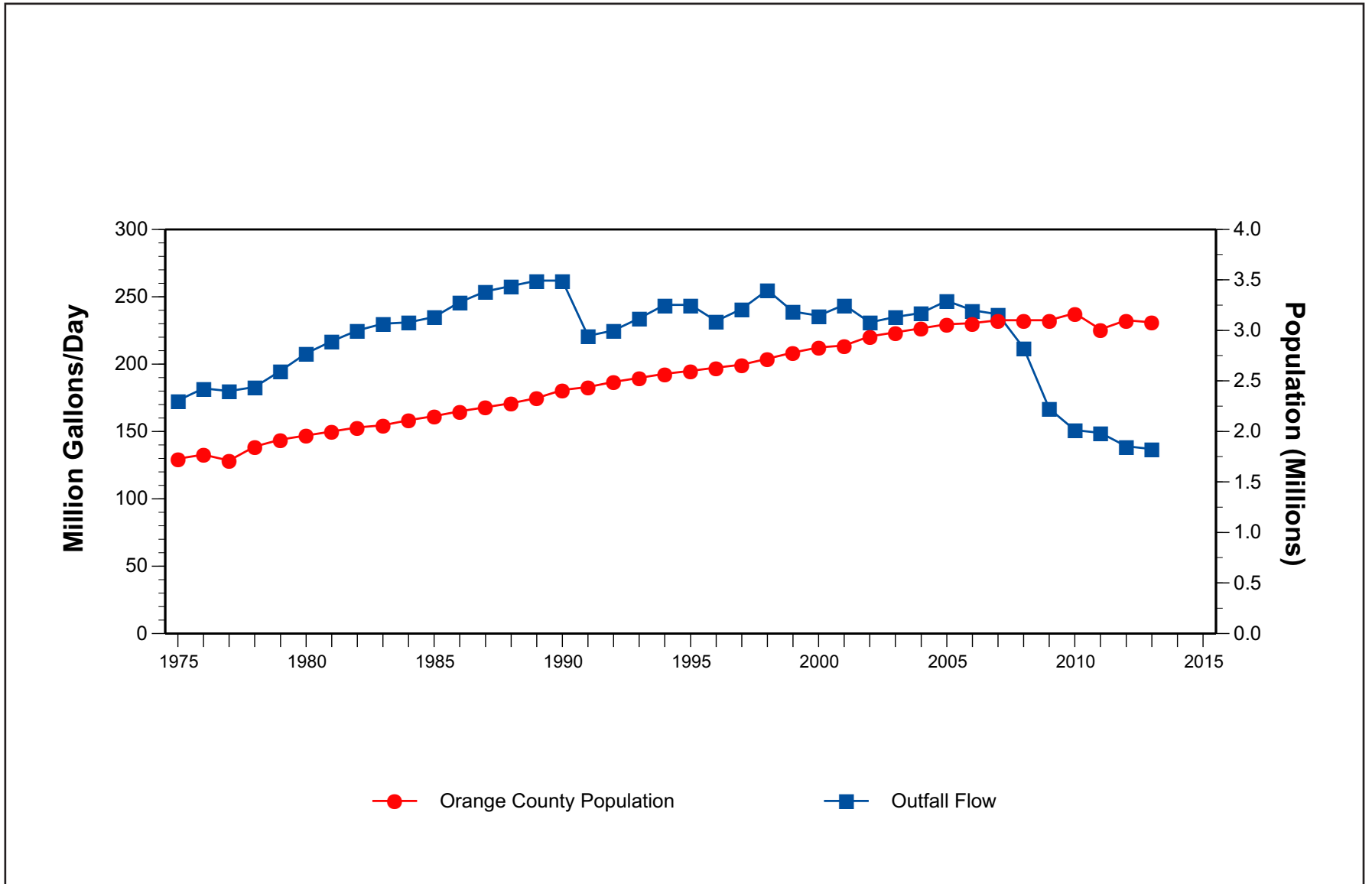
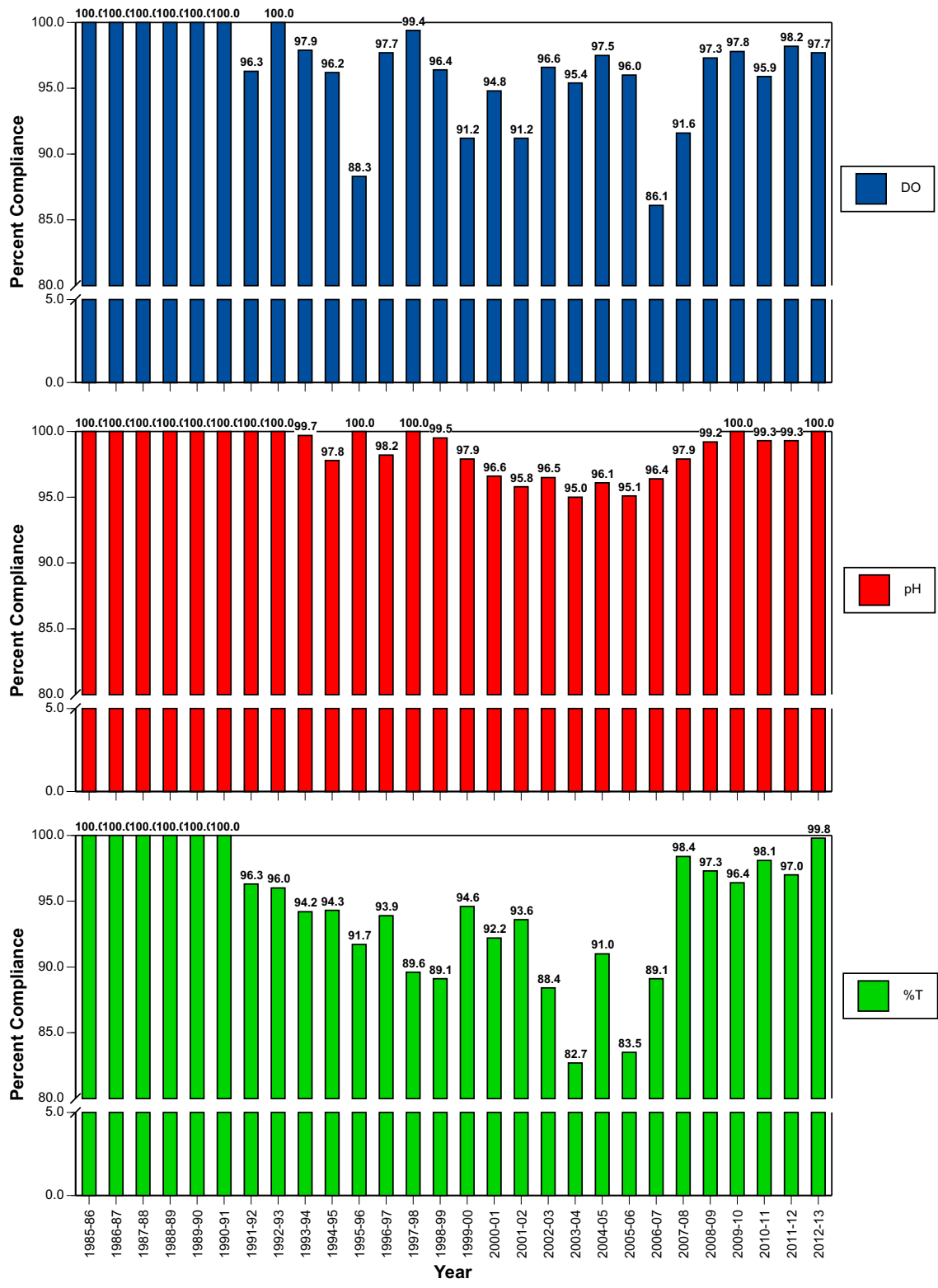


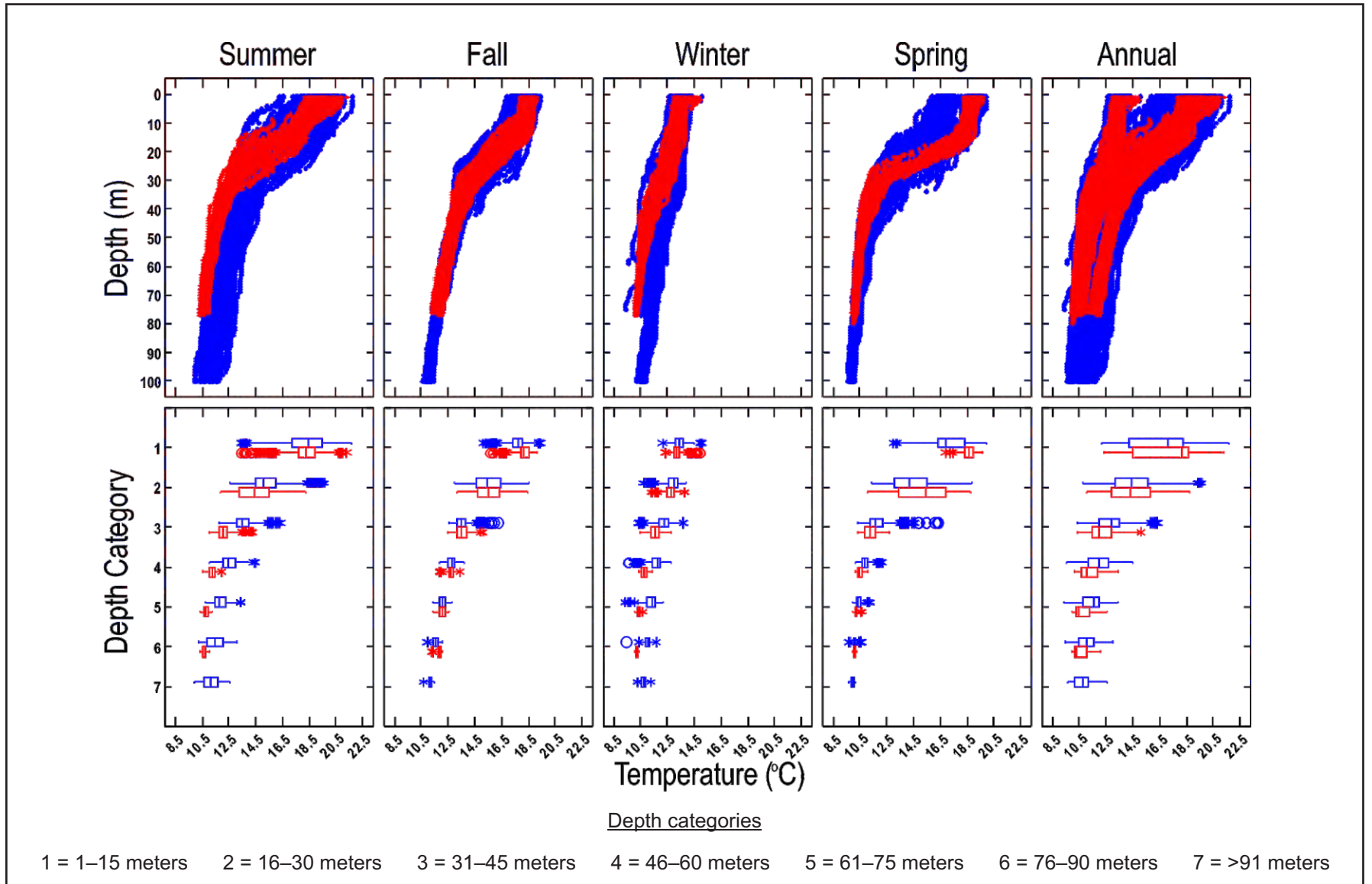
Figure B-1. Long-term trends in the District's effluent flow compared to Orange County population, 1975–2013.

Orange County Sanitation District, California.



**Figure B-2. Summary of mean percent compliance for dissolved oxygen, pH, and light transmissivity for all stations compared to reference stations, 1985–2013.**

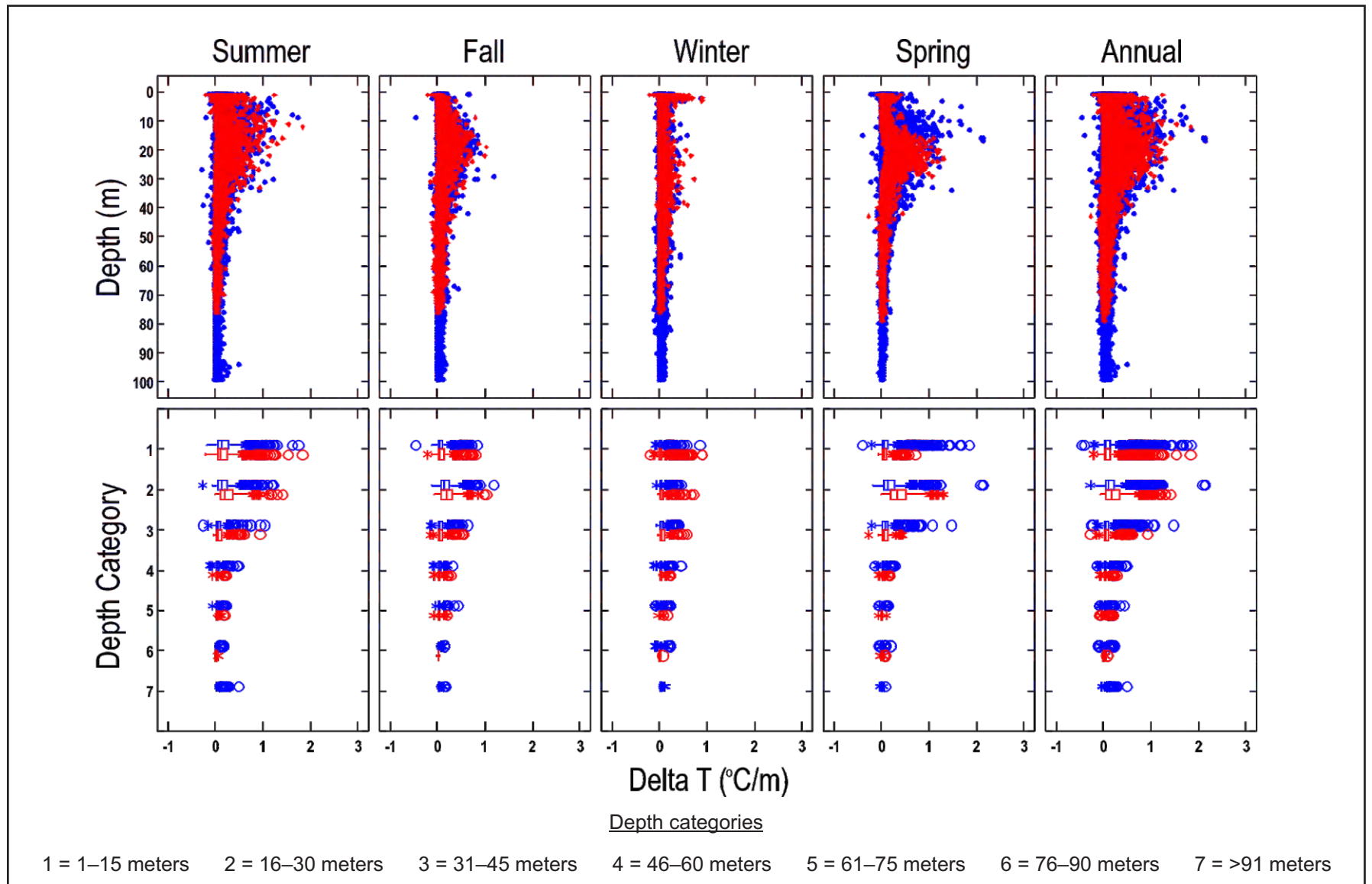
Orange County Sanitation District, California.



**Figure B-3. Seasonal scatter and box plots of temperature (°C) for the Central Bight Regional Water Quality Monitoring Program (blue) and OCSD stations (red), July 2012 through June 2013.**

Central Bight data includes the City of Oxnard, City of Los Angeles, LACSD, and OCSD.

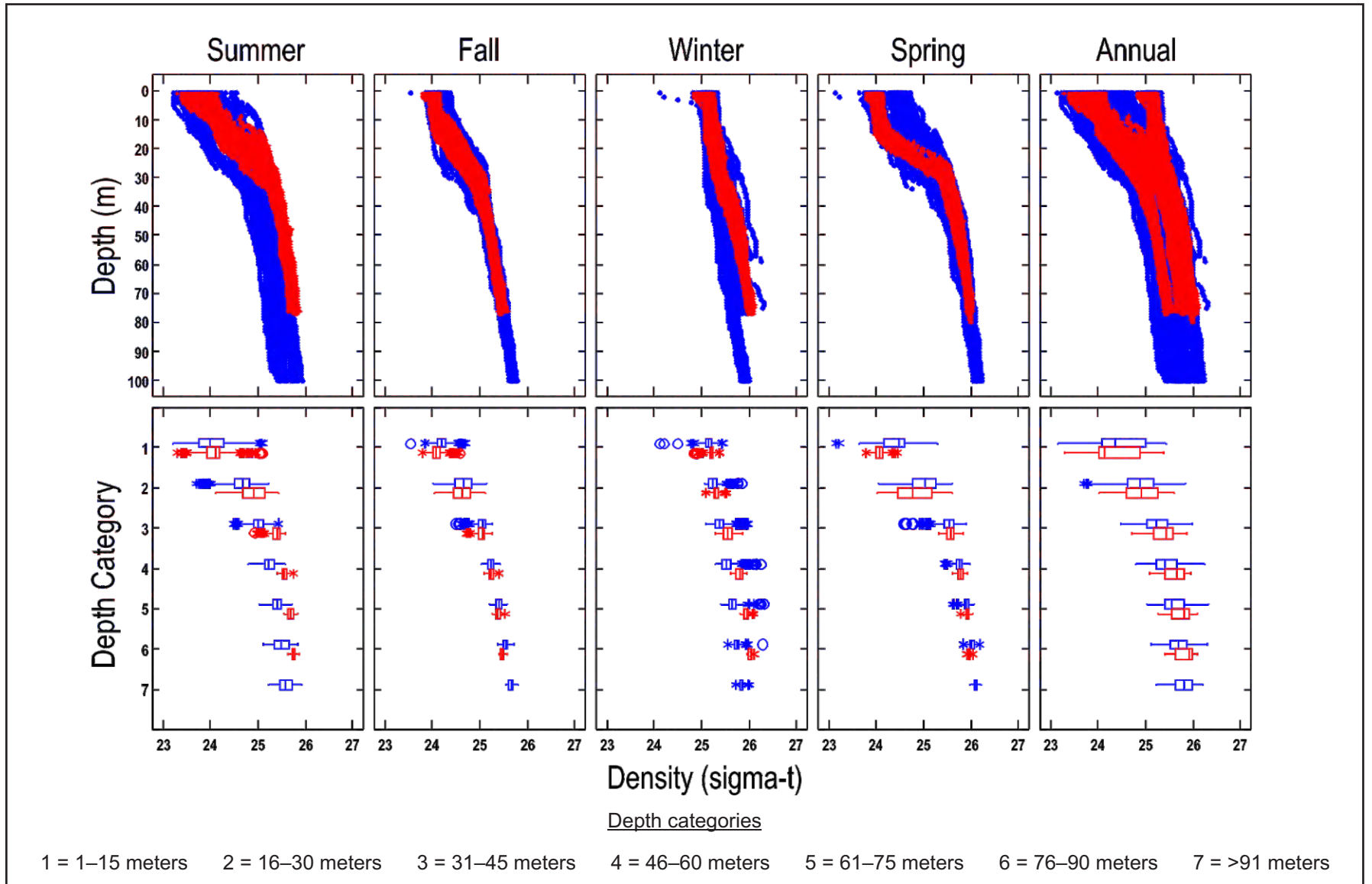
Orange County Sanitation District, California.



**Figure B-4.** Seasonal scatter and box plots of delta T ( $^{\circ}\text{C}$ ) for the Central Bight Regional Water Quality Monitoring Program (blue) and OCSD stations (red), July 2012 through June 2013.

Central Bight data includes the City of Oxnard, City of Los Angeles, LACSD, and OCSD.

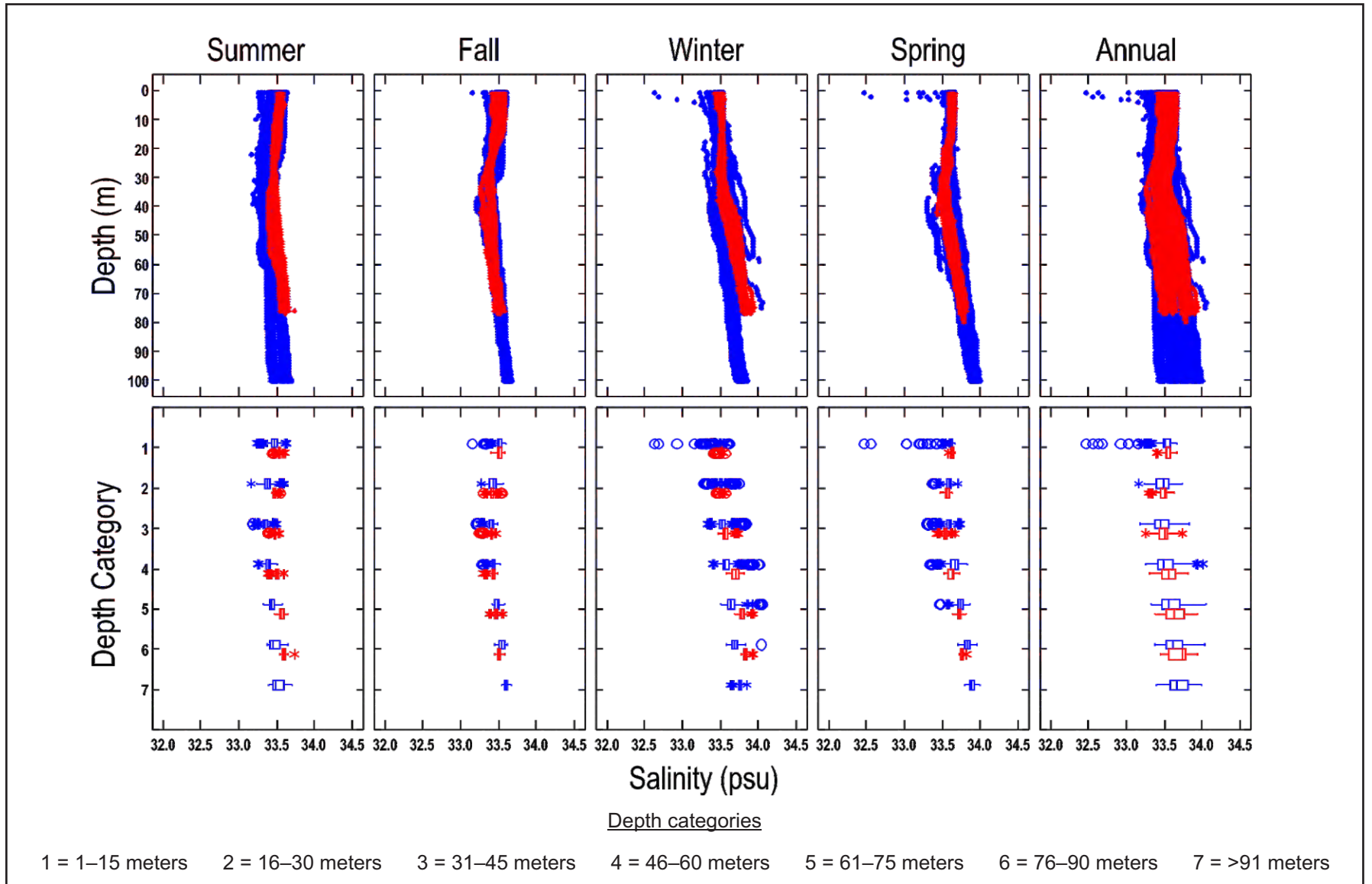
Orange County Sanitation District, California.



**Figure B-5. Seasonal scatter and box plots of density ( $\text{kg/m}^3$ ) for the Central Bight Regional Water Quality Monitoring Program (blue) and OCSD stations (red), July 2012 through June 2013.**

Central Bight data includes the City of Oxnard, City of Los Angeles, LACSD, and OCSD.  
 Orange County Sanitation District, California.

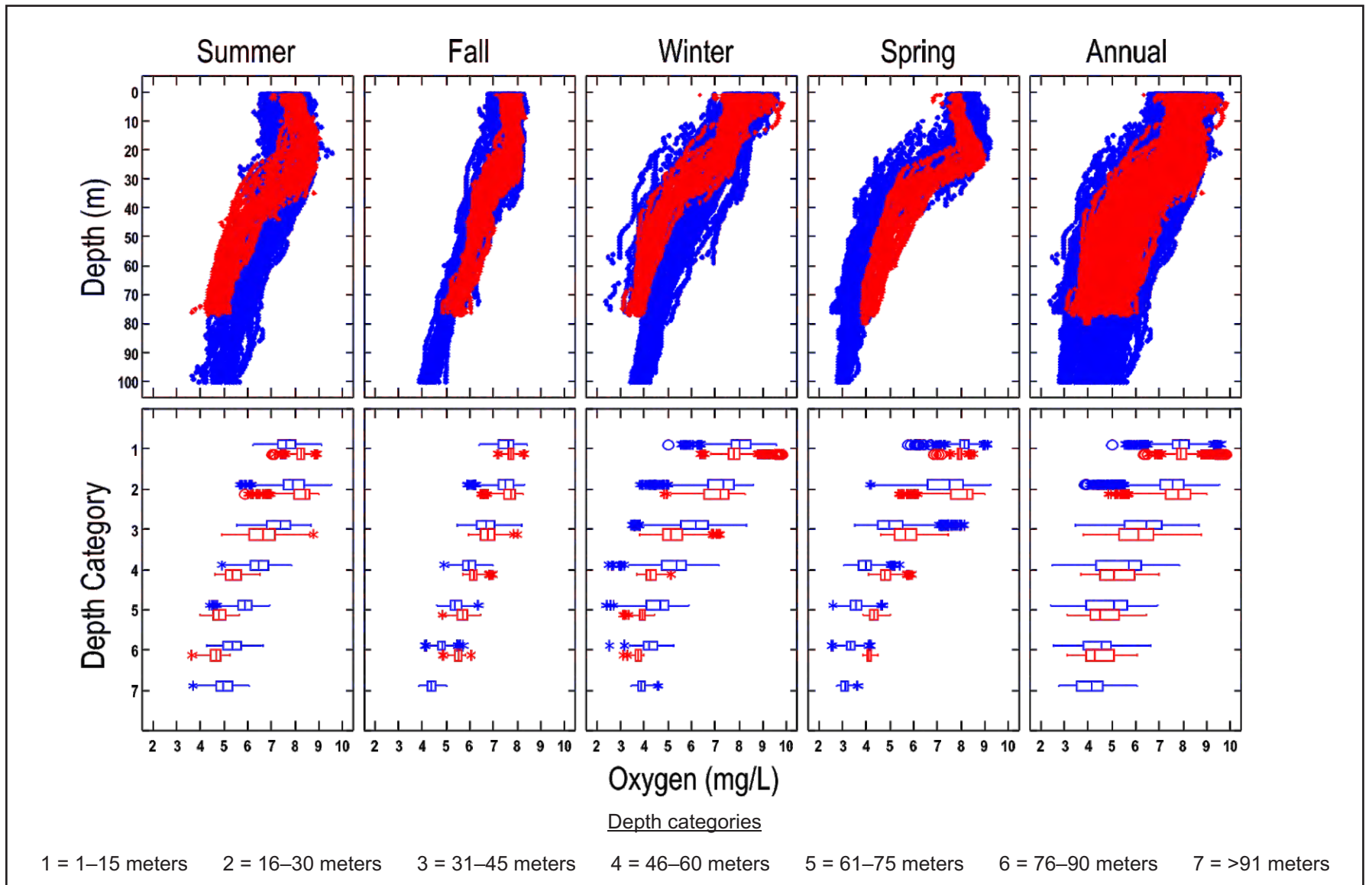




**Figure B-6. Seasonal scatter and box plots of salinity (psu) for the Central Bight Regional Water Quality Monitoring Program (blue) and OCSD stations (red), July 2012 through June 2013.**

Central Bight data includes the City of Oxnard, City of Los Angeles, LACSD, and OCSD.

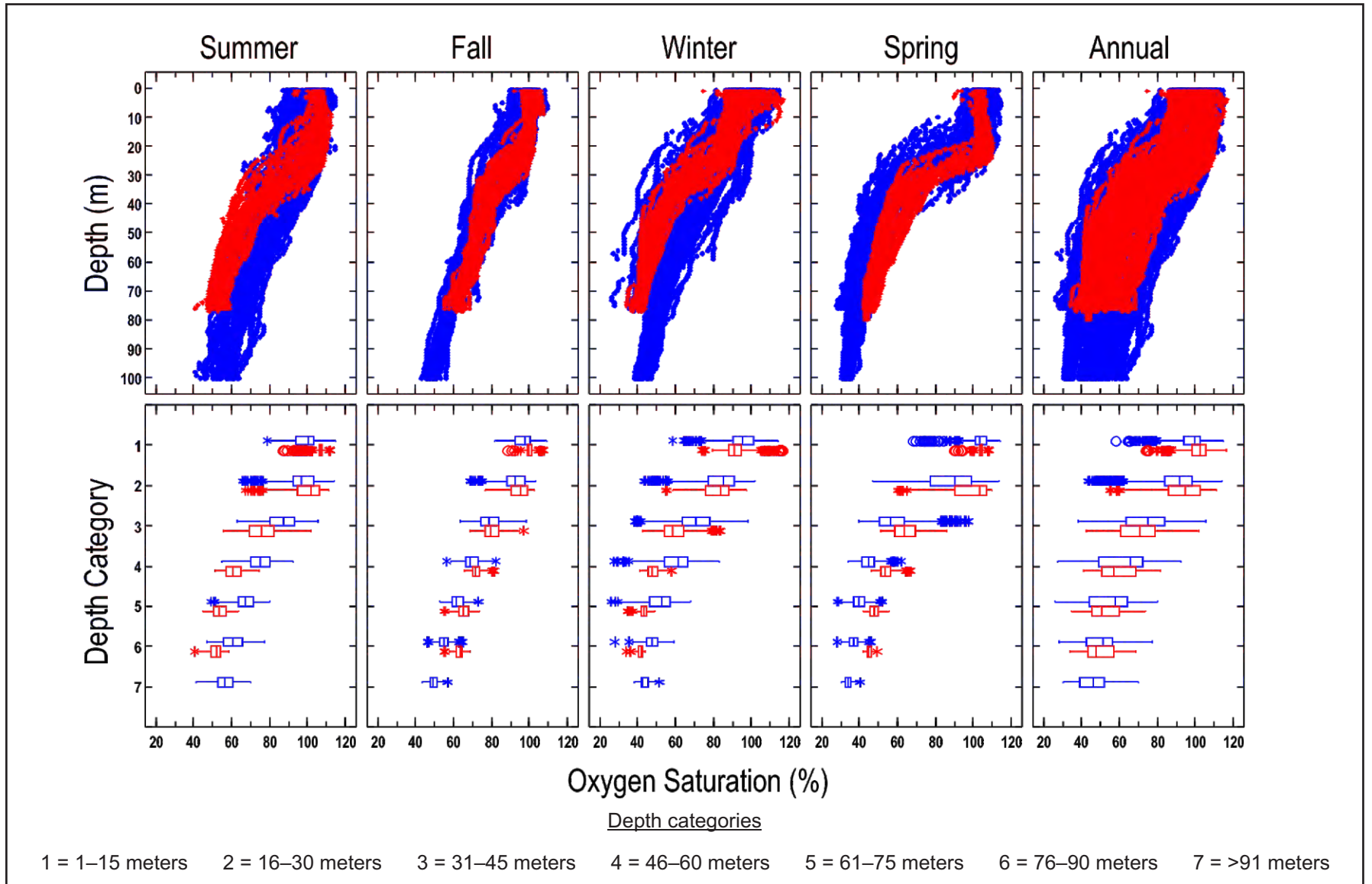
Orange County Sanitation District, California.



**Figure B-7. Seasonal scatter and box plots of dissolved oxygen (mg/L) for the Central Bight Regional Water Quality Monitoring Program (blue) and OCSD stations (red), July 2012 through June 2013.**

Central Bight data includes the City of Oxnard, City of Los Angeles, LACSD, and OCSD.

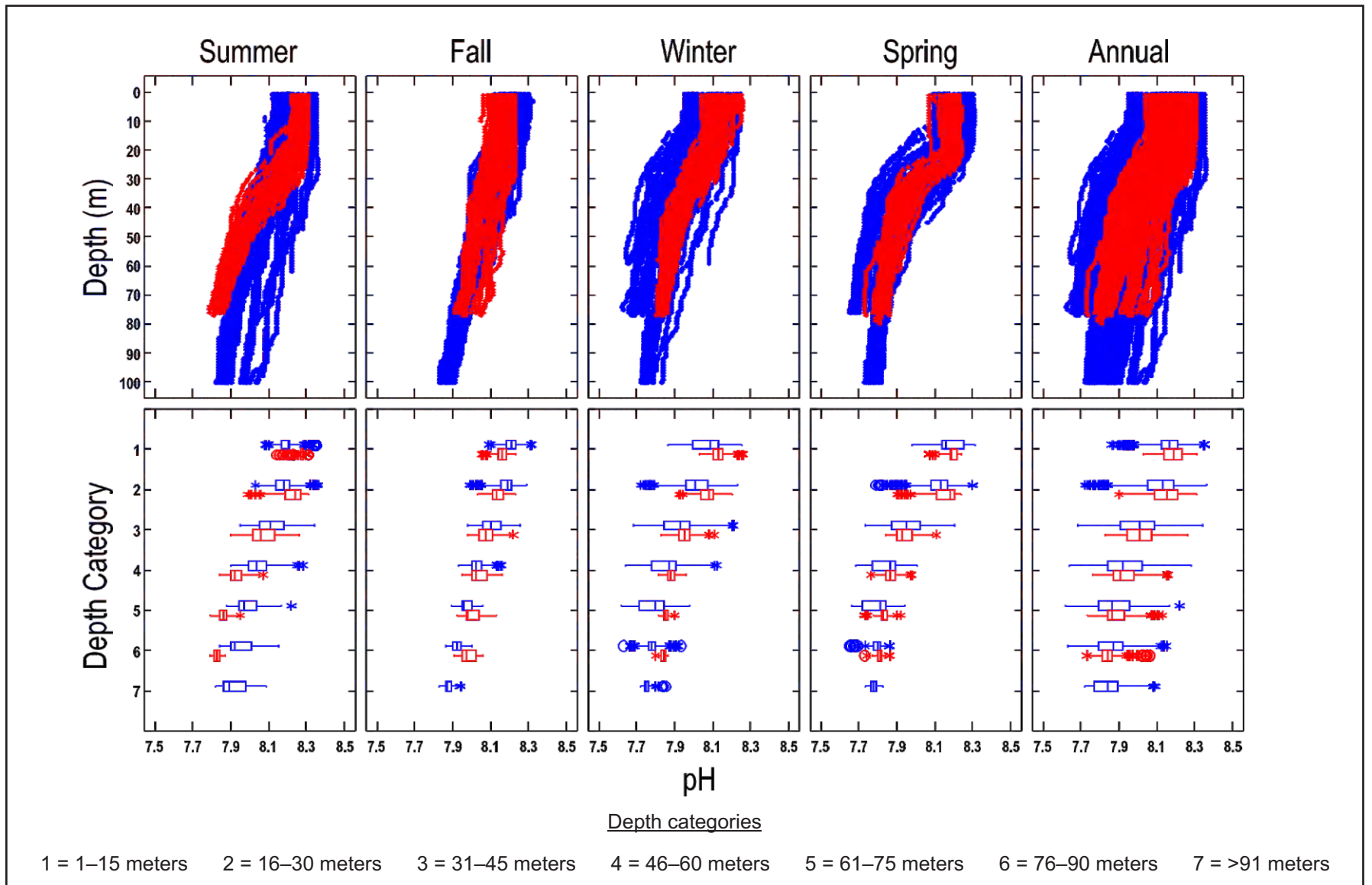
Orange County Sanitation District, California.



**Figure B-8. Seasonal scatter and box plots of oxygen saturation (%) for the Central Bight Regional Water Quality Monitoring Program (blue) and OCSD stations (red), July 2012 through June 2013.**

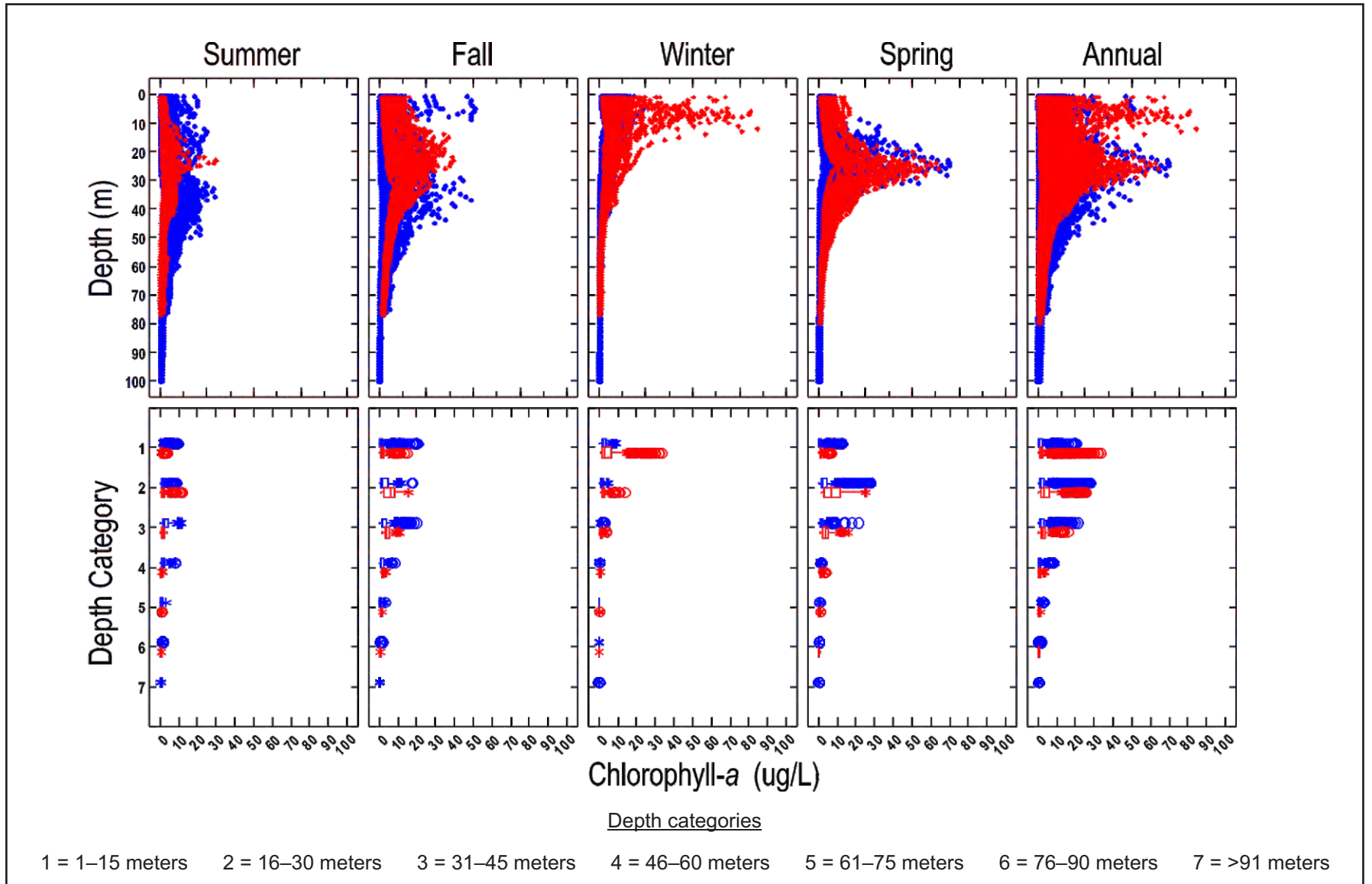
Central Bight data includes the City of Oxnard, City of Los Angeles, LACSD, and OCSD.

Orange County Sanitation District, California.



**Figure B-9. Seasonal scatter and box plots of pH (pH units) for the Central Bight Regional Water Quality Monitoring Program (blue) and OCSD stations (red), July 2012 through June 2013.**

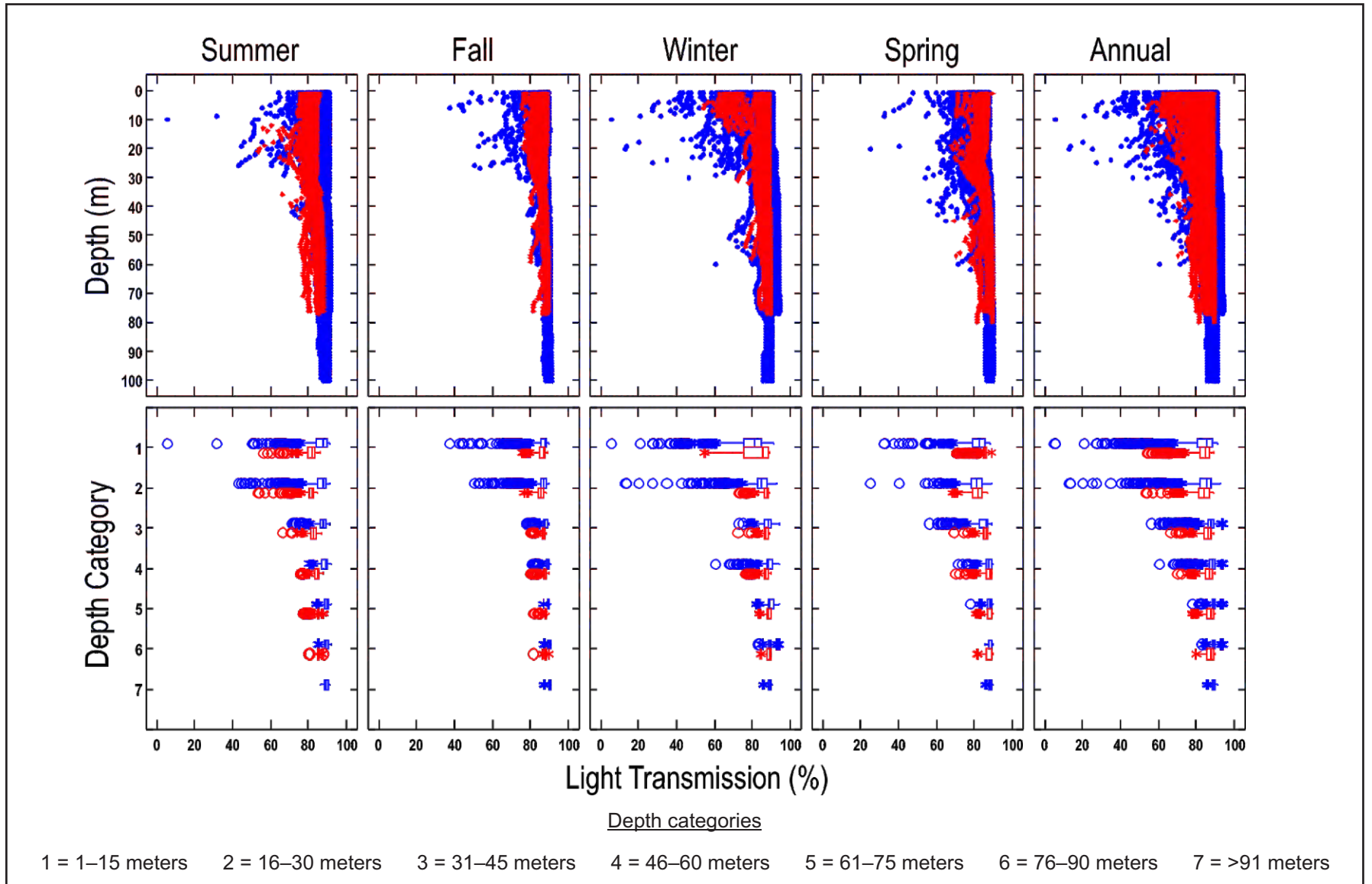
Central Bight data includes the City of Oxnard, City of Los Angeles, LACSD, and OCSD.  
 Orange County Sanitation District, California.



**Figure B-10. Seasonal scatter and box plots of chlorophyll-a (µg/L) for the Central Bight Regional Water Quality Monitoring Program (blue) and OCSD stations (red), July 2012 through June 2013.**

Central Bight data includes the City of Oxnard, City of Los Angeles, LACSD, and OCSD.

Orange County Sanitation District, California.

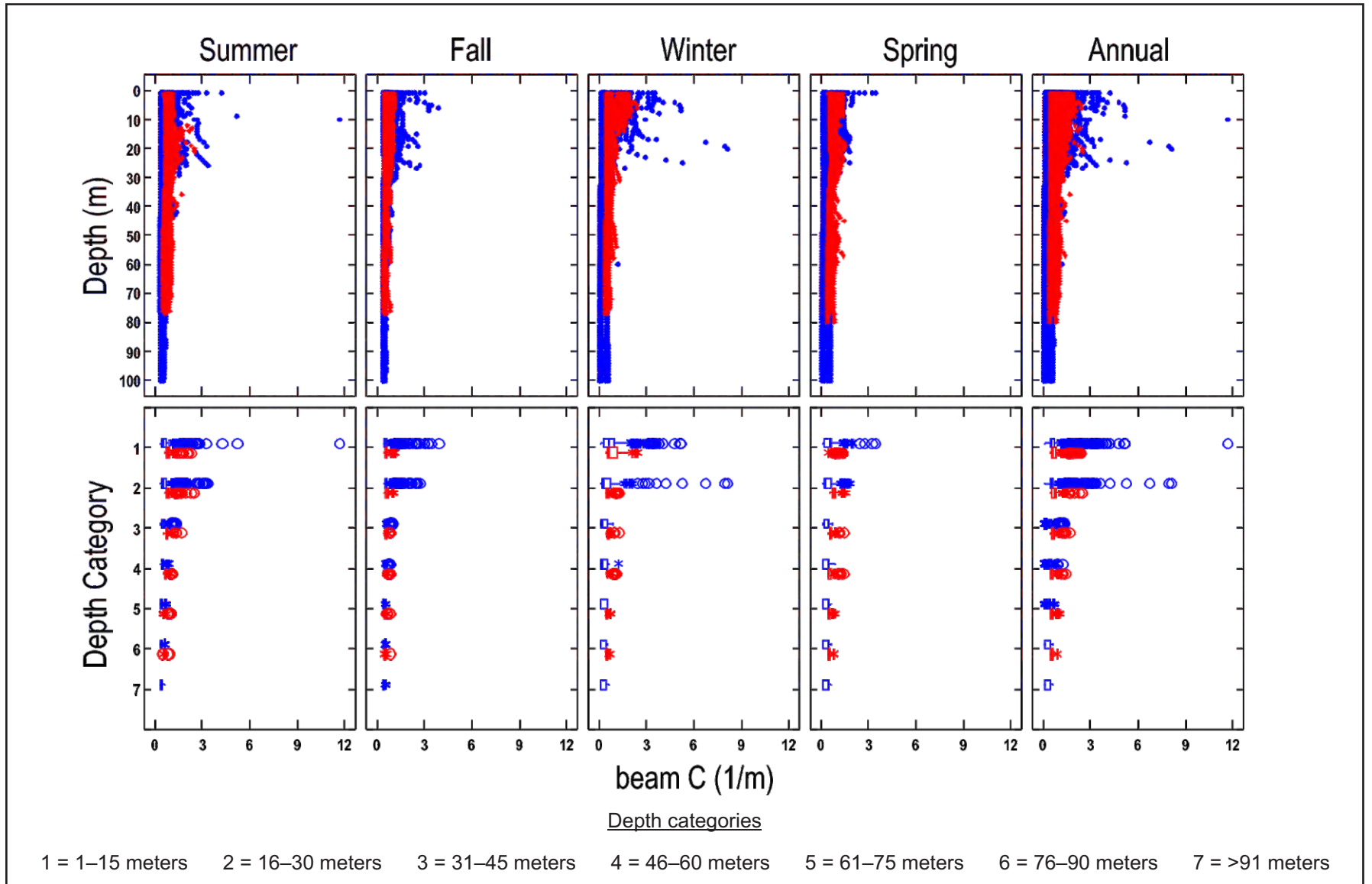


**Figure B-11. Seasonal scatter and box plots of light transmission (%) for the Central Bight Regional Water Quality Monitoring Program (blue) and OCSD stations (red), July 2012 through June 2013.**

Central Bight data includes the City of Oxnard, City of Los Angeles, LACSD, and OCSD.

Orange County Sanitation District, California.





**Figure B-12. Seasonal scatter and box plots of beam attenuation coefficient (beam-C; 1/m) for the Central Bight Regional Water Quality Monitoring Program (blue) and OCSD stations (red), July 2012 through June 2013.**

Central Bight data includes the City of Oxnard, City of Los Angeles, LACSD, and OCSD.

Orange County Sanitation District, California.

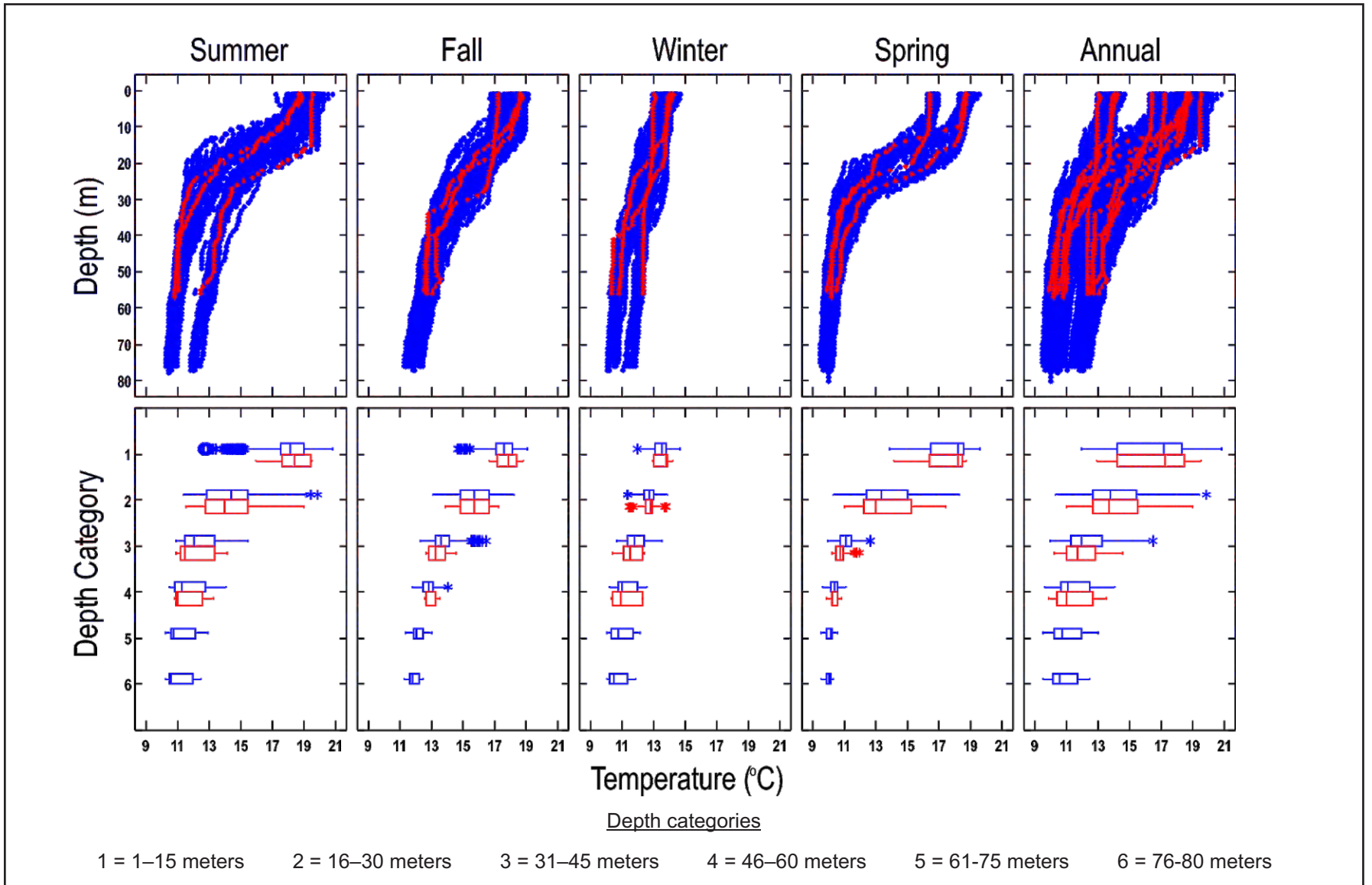


Figure B-13. Seasonal scatter and box plots of temperature (°C) for all stations (blue) and outfall Station 2205 (red), July 2012 through June 2013.



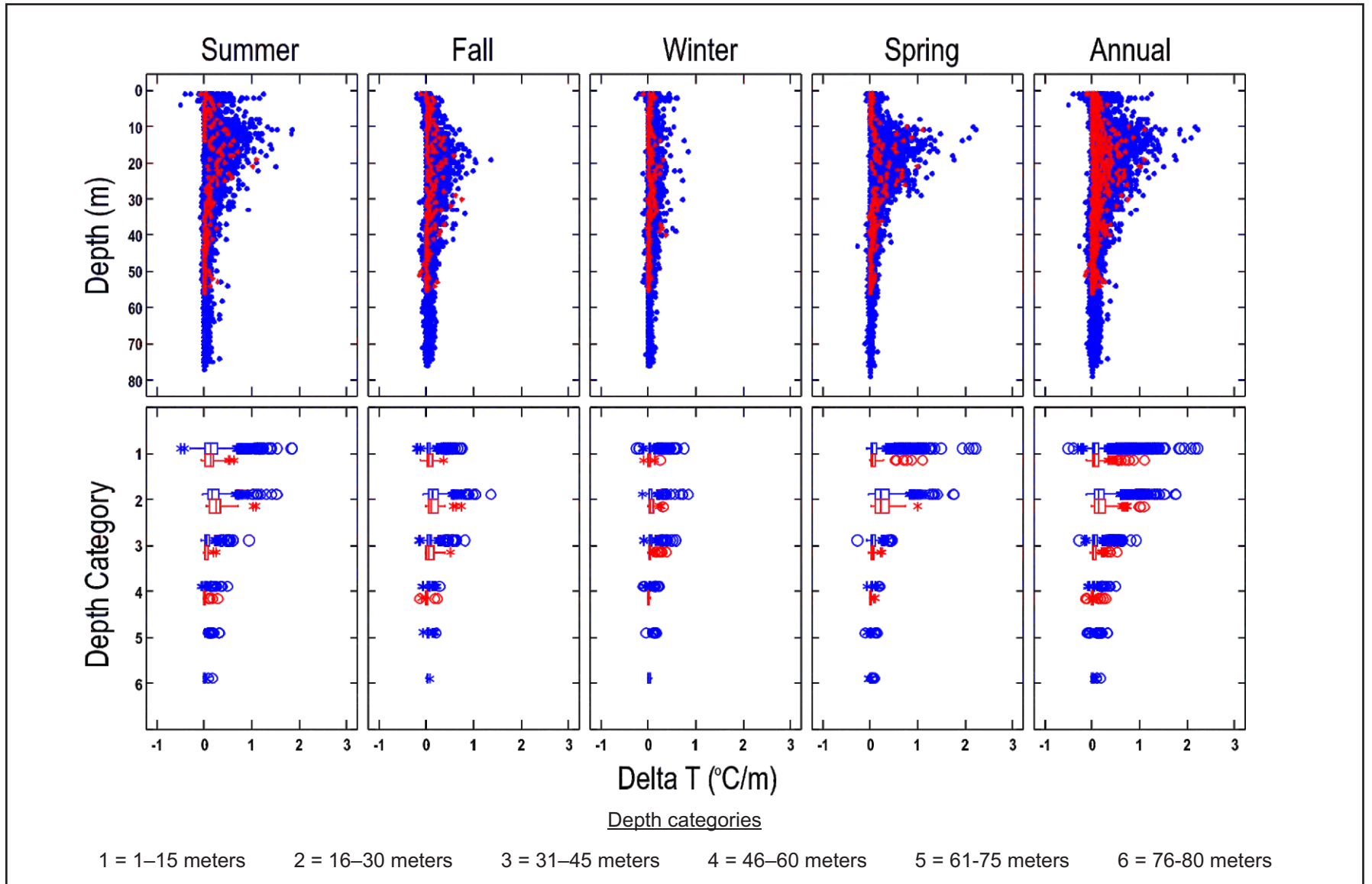


Figure B-14. Seasonal scatter and box plots of delta T (°C) for all stations (blue) and outfall Station 2205 (red), July 2012 through June 2013.

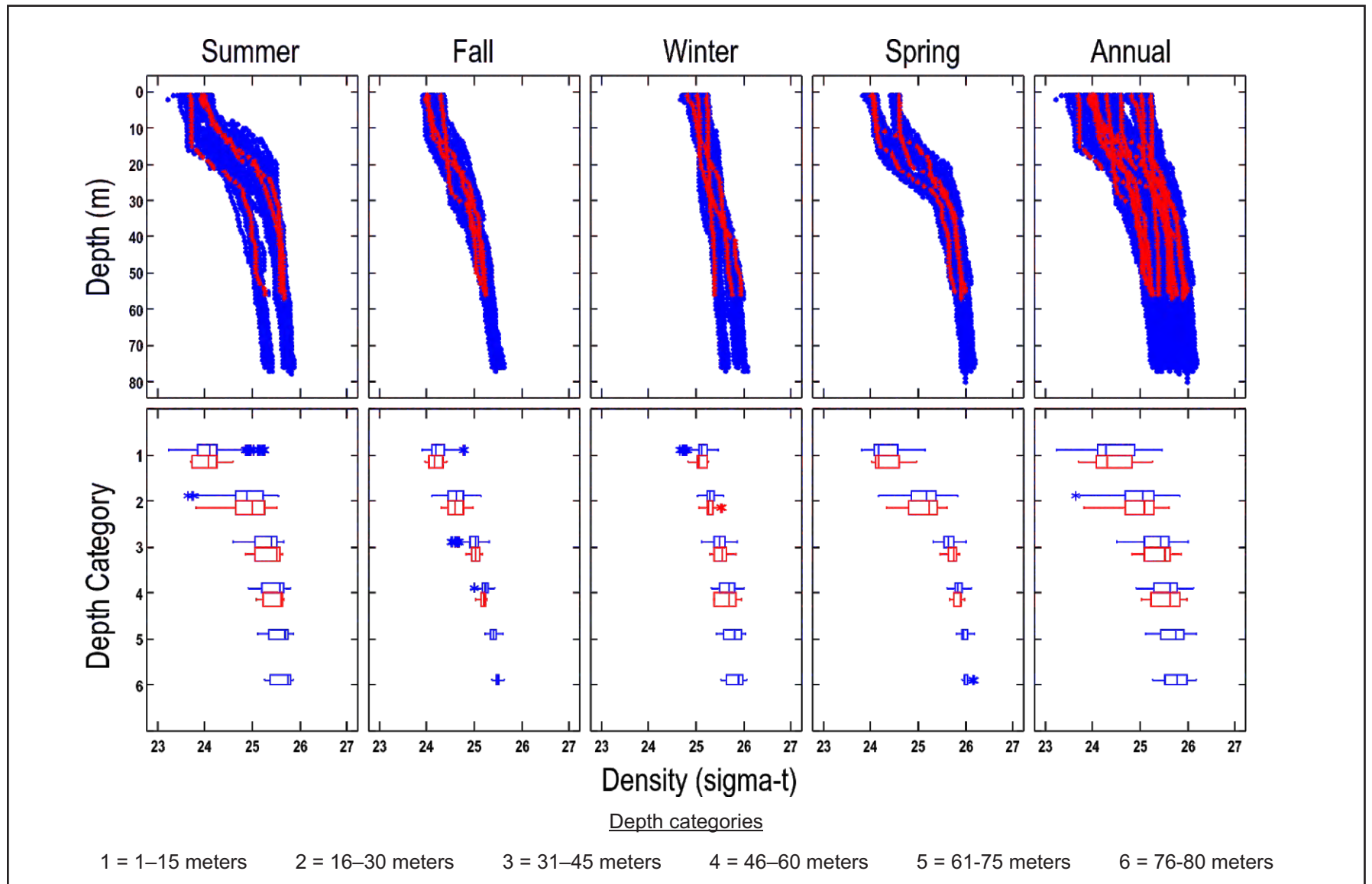


Figure B-15. Seasonal scatter and box plots of density ( $\text{kg/m}^3$ ) for all stations (blue) and outfall Station 2205 (red), July 2012 through June 2013.

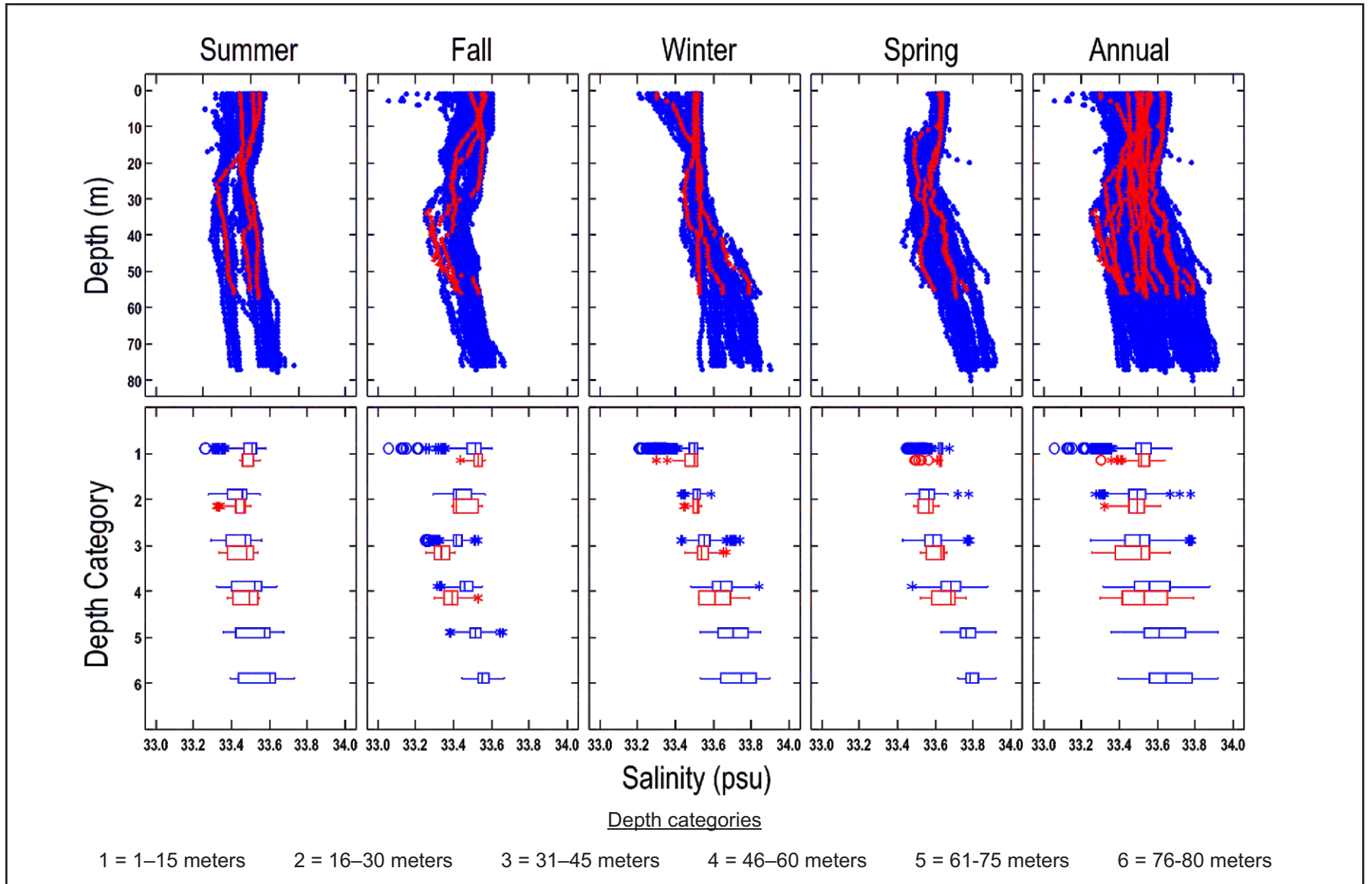


Figure B-16. Seasonal scatter and box plots of salinity (psu) for all stations (blue) and outfall Station 2205 (red), July 2012 through June 2013.

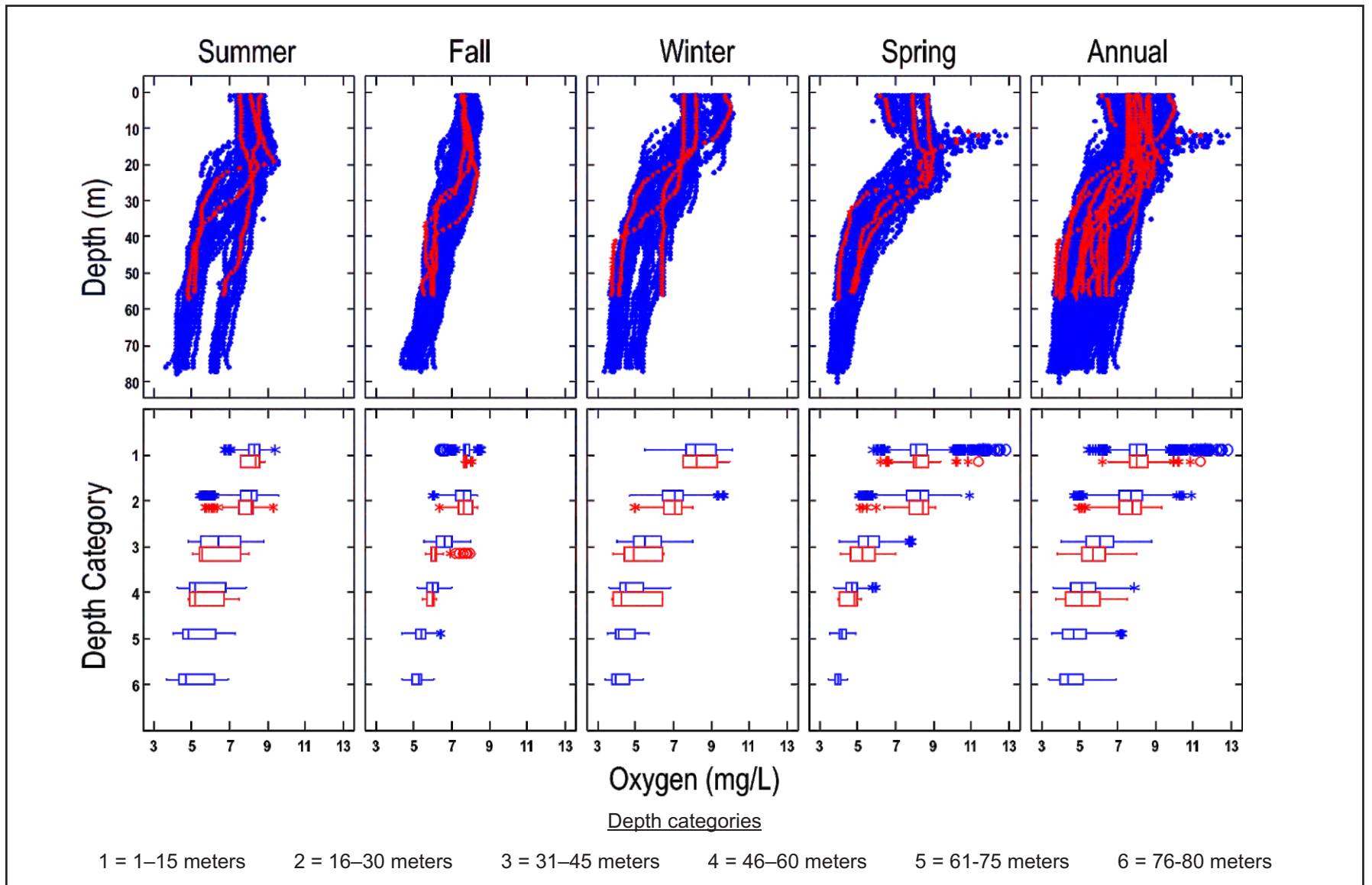


Figure B-17. Seasonal scatter and box plots of dissolved oxygen (mg/L) for all stations (blue) and outfall Station 2205 (red), July 2012 through June 2013.

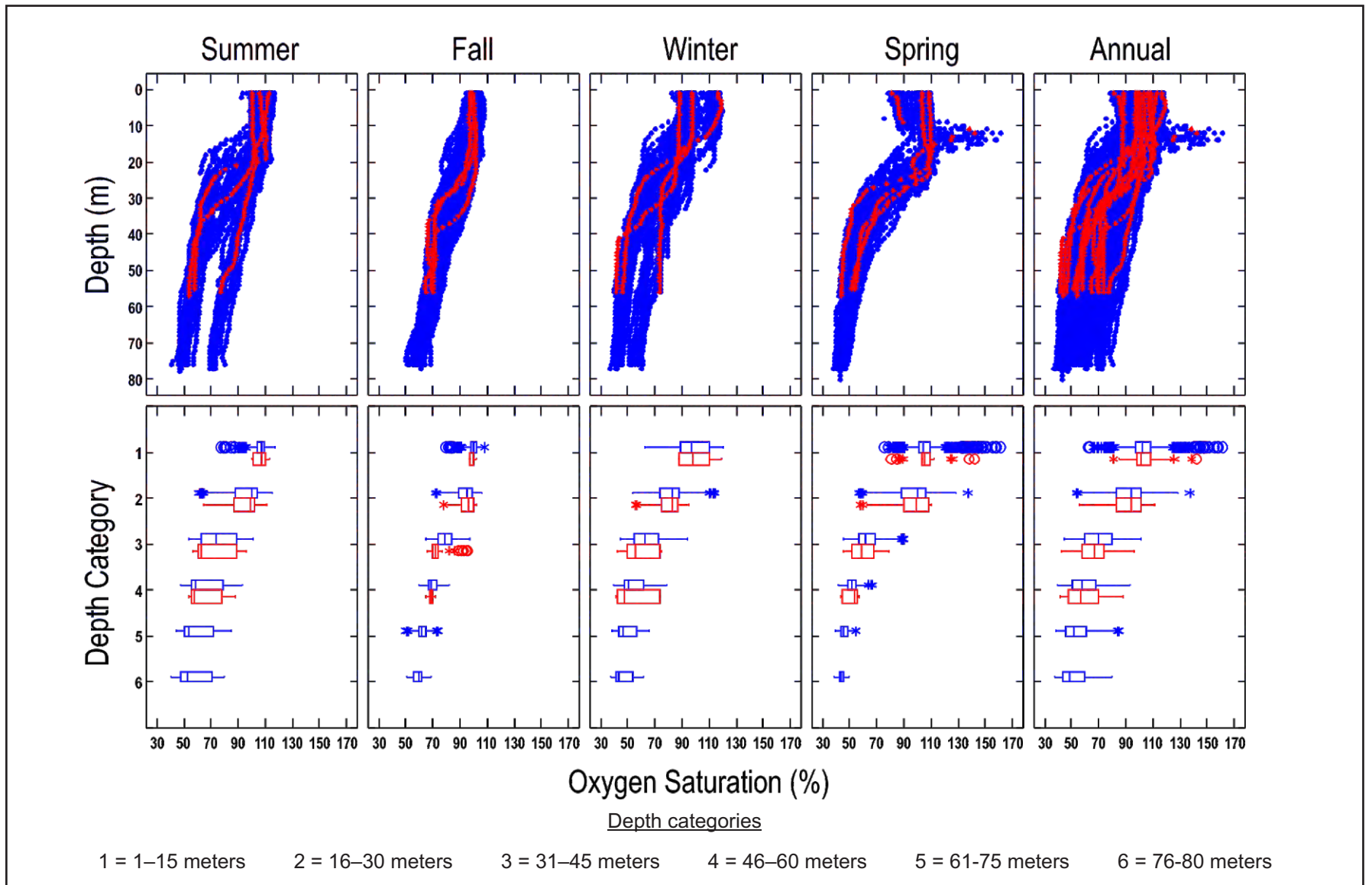


Figure B-18. Seasonal scatter and box plots of oxygen saturation (%) for all stations (blue) and outfall Station 2205 (red), July 2012 through June 2013.

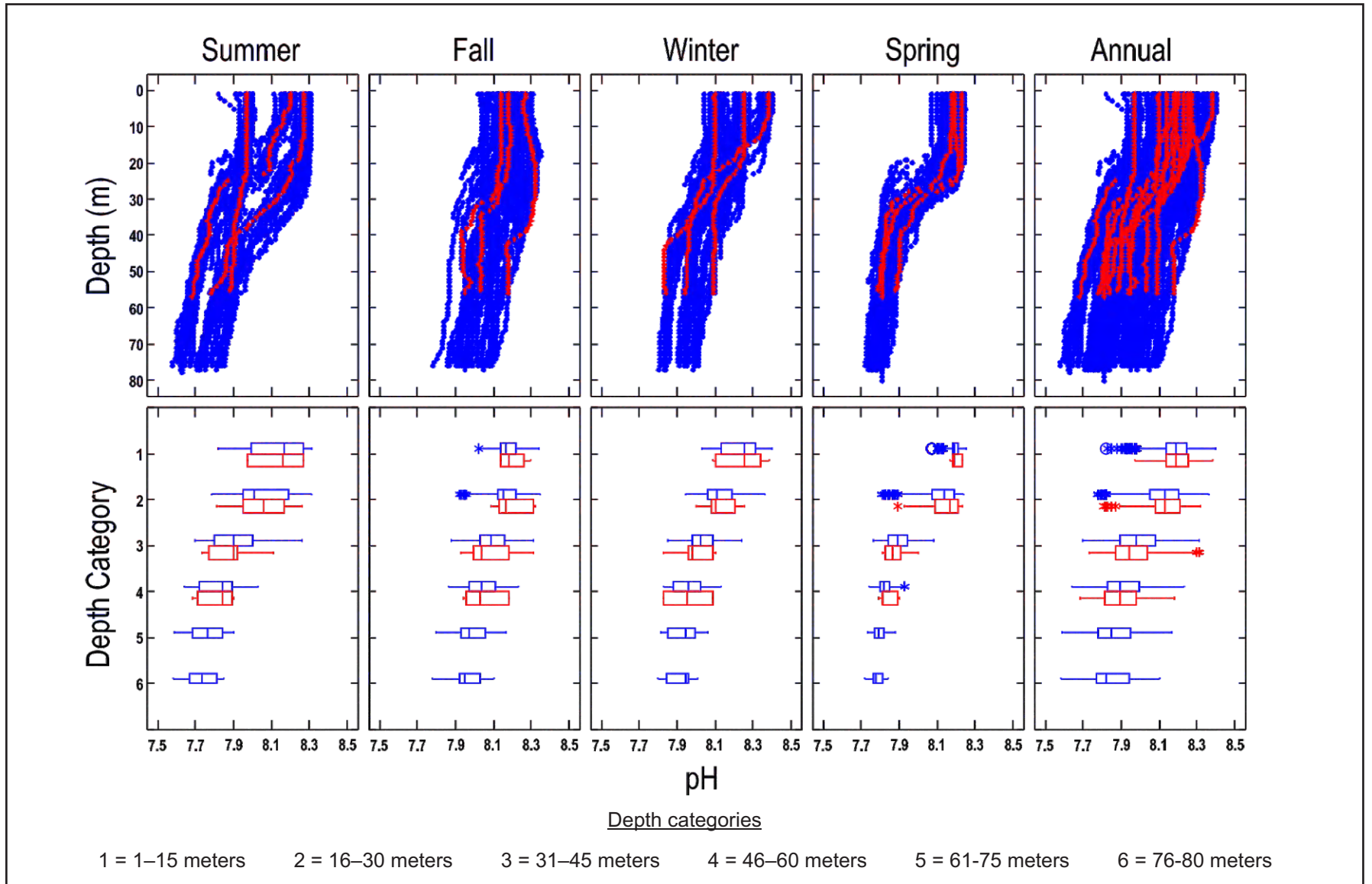


Figure B-19. Seasonal scatter and box plots of pH (pH units) for all stations (blue) and outfall Station 2205 (red), July 2012 through June 2013.



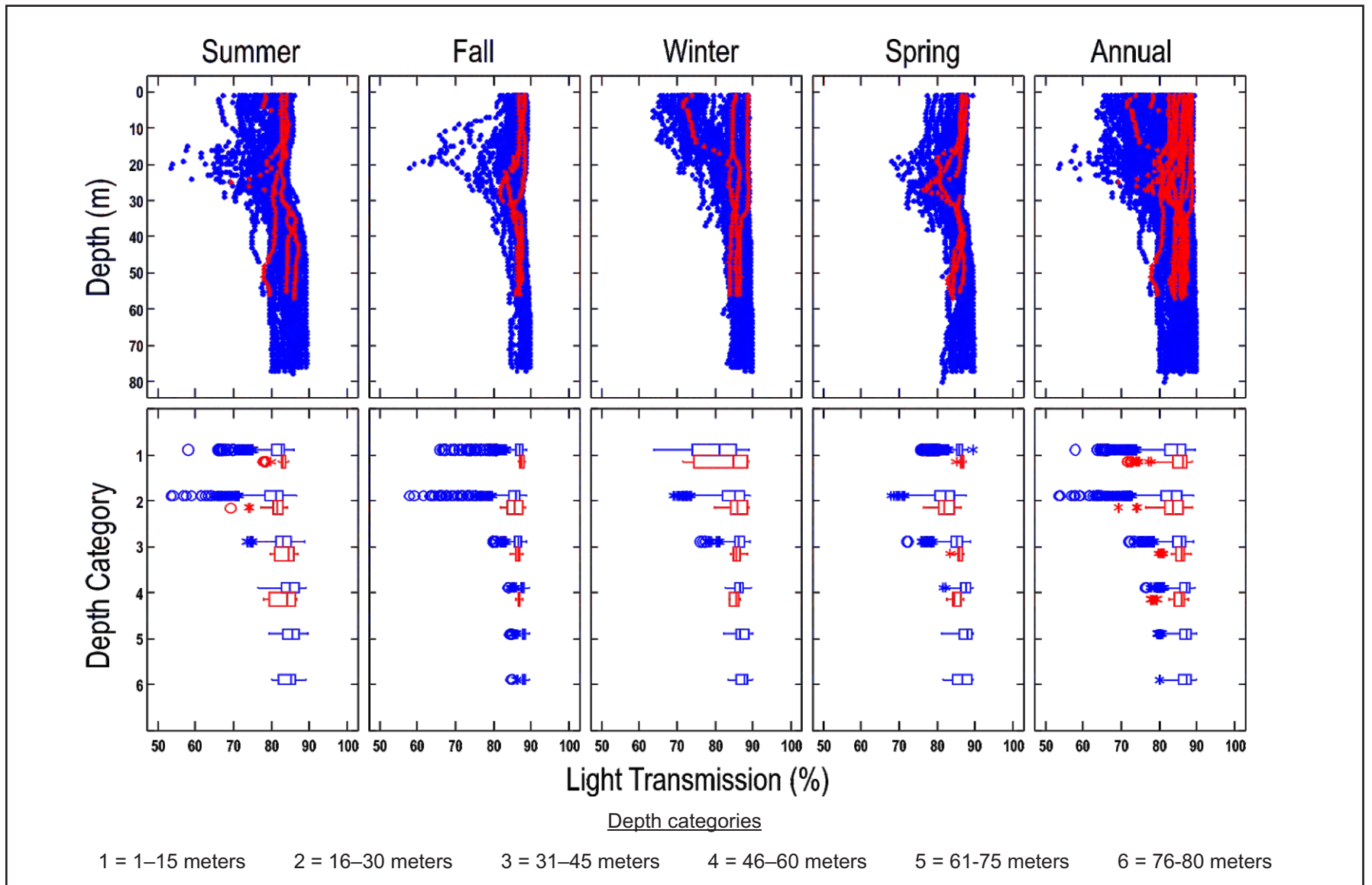


Figure B-20. Seasonal scatter and box plots of light transmission (%) for all stations (blue) and outfall Station 2205 (red), July 2012 through June 2013.

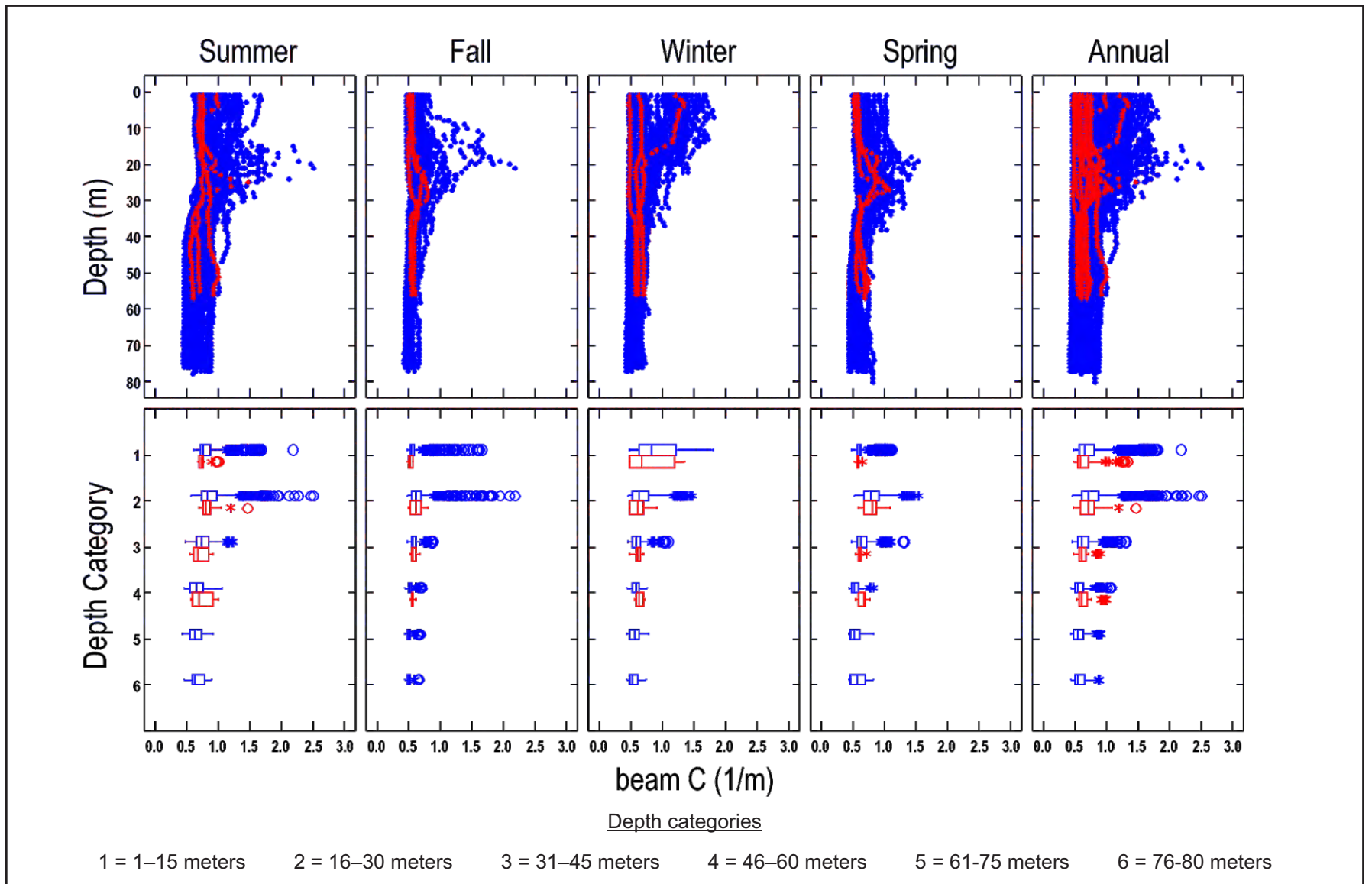


Figure B-21. Seasonal scatter and box plots of beam attenuation coefficient (beam-C; 1/m) for all stations (blue) and outfall Station 2205 (red), July 2011 through June 2012.



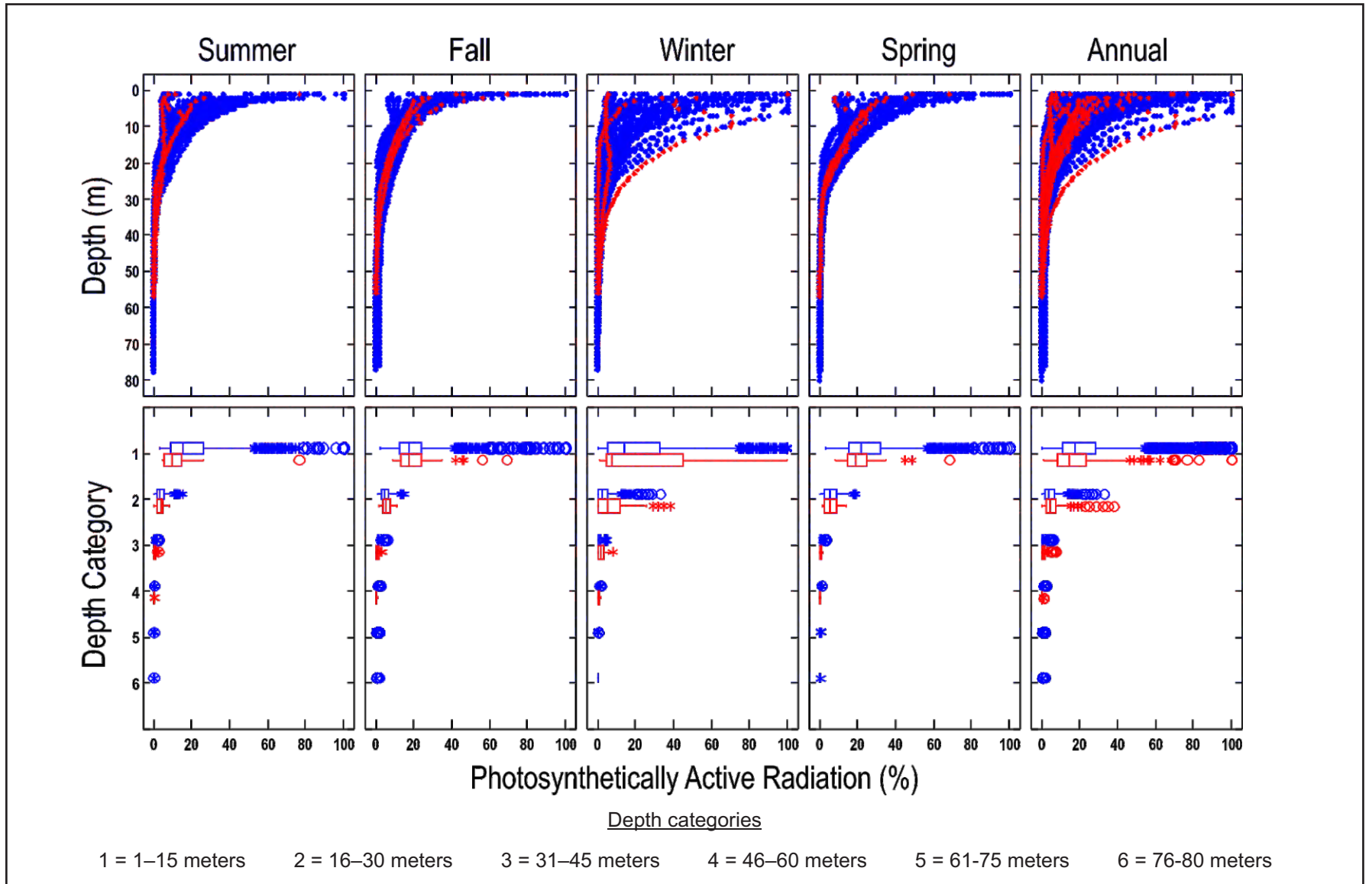


Figure B-22. Seasonal scatter and box plots of normalized photosynthetically active radiation (PAR; %) for all stations (blue) and outfall Station 2205 (red), July 2012 through June 2013.

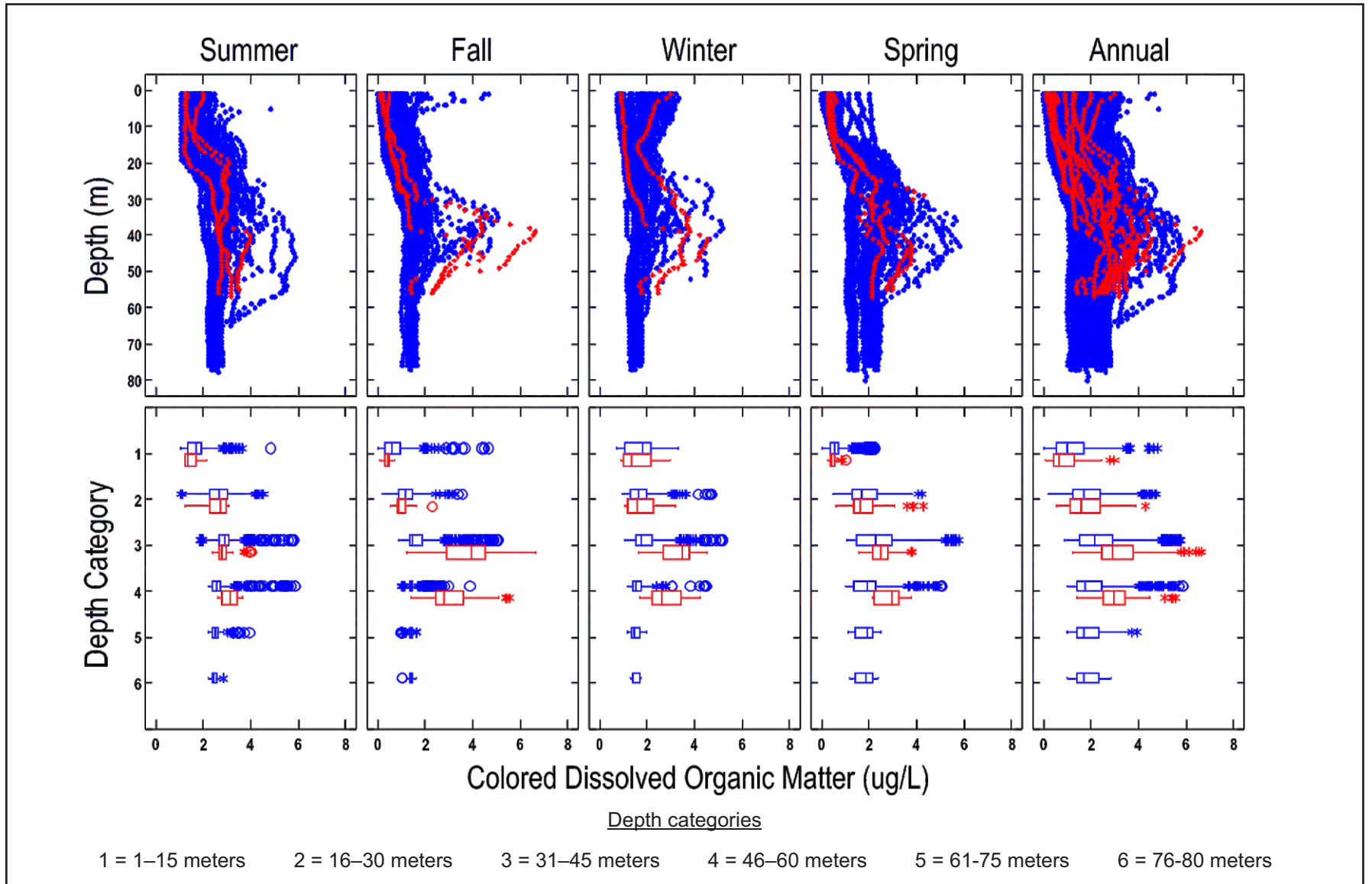


Figure B-23. Seasonal scatter and box plots of color dissolved organic matter (CDOM,  $\mu\text{g/L}$ ) for all stations (blue) and outfall Station 2205 (red), July 2012 through June 2013.

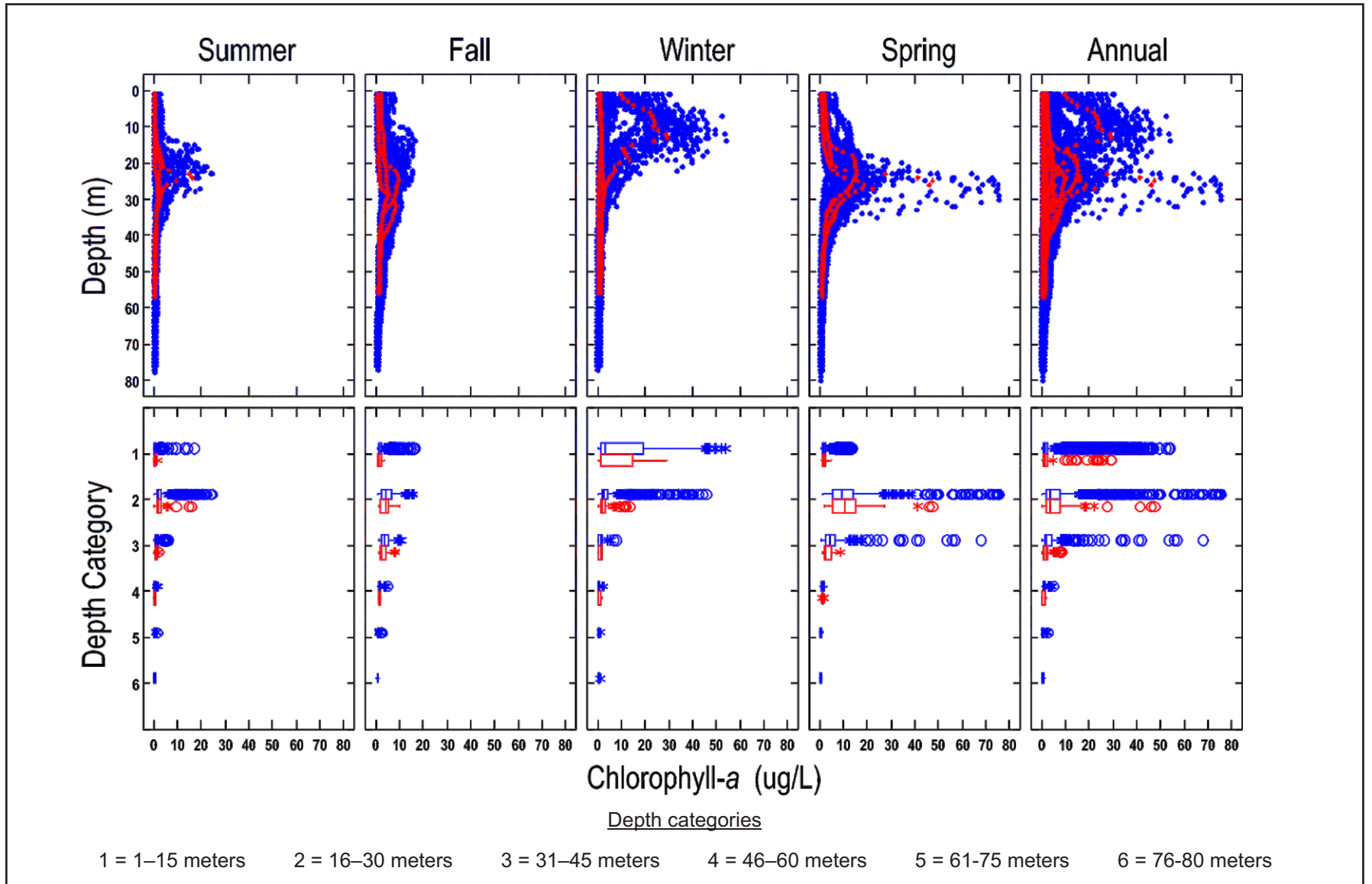


Figure B-24. Seasonal scatter and box plots of chlorophyll-a ( $\mu\text{g/L}$ ) for all stations (blue) and outfall Station 2205 (red), July 2012 through June 2013.

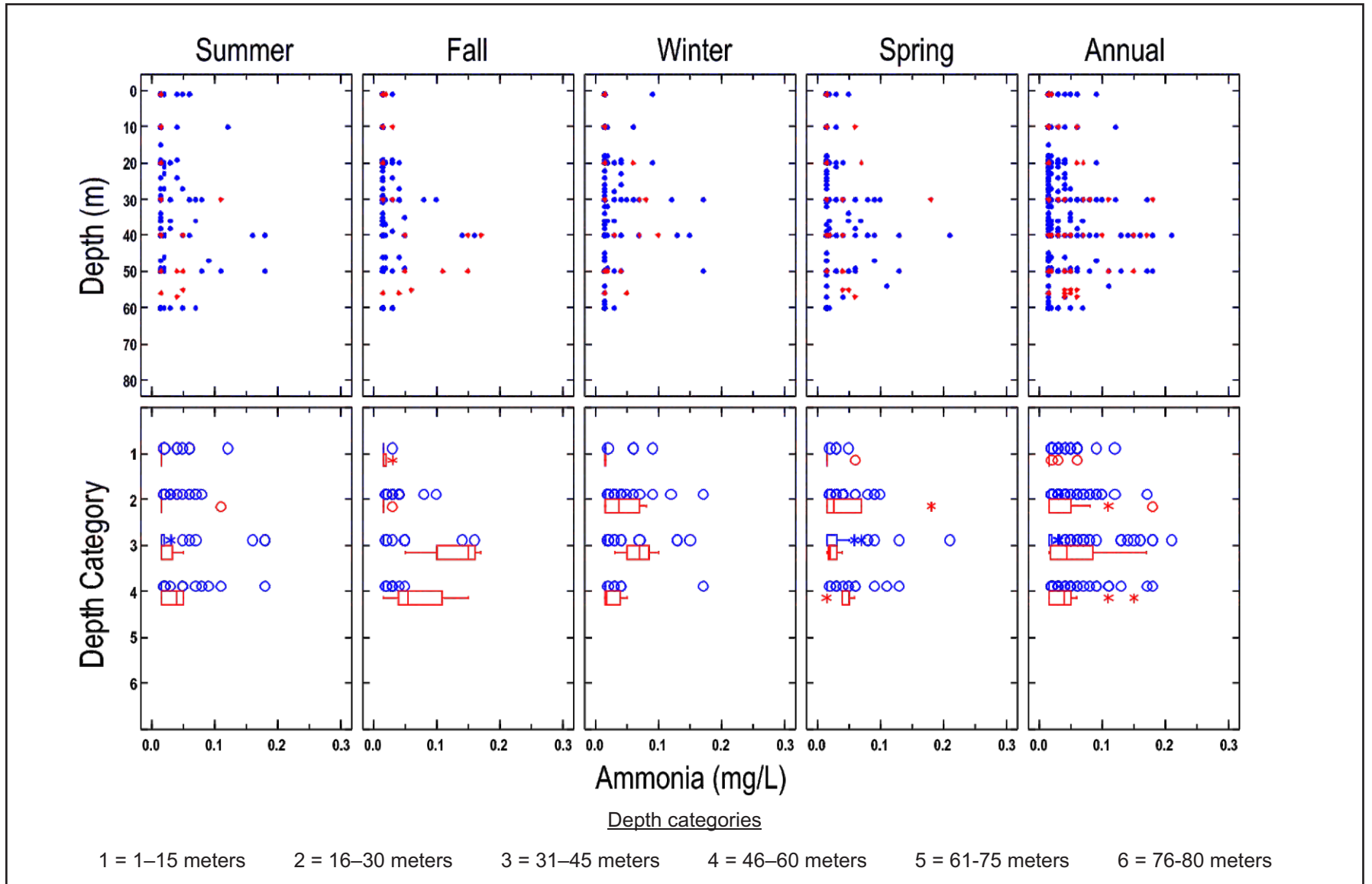


Figure B-25. Seasonal scatter and box plots of ammonia (NH<sub>3</sub>-N, mg/L) for all stations (blue) and outfall Station 2205 (red), July 2012 through June 2013.

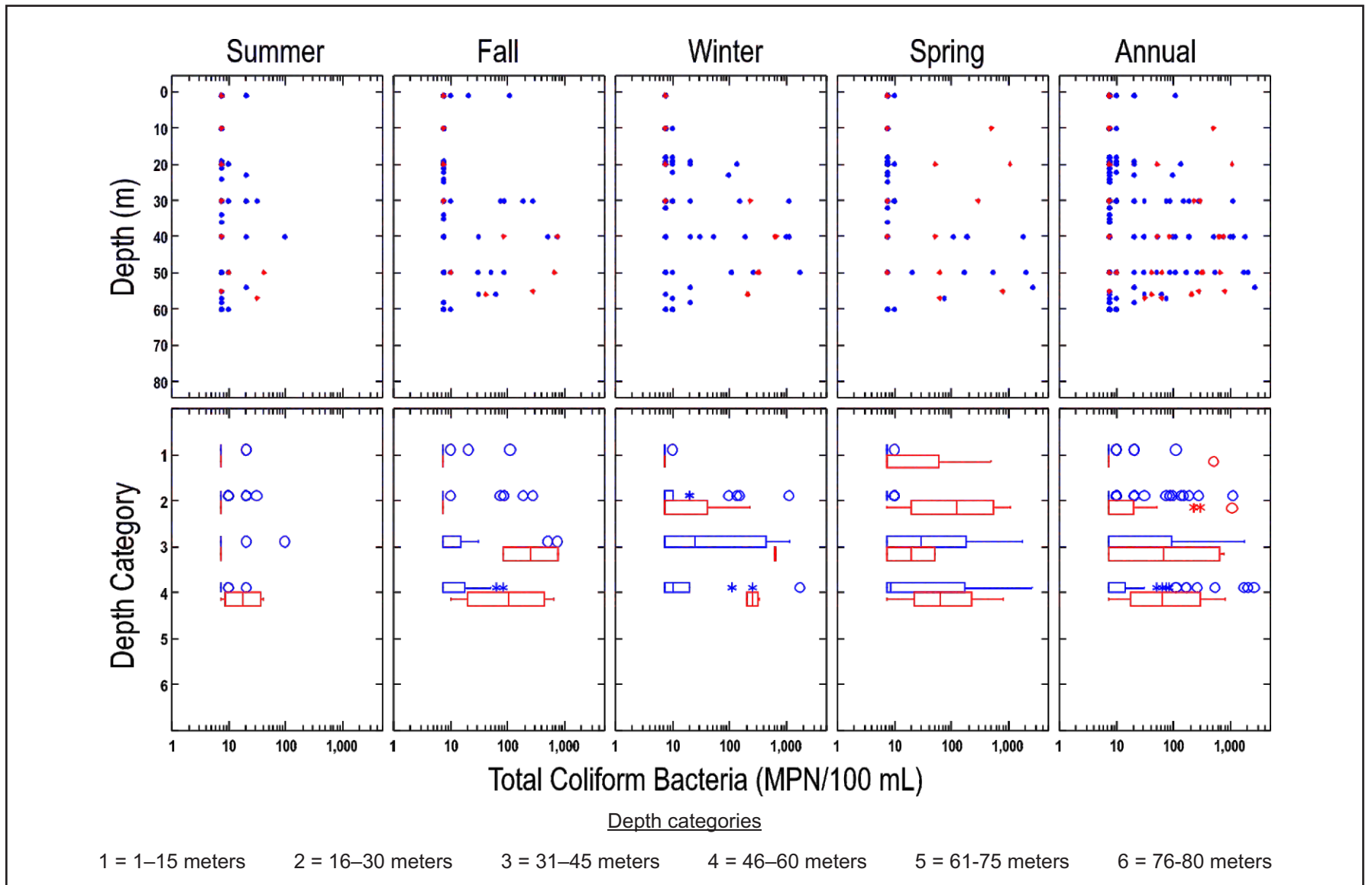


Figure B-26. Seasonal scatter and box plots of total coliforms (MPN/100 mL) for all stations (blue) and outfall Station 2205 (red), July 2012 through June 2013.

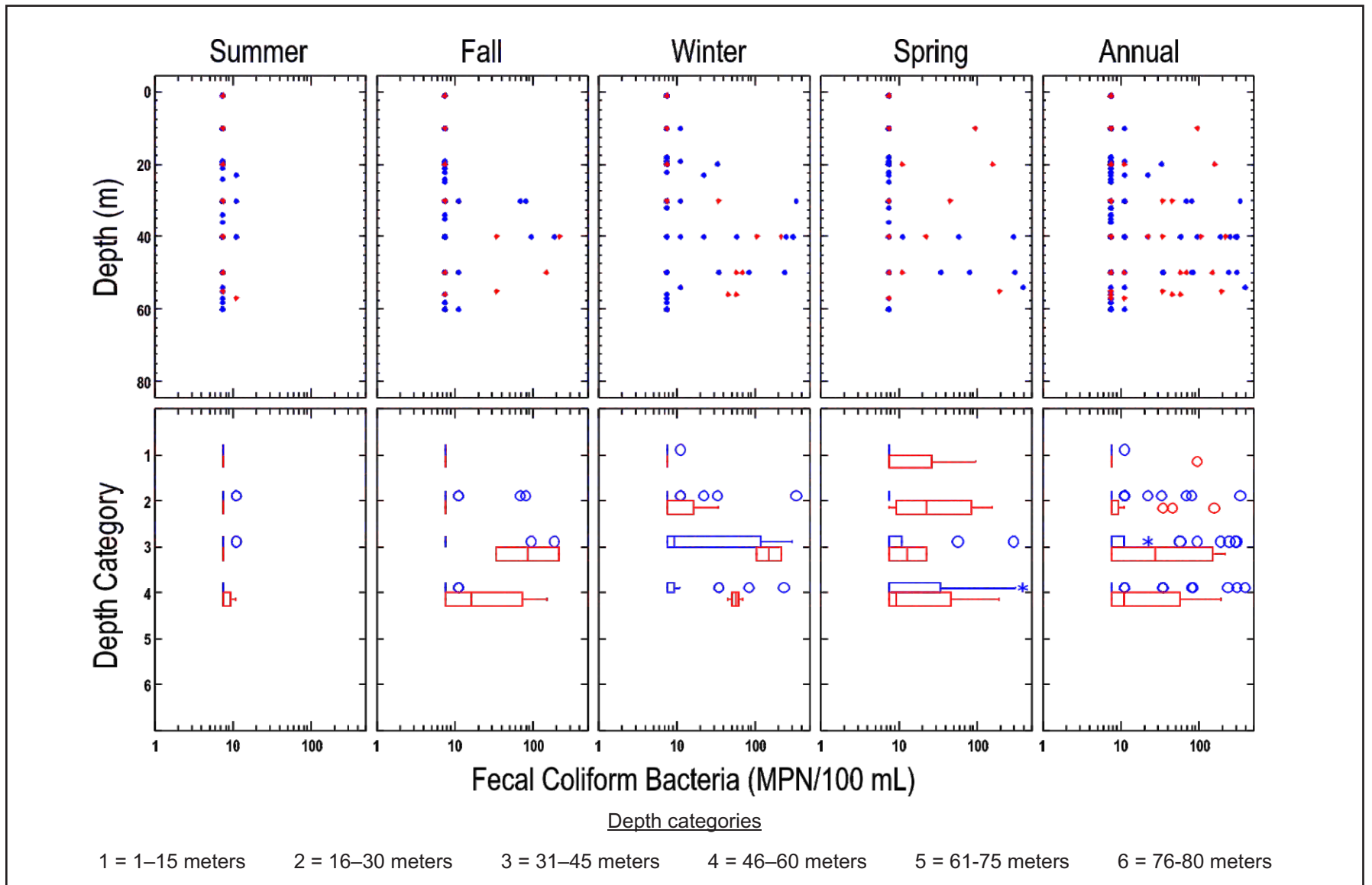


Figure B-27. Seasonal scatter and box plots of fecal coliforms (MPN/100 mL) for all stations (blue) and outfall Station 2205 (red), July 2012 through June 2013.

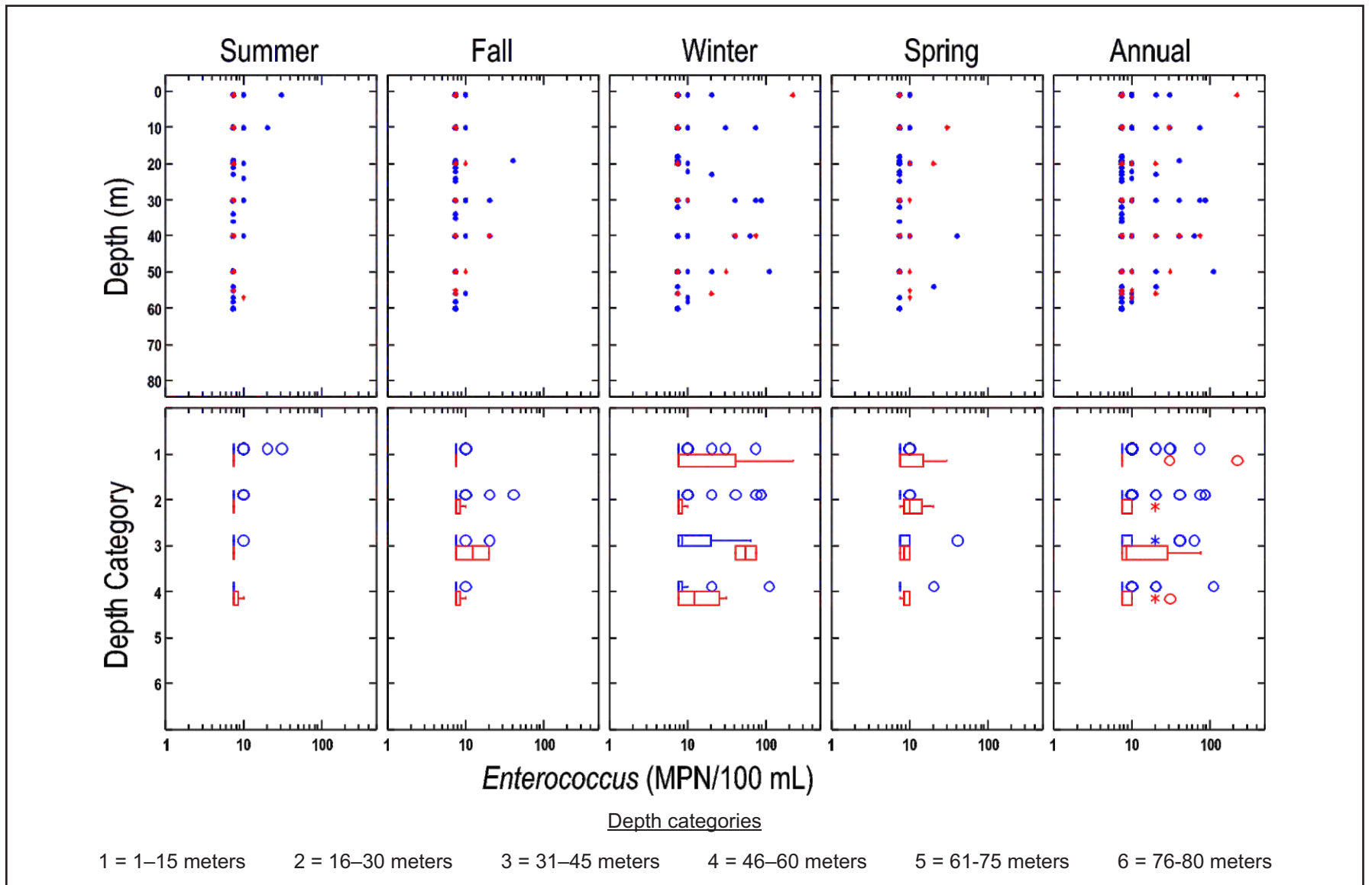
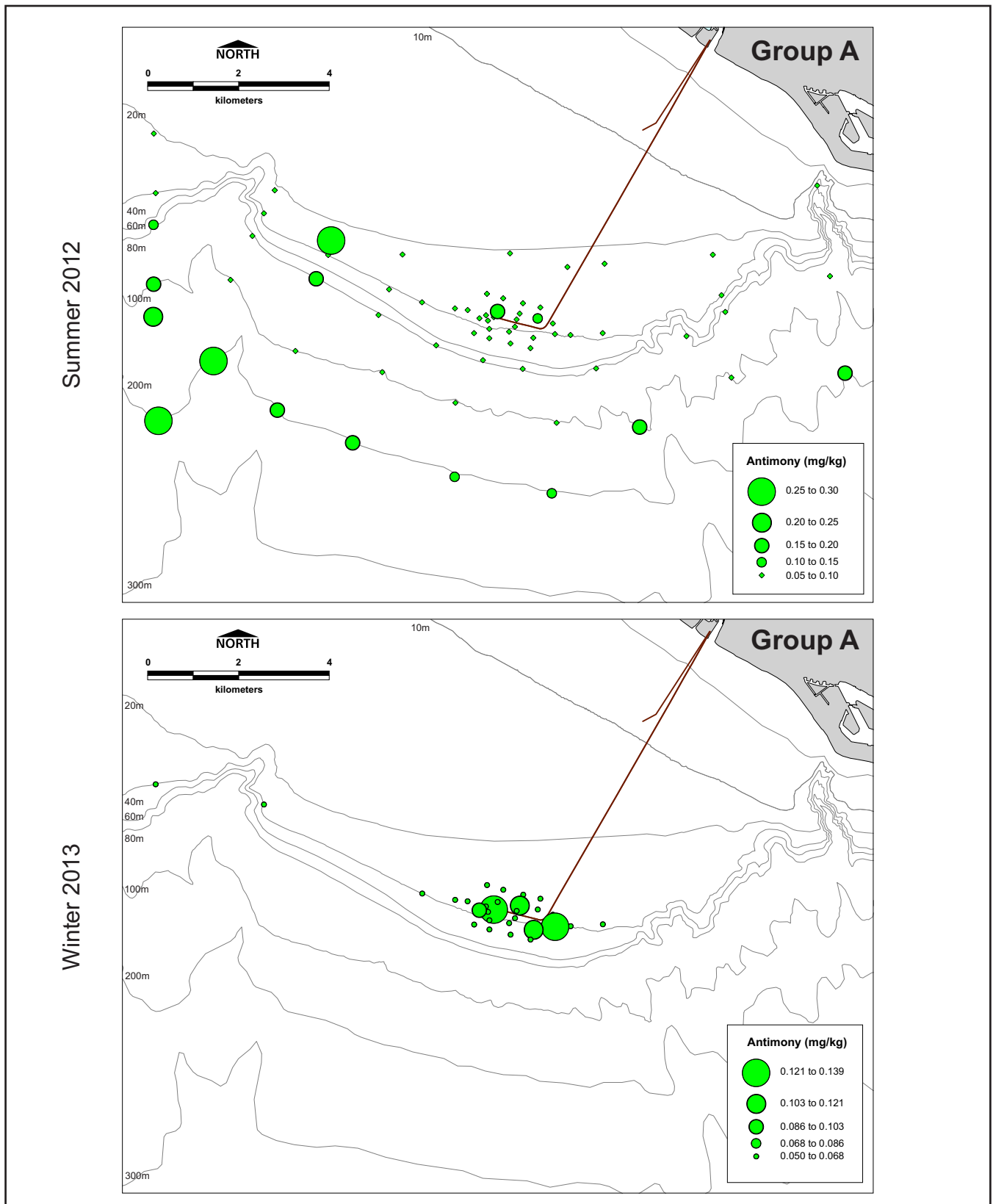


Figure B-28. Seasonal scatter and box plots of *Enterococcus* (MPN/100 mL) for all stations (blue) and outfall Station 2205 (red), July 2012 through June 2013.

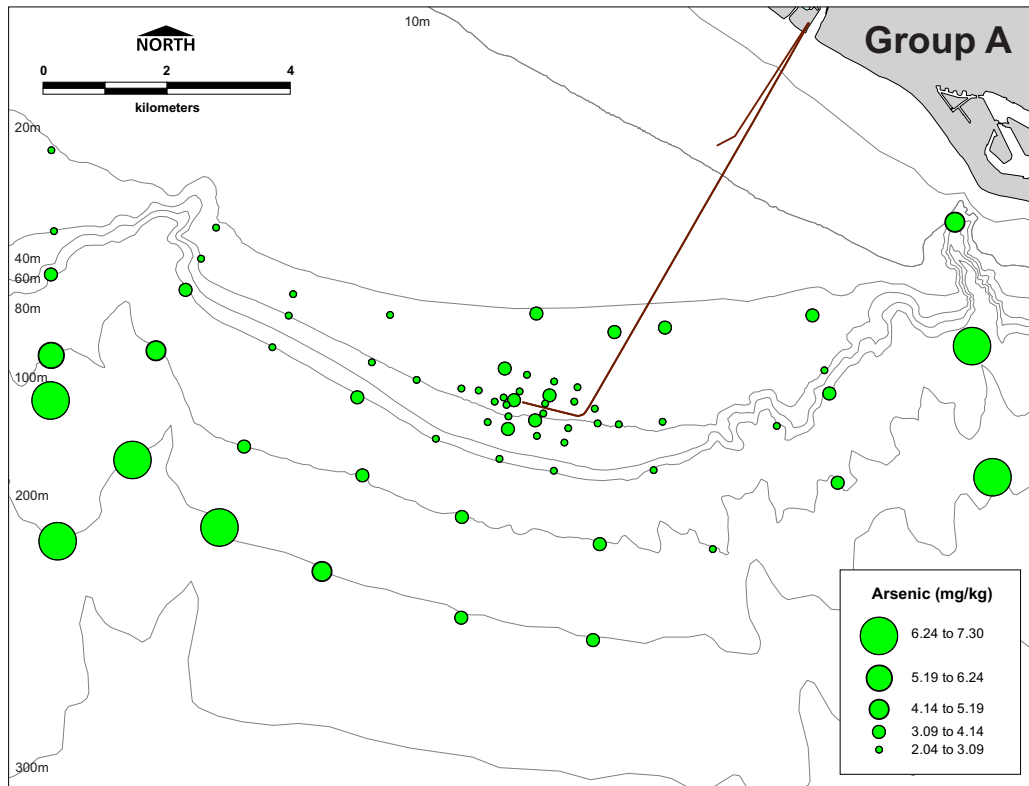


**Figure B-29. Spatial distributions of Group A and Group B metals concentrations (mg/kg) in sediments during Summer 2012 and Winter 2013. Group A metals included antimony, arsenic, barium, beryllium, chromium, lead, nickel, selenium, and zinc. Group B included cadmium, copper, mercury, and silver.**

Orange County Sanitation District, California.



Summer 2012



Winter 2013

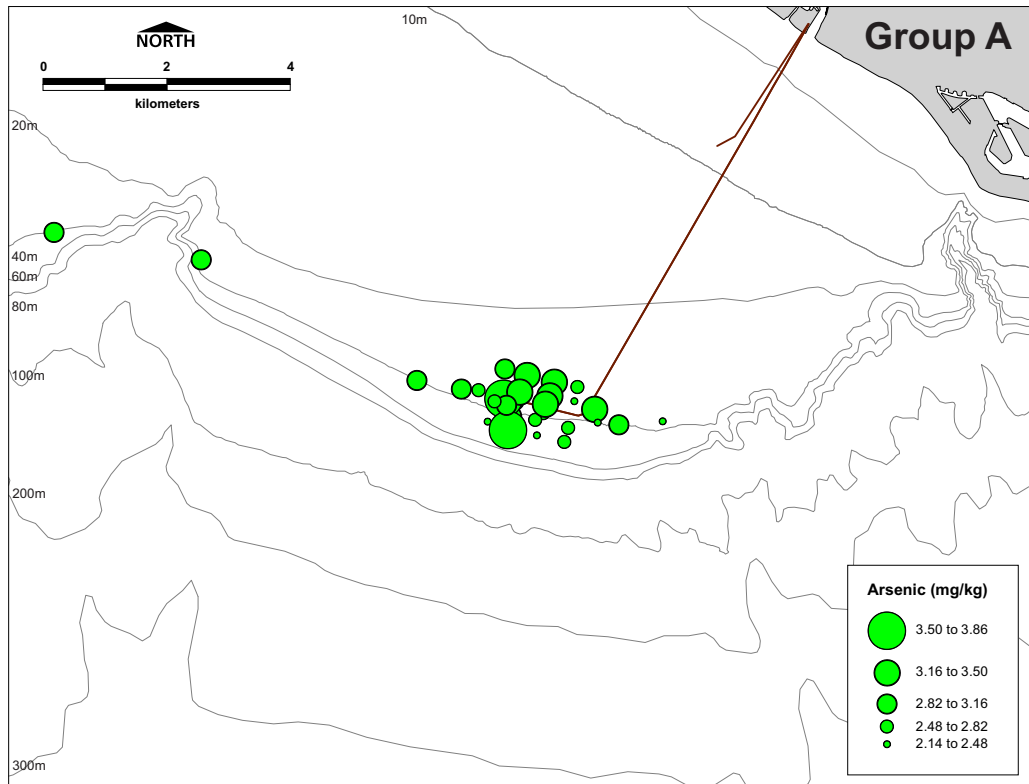
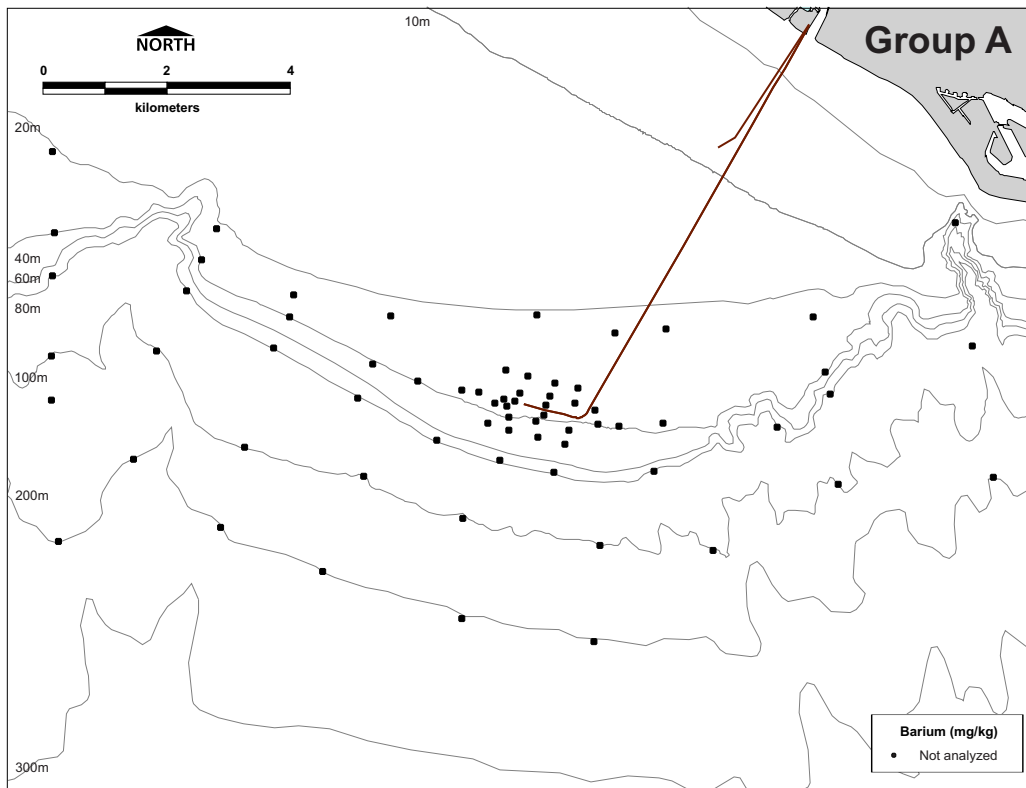


Figure B-29 continued.

Summer 2012



Winter 2013

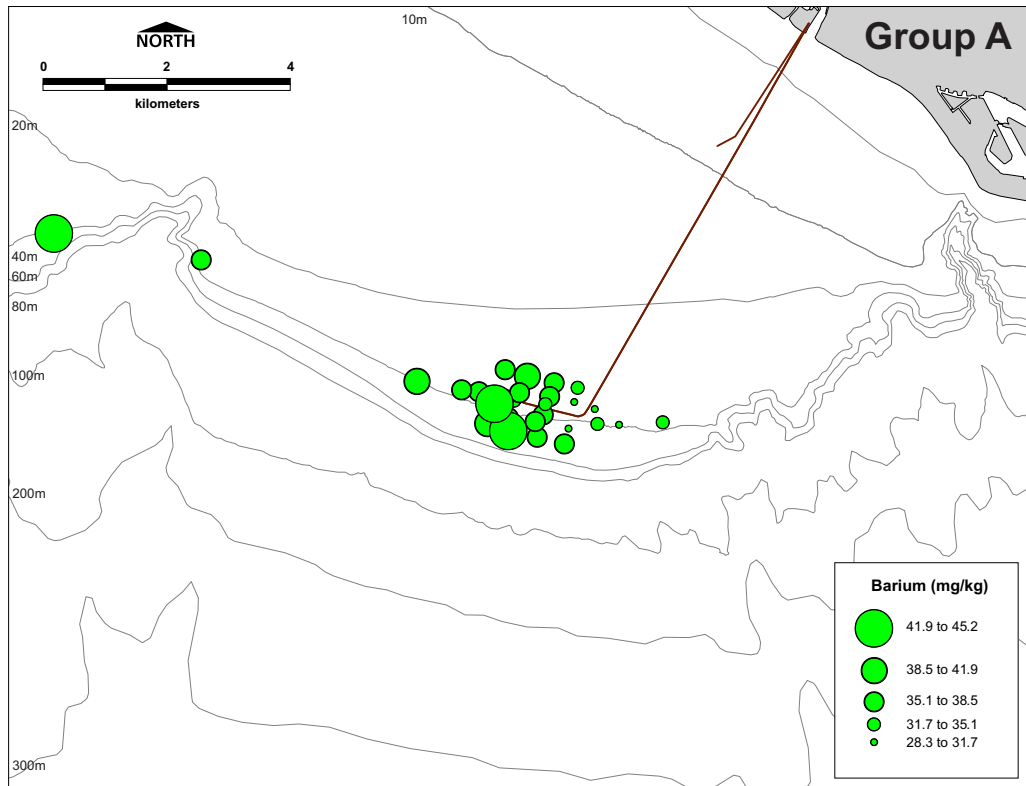
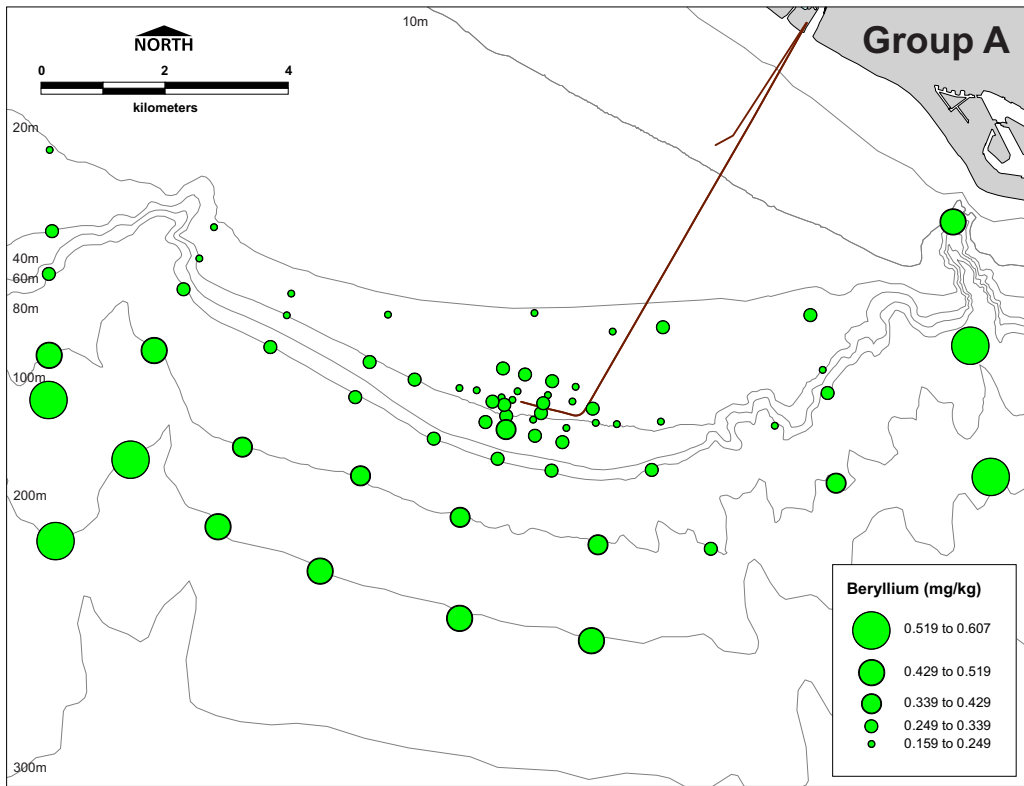


Figure B-29 continued.

Summer 2012



Winter 2013

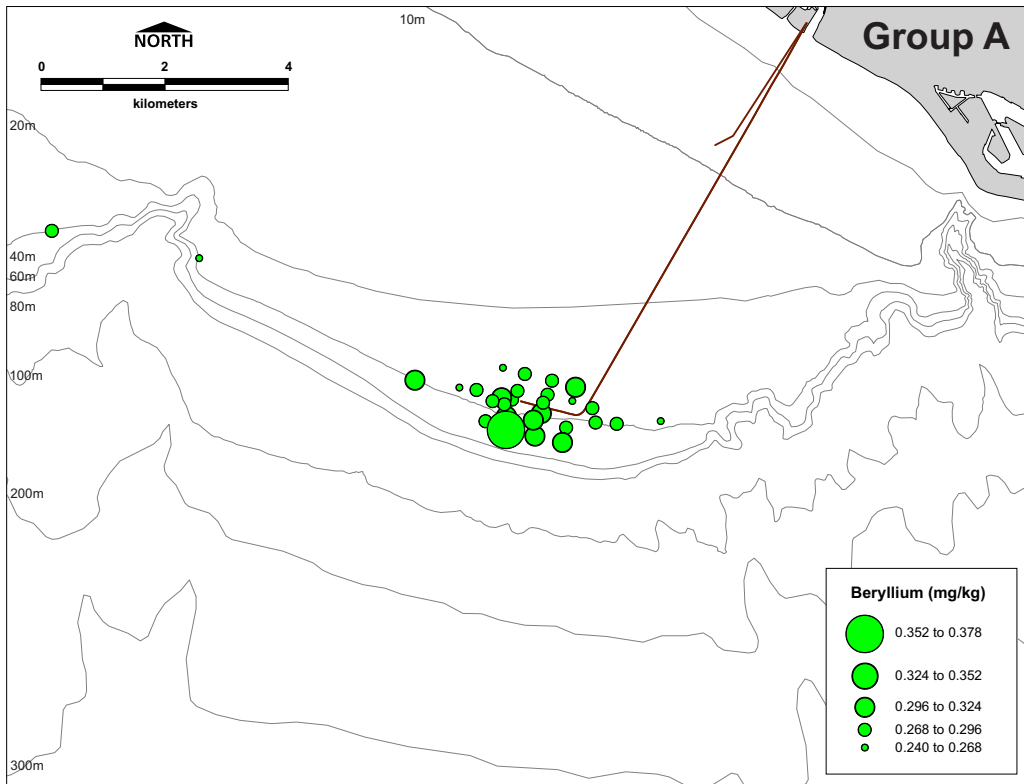
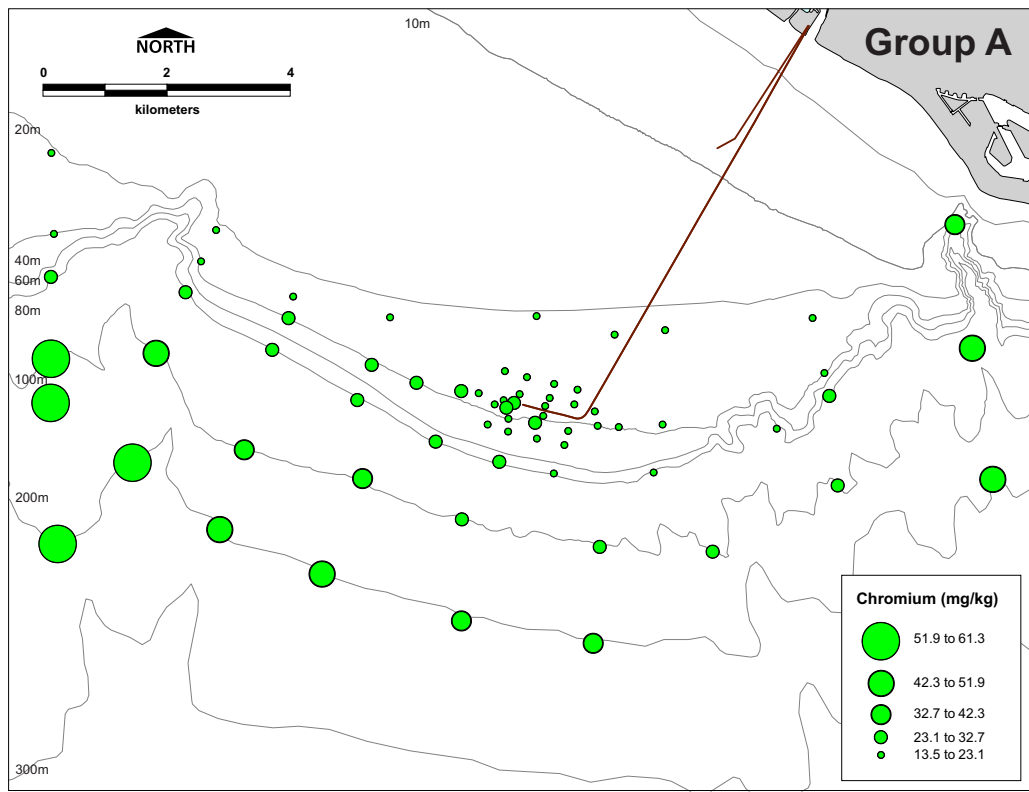


Figure B-29 continued.

Summer 2012



Winter 2013

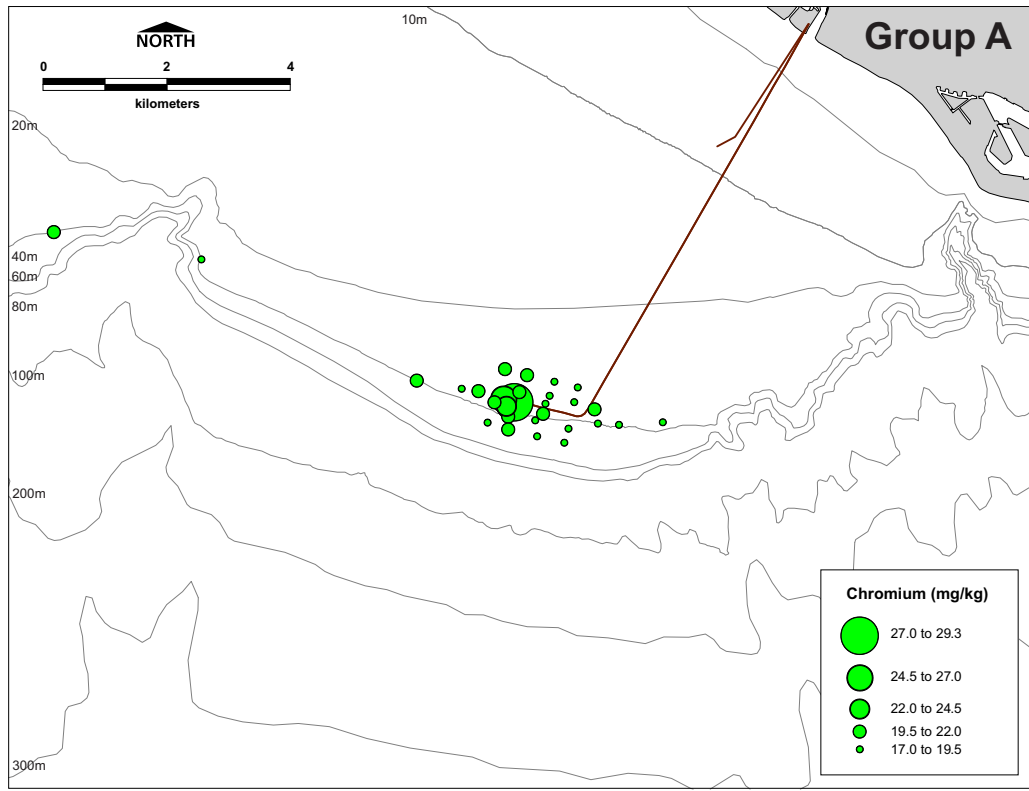
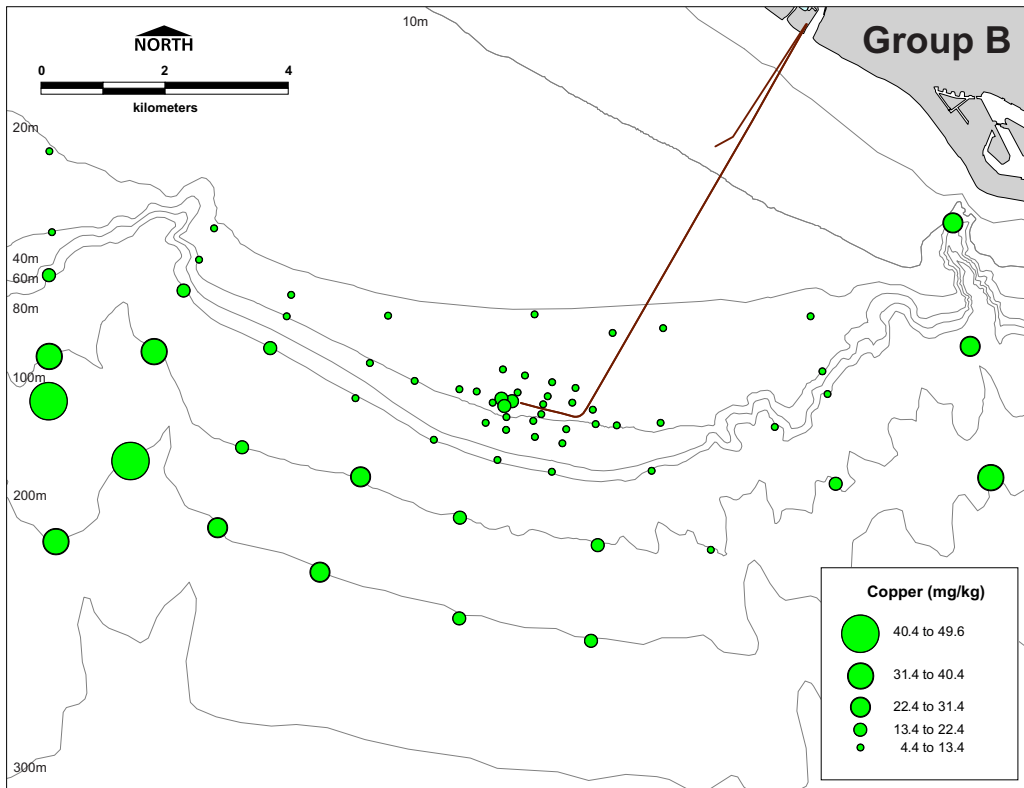


Figure B-29 continued.

Summer 2012



Winter 2013

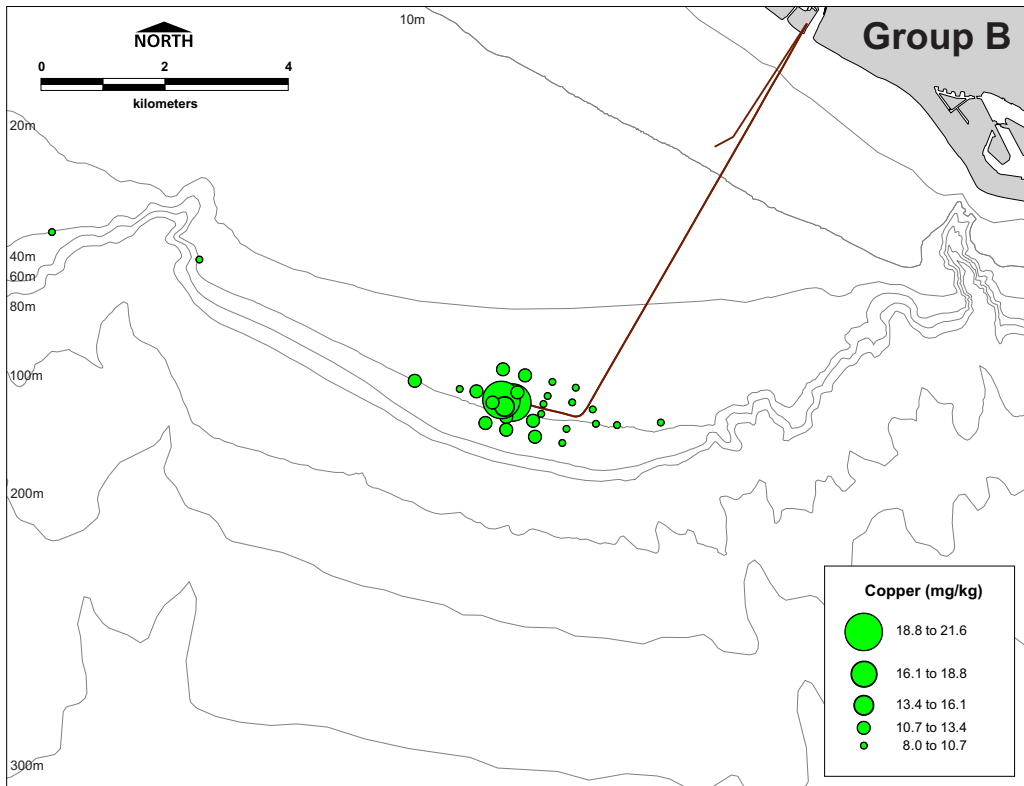
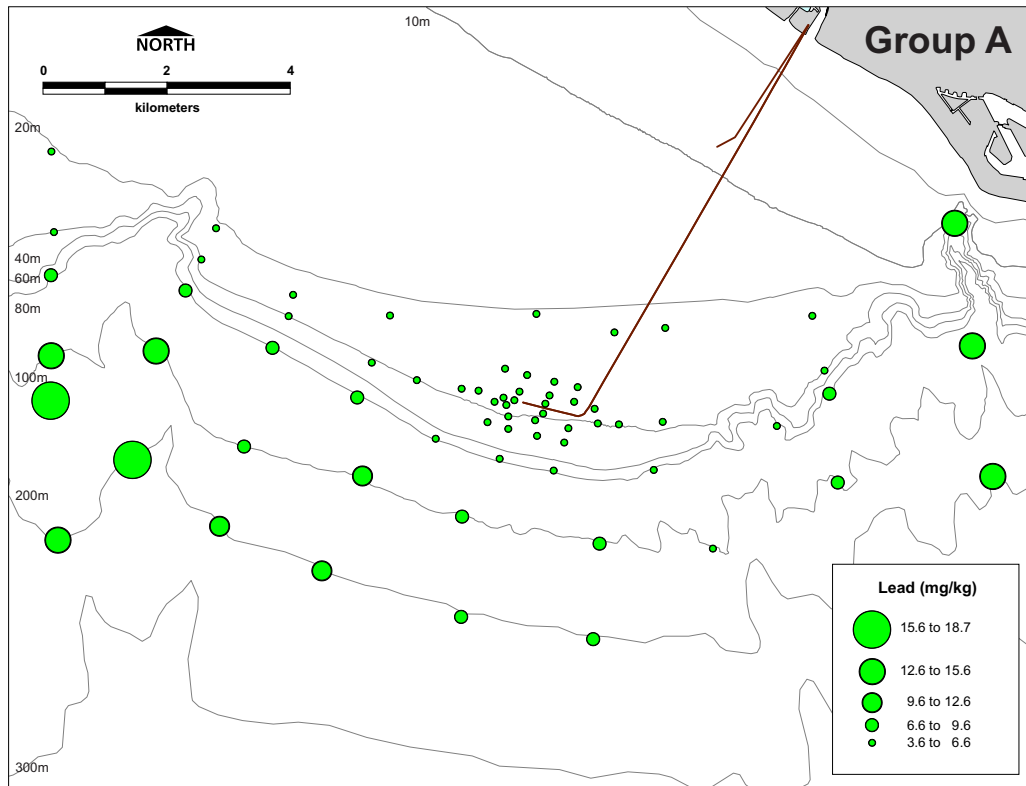


Figure B-29 continued.

Summer 2012



Winter 2013

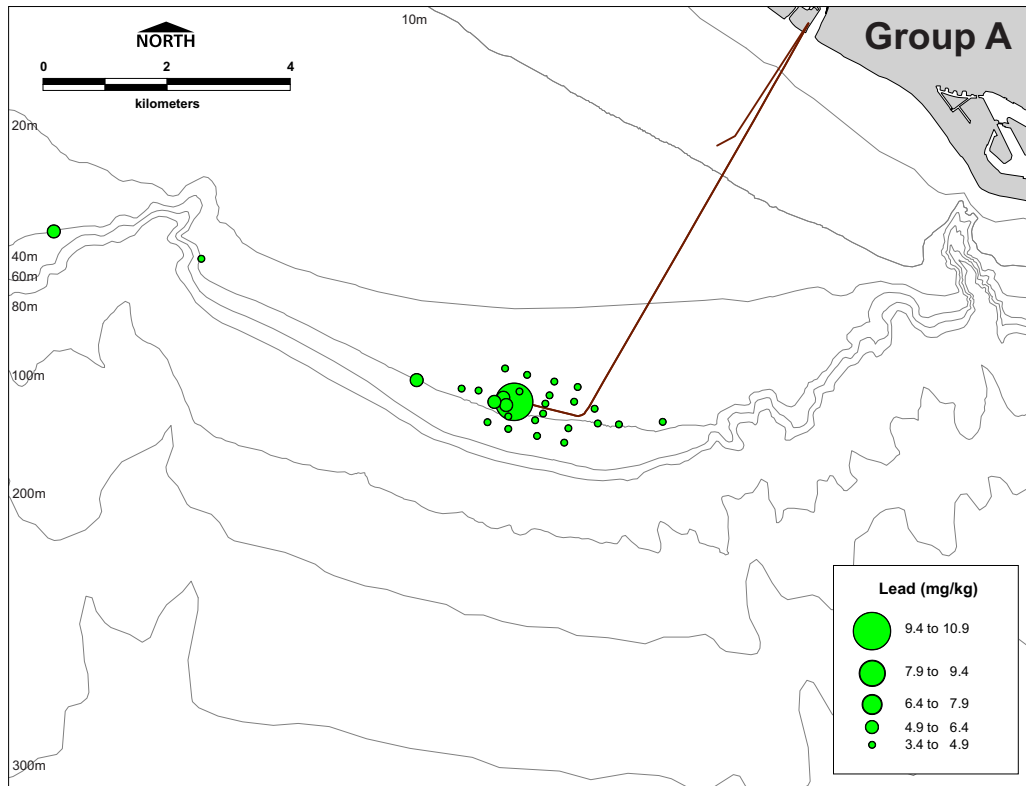
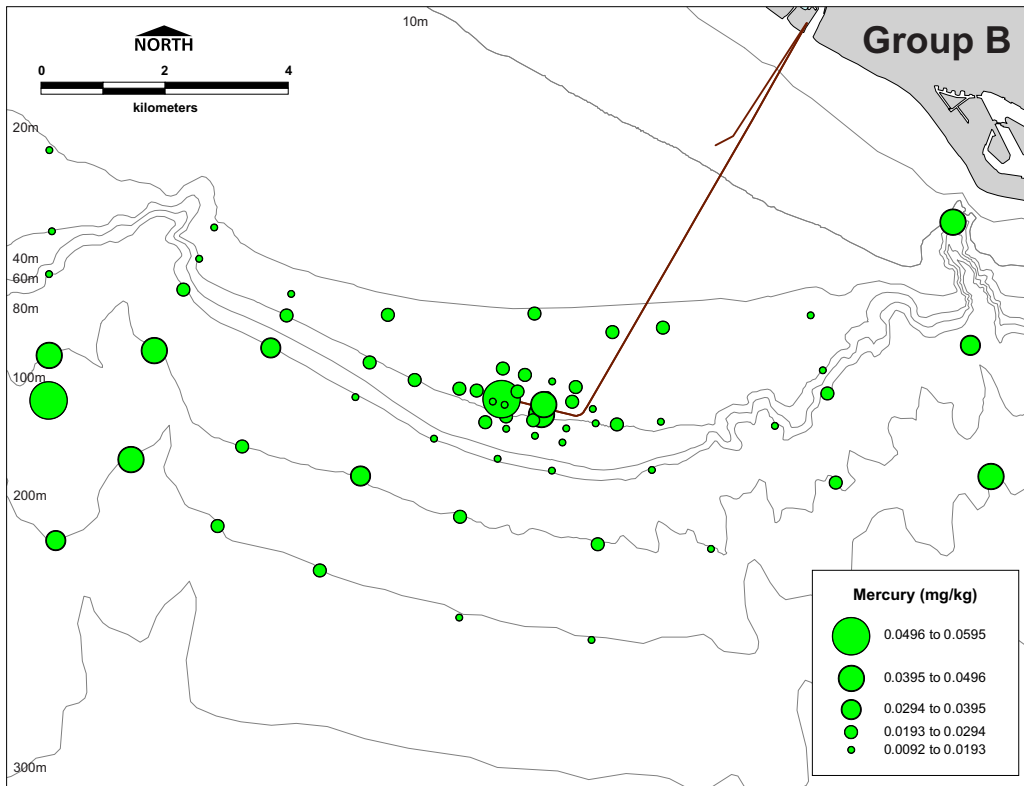


Figure B-29 continued.

Summer 2012



Winter 2013

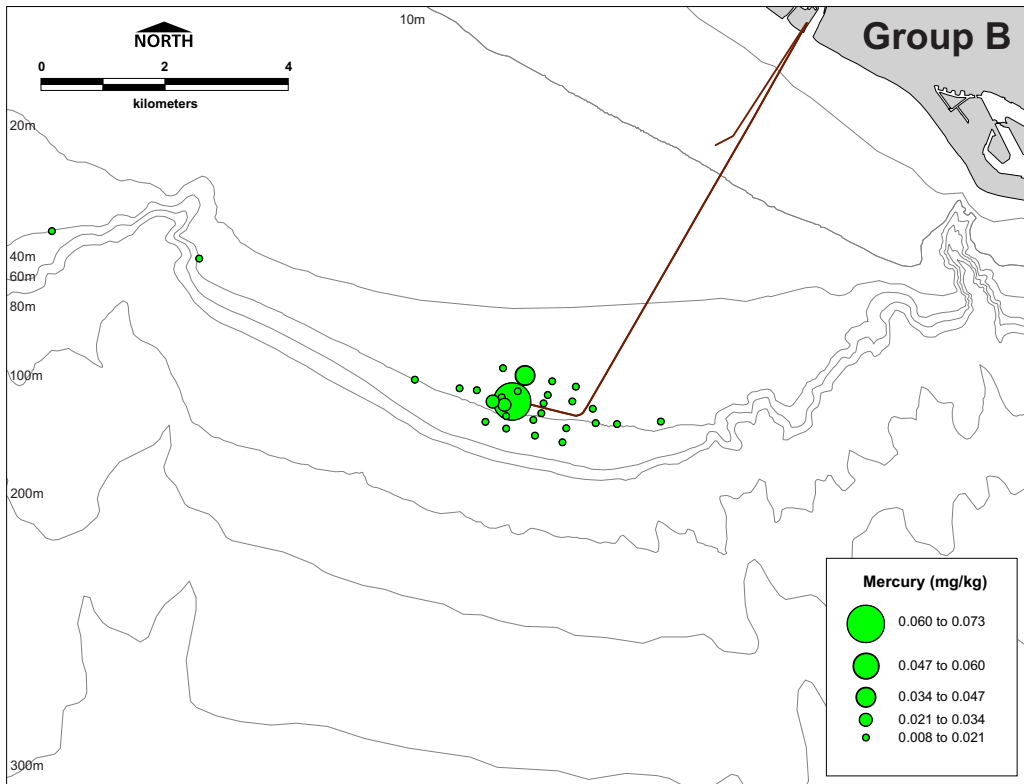
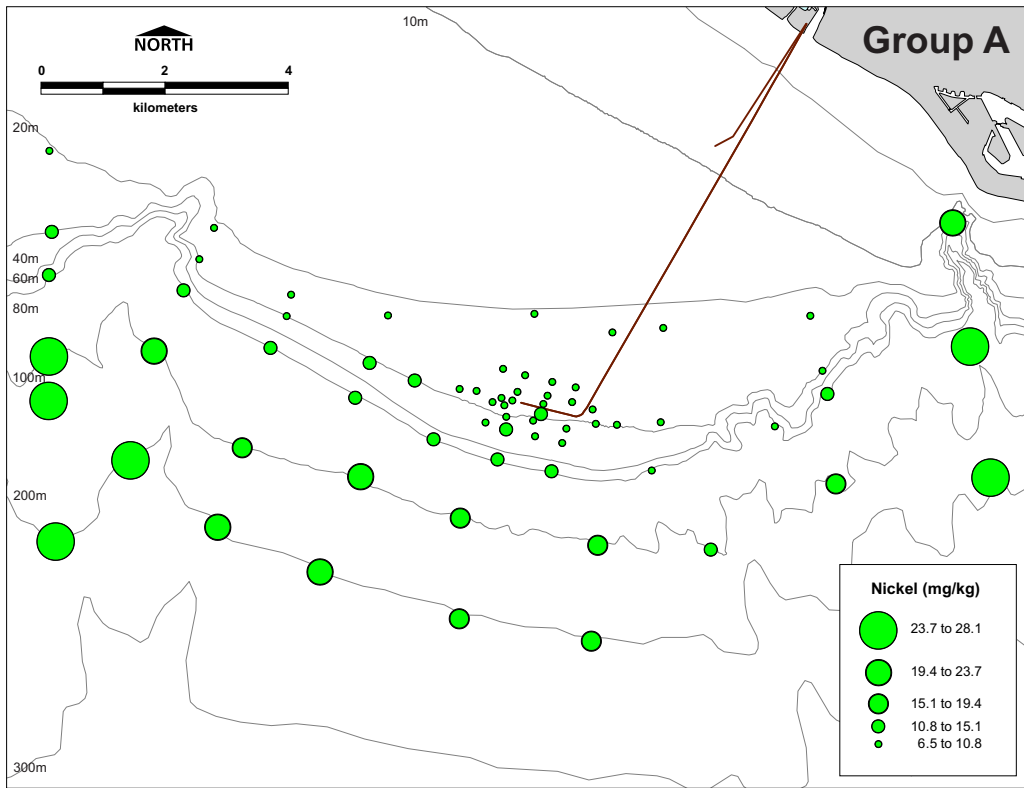


Figure B-29 continued.

Summer 2012



Winter 2013

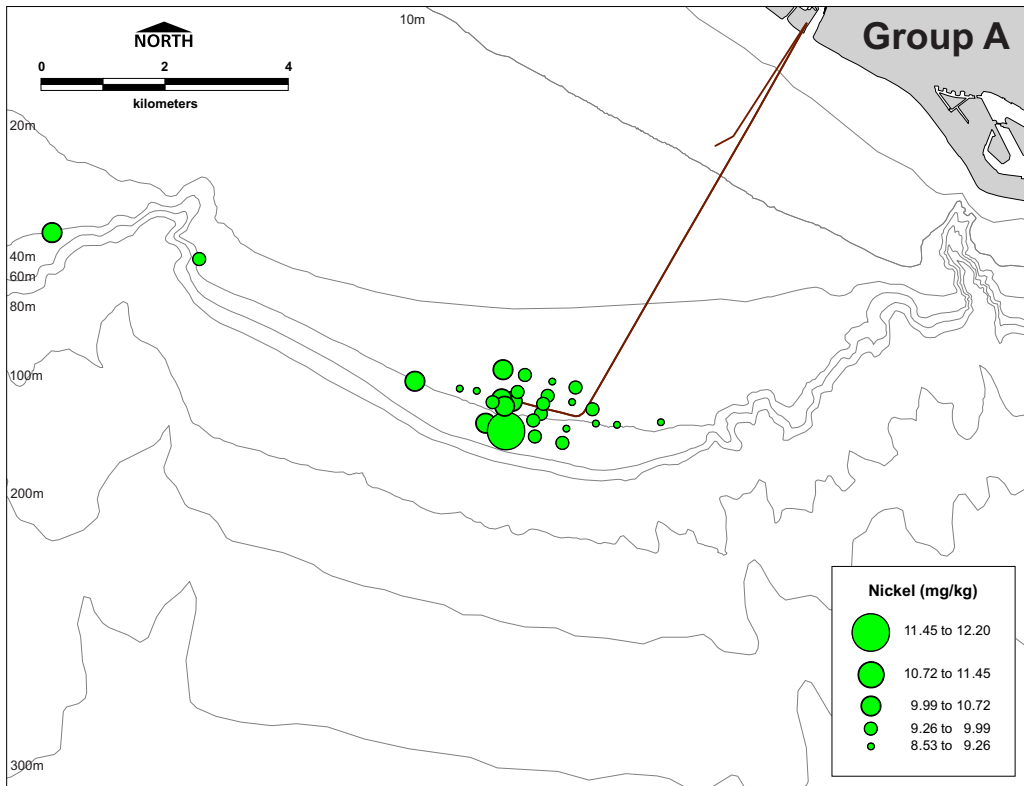
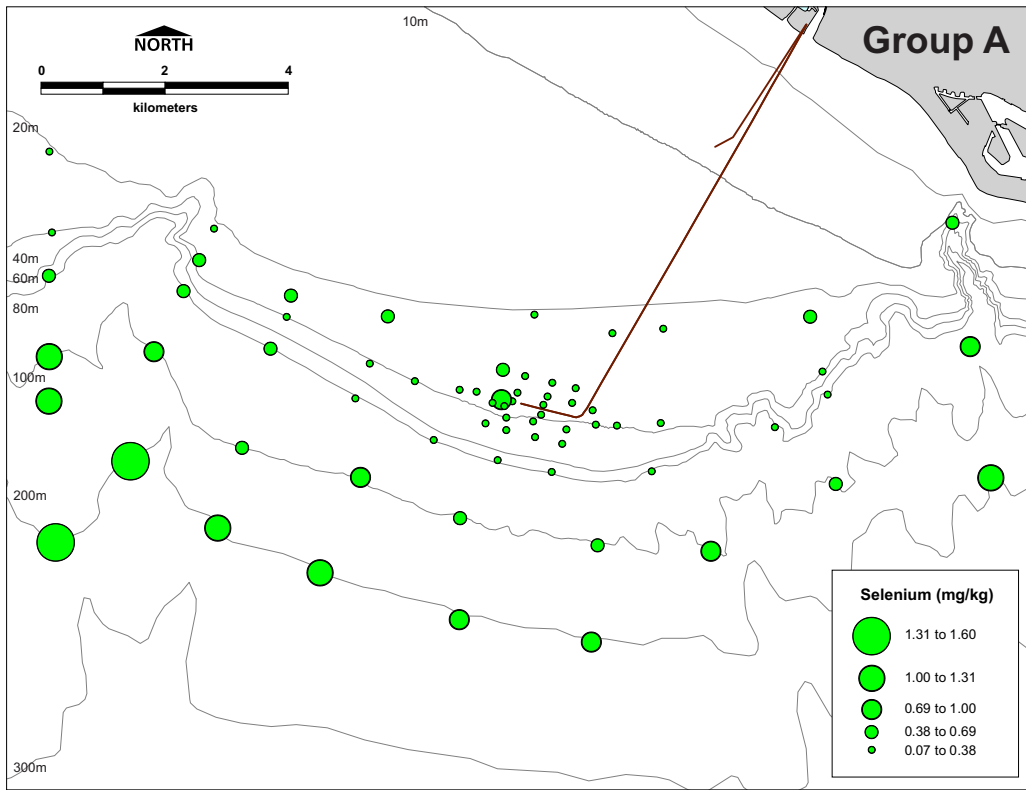


Figure B-29 continued.



Summer 2012



Winter 2013

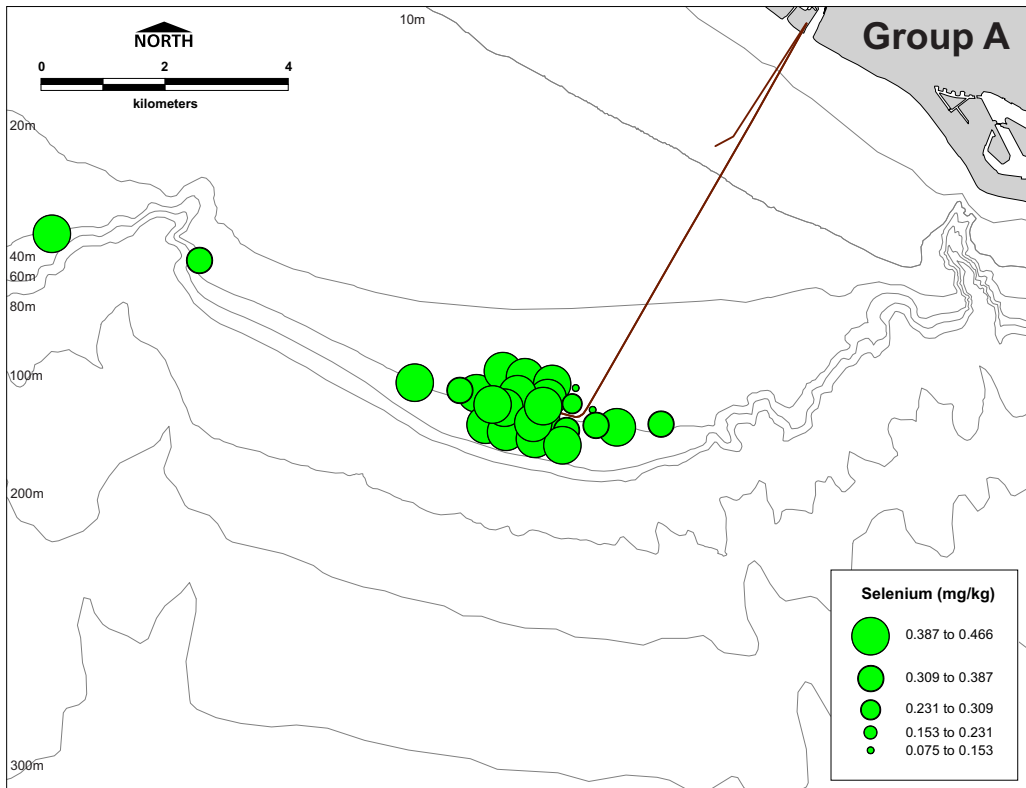
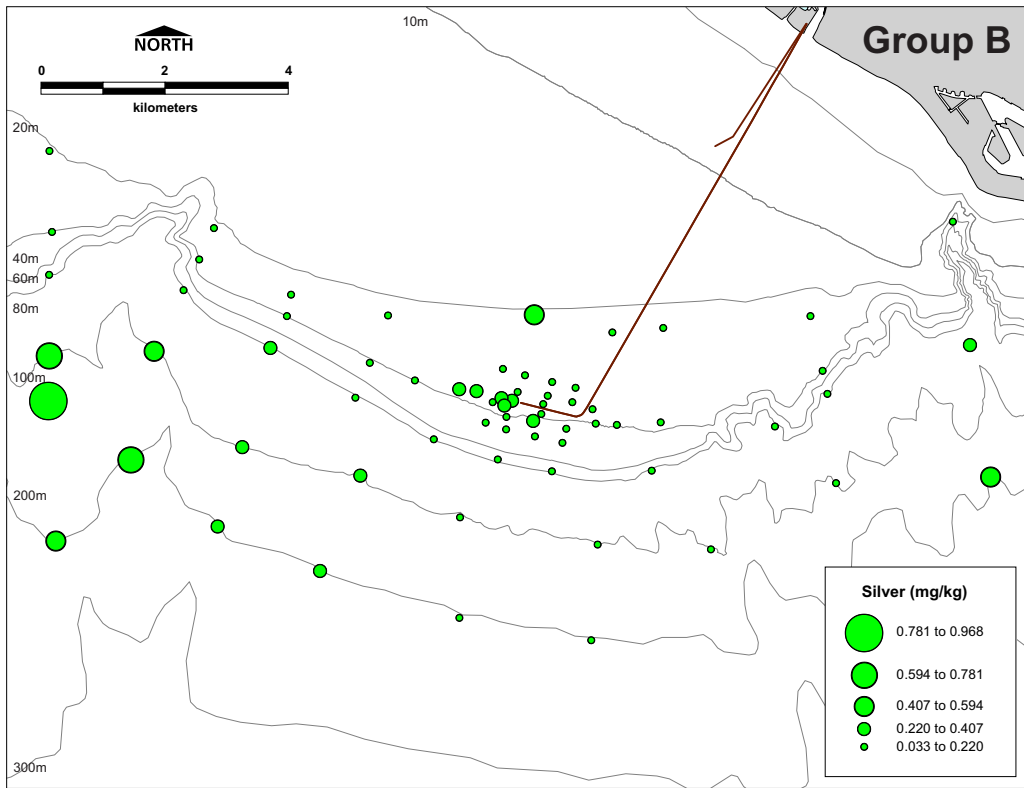


Figure B-29 continued.

Summer 2012



Winter 2013

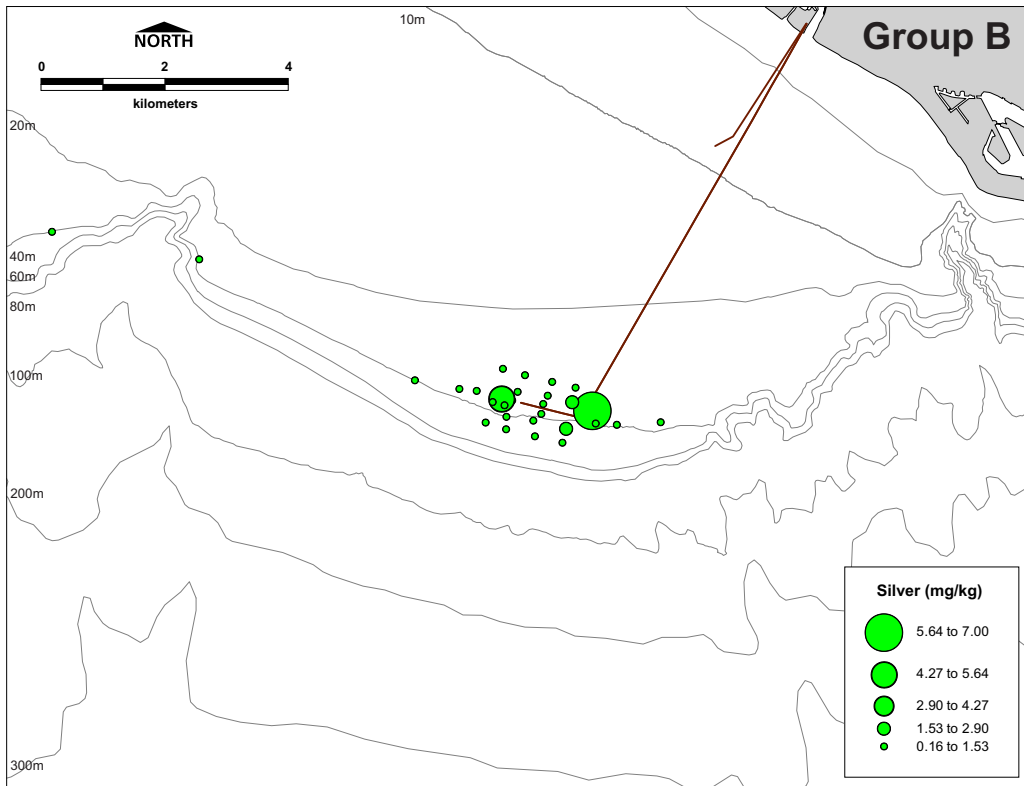


Figure B-29 continued.