

Appendix B
Supporting Data
2008 SBOO Stations
Microbiology

Appendix B.1

Summary of rainfall and bacteria levels at shore stations in the SBOO region during 2008. Rain data are from Lindbergh Field, San Diego, CA. Total coliform (Total), fecal coliform (Fecal), and enterococcus (Entero) densities are expressed as mean CFU/100 mL per month and for the entire year. Stations are listed north to south from left to right.

Month	Rain (in)		S9	S8	S12	S6	S11	S5	S10	S4	S3	S2	S0
Jan	3.3	Total	308	1643	1532	4688	9744	9628	3768	3420	2280	1740	997
		Fecal	50	191	265	1969	1996	7209	154	241	252	295	266
		Entero	94	450	573	2002	1505	7223	537	534	332	170	205
Feb	1.2	Total	12	156	1111	5425	8065	>16,000	5450	3145	2551	1275	1435
		Fecal	3	7	187	881	1814	8600	593	302	136	163	64
		Entero	5	12	31	99	192	6853	99	52	65	88	34
Mar	0.3	Total	56	7	70	4441	4385	11,250	4021	1681	4006	1253	392
		Fecal	3	2	11	462	3058	3886	231	28	107	47	20
		Entero	3	2	5	226	818	3701	10	10	6	17	14
Apr	0.0	Total	13	9	13	9	10	53	13	16	24	40	7128
		Fecal	2	2	2	2	2	2	2	2	4	7	251
		Entero	2	2	2	2	2	14	2	2	3	5	143
May	0.2	Total	61	61	72	25	42	30	11	26	41	465	4035
		Fecal	3	2	3	2	4	3	2	3	6	32	173
		Entero	2	2	6	12	8	6	3	5	8	12	112
Jun	Trace	Total	20	65	65	151	65	34	14	14	38	616	6515
		Fecal	37	3	3	4	3	4	3	2	6	37	346
		Entero	15	2	3	3	5	5	3	2	3	21	153
Jul	0.0	Total	164	20	20	20	20	128	16	52	16	17	3776
		Fecal	7	2	8	2	2	78	2	4	2	3	130
		Entero	2	2	2	2	2	110	2	4	3	2	46
Aug	0.0	Total	110	40	20	17	20	16	20	17	12	11	52
		Fecal	4	16	5	2	2	4	2	14	3	2	4
		Entero	8	2	11	2	4	2	2	4	3	6	5
Sep	0.0	Total	110	61	16	11	61	11	61	66	21	827	48
		Fecal	7	3	19	2	3	4	5	11	13	22	12
		Entero	6	4	4	2	8	8	10	23	36	125	22
Oct	1.2	Total	54	16	34	16	13	16	16	20	373	18	20
		Fecal	4	2	10	2	2	2	2	2	44	3	6
		Entero	4	3	4	3	2	3	2	4	51	4	4
Nov	2.5	Total	30	65	61	16	16	20	4081	32	201	11	606
		Fecal	7	3	26	8	2	5	203	5	16	4	103
		Entero	6	19	44	10	3	2	302	14	91	8	46
Dec	3.4	Total	456	1916	3356	3564	2544	8496	9924	10,922	10,606	6952	5624
		Fecal	161	285	2006	992	505	3064	2972	3996	3305	1480	1174
		Entero	171	1016	2410	2501	1133	3874	2908	3092	3253	1684	839
Annual means		n	60	60	60	60	60	60	60	60	60	60	60
		Total	116	338	531	1532	2082	3807	2283	1617	1681	1102	2552
		Fecal	24	43	212	361	616	1905	348	384	324	174	212
		Entero	26	126	258	405	307	1817	323	312	321	178	135

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Appendix B.2

Summary of samples with elevated (bold) total coliform (>1000 CFU/100 mL), fecal coliform (>400 CFU/100 L), and/or enterococcus (>104 CFU/100 mL) densities collected at SBOO shore stations during 2008. Values are expressed as CFU/100 mL; Total=total coliform; Fecal=fecal coliform; Entero=enterococcus; F:T=fecal to total coliform ratio.

Station	Date	Total	Fecal	Entero	F:T
S0	08 Jan 2008	4800	1300	1000	0.27
S2	02 Jan 2008	5800	1100	42	0.19
S2	08 Jan 2008	2600	260	740	0.10
S3	02 Jan 2008	1200	420	36	0.35
S3	08 Jan 2008	8600	720	1400	0.08
S3	15 Jan 2008	1200	54	10	0.05
S3	29 Jan 2008	60	10	160	0.17
S4	08 Jan 2008	>16,000	1100	2600	0.07
S5	08 Jan 2008	>16,000	>12,000	>12,000	0.75
S5	15 Jan 2008	>16,000	>12,000	>12,000	0.75
S5	29 Jan 2008	>16,000	>12,000	>12,000	0.75
S6	08 Jan 2008	5800	680	1600	0.12
S6	15 Jan 2008	1600	160	6	0.10
S6	29 Jan 2008	>16,000	9000	8400	0.56
S8	08 Jan 2008	600	90	240	0.15
S8	29 Jan 2008	7600	840	2000	0.11
S9	08 Jan 2008	880	86	140	0.10
S9	29 Jan 2008	600	140	320	0.23
S10	08 Jan 2008	>16,000	640	2600	0.04
S10	15 Jan 2008	2600	88	36	0.03
S11	08 Jan 2008	>16,000	800	2000	0.05
S11	15 Jan 2008	>16,000	360	72	0.02
S11	29 Jan 2008	>16,000	8800	5400	0.55
S12	08 Jan 2008	2400	120	440	0.05
S12	22 Jan 2008	20	2	220	0.10
S12	29 Jan 2008	5200	1200	2200	0.23
S0	05 Feb 2008	5200	220	110	0.04
S2	05 Feb 2008	4600	620	320	0.13
S3	05 Feb 2008	4000	120	160	0.03
S3	19 Feb 2008	3400	340	48	0.10
S3	26 Feb 2008	2800	80	42	0.03
S4	05 Feb 2008	1600	100	100	0.06
S4	19 Feb 2008	6400	760	76	0.12
S4	26 Feb 2008	4400	320	18	0.07
S5	05 Feb 2008	>16,000	>12,000	15,000	0.75
S5	12 Feb 2008	>16,000	8000	130	0.50
S5	19 Feb 2008	>16,000	2400	280	0.15
S5	26 Feb 2008	>16,000	>12,000	>12,000	0.75
S6	12 Feb 2008	5400	500	64	0.09
S6	19 Feb 2008	>16,000	3000	300	0.19
S10	05 Feb 2008	7800	780	280	0.10
S10	19 Feb 2008	6800	740	72	0.11
S10	26 Feb 2008	6600	740	32	0.11
S11	12 Feb 2008	>16,000	3800	380	0.24
S11	19 Feb 2008	>16,000	3400	300	0.21
S12	26 Feb 2008	3800	600	66	0.16
S2	18 Mar 2008	5000	180	4	0.04

Appendix B.2 *continued*

Station	Date	Total	Fecal	Entero	F:T
S3	18 Mar 2008	>16,000	420	14	0.03
S4	18 Mar 2008	6600	64	10	0.01
S5	04 Mar 2008	>16,000	>12,000	>12,000	0.75
S5	11 Mar 2008	13,000	2600	1600	0.20
S5	18 Mar 2008	>16,000	940	1200	0.06
S6	04 Mar 2008	>16,000	1800	800	0.11
S6	11 Mar 2008	1700	40	100	0.02
S10	18 Mar 2008	>16,000	880	24	0.06
S11	04 Mar 2008	>16,000	>12,000	3200	0.75
S11	11 Mar 2008	1500	220	64	0.15
S0	08 Apr 2008	>16,000	1100	340	0.07
S0	15 Apr 2008	19,000	120	360	0.01
S0	06 May 2008	>16,000	660	440	0.04
S2	13 May 2008	1800	120	40	0.07
S0	03 Jun 2008	>16,000	1000	520	0.06
S0	24 Jun 2008	10,000	380	80	0.04
S2	10 Jun 2008	1300	100	34	0.08
S0	08 Jul 2008	18,000	600	220	0.03
S5	08 Jul 2008	560	380	540	0.68
S2	17 Sep 2008	3200	80	480	0.03
S3	17 Sep 2008	40	40	120	1.00
S3	14 Oct 2008	20	16	140	0.80
S3	28 Oct 2008	1800	200	94	0.11
S0	04 Nov 2008	1600	160	110	0.10
S3	04 Nov 2008	180	10	340	0.06
S10	04 Nov 2008	>16,000	800	1200	0.05
S0	02 Dec 2008	>16,000	4800	420	0.30
S0	16 Dec 2008	3200	440	2600	0.14
S0	23 Dec 2008	8000	520	1100	0.07
S2	02 Dec 2008	>16,000	1800	200	0.11
S2	16 Dec 2008	2600	380	2200	0.15
S2	23 Dec 2008	>16,000	5200	6000	0.33
S3	02 Dec 2008	>16,000	3200	1000	0.20
S3	16 Dec 2008	10,000	700	2400	0.07
S3	23 Dec 2008	>16,000	>12,000	>12,000	0.75
S3	31 Dec 2008	11,000	620	860	0.06
S4	02 Dec 2008	>16,000	4200	100	0.26
S4	16 Dec 2008	6600	580	3000	0.09
S4	23 Dec 2008	>16,000	>12,000	>12,000	0.75
S4	31 Dec 2008	>16,000	3200	360	0.20
S5	02 Dec 2008	8600	500	80	0.06
S5	16 Dec 2008	>16,000	2400	7200	0.15
S5	23 Dec 2008	>16,000	>12,000	>12,000	0.75
S6	02 Dec 2008	800	130	300	0.16
S6	16 Dec 2008	>16,000	4800	>12,000	0.30
S6	23 Dec 2008	1000	24	180	0.02
S8	16 Dec 2008	9400	1400	4800	0.15
S8	23 Dec 2008	80	20	260	0.25
S9	16 Dec 2008	2200	780	760	0.35
S10	02 Dec 2008	>16,000	1600	180	0.10

Appendix B.2 *continued*

Station	Date	Total	Fecal	Entero	F:T
S10	16 Dec 2008	5600	480	2200	0.09
S10	23 Dec 2008	>16,000	>12,000	>12,000	0.75
S10	31 Dec 2008	12,000	780	160	0.07
S11	02 Dec 2008	3800	420	130	0.11
S11	16 Dec 2008	7400	2000	5400	0.27
S11	23 Dec 2008	1200	100	120	0.08
S12	16 Dec 2008	>16,000	10,000	>12,000	0.63

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Appendix B.3

Summary of samples with elevated (bold) total coliform (>1000 CFU/100 mL), fecal coliform (>400 CFU/100 mL), and/or enterococcus (>104 CFU/100 mL) densities collected at SBOO kelp bed stations during 2008. Values are expressed as CFU/100 mL; Total=total coliform; Fecal=fecal coliform; Entero=enterococcus; F:T=fecal to total coliform ratio.

Station	Date	Depth (m)	Total	Fecal	Entero	F:T
I25	12 Jan 2008	2	4600	180	38	0.04
I25	12 Jan 2008	6	1400	500	64	0.36
I25	12 Jan 2008	9	4800	260	62	0.05
I25	28 Jan 2008	2	700	58	200	0.08
I25	28 Jan 2008	6	720	64	240	0.09
I25	28 Jan 2008	9	880	66	240	0.08
I26	28 Jan 2008	6	200	74	200	0.37
I26	28 Jan 2008	9	400	86	130	0.22
I25	13 Feb 2008	2	2800	420	40	0.15
I25	13 Feb 2008	6	3000	820	76	0.27
I25	13 Feb 2008	9	3200	1000	82	0.31
I26	24 Feb 2008	2	1800	220	76	0.12
I26	24 Feb 2008	6	2000	320	130	0.16
I25	01 Mar 2008	6	>16,000	1000	120	0.06
I25	16 Dec 2008	2	6600	460	600	0.07
I25	16 Dec 2008	6	1500	68	80	0.05
I25	16 Dec 2008	9	5400	480	1400	0.09
I25	19 Dec 2008	2	5000	900	1600	0.18
I25	19 Dec 2008	6	3000	540	980	0.18
I25	19 Dec 2008	9	2200	360	780	0.16
I25	22 Dec 2008	2	3000	160	180	0.05
I25	22 Dec 2008	6	8800	400	660	0.05
I25	22 Dec 2008	9	600	120	300	0.20
I26	16 Dec 2008	2	7800	540	700	0.07
I26	16 Dec 2008	6	2200	120	200	0.05
I26	16 Dec 2008	9	800	76	220	0.10
I26	19 Dec 2008	2	3800	94	1800	0.02
I26	19 Dec 2008	6	9000	1000	1400	0.11
I26	19 Dec 2008	9	11,000	2600	1400	0.24
I26	22 Dec 2008	2	300	40	240	0.13
I26	22 Dec 2008	6	400	74	620	0.19
I26	22 Dec 2008	9	1400	140	2400	0.10
I39	16 Dec 2008	2	4600	620	2200	0.13
I39	19 Dec 2008	2	1000	100	580	0.10
I39	19 Dec 2008	12	1300	120	300	0.09
I39	19 Dec 2008	18	3200	780	1400	0.24

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Appendix B.4

Summary of samples with elevated (bold) total coliform (>1000 CFU/100 mL), fecal coliform (>400 CFU/100 mL), and/or enterococcus (>104 CFU/100 mL) densities collected at SBOO offshore stations during 2008. Values are expressed as CFU/100 mL; Total=total coliform; Fecal=fecal coliform; Entero=enterococcus; F:T=fecal to total coliform ratio.

Station	Date	Depth (m)	Total	Fecal	Entero	F:T
I14	16 Jan 2008	18	1600	2	2	0.00
I19	16 Jan 2008	2	>16,000	800	68	0.05
I19	16 Jan 2008	6	2000	220	8	0.11
I19	16 Jan 2008	11	1500	70	20	0.05
I40	16 Jan 2008	2	1400	120	24	0.09
I40	16 Jan 2008	6	2800	400	48	0.14
I40	16 Jan 2008	9	5400	340	54	0.06
I16	06 Feb 2008	18	11,000	1400	340	0.13
I19	06 Feb 2008	11	4600	120	340	0.03
I23	06 Feb 2008	2	1200	240	60	0.20
I24	06 Feb 2008	6	1300	120	42	0.09
I40	06 Feb 2008	2	1200	120	56	0.10
I19	18 Mar 2008	2	>16,000	720	40	0.05
I19	18 Mar 2008	11	1200	42	8	0.04
I9	03 Apr 2008	18	2800	2	2	0.00
I12	15 Jul 2008	18	1100	320	66	0.29
I16	15 Jul 2008	18	2600	800	400	0.31
I5	05 Aug 2008	6	1300	12	26	0.01
I14	09 Sep 2008	18	2800	1000	180	0.36
I5	11 Sep 2008	2	>16,000	140	1000	0.01
I5	11 Sep 2008	6	340	12	110	0.04
I12	14 Oct 2008	18	>16,000	>12,000	8200	0.75
I16	14 Oct 2008	18	2200	1100	200	0.50
I10	15 Oct 2008	12	1100	2	130	0.00
I5	15 Oct 2008	6	8200	320	140	0.04
I5	15 Oct 2008	11	>16,000	1200	160	0.08
I11	03 Dec 2008	11	1600	200	12	0.13
I12	03 Nov 2008	18	3200	200	36	0.06
I19	02 Dec 2008	2	>16,000	1600	60	0.10
I32	01 Dec 2008	6	700	50	110	0.07
I32	01 Dec 2008	9	800	160	200	0.20
I22	02 Dec 2008	18	1200	2	2	0.00
I23	02 Dec 2008	2	2400	380	6	0.16
I23	02 Dec 2008	18	520	100	140	0.19
I24	02 Dec 2008	2	>16,000	1400	80	0.09
I24	02 Dec 2008	6	9200	640	58	0.07
I24	02 Dec 2008	11	2400	220	180	0.09
I40	02 Dec 2008	2	2000	280	110	0.14
I40	02 Dec 2008	6	1000	110	70	0.11
I40	02 Dec 2008	9	600	140	120	0.23

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Appendix B.5

2001 California Ocean Plan water contact standards for SBOO shore and kelp bed stations during 2008. Values reflect the number of days that the standards were exceeded at each station (the 30-day Total Coliform, 10,000 Total Coliform, the 60-day Fecal Coliform, and 30-day Fecal Geometric Mean Standards; see Box 3.1). Shore stations are listed north to south from left to right.

		Shore stations								Kelp bed stations		
Month	# days	S9	S8	S12	S6	S11	S5	S10	S4	I25	I26	I39
30-day Total Coliform Standard												
January	31	0	0	17	30	30	31	31	30	3	0	0
February	29	0	19	25	29	29	29	29	27	0	0	0
March	31	0	0	18	31	31	31	26	31	13	0	0
April	30	0	0	0	7	7	16	0	10	0	0	0
May	31	0	0	0	0	0	0	0	0	0	0	0
June	30	0	0	0	0	0	0	0	0	0	0	0
July	31	0	0	0	0	0	0	0	0	0	0	0
August	31	0	0	0	0	0	0	0	0	0	0	0
September	30	0	0	0	0	0	0	0	0	0	0	0
October	31	0	0	0	0	0	0	0	0	0	0	0
November	30	0	0	0	0	0	0	26	0	0	0	0
December	31	11	11	15	15	26	26	31	29	28	13	0
Percent compliance		97%	92%	80%	69%	66%	66%	61%	65%	88%	97%	100%
10,000 Total Coliform Standard												
January	31	0	0	0	0	0	2	1	0	0	0	0
February	29	0	0	0	0	1	4	0	0	0	0	0
March	31	0	0	0	1	1	2	0	0	0	0	0
April	30	0	0	0	0	0	0	0	0	0	0	0
May	31	0	0	0	0	0	0	0	0	0	0	0
June	30	0	0	0	0	0	0	0	0	0	0	0
July	31	0	0	0	0	0	0	0	0	0	0	0
August	31	0	0	0	0	0	0	0	0	0	0	0
September	30	0	0	0	0	0	0	0	0	0	0	0
October	31	0	0	0	0	0	0	0	0	0	0	0
November	30	0	0	0	0	0	0	1	0	0	0	0
December	31	0	0	0	1	0	2	2	2	0	0	0
Total		0	0	0	2	2	10	4	2	0	0	0

Appendix B.5 *continued*

		Shore stations								Kelp stations		
Month	# days	S9	S8	S12	S6	S11	S5	S10	S4	I25	I26	I39
60-day Fecal Coliform Standard												
January	31	0	3	3	24	7	28	31	28	0	0	0
February	29	0	29	29	29	29	29	29	21	17	0	0
March	31	0	28	31	31	31	31	31	31	31	0	0
April	30	0	0	25	30	30	30	28	18	12	0	0
May	31	0	0	0	3	3	17	6	0	0	0	0
June	30	0	0	0	0	0	0	0	0	0	0	0
July	31	0	0	0	0	0	0	0	0	0	0	0
August	31	0	0	0	0	0	0	0	0	0	0	0
September	30	0	0	0	0	0	0	0	0	0	0	0
October	31	0	0	0	0	0	0	0	0	0	0	0
November	30	0	0	0	0	0	0	26	0	0	0	0
December	31	16	16	16	16	30	30	31	29	16	0	0
Percent compliance		96%	79%	72%	65%	65%	55%	55%	65%	79%	100%	100%
30-day Fecal Geometric Mean Standard												
January	31	0	0	0	0	0	18	0	0	0	0	0
February	29	0	0	0	11	25	29	0	0	0	0	0
March	31	0	0	0	15	24	31	2	0	0	0	0
April	30	0	0	0	0	0	0	0	0	0	0	0
May	31	0	0	0	0	0	0	0	0	0	0	0
June	30	0	0	0	0	0	0	0	0	0	0	0
July	31	0	0	0	0	0	0	0	0	0	0	0
August	31	0	0	0	0	0	0	0	0	0	0	0
September	30	0	0	0	0	0	0	0	0	0	0	0
October	31	0	0	0	0	0	0	0	0	0	0	0
November	30	0	0	0	0	0	0	0	0	0	0	0
December	31	0	0	0	0	0	0	0	0	0	0	0
Percent compliance		100%	100%	100%	93%	87%	79%	99%	100%	100%	100%	100%