

Occurrence of Shorebirds at Select GGNRA Beaches as Recorded by Beach Watch Surveys, 1993-2006

Total Number of Surveys by Month

	Muir Beach	Rodeo Beach	Baker Beach	China Beach	Ocean Beach N	Ocean Beach C	Ocean Beach S	Thornton Beach N		Total
January	24	25	20	16	10	16	15	14		140
February	22	19	17	9	8	14	10	14		113
March	22	26	22	12	5	16	19	15		137
April	21	26	19	12	5	18	12	16		129
May	21	24	18	11	4	17	15	13		123
June	20	26	17	12	6	17	12	10		120
July	24	26	23	12	5	18	13	15		136
August	22	24	25	12	6	17	16	14		136
September	21	26	20	12	5	16	14	16		130
October	23	20	21	12	6	15	13	11		121
November	16	23	21	12	8	15	16	14		125
December	26	23	22	13	8	14	15	15		136
Total	262	288	245	145	76	193	170	167		1546

Total Kms of Beach Surveyed by Month

	Muir Beach	Rodeo Beach	Baker Beach	China Beach	Ocean Beach N	Ocean Beach C	Ocean Beach S	Thornton Beach N		Total
January	13.5	16.1	24	2.9	15.52	51.2	11.92	28.39		163.53
February	12.96	12.25	20.4	1.72	12.64	46.88	8	32.01		146.86
March	13.74	17.12	26.4	2.36	7.44	51.2	15.2	38.12		171.58
April	12.54	17.57	22.8	2.4	7.84	57.6	9.6	41.6		171.95
May	12.6	16.28	22.8	2.16	6.4	54.4	12	32.79		159.43
June	12	17.99	20.4	2.35	9.28	54.4	9.6	25.12		151.14
July	14.4	17.75	27.6	2.38	7.84	57.6	10.4	34.4		172.37
August	13.2	16.52	29.82	2.37	8.8	54.4	12.8	33.51		171.42
September	12.6	17.89	23.88	2.28	7.6	51.2	10.66	38.77		164.88
October	13.38	13.41	25.2	2.26	9.12	48	10.4	26.86		148.63
November	9.48	15.09	25.2	2.43	14.08	48	12.8	31.2		158.28
December	14.97	14.32	26.4	1.93	12.64	44.8	11.92	34.55		161.53
Total	155.37	192.29	294.9	27.54	119.2	619.68	135.3	397.32		1941.6

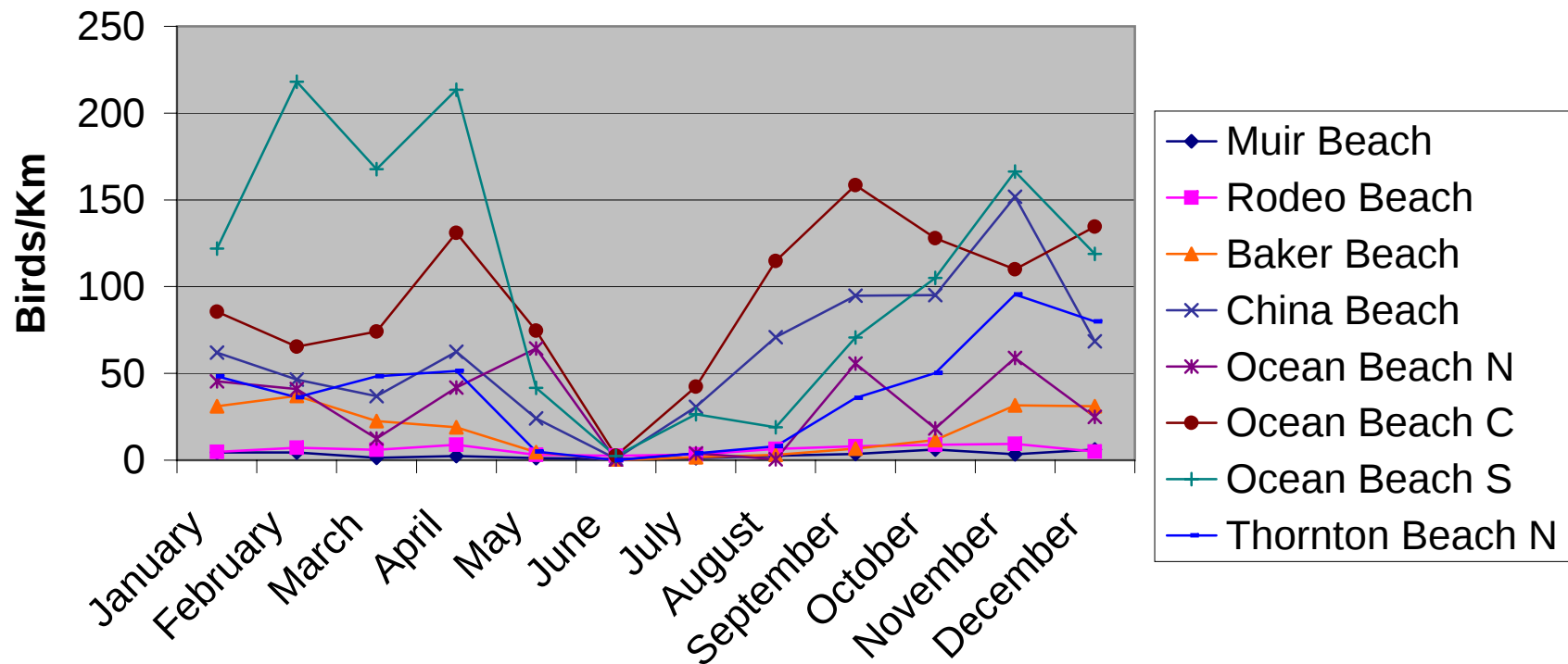
Total Number of Surveys by Year

	Muir Beach	Rodeo Beach	Baker Beach	China Beach	Ocean Beach N	Ocean Beach C	Ocean Beach S	Thornton Beach N		Total
1993	3		2							5
1994	11	13	4	5	4	1	3	2		43
1995	14	25	3	1	4	13	14	14		88
1996	26	25	16	3	2	14	18	19		123
1997	24	26	24	13	4	13	25	16		145
1998	15	25	25	13	2	15	17	14		126
1999	25	25	24	13	0	26	15	9		137
2000	21	26	22	13	0	20	13	12		127
2001	26	26	22	13	0	13	15	12		127
2002	26	26	21	13	2	13	13	11		125
2003	26	25	23	13	16	18	13	15		149
2004	26	27	21	11	19	27	14	25		170
2005	19	19	24	14	13	20	10	18		137
2006			14	20	10					44

Average Shorebird Density by Month (Birds/Km)

	Muir Beach	Rodeo Beach	Baker Beach	China Beach	Ocean Beach N	Ocean Beach C	Ocean Beach S	Thornton Beach N		All Beaches Combined
January	4.37	4.72	31.08	62.07	45.49	85.53	121.98	48.33		54.86
February	4.48	7.18	37.06	46.51	40.90	65.44	218.00	36.27		50.88
March	1.38	5.90	22.50	36.86	12.50	74.10	167.63	48.35		52.91
April	2.39	8.88	19.04	62.50	41.84	130.94	213.44	51.37		74.59
May	1.27	3.01	4.61	24.07	64.38	74.63	41.75	4.91		33.59
June	0.75	2.56	0.05	0.85	0.11	2.48	2.40	0.04		1.44
July	1.18	3.21	1.74	30.67	3.95	42.43	26.54	3.87		17.86
August	2.58	6.48	3.05	70.89	0.57	114.80	18.98	8.06		41.79
September	3.65	8.05	6.57	94.74	55.66	158.40	70.73	35.88		68.18
October	6.13	8.80	11.67	95.13	18.31	127.90	105.00	50.19		63.61
November	3.38	9.48	31.51	151.85	58.95	110.00	166.25	95.45		79.32
December	6.21	4.89	31.06	68.39	24.92	134.53	118.79	79.88		72.02
Total	3.19	6.01	16.41	62.60	32.11	92.34	105.16	39.15		51.01

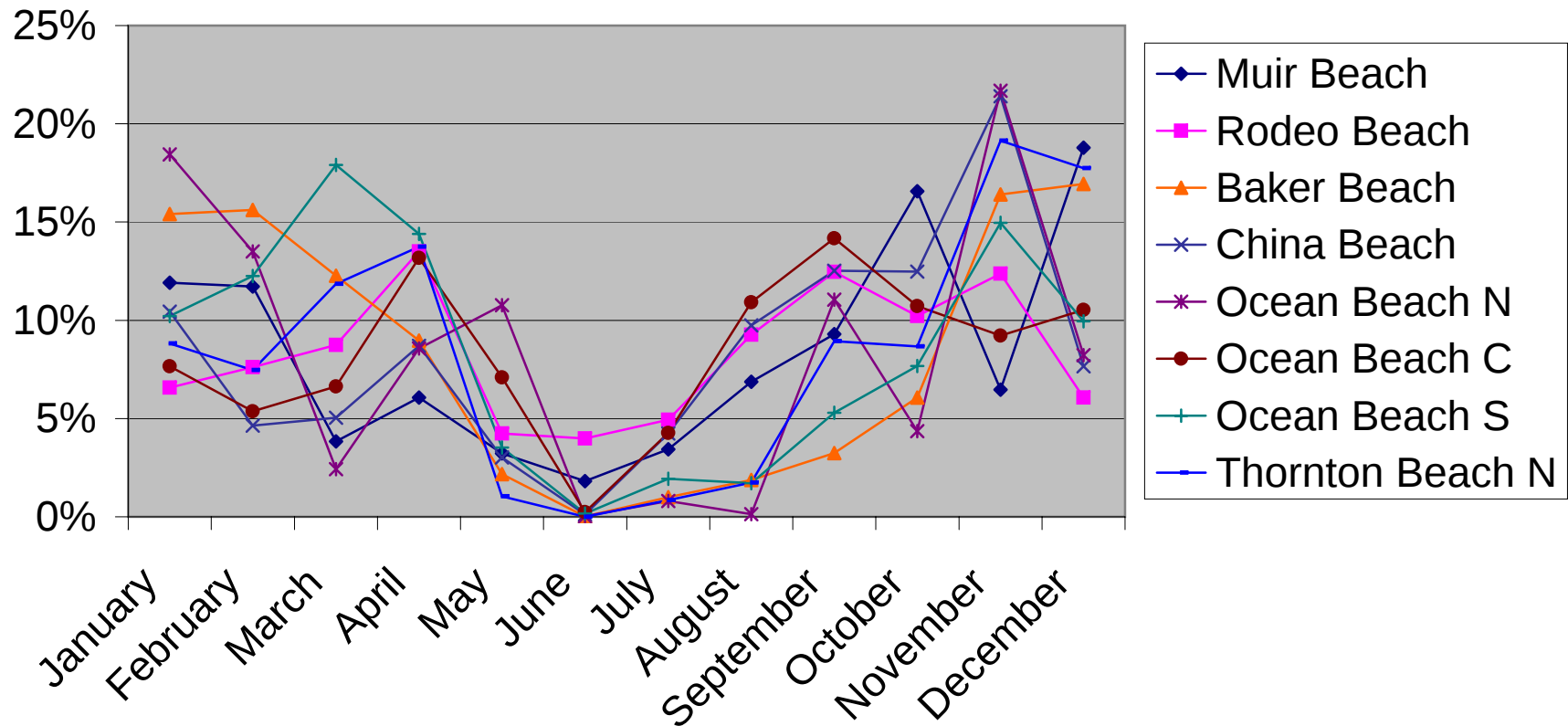
Average Shorebird Density by Month



Monthly Observed Shorebirds as Percentage of Total Observed

	Muir Beach	Rodeo Beach	Baker Beach	China Beach	Ocean Beach N	Ocean Beach C	Ocean Beach S	Thornton Beach N		All Beaches Combined
January	12%	7%	15%	10%	18%	8%	10%	9%		9%
February	12%	8%	16%	5%	14%	5%	12%	7%		8%
March	4%	9%	12%	5%	2%	7%	18%	12%		9%
April	6%	14%	9%	9%	9%	13%	14%	14%		13%
May	3%	4%	2%	3%	11%	7%	4%	1%		5%
June	2%	4%	0%	0%	0%	0%	0%	0%		0%
July	3%	5%	1%	4%	1%	4%	2%	1%		3%
August	7%	9%	2%	10%	0%	11%	2%	2%		7%
September	9%	12%	3%	13%	11%	14%	5%	9%		11%
October	17%	10%	6%	12%	4%	11%	8%	9%		10%
November	6%	12%	16%	21%	22%	9%	15%	19%		13%
December	19%	6%	17%	8%	8%	11%	10%	18%		12%

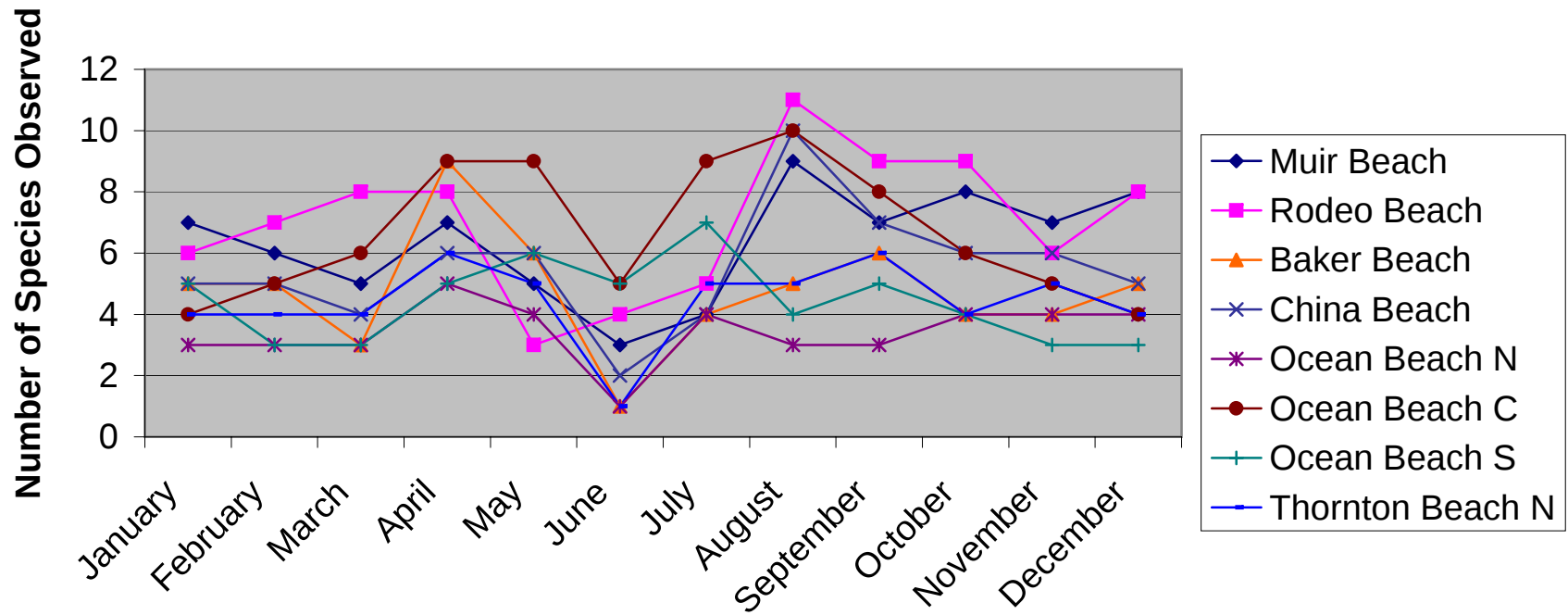
Monthly Observed Shorebirds as Percentage of Total Observed



Species Richness by Month

	Muir Beach	Rodeo Beach	Baker Beach	China Beach	Ocean Beach N	Ocean Beach C	Ocean Beach S	Thornton Beach N		Avg. All Beaches Combined	Avg. % of Maximum Richness (Avg all beaches combined / 21, the total # of species observed)
January	7	6	5	5	3	4	5	4		4.88	23%
February	6	7	5	5	3	5	3	4		4.75	23%
March	5	8	3	4	3	6	3	4		4.50	21%
April	7	8	9	6	5	9	5	6		6.88	33%
May	5	3	6	6	4	9	6	5		5.50	26%
June	3	4	1	2	1	5	5	1		2.75	13%
July	4	5	4	4	4	9	7	5		5.25	25%
August	9	11	5	10	3	10	4	5		7.13	34%
September	7	9	6	7	3	8	5	6		6.38	30%
October	8	9	4	6	4	6	4	4		5.63	27%
November	7	6	4	6	4	5	3	5		5.00	24%
December	8	8	5	5	4	4	3	4		5.13	24%

Species Richness by Month

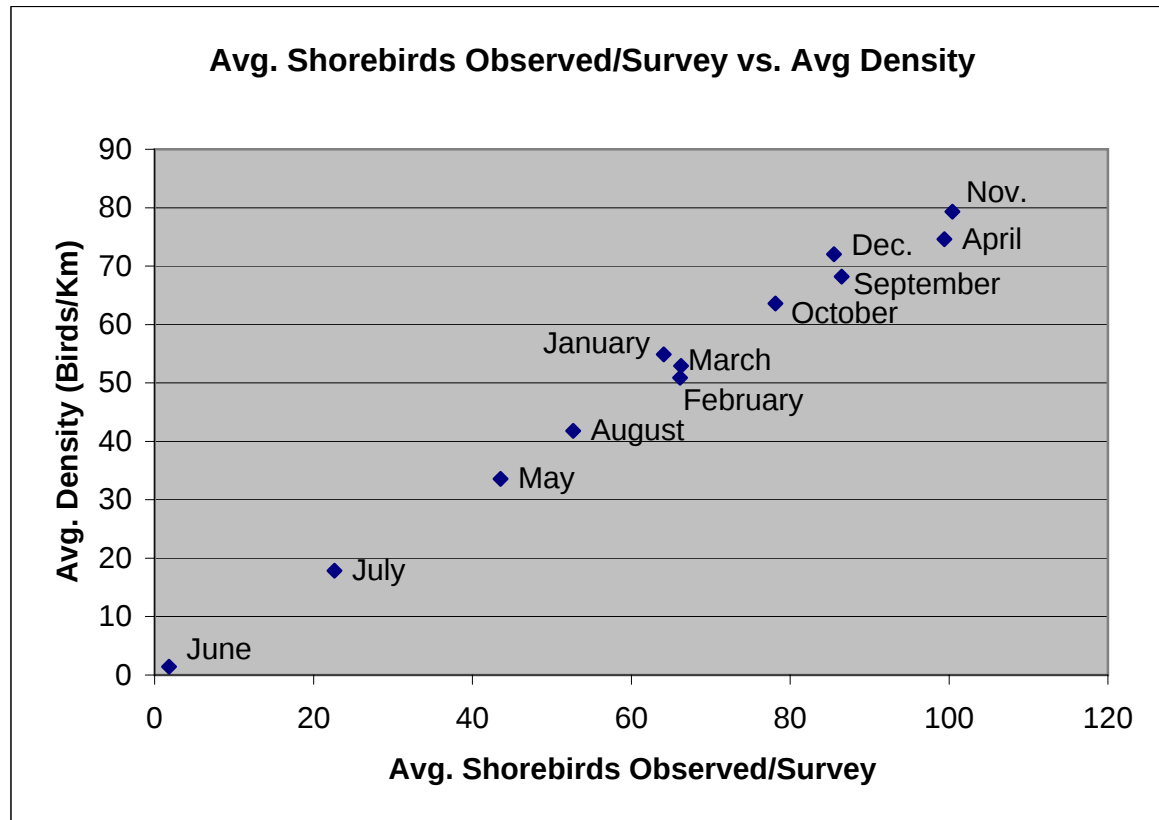


Abundance of Shorebird Species: Overall Average Density (Birds/Km) by Beach

	Muir Beach	Rodeo Beach	Baker Beach	China Beach	Ocean Beach N	Ocean Beach C	Ocean Beach S	Thornton Beach N
Sanderling	0.60	2.18	11.73	25.64	18.20	71.48	60.79	20.37
Willet	0.45	0.44	2.61	19.28	8.35	12.19	35.67	13.69
Marbled Godwit	0.51	0.23	1.44	5.56	4.93	7.15	6.52	4.02
Whimbrel	0.17	0.14	0.24	3.56	0.04	0.98	0.41	0.10
Least Sandpiper	0.04	0.10				0.30		
Black-bellied Plover		0.01	0.05	0.04		0.10	0.31	0.01
Long-billed Curlew	0.14	0.05	0.13	0.15	0.04	0.06	1.38	0.92
Western Sandpiper	0.01	0.25		0.15		0.03		
Short-billed Dowitcher			0.003			0.01		
Semipalmated Plover		0.05				0.01		0.01
Killdeer	0.53	2.21	0.003			0.01	0.03	
American Avocet	0.01					0.01		
Black Turnstone	0.33	0.12	0.14	4.68	0.55	0.01		
Dunlin		0.01				0.005		0.01
Black Oystercatcher	0.37	0.18	0.06	2.72		0.002		
Ruddy Turnstone						0.002		
Greater Yellowlegs	0.01	0.03		0.07				
Lesser Yellowlegs				0.07				
Long-billed Dowitcher		0.01					0.05	
Red Knot				0.04				0.03
Wandering Tattler	0.05		0.003	0.65				

**Average Shorebirds Observed/Survey and
Average Shorebird Density Across all
Beaches, by Month**

	Total Shorebirds Observed	Avg. Shorebirds Observed	Avg Density
January	8972	64.09	54.86
February	7472	66.12	50.88
March	9079	66.27	52.91
April	12826	99.43	74.59
May	5356	43.54	33.59
June	218	1.82	1.44
July	3079	22.64	17.86
August	7163	52.67	41.79
September	11241	86.47	68.18
October	9455	78.14	63.61
November	12554	100.43	79.32
December	11633	85.54	72.02



Average Willet Density by Month (Birds/Km)

	Muir Beach	Rodeo Beach	Baker Beach	China Beach	Ocean Beach N	Ocean Beach C	Ocean Beach S	Thornton Beach N		All Beaches Combined
January	0.59	0.37	4.96	7.24	12.56	30.43	69.55	16.13		19.53
February	0.46	0.57	1.86	14.53	29.19	15.70	157.13	11.18		19.04
March	0.58	0.70	8.64	6.78	4.44	14.71	42.76	26.44		15.78
April	0.32	0.57	1.54	9.17	14.16	9.46	11.77	12.28		7.86
May	0.00	0.00	0.04	0.00	1.41	1.05	4.42	0.82		0.92
June	0.00	0.00	0.00	0.00	0.00	0.37	0.00	0.00		0.13
July	0.00	0.23	0.40	13.45	0.38	0.90	0.38	0.20		0.66
August	0.23	0.61	1.74	41.77	0.11	2.87	1.25	0.45		2.05
September	0.79	0.50	3.94	67.98	2.50	6.00	14.63	10.42		7.00
October	0.75	0.75	2.34	50.88	1.54	16.25	30.38	23.31		12.99
November	0.74	0.46	2.30	12.35	6.25	29.71	39.84	33.69		20.07
December	0.94	0.63	2.84	8.29	12.10	26.03	77.35	28.19		20.61
Total	0.45	0.44	2.61	19.28	8.35	12.19	35.67	13.69		10.44

Average Marbled Godwit Density by Month (Birds/Km)

	Muir Beach	Rodeo Beach	Baker Beach	China Beach	Ocean Beach N	Ocean Beach C	Ocean Beach S	Thornton Beach N		All Beaches Combined
January	0.74	0.19	0.29	2.07	0.45	9.51	15.52	4.23		5.04
February	0.39	0.00	0.34	8.14	2.06	7.27	11.38	4.22		4.21
March	0.07	0.06	1.10	8.47	3.76	12.07	4.93	1.68		4.87
April	0.24	0.00	12.59	18.33	9.31	18.54	30.83	9.35		12.56
May	0.08	0.00	1.58	8.80	47.66	4.50	1.67	0.24		3.98
June	0.00	0.06	0.00	0.00	0.11	0.74	0.83	0.00		0.33
July	0.00	0.00	0.14	0.00	3.06	5.28	2.12	0.78		2.21
August	1.06	0.67	0.23	2.95	0.34	8.60	2.66	0.42		3.26
September	1.03	0.56	0.80	8.77	1.58	2.73	1.31	3.87		2.29
October	0.75	0.67	0.67	6.19	2.96	4.31	2.98	2.42		2.56
November	0.32	0.46	0.28	1.23	0.92	4.79	0.78	9.94		3.68
December	1.27	0.21	0.15	3.11	5.46	6.25	8.05	9.12		4.90
Total	0.51	0.23	1.44	5.56	4.93	7.15	6.52	4.02		4.22

Average Sanderling Density by Month (Birds/Km)

	Muir Beach	Rodeo Beach	Baker Beach	China Beach	Ocean Beach N	Ocean Beach C	Ocean Beach S	Thornton Beach N		All Beaches Combined
January	1.11	2.48	25.58	39.66	32.47	45.53	36.24	27.90		29.62
February	1.23	4.82	34.41	20.35	9.65	42.19	49.50	20.81		27.06
March	0.00	2.98	12.77	20.34	4.30	46.86	119.93	20.17		31.82
April	0.08	5.46	2.94	17.50	11.35	100.85	169.06	25.79		51.18
May	0.00	0.00	1.49	1.39	14.69	64.94	29.42	1.95		25.60
June	0.00	0.00	0.00	0.00	0.00	0.02	0.10	0.00		0.01
July	0.00	0.28	0.00	0.00	0.38	29.69	9.62	0.03		10.55
August	0.00	0.00	0.34	0.00	0.11	102.39	13.75	5.97		34.75
September	0.00	1.40	1.59	2.63	51.58	149.45	53.66	21.07		57.63
October	2.62	2.24	8.49	25.22	12.39	107.15	71.44	23.64		46.89
November	0.95	5.24	28.89	128.40	51.70	74.81	125.63	51.47		54.72
December	1.14	2.37	27.08	45.60	7.20	102.12	33.39	42.55		45.74
Total	0.60	2.18	11.73	25.64	18.20	71.48	60.79	20.37		34.74

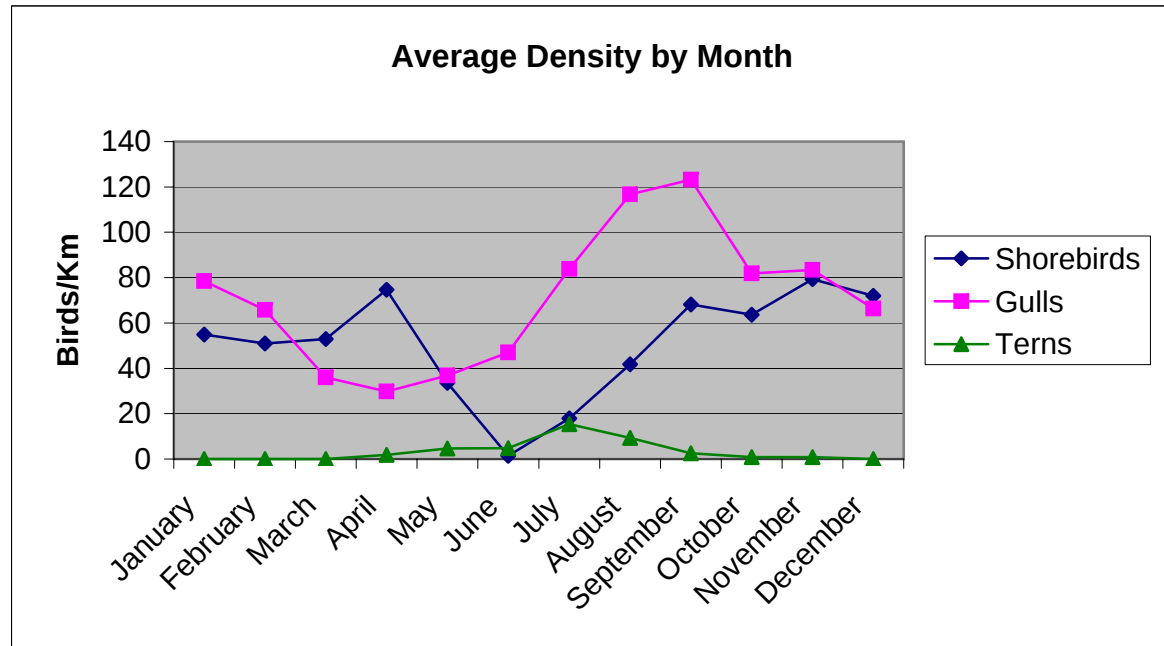
Average Whimbrel Density by Month (Birds/Km)

	Muir Beach	Rodeo Beach	Baker Beach	China Beach	Ocean Beach N	Ocean Beach C	Ocean Beach S	Thornton Beach N		All Beaches Combined
January	0.00	0.06	0.00	0.00	0.00	0.06	0.00	0.00		0.02
February	0.00	0.16	0.00	0.00	0.00	0.15	0.00	0.00		0.06
March	0.00	0.06	0.00	0.00	0.00	0.35	0.00	0.05		0.12
April	0.48	0.51	0.61	9.17	0.26	1.75	0.10	0.19		0.95
May	0.63	0.43	1.05	9.26	0.00	3.68	2.42	0.43		1.89
June	0.00	0.00	0.00	0.43	0.00	1.31	0.10	0.00		0.48
July	0.28	0.00	0.83	15.97	0.13	2.78	2.31	0.00		1.45
August	0.15	0.06	0.30	6.33	0.00	0.70	0.00	0.42		0.46
September	0.16	0.17	0.00	0.00	0.00	0.06	0.00	0.03		0.05
October	0.00	0.07	0.00	0.88	0.00	0.08	0.00	0.00		0.05
November	0.11	0.00	0.00	0.00	0.00	0.04	0.00	0.00		0.02
December	0.20	0.07	0.00	0.00	0.16	0.00	0.00	0.00		0.04
Total	0.17	0.14	0.24	3.56	0.04	0.98	0.41	0.10		0.48

Occurrence of Shorebirds, Gulls, and Terns at Select GGNRA Beaches as Recorded by Beach Watch Surveys, 1994-2005

Average Density by Month (Birds/Km): Shorebirds, Gulls, and Terns; All Beaches Combined

	Shorebirds	Gulls	Terns
January	54.86	78.47	0.02
February	50.88	65.72	0.00
March	52.91	35.94	0.03
April	74.59	29.76	1.82
May	33.59	36.89	4.69
June	1.44	46.96	4.74
July	17.86	83.87	15.44
August	41.79	116.68	9.31
September	68.18	123.24	2.61
October	63.61	81.91	0.86
November	79.32	83.46	0.82
December	72.02	66.30	0.02



Monthly Totals of Observed Birds as Percentage of Overall Total Observed Birds, All Beaches Combined

	Shorebirds	Gulls	Terns
January	9%	9%	0%
February	8%	7%	0%
March	9%	4%	0%
April	13%	4%	5%
May	5%	4%	11%
June	0%	5%	11%
July	3%	11%	40%
August	7%	15%	24%
September	11%	15%	6%
October	10%	9%	2%
November	13%	10%	2%
December	12%	8%	0%

