

California Collaborative Fisheries Research Program

Data availability for stock assessments

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1 Summary

This document summarizes the data from the California Collaborative Fisheries Research Program (CCFRP), a survey that monitors groundfish populations in California's network of Marine Protected Areas (MPAs) and adjacent reference areas.

2 Survey Background

The 1999 Marine Life Protection Act resulted in the creation of a network of Marine Protected Areas (MPAs) along California's coast. The state of California designated both State Marine Reserves (SMRs) and State Marine Recreational Management areas (SMCAs). The SMRs prohibit all recreational and commercial take and SMCAs allow some recreational and/or commercial take that varies by SMCA. A number of MPAs consist of an SMR adjacent to an SMCA, of which the SMR is closer to shore. The California Collaborative Fisheries Research Program, CCFRP, is a fishery-independent hook-and-line survey designed to monitor nearshore fish populations at a series of sampling locations both inside and adjacent to California's network of MPAs.

The CCFRP survey began in 2007 with California Polytechnic University San Luis Obispo (Cal Poly) and San Jose State University, Moss Landing Marine Laboratories (Moss Landing) in collaboration with NMFS scientists and the fishing community. The core area of the survey includes Año Nuevo SMR and Point Lobos SMR sampled by Moss Landing, and Point Buchon SMR and Piedras Blancas SMR sampled by Cal Poly (Figure 1). In 2017, CCFRP expanded within California to include four additional partners, Cal Poly Humboldt (formerly Humboldt State University), University of California Davis' Bodega Marine Laboratory, University of California Santa Barbara, and the Scripps Institution of Oceanography. The CCFRP now monitors 12 MPA and reference area pairs (Table 1). Cal Poly Humboldt samples the furthest north sites, which are south of Cape Mendocino, but north of the management line at $40^{\circ}10'N.lat.$. The COVID-19 pandemic also affected the survey effort, but all partners were able to conduct sampling in 2020 and 2021.

The CCFRP survey design is consistent across all partners. Each MPA and reference area consists of a number of 500 x 500 m cells that were selected because they share similar depth and rocky habitat. The survey was designed as a capture and release survey, with a sub-study tag/recapture program. Therefore, CCFRP restricts sampling areas to depths shallower than approximately 120 feet in order to reduce potential effects of barotrauma. On any given survey day, site cells are randomly selected within a stratum (MPA and/or reference cells). Commercial passenger fishing vessels (CPFVs) are chartered for the survey and the captain is allowed to search within the cell for a fishing location. Due to the nature of the fishery in northern California, Cal Poly Humboldt conducts sampling aboard 6-pax vessels, and therefore fishes for fewer total angler hours per year compared to the other partners (Tables 2 and 3). During a sampling event, each cell is fished for a total of 30-45 minutes by volunteer anglers. Volunteer anglers are allowed to reel up their lines at any time during a fishing drop if they think they've hooked fish. Anglers can then re-bait and continue fishing until the drift is complete. Each fish encountered can be linked back to an angler. Each angler fishes one line, with two hooks, with exception to the swimbait gear type used by University of California

Santa Barbara and Scripps Institution of Oceanography. The fishing gear and bait is assigned to each angler, but an angler may fish with a personal fishing rod.

All fish encountered are measured to the nearest centimeter (total length), and the majority of fish are released at the surface or released at depth with a descending device. A total of 62105 fish were tagged since 2007, and recapture data are available from each partner. Starting in 2017, at the request of Melissa Monk (NMFS SWFSC), a fraction of the fish encountered in the reference cells have been retained to collect otoliths and fin clips that provide needed biological information for nearshore species.

In 2022, the goal is to increase biological collections for commonly encountered species for use in the 2023 stock assessments.

3 Available Data for Indices

From 2007-2022 a total of 767 fishing trips were taken, consisting of 10571 fishing drops. When the CCFRP expanded in 2017, some paired MPAs/REF areas were fished in only one or two years during an exploratory phase. These included Laguna Beach, the southeast Farallon Islands, Point Conception and Trinidad (REF only), which were excluded from this summary since we would not include them in a stock assessment. Fishing drops that drifted outside a cell were also excluded. These site filter result in an available 8686. The final filter removed drifts within a cell that were not fished for at least ten minutes within a sampling occasion, resulting in a total of 8662 fishing drops available for analyses for stock assessments. The total number of fish encountered by CCFRP partners and the percent of positive drops by species and MPA can be found in Tables 4 - 30.

4 Available Lengths and Otoliths

The CCFRP measures every fish to the nearest centimeter. Distributions of fish lengths inside and outside the MPAs are in Figures 2 - 14. Length data were filtered to the drifts that would be used to develop indices of abundance. Any species and site (MPA or REF) combination with fewer than 20 observed fish over the entirety of the program were not plotted.

The total number of fish retained by university partner can be found in Table 31. This represents the maximum number of available otoliths, which will be verified once the stock assessments for 2025 are selected. The rule of thumb for including conditional age-at-length samples is a minimum of 30 available fish in a year/fleet stratum. Given this, there are likely not enough fish from Bodega Marine Laboratories or Cal Poly to support conditional age-at-lengths for any species.

NOTE: 2023 data are not yet available, but will be available for the June council meeting.

5 Tables

Table 1: Monitoring groups and the associated MPAs they sample. The abbreviated names will be used throughout most of the tables in this document

Monitoring Group	Abbreviated Name	Area
Cal Poly Humboldt	Humboldt	South Cape Mendocino
Cal Poly Humboldt	Humboldt	Ten Mile
Bodega Marine Lab	Bodega	Stewarts Point
Bodega Marine Lab	Bodega	Bodega Head
Moss Landing Marine Lab	Moss Landing	Ano Nuevo
Moss Landing Marine Lab	Moss Landing	Point Lobos
Cal Poly SLO	Cal Poly	Piedras Blancas
Cal Poly SLO	Cal Poly	Point Buchon
UC Santa Barbara	UCSB	Carrington Point
UC Santa Barbara	UCSB	Anacapa Island
Scripps Institute Ocean.	Scripps	Swamis
Scripps Institute Ocean.	Scripps	South La Jolla

Table 2: Total angler hours by institution summed across all active years.

YEAR	Humboldt	Bodega	Moss Landing	Cal Poly	UCSB	Scripps
2007	0	0	450	277	0	0
2008	0	0	639	455	0	0
2009	0	0	343	339	0	0
2010	0	0	406	440	0	0
2011	0	0	459	393	0	0
2012	0	0	526	422	0	0
2013	0	0	484	376	0	0
2014	0	0	522	473	0	0
2015	0	0	264	272	0	0
2016	0	0	524	532	0	0
2017	157	92	383	507	137	127
2018	136	353	330	373	230	186
2019	132	405	365	340	222	240
2020	103	143	198	222	227	105
2021	127	219	305	246	271	109
2022	137	213	384	304	296	320

Table 3: Total number of fishing drops by year at each monitored site in the reference areas and inside the MPAs, in parentheses.

YEAR	Cal Poly Humboldt		Bodega Marine Lab		Moss Landing		Cal Poly SLO		UC Santa Barbara		Scripps	
	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2007	-	-	-	-	125(72)	70(93)	-	64(71)	-	-	-	-
2008	-	-	-	-	90(101)	74(82)	30(45)	62(65)	-	-	-	-
2009	-	-	-	-	78(45)	38(45)	38(35)	46(40)	-	-	-	-
2010	-	-	-	-	76(80)	45(48)	44(39)	44(46)	-	-	-	-
2011	-	-	-	-	54(58)	40(49)	42(36)	44(42)	-	-	-	-
2012	-	-	-	-	63(62)	50(48)	40(39)	45(43)	-	-	-	-
2013	-	-	-	-	66(71)	58(53)	41(38)	40(52)	-	-	-	-
2014	-	-	-	-	66(77)	57(55)	46(46)	50(44)	-	-	-	-
2015	-	-	-	-	37(39)	24(27)	-	49(49)	-	-	-	-
2016	-	-	-	-	66(57)	47(50)	47(57)	48(49)	-	-	-	-
2017	38(34)	44(43)	13(9)	15(14)	59(48)	35(37)	44(46)	48(48)	17(17)	14(7)	9(7)	10(21)
2018	36(33)	34(35)	47(54)	36(34)	54(50)	31(34)	34(35)	36(34)	29(26)	21(16)	16(6)	22(28)
2019	34(35)	32(36)	50(60)	41(41)	47(46)	35(38)	34(32)	36(39)	25(27)	19(12)	12(13)	24(23)
2020	30(36)	34(35)	26(46)	43(39)	59(51)	34(44)	35(30)	35(35)	36(36)	23(11)	9(10)	26(33)
2021	37(35)	35(33)	28(41)	38(31)	51(46)	38(41)	32(36)	33(35)	31(35)	20(12)	6(8)	23(28)
2022	40(39)	32(30)	33(38)	26(32)	40(46)	36(34)	33(36)	38(38)	26(36)	23(24)	9(16)	34(33)

Table 4: Total number of fish encountered by each monitoring group.

Common.Name	Humboldt	Bodega	Moss Landing	Cal Poly	UCSB	Scripps
Black Rockfish	1650	1620	13792	1749	2	0
Blue Rockfish	1009	5768	33906	29298	2197	10
Brown Rockfish	17	946	732	240	30	78
Canary Rockfish	943	1074	1013	426	2	0
China Rockfish	192	572	1149	116	0	0
Copper Rockfish	438	665	993	1104	2740	54
Deacon Rockfish	1172	5676	2378	343	0	0
Gopher Rockfish	86	2033	13489	15949	599	388
Olive Rockfish	120	778	4759	4403	68	88
Quillback Rockfish	275	60	1	1	0	0
Treefish	0	0	45	229	200	212
Vermilion Rockfish	264	508	1671	2859	356	141
Yellowtail Rockfish	512	1085	1959	1062	8	0

Table 5: Total number of Brown Rockfish encountered annually at each monitoring location (inside and outside areas combined)

YEAR	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2007	0	0	0	0	10	0	0	0	0	0	0	0
2008	0	0	0	0	24	0	16	0	0	0	0	0
2009	0	0	0	0	21	0	24	0	0	0	0	0
2010	0	0	0	0	46	0	16	3	0	0	0	0
2011	0	0	0	0	18	1	13	7	0	0	0	0
2012	0	0	0	0	35	0	16	5	0	0	0	0
2013	0	0	0	0	20	0	27	4	0	0	0	0
2014	0	0	0	0	57	0	5	1	0	0	0	0
2015	0	0	0	0	41	0	0	11	0	0	0	0
2016	0	0	0	0	41	0	32	0	0	0	0	0
2017	0	3	0	69	66	0	7	1	1	1	6	20
2018	0	6	9	115	35	0	9	0	2	2	2	2
2019	0	3	3	253	50	0	2	12	13	0	9	5
2020	0	2	1	124	45	0	11	2	4	1	2	0
2021	0	1	1	175	53	0	4	0	1	0	3	2
2022	0	2	14	182	169	0	11	1	5	0	24	3

Table 6: Total number of Treefish encountered annually at each monitoring location (inside and outside areas combined)

YEAR	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2007	0	0	0	0	0	0	0	26	0	0	0	0
2008	0	0	0	0	0	2	0	19	0	0	0	0
2009	0	0	0	0	0	0	2	12	0	0	0	0
2010	0	0	0	0	0	0	2	10	0	0	0	0
2011	0	0	0	0	0	0	2	9	0	0	0	0
2012	0	0	0	0	0	5	3	7	0	0	0	0
2013	0	0	0	0	0	0	0	3	0	0	0	0
2014	0	0	0	0	0	3	0	6	0	0	0	0
2015	0	0	0	0	0	9	0	12	0	0	0	0
2016	0	0	0	0	0	3	0	10	0	0	0	0
2017	0	0	0	0	0	3	0	8	0	10	2	16
2018	0	0	0	0	0	1	1	8	7	33	12	11
2019	0	0	0	0	0	6	1	10	11	26	12	23
2020	0	0	0	0	0	2	0	25	12	15	9	9
2021	0	0	0	0	0	1	3	18	14	9	37	8
2022	0	0	0	0	0	10	4	28	16	47	43	30

Table 7: Total number of Blue Rockfish encountered annually at each monitoring location (inside and outside areas combined)

YEAR	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2007	0	0	0	0	400	1935	0	474	0	0	0	0
2008	0	0	0	0	605	1518	385	414	0	0	0	0
2009	0	0	0	0	515	189	87	54	0	0	0	0
2010	0	0	0	0	306	162	69	53	0	0	0	0
2011	0	0	0	0	108	135	170	110	0	0	0	0
2012	0	0	0	0	99	168	130	56	0	0	0	0
2013	0	0	0	0	357	622	297	176	0	0	0	0
2014	0	0	0	0	382	1124	871	415	0	0	0	0
2015	0	0	0	0	296	1037	0	1348	0	0	0	0
2016	0	0	0	0	3725	2006	2731	2921	0	0	0	0
2017	41	120	227	36	2680	2503	3458	4644	165	7	0	2
2018	28	98	1064	59	1689	2317	3655	1550	203	5	0	3
2019	24	120	1916	103	1946	2033	1321	540	306	3	0	3
2020	53	56	545	76	344	1273	1666	427	697	17	0	2
2021	5	229	932	154	789	1174	659	298	483	13	0	0
2022	31	204	605	51	451	1018	260	59	271	27	0	0

Table 8: Total number of Deacon Rockfish encountered annually at each monitoring location (inside and outside areas combined)

YEAR	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2011	0	0	0	0	202	39	21	19	0	0	0	0
2012	0	0	0	0	113	56	55	14	0	0	0	0
2013	0	0	0	0	310	165	56	44	0	0	0	0
2014	0	0	0	0	153	198	31	14	0	0	0	0
2015	0	0	0	0	103	65	0	14	0	0	0	0
2016	0	0	0	0	305	86	30	20	0	0	0	0
2017	17	29	242	47	169	12	18	2	0	0	0	0
2018	69	26	1635	104	99	23	3	0	0	0	0	0
2019	132	79	1283	198	206	1	0	0	0	0	0	0
2020	149	126	562	79	7	4	0	0	0	0	0	0
2021	163	213	596	149	8	13	2	0	0	0	0	0
2022	82	87	726	55	40	1	0	0	0	0	0	0

Table 9: Total number of Canary Rockfish encountered annually at each monitoring location (inside and outside areas combined)

YEAR	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2007	0	0	0	0	17	25	0	11	0	0	0	0
2008	0	0	0	0	21	22	24	11	0	0	0	0
2009	0	0	0	0	19	20	35	1	0	0	0	0
2010	0	0	0	0	85	12	19	11	0	0	0	0
2011	0	0	0	0	83	12	15	6	0	0	0	0
2012	0	0	0	0	98	17	10	44	0	0	0	0
2013	0	0	0	0	104	7	17	45	0	0	0	0
2014	0	0	0	0	162	10	28	50	0	0	0	0
2015	0	0	0	0	47	1	0	33	0	0	0	0
2016	0	0	0	0	56	10	9	11	0	0	0	0
2017	50	83	10	1	40	8	14	7	0	0	0	0
2018	76	60	126	30	25	3	7	2	0	0	0	0
2019	77	85	114	31	15	1	0	6	0	0	0	0
2020	112	94	96	152	30	2	1	3	2	0	0	0
2021	71	83	86	199	12	6	2	1	0	0	0	0
2022	89	63	161	68	43	0	1	2	0	0	0	0

Table 10: Total number of China Rockfish encountered annually at each monitoring location (inside and outside areas combined)

YEAR	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2007	0	0	0	0	25	42	0	18	0	0	0	0
2008	0	0	0	0	35	34	7	9	0	0	0	0
2009	0	0	0	0	45	19	2	7	0	0	0	0
2010	0	0	0	0	55	32	4	8	0	0	0	0
2011	0	0	0	0	20	35	3	4	0	0	0	0
2012	0	0	0	0	65	34	5	3	0	0	0	0
2013	0	0	0	0	19	13	4	3	0	0	0	0
2014	0	0	0	0	61	25	3	1	0	0	0	0
2015	0	0	0	0	35	20	0	4	0	0	0	0
2016	0	0	0	0	46	38	0	5	0	0	0	0
2017	0	31	15	9	56	29	0	2	0	0	0	0
2018	4	27	84	41	24	20	2	2	0	0	0	0
2019	9	21	110	59	37	25	3	3	0	0	0	0
2020	1	37	33	26	39	11	0	5	0	0	0	0
2021	3	31	94	24	55	29	4	1	0	0	0	0
2022	6	22	70	7	67	59	2	2	0	0	0	0

Table 11: Total number of Olive Rockfish encountered annually at each monitoring location (inside and outside areas combined)

YEAR	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2007	0	0	0	0	2	661	0	107	0	0	0	0
2008	0	0	0	0	10	380	179	26	0	0	0	0
2009	0	0	0	0	6	74	83	15	0	0	0	0
2010	0	0	0	0	6	64	47	34	0	0	0	0
2011	0	0	0	0	2	200	126	20	0	0	0	0
2012	0	0	0	0	10	169	170	64	0	0	0	0
2013	0	0	0	0	9	67	79	45	0	0	0	0
2014	0	0	0	0	9	262	159	72	0	0	0	0
2015	0	0	0	0	15	88	0	146	0	0	0	0
2016	0	0	0	0	91	348	389	118	0	0	0	0
2017	7	15	25	3	109	189	224	118	16	0	1	17
2018	12	12	280	2	80	419	429	175	0	0	0	9
2019	7	11	241	0	98	393	405	242	8	0	0	18
2020	17	7	77	2	7	229	419	100	24	0	0	19
2021	20	3	70	1	42	372	164	74	14	1	0	10
2022	4	5	77	0	12	336	135	39	5	0	0	14

Table 12: Total number of Black Rockfish encountered annually at each monitoring location (inside and outside areas combined)

YEAR	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2007	0	0	0	0	525	118	0	118	0	0	0	0
2008	0	0	0	0	622	77	10	199	0	0	0	0
2009	0	0	0	0	529	19	5	63	0	0	0	0
2010	0	0	0	0	581	19	3	12	0	0	0	0
2011	0	0	0	0	700	27	8	79	0	0	0	0
2012	0	0	0	0	1228	32	25	187	0	0	0	0
2013	0	0	0	0	2298	101	85	202	0	0	0	0
2014	0	0	0	0	1628	215	163	184	0	0	0	0
2015	0	0	0	0	874	105	0	117	0	0	0	0
2016	0	0	0	0	1073	140	58	99	0	0	0	0
2017	190	51	44	29	463	23	4	44	0	0	0	0
2018	119	58	293	21	429	37	3	38	0	0	0	0
2019	121	53	302	112	446	2	3	11	0	0	0	0
2020	175	110	104	142	341	0	7	8	0	0	0	0
2021	203	216	286	155	618	2	4	5	2	0	0	0
2022	188	166	69	63	505	15	1	4	0	0	0	0

Table 13: Total number of Copper Rockfish encountered annually at each monitoring location (inside and outside areas combined)

YEAR	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2007	0	0	0	0	3	78	0	12	0	0	0	0
2008	0	0	0	0	4	33	35	16	0	0	0	0
2009	0	0	0	0	3	33	60	4	0	0	0	0
2010	0	0	0	0	4	27	43	5	0	0	0	0
2011	0	0	0	0	7	33	41	2	0	0	0	0
2012	0	0	0	0	10	40	49	9	0	0	0	0
2013	0	0	0	0	7	14	36	13	0	0	0	0
2014	0	0	0	0	17	58	85	6	0	0	0	0
2015	0	0	0	0	4	26	0	13	0	0	0	0
2016	0	0	0	0	16	91	93	15	0	0	0	0
2017	28	33	11	14	6	69	83	11	288	22	2	11
2018	67	28	66	25	9	66	69	20	504	22	1	4
2019	28	31	77	103	5	63	78	26	505	20	1	9
2020	33	50	40	51	3	71	79	20	523	48	0	7
2021	47	20	69	53	12	89	64	21	387	33	0	11
2022	48	25	123	33	11	81	87	9	350	38	1	7

Table 14: Total number of Quillback Rockfish encountered annually at each monitoring location (inside and outside areas combined)

YEAR	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2014	0	0	0	0	0	0	0	1	0	0	0	0
2015	0	0	0	0	1	0	0	0	0	0	0	0
2017	25	18	1	4	0	0	0	0	0	0	0	0
2018	50	18	2	7	0	0	0	0	0	0	0	0
2019	30	6	3	2	0	0	0	0	0	0	0	0
2020	23	11	4	3	0	0	0	0	0	0	0	0
2021	23	16	8	5	0	0	0	0	0	0	0	0
2022	39	16	9	12	0	0	0	0	0	0	0	0

Table 15: Total number of Yellowtail Rockfish encountered annually at each monitoring location (inside and outside areas combined)

YEAR	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2007	0	0	0	0	32	28	0	76	0	0	0	0
2008	0	0	0	0	11	25	17	31	0	0	0	0
2009	0	0	0	0	39	35	40	56	0	0	0	0
2010	0	0	0	0	51	23	11	13	0	0	0	0
2011	0	0	0	0	39	69	10	12	0	0	0	0
2012	0	0	0	0	29	58	19	38	0	0	0	0
2013	0	0	0	0	124	89	102	63	0	0	0	0
2014	0	0	0	0	133	225	57	66	0	0	0	0
2015	0	0	0	0	46	116	0	62	0	0	0	0
2016	0	0	0	0	84	80	92	27	0	0	0	0
2017	6	38	43	2	123	31	19	27	2	0	0	0
2018	19	78	221	61	15	66	13	24	0	0	0	0
2019	16	27	150	9	28	16	14	19	1	0	0	0
2020	24	120	199	3	38	17	29	21	3	0	0	0
2021	56	98	249	42	96	62	28	43	0	0	0	0
2022	4	26	94	12	45	86	26	7	2	0	0	0

Table 16: Total number of Vermilion Rockfish encountered annually at each monitoring location (inside and outside areas combined)

YEAR	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2007	0	0	0	0	23	79	0	40	0	0	0	0
2008	0	0	0	0	20	36	131	46	0	0	0	0
2009	0	0	0	0	46	24	153	11	0	0	0	0
2010	0	0	0	0	135	33	116	39	0	0	0	0
2011	0	0	0	0	99	43	114	29	0	0	0	0
2012	0	0	0	0	71	42	92	93	0	0	0	0
2013	0	0	0	0	64	6	45	57	0	0	0	0
2014	0	0	0	0	45	29	93	107	0	0	0	0
2015	0	0	0	0	43	38	0	90	0	0	0	0
2016	0	0	0	0	43	48	194	103	0	0	0	0
2017	17	15	9	6	54	37	154	84	10	0	0	7
2018	42	11	59	4	45	55	151	111	43	3	0	7
2019	25	19	81	25	72	55	164	123	66	4	5	23
2020	35	9	54	42	48	45	141	74	56	8	0	35
2021	33	15	62	27	67	39	105	63	79	2	1	20
2022	27	16	92	47	132	55	83	53	77	8	2	41

Table 17: Total number of Gopher Rockfish encountered annually at each monitoring location (inside and outside areas combined)

YEAR	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2007	0	0	0	0	136	778	0	1015	0	0	0	0
2008	0	0	0	0	391	694	458	895	0	0	0	0
2009	0	0	0	0	317	322	393	349	0	0	0	0
2010	0	0	0	0	426	495	466	578	0	0	0	0
2011	0	0	0	0	261	540	397	361	0	0	0	0
2012	0	0	0	0	430	394	418	444	0	0	0	0
2013	0	0	0	0	122	139	195	183	0	0	0	0
2014	0	0	0	0	197	440	594	339	0	0	0	0
2015	0	0	0	0	143	397	0	545	0	0	0	0
2016	0	0	0	0	291	557	386	755	0	0	0	0
2017	0	8	42	27	259	693	429	726	40	6	4	84
2018	0	6	201	52	194	576	425	630	112	11	5	51
2019	0	6	276	160	311	641	363	1036	54	6	4	50
2020	1	13	124	121	206	400	272	781	124	3	4	38
2021	0	26	365	175	475	703	339	832	125	11	4	59
2022	1	25	276	214	631	930	538	807	103	4	14	71

Table 18: Percent of drifts with encounters of Brown Rockfish at each monitoring location (inside and outside areas combined) and year.

YEAR	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2007	-	-	-	-	4%	-	-	-	-	-	-	-
2008	-	-	-	-	6%	-	12%	-	-	-	-	-
2009	-	-	-	-	10%	-	8%	-	-	-	-	-
2010	-	-	-	-	16%	-	8%	4%	-	-	-	-
2011	-	-	-	-	10%	2%	6%	4%	-	-	-	-
2012	-	-	-	-	16%	-	6%	4%	-	-	-	-
2013	-	-	-	-	10%	-	12%	4%	-	-	-	-
2014	-	-	-	-	14%	-	4%	2%	-	-	-	-
2015	-	-	-	-	24%	-	-	2%	-	-	-	-
2016	-	-	-	-	16%	-	8%	-	-	-	-	-
2017	-	4%	-	62%	24%	-	6%	2%	2%	4%	32%	30%
2018	-	8%	6%	54%	14%	-	2%	-	4%	2%	10%	4%
2019	-	2%	2%	64%	28%	-	4%	4%	6%	-	24%	10%
2020	-	2%	2%	60%	26%	-	6%	2%	4%	2%	10%	-
2021	-	2%	2%	74%	28%	-	2%	-	2%	-	22%	4%
2022	-	4%	12%	74%	44%	-	4%	2%	4%	-	40%	2%

Table 19: Percent of drifts with encounters of Treefish at each monitoring location (inside and outside areas combined) and year.

YEAR	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2007	-	-	-	-	-	-	-	14%	-	-	-	-
2008	-	-	-	-	-	2%	-	12%	-	-	-	-
2009	-	-	-	-	-	-	2%	12%	-	-	-	-
2010	-	-	-	-	-	-	2%	10%	-	-	-	-
2011	-	-	-	-	-	-	2%	8%	-	-	-	-
2012	-	-	-	-	-	4%	4%	8%	-	-	-	-
2013	-	-	-	-	-	-	-	4%	-	-	-	-
2014	-	-	-	-	-	2%	-	6%	-	-	-	-
2015	-	-	-	-	-	12%	-	10%	-	-	-	-
2016	-	-	-	-	-	4%	-	10%	-	-	-	-
2017	-	-	-	-	-	4%	-	8%	-	48%	12%	22%
2018	-	-	-	-	-	2%	2%	12%	12%	46%	22%	20%
2019	-	-	-	-	-	8%	2%	12%	14%	46%	20%	36%
2020	-	-	-	-	-	2%	-	22%	16%	32%	22%	12%
2021	-	-	-	-	-	2%	4%	20%	16%	24%	28%	14%
2022	-	-	-	-	-	12%	4%	26%	20%	56%	28%	26%

Table 20: Percent of drifts with encounters of Blue Rockfish at each monitoring location (inside and outside areas combined) and year.

YEAR	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2007	-	-	-	-	56%	90%	-	76%	-	-	-	-
2008	-	-	-	-	62%	94%	82%	74%	-	-	-	-
2009	-	-	-	-	76%	44%	38%	30%	-	-	-	-
2010	-	-	-	-	56%	46%	36%	26%	-	-	-	-
2011	-	-	-	-	38%	44%	52%	56%	-	-	-	-
2012	-	-	-	-	32%	52%	32%	30%	-	-	-	-
2013	-	-	-	-	58%	74%	54%	58%	-	-	-	-
2014	-	-	-	-	64%	82%	78%	80%	-	-	-	-
2015	-	-	-	-	70%	92%	-	90%	-	-	-	-
2016	-	-	-	-	96%	92%	86%	90%	-	-	-	-
2017	20%	46%	60%	24%	94%	98%	92%	92%	68%	10%	-	6%
2018	18%	34%	84%	20%	90%	96%	92%	90%	60%	6%	-	6%
2019	20%	46%	90%	26%	90%	94%	86%	74%	68%	4%	-	4%
2020	26%	34%	88%	26%	64%	94%	90%	74%	84%	30%	-	2%
2021	4%	50%	92%	60%	92%	94%	82%	66%	78%	12%	-	-
2022	12%	56%	84%	24%	76%	86%	66%	36%	66%	36%	-	-

Table 21: Percent of drifts with encounters of Deacon Rockfish at each monitoring location (inside and outside areas combined) and year.

YEAR	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2007	-	-	-	-	-	-	-	-	-	-	-	-
2008	-	-	-	-	-	-	-	-	-	-	-	-
2009	-	-	-	-	-	-	-	-	-	-	-	-
2010	-	-	-	-	-	-	-	-	-	-	-	-
2011	-	-	-	-	40%	28%	12%	18%	-	-	-	-
2012	-	-	-	-	26%	30%	28%	10%	-	-	-	-
2013	-	-	-	-	36%	42%	22%	22%	-	-	-	-
2014	-	-	-	-	24%	34%	18%	12%	-	-	-	-
2015	-	-	-	-	22%	32%	-	10%	-	-	-	-
2016	-	-	-	-	32%	32%	18%	14%	-	-	-	-
2017	12%	8%	72%	24%	34%	12%	16%	2%	-	-	-	-
2018	28%	18%	86%	28%	22%	24%	4%	-	-	-	-	-
2019	34%	24%	86%	32%	16%	2%	-	-	-	-	-	-
2020	36%	40%	78%	32%	6%	6%	-	-	-	-	-	-
2021	38%	36%	82%	50%	6%	12%	2%	-	-	-	-	-
2022	32%	38%	90%	20%	12%	2%	-	-	-	-	-	-

Table 22: Percent of drifts with encounters of Canary Rockfish at each monitoring location (inside and outside areas combined) and year.

YEAR	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2007	-	-	-	-	4%	8%	-	6%	-	-	-	-
2008	-	-	-	-	8%	6%	14%	8%	-	-	-	-
2009	-	-	-	-	14%	14%	18%	2%	-	-	-	-
2010	-	-	-	-	26%	8%	14%	8%	-	-	-	-
2011	-	-	-	-	28%	6%	12%	4%	-	-	-	-
2012	-	-	-	-	24%	10%	6%	20%	-	-	-	-
2013	-	-	-	-	22%	6%	12%	22%	-	-	-	-
2014	-	-	-	-	32%	6%	10%	22%	-	-	-	-
2015	-	-	-	-	22%	2%	-	16%	-	-	-	-
2016	-	-	-	-	22%	6%	6%	6%	-	-	-	-
2017	32%	34%	22%	4%	18%	6%	8%	8%	-	-	-	-
2018	44%	34%	44%	12%	10%	4%	8%	2%	-	-	-	-
2019	38%	36%	40%	14%	12%	2%	-	6%	-	-	-	-
2020	44%	42%	56%	36%	12%	2%	2%	4%	2%	-	-	-
2021	38%	36%	40%	36%	6%	4%	2%	2%	-	-	-	-
2022	38%	44%	70%	30%	24%	-	2%	2%	-	-	-	-

Table 23: Percent of drifts with encounters of China Rockfish at each monitoring location (inside and outside areas combined) and year.

YEAR	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2007	-	-	-	-	10%	14%	-	10%	-	-	-	-
2008	-	-	-	-	14%	16%	10%	6%	-	-	-	-
2009	-	-	-	-	26%	18%	2%	8%	-	-	-	-
2010	-	-	-	-	26%	26%	4%	8%	-	-	-	-
2011	-	-	-	-	12%	26%	2%	4%	-	-	-	-
2012	-	-	-	-	36%	28%	6%	4%	-	-	-	-
2013	-	-	-	-	12%	8%	6%	4%	-	-	-	-
2014	-	-	-	-	24%	16%	4%	2%	-	-	-	-
2015	-	-	-	-	32%	30%	-	4%	-	-	-	-
2016	-	-	-	-	26%	26%	-	4%	-	-	-	-
2017	-	24%	50%	20%	30%	26%	-	2%	-	-	-	-
2018	4%	34%	46%	28%	18%	18%	2%	2%	-	-	-	-
2019	8%	24%	50%	36%	30%	28%	4%	4%	-	-	-	-
2020	2%	28%	34%	18%	28%	8%	-	8%	-	-	-	-
2021	4%	32%	60%	22%	40%	22%	6%	2%	-	-	-	-
2022	6%	28%	44%	12%	40%	42%	2%	2%	-	-	-	-

Table 24: Percent of drifts with encounters of Olive Rockfish at each monitoring location (inside and outside areas combined) and year.

YEAR	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2007	-	-	-	-	2%	78%	-	42%	-	-	-	-
2008	-	-	-	-	4%	70%	52%	16%	-	-	-	-
2009	-	-	-	-	4%	40%	36%	14%	-	-	-	-
2010	-	-	-	-	4%	40%	26%	22%	-	-	-	-
2011	-	-	-	-	2%	70%	54%	20%	-	-	-	-
2012	-	-	-	-	4%	64%	60%	38%	-	-	-	-
2013	-	-	-	-	6%	34%	44%	24%	-	-	-	-
2014	-	-	-	-	6%	70%	60%	38%	-	-	-	-
2015	-	-	-	-	14%	50%	-	58%	-	-	-	-
2016	-	-	-	-	36%	64%	64%	48%	-	-	-	-
2017	6%	14%	40%	10%	30%	66%	66%	50%	36%	-	6%	36%
2018	8%	14%	60%	2%	38%	94%	78%	72%	-	-	-	14%
2019	4%	14%	62%	-	38%	84%	82%	58%	14%	-	-	28%
2020	10%	8%	44%	2%	6%	74%	86%	48%	24%	-	-	24%
2021	16%	2%	56%	2%	24%	80%	64%	48%	16%	4%	-	14%
2022	2%	4%	46%	-	10%	78%	60%	34%	4%	-	-	20%

Table 25: Percent of drifts with encounters of Black Rockfish at each monitoring location (inside and outside areas combined) and year.

YEAR	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2007	-	-	-	-	70%	26%	-	34%	-	-	-	-
2008	-	-	-	-	74%	24%	10%	46%	-	-	-	-
2009	-	-	-	-	78%	10%	2%	30%	-	-	-	-
2010	-	-	-	-	56%	6%	2%	8%	-	-	-	-
2011	-	-	-	-	74%	18%	8%	38%	-	-	-	-
2012	-	-	-	-	82%	20%	14%	58%	-	-	-	-
2013	-	-	-	-	88%	28%	32%	52%	-	-	-	-
2014	-	-	-	-	84%	38%	28%	50%	-	-	-	-
2015	-	-	-	-	86%	50%	-	40%	-	-	-	-
2016	-	-	-	-	86%	36%	22%	32%	-	-	-	-
2017	54%	22%	50%	38%	76%	18%	4%	24%	-	-	-	-
2018	46%	30%	56%	12%	70%	10%	2%	28%	-	-	-	-
2019	44%	26%	56%	36%	68%	2%	4%	6%	-	-	-	-
2020	44%	40%	46%	48%	66%	-	4%	8%	-	-	-	-
2021	60%	48%	68%	48%	76%	2%	6%	4%	2%	-	-	-
2022	56%	54%	26%	18%	62%	8%	2%	6%	-	-	-	-

Table 26: Percent of drifts with encounters of Copper Rockfish at each monitoring location (inside and outside areas combined) and year.

YEAR	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2007	-	-	-	-	2%	30%	-	6%	-	-	-	-
2008	-	-	-	-	2%	16%	38%	10%	-	-	-	-
2009	-	-	-	-	2%	30%	54%	4%	-	-	-	-
2010	-	-	-	-	2%	22%	34%	6%	-	-	-	-
2011	-	-	-	-	6%	30%	38%	2%	-	-	-	-
2012	-	-	-	-	8%	26%	44%	6%	-	-	-	-
2013	-	-	-	-	6%	10%	30%	12%	-	-	-	-
2014	-	-	-	-	6%	42%	54%	6%	-	-	-	-
2015	-	-	-	-	6%	34%	-	10%	-	-	-	-
2016	-	-	-	-	8%	46%	46%	14%	-	-	-	-
2017	22%	24%	22%	32%	4%	38%	46%	10%	98%	38%	12%	20%
2018	60%	24%	30%	24%	8%	44%	52%	22%	100%	36%	4%	8%
2019	26%	26%	32%	52%	6%	46%	60%	20%	100%	36%	4%	10%
2020	34%	34%	28%	38%	2%	44%	56%	22%	98%	50%	-	10%
2021	42%	24%	42%	42%	10%	52%	52%	18%	94%	50%	-	18%
2022	40%	22%	60%	32%	10%	46%	56%	12%	94%	36%	4%	10%

Table 27: Percent of drifts with encounters of Quillback Rockfish at each monitoring location (inside and outside areas combined) and year.

YEAR	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2007	-	-	-	-	-	-	-	-	-	-	-	-
2008	-	-	-	-	-	-	-	-	-	-	-	-
2009	-	-	-	-	-	-	-	-	-	-	-	-
2010	-	-	-	-	-	-	-	-	-	-	-	-
2011	-	-	-	-	-	-	-	-	-	-	-	-
2012	-	-	-	-	-	-	-	-	-	-	-	-
2013	-	-	-	-	-	-	-	-	-	-	-	-
2014	-	-	-	-	-	-	-	2%	-	-	-	-
2015	-	-	-	-	2%	-	-	-	-	-	-	-
2016	-	-	-	-	-	-	-	-	-	-	-	-
2017	20%	20%	4%	10%	-	-	-	-	-	-	-	-
2018	46%	24%	2%	8%	-	-	-	-	-	-	-	-
2019	30%	8%	2%	2%	-	-	-	-	-	-	-	-
2020	28%	14%	4%	4%	-	-	-	-	-	-	-	-
2021	24%	12%	6%	6%	-	-	-	-	-	-	-	-
2022	30%	20%	10%	14%	-	-	-	-	-	-	-	-

Table 28: Percent of drifts with encounters of Yellowtail Rockfish at each monitoring location (inside and outside areas combined) and year.

YEAR	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2007	-	-	-	-	10%	14%	-	26%	-	-	-	-
2008	-	-	-	-	4%	10%	18%	16%	-	-	-	-
2009	-	-	-	-	16%	26%	20%	26%	-	-	-	-
2010	-	-	-	-	8%	16%	12%	8%	-	-	-	-
2011	-	-	-	-	14%	38%	8%	10%	-	-	-	-
2012	-	-	-	-	10%	30%	12%	20%	-	-	-	-
2013	-	-	-	-	18%	30%	40%	40%	-	-	-	-
2014	-	-	-	-	20%	56%	22%	18%	-	-	-	-
2015	-	-	-	-	22%	50%	-	30%	-	-	-	-
2016	-	-	-	-	24%	30%	28%	16%	-	-	-	-
2017	6%	18%	46%	4%	38%	24%	12%	14%	6%	-	-	-
2018	18%	24%	72%	14%	8%	46%	14%	16%	-	-	-	-
2019	14%	24%	46%	6%	14%	16%	14%	10%	2%	-	-	-
2020	22%	46%	72%	4%	22%	14%	22%	10%	4%	-	-	-
2021	30%	42%	78%	18%	28%	34%	16%	32%	-	-	-	-
2022	6%	20%	54%	6%	18%	44%	18%	10%	4%	-	-	-

Table 29: Percent of drifts with encounters of Vermilion Rockfish at each monitoring location (inside and outside areas combined) and year.

YEAR	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2007	-	-	-	-	8%	34%	-	20%	-	-	-	-
2008	-	-	-	-	8%	18%	62%	26%	-	-	-	-
2009	-	-	-	-	26%	22%	78%	10%	-	-	-	-
2010	-	-	-	-	44%	24%	68%	28%	-	-	-	-
2011	-	-	-	-	42%	30%	64%	24%	-	-	-	-
2012	-	-	-	-	32%	30%	64%	54%	-	-	-	-
2013	-	-	-	-	30%	6%	38%	36%	-	-	-	-
2014	-	-	-	-	26%	24%	56%	52%	-	-	-	-
2015	-	-	-	-	36%	50%	-	48%	-	-	-	-
2016	-	-	-	-	26%	30%	70%	40%	-	-	-	-
2017	20%	14%	28%	18%	30%	36%	64%	42%	18%	-	-	16%
2018	40%	14%	32%	6%	30%	42%	76%	60%	40%	8%	-	12%
2019	26%	22%	44%	14%	44%	44%	72%	62%	34%	10%	12%	30%
2020	34%	10%	40%	28%	28%	32%	72%	48%	40%	14%	-	28%
2021	34%	22%	44%	24%	42%	28%	64%	46%	52%	6%	8%	26%
2022	26%	20%	60%	32%	54%	42%	60%	44%	50%	14%	8%	32%

Table 30: Percent of drifts with encounters of Gopher Rockfish at each monitoring location (inside and outside areas combined) and year.

YEAR	South Cape Mendocino	Ten Mile	Stewarts Point	Bodega Head	Ano Nuevo	Point Lobos	Piedras Blancas	Point Buchon	Carrington Point	Anacapa Island	Swamis	South La Jolla
2007	-	-	-	-	46%	88%	-	96%	-	-	-	-
2008	-	-	-	-	70%	80%	98%	98%	-	-	-	-
2009	-	-	-	-	70%	96%	98%	94%	-	-	-	-
2010	-	-	-	-	76%	96%	90%	98%	-	-	-	-
2011	-	-	-	-	70%	94%	88%	92%	-	-	-	-
2012	-	-	-	-	84%	84%	92%	88%	-	-	-	-
2013	-	-	-	-	36%	60%	84%	72%	-	-	-	-
2014	-	-	-	-	56%	86%	90%	86%	-	-	-	-
2015	-	-	-	-	62%	92%	-	88%	-	-	-	-
2016	-	-	-	-	70%	96%	88%	96%	-	-	-	-
2017	-	8%	64%	56%	70%	98%	86%	96%	50%	24%	18%	70%
2018	-	8%	68%	48%	58%	98%	86%	92%	62%	24%	18%	48%
2019	-	8%	70%	68%	74%	96%	92%	100%	44%	16%	12%	44%
2020	2%	16%	76%	68%	68%	92%	80%	100%	70%	8%	16%	48%
2021	-	20%	88%	78%	92%	98%	86%	98%	60%	22%	14%	46%
2022	2%	26%	88%	86%	94%	98%	92%	98%	70%	8%	48%	42%

Table 31: Total number of fish retained by monitoring group over the duration of the program.

Common Name	Humboldt	Bodega	Moss Landing	Cal Poly	UCSB	Scripps
Black Rockfish	206	56	165	15	0	0
Blue Rockfish	175	62	337	200	28	0
Brown Rockfish	2	31	44	3	1	0
Canary Rockfish	0	19	3	3	0	0
China Rockfish	76	60	53	3	0	0
Copper Rockfish	113	26	25	42	29	0
Deacon Rockfish	145	92	64	2	0	0
Gopher Rockfish	24	101	891	469	16	1
Olive Rockfish	50	27	69	35	0	1
Quillback Rockfish	73	4	0	0	0	0
Treefish	0	0	1	29	4	1
Vermilion Rockfish	56	21	36	45	5	0
Yellowtail Rockfish	126	44	23	15	0	0

6 Figures

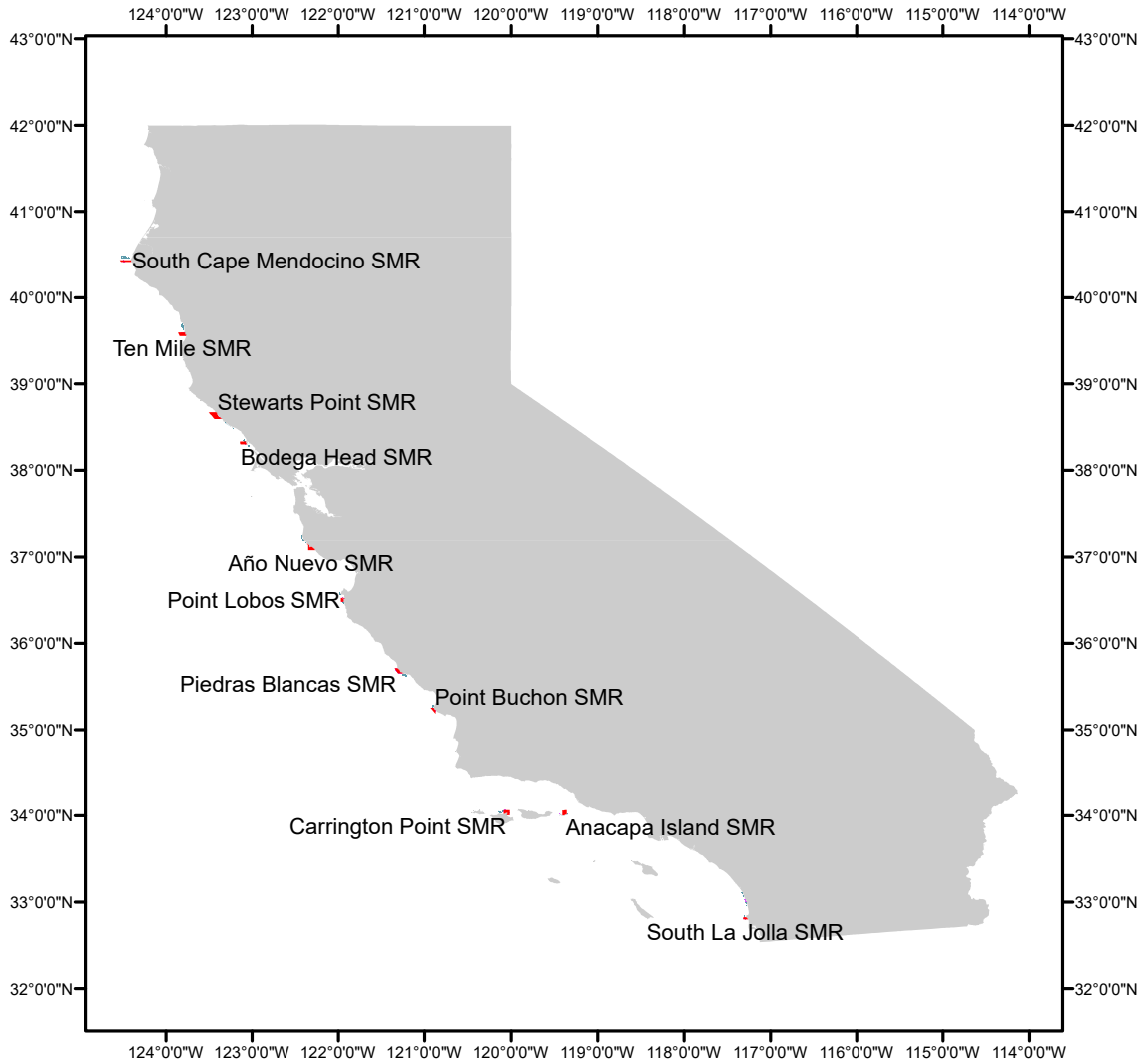


Figure 1: Map of the State Marine Reserves (SMRs) monitored by the CCFRP program.

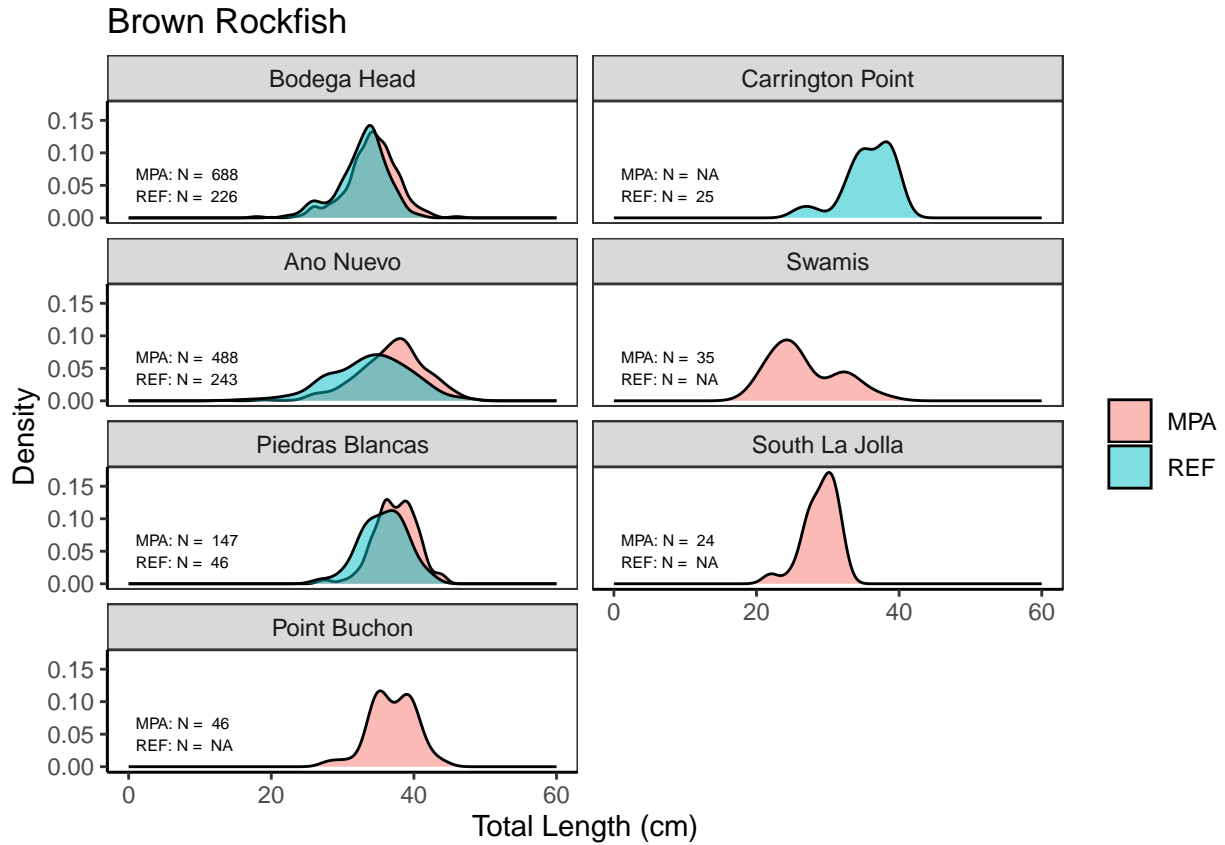


Figure 2: Density plot of total lengths form fish encountered inside each MPA and outside at reference areas (REF) over all years of the program. A sample size of NA indicates fewer than 20 fish were encountered in that MPA stratum and were not plotted. Areas north of Ano Nuevo and south of Point Buchon were sampled beginning in 2017.

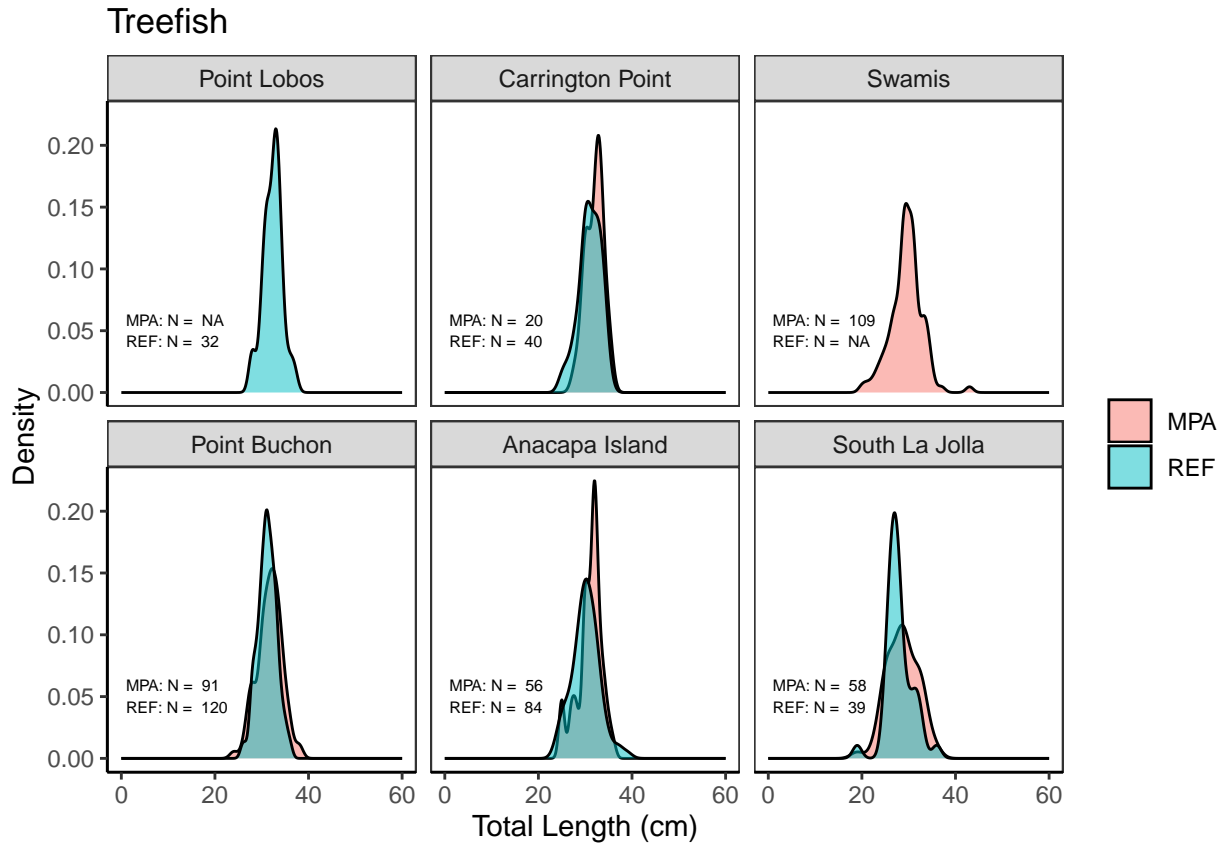


Figure 3: Density plot of total lengths form fish encountered inside each MPA and outside at reference areas (REF) over all years of the program. A sample size of NA indicates fewer than 20 fish were encountered in that MPA stratum and were not plotted. Areas north of Ano Nuevo and south of Point Buchon were sampled beginning in 2017.

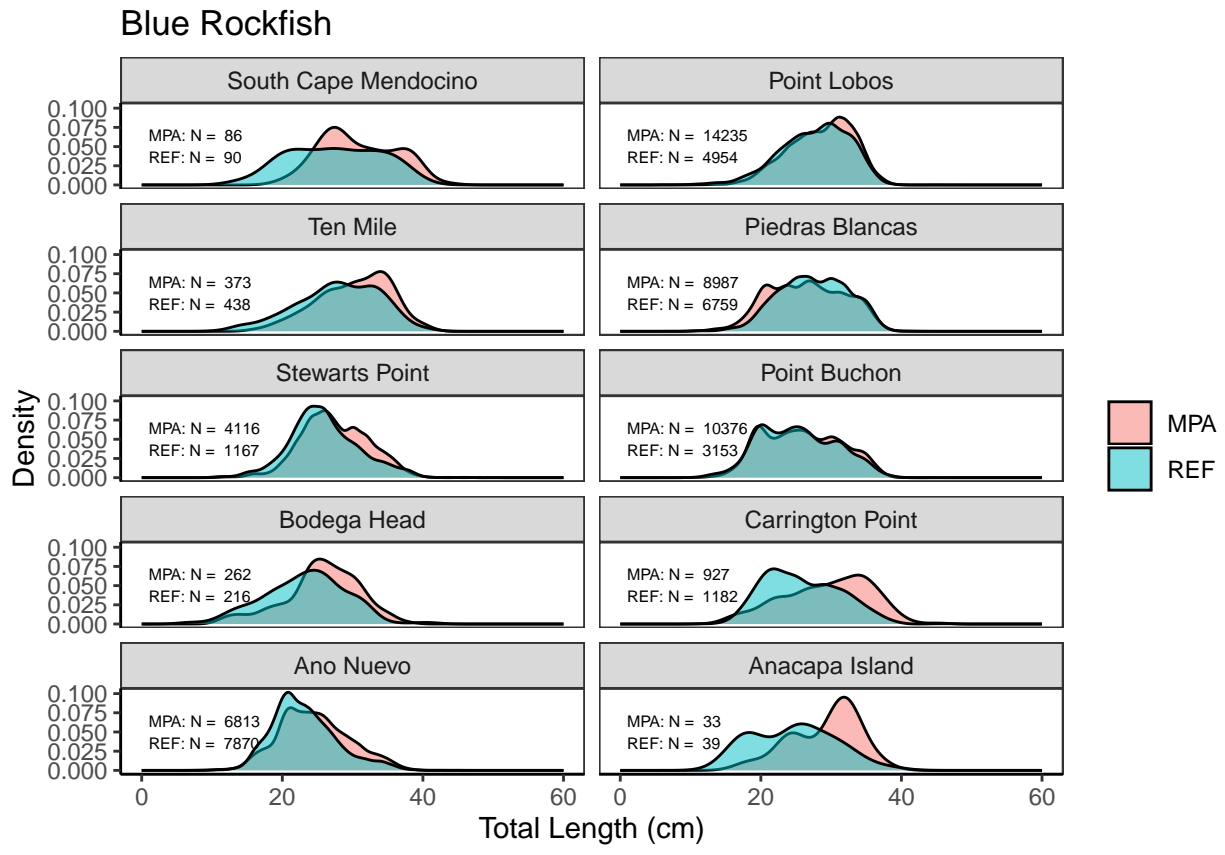


Figure 4: Density plot of total lengths form fish encountered inside each MPA and outside at reference areas (REF) over all years of the program. A sample size of NA indicates fewer than 20 fish were encountered in that MPA stratum and were not plotted. Areas north of Ano Nuevo and south of Point Buchon were sampled beginning in 2017.

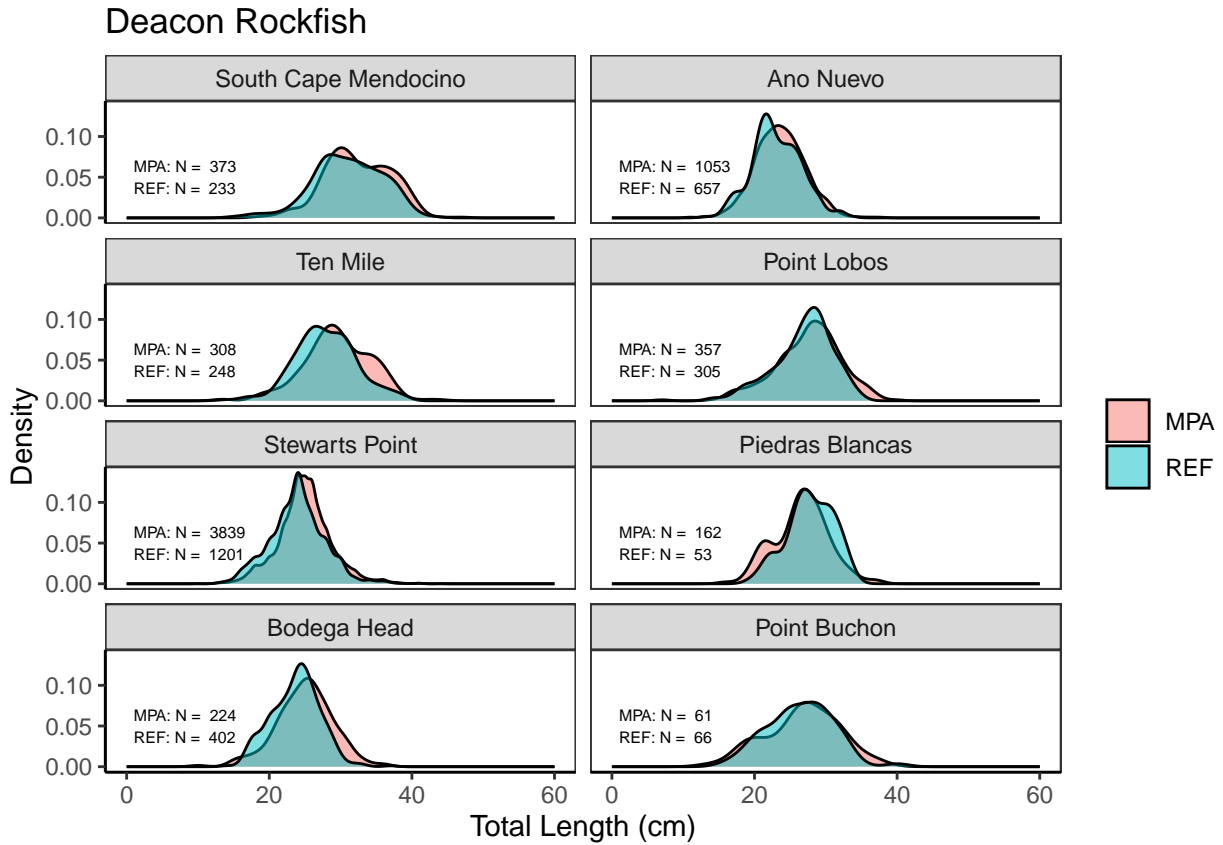


Figure 5: Density plot of total lengths form fish encountered inside each MPA and outside at reference areas (REF) over all years of the program. A sample size of NA indicates fewer than 20 fish were encountered in that MPA stratum and were not plotted. Areas north of Ano Nuevo and south of Point Buchon were sampled beginning in 2017.

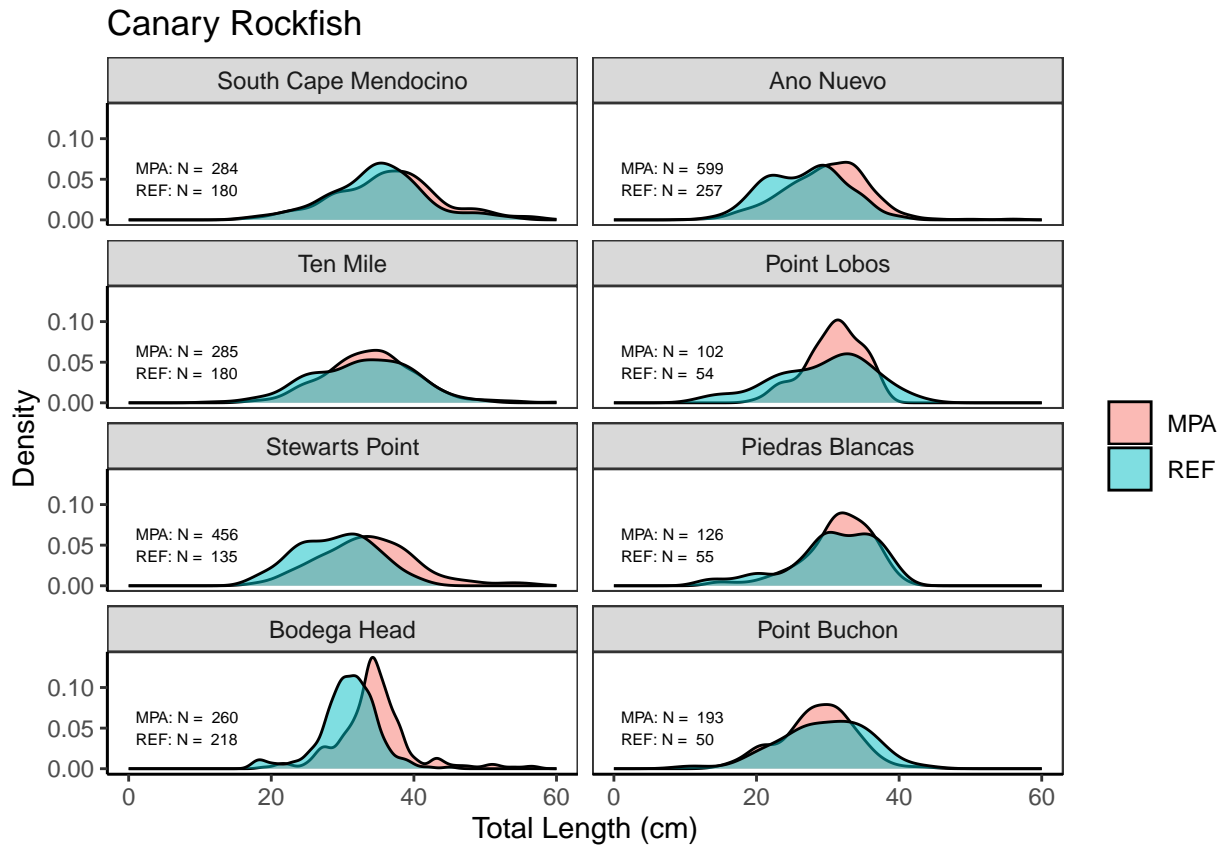


Figure 6: Density plot of total lengths form fish encountered inside each MPA and outside at reference areas (REF) over all years of the program. A sample size of NA indicates fewer than 20 fish were encountered in that MPA stratum and were not plotted. Areas north of Ano Nuevo and south of Point Buchon were sampled beginning in 2017.

China Rockfish

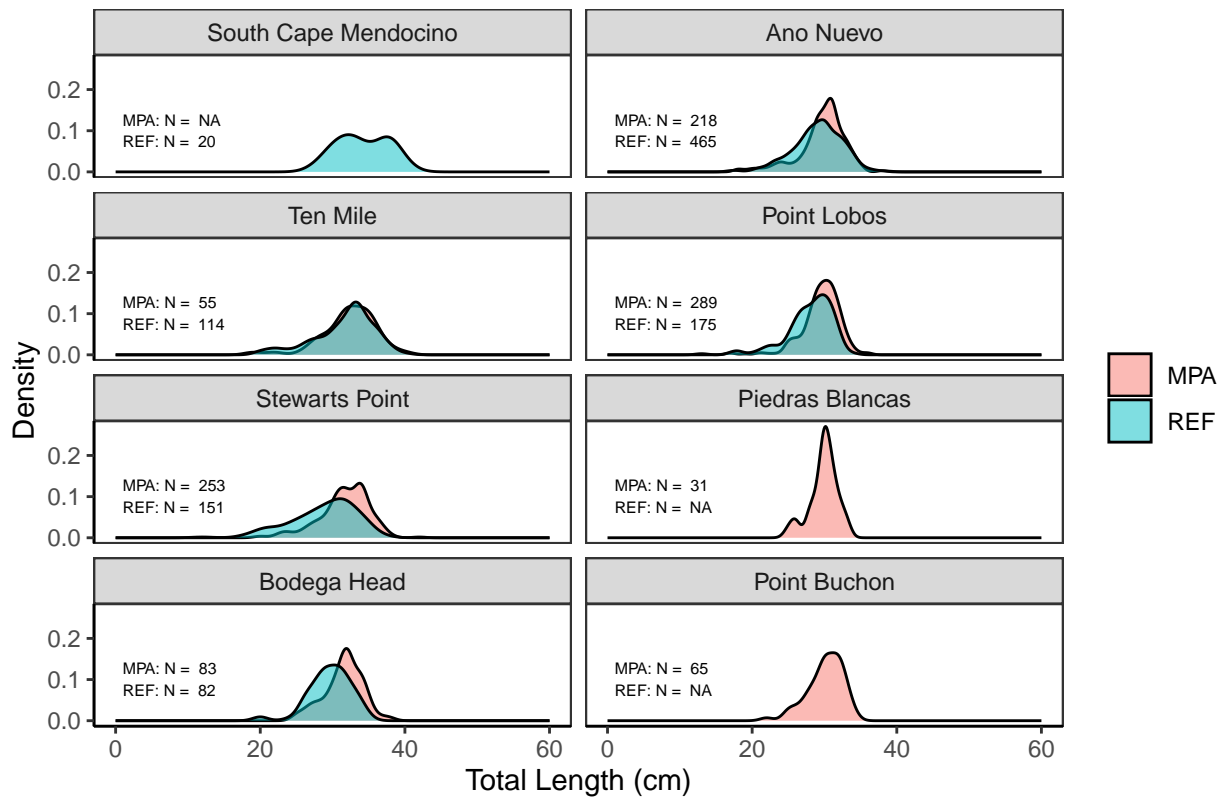


Figure 7: Density plot of total lengths form fish encountered inside each MPA and outside at reference areas (REF) over all years of the program. A sample size of NA indicates fewer than 20 fish were encountered in that MPA stratum and were not plotted. Areas north of Ano Nuevo and south of Point Buchon were sampled beginning in 2017.

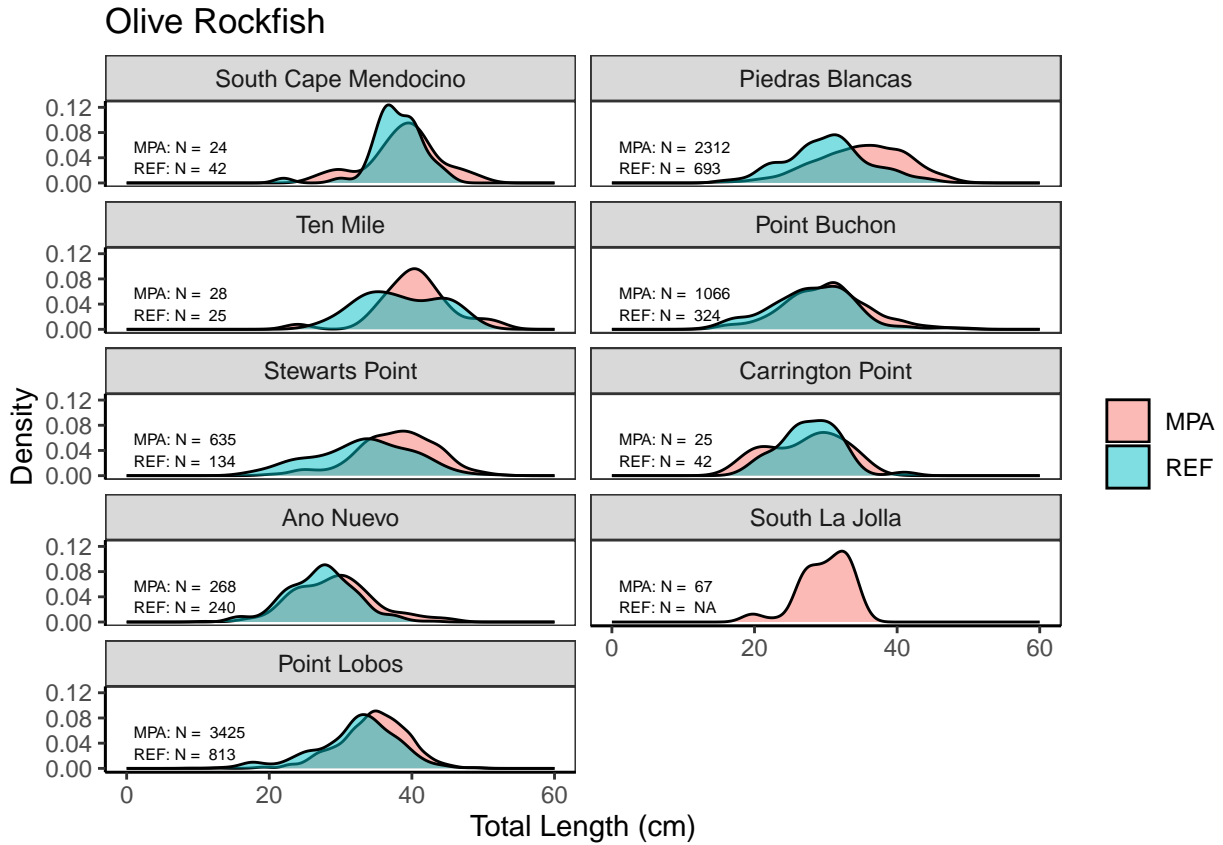


Figure 8: Density plot of total lengths form fish encountered inside each MPA and outside at reference areas (REF) over all years of the program. A sample size of NA indicates fewer than 20 fish were encountered in that MPA stratum and were not plotted. Areas north of Ano Nuevo and south of Point Buchon were sampled beginning in 2017.

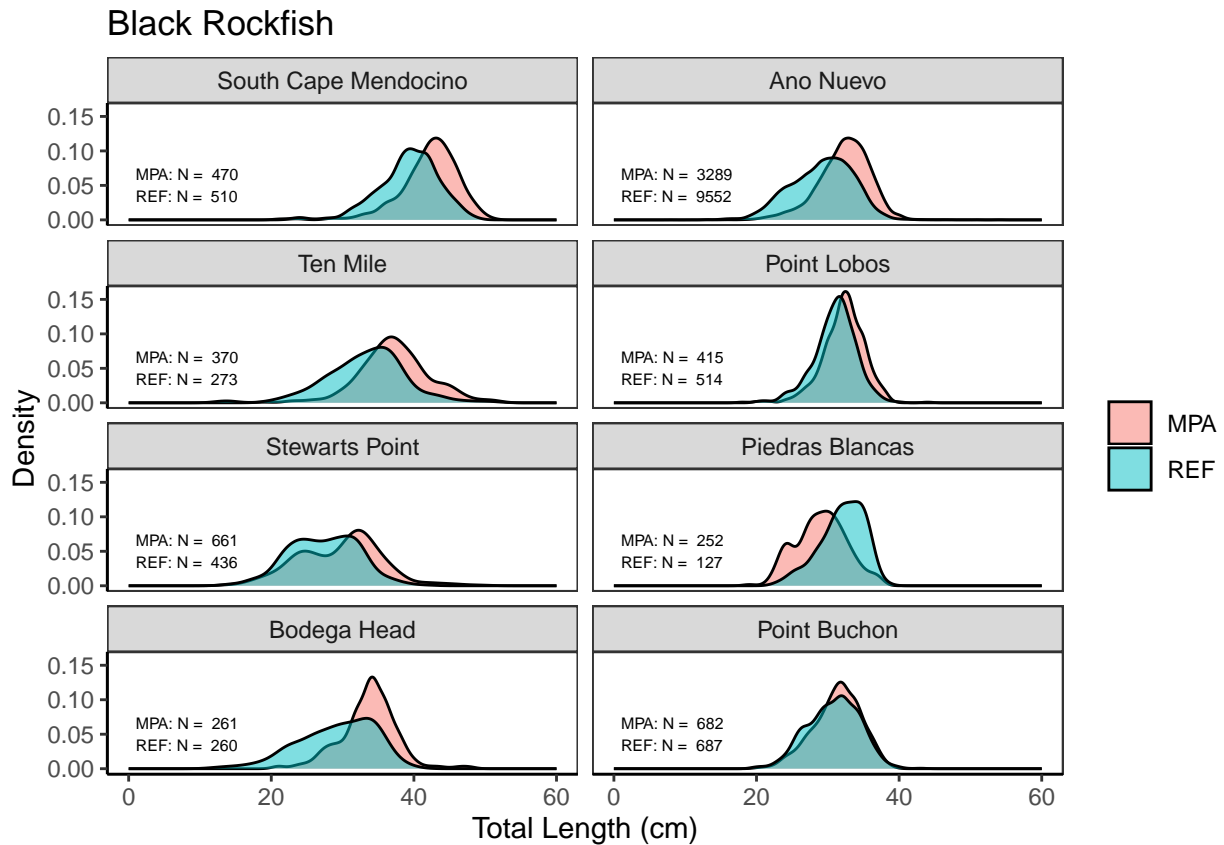


Figure 9: Density plot of total lengths form fish encountered inside each MPA and outside at reference areas (REF) over all years of the program. A sample size of NA indicates fewer than 20 fish were encountered in that MPA stratum and were not plotted. Areas north of Ano Nuevo and south of Point Buchon were sampled beginning in 2017.

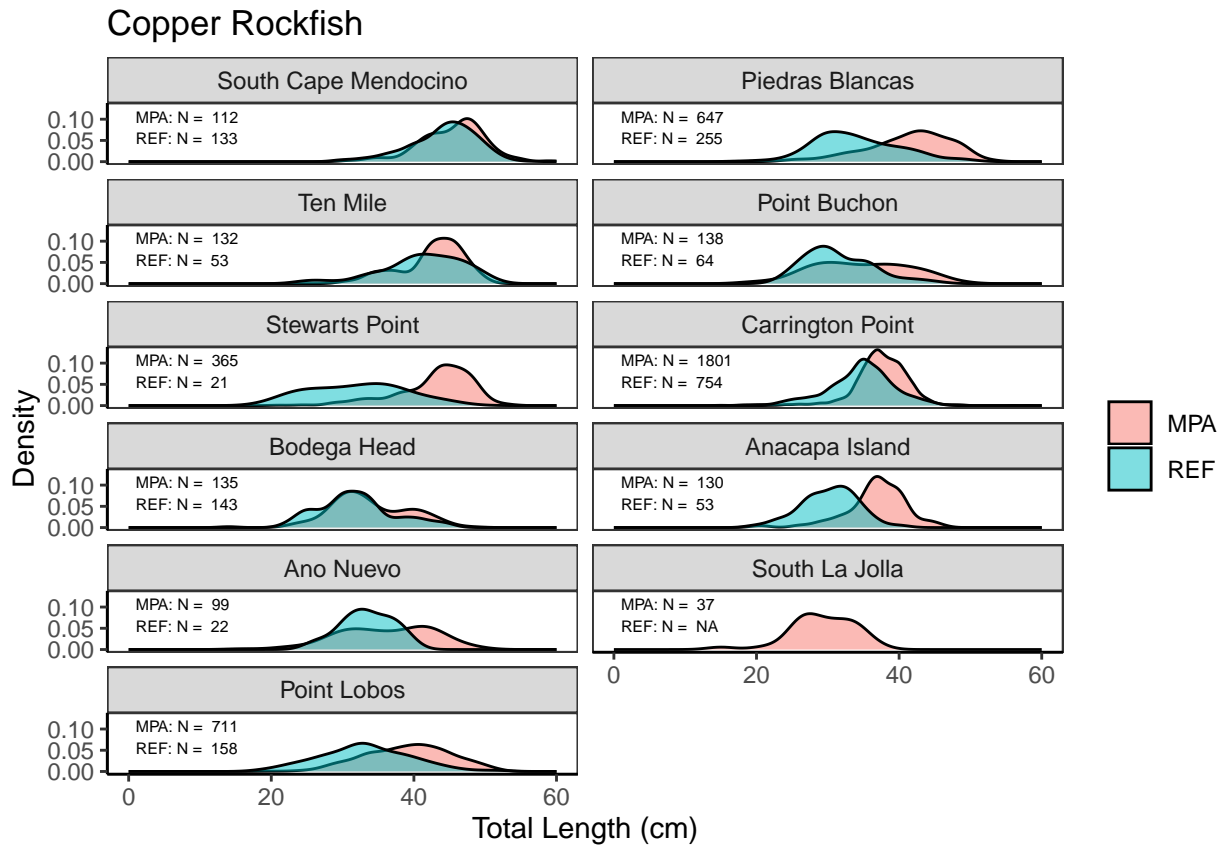


Figure 10: Density plot of total lengths from fish encountered inside each MPA and outside at reference areas (REF) over all years of the program. A sample size of NA indicates fewer than 20 fish were encountered in that MPA stratum and were not plotted. Areas north of Ano Nuevo and south of Point Buchon were sampled beginning in 2017.

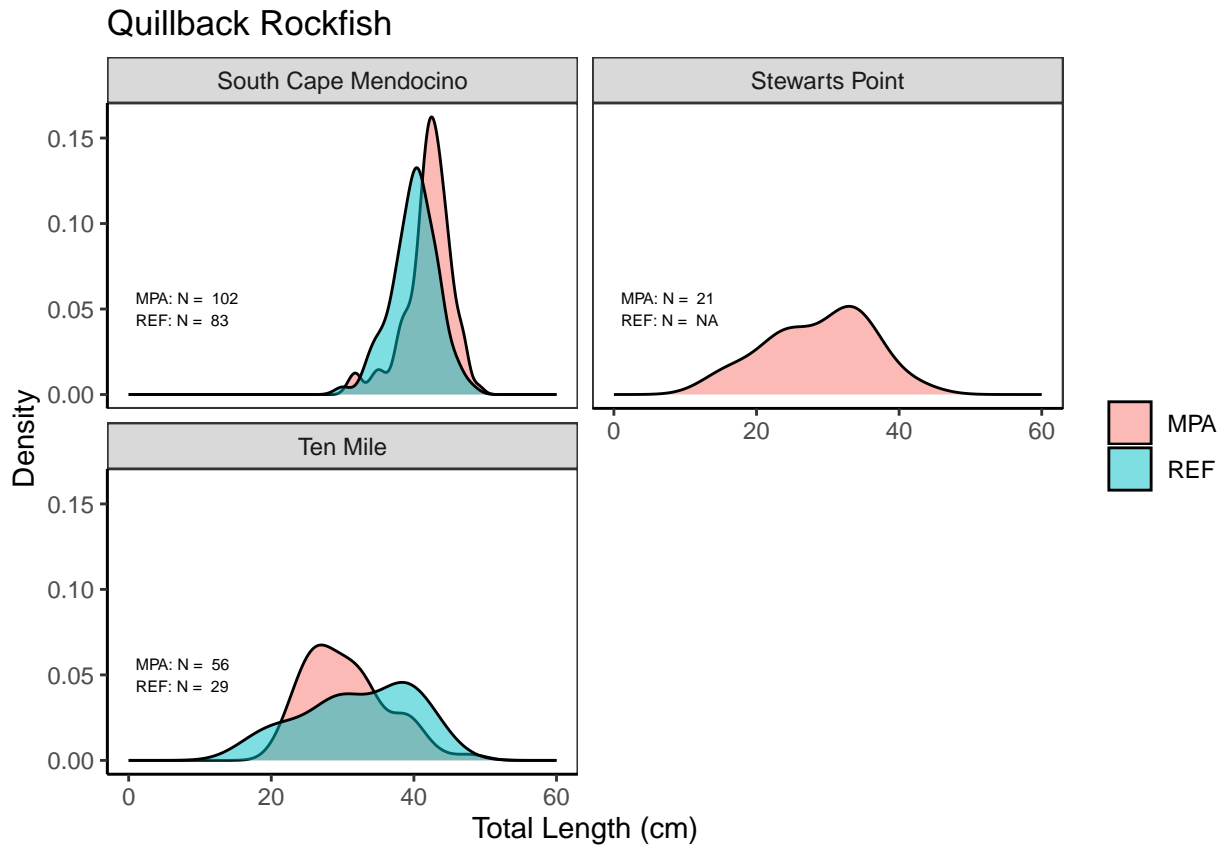


Figure 11: Density plot of total lengths form fish encountered inside each MPA and outside at reference areas (REF) over all years of the program. A sample size of NA indicates fewer than 20 fish were encountered in that MPA stratum and were not plotted. Areas north of Ano Nuevos Point and south of Point Buchon were sampled beginning in 2017.

Yellowtail Rockfish

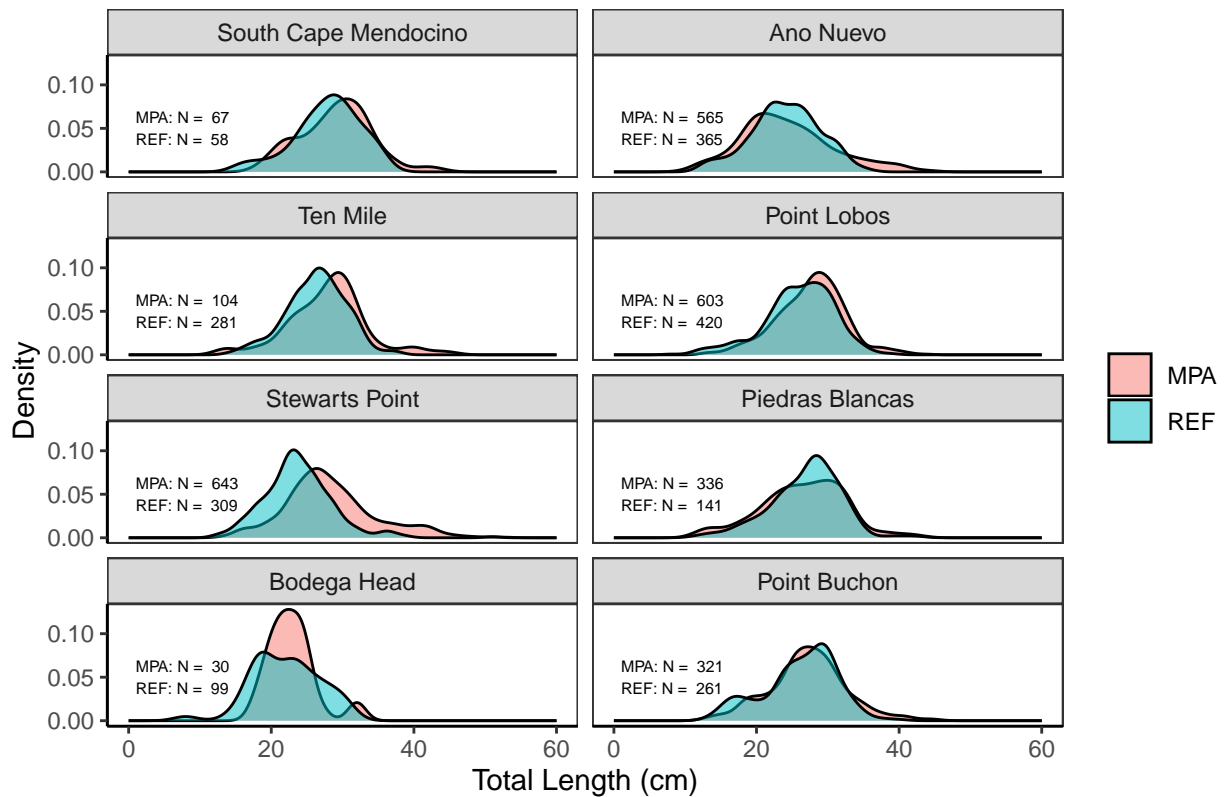


Figure 12: Density plot of total lengths form fish encountered inside each MPA and outside at reference areas (REF) over all years of the program. A sample size of NA indicates fewer than 20 fish were encountered in that MPA stratum and were not plotted. Areas north of Ano Nuevo and south of Point Buchon were sampled beginning in 2017.

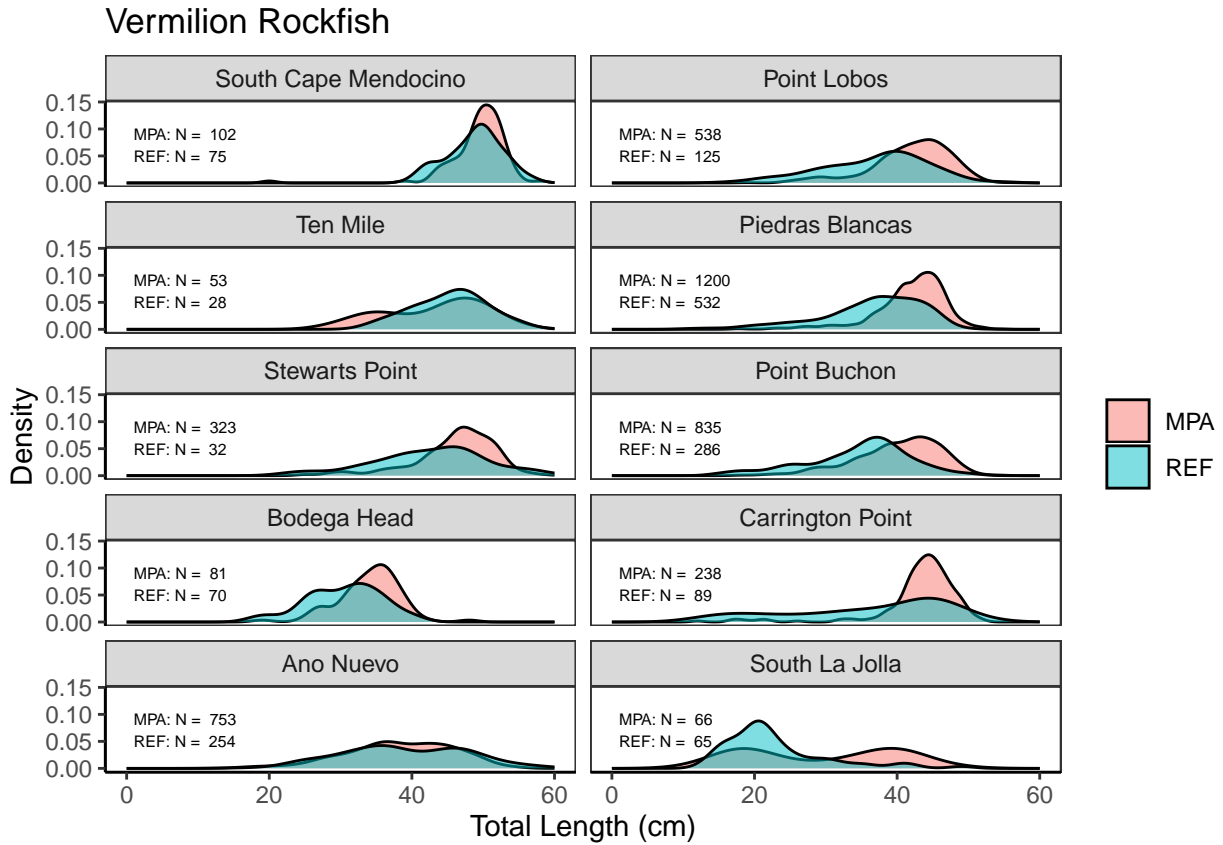


Figure 13: Density plot of total lengths form fish encountered inside each MPA and outside at reference areas (REF) over all years of the program. A sample size of NA indicates fewer than 20 fish were encountered in that MPA stratum and were not plotted. Areas north of Ano Nuevo and south of Point Buchon were sampled beginning in 2017.

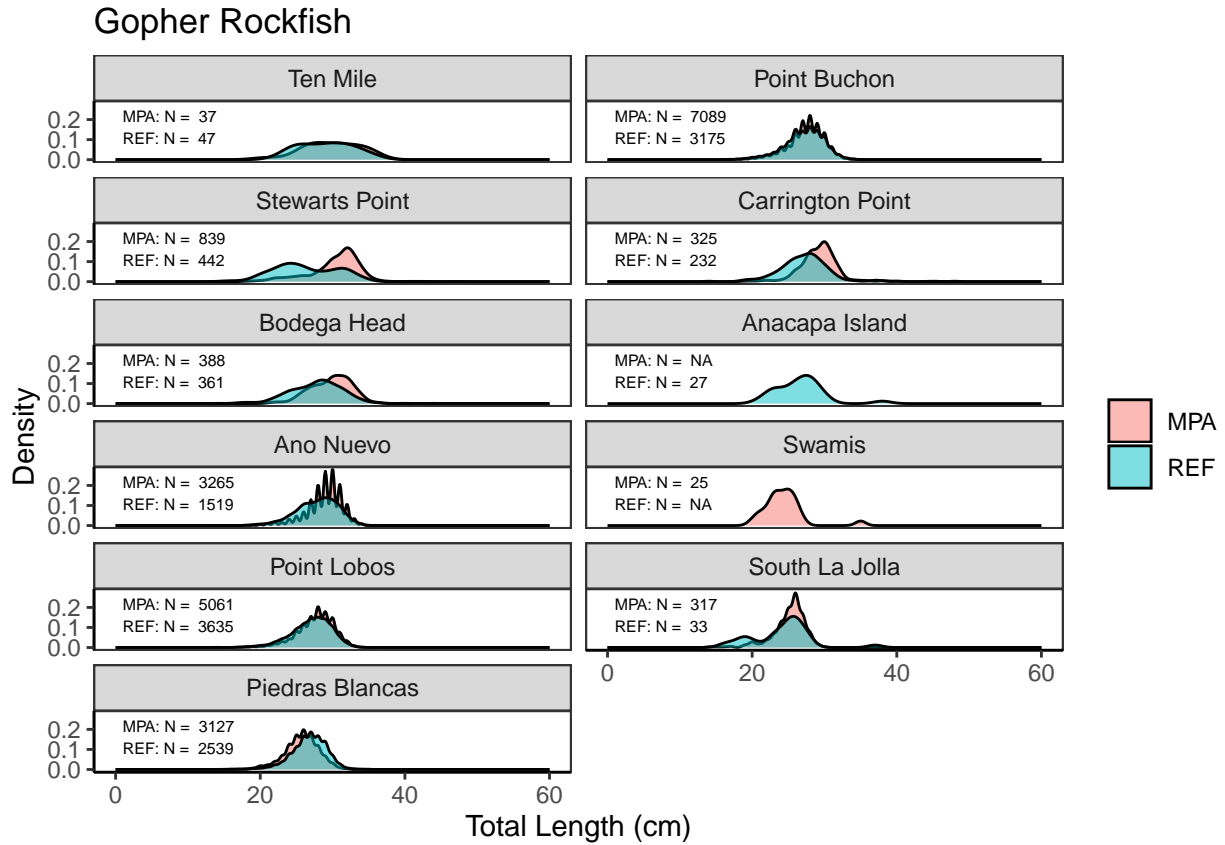


Figure 14: Density plot of total lengths from fish encountered inside each MPA and outside at reference areas (REF) over all years of the program. A sample size of NA indicates fewer than 20 fish were encountered in that MPA stratum and were not plotted. Areas north of Ano Nuevo and south of Point Buchon were sampled beginning in 2017.