

Summary of potential impacts of the Integrated Preferred Alternative and the Round 3 Revised South Coast Regional Stakeholder Group Proposals on commercial and recreational fisheries in the South Coast Study Region

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Astrid Scholz, ajscholz@ecotrust.org, Sarah Kruse, Charles Steinback,
Jon Bonkoski and Sonya Hetrick

1. Introduction

The purpose of this project is to analyze the relative effects of four MPA proposals on commercial and recreational fisheries in the South Coast Study Region (SCSR). For detailed information on how data were collected and/or analyzed, please see our *Draft Survey Methods and Summary Statistics for Ecotrust's South Coast Study Region Fishery Uses and Values Project* (presented to the RSG on 4/28/2009). For information on the methods used to evaluate these data, please see Section 12 of the *SAT Draft Methods Used to Evaluate Marine Protected Area Proposals for the MLPA South Coast Region* (presented to the RSG on 4/28/09). Additional proposal-specific information on potential fishery-specific impacts (to total area and total value at the study region level) for any given MPA are available in the series of Excel files provided to the RSG.

To analyze the SCSR fisheries, we used data layers characterizing the spatial extent and relative importance of fishing grounds for 15 commercial fisheries, ten commercial passenger fishing vessel (CPFV) fisheries, and 17 recreational fisheries. We collected this information during the summer and fall of 2008 using a stratified, representative sample of 254 commercial fishermen and a stratified, solicited sample¹ of 119 CPFV and 504 recreational fishermen. Individual responses regarding the relative importance of ocean areas for each fishery were standardized using a 100-point scale and normalized to the reported fishing grounds.

Based on these data, we evaluate the potential economic impacts on the commercial, CPFV, and recreational fishing grounds under each of the four MPA proposals (i.e., Round 3 Revised SCRSG Proposal 1 (P1R), Round 3 Revised SCRSG Proposal 2 (P2R), Round 3 Revised SCRSG Proposal 3 (P3R), and the MLPA South Coast Integrated Preferred Alternative (IPA)). We also conduct a socioeconomic impact analysis and a disproportionate impact analysis on the commercial and CPFV fisheries. We report commercial and CPFV results by port. We report recreational results by user group (i.e., dive, kayak, and private vessel) and by county.

The remaining sections of this document summarize the potential impacts. For more detailed statistics, please see the tables in the Appendix.

In all tables presented, a 'dashed line' represents a fishery that does not occur or a fishery for which insufficient data were collected to merit presentation.

¹ The use of a solicited sample may cause traditional statistical measures (e.g., confidence intervals) to be less precise. Nevertheless, it does allow us to make generalizations about preferences of the overall recreational fishing population and about the three user groups within the study area. We feel that this adds thematic resolution to the MLPA marine planning process.

2. Impact of the Channel Islands MPAs (C.I. MPAs)

This report also presents the potential impacts of the Channel Islands MPAs on commercial, CPFV, and recreational fishing grounds. We calculate these impacts the same way that we calculate the impacts of each MPA proposal (as described in the Introduction). For more information on this analysis, please see our *Summary of potential impacts of the Channel Islands MPAs on commercial and recreational fisheries in the South Coast Study Region* (presented to the RSG on 6/29/2009).

The Channel Islands network, which was established by California Fish and Game Commission (CFGC) in 2002 and expanded by the National Oceanic and Atmospheric Administration (NOAA) in 2006 and 2007, encompasses 241 square nautical miles (or 318 square miles). It consists of 11 marine reserves where all harvest and take is prohibited (Richardson Rock, Harris Point, Carrington Point, Scorpion, Anacapa Island, Footprint, Gulf Island, Skunk Point, South Point, Judith Rock, and Santa Barbara Island) and two marine conservation areas that allow limited take of Ca. Spiny Lobster and/or Coastal Pelagics (Painted Cave and Anacapa Island). The Channel Islands network was originally set to be reconsidered during the marine planning process (i.e., stakeholders would be given the opportunity to propose changes to the siting of the existing MPAs); however, it was later decided that the Channel Islands MPAs would not be changed.

Therefore, because all proposals must include the Channel Islands MPAs, the potential impacts of the Channel Islands (C.I.) MPAs will be the same under all the alternative MPA proposals and any comparison of the proposals should separate out these impacts.

By subtracting the estimated C.I. MPAs impacts from the estimated total impacts, stakeholders can more easily assess the potential impacts of MPAs that can be changed. For example, if the total impact of a MPA proposal is a 19% reduction in net economic revenue, but 5% of this reduction comes from the Channel Islands MPAs, then stakeholders can only potentially affect 14% of the impact (i.e., the minimum impact of their proposal is a 5% reduction in net economic revenue assuming zero impact elsewhere in the SCSR).

3. Comparison across Sectors

On average, the potential net economic impacts on the commercial and CPFV fisheries are lowest under P2R and highest under P3R. The potential impacts on the stated value of recreational fishing grounds are lowest under P2R and highest under P3R.

Table 1: Highest/lowest estimated impacts fishing grounds across the SCSR

		MPA Proposal(s) with highest potential impact		MPA Proposal(s) with lowest potential impact	
<u>Net economic value</u>					
Commercial	P3R	19.0%	P2R	10.3%	
CPFV	P3R	20.4%	P2R	12.6%	
<u>Stated value</u>					
Recreational	P3R		P2R		

4. Results for Commercial Fisheries

We summarize here our analyses of the potential impacts on the 15 commercial fisheries (i.e., Ca. halibut - hook & line, Ca. halibut - trawl, coastal pelagics, Ca. spiny lobster, N. fishery - hook & line, N. fishery - trap, rock crab, sablefish (blackcod), sea cucumber - dive, sea cucumber - trawl, spot prawn, market squid, swordfish, thornyhead, and red sea urchin). The coastal pelagics fishery includes both Northern anchovy and Pacific sardine. The N. fishery includes cabezon, greenling, and rockfish. The results for commercial fisheries are broken out by port (i.e., Santa Barbara, Ventura, Port Hueneme, San Pedro, Dana Point, Oceanside, and San Diego).

4.1. Potential Impacts on Commercial Fishing Grounds (Area and Stated Value)

MPA proposals vary considerably in their effects, both between and across fisheries. As mentioned previously, this report only presents results. Evaluation methods are presented in a separate document.

Each proposal affects the commercial fishing grounds differently. P2R generally has the lowest potential impacts in terms of both total area and total stated value, while P3R generally has the highest potential impacts and the IPA generally has the second lowest potential impacts. For information on the potential impacts on commercial fishing grounds for the 65 port-fishery combinations considered, please see Tables A.1–2 in the Appendix.

4.2. Potential Net Economic Impacts on Commercial Fisheries

A key assumption of our analysis is that each of the MPA proposals completely eliminates fishing opportunities in areas closed to specific fisheries and that fishermen are unable to adjust or mitigate in any way. In other words, we assume that all fishing in an area affected by an MPA is lost completely, when in reality it is more likely that fishermen will shift their efforts areas outside the MPA. The effect of such an assumption is most likely an overestimation of the impact, or a “worst case scenario.”

Figure 1 and Table 2 summarize the MPA proposals with the estimated highest and lowest potential net economic impact (NEI), calculated as a percentage reduction in annual net economic revenue (i.e., profit) (for associated values, see Table 3). On average, P2R is estimated to have the lowest potential NEI across the study region, while P3R is estimated to have the highest potential impact.

In terms of potential net economic impact across the SCSR for the top six commercial species based on percentage contribution to overall SCSR ex-vessel values (i.e., market squid, red sea urchin, Ca. spiny lobster, coastal pelagics, spot prawn, and rock crab), several patterns emerge from the analysis of the four proposals:

- The rock crab fishery sees the lowest range of potential impacts (in dollars). P3R has the highest potential impact on the rock crab fishery (\$99,356), while P2R has the lowest potential impact (\$80,740).
- The market squid fishery sees the highest range of potential impacts (in dollars). P3R has the highest potential impact on the market squid fishery (\$1,870,588), while P2R has the lowest potential impact (\$645,132).
- The coastal pelagics fishery sees the lowest range of potential impacts (as a percentage). P3R has the highest potential impact on the coastal pelagics fishery (11.7%), while P2R has the lowest potential impact (4.1%).
- The spot prawn and Ca. spiny lobster fisheries see the highest range of potential impacts (as a percentage). P3R has the highest potential impact on the Ca. spiny lobster fishery (21.2%), while P2R has the lowest potential impact on the spot prawn fishery (17.1%).

Figure 1: Estimated annual net economic impact on commercial fisheries (% reduction in profit)

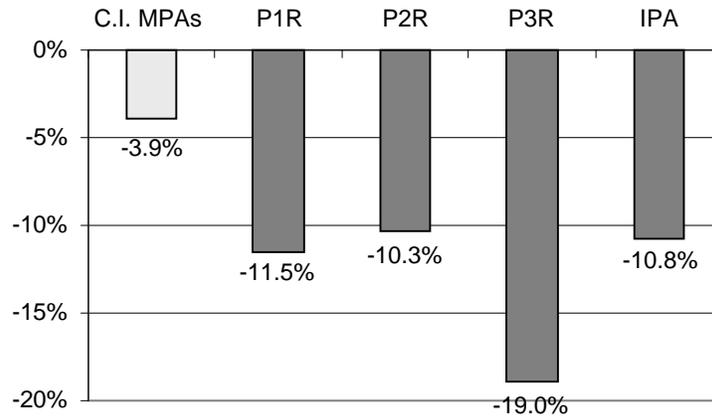
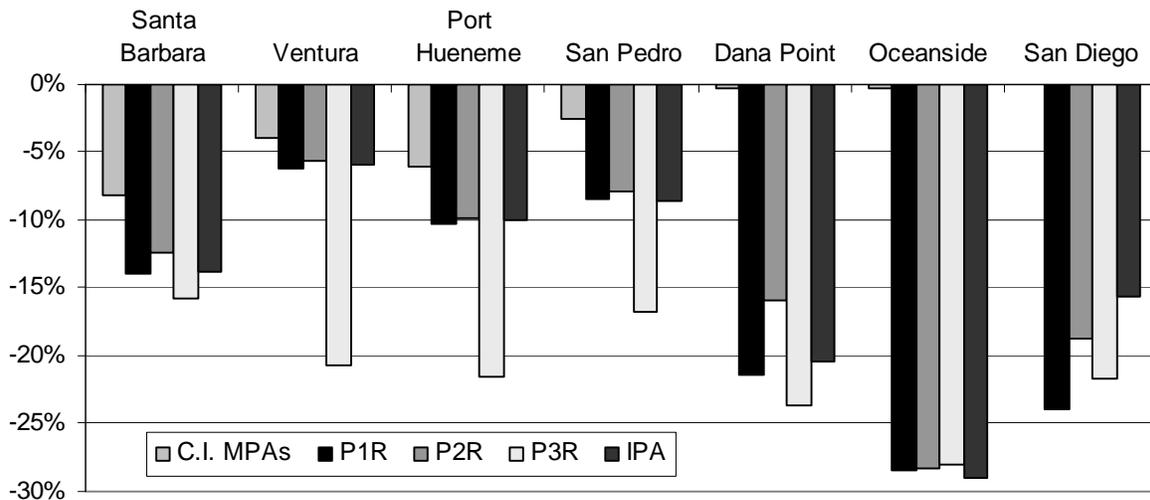


Table 2: Highest/lowest estimated annual net economic impact on commercial fisheries by port (% reduction in profit)²

Port	MPA Proposal(s) with highest potential impact		MPA Proposal(s) with lowest potential impact	
Santa Barbara	P3R	15.8%	P2R	12.4%
Ventura	P3R	20.7%	P2R	5.6%
Port Hueneme	P3R	21.5%	P2R	9.8%
San Pedro	P3R	16.7%	P2R	7.9%
Dana Point	P3R	23.6%	P2R	15.9%
Oceanside	IPA	29.1%	P3R	28.1%
San Diego	P1R	24.0%	IPA	18.7%
Study Region	P3R	19.0%	P2R	10.3%

The potential impacts from each proposal are broken down by port in Figure 2 and Table 3. On average, Ventura is the port estimated to see the lowest potential net economic impacts (as a percentage), while Oceanside is estimated to see the highest potential impacts.

Figure 2: Estimated annual net economic impact on commercial fisheries by port (% reduction in profit)



² Unless otherwise specified, economic impact is reported as the estimated maximum potential economic impact on average annual net revenue from 2000–07 (in \$2007).

Table 3: Estimated annual net economic impact on commercial fisheries by port (reduction in profit)

	Baseline GER	Estimated Costs	Baseline NER (Profit)	C.I. MPAs	P1R	P2R	P3R	IPA
				\$ Reduction in Profit				
Santa Barbara	\$5,796,804	\$2,655,064	\$3,141,740	\$256,224	\$439,340	\$390,779	\$497,798	\$434,196
Ventura	\$5,061,321	\$2,828,803	\$2,232,518	\$86,604	\$139,310	\$126,082	\$462,778	\$132,819
Port Hueneme	\$11,061,000	\$6,008,602	\$5,052,398	\$306,853	\$516,859	\$497,327	\$1,085,988	\$508,064
San Pedro	\$20,141,349	\$10,989,464	\$9,151,885	\$227,858	\$768,227	\$725,720	\$1,530,420	\$781,031
Dana Point	\$1,860,091	\$926,136	\$933,955	\$2,458	\$200,210	\$148,315	\$220,869	\$190,135
Oceanside	\$987,326	\$481,905	\$505,421	\$1,146	\$143,690	\$143,044	\$141,856	\$146,852
San Diego	\$3,093,219	\$1,462,682	\$1,630,538	\$168	\$391,505	\$305,068	\$353,248	\$254,981
Study Region³ Excluding Sablefish & Thornyhead⁴	\$48,001,110	\$25,352,655	\$22,648,455	\$881,311	\$2,599,140	\$2,336,335	\$4,292,958	\$2,448,079
	\$47,065,381	\$24,856,049	\$22,209,332	\$881,311	\$2,346,080	\$2,048,640	\$4,065,685	\$2,161,841
% Reduction in Profit								
Santa Barbara	100%	46%	54%	8.2%	14.0%	12.4%	15.8%	13.8%
Ventura	100%	56%	44%	3.9%	6.2%	5.6%	20.7%	5.9%
Port Hueneme	100%	54%	46%	6.1%	10.2%	9.8%	21.5%	10.1%
San Pedro	100%	55%	45%	2.5%	8.4%	7.9%	16.7%	8.5%
Dana Point	100%	50%	50%	0.3%	21.4%	15.9%	23.6%	20.4%
Oceanside	100%	49%	51%	0.2%	28.4%	28.3%	28.1%	29.1%
San Diego	100%	47%	53%	0.0%	24.0%	18.7%	21.7%	15.6%
Study Region Excluding Sablefish & Thornyhead	—	—	—	3.9%	11.5%	10.3%	19.0%	10.8%
	—	—	—	4.0%	10.6%	9.2%	18.3%	9.7%

Tables 4–11 show potential net economic impacts by fishery for each port and for the SCSR.⁵

³ Santa Barbara Ca. halibut - trawl and sea cucumber - trawl are not included in this total. Please see Table 4 for estimated impacts on these two fisheries.

⁴ The sablefish and thornyhead - trap fisheries data collected in this study indicated where those fisheries occur only inside state waters. These fisheries actually occur primarily outside of state waters and, because of this, the stated potential impacts may be overestimated throughout the study region. For this reason, we include estimates of potential net economic impact for commercial fisheries with and without these fisheries.

⁵ For an explanation of why net economic impact can exceed 100%, please see the Appendix.

Table 4: Estimated annual net economic impact for Santa Barbara

	Baseline GER	Estimated Costs	Baseline NER (Profit)	C.I. MPAs	P1R	P2R	P3R	IPA
				\$ Reduction in Profit				
Ca. Halibut (Hook & Line)	\$70,658	\$37,025	\$33,633	\$2,938	\$7,777	\$6,840	\$11,519	\$8,010
Ca. Halibut (Trawl)	\$200,567	\$65,184	\$135,383	\$0	\$11,754	\$12,052	\$19,193	\$11,035
Coastal Pelagics	—	—	—	—	—	—	—	—
Ca. Spiny Lobster	\$1,558,845	\$716,026	\$842,819	\$43,055	\$128,401	\$96,810	\$151,330	\$124,070
N. Fishery (Hook & Line)	\$150,237	\$77,523	\$72,715	\$10,879	\$14,799	\$14,938	\$16,782	\$15,019
N. Fishery (Trap)	\$39,144	\$19,986	\$19,157	\$1,266	\$2,819	\$2,087	\$4,451	\$2,757
Rock Crab	\$845,105	\$396,193	\$448,912	\$27,368	\$73,166	\$66,168	\$73,512	\$70,810
Sablefish (blackcod)	—	—	—	—	—	—	—	—
Sea Cucumber (Dive)	\$19,874	\$9,858	\$10,017	\$1,538	\$1,948	\$1,835	\$3,091	\$1,974
Sea Cucumber (Trawl)	\$163,088	\$40,772	\$122,316	\$0	\$4,795	\$4,138	\$6,307	\$4,281
Spot Prawn	\$48,537	\$23,651	\$24,886	\$0	\$4,706	\$4,810	\$4,810	\$4,810
Market Squid	—	—	—	—	—	—	—	—
Swordfish	—	—	—	—	—	—	—	—
Thornyhead	—	—	—	—	—	—	—	—
Red Sea Urchin	\$3,064,404	\$1,374,803	\$1,689,601	\$169,180	\$205,725	\$197,291	\$232,303	\$206,747
All Fisheries	\$6,160,459	\$2,761,020	\$3,399,438	\$256,224	\$455,889	\$406,969	\$523,298	\$449,512
% Reduction in Profit								
Ca. Halibut (Hook & Line)	100%	52%	48%	8.7%	23.1%	20.3%	34.3%	23.8%
Ca. Halibut (Trawl)	100%	33%	68%	0.0%	8.7%	8.9%	14.2%	8.2%
Coastal Pelagics	—	—	—	—	—	—	—	—
Ca. Spiny Lobster	100%	46%	54%	5.1%	15.2%	11.5%	18.0%	14.7%
N. Fishery (Hook & Line)	100%	52%	48%	15.0%	20.4%	20.5%	23.1%	20.7%
N. Fishery (Trap)	100%	51%	49%	6.6%	14.7%	10.9%	23.2%	14.4%
Rock Crab	100%	47%	53%	6.1%	16.3%	14.7%	16.4%	15.8%
Sablefish (blackcod)	—	—	—	—	—	—	—	—
Sea Cucumber (Dive)	100%	50%	50%	15.4%	19.4%	18.3%	30.9%	19.7%
Sea Cucumber (Trawl)	100%	25%	75%	0.0%	3.9%	3.4%	5.2%	3.5%
Spot Prawn	100%	49%	51%	0.0%	18.9%	19.3%	19.3%	19.3%
Market Squid	—	—	—	—	—	—	—	—
Swordfish	—	—	—	—	—	—	—	—
Thornyhead	—	—	—	—	—	—	—	—
Red Sea Urchin	100%	45%	55%	10.0%	12.2%	11.7%	13.7%	12.2%
All Fisheries	—	—	—	7.5%	13.4%	12.0%	15.4%	13.2%

Table 5: Estimated annual net economic impact for Ventura

	Baseline GER	Estimated Costs	Baseline NER (Profit)	C.I. MPAs	P1R	P2R	P3R	IPA
				\$ Reduction in Profit				
Ca. Halibut (Hook & Line)	\$18,178	\$9,525	\$8,653	\$952	\$1,288	\$1,205	\$1,343	\$1,306
Ca. Halibut (Trawl)	—	—	—	—	—	—	—	—
Coastal Pelagics	—	—	—	—	—	—	—	—
Ca. Spiny Lobster	\$371,161	\$170,486	\$200,675	\$0	\$4,034	\$4,458	\$65,482	\$4,034
N. Fishery (Hook & Line)	—	—	—	—	—	—	—	—
N. Fishery (Trap)	\$35,207	\$17,976	\$17,231	\$0	\$0	\$0	\$4,338	\$0
Rock Crab	\$126,384	\$59,250	\$67,134	\$3,637	\$3,637	\$3,637	\$5,015	\$3,637
Sablefish (blackcod)	—	—	—	—	—	—	—	—
Sea Cucumber (Dive)	\$49,076	\$24,342	\$24,734	\$116	\$5,604	\$4,238	\$7,208	\$5,604
Sea Cucumber (Trawl)	—	—	—	—	—	—	—	—
Spot Prawn	\$108,471	\$52,855	\$55,616	\$0	\$0	\$0	\$0	\$0
Market Squid	\$4,352,843	\$2,494,369	\$1,858,475	\$81,899	\$124,747	\$112,543	\$379,393	\$118,238
Swordfish	—	—	—	—	—	—	—	—
Thornyhead	—	—	—	—	—	—	—	—
Red Sea Urchin	—	—	—	—	—	—	—	—
All Fisheries	\$5,061,321	\$2,828,803	\$2,232,518	\$86,604	\$139,310	\$126,082	\$462,778	\$132,819
					% Reduction in Profit			
Ca. Halibut (Hook & Line)	100%	52%	48%	11.0%	14.9%	13.9%	15.5%	15.1%
Ca. Halibut (Trawl)	—	—	—	—	—	—	—	—
Coastal Pelagics	—	—	—	—	—	—	—	—
Ca. Spiny Lobster	100%	46%	54%	0.0%	2.0%	2.2%	32.6%	2.0%
N. Fishery (Hook & Line)	—	—	—	—	—	—	—	—
N. Fishery (Trap)	100%	51%	49%	0.0%	0.0%	0.0%	25.2%	0.0%
Rock Crab	100%	47%	53%	5.4%	5.4%	5.4%	7.5%	5.4%
Sablefish (blackcod)	—	—	—	—	—	—	—	—
Sea Cucumber (Dive)	100%	50%	50%	0.5%	22.7%	17.1%	29.1%	22.7%
Sea Cucumber (Trawl)	—	—	—	—	—	—	—	—
Spot Prawn	100%	49%	51%	0.0%	0.0%	0.0%	0.0%	0.0%
Market Squid	100%	57%	43%	4.4%	6.7%	6.1%	20.4%	6.4%
Swordfish	—	—	—	—	—	—	—	—
Thornyhead	—	—	—	—	—	—	—	—
Red Sea Urchin	—	—	—	—	—	—	—	—
All Fisheries	—	—	—	3.9%	6.2%	5.6%	20.7%	5.9%

Table 6: Estimated annual net economic impact for Port Hueneme

	Baseline GER	Estimated Costs	Baseline NER (Profit)	C.I. MPAs	P1R	P2R	P3R	IPA
				\$ Reduction in Profit				
Ca. Halibut (Hook & Line)	\$19,373	\$10,152	\$9,222	\$904	\$1,209	\$1,167	\$1,354	\$1,227
Ca. Halibut (Trawl)	—	—	—	—	—	—	—	—
Coastal Pelagics	\$767,935	427163.8736	\$340,771	\$3,764	\$14,666	\$12,075	\$28,647	\$16,963
Ca. Spiny Lobster	\$420,552	\$193,172	\$227,379	\$10,516	\$16,014	\$16,770	\$51,617	\$16,049
N. Fishery (Hook & Line)	\$49,637	\$25,613	\$24,024	\$65	\$7,817	\$7,656	\$9,453	\$7,955
N. Fishery (Trap)	\$61,447	\$31,374	\$30,073	\$0	\$602	\$769	\$769	\$602
Rock Crab	\$131,803	\$61,790	\$70,012	\$0	\$11	\$11	\$13,270	\$11
Sablefish (blackcod)	—	—	—	—	—	—	—	—
Sea Cucumber (Dive)	\$258,699	\$128,315	\$130,384	\$28,868	\$34,418	\$33,849	\$48,140	\$34,438
Sea Cucumber (Trawl)	—	—	—	—	—	—	—	—
Spot Prawn	\$427,903	\$208,506	\$219,398	\$88,006	\$88,006	\$88,006	\$88,006	\$88,006
Market Squid	\$7,387,374	\$4,233,286	\$3,154,088	\$131,170	\$254,055	\$242,089	\$687,145	\$243,009
Swordfish	—	—	—	—	—	—	—	—
Thornyhead	—	—	—	—	—	—	—	—
Red Sea Urchin	\$1,536,277	\$689,230	\$847,047	\$43,561	\$100,061	\$94,936	\$157,587	\$99,805
All Fisheries	\$11,061,000	\$6,008,602	\$5,052,398	\$306,853	\$516,859	\$497,327	\$1,085,988	\$508,064
% Reduction in Profit								
Ca. Halibut (Hook & Line)	100%	52%	48%	9.8%	13.1%	12.7%	14.7%	13.3%
Ca. Halibut (Trawl)	—	—	—	—	—	—	—	—
Coastal Pelagics	100%	56%	44%	1.1%	4.3%	3.5%	8.4%	5.0%
Ca. Spiny Lobster	100%	46%	54%	4.6%	7.0%	7.4%	22.7%	7.1%
N. Fishery (Hook & Line)	100%	52%	48%	0.3%	32.5%	31.9%	39.3%	33.1%
N. Fishery (Trap)	100%	51%	49%	0.0%	2.0%	2.6%	2.6%	2.0%
Rock Crab	100%	47%	53%	0.0%	0.0%	0.0%	19.0%	0.0%
Sablefish (blackcod)	—	—	—	—	—	—	—	—
Sea Cucumber (Dive)	100%	50%	50%	22.1%	26.4%	26.0%	36.9%	26.4%
Sea Cucumber (Trawl)	—	—	—	—	—	—	—	—
Spot Prawn	100%	49%	51%	40.1%	40.1%	40.1%	40.1%	40.1%
Market Squid	100%	57%	43%	4.2%	8.1%	7.7%	21.8%	7.7%
Swordfish	—	—	—	—	—	—	—	—
Thornyhead	—	—	—	—	—	—	—	—
Red Sea Urchin	100%	45%	55%	5.1%	11.8%	11.2%	18.6%	11.8%
All Fisheries	—	—	—	6.1%	10.2%	9.8%	21.5%	10.1%

Table 7: Estimated annual net economic impact for San Pedro

	Baseline GER	Estimated Costs	Baseline NER (Profit)	C.I. MPAs	P1R	P2R	P3R	IPA
				\$ Reduction in Profit				
Ca. Halibut (Hook & Line)	—	—	—	—	—	—	—	—
Ca. Halibut (Trawl)	—	—	—	—	—	—	—	—
Coastal Pelagics	\$5,121,261	\$2,848,701	\$2,272,559	\$17,278	\$111,169	\$94,216	\$276,455	\$132,359
Ca. Spiny Lobster	\$980,389	\$450,323	\$530,066	\$801	\$51,032	\$46,626	\$73,303	\$47,667
N. Fishery (Hook & Line)	\$14,034	\$7,242	\$6,793	\$724	\$1,356	\$1,271	\$2,005	\$1,380
N. Fishery (Trap)	\$76,447	\$39,033	\$37,414	\$0	\$3,539	\$2,675	\$9,482	\$4,127
Rock Crab	\$136,953	\$64,205	\$72,748	\$0	\$56	\$34	\$90	\$45
Sablefish (blackcod)	\$68,707	\$38,647	\$30,059	\$0	\$13,487	\$18,571	\$12,481	\$15,595
Sea Cucumber (Dive)	\$164,935	\$81,808	\$83,127	\$2,346	\$12,832	\$12,326	\$17,368	\$13,117
Sea Cucumber (Trawl)	—	—	—	—	—	—	—	—
Spot Prawn	\$389,257	\$189,674	\$199,583	\$0	\$5,274	\$3,557	\$16,496	\$4,109
Market Squid	\$10,719,087	\$6,142,503	\$4,576,584	\$144,248	\$319,216	\$290,500	\$804,050	\$295,174
Swordfish	—	—	—	—	—	—	—	—
Thornyhead	\$280,325	\$144,835	\$135,490	\$0	\$80,964	\$88,653	\$72,318	\$91,216
Red Sea Urchin	\$2,189,956	\$982,494	\$1,207,462	\$62,461	\$169,301	\$167,292	\$246,373	\$176,241
All Fisheries	\$20,141,349	\$10,989,464	\$9,151,885	\$227,858	\$768,227	\$725,720	\$1,530,420	\$781,031
% Reduction in Profit								
Ca. Halibut (Hook & Line)	—	—	—	—	—	—	—	—
Ca. Halibut (Trawl)	—	—	—	—	—	—	—	—
Coastal Pelagics	100%	56%	44%	0.8%	4.9%	4.1%	12.2%	5.8%
Ca. Spiny Lobster	100%	46%	54%	0.2%	9.6%	8.8%	13.8%	9.0%
N. Fishery (Hook & Line)	100%	52%	48%	10.7%	20.0%	18.7%	29.5%	20.3%
N. Fishery (Trap)	100%	51%	49%	0.0%	9.5%	7.1%	25.3%	11.0%
Rock Crab	100%	47%	53%	0.0%	0.1%	0.0%	0.1%	0.1%
Sablefish (blackcod)	100%	56%	44%	0.0%	44.9%	61.8%	41.5%	51.9%
Sea Cucumber (Dive)	100%	50%	50%	2.8%	15.4%	14.8%	20.9%	15.8%
Sea Cucumber (Trawl)	—	—	—	—	—	—	—	—
Spot Prawn	100%	49%	51%	0.0%	2.6%	1.8%	8.3%	2.1%
Market Squid	100%	57%	43%	3.2%	7.0%	6.3%	17.6%	6.4%
Swordfish	—	—	—	—	—	—	—	—
Thornyhead	100%	52%	48%	0.0%	59.8%	65.4%	53.4%	67.3%
Red Sea Urchin	100%	45%	55%	5.2%	14.0%	13.9%	20.4%	14.6%
All Fisheries	—	—	—	2.5%	8.4%	7.9%	16.7%	8.5%

Table 8: Estimated annual net economic impact for Dana Point

	Baseline GER	Estimated Costs	Baseline NER (Profit)	C.I. MPAs	P1R	P2R	P3R	IPA
				\$ Reduction in Profit				
Ca. Halibut (Hook & Line)	—	—	—	—	—	—	—	—
Ca. Halibut (Trawl)	—	—	—	—	—	—	—	—
Coastal Pelagics	—	—	—	—	—	—	—	—
Ca. Spiny Lobster	\$914,095	\$419,872	\$494,223	\$0	\$66,927	\$38,319	\$100,690	\$63,641
N. Fishery (Hook & Line)	—	—	—	—	—	—	—	—
N. Fishery (Trap)	\$31,345	\$16,004	\$15,341	\$0	\$6,932	\$527	\$6,977	\$6,608
Rock Crab	\$38,375	\$17,991	\$20,384	\$0	\$3,149	\$488	\$3,030	\$3,058
Sablefish (blackcod)	\$127,274	\$71,591	\$55,682	\$0	\$24,984	\$34,401	\$23,119	\$28,889
Sea Cucumber (Dive)	—	—	—	—	—	—	—	—
Sea Cucumber (Trawl)	—	—	—	—	—	—	—	—
Spot Prawn	\$300,792	\$146,568	\$154,224	\$0	\$23,101	\$9,477	\$15,377	\$16,017
Market Squid	—	—	—	—	—	—	—	—
Swordfish	\$196,774	\$130,362	\$66,411	\$2,458	\$20,996	\$11,090	\$22,450	\$12,244
Thornyhead	\$160,858	\$83,110	\$77,748	\$0	\$51,204	\$53,378	\$45,449	\$57,419
Red Sea Urchin	\$90,579	\$40,637	\$49,942	\$0	\$2,916	\$635	\$3,777	\$2,259
All Fisheries	\$1,860,091	\$926,136	\$933,955	\$2,458	\$200,210	\$148,315	\$220,869	\$190,135
% Reduction in Profit								
Ca. Halibut (Hook & Line)	—	—	—	—	—	—	—	—
Ca. Halibut (Trawl)	—	—	—	—	—	—	—	—
Coastal Pelagics	—	—	—	—	—	—	—	—
Ca. Spiny Lobster	100%	46%	54%	0.0%	13.5%	7.8%	20.4%	12.9%
N. Fishery (Hook & Line)	—	—	—	—	—	—	—	—
N. Fishery (Trap)	100%	51%	49%	0.0%	45.2%	3.4%	45.5%	43.1%
Rock Crab	100%	47%	53%	0.0%	15.4%	2.4%	14.9%	15.0%
Sablefish (blackcod)	100%	56%	44%	0.0%	44.9%	61.8%	41.5%	51.9%
Sea Cucumber (Dive)	—	—	—	—	—	—	—	—
Sea Cucumber (Trawl)	—	—	—	—	—	—	—	—
Spot Prawn	100%	49%	51%	0.0%	15.0%	6.1%	10.0%	10.4%
Market Squid	—	—	—	—	—	—	—	—
Swordfish	100%	66%	34%	3.7%	31.6%	16.7%	33.8%	18.4%
Thornyhead	100%	52%	48%	0.0%	65.9%	68.7%	58.5%	73.9%
Red Sea Urchin	100%	45%	55%	0.0%	5.8%	1.3%	7.6%	4.5%
All Fisheries	—	—	—	0.3%	21.4%	15.9%	23.6%	20.4%

Table 9: Estimated annual net economic impact for Oceanside

	Baseline GER	Estimated Costs	Baseline NER (Profit)	C.I. MPAs	P1R	P2R	P3R	IPA
				\$ Reduction in Profit				
Ca. Halibut (Hook & Line)	—	—	—	—	—	—	—	—
Ca. Halibut (Trawl)	—	—	—	—	—	—	—	—
Coastal Pelagics	—	—	—	—	—	—	—	—
Ca. Spiny Lobster	\$400,696	\$184,052	\$216,644	\$1,146	\$29,305	\$22,200	\$45,185	\$31,008
N. Fishery (Hook & Line)	—	—	—	—	—	—	—	—
N. Fishery (Trap)	\$21,205	\$10,827	\$10,378	\$0	\$198	\$144	\$379	\$355
Rock Crab	\$35,177	\$16,491	\$18,686	\$0	\$12	\$0	\$29	\$14
Sablefish (blackcod)	\$90,829	\$51,091	\$39,738	\$0	\$17,830	\$24,550	\$16,499	\$20,617
Sea Cucumber (Dive)	—	—	—	—	—	—	—	—
Sea Cucumber (Trawl)	—	—	—	—	—	—	—	—
Spot Prawn	\$211,491	\$103,054	\$108,437	\$0	\$21,490	\$21,490	\$21,490	\$21,490
Market Squid	—	—	—	—	—	—	—	—
Swordfish	—	—	—	—	—	—	—	—
Thornyhead	\$207,737	\$107,331	\$100,406	\$0	\$64,591	\$68,141	\$57,407	\$72,501
Red Sea Urchin	\$20,191	\$9,058	\$11,132	\$0	\$10,265	\$6,518	\$867	\$867
All Fisheries	\$987,326	\$481,905	\$505,421	\$1,146	\$143,690	\$143,044	\$141,856	\$146,852
% Reduction in Profit								
Ca. Halibut (Hook & Line)	—	—	—	—	—	—	—	—
Ca. Halibut (Trawl)	—	—	—	—	—	—	—	—
Coastal Pelagics	—	—	—	—	—	—	—	—
Ca. Spiny Lobster	100%	46%	54%	0.5%	13.5%	10.2%	20.9%	14.3%
N. Fishery (Hook & Line)	—	—	—	—	—	—	—	—
N. Fishery (Trap)	100%	51%	49%	0.0%	1.9%	1.4%	3.7%	3.4%
Rock Crab	100%	47%	53%	0.0%	0.1%	0.0%	0.2%	0.1%
Sablefish (blackcod)	100%	56%	44%	0.0%	44.9%	61.8%	41.5%	51.9%
Sea Cucumber (Dive)	—	—	—	—	—	—	—	—
Sea Cucumber (Trawl)	—	—	—	—	—	—	—	—
Spot Prawn	100%	49%	51%	0.0%	19.8%	19.8%	19.8%	19.8%
Market Squid	—	—	—	—	—	—	—	—
Swordfish	100%	66%	34%	—	—	—	—	—
Thornyhead	100%	52%	48%	0.0%	64.3%	67.9%	57.2%	72.2%
Red Sea Urchin	100%	45%	55%	0.0%	92.2%	58.6%	7.8%	7.8%
All Fisheries	—	—	—	0.2%	28.4%	28.3%	28.1%	29.1%

Table 10: Estimated annual net economic impact for San Diego

	Baseline GER	Estimated Costs	Baseline NER (Profit)	C.I. MPAs	P1R	P2R	P3R	IPA
				\$ Reduction in Profit				
Ca. Halibut (Hook & Line)	—	—	—	—	—	—	—	—
Ca. Halibut (Trawl)	—	—	—	—	—	—	—	—
Coastal Pelagics	—	—	—	—	—	—	—	—
Ca. Spiny Lobster	\$1,715,118	\$787,807	\$927,311	\$0	\$276,239	\$220,038	\$241,341	\$169,023
N. Fishery (Hook & Line)	\$3,291	\$1,698	\$1,593	\$0	\$325	\$355	\$264	\$203
N. Fishery (Trap)	\$107,924	\$55,105	\$52,819	\$0	\$14,681	\$10,034	\$12,622	\$9,806
Rock Crab	\$155,496	\$72,898	\$82,598	\$0	\$11,499	\$10,403	\$4,411	\$3,914
Sablefish (blackcod)	—	—	—	—	—	—	—	—
Sea Cucumber (Dive)	\$7,712	\$3,825	\$3,887	\$0	\$1,505	\$1,367	\$501	\$176
Sea Cucumber (Trawl)	—	—	—	—	—	—	—	—
Spot Prawn	\$254,984	\$124,247	\$130,737	\$0	\$24,684	\$25,046	\$26,050	\$25,548
Market Squid	—	—	—	—	—	—	—	—
Swordfish	\$169,952	\$112,593	\$57,359	\$168	\$1,100	\$919	\$1,152	\$971
Thornyhead	—	—	—	—	—	—	—	—
Red Sea Urchin	\$678,742	\$304,508	\$374,234	\$0	\$61,472	\$36,906	\$66,906	\$45,340
All Fisheries	\$3,093,219	\$1,462,682	\$1,630,538	\$168	\$391,505	\$305,068	\$353,248	\$254,981
% Reduction in Profit								
Ca. Halibut (Hook & Line)	—	—	—	—	—	—	—	—
Ca. Halibut (Trawl)	—	—	—	—	—	—	—	—
Coastal Pelagics	—	—	—	—	—	—	—	—
Ca. Spiny Lobster	100%	46%	54%	0.0%	29.8%	23.7%	26.0%	18.2%
N. Fishery (Hook & Line)	100%	52%	48%	0.0%	20.4%	22.3%	16.6%	12.7%
N. Fishery (Trap)	100%	51%	49%	0.0%	27.8%	19.0%	23.9%	18.6%
Rock Crab	100%	47%	53%	0.0%	13.9%	12.6%	5.3%	4.7%
Sablefish (blackcod)	—	—	—	—	—	—	—	—
Sea Cucumber (Dive)	100%	50%	50%	0.0%	38.7%	35.2%	12.9%	4.5%
Sea Cucumber (Trawl)	100%	25%	75%	—	—	—	—	—
Spot Prawn	100%	49%	51%	0.0%	18.9%	19.2%	19.9%	19.5%
Market Squid	—	—	—	—	—	—	—	—
Swordfish	100%	66%	34%	0.3%	1.9%	1.6%	2.0%	1.7%
Thornyhead	—	—	—	—	—	—	—	—
Red Sea Urchin	100%	45%	55%	0.0%	16.4%	9.9%	17.9%	12.1%
All Fisheries	—	—	—	0.0%	24.0%	18.7%	21.7%	15.6%

Table 11: Estimated annual net economic impact for the SCSR

	Baseline GER	Estimated Costs	Baseline NER (Profit)	C.I. MPAs	\$ Reduction in Profit				
					P1R	P2R	P3R	IPA	
Ca. Halibut (Hook & Line)	\$108,209	\$56,702	\$51,508	\$4,794	\$10,274	\$9,212	\$14,217	\$10,542	
Ca. Halibut (Trawl)	—	—	—	—	—	—	—	—	
Coastal Pelagics	\$5,889,196	\$3,275,865	\$2,613,331	\$21,043	\$125,834	\$106,291	\$305,102	\$149,322	
Ca. Spiny Lobster	\$6,360,856	\$2,921,739	\$3,439,117	\$55,518	\$571,952	\$445,222	\$728,948	\$455,491	
N. Fishery (Hook & Line)	\$217,200	\$112,075	\$105,125	\$11,668	\$24,297	\$24,220	\$28,505	\$24,557	
N. Fishery (Trap)	\$372,719	\$190,306	\$182,413	\$1,266	\$28,772	\$16,236	\$39,018	\$24,256	
Rock Crab	\$1,469,292	\$688,818	\$780,474	\$31,005	\$91,529	\$80,740	\$99,356	\$81,489	
Sablefish (blackcod)	\$286,809	\$161,330	\$125,479	\$0	\$56,302	\$77,522	\$52,099	\$65,101	
Sea Cucumber (Dive)	\$500,296	\$248,147	\$252,149	\$32,868	\$56,305	\$53,615	\$76,308	\$55,309	
Sea Cucumber (Trawl)	—	—	—	—	—	—	—	—	
Spot Prawn	\$1,741,435	\$848,554	\$892,881	\$88,006	\$167,261	\$152,385	\$172,229	\$159,979	
Market Squid	\$22,459,304	\$12,870,158	\$9,589,146	\$357,317	\$698,018	\$645,132	\$1,870,588	\$656,422	
Swordfish	\$366,725	\$242,956	\$123,770	\$2,626	\$22,097	\$12,009	\$23,602	\$13,215	
Thornyhead	\$648,920	\$335,275	\$313,645	\$0	\$196,759	\$210,172	\$175,173	\$221,136	
Red Sea Urchin	\$7,580,148	\$3,400,730	\$4,179,418	\$275,201	\$549,740	\$503,579	\$707,813	\$531,259	
All Fisheries⁶ Excluding Sablefish & Thornyhead⁷	\$48,001,110	\$25,352,655	\$22,648,455	\$881,311	\$2,599,140	\$2,336,335	\$4,292,958	\$2,448,079	
	\$47,065,381	\$24,856,049	\$22,209,332	\$881,311	\$2,346,080	\$2,048,640	\$4,065,685	\$2,161,841	
					% Reduction in Profit				
Ca. Halibut (Hook & Line)	100%	52%	48%	9.3%	19.9%	17.9%	27.6%	20.5%	
Ca. Halibut (Trawl)	—	—	—	—	—	—	—	—	
Coastal Pelagics	100%	56%	44%	0.8%	4.8%	4.1%	11.7%	5.7%	
Ca. Spiny Lobster	100%	46%	54%	1.6%	16.6%	12.9%	21.2%	13.2%	
N. Fishery (Hook & Line)	100%	52%	48%	11.1%	23.1%	23.0%	27.1%	23.4%	
N. Fishery (Trap)	100%	51%	49%	0.7%	15.8%	8.9%	21.4%	13.3%	
Rock Crab	100%	47%	53%	4.0%	11.7%	10.3%	12.7%	10.4%	
Sablefish (blackcod)	100%	56%	44%	0.0%	44.9%	61.8%	41.5%	51.9%	
Sea Cucumber (Dive)	100%	50%	50%	13.0%	22.3%	21.3%	30.3%	21.9%	
Sea Cucumber (Trawl)	—	—	—	—	—	—	—	—	
Spot Prawn	100%	49%	51%	9.9%	18.7%	17.1%	19.3%	17.9%	
Market Squid	100%	57%	43%	3.7%	7.3%	6.7%	19.5%	6.8%	
Swordfish	100%	66%	34%	2.1%	17.9%	9.7%	19.1%	10.7%	
Thornyhead	100%	52%	48%	0.0%	62.7%	67.0%	55.9%	70.5%	
Red Sea Urchin	100%	45%	55%	6.6%	13.2%	12.0%	16.9%	12.7%	
All Fisheries Excluding Sablefish & Thornyhead	—	—	—	3.9%	11.5%	10.3%	19.0%	10.8%	
	—	—	—	4.0%	10.6%	9.2%	18.3%	9.7%	

⁶ Santa Barbara Ca. halibut - trawl and sea cucumber - trawl are not included in this total. Please see Table 4 for estimated impacts on these two fisheries.

⁷ The sablefish and thornyhead - trap fisheries data collected in this study indicated where those fisheries occur only inside state waters. These fisheries actually occur primarily outside of state waters and, because of this, the stated potential impacts may be overestimated throughout the study region. For this reason, we include estimates of potential net economic impact for commercial fisheries with and without these fisheries.

4.3. Potential Gross Economic Impacts on Commercial Fisheries

A key assumption of our analysis is that each MPA proposal completely eliminates fishing opportunities in areas closed to specific fisheries and that fishermen are unable to adjust or mitigate in any way. In other words, we assume that all fishing in an area affected by an MPA is lost completely, when in reality it is more likely that fishermen will shift their efforts areas outside the MPA. The effect of this assumption is most likely an overestimation of the impacts, or a “worst case scenario.”

Gross economic impact (GEI) is calculated as a percentage reduction in annual gross economic revenue. Unlike net economic impact (NEI), GEI does not account for fishermen’s operating costs. Therefore, the percentage reduction in gross economic revenue is less than the percentage reduction in net economic revenue (i.e., profit). However, the dollar reduction in gross economic revenue is greater than the dollar reduction in net economic revenue.

Figures 3–4 compare the potential annual GEI with the potential annual NEI on SCSR commercial fisheries considered. The rank order of the proposals remains the same; all that changes is the magnitude of the potential impacts. On average, P2R is estimated to have the lowest potential GEI across the study region, while P3R is estimated to have the highest potential impact.

Figure 3: Estimated annual GEI (% reduction in revenue) and NEI (% reduction in profit) on commercial fisheries

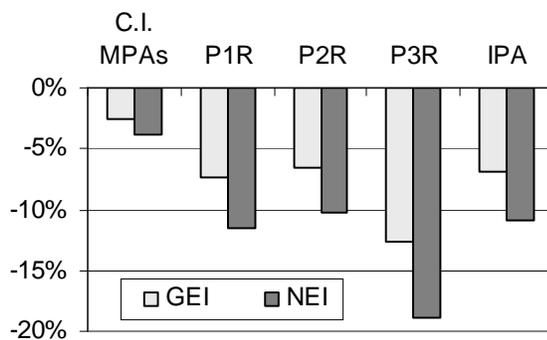
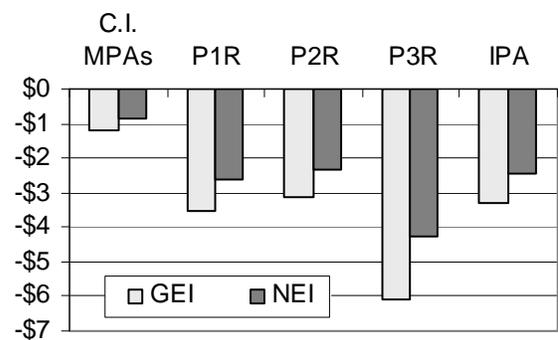


Figure 4: Estimated annual GEI (\$ reduction in revenue) and NEI (\$ reduction in profit) on commercial fisheries (in millions)



In terms of potential gross economic impact across the SCSR for the top six commercial species (based on percentage contribution to overall SCSR ex-vessel values), several patterns emerge from the analysis of the four proposals:

- The rock crab fishery sees the lowest range of potential impacts (in dollars). P3R has the highest potential impact on the rock crab fishery (\$121,188), while P2R has the lowest potential impact (\$98,481).
- The market squid fishery sees the highest range of potential impacts (in dollars). P3R has the highest potential impact on the market squid fishery (\$3,002,476), while P2R has the lowest potential impact (\$1,035,499).
- The coastal pelagics fishery sees the lowest range of potential impacts (as a percentage). P3R has the highest potential impact on the coastal pelagics fishery (8.1%), while P2R has the lowest potential impact (2.8%).
- The Ca. spiny lobster and spot prawn fisheries see the highest range of potential impacts (as a percentage). P3R has the highest potential impact on the Ca. spiny lobster fishery (14.0%), while P2R has the lowest potential impact on the spot prawn fishery (11.1%).
- These results are essentially the same as those in section 4.2; however, the magnitude of the impacts differs.

The potential impacts from each proposal are broken down by port in Figure 5 and Table 12. On average, Ventura is the port estimated to see the lowest potential gross economic impacts (as a percentage), while Oceanside is estimated to see the highest potential impacts (as a percentage).

Figure 5: Estimated annual gross economic impact on commercial fisheries by port (% reduction in revenue)

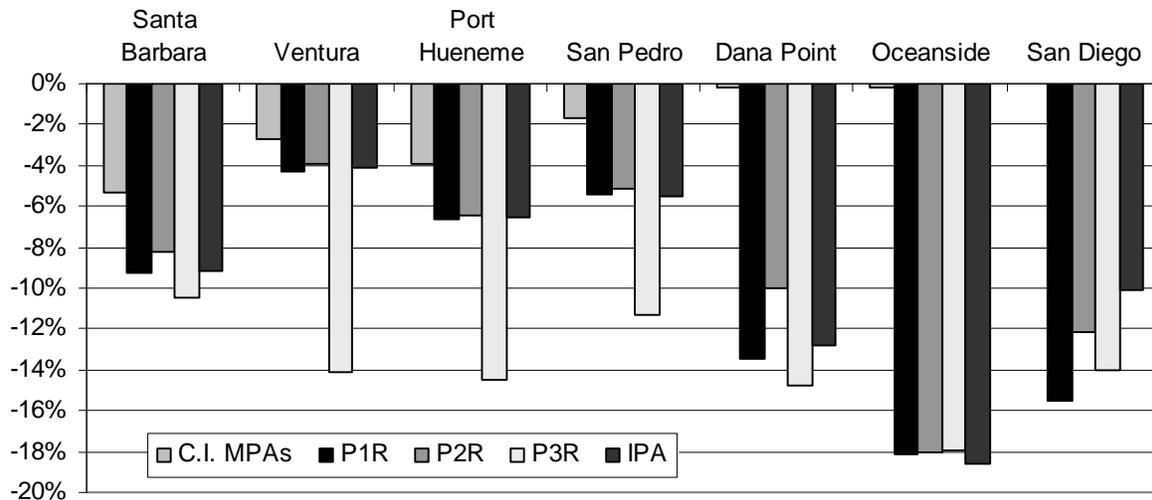


Table 12: Estimated annual gross economic impact on commercial fisheries by port (reduction in revenue)

	Baseline GER	C.I. MPAs P1R P2R P3R IPA				
		\$ Reduction in Revenue				
Santa Barbara	\$5,796,804	\$310,585	\$534,801	\$475,440	\$606,467	\$528,532
Ventura	\$5,061,321	\$137,310	\$218,454	\$197,537	\$711,931	\$208,030
Port Hueneme	\$11,061,000	\$431,308	\$738,477	\$709,212	\$1,604,309	\$724,319
San Pedro	\$20,141,349	\$338,475	\$1,100,514	\$1,031,833	\$2,274,701	\$1,114,597
Dana Point	\$1,860,091	\$3,227	\$250,601	\$185,179	\$275,425	\$237,406
Oceanside	\$987,326	\$1,402	\$179,002	\$178,496	\$176,747	\$183,422
San Diego	\$3,093,219	\$221	\$480,374	\$374,726	\$433,254	\$313,185
Study Region⁸	\$48,001,110	\$1,222,527	\$3,502,221	\$3,152,424	\$6,082,834	\$3,309,491
% Reduction in Revenue						
Santa Barbara	100%	5.4%	9.2%	8.2%	10.5%	9.1%
Ventura	100%	2.7%	4.3%	3.9%	14.1%	4.1%
Port Hueneme	100%	3.9%	6.7%	6.4%	14.5%	6.5%
San Pedro	100%	1.7%	5.5%	5.1%	11.3%	5.5%
Dana Point	100%	0.2%	13.5%	10.0%	14.8%	12.8%
Oceanside	100%	0.1%	18.1%	18.1%	17.9%	18.6%
San Diego	100%	0.0%	15.5%	12.1%	14.0%	10.1%
All Fisheries	—	2.5%	7.3%	6.6%	12.7%	6.9%

Tables 13–20 show potential gross economic impacts by fishery for each port and for the SCSR.

⁸ Santa Barbara Ca. halibut - trawl and sea cucumber - trawl are not included in this total. Please see Table 13 for estimated impacts on these two fisheries.

Table 13: Estimated annual gross economic impact for Santa Barbara

	Baseline GER	C.I. MPAs	\$ Reduction in Revenue			
			P1R	P2R	P3R	IPA
Ca. Halibut (Hook & Line)	\$70,658	\$3,922	\$10,380	\$9,129	\$15,375	\$10,691
Ca. Halibut (Trawl)	\$200,567	\$0	\$13,438	\$13,779	\$21,942	\$12,616
Coastal Pelagics	—	—	—	—	—	—
Ca. Spiny Lobster	\$1,558,845	\$52,689	\$157,132	\$118,472	\$185,191	\$151,831
N. Fishery (Hook & Line)	\$150,237	\$14,092	\$19,170	\$19,351	\$21,739	\$19,456
N. Fishery (Trap)	\$39,144	\$1,679	\$3,738	\$2,767	\$5,903	\$3,656
Rock Crab	\$845,105	\$33,382	\$89,243	\$80,708	\$89,666	\$86,370
Sablefish (blackcod)	—	—	—	—	—	—
Sea Cucumber (Dive)	\$19,874	\$1,958	\$2,478	\$2,335	\$3,933	\$2,512
Sea Cucumber (Trawl)	\$163,088	\$0	\$5,480	\$4,730	\$7,208	\$4,893
Spot Prawn	\$48,537	\$0	\$5,975	\$6,106	\$6,106	\$6,106
Market Squid	—	—	—	—	—	—
Swordfish	—	—	—	—	—	—
Thornyhead	—	—	—	—	—	—
Red Sea Urchin	\$3,064,404	\$202,864	\$246,685	\$236,572	\$278,554	\$247,910
All Fisheries	\$6,160,459	\$310,585	\$553,718	\$493,948	\$635,618	\$546,040
% Reduction in Revenue						
Ca. Halibut (Hook & Line)	100%	5.6%	14.7%	12.9%	21.8%	15.1%
Ca. Halibut (Trawl)	100%	0.0%	6.7%	6.9%	10.9%	6.3%
Coastal Pelagics	—	—	—	—	—	—
Ca. Spiny Lobster	100%	3.4%	10.1%	7.6%	11.9%	9.7%
N. Fishery (Hook & Line)	100%	9.4%	12.8%	12.9%	14.5%	13.0%
N. Fishery (Trap)	100%	4.3%	9.6%	7.1%	15.1%	9.3%
Rock Crab	100%	4.0%	10.6%	9.6%	10.6%	10.2%
Sablefish (blackcod)	—	—	—	—	—	—
Sea Cucumber (Dive)	100%	9.9%	12.5%	11.8%	19.8%	12.6%
Sea Cucumber (Trawl)	100%	0.0%	3.4%	2.9%	4.4%	3.0%
Spot Prawn	100%	0.0%	12.3%	12.6%	12.6%	12.6%
Market Squid	—	—	—	—	—	—
Swordfish	—	—	—	—	—	—
Thornyhead	—	—	—	—	—	—
Red Sea Urchin	100%	6.6%	8.1%	7.7%	9.1%	8.1%
All Fisheries	—	5.0%	9.0%	8.0%	10.3%	8.9%

Table 14: Estimated annual gross economic impact for Ventura

	Baseline GER	C.I. MPAs	\$ Reduction in Revenue			
			P1R	P2R	P3R	IPA
Ca. Halibut (Hook & Line)	\$18,178	\$1,271	\$1,720	\$1,609	\$1,792	\$1,743
Ca. Halibut (Trawl)	—	—	—	—	—	—
Coastal Pelagics	—	—	—	—	—	—
Ca. Spiny Lobster	\$371,161	\$0	\$4,936	\$5,456	\$80,134	\$4,936
N. Fishery (Hook & Line)	—	—	—	—	—	—
N. Fishery (Trap)	\$35,207	\$0	\$0	\$0	\$5,753	\$0
Rock Crab	\$126,384	\$4,436	\$4,436	\$4,436	\$6,117	\$4,436
Sablefish (blackcod)	—	—	—	—	—	—
Sea Cucumber (Dive)	\$49,076	\$147	\$7,131	\$5,393	\$9,172	\$7,131
Sea Cucumber (Trawl)	—	—	—	—	—	—
Spot Prawn	\$108,471	\$0	\$0	\$0	\$0	\$0
Market Squid	\$4,352,843	\$131,456	\$200,231	\$180,643	\$608,963	\$189,784
Swordfish	—	—	—	—	—	—
Thornyhead	—	—	—	—	—	—
Red Sea Urchin	—	—	—	—	—	—
All Fisheries	\$5,061,321	\$137,310	\$218,454	\$197,537	\$711,931	\$208,030
% Reduction in Revenue						
Ca. Halibut (Hook & Line)	100%	7.0%	9.5%	8.9%	9.9%	9.6%
Ca. Halibut (Trawl)	—	—	—	—	—	—
Coastal Pelagics	—	—	—	—	—	—
Ca. Spiny Lobster	100%	0.0%	1.3%	1.5%	21.6%	1.3%
N. Fishery (Hook & Line)	—	—	—	—	—	—
N. Fishery (Trap)	100%	0.0%	0.0%	0.0%	16.3%	0.0%
Rock Crab	100%	3.5%	3.5%	3.5%	4.8%	3.5%
Sablefish (blackcod)	—	—	—	—	—	—
Sea Cucumber (Dive)	100%	0.3%	14.5%	11.0%	18.7%	14.5%
Sea Cucumber (Trawl)	—	—	—	—	—	—
Spot Prawn	100%	0.0%	0.0%	0.0%	0.0%	0.0%
Market Squid	100%	3.0%	4.6%	4.2%	14.0%	4.4%
Swordfish	—	—	—	—	—	—
Thornyhead	—	—	—	—	—	—
Red Sea Urchin	—	—	—	—	—	—
All Fisheries	—	2.7%	4.3%	3.9%	14.1%	4.1%

Table 15: Estimated annual gross economic impact for Port Hueneme

	Baseline GER	C.I. MPAs	P1R	P2R	P3R	IPA
		\$ Reduction in Revenue				
Ca. Halibut (Hook & Line)	\$19,373	\$1,207	\$1,614	\$1,558	\$1,808	\$1,637
Ca. Halibut (Trawl)	—	—	—	—	—	—
Coastal Pelagics	\$767,935	\$5,913	\$23,038	\$18,968	\$45,001	\$26,647
Ca. Spiny Lobster	\$420,552	\$12,869	\$19,598	\$20,523	\$63,167	\$19,640
N. Fishery (Hook & Line)	\$49,637	\$84	\$10,126	\$9,918	\$12,245	\$10,305
N. Fishery (Trap)	\$61,447	\$0	\$799	\$1,020	\$1,020	\$799
Rock Crab	\$131,803	\$0	\$13	\$13	\$16,185	\$13
Sablefish (blackcod)	—	—	—	—	—	—
Sea Cucumber (Dive)	\$258,699	\$36,735	\$43,798	\$43,073	\$61,260	\$43,824
Sea Cucumber (Trawl)	—	—	—	—	—	—
Spot Prawn	\$427,903	\$111,726	\$111,726	\$111,726	\$111,726	\$111,726
Market Squid	\$7,387,374	\$210,540	\$407,783	\$388,576	\$1,102,935	\$390,053
Swordfish	—	—	—	—	—	—
Thornyhead	—	—	—	—	—	—
Red Sea Urchin	\$1,536,277	\$52,233	\$119,983	\$113,838	\$188,962	\$119,676
All Fisheries	\$11,061,000	\$431,308	\$738,477	\$709,212	\$1,604,309	\$724,319
			% Reduction in Revenue			
Ca. Halibut (Hook & Line)	100%	6.2%	8.3%	8.0%	9.3%	8.5%
Ca. Halibut (Trawl)	—	—	—	—	—	—
Coastal Pelagics	100%	0.8%	3.0%	2.5%	5.9%	3.5%
Ca. Spiny Lobster	100%	3.1%	4.7%	4.9%	15.0%	4.7%
N. Fishery (Hook & Line)	100%	0.2%	20.4%	20.0%	24.7%	20.8%
N. Fishery (Trap)	100%	0.0%	1.3%	1.7%	1.7%	1.3%
Rock Crab	100%	0.0%	0.0%	0.0%	12.3%	0.0%
Sablefish (blackcod)	—	—	—	—	—	—
Sea Cucumber (Dive)	100%	14.2%	16.9%	16.7%	23.7%	16.9%
Sea Cucumber (Trawl)	—	—	—	—	—	—
Spot Prawn	100%	26.1%	26.1%	26.1%	26.1%	26.1%
Market Squid	100%	2.9%	5.5%	5.3%	14.9%	5.3%
Swordfish	—	—	—	—	—	—
Thornyhead	—	—	—	—	—	—
Red Sea Urchin	100%	3.4%	7.8%	7.4%	12.3%	7.8%
All Fisheries	—	3.9%	6.7%	6.4%	14.5%	6.5%

Table 16: Estimated annual gross economic impact for San Pedro

	Baseline GER	C.I. MPAs	\$ Reduction in Revenue			
			P1R	P2R	P3R	IPA
Ca. Halibut (Hook & Line)	—	—	—	—	—	—
Ca. Halibut (Trawl)	—	—	—	—	—	—
Coastal Pelagics	\$5,121,261	\$27,143	\$174,635	\$148,004	\$434,283	\$207,923
Ca. Spiny Lobster	\$980,389	\$980	\$62,451	\$57,059	\$89,706	\$58,333
N. Fishery (Hook & Line)	\$14,034	\$937	\$1,757	\$1,646	\$2,598	\$1,788
N. Fishery (Trap)	\$76,447	\$0	\$4,694	\$3,547	\$12,576	\$5,474
Rock Crab	\$136,953	\$0	\$68	\$41	\$110	\$55
Sablefish (blackcod)	\$68,707	\$0	\$16,661	\$22,941	\$15,418	\$19,265
Sea Cucumber (Dive)	\$164,935	\$2,985	\$16,329	\$15,685	\$22,101	\$16,691
Sea Cucumber (Trawl)	—	—	—	—	—	—
Spot Prawn	\$389,257	\$0	\$6,695	\$4,515	\$20,942	\$5,216
Market Squid	\$10,719,087	\$231,532	\$512,372	\$466,280	\$1,290,578	\$473,784
Swordfish	—	—	—	—	—	—
Thornyhead	\$280,325	\$0	\$101,842	\$111,513	\$90,965	\$114,737
Red Sea Urchin	\$2,189,956	\$74,896	\$203,009	\$200,600	\$295,425	\$211,331
All Fisheries	\$20,141,349	\$338,475	\$1,100,514	\$1,031,833	\$2,274,701	\$1,114,597
% Reduction in Revenue						
Ca. Halibut (Hook & Line)	—	—	—	—	—	—
Ca. Halibut (Trawl)	—	—	—	—	—	—
Coastal Pelagics	100%	0.5%	3.4%	2.9%	8.5%	4.1%
Ca. Spiny Lobster	100%	0.1%	6.4%	5.8%	9.2%	6.0%
N. Fishery (Hook & Line)	100%	6.7%	12.5%	11.7%	18.5%	12.7%
N. Fishery (Trap)	100%	0.0%	6.1%	4.6%	16.5%	7.2%
Rock Crab	100%	0.0%	0.1%	0.0%	0.1%	0.0%
Sablefish (blackcod)	100%	0.0%	24.3%	33.4%	22.4%	28.0%
Sea Cucumber (Dive)	100%	1.8%	9.9%	9.5%	13.4%	10.1%
Sea Cucumber (Trawl)	—	—	—	—	—	—
Spot Prawn	100%	0.0%	1.7%	1.2%	5.4%	1.3%
Market Squid	100%	2.2%	4.8%	4.4%	12.0%	4.4%
Swordfish	—	—	—	—	—	—
Thornyhead	100%	0.0%	36.3%	39.8%	32.5%	40.9%
Red Sea Urchin	100%	3.4%	9.3%	9.2%	13.5%	9.7%
All Fisheries	—	1.7%	5.5%	5.1%	11.3%	5.5%

Table 17: Estimated annual gross economic impact for Dana Point

	Baseline GER	C.I. MPAs	P1R	P2R	P3R	IPA
			\$ Reduction in Revenue			
Ca. Halibut (Hook & Line)	—	—	—	—	—	—
Ca. Halibut (Trawl)	—	—	—	—	—	—
Coastal Pelagics	—	—	—	—	—	—
Ca. Spiny Lobster	\$914,095	\$0	\$81,903	\$46,893	\$123,220	\$77,881
N. Fishery (Hook & Line)	—	—	—	—	—	—
N. Fishery (Trap)	\$31,345	\$0	\$9,194	\$699	\$9,253	\$8,764
Rock Crab	\$38,375	\$0	\$3,841	\$595	\$3,696	\$3,730
Sablefish (blackcod)	\$127,274	\$0	\$30,864	\$42,497	\$28,560	\$35,688
Sea Cucumber (Dive)	—	—	—	—	—	—
Sea Cucumber (Trawl)	—	—	—	—	—	—
Spot Prawn	\$300,792	\$0	\$29,327	\$12,032	\$19,521	\$20,334
Market Squid	—	—	—	—	—	—
Swordfish	\$196,774	\$3,227	\$27,568	\$14,561	\$29,477	\$16,076
Thornyhead	\$160,858	\$0	\$64,407	\$67,142	\$57,169	\$72,225
Red Sea Urchin	\$90,579	\$0	\$3,496	\$761	\$4,529	\$2,708
All Fisheries	\$1,860,091	\$3,227	\$250,601	\$185,179	\$275,425	\$237,406
% Reduction in Revenue						
Ca. Halibut (Hook & Line)	—	—	—	—	—	—
Ca. Halibut (Trawl)	—	—	—	—	—	—
Coastal Pelagics	—	—	—	—	—	—
Ca. Spiny Lobster	100%	0.0%	9.0%	5.1%	13.5%	8.5%
N. Fishery (Hook & Line)	—	—	—	—	—	—
N. Fishery (Trap)	100%	0.0%	29.3%	2.2%	29.5%	28.0%
Rock Crab	100%	0.0%	10.0%	1.6%	9.6%	9.7%
Sablefish (blackcod)	100%	0.0%	24.3%	33.4%	22.4%	28.0%
Sea Cucumber (Dive)	—	—	—	—	—	—
Sea Cucumber (Trawl)	—	—	—	—	—	—
Spot Prawn	100%	0.0%	9.8%	4.0%	6.5%	6.8%
Market Squid	—	—	—	—	—	—
Swordfish	100%	1.6%	14.0%	7.4%	15.0%	8.2%
Thornyhead	100%	0.0%	40.0%	41.7%	35.5%	44.9%
Red Sea Urchin	100%	0.0%	3.9%	0.8%	5.0%	3.0%
All Fisheries	—	0.2%	13.5%	10.0%	14.8%	12.8%

Table 18: Estimated annual gross economic impact for Oceanside

	Baseline GER	C.I. MPAs	\$ Reduction in Revenue			
			P1R	P2R	P3R	IPA
Ca. Halibut (Hook & Line)	—	—	—	—	—	—
Ca. Halibut (Trawl)	—	—	—	—	—	—
Coastal Pelagics	—	—	—	—	—	—
Ca. Spiny Lobster	\$400,696	\$1,402	\$35,862	\$27,167	\$55,296	\$37,946
N. Fishery (Hook & Line)	—	—	—	—	—	—
N. Fishery (Trap)	\$21,205	\$0	\$263	\$191	\$503	\$471
Rock Crab	\$35,177	\$0	\$14	\$0	\$35	\$18
Sablefish (blackcod)	\$90,829	\$0	\$22,026	\$30,328	\$20,382	\$25,468
Sea Cucumber (Dive)	—	—	—	—	—	—
Sea Cucumber (Trawl)	—	—	—	—	—	—
Spot Prawn	\$211,491	\$0	\$27,282	\$27,282	\$27,282	\$27,282
Market Squid	—	—	—	—	—	—
Swordfish	—	—	—	—	—	—
Thornyhead	\$207,737	\$0	\$81,246	\$85,712	\$72,209	\$91,197
Red Sea Urchin	\$20,191	\$0	\$12,308	\$7,816	\$1,040	\$1,040
All Fisheries	\$987,326	\$1,402	\$179,002	\$178,496	\$176,747	\$183,422
% Reduction in Revenue						
Ca. Halibut (Hook & Line)	—	—	—	—	—	—
Ca. Halibut (Trawl)	—	—	—	—	—	—
Coastal Pelagics	—	—	—	—	—	—
Ca. Spiny Lobster	100%	0.4%	9.0%	6.8%	13.8%	9.5%
N. Fishery (Hook & Line)	—	—	—	—	—	—
N. Fishery (Trap)	100%	0.0%	1.2%	0.9%	2.4%	2.2%
Rock Crab	100%	0.0%	0.0%	0.0%	0.1%	0.1%
Sablefish (blackcod)	100%	0.0%	24.3%	33.4%	22.4%	28.0%
Sea Cucumber (Dive)	—	—	—	—	—	—
Sea Cucumber (Trawl)	—	—	—	—	—	—
Spot Prawn	100%	0.0%	12.9%	12.9%	12.9%	12.9%
Market Squid	—	—	—	—	—	—
Swordfish	100%	—	—	—	—	—
Thornyhead	100%	0.0%	39.1%	41.3%	34.8%	43.9%
Red Sea Urchin	100%	0.0%	61.0%	38.7%	5.2%	5.2%
All Fisheries	—	0.1%	18.1%	18.1%	17.9%	18.6%

Table 19: Estimated annual gross economic impact for San Diego

	Baseline GER	C.I. MPAs	\$ Reduction in Revenue			
			P1R	P2R	P3R	IPA
Ca. Halibut (Hook & Line)	—	—	—	—	—	—
Ca. Halibut (Trawl)	—	—	—	—	—	—
Coastal Pelagics	—	—	—	—	—	—
Ca. Spiny Lobster	\$1,715,118	\$0	\$338,050	\$269,274	\$295,343	\$206,843
N. Fishery (Hook & Line)	\$3,291	\$0	\$421	\$460	\$343	\$263
N. Fishery (Trap)	\$107,924	\$0	\$19,470	\$13,307	\$16,739	\$13,005
Rock Crab	\$155,496	\$0	\$14,026	\$12,688	\$5,380	\$4,774
Sablefish (blackcod)	—	—	—	—	—	—
Sea Cucumber (Dive)	\$7,712	\$0	\$1,915	\$1,740	\$638	\$224
Sea Cucumber (Trawl)	—	—	—	—	—	—
Spot Prawn	\$254,984	\$0	\$31,338	\$31,797	\$33,071	\$32,434
Market Squid	—	—	—	—	—	—
Swordfish	\$169,952	\$221	\$1,445	\$1,207	\$1,513	\$1,275
Thornyhead	—	—	—	—	—	—
Red Sea Urchin	\$678,742	\$0	\$73,711	\$44,254	\$80,227	\$54,367
All Fisheries	\$3,093,219	\$221	\$480,374	\$374,726	\$433,254	\$313,185
% Reduction in Revenue						
Ca. Halibut (Hook & Line)	—	—	—	—	—	—
Ca. Halibut (Trawl)	—	—	—	—	—	—
Coastal Pelagics	—	—	—	—	—	—
Ca. Spiny Lobster	100%	0.0%	19.7%	15.7%	17.2%	12.1%
N. Fishery (Hook & Line)	100%	0.0%	12.8%	14.0%	10.4%	8.0%
N. Fishery (Trap)	100%	0.0%	18.0%	12.3%	15.5%	12.1%
Rock Crab	100%	0.0%	9.0%	8.2%	3.5%	3.1%
Sablefish (blackcod)	—	—	—	—	—	—
Sea Cucumber (Dive)	100%	0.0%	24.8%	22.6%	8.3%	2.9%
Sea Cucumber (Trawl)	100%	—	—	—	—	—
Spot Prawn	100%	0.0%	12.3%	12.5%	13.0%	12.7%
Market Squid	—	—	—	—	—	—
Swordfish	100%	0.1%	0.9%	0.7%	0.9%	0.8%
Thornyhead	—	—	—	—	—	—
Red Sea Urchin	100%	0.0%	10.9%	6.5%	11.8%	8.0%
All Fisheries	—	0.0%	15.5%	12.1%	14.0%	10.1%

Table 20: Estimated annual gross economic impact for the SCSR

	Baseline GER	C.I. MPAs	\$ Reduction in Revenue			
			P1R	P2R	P3R	IPA
Ca. Halibut (Hook & Line)	\$108,209	\$6,399	\$13,713	\$12,295	\$18,975	\$14,071
Ca. Halibut (Trawl)	—	—	—	—	—	—
Coastal Pelagics	\$5,889,196	\$33,056	\$197,673	\$166,972	\$479,284	\$234,571
Ca. Spiny Lobster	\$6,360,856	\$67,941	\$699,932	\$544,844	\$892,056	\$557,411
N. Fishery (Hook & Line)	\$217,200	\$15,114	\$31,474	\$31,375	\$36,925	\$31,811
N. Fishery (Trap)	\$372,719	\$1,679	\$38,157	\$21,532	\$51,746	\$32,168
Rock Crab	\$1,469,292	\$37,818	\$111,642	\$98,481	\$121,188	\$99,395
Sablefish (blackcod)	\$286,809	\$0	\$69,551	\$95,766	\$64,360	\$80,421
Sea Cucumber (Dive)	\$500,296	\$41,825	\$71,650	\$68,227	\$97,104	\$70,382
Sea Cucumber (Trawl)	—	—	—	—	—	—
Spot Prawn	\$1,741,435	\$111,726	\$212,343	\$193,457	\$218,649	\$203,097
Market Squid	\$22,459,304	\$573,528	\$1,120,386	\$1,035,499	\$3,002,476	\$1,053,621
Swordfish	\$366,725	\$3,448	\$29,013	\$15,768	\$30,989	\$17,351
Thornyhead	\$648,920	\$0	\$247,495	\$264,368	\$220,344	\$278,159
Red Sea Urchin	\$7,580,148	\$329,993	\$659,193	\$603,841	\$848,737	\$637,032
All Fisheries⁹	\$48,001,110	\$1,222,527	\$3,502,221	\$3,152,424	\$6,082,834	\$3,309,491
% Reduction in Revenue						
Ca. Halibut (Hook & Line)	100%	5.9%	12.7%	11.4%	17.5%	13.0%
Ca. Halibut (Trawl)	—	—	—	—	—	—
Coastal Pelagics	100%	0.6%	3.4%	2.8%	8.1%	4.0%
Ca. Spiny Lobster	100%	1.1%	11.0%	8.6%	14.0%	8.8%
N. Fishery (Hook & Line)	100%	7.0%	14.5%	14.4%	17.0%	14.6%
N. Fishery (Trap)	100%	0.5%	10.2%	5.8%	13.9%	8.6%
Rock Crab	100%	2.6%	7.6%	6.7%	8.2%	6.8%
Sablefish (blackcod)	100%	0.0%	24.3%	33.4%	22.4%	28.0%
Sea Cucumber (Dive)	100%	8.4%	14.3%	13.6%	19.4%	14.1%
Sea Cucumber (Trawl)	—	—	—	—	—	—
Spot Prawn	100%	6.4%	12.2%	11.1%	12.6%	11.7%
Market Squid	100%	2.6%	5.0%	4.6%	13.4%	4.7%
Swordfish	100%	0.9%	7.9%	4.3%	8.5%	4.7%
Thornyhead	100%	0.0%	38.1%	40.7%	34.0%	42.9%
Red Sea Urchin	100%	4.4%	8.7%	8.0%	11.2%	8.4%
All Fisheries	—	2.5%	7.3%	6.6%	12.7%	6.9%

⁹ Santa Barbara Ca. halibut - trawl and sea cucumber - trawl are not included in this total. Please see Table 13 for estimated impacts on these two fisheries.

4.4. Disproportionate Impacts on Commercial Fisheries

We also use the results of our analysis to evaluate whether there are port-fishery combinations that may be disproportionately affected by the four proposals considered.

To assess these impacts, we use a box plot analysis (Figure A.1 in the Appendix) to identify outliers within each fishery (calculated using estimated impacts on the stated value of total fishing grounds minus the Channel Islands impacts). In a box plot analysis, outliers are defined as extreme values that deviate significantly from the rest of the sample. Box plot analysis results (Table 21) can also inform convergence among MPA proposals within a fishery and/or relative potential impacts between fisheries.

It should be noted that while only one port-fishery combination is identified as a statistically significant outlier (i.e., Oceanside red sea urchin under P1R and P2R), practically speaking, the other port-fishery combinations highlighted in Table 21 may be disproportionately impacted given their relative proximity to the statistically significant port-fishery combinations on the box plot.

Table 21: Disproportionately impacted commercial fisheries

Port	Fishery	Proposal(s)	Estimated Impact on Stated Value of Total Fishing Grounds
Oceanside	Red Sea Urchin	P1R	60.9%
		P2R	38.7%
Dana Point	N. Fishery (Trap)	P1R	29.3%
		P3R	29.5%
		IPA	28.0%
Santa Barbara	Ca. Halibut (Hook & Line)	P3R	16.2%

4.5. Disproportionate Impacts on Individuals

We also evaluate if there are individual fishermen we interviewed who may be disproportionately affected by the four proposals considered. To assess these impacts, we first overlay each fisherman's fishing grounds weighted by ex-vessel revenue (for each fishery in which the individual participates) with those areas being considered for closure under each proposal. We then summarize the potential impact on each fisherman's ex-vessel revenue across all fisheries in which the individual participates. It should be noted that the "worst case scenario" still applies in that individual fishermen are assumed not to adjust to different fishing grounds and the estimates presented here **do not** include impacts from Channel Island MPAs.

We then use a box plot analysis (Figure A.3 in the Appendix) to identify individual outliers. In a box plot analysis, outliers are defined as extreme values that deviate significantly from the rest of the sample. This analysis not only identifies individual outliers, but is able also to describe the relative impacts of proposals on individual fishermen (Table 24).

Table 22 shows the number of individuals identified in the box plot analysis as being disproportionately impacted by four, three, two, and one proposal(s). It should be noted that the combination of proposal(s) under which each individual is disproportionately impacted may vary.

Table 22: Number of individuals disproportionately impacted

4 Proposals	3 Proposals	2 Proposals	1 Proposal
3	2	12	8

Table 23 shows the highest and lowest disproportionate impacts (i.e., outliers) by proposal. The range of outliers is widest for P3R (32.4%) and narrowest for P2R (18.1%).

Table 23: Range of outliers by proposal

Proposal	Highest disproportionate impact	Lowest disproportionate impact
P1R	55.0%	34.6%
P2R	47.3%	29.2%
P3R	77.0%	44.6%
IPA	57.2%	32.2%

Table 24 shows the distribution of individual impacts by proposal. We use quartiles to divide the individual impacts under each proposal into four equal parts such that each quartile contains 25% of the data. For example, under P1R, 25% of individual fishermen as estimated to be impacted less than or equal to 1.0% across all fisheries in which they participate, 50% are estimated to be impacted less than or equal to 5.6%, and 75% are estimated to be impacted less than or equal to 14.3%.

Based on these results, P2R generally performs the best, followed by the IPA and P1R, while P3R generally performs the worst. Under P3R, 50% of fishermen are estimated to lose up to 12.1% of their ex-vessel revenue, another 25% of fishermen are estimated to lose between 12.1%–18.6% of their ex-vessel revenue, and the remaining 25% are estimated to lose more than 18.6% of their ex-vessel revenue.

Table 24: Distribution of individual impacts by proposal

	P1R	P2R	P3R	IPA
1st quartile	1.0%	0.3%	4.3%	1.0%
Median (2nd quartile)	5.6%	3.3%	12.1%	4.7%
3rd quartile	14.3%	11.3%	18.6%	12.9%

5. Results for Commercial Passenger Fishing Vessels (CPFV)

We summarize here our analyses of the potential impacts on the ten CPFV fisheries (i.e., Pacific barracuda, Ca. halibut, kelp bass (calico bass), lingcod, rockfish, Ca. scorpionfish (sculpin), Ca. sheephead, sand bass, ocean whitefish, and white seabass). The sand bass fishery includes both barred sand bass (sand bass) and spotted sand bass (spotted bay bass). The results for CPFV fisheries are broken out by port (i.e., Santa Barbara, Port Hueneme/Channel Islands Harbor, Santa Monica, San Pedro/Long Beach, Newport Beach, Dana Point, Oceanside, and San Diego).

5.1. Potential Impacts on CPFV Fishing Grounds (Area and Stated Value)

MPA proposals vary considerably in their effects, both between and across fisheries. As mentioned previously, this report only presents results. Evaluation methods are presented in a separate document.

Each proposal affects the CPFV fishing grounds differently. For information on the potential impacts on CPFV fishing grounds for the 80 port-fishery combinations considered (both in terms of total area and total value), please see Tables A.3–4 in the Appendix.

5.2. Potential Net Economic Impacts on CPFV Fisheries

A key assumption of this analysis is that each of the MPA proposals completely eliminates fishing opportunities in areas closed to specific fisheries and that fishermen are unable to adjust or mitigate in any way. In other words, the analysis assumes that all fishing in an area affected by an MPA is lost completely, when in reality it is more likely that fishermen will shift their efforts areas outside the MPA. The effect of such an assumption is most likely an overestimation of the impacts, or a “worst case scenario.”

Similar to our analysis of the commercial fisheries, we calculate the potential net economic impact for the CPFV fisheries as the average percentage reduction in net economic revenue (i.e., profit) for all ten species considered.

Figure 6 and Table 25 summarize the MPA proposals with the estimated highest and lowest potential annual net economic impact by port (for associated values, see Table 26). On average, P2R is estimated to have the lowest potential net economic impact across the study region, while P3R is estimated to have the highest potential impact.

Figure 6: Estimated annual net economic impact on CPFV fisheries (% reduction in profit)

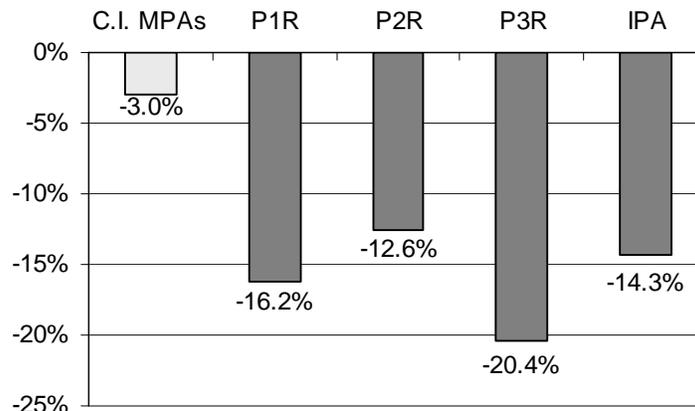


Table 25: Highest/lowest estimated annual net economic impact on CPFV fisheries by port (% reduction in profit)

Port	MPA Proposal(s) with highest potential impact		MPA Proposal(s) with lowest potential impact	
	MPA Proposal(s)	% Reduction in Profit	MPA Proposal(s)	% Reduction in Profit
Santa Barbara	P3R	19.8%	P2R	13.7%
Port Hueneme / Channel Islands Harbor	P3R	28.3%	P1R	24.1%
Santa Monica	P3R	16.5%	P2R	2.7%
San Pedro / Long Beach	P3R	9.5%	P2R	4.7%
Newport Beach	P3R	19.0%	P2R	5.9%
Dana Point	P3R	32.4%	P2R	9.4%
Oceanside	P1R	15.7%	IPA	12.0%
San Diego	P1R	39.6%	P2R	27.2%
Study Region	P3R	20.4%	P2R	12.6%

The potential impacts from each proposal are broken down by port in Figure 7 and Table 26. On average, San Pedro/Long Beach is the port estimated to see the lowest potential net economic impacts (as a percentage), while San Diego is estimated to see the highest potential impacts.

Figure 7: Estimated annual net economic impact on CPFV fisheries by port (% reduction in profit)

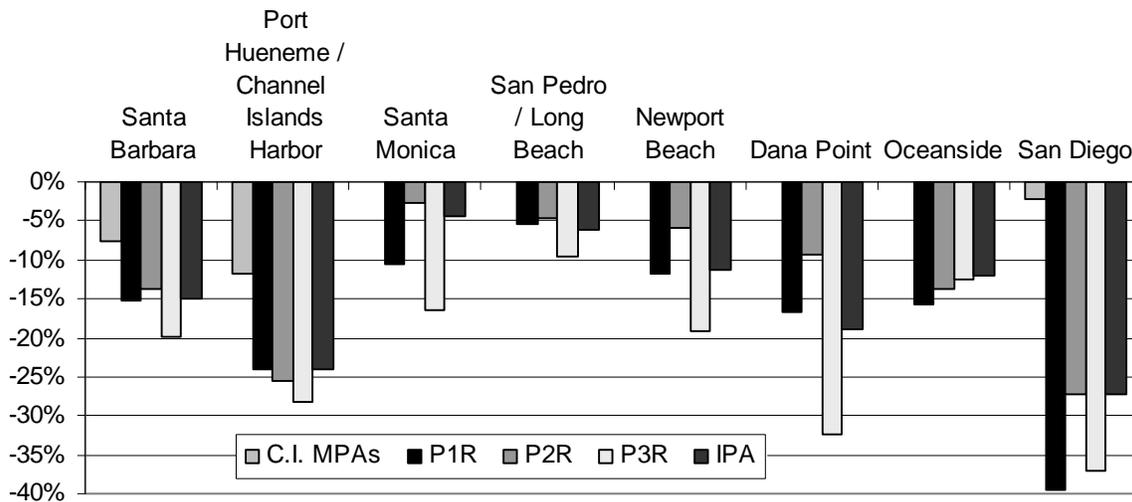


Table 26: Estimated annual net economic impact on CPFV fisheries by port (% reduction in profit)

Port	Baseline GER	Estimated Costs	Baseline NER (Profit)	% Reduction in Profit				
				C.I. MPAs	P1R	P2R	P3R	IPA
Santa Barbara	100%	67%	33%	7.5%	15.3%	13.7%	19.8%	14.9%
Port Hueneme / Channel Islands Harbor	100%	61%	39%	11.8%	24.1%	25.5%	28.3%	24.2%
Santa Monica	100%	74%	26%	0.0%	10.4%	2.7%	16.5%	4.4%
San Pedro / Long Beach	100%	65%	35%	0.0%	5.4%	4.7%	9.5%	6.1%
Newport Beach	100%	62%	38%	0.0%	11.7%	5.9%	19.0%	11.3%
Dana Point	100%	79%	21%	0.0%	16.8%	9.4%	32.4%	18.8%
Oceanside	100%	62%	38%	0.0%	15.7%	13.8%	12.5%	12.0%
San Diego	100%	82%	18%	2.1%	39.6%	27.2%	37.0%	27.4%
Study Region	—	—	—	3.0%	16.2%	12.6%	20.4%	14.3%

5.3. Disproportionate Impacts on CPFV Fisheries

For a discussion of the methods we use to identify whether there are port-fishery combinations that could be disproportionately affected by the MPA proposals considered, please see section 4.4.

Figure A.2 in the Appendix presents box plot analysis for the CPFV fisheries (calculated using estimated impacts on the stated value of total fishing grounds minus the Channel Islands impacts). Table 27 presents box plot analysis results.

Table 27: Disproportionately impacted CPFV fisheries

Port	Fishery	Proposal(s)	Estimated Impact on Stated Value of Total Fishing Grounds
		P1R	16.1%
		P3R	22.3%
Newport Beach	Lingcod	IPA	15.9%
Newport Beach	White Seabass	P3R	19.3%

6. Results for Recreational Fisheries

We summarize here our analyses of the potential impacts on the 17 recreational fisheries (i.e., Pacific barracuda, Pacific bonito, Ca. halibut, kelp bass (calico bass), white croaker, Ca. spiny lobster, jack mackerel, rockfish, rock crab, scallops, Ca. sheephead, sand bass, market squid, surfperch, thresher shark, white seabass, and Ca. yellowtail). The sand bass fishery includes both barred sand bass (sand bass) and spotted sand bass (spotted bay bass). The results for recreational fisheries are broken out by user group (i.e., dive, kayak, and private vessel) and by county (i.e., Santa Barbara, Ventura, Los Angeles, Orange, and San Diego).

6.1. Potential Impacts on Recreational Fishing Grounds (Area and Stated Value)

Each proposal impacts the stated value of the recreational fishing grounds differently. Table 28 presents the number of county-user group-recreational fishery combinations that are most and least impacted under each proposal (for associated values, see Tables A.5–14 in the Appendix.). For example, out of the eight fisheries considered for Santa Barbara divers, P1R has the highest potential impact on two fisheries and the lowest potential impact on one fishery.

Overall, across all county-user group-recreational fishery combinations, P2R generally has the lowest potential impacts, while P3R generally has the highest potential impacts.

Table 28: Number of county-user group-recreational fishery combinations that are most and least impacted

County	Sector	# of fisheries considered	Greatest potential impact				Least potential impact			
			P1R	P2R	P3R	IPA	P1R	P2R	P3R	IPA
Santa Barbara	Dive	8	2	1	7	1	1	3	2	7
	Kayak	5	0	0	5	1	2	4	0	1
	Private Vessel	9	1	0	7	0	0	8	1	1
Ventura	Dive	10	0	0	9	0	0	9	0	0
	Kayak	13	0	0	13	0	2	11	0	2
	Private Vessel	11	2	1	9	2	3	7	1	2
Los Angeles	Dive	12	0	0	12	0	3	9	0	2
	Kayak	14	0	0	13	0	0	10	0	7
	Private Vessel	14	0	0	13	1	2	11	1	2
Orange	Dive	11	0	0	11	0	0	11	0	0
	Kayak	13	1	0	10	1	0	12	0	0
	Private Vessel	14	0	0	12	1	1	11	0	2
San Diego	Dive	12	2	0	10	0	0	12	0	0
	Kayak	14	0	0	14	0	0	14	0	0
	Private Vessel	14	4	1	9	0	0	9	0	5
SCSR	Dive	53	4	1	49	1	4	44	2	9
	Kayak	59	1	0	55	2	4	51	0	10
	Private Vessel	62	7	2	50	4	6	46	3	12
All Sectors		174	12	3	154	7	14	141	5	31

Appendix A: Summary Tables of Potential Impacts

Table A.1: Percentage area of total commercial fishing grounds affected by port

Port	Fishery	C.I. MPAs	P1R	P2R	P3R	IPA
Santa Barbara	Ca. Halibut (Hook & Line)	3.7%	9.0%	8.7%	19.5%	9.1%
	Ca. Halibut (Trawl)	0.0%	3.3%	3.5%	4.9%	3.1%
	Coastal Pelagics	—	—	—	—	—
	Live Bait	—	—	—	—	—
	Ca. Spiny Lobster	5.8%	9.9%	9.6%	17.9%	9.8%
	N. Fishery (Hook & Line)	9.8%	14.2%	13.6%	16.9%	14.4%
	N. Fishery (Trap)	1.6%	7.8%	6.7%	16.7%	7.7%
	Rock Crab	3.9%	9.7%	9.4%	11.9%	9.5%
	Sablefish (blackcod)	—	—	—	—	—
	Sea Cucumber (Dive)	10.4%	15.7%	14.1%	19.7%	15.9%
	Sea Cucumber (Trawl)	0.0%	2.2%	2.3%	3.8%	2.0%
	Spot Prawn	0.0%	13.2%	12.9%	12.9%	12.9%
	Market Squid	—	—	—	—	—
	Swordfish	—	—	—	—	—
	Thornyhead	—	—	—	—	—
Red Sea Urchin	7.2%	13.2%	11.8%	20.2%	13.3%	
Ventura	Ca. Halibut (Hook & Line)	9.2%	13.8%	12.7%	14.5%	14.0%
	Ca. Halibut (Trawl)	—	—	—	—	—
	Coastal Pelagics	—	—	—	—	—
	Live Bait	—	—	—	—	—
	Ca. Spiny Lobster	0.1%	1.8%	1.7%	14.6%	1.8%
	N. Fishery (Hook & Line)	—	—	—	—	—
	N. Fishery (Trap)	10.5%	12.6%	12.3%	16.7%	12.8%
	Rock Crab	1.8%	1.8%	1.8%	3.1%	1.8%
	Sablefish (blackcod)	—	—	—	—	—
	Sea Cucumber (Dive)	11.7%	14.6%	13.7%	19.2%	14.6%
	Sea Cucumber (Trawl)	—	—	—	—	—
	Spot Prawn	0.0%	0.0%	0.0%	0.0%	0.0%
	Market Squid	3.1%	8.1%	7.2%	11.6%	7.7%
	Swordfish	—	—	—	—	—
	Thornyhead	—	—	—	—	—
Red Sea Urchin	—	—	—	—	—	

Table A.1 (continued): Percentage area of total commercial fishing grounds affected by port

Port	Fishery	C.I. MPAs	P1R	P2R	P3R	IPA
Port Huenueme	Ca. Halibut (Hook & Line)	7.1%	12.2%	12.0%	15.5%	12.4%
	Ca. Halibut (Trawl)	—	—	—	—	—
	Coastal Pelagics	3.8%	7.3%	6.8%	9.2%	7.2%
	Live Bait	—	—	—	—	—
	Ca. Spiny Lobster	1.0%	3.5%	3.4%	11.7%	3.5%
	N. Fishery (Hook & Line)	7.0%	15.5%	15.4%	19.2%	15.7%
	N. Fishery (Trap)	0.0%	6.3%	8.1%	8.1%	6.3%
	Rock Crab	0.0%	1.3%	1.5%	8.3%	1.3%
	Sablefish (blackcod)	—	—	—	—	—
	Sea Cucumber (Dive)	9.5%	15.5%	13.9%	19.4%	15.8%
	Sea Cucumber (Trawl)	—	—	—	—	—
	Spot Prawn	25.6%	25.6%	25.6%	25.6%	25.6%
	Market Squid	4.0%	9.6%	8.9%	13.1%	9.4%
	Swordfish	—	—	—	—	—
	Thornyhead	—	—	—	—	—
Red Sea Urchin	5.5%	7.5%	7.1%	11.3%	7.5%	
San Pedro / Terminal Island	Ca. Halibut (Hook & Line)	—	—	—	—	—
	Ca. Halibut (Trawl)	—	—	—	—	—
	Coastal Pelagics	3.0%	7.8%	7.1%	9.6%	7.4%
	Live Bait	0.0%	2.5%	0.9%	7.4%	2.5%
	Ca. Spiny Lobster	0.4%	6.1%	5.4%	8.0%	5.9%
	N. Fishery (Hook & Line)	8.6%	14.4%	13.6%	17.9%	14.6%
	N. Fishery (Trap)	0.0%	5.4%	5.5%	14.5%	5.9%
	Rock Crab	0.0%	2.0%	0.7%	2.1%	1.5%
	Sablefish (blackcod)	0.0%	38.9%	46.0%	29.7%	47.0%
	Sea Cucumber (Dive)	7.1%	14.6%	13.2%	19.6%	15.1%
	Sea Cucumber (Trawl)	—	—	—	—	—
	Spot Prawn	0.0%	5.8%	3.9%	7.3%	4.2%
	Market Squid	3.6%	8.7%	7.9%	11.9%	8.3%
	Swordfish	—	—	—	—	—
	Thornyhead	0.0%	38.9%	46.0%	29.7%	47.0%
Red Sea Urchin	5.9%	8.8%	8.3%	11.0%	8.8%	
Dana Point	Ca. Halibut (Hook & Line)	—	—	—	—	—
	Ca. Halibut (Trawl)	—	—	—	—	—
	Coastal Pelagics	—	—	—	—	—
	Live Bait	0.0%	1.7%	0.0%	5.4%	5.1%
	Ca. Spiny Lobster	0.0%	4.7%	3.2%	10.8%	4.6%
	N. Fishery (Hook & Line)	—	—	—	—	—
	N. Fishery (Trap)	0.0%	14.7%	2.3%	14.8%	14.1%
	Rock Crab	0.0%	11.7%	2.3%	9.9%	10.8%
	Sablefish (blackcod)	0.0%	38.9%	46.0%	29.7%	47.0%
	Sea Cucumber (Dive)	—	—	—	—	—
	Sea Cucumber (Trawl)	—	—	—	—	—
	Spot Prawn	0.0%	12.7%	7.2%	11.3%	9.6%
	Market Squid	—	—	—	—	—
	Swordfish	0.9%	1.9%	1.7%	2.1%	1.7%
	Thornyhead	0.0%	38.9%	46.0%	29.7%	47.0%
Red Sea Urchin	0.0%	4.5%	2.8%	5.3%	4.3%	

Table A.1 (continued): Percentage area of total commercial fishing grounds affected by port

Port	Fishery	C.I. MPAs	P1R	P2R	P3R	IPA
Oceanside	Ca. Halibut (Hook & Line)	—	—	—	—	—
	Ca. Halibut (Trawl)	—	—	—	—	—
	Coastal Pelagics	—	—	—	—	—
	Live Bait	0.0%	13.1%	14.3%	3.0%	3.0%
	Ca. Spiny Lobster	0.5%	11.0%	10.3%	9.3%	7.3%
	N. Fishery (Hook & Line)	—	—	—	—	—
	N. Fishery (Trap)	0.0%	10.3%	7.8%	8.1%	7.1%
	Rock Crab	0.0%	1.6%	0.0%	4.6%	4.5%
	Sablefish (blackcod)	0.0%	38.9%	46.0%	29.7%	47.0%
	Sea Cucumber (Dive)	—	—	—	—	—
	Sea Cucumber (Trawl)	—	—	—	—	—
	Spot Prawn	0.0%	8.5%	8.5%	8.5%	8.5%
	Market Squid	—	—	—	—	—
	Swordfish	—	—	—	—	—
	Thornyhead	0.0%	38.9%	46.0%	29.7%	47.0%
Red Sea Urchin	0.0%	34.7%	26.0%	19.3%	19.3%	
San Diego	Ca. Halibut (Hook & Line)	—	—	—	—	—
	Ca. Halibut (Trawl)	—	—	—	—	—
	Coastal Pelagics	—	—	—	—	—
	Live Bait	0.0%	0.0%	0.0%	5.4%	2.5%
	Ca. Spiny Lobster	0.0%	7.8%	6.9%	9.6%	5.9%
	N. Fishery (Hook & Line)	0.0%	6.1%	6.4%	5.5%	4.8%
	N. Fishery (Trap)	0.0%	7.7%	5.8%	9.4%	5.9%
	Rock Crab	0.0%	12.4%	9.6%	10.4%	8.3%
	Sablefish (blackcod)	—	—	—	—	—
	Sea Cucumber (Dive)	0.0%	26.0%	23.9%	11.1%	6.4%
	Sea Cucumber (Trawl)	—	—	—	—	—
	Spot Prawn	0.0%	12.0%	12.1%	12.9%	12.2%
	Market Squid	—	—	—	—	—
	Swordfish	0.1%	0.9%	0.7%	0.9%	0.8%
	Thornyhead	—	—	—	—	—
Red Sea Urchin	0.0%	16.9%	10.1%	17.6%	13.2%	

Table A.2: Percentage value of total commercial fishing grounds affected by port

Port	Fishery	C.I. MPAs	P1R	P2R	P3R	IPA
Santa Barbara	Ca. Halibut (Hook & Line)	5.6%	14.7%	12.9%	21.8%	15.1%
	Ca. Halibut (Trawl)	0.0%	6.7%	6.9%	10.9%	6.3%
	Coastal Pelagics	—	—	—	—	—
	Live Bait	—	—	—	—	—
	Ca. Spiny Lobster	3.4%	10.1%	7.6%	11.9%	9.7%
	N. Fishery (Hook & Line)	9.4%	12.8%	12.9%	14.5%	13.0%
	N. Fishery (Trap)	4.3%	9.6%	7.1%	15.1%	9.3%
	Rock Crab	4.0%	10.6%	9.6%	10.6%	10.2%
	Sablefish (blackcod)	—	—	—	—	—
	Sea Cucumber (Dive)	9.9%	12.5%	11.8%	19.8%	12.6%
	Sea Cucumber (Trawl)	0.0%	3.4%	2.9%	4.4%	3.0%
	Spot Prawn	0.0%	12.3%	12.6%	12.6%	12.6%
	Market Squid	—	—	—	—	—
	Swordfish	—	—	—	—	—
	Thornyhead	—	—	—	—	—
Red Sea Urchin	6.6%	8.1%	7.7%	9.1%	8.1%	
Ventura	Ca. Halibut (Hook & Line)	7.0%	9.5%	8.9%	9.9%	9.6%
	Ca. Halibut (Trawl)	—	—	—	—	—
	Coastal Pelagics	—	—	—	—	—
	Live Bait	—	—	—	—	—
	Ca. Spiny Lobster	0.0%	1.3%	1.5%	21.6%	1.3%
	N. Fishery (Hook & Line)	—	—	—	—	—
	N. Fishery (Trap)	0.0%	0.0%	0.0%	16.3%	0.0%
	Rock Crab	3.5%	3.5%	3.5%	4.8%	3.5%
	Sablefish (blackcod)	—	—	—	—	—
	Sea Cucumber (Dive)	0.3%	14.5%	11.0%	18.7%	14.5%
	Sea Cucumber (Trawl)	—	—	—	—	—
	Spot Prawn	0.0%	0.0%	0.0%	0.0%	0.0%
	Market Squid	3.0%	4.6%	4.2%	14.0%	4.4%
	Swordfish	—	—	—	—	—
	Thornyhead	—	—	—	—	—
Red Sea Urchin	—	—	—	—	—	
Port Hueneume	Ca. Halibut (Hook & Line)	6.2%	8.3%	8.0%	9.3%	8.5%
	Ca. Halibut (Trawl)	—	—	—	—	—
	Coastal Pelagics	0.8%	3.0%	2.5%	5.9%	3.5%
	Live Bait	—	—	—	—	—
	Ca. Spiny Lobster	3.1%	4.7%	4.9%	15.0%	4.7%
	N. Fishery (Hook & Line)	0.2%	20.4%	20.0%	24.7%	20.8%
	N. Fishery (Trap)	0.0%	1.3%	1.7%	1.7%	1.3%
	Rock Crab	0.0%	0.0%	0.0%	12.3%	0.0%
	Sablefish (blackcod)	—	—	—	—	—
	Sea Cucumber (Dive)	14.2%	16.9%	16.7%	23.7%	16.9%
	Sea Cucumber (Trawl)	—	—	—	—	—
	Spot Prawn	26.1%	26.1%	26.1%	26.1%	26.1%
	Market Squid	2.9%	5.5%	5.3%	14.9%	5.3%
	Swordfish	—	—	—	—	—
	Thornyhead	—	—	—	—	—
Red Sea Urchin	3.4%	7.8%	7.4%	12.3%	7.8%	

Table A.2 (continued): Percentage value of total commercial fishing grounds affected by port

Port	Fishery	C.I. MPAs	P1R	P2R	P3R	IPA
San Pedro / Terminal Island	Ca. Halibut (Hook & Line)	—	—	—	—	—
	Ca. Halibut (Trawl)	—	—	—	—	—
	Coastal Pelagics	0.5%	3.4%	2.9%	8.5%	4.1%
	Live Bait	0.0%	1.3%	0.4%	3.9%	1.2%
	Ca. Spiny Lobster	0.1%	6.4%	5.8%	9.2%	6.0%
	N. Fishery (Hook & Line)	6.7%	12.5%	11.7%	18.5%	12.7%
	N. Fishery (Trap)	0.0%	6.1%	4.6%	16.5%	7.2%
	Rock Crab	0.0%	0.1%	0.0%	0.1%	0.0%
	Sablefish (blackcod)	0.0%	24.3%	33.4%	22.4%	28.0%
	Sea Cucumber (Dive)	1.8%	9.9%	9.5%	13.4%	10.1%
	Sea Cucumber (Trawl)	—	—	—	—	—
	Spot Prawn	0.0%	1.7%	1.2%	5.4%	1.3%
	Market Squid	2.2%	4.8%	4.4%	12.0%	4.4%
	Swordfish	—	—	—	—	—
	Thornyhead	0.0%	36.3%	39.8%	32.5%	40.9%
Red Sea Urchin	3.4%	9.3%	9.2%	13.5%	9.7%	
Dana Point	Ca. Halibut (Hook & Line)	—	—	—	—	—
	Ca. Halibut (Trawl)	—	—	—	—	—
	Coastal Pelagics	—	—	—	—	—
	Live Bait	0.0%	1.8%	0.0%	6.8%	6.3%
	Ca. Spiny Lobster	0.0%	9.0%	5.1%	13.5%	8.5%
	N. Fishery (Hook & Line)	—	—	—	—	—
	N. Fishery (Trap)	0.0%	29.3%	2.2%	29.5%	28.0%
	Rock Crab	0.0%	10.0%	1.6%	9.6%	9.7%
	Sablefish (blackcod)	0.0%	24.3%	33.4%	22.4%	28.0%
	Sea Cucumber (Dive)	—	—	—	—	—
	Sea Cucumber (Trawl)	—	—	—	—	—
	Spot Prawn	0.0%	9.8%	4.0%	6.5%	6.8%
	Market Squid	—	—	—	—	—
	Swordfish	1.6%	14.0%	7.4%	15.0%	8.2%
	Thornyhead	0.0%	40.0%	41.7%	35.5%	44.9%
Red Sea Urchin	0.0%	3.9%	0.8%	5.0%	3.0%	
Oceanside	Ca. Halibut (Hook & Line)	—	—	—	—	—
	Ca. Halibut (Trawl)	—	—	—	—	—
	Coastal Pelagics	—	—	—	—	—
	Live Bait	0.0%	1.4%	1.5%	0.3%	0.3%
	Ca. Spiny Lobster	0.4%	9.0%	6.8%	13.8%	9.5%
	N. Fishery (Hook & Line)	—	—	—	—	—
	N. Fishery (Trap)	0.0%	1.2%	0.9%	2.4%	2.2%
	Rock Crab	0.0%	0.0%	0.0%	0.1%	0.1%
	Sablefish (blackcod)	0.0%	24.3%	33.4%	22.4%	28.0%
	Sea Cucumber (Dive)	—	—	—	—	—
	Sea Cucumber (Trawl)	—	—	—	—	—
	Spot Prawn	0.0%	12.9%	12.9%	12.9%	12.9%
	Market Squid	—	—	—	—	—
	Swordfish	—	—	—	—	—
	Thornyhead	0.0%	39.1%	41.3%	34.8%	43.9%
Red Sea Urchin	0.0%	61.0%	38.7%	5.2%	5.2%	

Table A.2 (continued): Percentage value of total commercial fishing grounds affected by port

Port	Fishery	C.I. MPAs	P1R	P2R	P3R	IPA
San Diego	Ca. Halibut (Hook & Line)	—	—	—	—	—
	Ca. Halibut (Trawl)	—	—	—	—	—
	Coastal Pelagics	—	—	—	—	—
	Live Bait	0.0%	0.0%	0.0%	5.7%	2.7%
	Ca. Spiny Lobster	0.0%	19.7%	15.7%	17.2%	12.1%
	N. Fishery (Hook & Line)	0.0%	12.8%	14.0%	10.4%	8.0%
	N. Fishery (Trap)	0.0%	18.0%	12.3%	15.5%	12.1%
	Rock Crab	0.0%	9.0%	8.2%	3.5%	3.1%
	Sablefish (blackcod)	—	—	—	—	—
	Sea Cucumber (Dive)	0.0%	24.8%	22.6%	8.3%	2.9%
	Sea Cucumber (Trawl)	—	—	—	—	—
	Spot Prawn	0.0%	12.3%	12.5%	13.0%	12.7%
	Market Squid	—	—	—	—	—
	Swordfish	0.1%	0.9%	0.7%	0.9%	0.8%
	Thornyhead	—	—	—	—	—
	Red Sea Urchin	0.0%	10.9%	6.5%	11.8%	8.0%

Table A.3: Percentage area of total CPFV fishing grounds affected by port

Port	Fishery	C.I. MPAs	P1R	P2R	P3R	IPA
Santa Barbara	Pacific Barracuda	8.3%	8.9%	8.3%	11.7%	8.7%
	Ca. Halibut	9.5%	12.3%	11.7%	19.0%	12.2%
	Kelp Bass (calico bass)	9.3%	12.8%	12.5%	18.5%	12.7%
	Lingcod	7.1%	11.0%	10.9%	13.6%	10.8%
	Rockfish	7.2%	10.8%	10.7%	13.5%	10.6%
	Ca. Scorpionfish (sculpin)	8.5%	9.4%	8.7%	13.6%	9.1%
	Ca. Sheephead	6.6%	12.2%	12.1%	15.7%	11.9%
	Sand Bass	0.0%	5.7%	3.0%	19.9%	5.5%
	Ocean Whitefish	9.2%	11.3%	10.6%	13.3%	11.1%
	White Seabass	8.1%	12.0%	11.8%	15.8%	11.7%
Port Hueneme / Channel Islands Harbor	Pacific Barracuda	5.9%	6.9%	8.0%	13.1%	6.9%
	Ca. Halibut	14.6%	18.5%	18.2%	21.7%	18.5%
	Kelp Bass (calico bass)	4.5%	7.7%	7.3%	12.7%	7.7%
	Lingcod	10.4%	11.4%	11.4%	13.5%	11.4%
	Rockfish	11.6%	12.5%	12.5%	13.3%	12.5%
	Ca. Scorpionfish (sculpin)	6.9%	9.0%	9.0%	10.8%	9.0%
	Ca. Sheephead	5.4%	7.5%	7.5%	11.1%	7.5%
	Sand Bass	0.0%	3.4%	3.2%	10.2%	3.4%
	Ocean Whitefish	10.8%	13.7%	13.5%	16.7%	13.7%
	White Seabass	10.1%	14.6%	14.5%	15.2%	14.6%
Santa Monica	Pacific Barracuda	0.0%	3.4%	1.8%	7.2%	2.7%
	Ca. Halibut	0.0%	3.9%	2.1%	6.1%	3.5%
	Kelp Bass (calico bass)	0.0%	4.5%	3.4%	6.3%	4.5%
	Lingcod	0.0%	6.9%	5.0%	8.4%	5.7%
	Rockfish	0.0%	8.8%	6.5%	10.4%	7.1%
	Ca. Scorpionfish (sculpin)	0.0%	3.0%	1.8%	4.8%	2.4%
	Ca. Sheephead	0.0%	7.5%	5.9%	9.7%	6.8%
	Sand Bass	0.0%	1.5%	1.0%	2.4%	1.5%
	Ocean Whitefish	0.0%	2.2%	1.1%	6.9%	2.1%
	White Seabass	0.0%	5.5%	4.3%	6.9%	4.9%
San Pedro / Long Beach	Pacific Barracuda	0.0%	4.4%	3.2%	7.7%	3.7%
	Ca. Halibut	0.0%	2.4%	2.3%	4.2%	2.8%
	Kelp Bass (calico bass)	0.6%	4.8%	4.3%	7.0%	5.1%
	Lingcod	0.4%	11.1%	10.8%	11.6%	10.8%
	Rockfish	0.3%	10.4%	9.6%	8.7%	10.1%
	Ca. Scorpionfish (sculpin)	0.2%	4.2%	3.3%	7.2%	4.1%
	Ca. Sheephead	0.1%	6.7%	4.4%	9.0%	6.3%
	Sand Bass	0.0%	0.7%	1.1%	1.5%	1.1%
	Ocean Whitefish	0.2%	5.4%	4.3%	7.6%	5.0%
	White Seabass	0.0%	5.6%	4.2%	8.6%	5.2%

Table A.3 (continued): Percentage area of total CPFV fishing grounds affected by port

Port	Fishery	C.I. MPAs	P1R	P2R	P3R	IPA
Newport Beach	Pacific Barracuda	0.0%	3.6%	2.4%	8.6%	3.6%
	Ca. Halibut	0.0%	2.2%	0.9%	5.4%	2.2%
	Kelp Bass (calico bass)	0.0%	3.7%	2.1%	7.0%	3.6%
	Lingcod	0.0%	9.5%	6.6%	13.1%	9.2%
	Rockfish	0.0%	9.4%	6.5%	11.7%	9.1%
	Ca. Scorpionfish (sculpin)	0.0%	3.6%	1.8%	7.3%	3.4%
	Ca. Sheephead	0.0%	9.6%	3.2%	10.0%	8.9%
	Sand Bass	0.0%	1.9%	0.9%	4.6%	1.9%
	Ocean Whitefish	0.0%	4.0%	2.2%	7.5%	3.8%
	White Seabass	0.0%	7.2%	4.3%	9.8%	5.9%
Dana Point	Pacific Barracuda	0.0%	4.7%	2.9%	8.4%	4.6%
	Ca. Halibut	0.0%	4.2%	1.7%	10.5%	4.4%
	Kelp Bass (calico bass)	0.0%	7.4%	4.7%	14.1%	7.4%
	Lingcod	0.0%	9.6%	7.6%	13.7%	9.9%
	Rockfish	0.0%	14.1%	11.8%	17.0%	14.3%
	Ca. Scorpionfish (sculpin)	0.0%	11.4%	8.5%	15.6%	11.3%
	Ca. Sheephead	0.0%	10.2%	3.4%	10.8%	10.0%
	Sand Bass	0.0%	3.5%	1.7%	8.4%	3.6%
	Ocean Whitefish	0.0%	15.3%	12.8%	22.6%	18.4%
	White Seabass	0.0%	3.0%	0.8%	9.1%	3.5%
Oceanside	Pacific Barracuda	0.0%	7.5%	6.6%	7.0%	5.1%
	Ca. Halibut	0.0%	6.9%	6.6%	5.0%	4.9%
	Kelp Bass (calico bass)	0.0%	7.5%	6.0%	6.5%	5.5%
	Lingcod	0.0%	6.9%	6.8%	5.7%	5.6%
	Rockfish	0.0%	7.8%	8.1%	6.9%	6.9%
	Ca. Scorpionfish (sculpin)	0.0%	7.6%	6.1%	6.3%	5.1%
	Ca. Sheephead	0.0%	8.8%	6.7%	7.2%	6.3%
	Sand Bass	0.0%	7.2%	6.7%	6.1%	5.1%
	Ocean Whitefish	0.0%	9.4%	8.6%	7.1%	6.7%
	White Seabass	0.0%	9.3%	6.4%	10.6%	7.0%
San Diego	Pacific Barracuda	2.7%	8.2%	7.6%	8.0%	6.7%
	Ca. Halibut	1.5%	9.6%	7.4%	8.9%	7.5%
	Kelp Bass (calico bass)	0.2%	9.1%	7.1%	10.3%	7.7%
	Lingcod	8.7%	13.2%	12.4%	12.6%	12.0%
	Rockfish	9.6%	12.8%	12.6%	12.2%	12.0%
	Ca. Scorpionfish (sculpin)	1.2%	8.1%	6.8%	7.4%	6.5%
	Ca. Sheephead	1.3%	8.2%	6.6%	7.9%	6.5%
	Sand Bass	0.0%	9.4%	7.6%	9.4%	7.7%
	Ocean Whitefish	3.0%	13.7%	10.6%	12.8%	10.6%
	White Seabass	1.8%	13.0%	10.1%	14.2%	10.6%

Table A.4: Percentage value of total CPFV fishing grounds affected by port

Port	Fishery	C.I. MPAs	P1R	P2R	P3R	IPA
Santa Barbara	Pacific Barracuda	2.7%	3.2%	2.7%	9.8%	3.0%
	Ca. Halibut	5.5%	11.4%	10.2%	13.9%	11.3%
	Kelp Bass (calico bass)	1.2%	7.8%	6.2%	9.7%	7.8%
	Lingcod	4.8%	10.3%	10.1%	12.0%	10.0%
	Rockfish	3.7%	7.9%	7.9%	9.6%	7.6%
	Ca. Scorpionfish (sculpin)	3.7%	4.2%	3.7%	4.6%	4.0%
	Ca. Sheephead	5.3%	10.0%	9.6%	11.7%	9.7%
	Sand Bass	0.0%	5.8%	3.2%	8.3%	5.8%
	Ocean Whitefish	8.2%	9.9%	9.2%	11.6%	9.7%
	White Seabass	3.6%	8.2%	7.5%	10.2%	8.0%
Port Hueneme / Channel Islands Harbor	Pacific Barracuda	3.4%	5.1%	10.2%	14.7%	5.2%
	Ca. Halibut	12.0%	22.1%	22.5%	23.5%	22.1%
	Kelp Bass (calico bass)	3.3%	14.8%	14.8%	18.1%	14.8%
	Lingcod	10.6%	14.0%	14.2%	14.6%	14.0%
	Rockfish	12.1%	14.6%	14.8%	15.0%	14.6%
	Ca. Scorpionfish (sculpin)	4.3%	12.9%	13.2%	14.6%	12.9%
	Ca. Sheephead	7.0%	14.8%	15.1%	16.7%	14.8%
	Sand Bass	0.0%	3.2%	3.3%	4.2%	3.2%
	Ocean Whitefish	5.2%	14.8%	15.2%	16.7%	14.8%
	White Seabass	6.6%	15.5%	15.8%	16.7%	15.5%
Santa Monica	Pacific Barracuda	0.0%	4.6%	1.0%	7.5%	1.3%
	Ca. Halibut	0.0%	2.9%	1.3%	4.3%	2.5%
	Kelp Bass (calico bass)	0.0%	6.2%	2.3%	9.5%	3.5%
	Lingcod	0.0%	3.9%	0.6%	6.5%	0.7%
	Rockfish	0.0%	3.8%	0.5%	6.7%	0.7%
	Ca. Scorpionfish (sculpin)	0.0%	2.2%	0.6%	4.0%	0.7%
	Ca. Sheephead	0.0%	5.7%	1.6%	9.3%	2.5%
	Sand Bass	0.0%	2.4%	0.2%	2.6%	0.5%
	Ocean Whitefish	0.0%	4.7%	1.5%	7.5%	2.6%
	White Seabass	0.0%	5.5%	1.2%	8.4%	2.5%
San Pedro / Long Beach	Pacific Barracuda	0.0%	1.2%	1.5%	2.5%	1.6%
	Ca. Halibut	0.0%	1.2%	0.9%	3.1%	1.6%
	Kelp Bass (calico bass)	0.0%	3.3%	2.7%	5.9%	3.8%
	Lingcod	0.0%	5.2%	4.9%	8.7%	5.6%
	Rockfish	0.0%	5.0%	4.6%	6.2%	4.8%
	Ca. Scorpionfish (sculpin)	0.0%	2.4%	2.8%	3.5%	2.9%
	Ca. Sheephead	0.0%	3.8%	3.3%	6.3%	4.5%
	Sand Bass	0.0%	0.1%	0.4%	0.5%	0.4%
	Ocean Whitefish	0.0%	1.8%	1.8%	3.7%	2.4%
	White Seabass	0.0%	6.1%	3.5%	13.2%	6.5%

Table A.4 (continued): Percentage value of total CPFV fishing grounds affected by port

Port	Fishery	C.I. MPAs	P1R	P2R	P3R	IPA
Newport Beach	Pacific Barracuda	0.0%	2.7%	1.4%	5.6%	2.4%
	Ca. Halibut	0.0%	3.2%	1.5%	8.0%	3.2%
	Kelp Bass (calico bass)	0.0%	6.9%	3.9%	15.1%	6.6%
	Lingcod	0.0%	16.1%	13.1%	22.3%	15.9%
	Rockfish	0.0%	6.8%	4.5%	9.2%	6.6%
	Ca. Scorpionfish (sculpin)	0.0%	1.1%	0.6%	2.3%	1.1%
	Ca. Sheephead	0.0%	17.4%	3.6%	17.8%	16.9%
	Sand Bass	0.0%	2.5%	1.2%	6.5%	2.5%
	Ocean Whitefish	0.0%	4.2%	2.1%	7.6%	4.0%
	White Seabass	0.0%	9.3%	3.5%	19.3%	8.8%
Dana Point	Pacific Barracuda	0.0%	2.5%	1.8%	7.1%	3.2%
	Ca. Halibut	0.0%	3.3%	1.5%	10.0%	3.9%
	Kelp Bass (calico bass)	0.0%	3.2%	1.9%	8.6%	3.4%
	Lingcod	0.0%	6.7%	5.5%	11.6%	7.5%
	Rockfish	0.0%	6.5%	5.2%	10.4%	7.3%
	Ca. Scorpionfish (sculpin)	0.0%	5.7%	4.0%	10.8%	6.3%
	Ca. Sheephead	0.0%	13.3%	2.1%	14.1%	12.7%
	Sand Bass	0.0%	1.3%	0.5%	4.7%	1.6%
	Ocean Whitefish	0.0%	10.7%	8.1%	20.5%	13.7%
	White Seabass	0.0%	2.9%	0.7%	10.4%	3.4%
Oceanside	Pacific Barracuda	0.0%	7.8%	6.7%	6.3%	5.9%
	Ca. Halibut	0.0%	6.9%	6.0%	5.1%	5.1%
	Kelp Bass (calico bass)	0.0%	6.7%	5.5%	5.0%	4.8%
	Lingcod	0.0%	9.4%	8.9%	7.8%	7.7%
	Rockfish	0.0%	6.7%	5.9%	6.8%	6.8%
	Ca. Scorpionfish (sculpin)	0.0%	6.9%	5.7%	5.5%	5.4%
	Ca. Sheephead	0.0%	10.0%	8.7%	8.3%	7.8%
	Sand Bass	0.0%	6.4%	5.2%	5.8%	5.5%
	Ocean Whitefish	0.0%	15.6%	14.6%	9.6%	9.4%
	White Seabass	0.0%	7.1%	5.9%	6.0%	5.5%
San Diego	Pacific Barracuda	0.7%	11.0%	8.5%	11.0%	7.1%
	Ca. Halibut	0.1%	12.4%	6.9%	11.5%	8.6%
	Kelp Bass (calico bass)	0.0%	16.3%	12.3%	16.2%	11.7%
	Lingcod	2.4%	12.9%	9.8%	10.9%	8.8%
	Rockfish	2.5%	10.1%	9.4%	8.1%	6.7%
	Ca. Scorpionfish (sculpin)	0.4%	11.3%	6.7%	10.4%	7.7%
	Ca. Sheephead	0.2%	14.5%	9.0%	11.5%	8.4%
	Sand Bass	0.0%	7.9%	5.1%	9.1%	6.6%
	Ocean Whitefish	0.4%	16.7%	9.7%	15.4%	11.7%
	White Seabass	0.1%	14.0%	10.2%	14.8%	10.6%

Table A.5: Percentage area of total recreational fishing grounds affected by county for Channel Islands MPAs

County	User group	Pacific Barracuda	Pacific Bonito	Ca. Halibut	Kelp Bass (calico bass)	White Croaker	Ca. Spiny Lobster	Jack Mackerel	Rockfish	Rock Crab	Scallops	Ca. Sheephead	Sand Bass	Market Squid	Surfperch	Thresher Shark	White Seabass	Ca. Yellowtail
Santa Barbara	Dive			0.2%	0.0%	0.0%	3.4%		2.8%		1.6%						5.4%	3.7%
	Kayak			0.0%	0.0%		0.0%						0.0%			0.0%		
	Private Vessel	0.0%		1.2%	0.0%		0.0%		10.3%				0.0%			0.2%	0.6%	0.0%
Ventura	Dive	0.0%		14.9%	13.6%		7.2%		0.0%		14.2%	0.0%	0.0%				9.1%	13.3%
	Kayak	0.0%		0.0%	0.0%		0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	0.0%	0.0%
	Private Vessel	6.3%	11.9%	7.9%	3.4%	0.0%	7.5%	0.0%	1.6%							0.0%	6.1%	4.7%
Los Angeles	Dive	0.0%	0.0%	0.6%	0.1%	0.0%	0.6%		0.0%		0.0%	0.0%	0.0%				4.4%	1.7%
	Kayak	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	4.8%	0.0%
	Private Vessel	0.0%	0.0%	0.1%	0.2%	0.0%	0.0%	0.0%	0.6%			0.5%	0.0%		0.0%	0.0%	0.4%	0.4%
Orange	Dive		0.0%	0.0%	0.0%	0.0%	0.0%		0.0%		0.0%	0.0%	0.0%				0.0%	0.0%
	Kayak	0.0%	0.0%	0.1%	0.0%		0.0%	0.0%	0.0%			0.0%	0.0%	0.0%		0.0%	0.0%	0.0%
	Private Vessel	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			0.0%	0.0%		0.0%	0.0%	0.5%	0.0%
San Diego	Dive	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%		0.0%	0.0%	0.0%				0.0%	0.0%
	Kayak	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	0.0%	0.0%
	Private Vessel	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			0.0%	0.0%		0.0%	0.0%	0.0%	0.0%

Table A.6: Percentage area of total recreational fishing grounds affected by county for P1R

County	User group	Pacific Barracuda	Pacific Bonito	Ca. Halibut	Kelp Bass (calico bass)	White Croaker	Ca. Spiny Lobster	Jack Mackerel	Rockfish	Rock Crab	Scallops	Ca. Sheephead	Sand Bass	Market Squid	Surperch	Thresher Shark	White Seabass	Ca. Yellowtail
Santa Barbara	Dive			5.5%	9.2%	13.8%	8.6%		6.7%		7.4%						7.2%	3.7%
	Kayak			9.0%	11.9%		0.0%						27.6%			1.0%		
	Private Vessel	0.5%		9.2%	8.0%		2.3%		11.3%				0.0%			0.8%	5.0%	0.2%
Ventura	Dive	3.7%		17.9%	16.1%		14.2%		10.2%		16.4%	0.0%	11.6%				10.5%	14.0%
	Kayak	5.0%		8.9%	13.1%		13.9%	2.3%	11.4%	0.0%		16.0%	18.5%	11.3%		1.8%	10.4%	26.9%
	Private Vessel	8.5%	11.9%	10.5%	8.8%	0.0%	17.3%	0.0%	2.2%							7.3%	8.9%	11.4%
Los Angeles	Dive	15.2%	36.5%	13.0%	9.2%	18.2%	7.9%		20.7%		14.7%	26.5%	22.0%				9.6%	13.0%
	Kayak	3.5%	9.8%	4.5%	5.2%		9.8%	11.4%	13.7%	0.0%		5.8%	4.5%	19.0%		2.9%	10.5%	15.9%
	Private Vessel	4.3%	4.5%	4.2%	4.7%	0.0%	4.4%	1.2%	8.1%			5.3%	2.6%		1.7%	6.0%	7.3%	4.4%
Orange	Dive		12.7%	3.1%	10.0%	18.3%	5.4%		4.5%		7.0%	12.7%	11.1%				7.6%	4.2%
	Kayak	3.4%	7.0%	2.6%	4.9%		4.2%	0.0%	11.8%			17.3%	2.9%	21.9%		4.5%	8.6%	19.0%
	Private Vessel	4.3%	2.5%	3.6%	3.3%	11.7%	3.7%	1.8%	9.7%			23.1%	2.6%		0.0%	1.2%	6.2%	1.9%
San Diego	Dive	14.5%	17.4%	19.9%	15.2%	13.0%	9.6%		33.9%		28.3%	34.5%	11.0%				9.9%	9.5%
	Kayak	21.3%	13.2%	16.2%	16.9%		20.5%	21.6%	17.8%	20.6%		34.1%	15.2%	31.0%		28.7%	14.4%	12.6%
	Private Vessel	4.4%	2.7%	7.7%	8.8%	10.1%	9.4%	10.4%	8.9%			9.5%	5.9%		18.0%	1.4%	8.4%	1.8%

Table A.7: Percentage area of total recreational fishing grounds affected by county for P2R

County	User group	Pacific Barracuda	Pacific Bonito	Ca. Halibut	Kelp Bass (calico bass)	White Croaker	Ca. Spiny Lobster	Jack Mackerel	Rockfish	Rock Crab	Scallops	Ca. Sheephead	Sand Bass	Market Squid	Surfperch	Thresher Shark	White Seabass	Ca. Yellowtail	
Santa Barbara	Dive			6.8%	11.1%	16.6%	7.5%		7.9%		6.4%							7.4%	3.7%
	Kayak			6.1%	4.9%		0.0%						3.1%			3.8%			
	Private Vessel	0.3%		8.0%	5.8%		0.0%		11.6%				0.0%			0.4%	4.0%	0.2%	
Ventura	Dive	0.0%		17.2%	15.4%		12.2%		9.1%		16.0%	0.0%	9.6%					10.0%	13.8%
	Kayak	8.5%		7.8%	7.6%		10.7%	10.2%	11.2%	0.0%		12.3%	16.1%	0.0%		0.0%		9.1%	4.6%
	Private Vessel	6.5%	11.9%	9.3%	6.8%	0.0%	9.0%	0.0%	3.6%							18.0%	7.4%	6.6%	
Los Angeles	Dive	7.4%	16.2%	7.9%	7.0%	11.2%	3.8%		28.2%		14.9%	9.5%	15.7%					7.7%	10.1%
	Kayak	8.9%	3.2%	3.5%	3.5%		3.3%	4.2%	12.6%	0.0%		8.8%	2.7%	4.9%		5.4%		8.5%	13.4%
	Private Vessel	3.4%	3.2%	3.6%	4.0%	0.0%	3.0%	1.0%	6.7%			4.3%	1.6%		0.0%	7.7%		5.3%	3.5%
Orange	Dive		5.0%	1.7%	6.1%	7.1%	3.5%		3.2%		4.6%	4.6%	4.9%					5.1%	2.8%
	Kayak	1.7%	2.5%	2.2%	1.9%		2.9%	0.0%	6.9%			2.6%	1.4%	12.1%		2.6%		4.7%	14.9%
	Private Vessel	4.2%	1.6%	2.7%	2.3%	6.6%	2.0%	0.8%	7.2%			20.3%	1.6%		0.0%	1.2%		4.2%	1.7%
San Diego	Dive	11.6%	13.6%	14.2%	8.8%	2.5%	7.5%		18.7%		16.3%	19.5%	6.1%					6.6%	7.8%
	Kayak	15.1%	11.5%	11.4%	14.9%		15.3%	20.5%	7.9%	9.3%		26.2%	13.1%	15.4%		23.8%		11.2%	10.9%
	Private Vessel	3.9%	2.6%	5.1%	6.4%	5.5%	5.2%	8.0%	7.1%			7.0%	4.3%		11.4%	1.4%		6.4%	1.5%

Table A.8: Percentage area of total recreational fishing grounds affected by county for P3R

County	User group	Pacific Barracuda	Pacific Bonito	Ca. Halibut	Kelp Bass (calico bass)	White Croaker	Ca. Spiny Lobster	Jack Mackerel	Rockfish	Rock Crab	Scallops	Ca. Sheephead	Sand Bass	Market Squid	Surperch	Thresher Shark	White Seabass	Ca. Yellowtail	
Santa Barbara	Dive			19.8%	17.6%	21.8%	18.5%		14.0%		6.4%							14.6%	3.7%
	Kayak			18.6%	21.8%		13.0%						29.6%			15.6%			
	Private Vessel	5.3%		12.0%	10.0%		0.0%		12.7%				0.0%			5.5%	9.6%	0.4%	
Ventura	Dive	11.1%		18.6%	18.1%		15.8%		11.5%		16.8%	0.0%	13.1%					14.8%	15.4%
	Kayak	17.7%		10.2%	19.7%		17.7%	12.6%	13.0%	1.9%		18.2%	21.1%	12.9%			12.7%	11.9%	33.5%
	Private Vessel	9.0%	11.9%	10.5%	13.7%	0.0%	18.9%	0.0%	5.2%							26.8%	11.2%	17.2%	
Los Angeles	Dive	26.5%	62.2%	25.3%	15.9%	54.1%	11.8%		42.9%		37.8%	37.6%	34.1%					14.3%	21.3%
	Kayak	15.6%	21.4%	8.1%	10.4%		8.0%	17.8%	18.4%	0.0%		16.1%	9.1%	29.5%			9.9%	17.0%	19.4%
	Private Vessel	5.0%	6.0%	6.0%	6.3%	30.0%	7.0%	3.0%	10.3%			11.6%	5.8%		2.2%	8.7%	9.8%	6.1%	
Orange	Dive		15.1%	11.8%	20.2%	55.6%	8.2%		10.2%		9.4%	27.2%	27.4%					16.0%	8.2%
	Kayak	7.9%	18.2%	6.5%	12.1%		4.6%	0.0%	28.0%			16.9%	9.4%	25.9%			15.7%	20.3%	21.8%
	Private Vessel	4.7%	3.4%	7.1%	6.3%	24.0%	5.8%	2.3%	13.6%			29.4%	6.4%		0.0%	2.2%	9.3%	2.4%	
San Diego	Dive	16.5%	20.7%	14.1%	20.0%	28.9%	8.6%		18.9%		21.3%	28.2%	13.6%					13.3%	9.8%
	Kayak	29.9%	29.4%	11.8%	19.9%		14.0%	23.6%	35.5%	18.8%		23.2%	12.3%	45.8%			21.4%	15.3%	11.2%
	Private Vessel	4.1%	2.8%	6.8%	9.8%	12.5%	9.7%	8.7%	9.4%			7.7%	6.0%		17.6%	1.3%	9.3%	2.9%	

Table A.9: Percentage area of total recreational fishing grounds affected by county for the IPA

County	User group	Pacific Barracuda	Pacific Bonito	Ca. Halibut	Kelp Bass (calico bass)	White Croaker	Ca. Spiny Lobster	Jack Mackerel	Rockfish	Rock Crab	Scallops	Ca. Sheephead	Sand Bass	Market Squid	Surperch	Thresher Shark	White Seabass	Ca. Yellowtail
Santa Barbara	Dive			5.3%	8.8%	12.9%	8.5%		6.7%		6.4%						7.0%	3.7%
	Kayak			8.9%	11.2%		0.0%						29.6%			1.1%		
	Private Vessel	0.5%		8.9%	7.7%		0.0%		11.3%				0.0%			0.9%	4.8%	0.2%
Ventura	Dive	3.7%		17.7%	15.8%		14.7%		10.2%		16.4%	0.0%	11.6%				10.5%	13.9%
	Kayak	2.4%		8.9%	12.6%		13.9%	2.5%	11.4%	0.0%		16.0%	18.5%	11.2%		1.8%	10.4%	12.6%
	Private Vessel	6.7%	11.9%	10.5%	7.7%	0.0%	17.3%	0.0%	2.2%							8.1%	8.6%	6.6%
Los Angeles	Dive	7.4%	18.1%	13.0%	9.3%	19.4%	8.4%		20.7%		21.9%	27.2%	22.9%				8.9%	10.7%
	Kayak	1.4%	3.2%	4.6%	5.2%		9.9%	4.2%	12.7%	0.0%		8.8%	3.1%	4.9%		1.6%	10.5%	10.7%
	Private Vessel	4.4%	4.3%	4.2%	4.6%	0.0%	4.6%	1.1%	7.6%			5.3%	2.5%		1.7%	6.3%	6.9%	3.9%
Orange	Dive		10.1%	3.1%	9.6%	18.3%	5.7%		4.7%		7.7%	13.1%	10.3%				6.8%	3.6%
	Kayak	2.4%	9.7%	3.1%	4.7%		10.3%	0.0%	12.7%			16.4%	4.6%	18.1%		4.5%	8.9%	14.2%
	Private Vessel	4.5%	1.8%	3.8%	3.3%	12.2%	6.1%	1.8%	9.0%			20.3%	2.8%		0.0%	1.3%	5.9%	1.6%
San Diego	Dive	10.7%	13.4%	11.7%	14.7%	23.9%	6.7%		14.0%		15.8%	21.4%	9.5%				9.4%	6.0%
	Kayak	18.5%	18.9%	9.8%	16.5%		11.8%	15.1%	26.6%	14.1%		18.2%	9.2%	34.8%		16.9%	11.8%	8.6%
	Private Vessel	3.5%	1.7%	5.6%	7.4%	9.6%	7.2%	6.6%	7.3%			5.1%	4.8%		13.6%	0.9%	6.7%	1.4%

Table A.10: Percentage value of total recreational fishing grounds affected by county for Channel Islands MPAs

County	User group	Pacific Barracuda	Pacific Bonito	Ca. Hailbut	Kelp Bass (calico bass)	White Croaker	Ca. Spiny Lobster	Jack Mackerel	Rockfish	Rock Crab	Scallops	Ca. Sheephead	Sand Bass	Market Squid	Surfperch	Thresher Shark	White Seabass	Ca. Yellowtail
Santa Barbara	Dive			0.0%	0.0%	0.0%	0.4%		0.7%		4.3%						0.9%	0.6%
	Kayak			0.0%	0.0%		0.0%						0.0%			0.0%		
	Private Vessel	0.0%		0.4%	0.0%		0.0%		6.7%				0.0%			0.1%	0.2%	0.0%
Ventura	Dive	0.0%		0.2%	0.2%		1.5%		0.0%		3.7%	0.0%	0.0%				1.1%	12.0%
	Kayak	0.0%		0.0%	0.0%		0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	0.0%	0.0%
	Private Vessel	6.2%	1.2%	1.0%	2.6%	0.0%	4.6%	0.0%	4.4%							0.0%	2.3%	11.0%
Los Angeles	Dive	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%		0.0%		0.0%	0.0%	0.0%				0.6%	1.0%
	Kayak	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	1.5%	0.0%
	Private Vessel	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%			0.4%	0.0%		0.0%	0.0%	0.1%	0.1%
Orange	Dive		0.0%	0.0%	0.0%	0.0%	0.0%		0.0%		0.0%	0.0%	0.0%				0.0%	0.0%
	Kayak	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%			0.0%	0.0%	0.0%		0.0%	0.0%	0.0%
	Private Vessel	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			0.0%	0.0%		0.0%	0.0%	0.1%	0.0%
San Diego	Dive	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%		0.0%		0.0%	0.0%	0.0%				0.0%	0.0%
	Kayak	0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%	0.0%		0.0%	0.0%	0.0%		0.0%	0.0%	0.0%
	Private Vessel	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%			0.0%	0.0%		0.0%	0.0%	0.0%	0.0%

Table A.11: Percentage value of total recreational fishing grounds affected by county for P1R

County	User group	Pacific Barracuda	Pacific Bonito	Ca. Halibut	Kelp Bass (calico bass)	White Croaker	Ca. Spiny Lobster	Jack Mackerel	Rockfish	Rock Crab	Scallops	Ca. Sheephead	Sand Bass	Market Squid	Surperch	Thresher Shark	White Seabass	Ca. Yellowtail
Santa Barbara	Dive			7.9%	12.0%	12.2%	9.6%		6.0%		10.0%						4.9%	0.6%
	Kayak			12.2%	12.2%		0.0%						18.9%			1.7%		
	Private Vessel	0.4%		14.7%	12.1%		2.8%		8.7%				0.0%			0.3%	5.9%	0.0%
Ventura	Dive	1.8%		20.2%	15.8%		17.0%		10.8%		13.7%	0.0%	11.6%				3.0%	12.8%
	Kayak	5.5%		15.9%	17.8%		13.6%	4.1%	15.5%	0.0%		25.0%	21.8%	11.3%		2.2%	13.8%	24.3%
	Private Vessel	9.6%	1.2%	4.0%	6.9%	0.0%	16.7%	0.0%	5.7%							7.3%	5.0%	15.7%
Los Angeles	Dive	25.6%	29.0%	11.7%	12.4%	34.0%	9.8%		20.7%		4.0%	22.6%	12.4%				8.9%	12.3%
	Kayak	7.2%	12.4%	5.2%	9.7%		12.0%	14.1%	19.1%	0.0%		10.9%	3.8%	19.0%		5.2%	12.2%	18.6%
	Private Vessel	3.3%	4.9%	2.1%	4.6%	0.0%	6.1%	0.8%	8.5%			7.5%	0.3%		2.0%	7.2%	11.2%	6.3%
Orange	Dive		16.9%	15.1%	32.9%	25.4%	17.1%		8.3%		11.9%	60.2%	35.5%				12.8%	10.5%
	Kayak	1.2%	14.9%	4.1%	7.2%		6.9%	0.0%	7.3%			39.4%	6.4%	15.2%		10.0%	7.5%	15.5%
	Private Vessel	3.6%	4.0%	2.1%	6.1%	8.9%	7.7%	3.5%	9.3%			33.5%	2.0%		0.0%	4.4%	11.5%	3.1%
San Diego	Dive	19.9%	18.9%	31.6%	26.2%	37.6%	19.1%		31.2%		30.2%	43.7%	18.1%				19.1%	13.1%
	Kayak	15.5%	15.4%	23.2%	19.9%		19.7%	13.9%	17.7%	18.3%		27.2%	20.1%	13.3%		18.6%	15.5%	15.5%
	Private Vessel	8.6%	6.0%	9.3%	17.9%	6.2%	17.2%	15.0%	10.0%			14.6%	5.7%		22.9%	2.4%	12.9%	3.9%

Table A.12: Percentage value of total recreational fishing grounds affected by county for P2R

County	User group	Pacific Barracuda	Pacific Bonito	Ca. Hailbut	Kelp Bass (calico bass)	White Croaker	Ca. Spiny Lobster	Jack Mackerel	Rockfish	Rock Crab	Scallops	Ca. Sheephead	Sand Bass	Market Squid	Surfperch	Thresher Shark	White Seabass	Ca. Yellowtail
Santa Barbara	Dive			9.2%	13.8%	18.4%	6.3%		7.1%		9.0%						5.0%	0.6%
	Kayak			9.1%	2.8%		0.0%						4.1%		2.1%			
	Private Vessel	0.1%		9.3%	7.5%		0.0%		8.5%				0.0%		0.1%		4.2%	0.0%
Ventura	Dive	0.0%		16.5%	12.4%		11.3%		8.9%		12.1%	0.0%	9.6%				1.1%	12.4%
	Kayak	8.1%		13.8%	13.3%		10.5%	14.5%	15.3%	0.0%		8.4%	14.6%	0.0%		0.0%	9.6%	5.2%
	Private Vessel	6.5%	1.2%	2.1%	5.4%	0.0%	6.5%	0.0%	8.7%							18.0%	4.6%	12.0%
Los Angeles	Dive	13.3%	39.5%	9.5%	10.0%	14.0%	6.6%		28.2%		19.8%	15.9%	8.4%				5.4%	10.6%
	Kayak	6.1%	3.6%	3.0%	7.1%		5.2%	4.6%	10.2%	0.0%		5.5%	2.0%	4.9%		4.8%	7.7%	13.4%
	Private Vessel	3.0%	5.1%	1.4%	3.7%	0.0%	3.3%	0.8%	7.5%			8.0%	0.3%		0.0%	6.8%	4.5%	3.9%
Orange	Dive		6.7%	6.9%	14.8%	10.0%	9.2%		5.3%		7.3%	10.4%	15.4%				7.4%	8.5%
	Kayak		0.4%	6.8%	2.0%	3.0%	3.1%	0.0%	3.7%			4.7%	2.9%	6.4%		5.2%	3.0%	9.8%
	Private Vessel		3.8%	2.4%	1.1%	3.5%	7.7%	3.4%	1.5%	7.3%		25.0%	0.9%		0.0%	4.8%	4.2%	2.2%
San Diego	Dive	12.1%	4.3%	11.2%	11.8%	3.2%	11.6%		14.7%		9.5%	14.2%	9.0%				9.1%	7.8%
	Kayak	4.2%	3.3%	11.0%	7.8%		12.0%	8.7%	3.2%	5.0%		12.9%	10.2%	4.8%		14.2%	3.9%	6.0%
	Private Vessel	7.1%	5.0%	5.2%	12.0%	3.6%	9.4%	10.6%	7.2%			8.4%	2.4%		19.9%	2.4%	7.7%	2.9%

Table A.13: Percentage value of total recreational fishing grounds affected by county for P3R

County	User group	Pacific Barracuda	Pacific Bonito	Ca. Halibut	Kelp Bass (calico bass)	White Croaker	Ca. Spiny Lobster	Jack Mackerel	Rockfish	Rock Crab	Scallops	Ca. Sheephead	Sand Bass	Market Squid	Surperch	Thresher Shark	White Seabass	Ca. Yellowtail
Santa Barbara	Dive			17.2%	22.8%	21.6%	17.5%		14.4%		9.0%						12.0%	0.6%
	Kayak			14.4%	20.9%		2.8%						21.6%			8.2%		
	Private Vessel	2.5%		17.8%	13.7%		0.0%		9.6%				0.0%			23.5%	10.9%	0.1%
Ventura	Dive	9.2%		23.2%	22.2%		19.7%		11.7%		15.1%	0.0%	13.1%				6.7%	16.1%
	Kayak	17.6%		19.2%	20.8%		16.0%	18.8%	19.2%	1.6%		32.4%	25.6%	12.9%		6.9%	16.5%	27.7%
	Private Vessel	10.9%	1.2%	4.0%	10.7%	0.0%	18.6%	0.0%	11.8%							26.8%	9.3%	20.1%
Los Angeles	Dive	47.6%	70.8%	23.2%	22.7%	84.5%	16.4%		42.9%		40.1%	35.8%	27.1%				20.9%	22.9%
	Kayak	16.6%	21.2%	9.8%	17.8%		20.3%	21.9%	26.9%	0.0%		16.5%	7.5%	29.5%		12.3%	24.3%	22.7%
	Private Vessel	3.8%	4.7%	3.0%	8.3%	9.7%	11.0%	1.6%	9.7%			10.9%	1.0%		2.6%	11.1%	20.9%	10.5%
Orange	Dive		18.6%	37.2%	78.3%	77.4%	21.8%		20.7%		14.8%	66.1%	83.2%				31.7%	18.8%
	Kayak	6.9%	29.6%	16.6%	24.1%		10.1%	0.0%	41.9%			39.0%	25.2%	19.9%		36.1%	35.0%	28.7%
	Private Vessel	5.1%	5.9%	5.8%	13.9%	25.6%	11.8%	4.1%	12.0%			52.6%	5.3%		0.0%	7.3%	21.3%	4.6%
San Diego	Dive	27.7%	46.7%	33.2%	37.9%	54.3%	25.2%		20.8%		30.3%	41.3%	26.6%				30.2%	20.8%
	Kayak	38.8%	38.4%	27.8%	37.3%		20.2%	33.7%	35.3%	29.9%		30.1%	29.3%	38.2%		30.0%	36.9%	36.9%
	Private Vessel	8.9%	6.2%	9.1%	18.0%	6.6%	13.3%	15.2%	10.4%			13.5%	8.3%		11.5%	2.4%	21.1%	5.7%

Table A.14: Percentage value of total recreational fishing grounds affected by county for the IPA

County	User group	Pacific Barracuda	Pacific Bonito	Ca. Halibut	Kelp Bass (calico bass)	White Croaker	Ca. Spiny Lobster	Jack Mackerel	Rockfish	Rock Crab	Scallops	Ca. Sheephead	Sand Bass	Market Squid	Surperch	Thresher Shark	White Seabass	Ca. Yellowtail	
Santa Barbara	Dive			7.3%	11.9%	12.1%	9.4%		6.0%		9.0%							4.7%	0.6%
	Kayak			11.5%	12.0%		0.0%						21.6%			1.7%			
	Private Vessel	0.4%		14.2%	11.6%		0.0%		8.8%				0.0%			0.3%	5.7%	0.0%	
Ventura	Dive	1.8%		20.1%	15.3%		16.9%		10.8%		13.7%	0.0%	11.6%					3.2%	12.6%
	Kayak	3.5%		15.9%	17.8%		13.6%	4.3%	15.6%	0.0%		25.0%	21.8%	11.2%		2.2%	13.8%	12.2%	
	Private Vessel	6.7%	1.2%	4.0%	5.4%	0.0%	16.7%	0.0%	5.7%							8.1%	4.8%	12.8%	
Los Angeles	Dive	13.3%	45.5%	12.1%	13.0%	33.4%	9.8%		20.7%		21.0%	27.5%	10.5%					6.4%	11.4%
	Kayak	2.5%	3.6%	3.9%	9.2%		8.0%	4.6%	12.1%	0.0%		5.5%	2.2%	4.9%		2.9%	11.0%	12.4%	
	Private Vessel	3.3%	5.8%	1.8%	4.8%	0.0%	6.2%	0.8%	8.0%			8.8%	0.4%		2.0%	6.1%	9.7%	4.8%	
Orange	Dive		13.4%	14.6%	30.8%	25.4%	17.0%		8.2%		12.0%	59.8%	32.7%					11.4%	10.0%
	Kayak	0.8%	13.2%	4.5%	6.9%		30.7%	0.0%	11.0%			37.1%	6.6%	13.7%		9.1%	7.7%	17.7%	
	Private Vessel	3.6%	2.8%	2.3%	6.2%	11.0%	15.0%	3.1%	8.9%			25.0%	2.0%		0.0%	4.2%	11.2%	2.4%	
San Diego	Dive	16.1%	28.1%	25.6%	26.9%	41.3%	19.7%		15.1%		21.9%	29.8%	18.4%					20.6%	12.1%
	Kayak	23.4%	22.4%	21.4%	25.6%		13.6%	21.8%	25.0%	14.8%		20.3%	18.9%	26.5%		23.7%	21.9%	21.7%	
	Private Vessel	4.2%	2.9%	7.0%	13.0%	5.2%	9.6%	10.7%	7.3%			9.1%	6.1%		9.2%	1.3%	11.6%	2.6%	

Figure A.1: Disproportionate impacts (minus Channel Islands impacts) on commercial fisheries

Each dot in Figure A.1 represents one port/proposal impact on stated value for total fishing grounds for a specific fishery (from Table A.2). All points not in a box or on a line are considered statistically significant outliers (i.e., port-fishery combinations that may be disproportionately affected). The commercial fisheries are listed along the x-axis in descending order of importance (using average baseline gross economic revenue from 2000–07 as a proxy for importance). The y-axis measures the potential estimated impact on stated value of total fishing grounds minus the Channel Islands impacts. Please see section 4.4 for further information on box plot analysis for commercial fisheries as well as identification of the potential outliers.

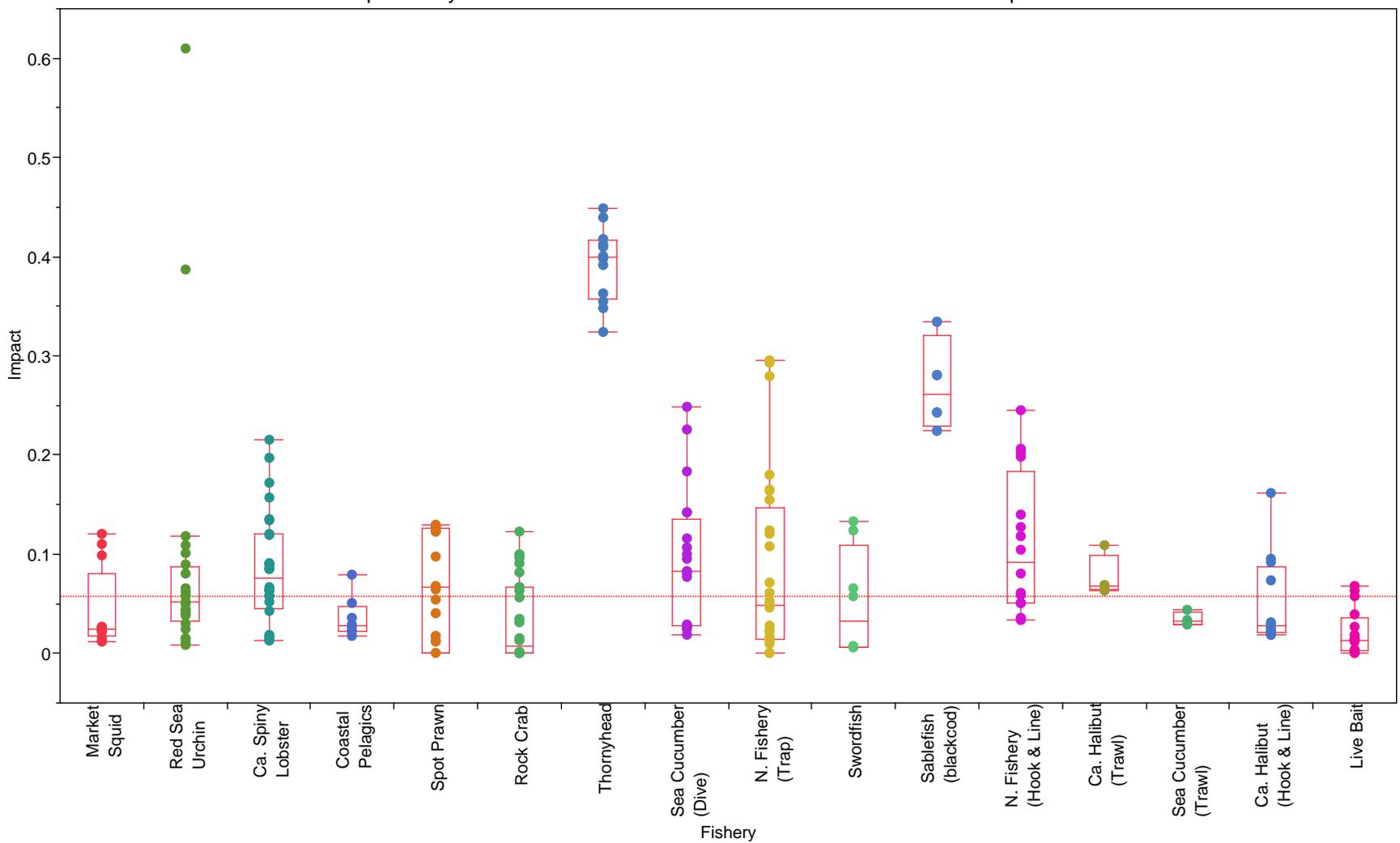
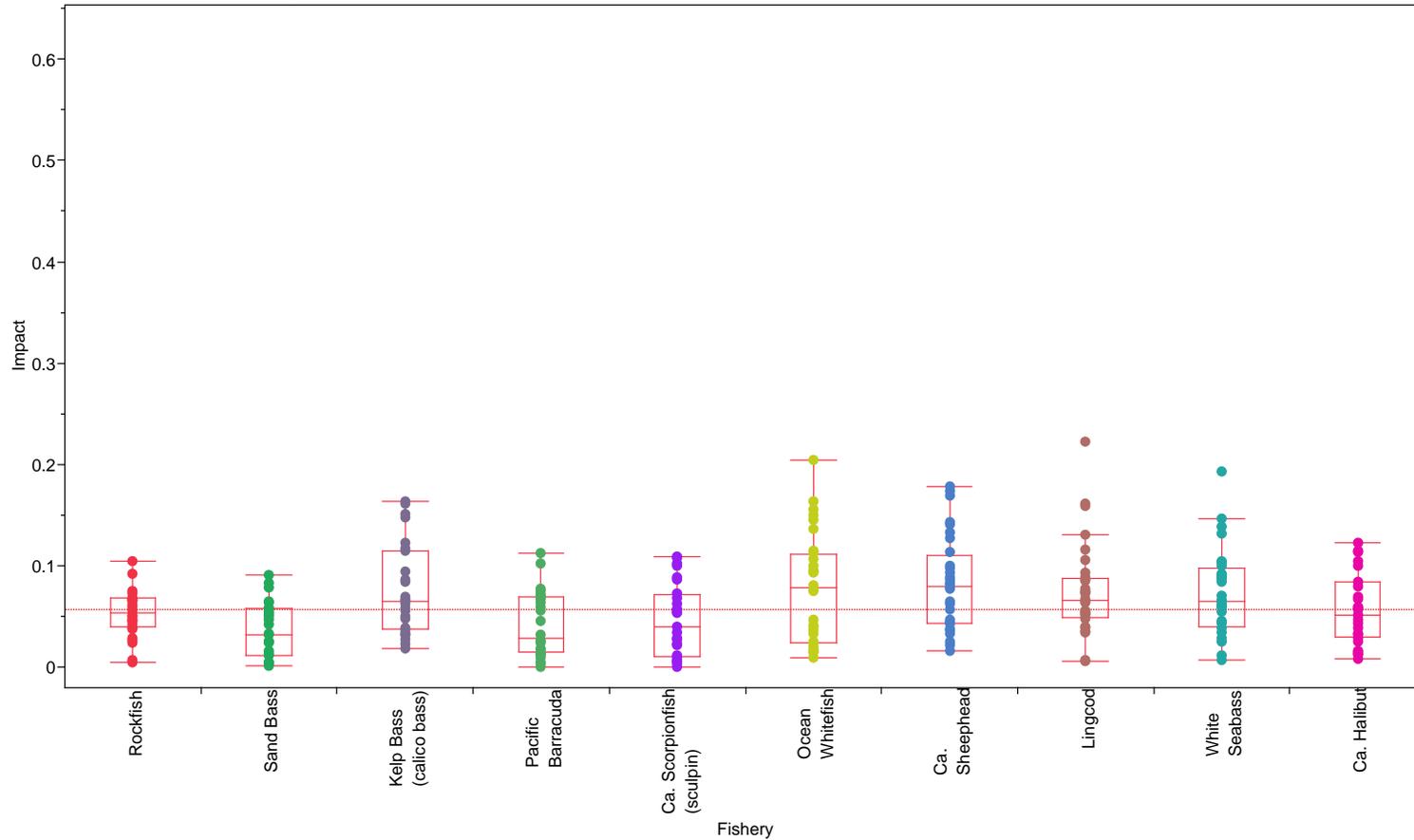


Figure A.2: Disproportionate impacts (minus Channel Islands impacts) on CPFV fisheries

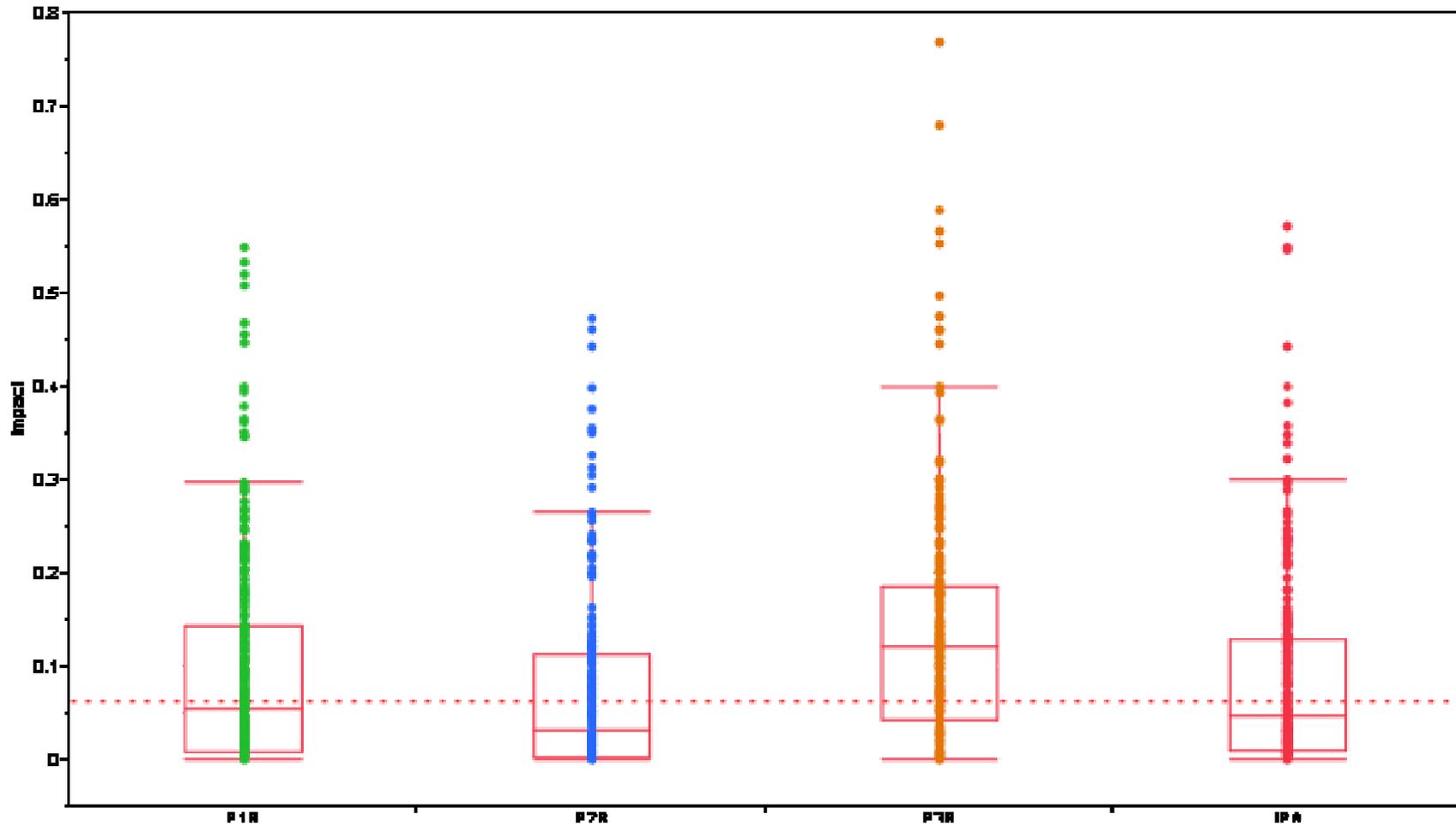
Each dot in Figure A.2 represents one port/proposal impact on stated value for total fishing grounds for a specific fishery (from Table A.4). All points not in a box or on a line are considered statistically significant outliers (i.e., port-fishery combinations that may be disproportionately affected). The CPFV fisheries are listed along the x-axis in order of importance using the cumulative number of fish landed (by species) from 2000–08¹⁰ as a proxy for importance. Data on the number of fish landed were obtained from the Department of Fish & Game’s annual California Recreational Fisheries Surveys. The y-axis measures the potential estimated impact on stated value of total fishing grounds minus the Channel Islands impacts. Please see section 5.3 for further information on box plot analysis for CPFV fisheries.



¹⁰ Rockfish landings were measured as the sum of unspecified, blue, canary, copper, gopher, and yelloweye rockfish landings. Unspecified rockfish landings were available in every year. However, blue, canary, copper, gopher, and yelloweye rockfish landings were not available in 2001. Nevertheless, the total number of rockfish landed was the highest out of all the CPFV fisheries.

Figure A.3: Disproportionate impacts (minus Channel Islands impacts) on individuals

Please see section 4.5 for further information on box plot analysis for the disproportionate impacts on individual fishermen.



Example of Why Potential Impact on Profit (as a %) Can Exceed 100%

Cases where the potential net economic impact of a given MPA proposal on a commercial fishery exceeds 100% are not mistakes. Rather, they are directly related to how we account for operating costs.

In an effort to alleviate concerns over why potential impact can exceed 100%, we provide the following example.

The potential impact of a given MPA proposal is the impact to the baseline gross economic revenue (BGER), also known as ex-vessel landing value for the fishery. Assume a hypothetical fishery for which BGER is \$196,774 and a given MPA proposal that has a 58% impact on that fishery. To estimate gross economic impact (GEI), we multiply BGER * 58%, which equals \$114,207. Then we calculate the potential gross economic revenue (GER) if the MPA proposal went into effect by subtracting the GEI from BGER. In this case, $GER = BGER - GEI = \$82,566$.

To determine net economic revenue (NER) (i.e., profit) prior to the MPA, we consider fishermen's costs. The total estimated cost for this hypothetical fishery is 66% of BGER, or $66\% * \$196,774 = \$130,362$. NER is calculated as BGER minus estimated costs, or $\$196,774 - \$130,362 = \$66,412$.

To determine NER (i.e., profit) post impact, we consider how the MPA proposal will affect fishermen's costs. Total costs are equal to fixed costs + variable costs. Fixed costs¹¹, which are calculated as a percentage of BGER, will not change. In this case, fixed costs are 42% of BGER, or $42\% * \$196,774 = \$83,457$.

However, the MPA proposal will affect fishermen's variable costs because fishermen will no longer be able to fish in certain areas. Variable costs are broken out by crew (11%) and fuel (13%) and are based on GER after considering the impact of the MPA. In this case, variable costs = fuel ($11\% * \$82,566$) + crew ($13\% * \$82,566$) = \$19,682.

Therefore, NER (i.e., profit) after the MPA proposal = $GER - \text{fixed costs} - \text{variable costs} = \$82,566 - \$83,457 - \$19,683 = -\$20,572$.

Net economic impact (NEI) after the MPA proposal (i.e., change in profit) is calculated as $BNER - NER$. In this case, $\$66,411 - (-\$20,572) = \$86,983$. Finally, to estimate the % NEI we divide NEI by BNER, or $\$86,983 / \$66,412 = 130.9\%$. Because fishermen are likely to incur fixed costs regardless of the MPA proposal, the impact of the MPA on fishermen's profit exceeds 100%.

For additional details, please see Section 12 of the *SAT Draft Methods Used to Evaluate Marine Protected Area Proposals for the MLPA South Coast Region*.

¹¹ We assume fixed costs to be anything other than crew and fuel (a simplifying assumption, but generally appropriate). Examples of fixed costs could be payment on a boat, docking/mooring fees, permit fees, gear costs, etc.