

Summary of potential impacts of the February Proposed External 2010 MPA Arrays on commercial and recreational fisheries in the North Coast Study Region

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

1. INTRODUCTION

The purpose of this project is to analyze the relative effects of eight proposed External MPA arrays on commercial and recreational fisheries in the North Coast Study Region (NCSR). For detailed information on how data were collected and/or analyzed, please see our *Draft Survey Methods and Summary Statistics for Ecotrust's North Coast Study Region Fishery Uses and Values Project*. For information on the methods used to evaluate these data, please see Chapter 11 of the SAT's *Draft Methods Used to Evaluate Marine Protected Area Proposals in the MLPA North Coast Study Region*. Additional proposal-specific information on potential fishery-specific impacts (to the study region and to total area and value) for any given MPA is available in the series of Excel files provided to the RSG.

To analyze the NCSR fisheries, we used data layers characterizing the spatial extent and relative importance of fishing grounds for ten commercial fisheries and five commercial passenger fishing vessel (CPFV) and recreational fisheries. We collected this information during the summer and fall of 2009 (June through October) using a stratified, representative sample of 219 commercial fishermen and a stratified, solicited sample¹ of 22 CPFV and 574 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 in terms of both total area and total stated value under each of the eight MPA proposals (i.e., ExA, ExB, ExC, ExD, ExE, ExF, ExG, ExH). We also conduct a first-order impact analysis and a disproportionate impact analysis on the commercial and CPFV fisheries.

Figure 1. Analyses conducted

	Commercial	CPFV	Recreational
Potential impacts on fishing grounds (area and stated value)	✓	✓	✓
Potential net economic impacts	✓	✓	
Potential gross economic impacts	✓		
Disproportionate impacts on fisheries	✓	✓	
Disproportionate impacts on individuals	✓		

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, 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."

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.

The remaining sections of this document summarize the potential impacts. We report commercial and CPFV results by port group. We report recreational results by port group and by user group (i.e., dive, kayak, and private vessel). For a description of the ports included in each port group, please see our *Draft Survey Methods and Summary Statistics for Ecotrust's North Coast Study Region Fishery Uses and Values Project*.

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. For more detailed statistics, please see the tables in Appendix A.

2. RESULTS FOR COMMERCIAL FISHERIES

We summarize here our analysis of the potential impacts on the ten commercial fisheries: anchovy/sardine – lampara net, Dungeness crab – trap, herring – gillnet, rockfish – fixed gear, salmon – troll, seaweed – hand harvest², shrimp – trap, smelt – brail (dip net), surfperch – hook and line, and urchin – dive³. The rockfish fishery includes the nearshore, deeper nearshore, and lingcod fisheries, which were combined at the recommendation of the NCSR fishing community into a single fishery. The results for commercial fisheries are broken out by port group (i.e., Crescent City, Trinidad, Eureka, Shelter Cove, Fort Bragg, and Albion).

2.1. 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.

For information on the potential impacts (in terms of both total area and total stated value) on commercial fishing grounds for the port-fishery combinations considered, please see Tables A.1–2 in Appendix A.

2.2. Potential Net Economic Impacts on Commercial Fisheries

Figure 1 and Table 1 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 2). On average, ExD is estimated to have the highest potential NEI across the study region, while ExA is estimated to have the lowest potential NEI.

To analyze the potential net economic impacts across the study region, we focus on the top four commercial species (i.e., Dungeness crab, salmon, urchin, and rockfish), as they comprise approximately 98.1% of the total NCSR ex-vessel revenue. Several patterns emerge from our analysis:

- The Dungeness crab fishery sees the highest range of potential impacts (in dollars)—with the exception of ExA. ExD has the highest potential impact on the Dungeness crab fishery (\$363,681), while ExA has the lowest potential impact (\$31,252).
- The rockfish fishery generally sees the lowest range of potential impacts (in dollars)—with the exception of ExA and ExE. ExE has the highest potential impact on the rockfish fishery (\$79,529), while ExH has the lowest potential impact (\$6,345).

² Seaweed – hand harvest is excluded from the potential net economic impact analysis. For reporting purposes, four seaweed survey respondents who operate across the Fort Bragg, Albion, and Elk areas were indicated as operating out of Fort Bragg and one survey respondent who operates out of both Crescent City and Trinidad was indicated as operating out of Crescent City.

³ For the purposes of the potential net economic impact analysis, urchin – dive is broken into two sub-groups due to differences in operating costs (i.e., urchin – dive captain (those who own or operate a boat) and urchin – walk-on dive). Based on communication with NCSR urchin divers, we determined that the most reasonable estimate of operating costs for walk-on divers was a fixed 30% of gross economic revenue. For dive captains, we estimated average operating costs using data from the interview process. It should be noted that the ex-vessel revenue reported for dive captains does not include the 30% of walk-on divers' gross landings that captains receive for boat operating costs.

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

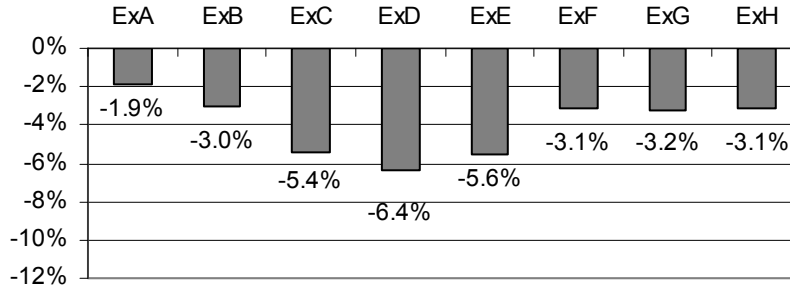


Table 1: Highest/lowest estimated annual net economic impact on commercial fisheries by port (% reduction in profit)⁴

Port	MPA Proposal(s) with Highest Potential Impact		MPA Proposal(s) with Lowest Potential Impact	
Crescent City	ExE	7.4%	ExA	1.3%
Trinidad	ExD, ExA	0.2%	ExA, B, C, F, G, H	0.1%
Eureka	ExD	2.6%	ExA	1.1%
Shelter Cove	ExD	5.8%	ExB, F, G, H	0.2%
Fort Bragg	ExD	11.2%	ExB, ExF, ExH	3.0%
Albion	ExD	4.3%	ExB, ExF	0.7%
NCSR	ExD	6.4%	ExA	1.9%

The potential impacts from each proposal are broken out by port in Table 2 and Figure 2. On average, Fort Bragg is the port estimated to see the highest potential net economic impact (as a percentage), while Trinidad is estimated to see the lowest potential impact.

Tables 3–9 show potential net economic impacts⁵ by fishery for each port and for the NCSR.

⁴ Unless otherwise specified, economic impact is reported as the estimated maximum potential economic impact on average annual net revenue from 2000–07 (in \$2007). The ex-vessel revenue for urchin is likely a lower bound estimate as urchin quality is unknown at the time the landing tickets are written.

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

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

Port	ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
	\$ Reduction in Profit							
Crescent City	\$56,539	\$188,222	\$295,276	\$301,187	\$319,332	\$196,909	\$196,909	\$192,241
Trinidad	\$777	\$363	\$995	\$1,338	\$1,210	\$511	\$511	\$510
Eureka	\$23,110	\$31,273	\$49,519	\$53,998	\$46,539	\$32,649	\$32,649	\$32,604
Shelter Cove	\$1,365	\$62	\$1,113	\$2,315	\$167	\$62	\$62	\$62
Fort Bragg	\$90,018	\$60,464	\$154,761	\$227,649	\$143,568	\$60,464	\$65,916	\$60,427
Albion	\$4,351	\$1,526	\$4,542	\$8,752	\$6,160	\$1,526	\$1,925	\$1,550
NCSR	\$176,161	\$281,910	\$506,206	\$595,239	\$516,977	\$292,121	\$297,972	\$287,394

Port	% Reduction in Profit							
	Crescent City	1.3%	4.4%	6.9%	7.0%	7.4%	4.6%	4.6%
Trinidad	0.1%	0.1%	0.1%	0.2%	0.2%	0.1%	0.1%	0.1%
Eureka	1.1%	1.5%	2.4%	2.6%	2.3%	1.6%	1.6%	1.6%
Shelter Cove	3.4%	0.2%	2.8%	5.8%	0.4%	0.2%	0.2%	0.2%
Fort Bragg	4.4%	3.0%	7.6%	11.2%	7.1%	3.0%	3.2%	3.0%
Albion	2.1%	0.7%	2.2%	4.3%	3.0%	0.7%	0.9%	0.8%
NCSR	1.9%	3.0%	5.4%	6.4%	5.6%	3.1%	3.2%	3.1%

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

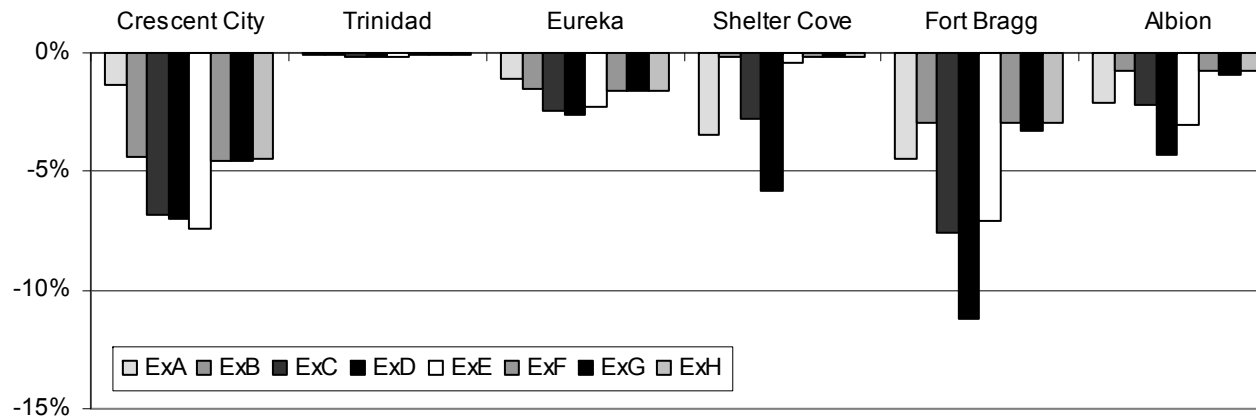


Table 3: Estimated annual net economic impact for Crescent City

Fishery	Baseline GER	Estimated Costs	Baseline NER (Profit)	ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
				\$ Reduction in Profit							
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—	—	—	—
Dungeness Crab (Trap)	\$10,615,878	\$6,677,468	\$3,938,410	\$5,953	\$183,874	\$261,921	\$254,646	\$250,016	\$192,473	\$192,473	\$187,843
Herring (Gillnet)	\$2,127	\$1,234	\$893	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Rockfish (Fixed Gear)	\$391,258	\$210,877	\$180,381	\$46,336	\$0	\$27,281	\$40,003	\$63,171	\$27	\$27	\$27
Salmon (Troll)	\$189,503	\$111,297	\$78,206	\$1,554	\$2,544	\$4,060	\$4,762	\$3,446	\$2,581	\$2,581	\$2,544
Shrimp (Trap)	\$251,315	\$158,029	\$93,286	\$0	\$0	\$0	\$0	\$956	\$0	\$0	\$0
Smelt (Brail – Dip Net)	\$16,532	\$10,015	\$6,517	\$1,864	\$957	\$1,126	\$975	\$942	\$1,012	\$1,012	\$1,012
Surfperch (Hook and Line)	\$5,986	\$3,230	\$2,755	\$833	\$847	\$888	\$802	\$802	\$816	\$816	\$816
Urchin (Dive Captain)	—	—	—	—	—	—	—	—	—	—	—
Urchin (Walk-on Dive)	—	—	—	—	—	—	—	—	—	—	—
All Fisheries	\$11,472,598	\$7,172,150	\$4,300,448	\$56,539	\$188,222	\$295,276	\$301,187	\$319,332	\$196,909	\$196,909	\$192,241

Fishery	Baseline GER	Estimated Costs	Baseline NER (Profit)	% Reduction in Profit							
				ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—	—	—	—
Dungeness Crab (Trap)	100%	63%	37%	0.2%	4.7%	6.7%	6.5%	6.3%	4.9%	4.9%	4.8%
Herring (Gillnet)	100%	58%	42%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Rockfish (Fixed Gear)	100%	54%	46%	25.7%	0.0%	15.1%	22.2%	35.0%	0.0%	0.0%	0.0%
Salmon (Troll)	100%	59%	41%	2.0%	3.3%	5.2%	6.1%	4.4%	3.3%	3.3%	3.3%
Shrimp (Trap)	100%	63%	37%	0.0%	0.0%	0.0%	0.0%	1.0%	0.0%	0.0%	0.0%
Smelt (Brail – Dip Net)	100%	61%	39%	28.6%	14.7%	17.3%	15.0%	14.5%	15.5%	15.5%	15.5%
Surfperch (Hook and Line)	100%	54%	46%	30.2%	30.7%	32.2%	29.1%	29.1%	29.6%	29.6%	29.6%
Urchin (Dive Captain)	—	—	—	—	—	—	—	—	—	—	—
Urchin (Walk-on Dive)	—	—	—	—	—	—	—	—	—	—	—
All Fisheries	—	—	—	1.3%	4.4%	6.9%	7.0%	7.4%	4.6%	4.6%	4.5%

Table 4: Estimated annual net economic impact for Trinidad

Fishery	Baseline GER	Estimated Costs	Baseline NER (Profit)	ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
				\$ Reduction in Profit							
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—	—	—	—
Dungeness Crab (Trap)	\$1,756,959	\$1,105,140	\$651,818	\$0	\$109	\$109	\$219	\$219	\$109	\$109	\$109
Herring (Gillnet)	—	—	—	—	—	—	—	—	—	—	—
Rockfish (Fixed Gear)	\$19,776	\$10,659	\$9,117	\$705	\$218	\$718	\$716	\$837	\$364	\$364	\$363
Salmon (Troll)	\$11,671	\$6,854	\$4,816	\$72	\$35	\$167	\$403	\$154	\$37	\$37	\$37
Shrimp (Trap)	—	—	—	—	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—	—	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—	—	—	—	—	—	—
Urchin (Dive Captain)	—	—	—	—	—	—	—	—	—	—	—
Urchin (Walk-on Dive)	—	—	—	—	—	—	—	—	—	—	—
All Fisheries	\$1,788,406	\$1,122,654	\$665,752	\$777	\$363	\$995	\$1,338	\$1,210	\$511	\$511	\$510

Fishery	Baseline GER	Estimated Costs	Baseline NER (Profit)	% Reduction in Profit							
				ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—	—	—	—
Dungeness Crab (Trap)	100%	63%	37%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Herring (Gillnet)	—	—	—	—	—	—	—	—	—	—	—
Rockfish (Fixed Gear)	100%	54%	46%	7.7%	2.4%	7.9%	7.9%	9.2%	4.0%	4.0%	4.0%
Salmon (Troll)	100%	59%	41%	1.5%	0.7%	3.5%	8.4%	3.2%	0.8%	0.8%	0.8%
Shrimp (Trap)	—	—	—	—	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—	—	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—	—	—	—	—	—	—
Urchin (Dive Captain)	—	—	—	—	—	—	—	—	—	—	—
Urchin (Walk-on Dive)	—	—	—	—	—	—	—	—	—	—	—
All Fisheries	—	—	—	0.1%	0.1%	0.1%	0.2%	0.2%	0.1%	0.1%	0.1%

Table 5: Estimated annual net economic impact for Eureka

Fishery	Baseline GER	Estimated Costs	Baseline NER (Profit)	ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
				\$ Reduction in Profit							
Anchovy/Sardine (Lampara Net)	\$44,428	\$36,875	\$7,553	\$1,483	\$1,075	\$1,075	\$1,515	\$1,483	\$1,075	\$1,075	\$1,075
Dungeness Crab (Trap)	\$5,062,040	\$3,184,061	\$1,877,978	\$5,046	\$13,877	\$27,123	\$31,854	\$24,916	\$14,508	\$14,508	\$14,508
Herring (Gillnet)	\$9,574	\$5,553	\$4,021	\$284	\$204	\$204	\$290	\$284	\$204	\$204	\$204
Rockfish (Fixed Gear)	\$51,344	\$27,673	\$23,671	\$2,738	\$2,202	\$2,421	\$3,159	\$4,641	\$2,180	\$2,180	\$2,180
Salmon (Troll)	\$202,095	\$118,692	\$83,402	\$2,285	\$1,751	\$4,357	\$4,570	\$3,301	\$1,764	\$1,764	\$1,764
Shrimp (Trap)	—	—	—	—	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	\$106,148	\$64,306	\$41,842	\$9,103	\$9,856	\$11,748	\$9,790	\$9,629	\$10,491	\$10,491	\$10,447
Surfperch (Hook and Line)	\$20,445	\$11,034	\$9,411	\$2,171	\$2,309	\$2,591	\$2,819	\$2,285	\$2,426	\$2,426	\$2,425
Urchin (Dive Captain)	—	—	—	—	—	—	—	—	—	—	—
Urchin (Walk-on Dive)	—	—	—	—	—	—	—	—	—	—	—
All Fisheries	\$5,496,074	\$3,448,196	\$2,047,879	\$23,110	\$31,273	\$49,519	\$53,998	\$46,539	\$32,649	\$32,649	\$32,604
				% Reduction in Profit							
Anchovy/Sardine (Lampara Net)	100%	83%	17%	19.6%	14.2%	14.2%	20.1%	19.6%	14.2%	14.2%	14.2%
Dungeness Crab (Trap)	100%	63%	37%	0.3%	0.7%	1.4%	1.7%	1.3%	0.8%	0.8%	0.8%
Herring (Gillnet)	100%	58%	42%	7.1%	5.1%	5.1%	7.2%	7.1%	5.1%	5.1%	5.1%
Rockfish (Fixed Gear)	100%	54%	46%	11.6%	9.3%	10.2%	13.3%	19.6%	9.2%	9.2%	9.2%
Salmon (Troll)	100%	59%	41%	2.7%	2.1%	5.2%	5.5%	4.0%	2.1%	2.1%	2.1%
Shrimp (Trap)	—	—	—	—	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	100%	61%	39%	21.8%	23.6%	28.1%	23.4%	23.0%	25.1%	25.1%	25.0%
Surfperch (Hook and Line)	100%	54%	46%	23.1%	24.5%	27.5%	29.9%	24.3%	25.8%	25.8%	25.8%
Urchin (Dive Captain)	—	—	—	—	—	—	—	—	—	—	—
Urchin (Walk-on Dive)	—	—	—	—	—	—	—	—	—	—	—
All Fisheries	—	—	—	1.1%	1.5%	2.4%	2.6%	2.3%	1.6%	1.6%	1.6%

Table 6: Estimated annual net economic impact for Shelter Cove

Fishery	Baseline GER	Estimated Costs	Baseline NER (Profit)	ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
				\$ Reduction in Profit							
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—	—	—	—
Dungeness Crab (Trap)	\$18,626	\$11,716	\$6,910	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Herring (Gillnet)	—	—	—	—	—	—	—	—	—	—	—
Rockfish (Fixed Gear)	\$14,575	\$7,856	\$6,720	\$785	\$0	\$26	\$182	\$26	\$0	\$0	\$0
Salmon (Troll)	\$63,003	\$37,003	\$26,001	\$579	\$62	\$1,087	\$2,133	\$142	\$62	\$62	\$62
Shrimp (Trap)	—	—	—	—	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—	—	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—	—	—	—	—	—	—
Urchin (Dive Captain)	—	—	—	—	—	—	—	—	—	—	—
Urchin (Walk-on Dive)	—	—	—	—	—	—	—	—	—	—	—
All Fisheries	\$96,205	\$56,574	\$39,630	\$1,365	\$62	\$1,113	\$2,315	\$167	\$62	\$62	\$62
				% Reduction in Profit							
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—	—	—	—
Dungeness Crab (Trap)	100%	63%	37%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Herring (Gillnet)	—	—	—	—	—	—	—	—	—	—	—
Rockfish (Fixed Gear)	100%	54%	46%	11.7%	0.0%	0.4%	2.7%	0.4%	0.0%	0.0%	0.0%
Salmon (Troll)	100%	59%	41%	2.2%	0.2%	4.2%	8.2%	0.5%	0.2%	0.2%	0.2%
Shrimp (Trap)	—	—	—	—	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—	—	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—	—	—	—	—	—	—
Urchin (Dive Captain)	—	—	—	—	—	—	—	—	—	—	—
Urchin (Walk-on Dive)	—	—	—	—	—	—	—	—	—	—	—
All Fisheries	—	—	—	3.4%	0.2%	2.8%	5.8%	0.4%	0.2%	0.2%	0.2%

Table 7: Estimated annual net economic impact for Fort Bragg

Fishery	Baseline GER	Estimated Costs	Baseline NER (Profit)	ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
				\$ Reduction in Profit							
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—	—	—	—
Dungeness Crab (Trap)	\$1,015,833	\$638,967	\$376,866	\$20,253	\$14,177	\$41,582	\$76,962	\$23,544	\$14,177	\$14,177	\$14,240
Herring (Gillnet)	—	—	—	—	—	—	—	—	—	—	—
Rockfish (Fixed Gear)	\$143,137	\$77,147	\$65,990	\$13,320	\$4,082	\$8,536	\$7,774	\$10,422	\$4,082	\$4,082	\$3,731
Salmon (Troll)	\$2,556,982	\$1,501,744	\$1,055,238	\$30,435	\$22,826	\$54,614	\$54,275	\$41,594	\$22,826	\$22,826	\$22,488
Shrimp (Trap)	—	—	—	—	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—	—	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—	—	—	—	—	—	—
Urchin (Dive Captain)	\$670,057	\$322,505	\$347,552	\$16,684	\$12,430	\$32,092	\$56,857	\$43,624	\$12,430	\$15,928	\$12,808
Urchin (Walk-on Dive)	\$264,179	\$79,254	\$184,926	\$9,326	\$6,948	\$17,938	\$31,781	\$24,384	\$6,948	\$8,903	\$7,159
All Fisheries	\$4,650,189	\$2,619,617	\$2,030,572	\$90,018	\$60,464	\$154,761	\$227,649	\$143,568	\$60,464	\$65,916	\$60,427

Fishery	Baseline GER	Estimated Costs	Baseline NER (Profit)	% Reduction in Profit							
				ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—	—	—	—
Dungeness Crab (Trap)	100%	63%	37%	5.4%	3.8%	11.0%	20.4%	6.2%	3.8%	3.8%	3.8%
Herring (Gillnet)	—	—	—	—	—	—	—	—	—	—	—
Rockfish (Fixed Gear)	100%	54%	46%	20.2%	6.2%	12.9%	11.8%	15.8%	6.2%	6.2%	5.7%
Salmon (Troll)	100%	59%	41%	2.9%	2.2%	5.2%	5.1%	3.9%	2.2%	2.2%	2.1%
Shrimp (Trap)	—	—	—	—	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—	—	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—	—	—	—	—	—	—
Urchin (Dive Captain)	100%	48%	52%	4.8%	3.6%	9.2%	16.4%	12.6%	3.6%	4.6%	3.7%
Urchin (Walk-on Dive)	100%	30%	70%	5.0%	3.8%	9.7%	17.2%	13.2%	3.8%	4.8%	3.9%
All Fisheries	—	—	—	4.4%	3.0%	7.6%	11.2%	7.1%	3.0%	3.2%	3.0%

Table 8: Estimated annual net economic impact for Albion

Fishery	Baseline GER	Estimated Costs	Baseline NER (Profit)	ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
				\$ Reduction in Profit							
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—	—	—	—
Dungeness Crab (Trap)	\$2,401	\$1,510	\$891	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Herring (Gillnet)	—	—	—	—	—	—	—	—	—	—	—
Rockfish (Fixed Gear)	\$22,362	\$12,053	\$10,310	\$2,219	\$72	\$290	\$490	\$433	\$72	\$72	\$42
Salmon (Troll)	\$4,362	\$2,562	\$1,800	\$32	\$19	\$52	\$47	\$39	\$19	\$19	\$19
Shrimp (Trap)	—	—	—	—	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—	—	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—	—	—	—	—	—	—
Urchin (Dive Captain)	\$226,722	\$109,124	\$117,599	\$1,263	\$864	\$2,527	\$4,942	\$3,422	\$864	\$1,103	\$896
Urchin (Walk-on Dive)	\$105,897	\$31,769	\$74,128	\$837	\$572	\$1,673	\$3,272	\$2,266	\$572	\$731	\$593
All Fisheries	\$361,745	\$157,018	\$204,727	\$4,351	\$1,526	\$4,542	\$8,752	\$6,160	\$1,526	\$1,925	\$1,550

Fishery	Baseline GER	Estimated Costs	Baseline NER (Profit)	% Reduction in Profit							
				ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—	—	—	—
Dungeness Crab (Trap)	100%	63%	37%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Herring (Gillnet)	—	—	—	—	—	—	—	—	—	—	—
Rockfish (Fixed Gear)	100%	54%	46%	21.5%	0.7%	2.8%	4.8%	4.2%	0.7%	0.7%	0.4%
Salmon (Troll)	100%	59%	41%	1.8%	1.0%	2.9%	2.6%	2.2%	1.0%	1.0%	1.0%
Shrimp (Trap)	100%	63%	37%	—	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—	—	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—	—	—	—	—	—	—
Urchin (Dive Captain)	100%	48%	52%	1.1%	0.7%	2.1%	4.2%	2.9%	0.7%	0.9%	0.8%
Urchin (Walk-on Dive)	100%	30%	70%	1.1%	0.8%	2.3%	4.4%	3.1%	0.8%	1.0%	0.8%
All Fisheries	—	—	—	2.1%	0.7%	2.2%	4.3%	3.0%	0.7%	0.9%	0.8%

Table 9: Estimated annual net economic impact for the NCSR

Fishery	Baseline GER	Estimated Costs	Baseline NER (Profit)	ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
				\$ Reduction in Profit							
Anchovy/Sardine (Lampara Net)	\$44,428	\$36,875	\$7,553	\$1,483	\$1,075	\$1,075	\$1,515	\$1,483	\$1,075	\$1,075	\$1,075
Dungeness Crab (Trap)	\$18,471,736	\$11,618,862	\$6,852,874	\$31,252	\$212,038	\$330,737	\$363,681	\$298,695	\$221,267	\$221,267	\$216,700
Herring (Gillnet)	\$11,701	\$6,787	\$4,915	\$284	\$204	\$204	\$290	\$284	\$204	\$204	\$204
Rockfish (Fixed Gear)	\$642,453	\$346,264	\$296,189	\$66,104	\$6,574	\$39,271	\$52,324	\$79,529	\$6,727	\$6,727	\$6,345
Salmon (Troll)	\$3,027,616	\$1,778,153	\$1,249,463	\$34,957	\$27,237	\$64,337	\$66,191	\$48,676	\$27,290	\$27,290	\$26,914
Shrimp (Trap)	\$251,315	\$158,029	\$93,286	\$0	\$0	\$0	\$0	\$956	\$0	\$0	\$0
Smelt (Brail – Dip Net)	\$122,680	\$74,322	\$48,358	\$10,967	\$10,813	\$12,874	\$10,765	\$10,571	\$11,503	\$11,503	\$11,459
Surfperch (Hook and Line)	\$26,431	\$14,264	\$12,167	\$3,003	\$3,156	\$3,478	\$3,620	\$3,087	\$3,242	\$3,242	\$3,241
Urchin (Dive Captain)	\$896,780	\$431,629	\$465,151	\$17,947	\$13,294	\$34,618	\$61,799	\$47,046	\$13,294	\$17,031	\$13,704
Urchin (Walk-on Dive)	\$370,076	\$111,023	\$259,053	\$10,162	\$7,520	\$19,611	\$35,053	\$26,650	\$7,520	\$9,634	\$7,752
All Fisheries	\$23,865,216	\$14,576,208	\$9,289,008	\$176,161	\$281,910	\$506,206	\$595,239	\$516,977	\$292,121	\$297,972	\$287,394
				% Reduction in Profit							
Anchovy/Sardine (Lampara Net)	100%	83%	17%	19.6%	14.2%	14.2%	20.1%	19.6%	14.2%	14.2%	14.2%
Dungeness Crab (Trap)	100%	63%	37%	0.5%	3.1%	4.8%	5.3%	4.4%	3.2%	3.2%	3.2%
Herring (Gillnet)	100%	58%	42%	5.8%	4.2%	4.2%	5.9%	5.8%	4.2%	4.2%	4.2%
Rockfish (Fixed Gear)	100%	54%	46%	22.3%	2.2%	13.3%	17.7%	26.9%	2.3%	2.3%	2.1%
Salmon (Troll)	100%	59%	41%	2.8%	2.2%	5.1%	5.3%	3.9%	2.2%	2.2%	2.2%
Shrimp (Trap)	100%	63%	37%	0.0%	0.0%	0.0%	0.0%	1.0%	0.0%	0.0%	0.0%
Smelt (Brail – Dip Net)	100%	61%	39%	22.7%	22.4%	26.6%	22.3%	21.9%	23.8%	23.8%	23.7%
Surfperch (Hook and Line)	100%	54%	46%	24.7%	25.9%	28.6%	29.8%	25.4%	26.6%	26.6%	26.6%
Urchin (Dive Captain)	100%	48%	52%	3.9%	2.9%	7.4%	13.3%	10.1%	2.9%	3.7%	2.9%
Urchin (Walk-on Dive)	100%	30%	70%	3.9%	2.9%	7.6%	13.5%	10.3%	2.9%	3.7%	3.0%
All Fisheries	—	—	—	1.9%	3.0%	5.4%	6.4%	5.6%	3.1%	3.2%	3.1%

2.3. Potential Gross Economic Impacts on Commercial Fisheries

Potential 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.

To analyze the potential gross economic impacts across the study region, we focus on the top four commercial species (i.e., Dungeness crab, salmon, urchin, and rockfish), as they comprise approximately 98.1% of the total NCSR ex-vessel revenue. Several patterns emerge from our analysis:

- The Dungeness crab fishery sees the highest range of potential impacts (in dollars)—with the exception of ExA. ExD has the highest potential impact on the Dungeness crab fishery (\$583,715), while ExA has the lowest potential impact (\$50,160).
- The rockfish fishery sees the lowest range of potential impacts (in dollars) —with the exception of ExA and ExE. ExE has the highest potential impact on the rockfish fishery (\$113,489), while ExH has the lowest potential impact (\$9,054).
- These results are essentially the same as those in section 2.2; however, the magnitude of the impacts differs.

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

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

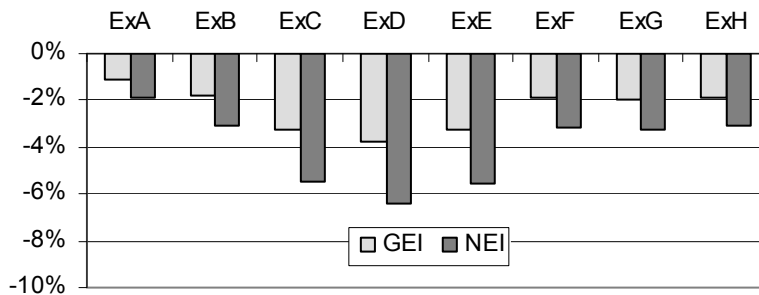
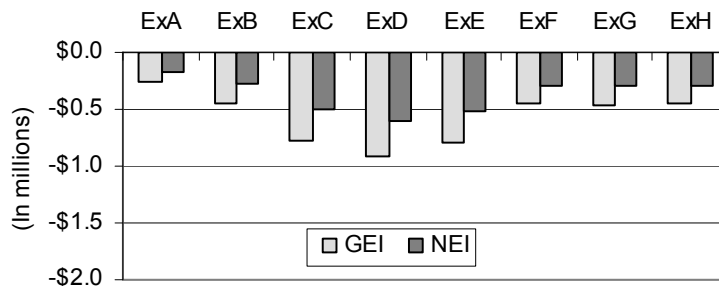


Figure 4: Estimated annual GEI (\$ reduction in revenue) and NEI (\$ reduction in profit) on commercial fisheries (in millions)



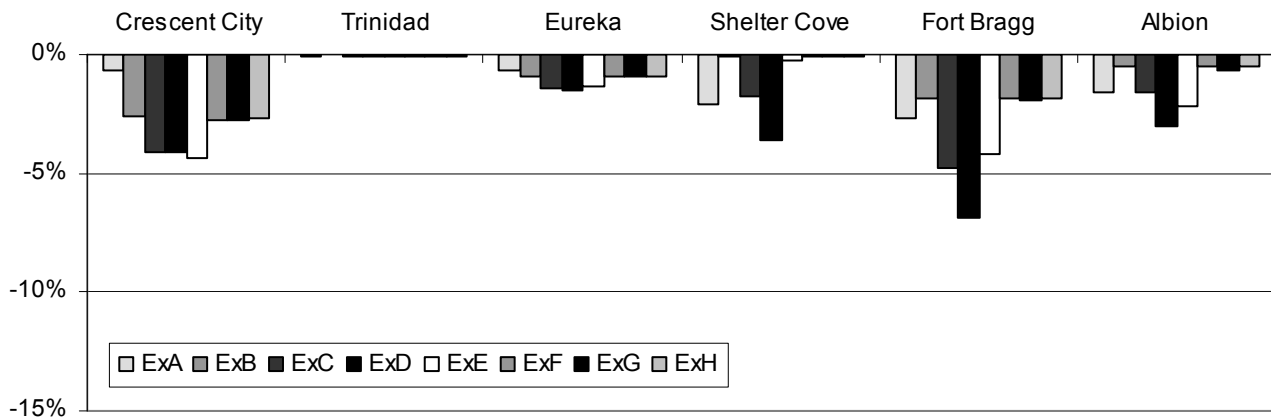
The potential impacts from each proposal are broken out by port in Table 10 and Figure 5. On average, Fort Bragg is the port estimated to see the highest potential GEI (as a percentage), while Trinidad is estimated to see the lowest potential impact.

Tables 11–17 show potential gross economic impacts by fishery for each port and for the NCSR.

Table 10: Estimated annual gross economic impact on commercial fisheries by port (reduction in revenue)

Port	Baseline GER	ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
		\$ Reduction in Revenue							
Crescent City	\$11,501,714	\$81,893	\$301,537	\$468,330	\$475,803	\$503,191	\$315,469	\$315,469	\$307,982
Trinidad	\$1,788,406	\$1,115	\$540	\$1,453	\$1,983	\$1,778	\$752	\$752	\$750
Eureka	\$5,496,074	\$35,729	\$48,505	\$77,162	\$84,800	\$72,796	\$50,594	\$50,594	\$50,529
Shelter Cove	\$96,205	\$1,997	\$95	\$1,681	\$3,485	\$251	\$95	\$95	\$95
Fort Bragg	\$4,819,786	\$130,519	\$87,670	\$228,542	\$330,884	\$203,590	\$87,670	\$94,583	\$87,507
Albion	\$361,745	\$5,843	\$1,927	\$5,748	\$11,049	\$7,795	\$1,927	\$2,426	\$1,951
NCSR	\$24,063,930⁶	\$257,097	\$440,274	\$782,916	\$908,004	\$789,401	\$456,507	\$463,920	\$448,812
		% Reduction in Revenue							
Crescent City	100%	0.7%	2.6%	4.1%	4.1%	4.4%	2.7%	2.7%	2.7%
Trinidad	100%	0.1%	0.0%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%
Eureka	100%	0.7%	0.9%	1.4%	1.5%	1.3%	0.9%	0.9%	0.9%
Shelter Cove	100%	2.1%	0.1%	1.7%	3.6%	0.3%	0.1%	0.1%	0.1%
Fort Bragg	100%	2.7%	1.8%	4.7%	6.9%	4.2%	1.8%	2.0%	1.8%
Albion	100%	1.6%	0.5%	1.6%	3.1%	2.2%	0.5%	0.7%	0.5%
NCSR	—	1.1%	1.8%	3.3%	3.8%	3.3%	1.9%	1.9%	1.9%

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



⁶ This total includes the revenue reported by our five seaweed survey respondents, who represent approximately 69% of the total poundage of seaweed landed in the NCSR. For reporting purposes, four survey respondents who operate across the Fort Bragg, Albion, and Elk areas were indicated as operating out of Fort Bragg and one survey respondent who operates out of both Crescent City and Trinidad was indicated as operating out of Crescent City.

Table 11: Estimated annual gross economic impact for Crescent City

Fishery	Baseline GER	ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
		\$ Reduction in Revenue							
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—	—
Dungeness Crab (Trap)	\$10,615,878	\$9,554	\$295,121	\$420,389	\$408,711	\$401,280	\$308,922	\$308,922	\$301,491
Herring (Seine)	\$2,127	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Rockfish (Fixed Gear)	\$391,258	\$66,123	\$0	\$38,930	\$57,085	\$90,146	\$39	\$39	\$39
Salmon (Troll)	\$189,503	\$2,350	\$3,847	\$6,140	\$7,201	\$5,211	\$3,904	\$3,904	\$3,847
Seaweed (Hand Harvest)	\$29,116 ⁷	\$0	\$0	\$0	\$274	\$2,562	\$0	\$0	\$0
Shrimp (Trap)	\$251,315	\$0	\$0	\$0	\$0	\$1,508	\$0	\$0	\$0
Smelt (Brail – Dip Net)	\$16,532	\$2,708	\$1,390	\$1,637	\$1,417	\$1,369	\$1,470	\$1,470	\$1,470
Surfperch (Hook and Line)	\$5,986	\$1,159	\$1,179	\$1,235	\$1,115	\$1,115	\$1,135	\$1,135	\$1,135
Urchin (Dive)	—	—	—	—	—	—	—	—	—
All Fisheries	\$11,501,714	\$81,893	\$301,537	\$468,330	\$475,803	\$503,191	\$315,469	\$315,469	\$307,982

Fishery	Baseline GER	% Reduction in Revenue							
		ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—	—
Dungeness Crab (Trap)	100%	0.1%	2.8%	4.0%	3.9%	3.8%	2.9%	2.9%	2.8%
Herring (Seine)	100%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Rockfish (Fixed Gear)	100%	16.9%	0.0%	10.0%	14.6%	23.0%	0.0%	0.0%	0.0%
Salmon (Troll)	100%	1.2%	2.0%	3.2%	3.8%	2.8%	2.1%	2.1%	2.0%
Seaweed (Hand Harvest)	100%	0.0%	0.0%	0.0%	0.9%	8.8%	0.0%	0.0%	0.0%
Shrimp (Trap)	100%	0.0%	0.0%	0.0%	0.0%	0.6%	0.0%	0.0%	0.0%
Smelt (Brail – Dip Net)	100%	16.4%	8.4%	9.9%	8.6%	8.3%	8.9%	8.9%	8.9%
Surfperch (Hook and Line)	100%	19.4%	19.7%	20.6%	18.6%	18.6%	19.0%	19.0%	19.0%
Urchin (Dive)	—	—	—	—	—	—	—	—	—
All Fisheries	—	0.7%	2.6%	4.1%	4.1%	4.4%	2.7%	2.7%	2.7%

⁷ We obtained permission to display this value from the seaweed survey respondent who is indicated as operating out of Crescent City.

Table 12: Estimated annual gross economic impact for Trinidad

Fishery	Baseline GER	ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
		\$ Reduction in Revenue							
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—	—
Dungeness Crab (Trap)	\$1,756,959	\$0	\$176	\$176	\$351	\$351	\$176	\$176	\$176
Herring (Seine)	—	—	—	—	—	—	—	—	—
Rockfish (Fixed Gear)	\$19,776	\$1,007	\$310	\$1,024	\$1,022	\$1,194	\$520	\$520	\$518
Salmon (Troll)	\$11,671	\$109	\$54	\$253	\$609	\$232	\$56	\$56	\$56
Seaweed (Hand Harvest)	—	—	—	—	—	—	—	—	—
Shrimp (Trap)	—	—	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—	—	—	—	—
Urchin (Dive)	—	—	—	—	—	—	—	—	—
All Fisheries	\$1,788,406	\$1,115	\$540	\$1,453	\$1,983	\$1,778	\$752	\$752	\$750
		% Reduction in Revenue							
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—	—
Dungeness Crab (Trap)	100%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Herring (Seine)	—	—	—	—	—	—	—	—	—
Rockfish (Fixed Gear)	100%	5.1%	1.6%	5.2%	5.2%	6.0%	2.6%	2.6%	2.6%
Salmon (Troll)	100%	0.9%	0.5%	2.2%	5.2%	2.0%	0.5%	0.5%	0.5%
Seaweed (Hand Harvest)	—	—	—	—	—	—	—	—	—
Shrimp (Trap)	—	—	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—	—	—	—	—
Urchin (Dive)	—	—	—	—	—	—	—	—	—
All Fisheries	—	0.1%	0.0%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%

Table 13: Estimated annual gross economic impact for Eureka

Fishery	Baseline GER	ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
		\$ Reduction in Revenue							
Anchovy/Sardine (Lampara Net)	\$44,428	\$3,532	\$2,559	\$2,559	\$3,608	\$3,532	\$2,559	\$2,559	\$2,559
Dungeness Crab (Trap)	\$5,062,040	\$8,099	\$22,273	\$43,534	\$51,127	\$39,990	\$23,285	\$23,285	\$23,285
Herring (Seine)	\$9,574	\$489	\$352	\$352	\$501	\$489	\$352	\$352	\$352
Rockfish (Fixed Gear)	\$51,344	\$3,907	\$3,142	\$3,455	\$4,508	\$6,623	\$3,111	\$3,111	\$3,111
Salmon (Troll)	\$202,095	\$3,456	\$2,647	\$6,588	\$6,912	\$4,992	\$2,668	\$2,668	\$2,668
Seaweed (Hand Harvest)	—	—	—	—	—	—	—	—	—
Shrimp (Trap)	—	—	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	\$106,148	\$13,226	\$14,319	\$17,069	\$14,224	\$13,990	\$15,243	\$15,243	\$15,179
Surfperch (Hook and Line)	\$20,445	\$3,020	\$3,212	\$3,605	\$3,921	\$3,179	\$3,376	\$3,376	\$3,373
Urchin (Dive)	—	—	—	—	—	—	—	—	—
All Fisheries	\$5,496,074	\$35,729	\$48,505	\$77,162	\$84,800	\$72,796	\$50,594	\$50,594	\$50,529
		% Reduction in Revenue							
Anchovy/Sardine (Lampara Net)	100%	8.0%	5.8%	5.8%	8.1%	8.0%	5.8%	5.8%	5.8%
Dungeness Crab (Trap)	100%	0.2%	0.4%	0.9%	1.0%	0.8%	0.5%	0.5%	0.5%
Herring (Seine)	100%	5.1%	3.7%	3.7%	5.2%	5.1%	3.7%	3.7%	3.7%
Rockfish (Fixed Gear)	100%	7.6%	6.1%	6.7%	8.8%	12.9%	6.1%	6.1%	6.1%
Salmon (Troll)	100%	1.7%	1.3%	3.3%	3.4%	2.5%	1.3%	1.3%	1.3%
Seaweed (Hand Harvest)	—	—	—	—	—	—	—	—	—
Shrimp (Trap)	—	—	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	100%	12.5%	13.5%	16.1%	13.4%	13.2%	14.4%	14.4%	14.3%
Surfperch (Hook and Line)	100%	14.8%	15.7%	17.6%	19.2%	15.6%	16.5%	16.5%	16.5%
Urchin (Dive)	—	—	—	—	—	—	—	—	—
All Fisheries	—	0.7%	0.9%	1.4%	1.5%	1.3%	0.9%	0.9%	0.9%

Table 14: Estimated annual gross economic impact for Shelter Cove

Fishery	Baseline GER	ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
		\$ Reduction in Revenue							
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—	—
Dungeness Crab (Trap)	\$18,626	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Herring (Seine)	—	—	—	—	—	—	—	—	—
Rockfish (Fixed Gear)	\$14,575	\$1,121	\$0	\$36	\$259	\$36	\$0	\$0	\$0
Salmon (Troll)	\$63,003	\$876	\$95	\$1,644	\$3,226	\$214	\$95	\$95	\$95
Seaweed (Hand Harvest)	—	—	—	—	—	—	—	—	—
Shrimp (Trap)	—	—	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—	—	—	—	—
Urchin (Dive)	—	—	—	—	—	—	—	—	—
All Fisheries	\$96,205	\$1,997	\$95	\$1,681	\$3,485	\$251	\$95	\$95	\$95
		% Reduction in Revenue							
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—	—
Dungeness Crab (Trap)	100%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Herring (Seine)	—	—	—	—	—	—	—	—	—
Rockfish (Fixed Gear)	100%	7.7%	0.0%	0.3%	1.8%	0.3%	0.0%	0.0%	0.0%
Salmon (Troll)	100%	1.4%	0.2%	2.6%	5.1%	0.3%	0.2%	0.2%	0.2%
Seaweed (Hand Harvest)	—	—	—	—	—	—	—	—	—
Shrimp (Trap)	—	—	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—	—	—	—	—
Urchin (Dive)	—	—	—	—	—	—	—	—	—
All Fisheries	—	2.1%	0.1%	1.7%	3.6%	0.3%	0.1%	0.1%	0.1%

Table 15: Estimated annual gross economic impact for Fort Bragg

Fishery	Baseline GER	ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
		\$ Reduction in Revenue							
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—	—
Dungeness Crab (Trap)	\$1,015,833	\$32,507	\$22,755	\$66,740	\$123,525	\$37,789	\$22,755	\$22,755	\$22,856
Herring (Seine)	—	—	—	—	—	—	—	—	—
Rockfish (Fixed Gear)	\$143,137	\$19,009	\$5,826	\$12,181	\$11,093	\$14,872	\$5,826	\$5,826	\$5,325
Salmon (Troll)	\$2,556,982	\$46,026	\$34,519	\$82,591	\$82,079	\$62,902	\$34,519	\$34,519	\$34,008
Seaweed (Hand Harvest)	\$169,597	\$0	\$0	\$3,595	\$1,798	\$1,798	\$0	\$0	\$0
Shrimp (Trap)	—	—	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—	—	—	—	—
Urchin (Dive)	\$934,237	\$32,979	\$24,570	\$63,435	\$112,389	\$86,230	\$24,570	\$31,484	\$25,318
All Fisheries	\$4,819,786	\$130,519	\$87,670	\$228,542	\$330,884	\$203,590	\$87,670	\$94,583	\$87,507

Fishery	Baseline GER	% Reduction in Revenue							
		ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—	—
Dungeness Crab (Trap)	100%	3.2%	2.2%	6.6%	12.2%	3.7%	2.2%	2.2%	2.3%
Herring (Seine)	—	—	—	—	—	—	—	—	—
Rockfish (Fixed Gear)	100%	13.3%	4.1%	8.5%	7.8%	10.4%	4.1%	4.1%	3.7%
Salmon (Troll)	100%	1.8%	1.4%	3.2%	3.2%	2.5%	1.4%	1.4%	1.3%
Seaweed (Hand Harvest)	100%	0.0%	0.0%	2.1%	1.1%	1.1%	0.0%	0.0%	0.0%
Shrimp (Trap)	—	—	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—	—	—	—	—
Urchin (Dive)	100%	3.5%	2.6%	6.8%	12.0%	9.2%	2.6%	3.4%	2.7%
All Fisheries	—	2.7%	1.8%	4.7%	6.9%	4.2%	1.8%	2.0%	1.8%

Table 16: Estimated annual gross economic impact for Albion

Fishery	Baseline GER	ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
		\$ Reduction in Revenue							
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—	—
Dungeness Crab (Trap)	\$2,401	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Herring (Seine)	—	—	—	—	—	—	—	—	—
Rockfish (Fixed Gear)	\$22,362	\$3,167	\$103	\$414	\$700	\$617	\$103	\$103	\$60
Salmon (Troll)	\$4,362	\$49	\$28	\$79	\$72	\$59	\$28	\$28	\$28
Seaweed (Hand Harvest)	—	—	—	—	—	—	—	—	—
Shrimp (Trap)	—	—	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—	—	—	—	—
Urchin (Dive)	\$332,619	\$2,628	\$1,796	\$5,255	\$10,278	\$7,118	\$1,796	\$2,295	\$1,863
All Fisheries	\$361,745	\$5,843	\$1,927	\$5,748	\$11,049	\$7,795	\$1,927	\$2,426	\$1,951
		% Reduction in Revenue							
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—	—
Dungeness Crab (Trap)	100%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Herring (Seine)	—	—	—	—	—	—	—	—	—
Rockfish (Fixed Gear)	100%	14.2%	0.5%	1.9%	3.1%	2.8%	0.5%	0.5%	0.3%
Salmon (Troll)	100%	1.1%	0.7%	1.8%	1.6%	1.4%	0.7%	0.7%	0.7%
Seaweed (Hand Harvest)	—	—	—	—	—	—	—	—	—
Shrimp (Trap)	—	—	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—	—	—	—	—
Urchin (Dive)	100%	0.8%	0.5%	1.6%	3.1%	2.1%	0.5%	0.7%	0.6%
All Fisheries	—	1.6%	0.5%	1.6%	3.1%	2.2%	0.5%	0.7%	0.5%

Table 17: Estimated annual gross economic impact for the NCSR

Fishery	Baseline GER	ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
		\$ Reduction in Revenue							
Anchovy/Sardine (Lampara Net)	\$44,428	\$3,532	\$2,559	\$2,559	\$3,608	\$3,532	\$2,559	\$2,559	\$2,559
Dungeness Crab (Trap)	\$18,471,736	\$50,160	\$340,325	\$530,838	\$583,715	\$479,411	\$355,138	\$355,138	\$347,808
Herring (Seine)	\$11,701	\$489	\$352	\$352	\$501	\$489	\$352	\$352	\$352
Rockfish (Fixed Gear)	\$642,453	\$94,332	\$9,381	\$56,041	\$74,668	\$113,489	\$9,599	\$9,599	\$9,054
Salmon (Troll)	\$3,027,616	\$52,864	\$41,190	\$97,295	\$100,098	\$73,611	\$41,270	\$41,270	\$40,701
Seaweed (Hand Harvest)	\$198,714	\$0	\$0	\$3,595	\$2,071	\$4,360	\$0	\$0	\$0
Shrimp (Trap)	\$251,315	\$0	\$0	\$0	\$0	\$1,508	\$0	\$0	\$0
Smelt (Brail – Dip Net)	\$122,680	\$15,934	\$15,710	\$18,705	\$15,641	\$15,359	\$16,713	\$16,713	\$16,649
Surfperch (Hook and Line)	\$26,431	\$4,179	\$4,391	\$4,839	\$5,037	\$4,294	\$4,510	\$4,510	\$4,508
Urchin (Dive)	\$1,266,856	\$35,606	\$26,367	\$68,690	\$122,667	\$93,348	\$26,367	\$33,779	\$27,180
All Fisheries	\$24,063,930⁸	\$257,097	\$440,274	\$782,916	\$908,004	\$789,401	\$456,507	\$463,920	\$448,812

		% Reduction in Revenue							
Anchovy/Sardine (Lampara Net)	100%	8.0%	5.8%	5.8%	8.1%	8.0%	5.8%	5.8%	5.8%
Dungeness Crab (Trap)	100%	0.3%	1.8%	2.9%	3.2%	2.6%	1.9%	1.9%	1.9%
Herring (Seine)	100%	4.2%	3.0%	3.0%	4.3%	4.2%	3.0%	3.0%	3.0%
Rockfish (Fixed Gear)	100%	14.7%	1.5%	8.7%	11.6%	17.7%	1.5%	1.5%	1.4%
Salmon (Troll)	100%	1.7%	1.4%	3.2%	3.3%	2.4%	1.4%	1.4%	1.3%
Seaweed (Hand Harvest)	100%	0.0%	0.0%	1.8%	1.0%	2.2%	0.0%	0.0%	0.0%
Shrimp (Trap)	100%	0.0%	0.0%	0.0%	0.0%	0.6%	0.0%	0.0%	0.0%
Smelt (Brail – Dip Net)	100%	13.0%	12.8%	15.2%	12.7%	12.5%	13.6%	13.6%	13.6%
Surfperch (Hook and Line)	100%	15.8%	16.6%	18.3%	19.1%	16.2%	17.1%	17.1%	17.1%
Urchin (Dive)	100%	2.8%	2.1%	5.4%	9.7%	7.4%	2.1%	2.7%	2.1%
All Fisheries	—	1.1%	1.8%	3.3%	3.8%	3.3%	1.9%	1.9%	1.9%

⁸ This total includes the revenue reported by our five seaweed survey respondents, who represent approximately 69% of the total poundage of seaweed landed in the NCSR.

2.4. Disproportionate Impacts on Commercial Fisheries

We also evaluate whether there are port-fishery combinations that may be disproportionately affected by the MPA proposals considered.

To assess these impacts, we use a box plot analysis (see Figure A.1 in Appendix A) to identify outliers within each fishery (calculated using estimated impacts on the stated value of total fishing grounds). 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 18) can also inform convergence among MPA proposals within a fishery and/or relative potential impacts between fisheries.

Table 18: Disproportionately impacted commercial fisheries

Port	Fishery	MPA Proposal(s)	Estimated Impact on Stated Value of Total Fishing Grounds
Crescent City	Rockfish	ExE	23.0%
Crescent City	Seaweed	ExE	8.8%
Fort Bragg	Dungeness crab	ExC, ExD	6.6%, 12.2%
Fort Bragg	Urchin	ExD, ExE	12.0%, 9.2%
Shelter Cove	Salmon	ExD	5.1%
Trinidad	Salmon	ExD	5.2%

3. RESULTS FOR COMMERCIAL PASSENGER FISHING VESSELS (CPFV)

We summarize here our analysis of the potential impacts on the five CPFV fisheries: California halibut, Dungeness crab, Pacific halibut, rockfish/bottomfish, and salmon. The rockfish/bottomfish fishery includes lingcod and the nearshore and deeper nearshore fish species, which were combined at the recommendation of the NCSR fishing community into a single fishery. The results for CPFV fisheries are broken out by port group (i.e., Crescent City, Trinidad, Eureka, Shelter Cove, and Fort Bragg).

3.1. 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 port-fishery combinations considered, please see Tables A.3–4 in Appendix A.

3.2. Potential Net Economic Impacts on CPFV Fisheries

Similar to our analysis of the commercial fisheries, we calculate the potential net economic impact (NEI) on the CPFV fisheries as the average percentage reduction in net economic revenue across the fisheries considered in each port (for a list of fisheries considered in each port, please see *Draft Survey Methods and Summary Statistics for Ecotrust's North Coast Study Region Fishery Uses and Values Project*). Unlike the commercial fisheries, however, we assume a similar cost structure across the CPFV port groups for reasons of confidentiality (i.e., $n = 22$).

Table 19 and Figure 6 summarize the MPA proposals with the estimated highest and lowest potential annual net economic impact (for associated values, see Table 20). On average, ExE is estimated to have the highest potential NEI across the study region, while ExH is estimated to have the lowest potential NEI.

**Table 19: 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	
Crescent City	3.8%	ExA	0.0%	ExB, ExF, ExG, ExH
Trinidad	7.3%	ExD	0.6%	ExB
Eureka	4.8%	ExE	0.4%	ExC
Shelter Cove	46.7%	ExE	21.9%	ExB, ExF, ExG, ExH
Fort Bragg	21.3%	ExE	7.9%	ExD
NCSR	15.1%	ExE	6.6%	ExH

The potential impacts from each proposal are broken out by port in Table 20. On average, Shelter Cove is the port estimated to see the highest potential net economic impact (as a percentage), while Crescent City is estimated to see the lowest potential impact.

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

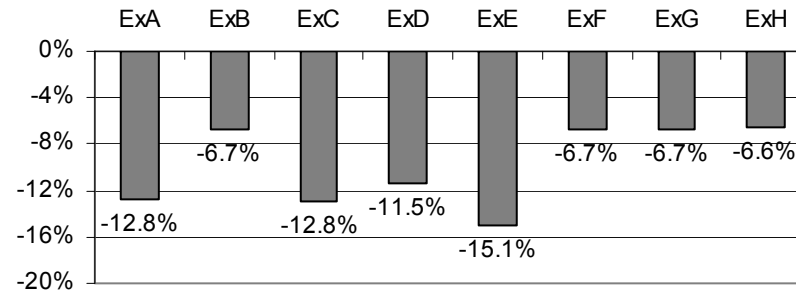


Table 20: Estimated annual net economic impact on CPFV fisheries by port (reduction in profit)

Port	Baseline GER	Estimated Costs	Baseline NER (Profit)	ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
				% Reduction in Profit							
Crescent City	100%	51.8%	48.2%	3.8%	0.0%	0.2%	0.3%	1.5%	0.0%	0.0%	0.0%
Trinidad	100%	51.8%	48.2%	1.8%	0.6%	1.2%	7.3%	1.0%	0.7%	0.7%	0.7%
Eureka	100%	51.8%	48.2%	0.9%	1.3%	0.4%	0.6%	4.8%	1.3%	1.3%	1.3%
Shelter Cove	100%	51.8%	48.2%	39.1%	21.9%	45.7%	41.2%	46.7%	21.9%	21.9%	21.9%
Fort Bragg	100%	51.8%	48.2%	18.6%	9.5%	16.7%	7.9%	21.3%	9.5%	9.5%	9.1%
NCSR	100%	51.8%	48.2%	12.8%	6.7%	12.8%	11.5%	15.1%	6.7%	6.7%	6.6%

3.3. 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 2.4.

Figure A.2 in Appendix A presents the box plot analysis for the CPFV fisheries (calculated using estimated impacts on the stated value of total fishing grounds). Table 21 presents box plot analysis results.

Shelter Cove Pacific halibut, while not a statistically significant outlier, practically speaking, may be disproportionately impacted given the relative proximity of certain points to the statistically significant port-fishery combinations on the box plot.

Table 21: Disproportionately impacted CPFV fisheries

Port	Fishery	MPA Proposal(s)	Estimated Impact on Stated Value of Total Fishing Grounds
Eureka	Rockfish/Bottomfish	ExE	13.7%
Fort Bragg	Dungeness crab	ExA, ExB, ExC, ExE, ExF, ExG, ExH	16.3%, 9.0%, 16.7%, 17.3%, 9.0%, 9.0%, 9.0%
Fort Bragg	Salmon	ExC, ExE	13.3%, 15.5%
Fort Bragg	Rockfish/Bottomfish	ExA, ExD, ExE	15.5%, 13.6%, 15.2%
Shelter Cove	Pacific Halibut	ExA, ExB, ExC, ExD, ExE, ExF, ExG, ExH	78.0%, 49.2%, 97.7%, 78.0%, 97.7%, 49.2%, 49.2%, 49.2%
Trinidad	Rockfish/Bottomfish	ExD	11.8%

4. RESULTS FOR RECREATIONAL FISHERIES

We summarize here our analysis of the potential impacts on the six recreational fisheries: abalone (dive only), California halibut, Dungeness crab, Pacific halibut, rockfish/bottomfish, and salmon. The rockfish/bottomfish fishery includes lingcod and the deeper nearshore and nearshore fish species, which were combined at the recommendation of the NCSR fishing community into a single fishery. The results for recreational fisheries are broken out by user group (i.e., dive, kayak, and private vessel) and by port group (i.e., Crescent City, Trinidad, Eureka, Shelter Cove, and Fort Bragg/Albion).

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

Each proposal impacts the recreational fishing grounds differently. Due to the large number of fisheries, user groups, and port groups considered, we present potential impacts (both in terms of total area and stated value) in Tables A.5–A.20 in Appendix A.

APPENDIX A: SUMMARY TABLES OF POTENTIAL IMPACTS

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

Port	Fishery	ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
Crescent City	Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—
	Dungeness Crab (Trap)	0.3%	1.0%	1.6%	1.8%	1.5%	1.0%	1.0%	1.0%
	Herring (Gillnet)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Rockfish (Fixed Gear)	9.3%	1.0%	5.1%	11.1%	9.2%	1.2%	1.2%	1.2%
	Salmon (Troll)	0.5%	1.0%	1.3%	1.7%	1.2%	1.0%	1.0%	1.0%
	Seaweed (Hand Harvest) ⁹	0.0%	0.0%	0.0%	9.4%	4.0%	0.0%	0.0%	0.0%
	Shrimp (Trap)	0.0%	0.0%	0.0%	0.0%	3.0%	0.0%	0.0%	0.0%
	Smelt (Brail – Dip Net)	7.5%	4.6%	5.4%	4.6%	4.3%	4.6%	4.6%	4.6%
	Surfperch (Hook and Line)	6.4%	6.9%	8.2%	6.0%	6.0%	6.4%	6.4%	6.4%
	Urchin (Dive)	—	—	—	—	—	—	—	—
Trinidad	Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—
	Dungeness Crab (Trap)	0.0%	1.9%	2.6%	2.6%	2.9%	1.9%	1.9%	1.9%
	Herring (Gillnet)	—	—	—	—	—	—	—	—
	Rockfish (Fixed Gear)	8.4%	2.2%	5.8%	9.6%	7.0%	2.6%	2.6%	2.5%
	Salmon (Troll)	1.5%	1.4%	2.4%	3.2%	2.0%	1.5%	1.5%	1.5%
	Seaweed (Hand Harvest)	—	—	—	—	—	—	—	—
	Shrimp (Trap)	—	—	—	—	—	—	—	—
	Smelt (Brail – Dip Net)	—	—	—	—	—	—	—	—
	Surfperch (Hook and Line)	—	—	—	—	—	—	—	—
	Urchin (Dive)	—	—	—	—	—	—	—	—
Eureka	Anchovy/Sardine (Lampara Net)	22.6%	16.4%	16.4%	23.1%	22.6%	16.4%	16.4%	16.4%
	Dungeness Crab (Trap)	0.8%	2.6%	3.8%	4.3%	3.5%	2.6%	2.6%	2.6%
	Herring (Gillnet)	17.4%	12.5%	12.5%	17.7%	17.4%	12.5%	12.5%	12.5%
	Rockfish (Fixed Gear)	10.7%	4.4%	7.5%	12.0%	12.6%	4.6%	4.6%	4.6%
	Salmon (Troll)	0.6%	1.2%	1.6%	2.1%	1.4%	1.2%	1.2%	1.2%
	Seaweed (Hand Harvest)	—	—	—	—	—	—	—	—
	Shrimp (Trap)	—	—	—	—	—	—	—	—
	Smelt (Brail – Dip Net)	6.6%	8.8%	5.4%	4.4%	4.4%	8.6%	8.6%	7.7%
	Surfperch (Hook and Line)	3.9%	7.8%	4.4%	8.2%	3.4%	7.6%	7.6%	7.0%
	Urchin (Dive)	—	—	—	—	—	—	—	—

⁹ These values represent impacts on seaweed harvesters who operate out of both Crescent City and Trinidad.

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

Port	Fishery	ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
Shelter Cove	Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—
	Dungeness Crab (Trap)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Herring (Gillnet)	—	—	—	—	—	—	—	—
	Rockfish (Fixed Gear)	10.6%	0.0%	2.2%	10.6%	2.2%	0.0%	0.0%	0.0%
	Salmon (Troll)	0.5%	0.6%	1.2%	1.8%	1.1%	0.6%	0.6%	0.6%
	Seaweed (Hand Harvest)	—	—	—	—	—	—	—	—
	Shrimp (Trap)	—	—	—	—	—	—	—	—
	Smelt (Brail – Dip Net)	—	—	—	—	—	—	—	—
	Surfperch (Hook and Line)	—	—	—	—	—	—	—	—
	Urchin (Dive)	—	—	—	—	—	—	—	—
Fort Bragg	Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—
	Dungeness Crab (Trap)	0.8%	2.9%	4.3%	5.0%	4.4%	3.0%	3.0%	2.8%
	Herring (Gillnet)	—	—	—	—	—	—	—	—
	Rockfish (Fixed Gear)	11.5%	3.8%	6.0%	9.7%	9.9%	3.8%	3.8%	3.7%
	Salmon (Troll)	0.4%	0.9%	1.2%	1.5%	1.1%	0.9%	0.9%	0.9%
	Seaweed (Hand Harvest) ¹⁰	0.0%	0.0%	2.0%	1.0%	1.0%	0.0%	0.0%	0.0%
	Shrimp (Trap)	—	—	—	—	—	—	—	—
	Smelt (Brail – Dip Net)	—	—	—	—	—	—	—	—
	Surfperch (Hook and Line)	—	—	—	—	—	—	—	—
	Urchin (Dive)	2.9%	1.9%	5.7%	9.7%	7.8%	1.9%	2.1%	1.9%
Albion	Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—
	Dungeness Crab (Trap)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Herring (Gillnet)	—	—	—	—	—	—	—	—
	Rockfish (Fixed Gear)	11.5%	0.3%	2.0%	5.3%	4.4%	0.3%	0.3%	0.2%
	Salmon (Troll)	0.8%	0.5%	1.2%	1.2%	1.0%	0.5%	0.5%	0.5%
	Seaweed (Hand Harvest)	—	—	—	—	—	—	—	—
	Shrimp (Trap)	—	—	—	—	—	—	—	—
	Smelt (Brail – Dip Net)	—	—	—	—	—	—	—	—
	Surfperch (Hook and Line)	—	—	—	—	—	—	—	—
	Urchin (Dive)	2.9%	1.9%	5.7%	9.7%	7.8%	1.9%	2.1%	1.9%

¹⁰ These values represent impacts on seaweed harvesters who operate across the Fort Bragg, Albion, and Elk areas.

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

Port	Fishery	ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
Crescent City	Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—
	Dungeness Crab (Trap)	0.1%	2.8%	4.0%	3.9%	3.8%	2.9%	2.9%	2.8%
	Herring (Gillnet)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Rockfish (Fixed Gear)	16.9%	0.0%	10.0%	14.6%	23.0%	0.0%	0.0%	0.0%
	Salmon (Troll)	1.2%	2.0%	3.2%	3.8%	2.8%	2.1%	2.1%	2.0%
	Seaweed (Hand Harvest) ¹¹	0.0%	0.0%	0.0%	0.9%	8.8%	0.0%	0.0%	0.0%
	Shrimp (Trap)	0.0%	0.0%	0.0%	0.0%	0.6%	0.0%	0.0%	0.0%
	Smelt (Brail – Dip Net)	16.4%	8.4%	9.9%	8.6%	8.3%	8.9%	8.9%	8.9%
	Surfperch (Hook and Line)	19.4%	19.7%	20.6%	18.6%	18.6%	19.0%	19.0%	19.0%
Urchin (Dive)	—	—	—	—	—	—	—	—	
Trinidad	Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—
	Dungeness Crab (Trap)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Herring (Gillnet)	—	—	—	—	—	—	—	—
	Rockfish (Fixed Gear)	5.1%	1.6%	5.2%	5.2%	6.0%	2.6%	2.6%	2.6%
	Salmon (Troll)	0.9%	0.5%	2.2%	5.2%	2.0%	0.5%	0.5%	0.5%
	Seaweed (Hand Harvest)	—	—	—	—	—	—	—	—
	Shrimp (Trap)	—	—	—	—	—	—	—	—
	Smelt (Brail – Dip Net)	—	—	—	—	—	—	—	—
	Surfperch (Hook and Line)	—	—	—	—	—	—	—	—
Urchin (Dive)	—	—	—	—	—	—	—	—	
Eureka	Anchovy/Sardine (Lampara Net)	8.0%	5.8%	5.8%	8.1%	8.0%	5.8%	5.8%	5.8%
	Dungeness Crab (Trap)	0.2%	0.4%	0.9%	1.0%	0.8%	0.5%	0.5%	0.5%
	Herring (Gillnet)	5.1%	3.7%	3.7%	5.2%	5.1%	3.7%	3.7%	3.7%
	Rockfish (Fixed Gear)	7.6%	6.1%	6.7%	8.8%	12.9%	6.1%	6.1%	6.1%
	Salmon (Troll)	1.7%	1.3%	3.3%	3.4%	2.5%	1.3%	1.3%	1.3%
	Seaweed (Hand Harvest)	—	—	—	—	—	—	—	—
	Shrimp (Trap)	—	—	—	—	—	—	—	—
	Smelt (Brail – Dip Net)	12.5%	13.5%	16.1%	13.4%	13.2%	14.4%	14.4%	14.3%
	Surfperch (Hook and Line)	14.8%	15.7%	17.6%	19.2%	15.6%	16.5%	16.5%	16.5%
Urchin (Dive)	—	—	—	—	—	—	—	—	

¹¹ These values represent impacts on seaweed harvesters who operate out of both Crescent City and Trinidad.

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

Port	Fishery	ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
Shelter Cove	Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—
	Dungeness Crab (Trap)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Herring (Gillnet)	—	—	—	—	—	—	—	—
	Rockfish (Fixed Gear)	7.7%	0.0%	0.3%	1.8%	0.3%	0.0%	0.0%	0.0%
	Salmon (Troll)	1.4%	0.2%	2.6%	5.1%	0.3%	0.2%	0.2%	0.2%
	Seaweed (Hand Harvest)	—	—	—	—	—	—	—	—
	Shrimp (Trap)	—	—	—	—	—	—	—	—
	Smelt (Brail – Dip Net)	—	—	—	—	—	—	—	—
	Surfperch (Hook and Line)	—	—	—	—	—	—	—	—
	Urchin (Dive)	—	—	—	—	—	—	—	—
Fort Bragg	Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—
	Dungeness Crab (Trap)	3.2%	2.2%	6.6%	12.2%	3.7%	2.2%	2.2%	2.3%
	Herring (Gillnet)	—	—	—	—	—	—	—	—
	Rockfish (Fixed Gear)	13.3%	4.1%	8.5%	7.8%	10.4%	4.1%	4.1%	3.7%
	Salmon (Troll)	1.8%	1.4%	3.2%	3.2%	2.5%	1.4%	1.4%	1.3%
	Seaweed (Hand Harvest) ¹²	0.0%	0.0%	2.1%	1.1%	1.1%	0.0%	0.0%	0.0%
	Shrimp (Trap)	—	—	—	—	—	—	—	—
	Smelt (Brail – Dip Net)	—	—	—	—	—	—	—	—
	Surfperch (Hook and Line)	—	—	—	—	—	—	—	—
	Urchin (Dive)	3.5%	2.6%	6.8%	12.0%	9.2%	2.6%	3.4%	2.7%
Albion	Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—	—
	Dungeness Crab (Trap)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Herring (Gillnet)	—	—	—	—	—	—	—	—
	Rockfish (Fixed Gear)	14.2%	0.5%	1.9%	3.1%	2.8%	0.5%	0.5%	0.3%
	Salmon (Troll)	1.1%	0.7%	1.8%	1.6%	1.4%	0.7%	0.7%	0.7%
	Seaweed (Hand Harvest)	—	—	—	—	—	—	—	—
	Shrimp (Trap)	—	—	—	—	—	—	—	—
	Smelt (Brail – Dip Net)	—	—	—	—	—	—	—	—
	Surfperch (Hook and Line)	—	—	—	—	—	—	—	—
	Urchin (Dive)	0.8%	0.5%	1.6%	3.1%	2.1%	0.5%	0.7%	0.6%

¹² These values represent impacts on seaweed harvesters who operate across the Fort Bragg, Albion, and Elk areas.

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

Port	Fishery	ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
Crescent City	California Halibut	—	—	—	—	—	—	—	—
	Dungeness Crab	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Pacific Halibut	—	—	—	—	—	—	—	—
	Rockfish/Bottomfish	18.1%	0.0%	1.3%	2.0%	10.7%	0.0%	0.0%	0.0%
	Salmon	0.6%	2.4%	3.2%	3.5%	2.3%	2.4%	2.4%	2.3%
Trinidad	California Halibut	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Dungeness Crab	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Pacific Halibut	1.5%	1.5%	3.7%	4.8%	3.7%	1.7%	1.7%	1.7%
	Rockfish/Bottomfish	11.0%	0.0%	2.2%	11.2%	0.1%	0.0%	0.0%	0.0%
	Salmon	2.9%	3.2%	5.5%	10.5%	4.9%	3.4%	3.4%	3.4%
Eureka	California Halibut	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Dungeness Crab	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Pacific Halibut	7.7%	7.0%	3.8%	4.4%	5.8%	6.9%	6.9%	6.9%
	Rockfish/Bottomfish	13.9%	0.0%	0.0%	0.0%	16.0%	0.0%	0.0%	0.0%
	Salmon	0.0%	3.3%	0.0%	0.7%	3.1%	3.3%	3.3%	3.3%
Shelter Cove	California Halibut	—	—	—	—	—	—	—	—
	Dungeness Crab	—	—	—	—	—	—	—	—
	Pacific Halibut	76.5%	46.4%	96.7%	76.5%	96.7%	46.4%	46.4%	46.4%
	Rockfish/Bottomfish	5.5%	0.0%	2.3%	10.7%	2.3%	0.0%	0.0%	0.0%
	Salmon	3.2%	0.0%	6.7%	13.5%	11.2%	0.0%	0.0%	0.0%
Fort Bragg	California Halibut	—	—	—	—	—	—	—	—
	Dungeness Crab	41.3%	27.6%	42.9%	0.7%	45.2%	27.6%	27.6%	27.6%
	Pacific Halibut	—	—	—	—	—	—	—	—
	Rockfish/Bottomfish	12.7%	1.9%	5.6%	9.0%	10.5%	1.9%	1.9%	1.7%
	Salmon	7.1%	6.1%	13.7%	6.5%	17.3%	6.1%	6.1%	6.0%

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

Port	Fishery	ExA	ExB	ExC	ExD	ExE	ExF	ExG	ExH
Crescent City	California Halibut	—	—	—	—	—	—	—	—
	Dungeness Crab	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Pacific Halibut	—	—	—	—	—	—	—	—
	Rockfish/Bottomfish	8.5%	0.0%	0.4%	0.6%	3.3%	0.0%	0.0%	0.0%
	Salmon	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Trinidad	California Halibut	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Dungeness Crab	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Pacific Halibut	0.0%	0.0%	0.0%	6.4%	0.0%	0.0%	0.0%	0.0%
	Rockfish/Bottomfish	4.4%	0.0%	0.2%	11.8%	0.0%	0.0%	0.0%	0.0%
	Salmon	2.2%	2.4%	4.3%	9.4%	3.8%	2.6%	2.6%	2.6%
Eureka	California Halibut	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Dungeness Crab	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
	Pacific Halibut	2.8%	2.6%	1.7%	2.3%	2.6%	2.6%	2.6%	2.6%
	Rockfish/Bottomfish	0.4%	0.0%	0.0%	0.0%	13.7%	0.0%	0.0%	0.0%
	Salmon	0.0%	2.4%	0.0%	0.1%	1.8%	2.4%	2.4%	2.4%
Shelter Cove	California Halibut	—	—	—	—	—	—	—	—
	Dungeness Crab	—	—	—	—	—	—	—	—
	Pacific Halibut	78.0%	49.2%	97.7%	78.0%	97.7%	49.2%	49.2%	49.2%
	Rockfish/Bottomfish	6.7%	0.0%	1.9%	8.1%	1.9%	0.0%	0.0%	0.0%
	Salmon	3.2%	0.0%	3.3%	6.6%	5.5%	0.0%	0.0%	0.0%
Fort Bragg	California Halibut	—	—	—	—	—	—	—	—
	Dungeness Crab	16.3%	9.0%	16.7%	0.3%	17.3%	9.0%	9.0%	9.0%
	Pacific Halibut	—	—	—	—	—	—	—	—
	Rockfish/Bottomfish	15.5%	3.2%	7.8%	13.6%	15.2%	3.2%	3.2%	2.4%
	Salmon	10.0%	9.2%	13.0%	3.9%	15.5%	9.2%	9.2%	9.0%

Table A.5: Percentage area of total recreational fishing grounds affected by port for ExA

Port	User Group	Abalone	California Halibut	Dungeness Crab	Pacific Halibut	Rockfish/ Bottomfish	Salmon
Crescent City	Dive	7.6%	—	—	—	9.6%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.0%	0.4%	11.6%	1.2%
Trinidad	Dive	21.2%	—	—	—	21.6%	—
	Kayak	—	—	—	—	69.6%	—
	Private Vessel	—	0.0%	0.0%	1.5%	12.2%	2.2%
Eureka	Dive	11.8%	—	—	—	6.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	9.0%	0.0%	6.2%	13.0%	0.1%
Shelter Cove	Dive	0.0%	—	—	—	9.7%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	11.1%	0.0%	2.5%	4.1%	1.6%
Fort Bragg/ Albion	Dive	1.7%	—	0.0%	—	14.2%	—
	Kayak	—	—	—	—	18.9%	12.0%
	Private Vessel	—	22.2%	7.7%	6.1%	15.6%	2.2%

Table A.6: Percentage value of total recreational fishing grounds affected by port for ExA

Port	User Group	Abalone	California Halibut	Dungeness Crab	Pacific Halibut	Rockfish/ Bottomfish	Salmon
Crescent City	Dive	1.8%	—	—	—	9.7%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.0%	0.3%	13.0%	0.0%
Trinidad	Dive	1.5%	—	—	—	0.1%	—
	Kayak	—	—	—	—	42.1%	—
	Private Vessel	—	0.0%	0.0%	1.8%	6.8%	0.7%
Eureka	Dive	0.1%	—	—	—	3.9%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.3%	0.0%	2.1%	5.4%	0.0%
Shelter Cove	Dive	0.0%	—	—	—	3.2%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	10.3%	0.0%	4.8%	5.3%	3.3%
Fort Bragg/ Albion	Dive	2.1%	0.0%	0.0%	0.0%	17.6%	0.0%
	Kayak	—	0.0%	0.0%	0.0%	22.2%	10.9%
	Private Vessel	—	29.1%	12.1%	11.5%	23.5%	7.5%

Table A.7: Percentage area of total recreational fishing grounds affected by port for ExB

Port	User Group	Abalone	California Halibut	Dungeness Crab	Pacific Halibut	Rockfish/ Bottomfish	Salmon
Crescent City	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.6%	0.4%	4.4%	2.6%
Trinidad	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	0.0%	—
	Private Vessel	—	0.0%	2.1%	0.0%	5.6%	2.3%
Eureka	Dive	4.2%	—	—	—	1.5%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	6.6%	0.0%	4.3%	7.6%	0.9%
Shelter Cove	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.0%	0.0%	0.0%	0.0%
Fort Bragg/ Albion	Dive	3.3%	—	0.0%	—	5.8%	—
	Kayak	—	—	—	—	1.2%	2.7%
	Private Vessel	—	11.7%	6.1%	5.5%	3.7%	0.8%

Table A.8: Percentage value of total recreational fishing grounds affected by port for ExB

Port	User Group	Abalone	California Halibut	Dungeness Crab	Pacific Halibut	Rockfish/ Bottomfish	Salmon
Crescent City	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.1%	0.3%	0.3%	0.8%
Trinidad	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	0.0%	—
	Private Vessel	—	0.0%	0.1%	0.0%	0.9%	0.7%
Eureka	Dive	0.4%	—	—	—	1.4%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.2%	0.0%	0.6%	2.1%	0.3%
Shelter Cove	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.0%	0.0%	0.0%	0.0%
Fort Bragg/ Albion	Dive	2.2%	—	0.0%	—	5.3%	—
	Kayak	—	—	—	—	2.6%	0.7%
	Private Vessel	—	13.3%	7.6%	14.9%	3.6%	3.3%

Table A.9: Percentage area of total recreational fishing grounds affected by port for ExC

Port	User Group	Abalone	California Halibut	Dungeness Crab	Pacific Halibut	Rockfish/ Bottomfish	Salmon
Crescent City	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.6%	2.7%	8.2%	3.8%
Trinidad	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	0.0%	—
	Private Vessel	—	0.0%	3.9%	0.0%	10.1%	3.7%
Eureka	Dive	0.4%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	6.6%	0.0%	2.0%	5.6%	0.8%
Shelter Cove	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.0%	0.0%	4.2%	3.1%
Fort Bragg/ Albion	Dive	4.4%	—	0.0%	—	8.3%	—
	Kayak	—	—	—	—	10.1%	5.3%
	Private Vessel	—	17.8%	12.3%	4.6%	6.9%	2.1%

Table A.10: Percentage value of total recreational fishing grounds affected by port for ExC

Port	User Group	Abalone	California Halibut	Dungeness Crab	Pacific Halibut	Rockfish/ Bottomfish	Salmon
Crescent City	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.1%	1.2%	2.2%	1.5%
Trinidad	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	0.0%	—
	Private Vessel	—	0.0%	0.2%	0.0%	2.0%	1.1%
Eureka	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.2%	0.0%	0.1%	1.1%	0.1%
Shelter Cove	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.0%	0.0%	2.9%	3.0%
Fort Bragg/ Albion	Dive	5.1%	—	0.0%	—	14.6%	—
	Kayak	—	—	—	—	6.7%	1.7%
	Private Vessel	—	13.0%	13.5%	11.2%	8.6%	6.3%

Table A.11: Percentage area of total recreational fishing grounds affected by port for ExD

Port	User Group	Abalone	California Halibut	Dungeness Crab	Pacific Halibut	Rockfish/ Bottomfish	Salmon
Crescent City	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.6%	3.7%	14.8%	5.5%
Trinidad	Dive	15.5%	—	—	—	15.8%	—
	Kayak	—	—	—	—	0.0%	—
	Private Vessel	—	0.0%	3.6%	2.0%	17.6%	6.8%
Eureka	Dive	11.1%	—	—	—	1.5%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	10.4%	0.0%	2.6%	7.9%	2.1%
Shelter Cove	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	16.5%	10.8%	21.3%	6.6%
Fort Bragg/ Albion	Dive	10.3%	—	0.0%	—	17.3%	—
	Kayak	—	—	—	—	21.1%	4.4%
	Private Vessel	—	10.1%	10.8%	7.1%	6.1%	2.1%

Table A.12: Percentage value of total recreational fishing grounds affected by port for ExD

Port	User Group	Abalone	California Halibut	Dungeness Crab	Pacific Halibut	Rockfish/ Bottomfish	Salmon
Crescent City	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.1%	1.6%	3.3%	1.8%
Trinidad	Dive	1.1%	—	—	—	0.1%	—
	Kayak	—	—	—	—	0.0%	—
	Private Vessel	—	0.0%	0.2%	1.7%	13.3%	4.5%
Eureka	Dive	5.8%	—	—	—	1.4%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.3%	0.0%	0.2%	2.1%	1.3%
Shelter Cove	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	1.5%	17.5%	15.0%	7.0%
Fort Bragg/ Albion	Dive	11.6%	—	0.0%	—	15.2%	—
	Kayak	—	—	—	—	15.7%	3.1%
	Private Vessel	—	4.8%	3.8%	1.2%	8.0%	4.0%

Table A.13: Percentage area of total recreational fishing grounds affected by port for ExE

Port	User Group	Abalone	California Halibut	Dungeness Crab	Pacific Halibut	Rockfish/ Bottomfish	Salmon
Crescent City	Dive	2.5%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.5%	5.4%	11.6%	3.1%
Trinidad	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	0.0%	—
	Private Vessel	—	0.0%	3.6%	2.9%	11.2%	3.3%
Eureka	Dive	4.2%	—	—	—	1.5%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	9.0%	0.7%	4.9%	15.3%	1.4%
Shelter Cove	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.0%	0.0%	8.8%	5.4%
Fort Bragg/ Albion	Dive	8.0%	—	0.0%	—	14.0%	—
	Kayak	—	—	—	—	20.0%	7.2%
	Private Vessel	—	18.0%	15.0%	7.3%	10.0%	3.2%

Table A.14: Percentage value of total recreational fishing grounds affected by port for ExE

Port	User Group	Abalone	California Halibut	Dungeness Crab	Pacific Halibut	Rockfish/ Bottomfish	Salmon
Crescent City	Dive	0.4%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.1%	3.0%	6.6%	0.8%
Trinidad	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	0.0%	—
	Private Vessel	—	0.0%	0.2%	2.4%	1.9%	0.9%
Eureka	Dive	0.4%	—	—	—	1.4%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.3%	0.2%	0.9%	11.4%	0.4%
Shelter Cove	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.0%	0.0%	6.0%	5.5%
Fort Bragg/ Albion	Dive	6.7%	—	0.0%	—	16.6%	—
	Kayak	—	—	—	—	14.3%	3.2%
	Private Vessel	—	13.1%	14.4%	11.7%	13.0%	8.8%

Table A.15: Percentage area of total recreational fishing grounds affected by port for ExF

Port	User Group	Abalone	California Halibut	Dungeness Crab	Pacific Halibut	Rockfish/ Bottomfish	Salmon
Crescent City	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.6%	0.4%	4.5%	2.6%
Trinidad	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	0.0%	—
	Private Vessel	—	0.0%	2.2%	0.0%	5.9%	2.5%
Eureka	Dive	4.2%	—	—	—	1.5%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	6.6%	0.0%	4.3%	7.5%	0.9%
Shelter Cove	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.0%	0.0%	0.0%	0.0%
Fort Bragg/ Albion	Dive	3.3%	—	0.0%	—	5.8%	—
	Kayak	—	—	—	—	1.2%	2.7%
	Private Vessel	—	11.7%	6.1%	5.4%	3.7%	0.8%

Table A.16: Percentage value of total recreational fishing grounds affected by port for ExF

Port	User Group	Abalone	California Halibut	Dungeness Crab	Pacific Halibut	Rockfish/ Bottomfish	Salmon
Crescent City	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.1%	0.3%	0.3%	0.8%
Trinidad	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	0.0%	—
	Private Vessel	—	0.0%	0.1%	0.0%	1.0%	0.8%
Eureka	Dive	0.4%	—	—	—	1.4%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.2%	0.0%	0.6%	2.1%	0.3%
Shelter Cove	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.0%	0.0%	0.0%	0.0%
Fort Bragg/ Albion	Dive	2.2%	—	0.0%	—	5.3%	—
	Kayak	—	—	—	—	2.6%	0.7%
	Private Vessel	—	13.3%	7.7%	14.9%	3.6%	3.3%

Table A.17: Percentage area of total recreational fishing grounds affected by port for ExG

Port	User Group	Abalone	California Halibut	Dungeness Crab	Pacific Halibut	Rockfish/ Bottomfish	Salmon
Crescent City	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.6%	0.4%	4.5%	2.6%
Trinidad	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	0.0%	—
	Private Vessel	—	0.0%	2.2%	0.0%	5.9%	2.5%
Eureka	Dive	4.2%	—	—	—	1.5%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	6.6%	0.0%	4.3%	7.5%	0.9%
Shelter Cove	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.0%	0.0%	0.0%	0.0%
Fort Bragg/ Albion	Dive	3.3%	—	0.0%	—	5.8%	—
	Kayak	—	—	—	—	1.2%	2.7%
	Private Vessel	—	11.7%	6.1%	5.4%	3.7%	0.8%

Table A.18: Percentage value of total recreational fishing grounds affected by port for ExG

Port	User Group	Abalone	California Halibut	Dungeness Crab	Pacific Halibut	Rockfish/ Bottomfish	Salmon
Crescent City	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.1%	0.3%	0.3%	0.8%
Trinidad	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	0.0%	—
	Private Vessel	—	0.0%	0.1%	0.0%	1.0%	0.8%
Eureka	Dive	0.4%	—	—	—	1.4%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.2%	0.0%	0.6%	2.1%	0.3%
Shelter Cove	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.0%	0.0%	0.0%	0.0%
Fort Bragg/ Albion	Dive	2.2%	—	0.0%	—	5.3%	—
	Kayak	—	—	—	—	2.6%	0.7%
	Private Vessel	—	13.3%	7.6%	14.9%	3.6%	3.3%

Table A.19: Percentage area of total recreational fishing grounds affected by port for ExH

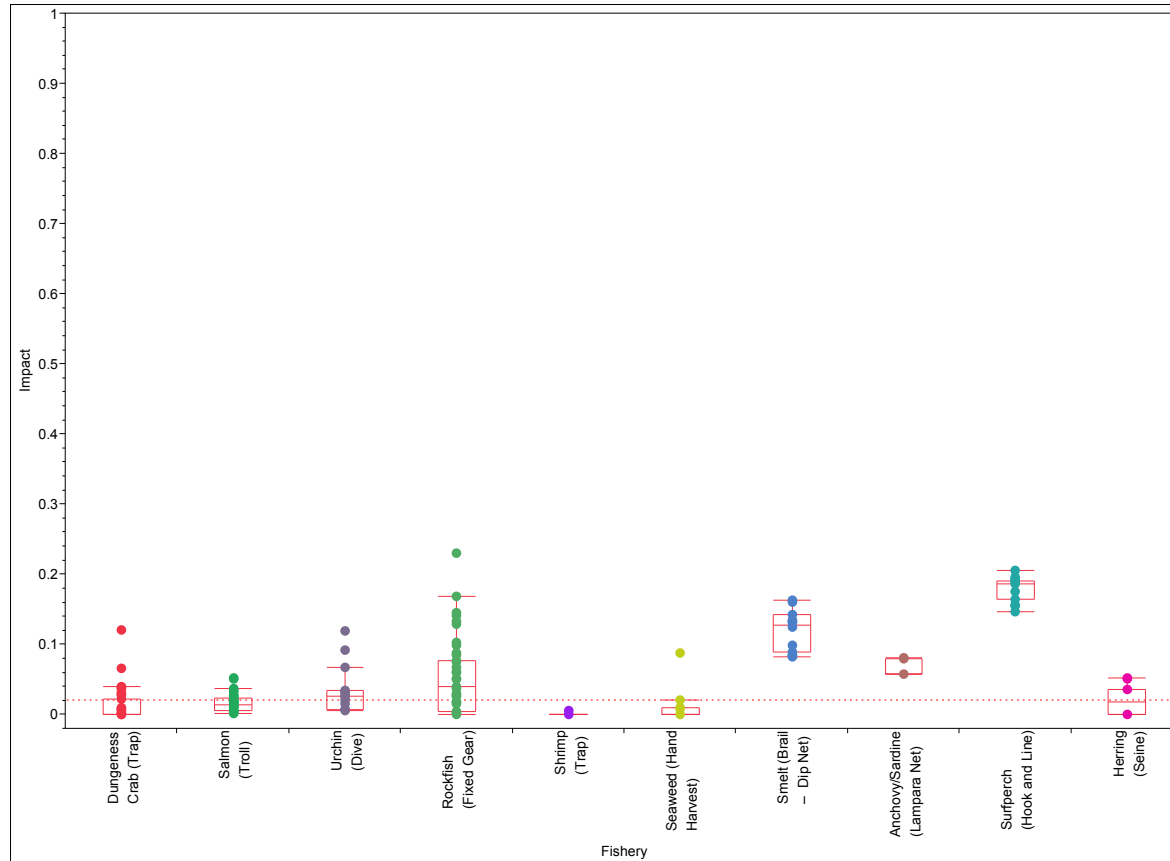
Port	User Group	Abalone	California Halibut	Dungeness Crab	Pacific Halibut	Rockfish/ Bottomfish	Salmon
Crescent City	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.6%	0.4%	4.5%	2.5%
Trinidad	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	0.0%	—
	Private Vessel	—	0.0%	2.2%	0.0%	5.9%	2.5%
Eureka	Dive	4.2%	—	—	—	1.5%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	6.6%	0.0%	4.3%	7.5%	0.9%
Shelter Cove	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.0%	0.0%	0.0%	0.0%
Fort Bragg/ Albion	Dive	3.3%	—	0.0%	—	5.6%	—
	Kayak	—	—	—	—	0.8%	2.5%
	Private Vessel	—	10.3%	5.9%	5.4%	3.6%	0.8%

Table A.20: Percentage value of total recreational fishing grounds affected by port for ExH

Port	User Group	Abalone	California Halibut	Dungeness Crab	Pacific Halibut	Rockfish/ Bottomfish	Salmon
Crescent City	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.1%	0.3%	0.2%	0.7%
Trinidad	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	0.0%	—
	Private Vessel	—	0.0%	0.1%	0.0%	1.0%	0.8%
Eureka	Dive	0.4%	—	—	—	1.4%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.2%	0.0%	0.6%	2.1%	0.3%
Shelter Cove	Dive	0.0%	—	—	—	0.0%	—
	Kayak	—	—	—	—	—	—
	Private Vessel	—	0.0%	0.0%	0.0%	0.0%	0.0%
Fort Bragg/ Albion	Dive	2.4%	—	0.0%	—	4.2%	—
	Kayak	—	—	—	—	1.2%	0.5%
	Private Vessel	—	12.7%	7.5%	14.9%	3.4%	3.2%

Figure A.1: Disproportionate impacts on commercial fisheries

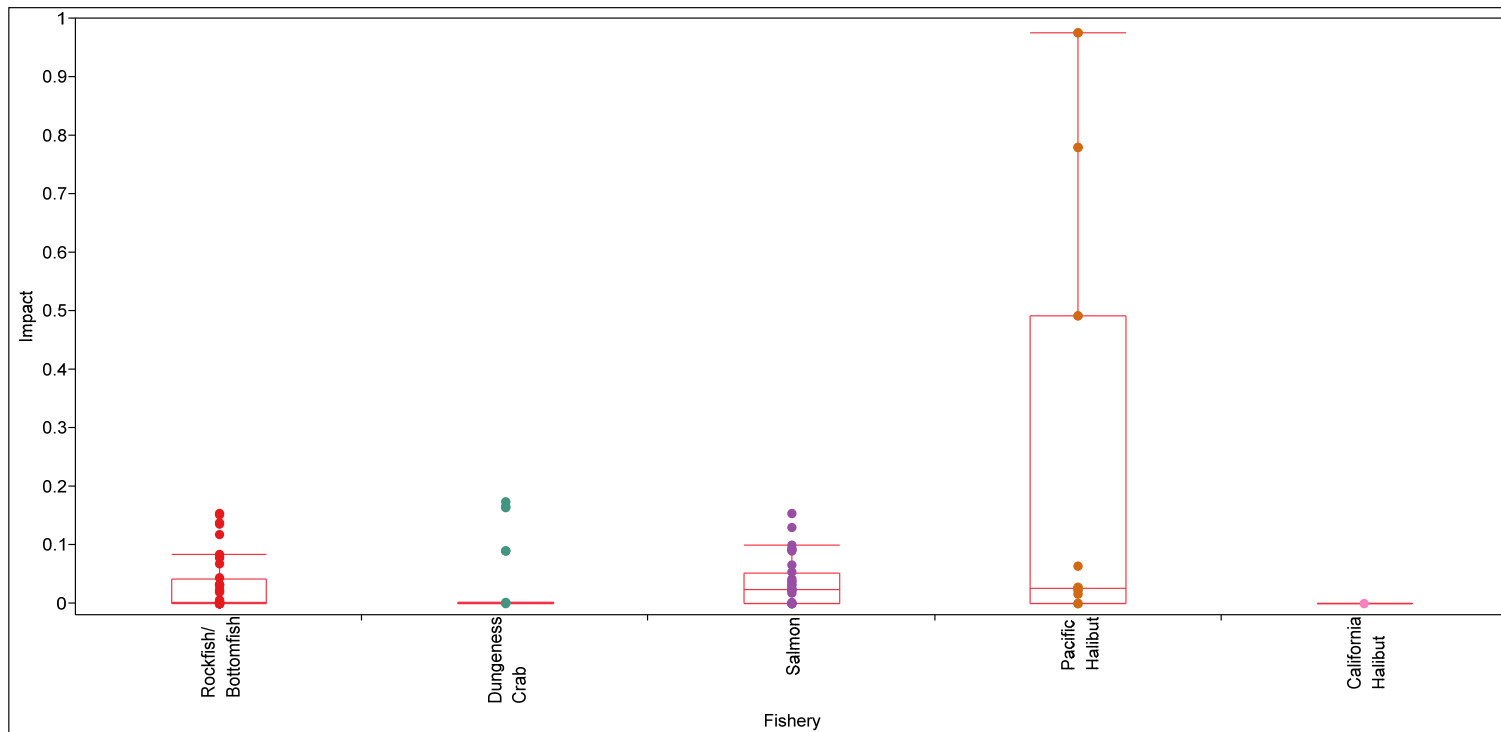
Each dot in Figure A.1 represents the potential impact of one MPA proposal on the stated value of fishing grounds in a specific port for a specific fishery (from Table A.2). All points not in a box or on a line are considered statistically significant outliers (i.e., port-fishery combinations that may 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 importance¹³. Please see Section 2.4 for further information on box plot analysis for the commercial fisheries as well as identification of the potential outliers.



¹³ For all species except seaweed – hand harvest, we used the Department of Fish and Game's landing data. For seaweed, which is recorded only by pounds landed on a region wide scale, we used the average gross economic revenue reported by our five seaweed survey respondents, who represent approximately 69% of the total poundage of seaweed landed in the NCSR.

Figure A.2: Disproportionate impacts on CPFV fisheries

Each dot in Figure A.2 represents the potential impact of one MPA proposal on the stated value of fishing grounds in a specific port 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 2000–07¹⁴ as a proxy for importance. Data on the number of fish landed were obtained from the Department of Fish and Game’s Annual Reports of Statewide Fish Landings by the CPFV Fleet. Please see Section 3.3 for further information on box plot analysis for the CPFV fisheries as well as identification of the potential outliers.



¹⁴ Rockfish/bottomfish landings (2000–07) were calculated using the species groupings defined in Appendix G of the *Draft Survey Methods and Summary Statistics for Ecotrust’s North Coast Study Region Fishery Uses and Values Project*. This calculation may be an underestimate as kelp greenling and blue, canary, copper, gopher, and yelloweye rockfish landings were not available in 2001. Nevertheless, the total number of rockfish/bottomfish landed was the highest out of all the CPFV fisheries. Landings of unspecified invertebrates were used as a proxy for Dungeness crab landings as the NCSR fishing community indicated that, almost exclusively, invertebrates caught by the CPFV fleet are crab. Landings of unspecified flatfish were used as a proxy for Pacific halibut landings because CPFV operators principally target or sell “halibut” trips and because landings of other flatfish such as sanddab (which is reported separately) or sole are only a minor incidental from targeting halibut.

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

Cases where the potential net economic impact of a given MPA proposal on a 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 costs¹⁵, 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 percentage 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 Chapter 11 of the SAT's *Draft Methods Used to Evaluate Marine Protected Area Proposals in the MLPA North Coast Study Region*.

¹⁵ 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.