California MLPA Master Plan Science Advisory Team

Summary of Potential Impacts of the Round 2 North Coast Regional Stakeholder Group Draft MPA Proposals on Commercial and Recreational Fisheries in the North Coast Study Region

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1. INTRODUCTION

The purpose of this project is to analyze the relative effects of four North Coast Regional Stakeholder Group (NCRSG) draft marine protected area (MPA) proposals 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 each MPA in the Round 2 draft proposals is available in the series of Excel files that will be posted online at: http://www.dfg.ca.gov/mlpa/mpaproposals_nc.asp.

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 sample[1] 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 four draft MPA proposals—Ruby 1 (RU1), Ruby 2 (RU2), Sapphire 1 (SA1), and Sapphire 2 (SA2). We also conduct first-order impact and disproportionate impact analyses for the commercial and CPFV fisheries.

Some proposed MPAs state the intent to allow for tribal gathering activities. According to the California Secretary for Natural Resources, the State lacks legal authority to allow exclusive tribal gathering activities in MPAs. Unless and until legal authority can be established for exclusive tribal gathering activities in marine protected areas (MPAs), it is understood that non-commercial gathering activities specifically authorized in tribal resource protection areas will be allowable for all recreational users. Thus, to provide information regarding proposed allowed uses (under the current regulatory framework), for any MPA where tribal gathering activities are identified as a proposed use, we report the potential impacts to any recreational fisheries that were identified as not allowed in that MPA. Marine protected areas that proposal tribal uses are indicated in the associated Excel spreadsheets available to NCRSG members.

[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.

Table 1. Analyses conducted

	Commercial	CPFV	Recreational
Potential impacts on fishing grounds (area & 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."

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 harvest[2], shrimp – trap, smelt – brail (dip net), surfperch – hook and line, and urchin – dive[3]. 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 of Round 2 evaluations. 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] 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.

2.2. Potential Net Economic Impacts on Commercial Fisheries

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, SA1 is estimated to have the highest potential NEI across the study region, while RU2 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). SA1 has the highest potential impact on the Dungeness crab fishery ($247,844), while RU1 has the lowest potential impact ($41,440).
- With the two urchin fisheries combined, the salmon fishery generally sees the lowest range of potential impacts (in dollars). RU1 has the highest potential impact on the salmon fishery ($25,153), while RU2 has the lowest potential impact ($4,221).

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

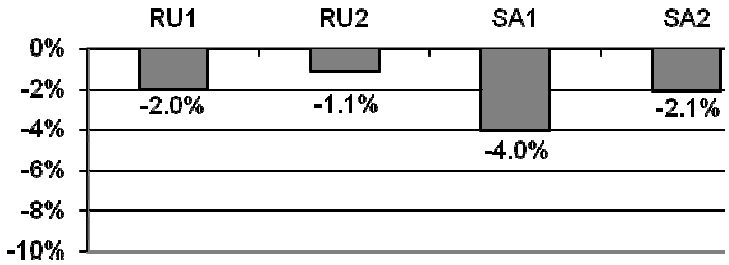


Table 2: Highest/lowest estimated annual net economic impact on commercial fisheries by port (% reduction in profit)[4]

Port	MPA Proposal(s) with Highest Potential Impact		MPA Proposal(s) with Lowest Potential Impact	
Crescent City	SA1	5.7%	RU1	1.1%
Trinidad	SA1	1.5%	RU2	0.1%
Eureka	RU1, SA1	1.7%	RU2, SA2	1.0%
Shelter Cove	SA1, SA2	0.7%	RU2	0.3%
Fort Bragg	SA1	4.8%	RU2	1.4%
Albion	RU1	2.1%	RU2	0.9%
NCSR	SA1	4.0%	RU2	1.1%

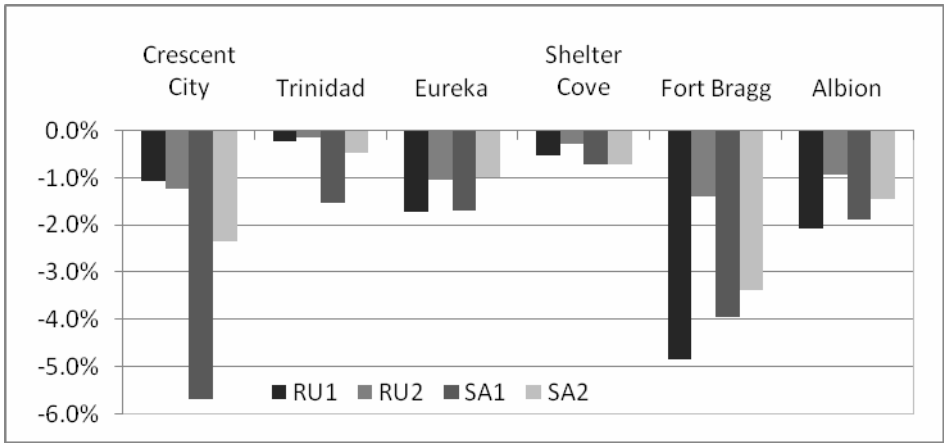
The potential impacts from each proposal are broken out by port in Table 3 and Figure 2. On average, Fort Bragg is the port estimated to see the highest potential net economic impact (as a percentage), while Shelter Cove and Trinidad are estimated to see the lowest potential impact.

[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.

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

Port	RU1	RU2	SA1	SA2
	$ Reduction in Profit			
Crescent City	$45,429	$52,283	$243,852	$100,973
Trinidad	$1,481	$902	$10,127	$3,011
Eureka	$35,243	$21,006	$34,332	$20,000
Shelter Cove	$205	$109	$283	$280
Fort Bragg	$98,233	$27,910	$79,738	$68,102
Albion	$4,207	$1,911	$3,823	$2,925
NCSR	**$184,798**	**$104,121**	**$372,154**	**$195,292**
	% Reduction in Profit			
Crescent City	1.1%	1.2%	5.7%	2.3%
Trinidad	0.2%	0.1%	1.5%	0.5%
Eureka	1.7%	1.0%	1.7%	1.0%
Shelter Cove	0.5%	0.3%	0.7%	0.7%
Fort Bragg	4.8%	1.4%	3.9%	3.4%
Albion	2.1%	0.9%	1.9%	1.4%
NCSR	**2.0%**	**1.1%**	**4.0%**	**2.1%**

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



Tables 4–10 show potential net economic impacts[5] by fishery for each port and for the NCSR.

Table 4: Estimated annual net economic impact for Crescent City

Fishery	Baseline GER	Estimated Costs	Baseline NER (Profit)	RU1	RU2	SA1	SA2
				$ Reduction in Profit			
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—
Dungeness Crab (Trap)	$10,615,878	$6,677,468	$3,938,410	$10,583	$49,606	$205,040	$62,173
Herring (Gillnet)	$2,127	$1,234	$893	$0	$0	$0	$0
Rockfish (Fixed Gear)	$391,258	$210,877	$180,381	$31,201	$27	$35,506	$35,506
Salmon (Troll)	$189,503	$111,297	$78,206	$1,566	$990	$2,845	$2,832
Shrimp (Trap)	$251,315	$158,029	$93,286	$0	$0	$0	$0
Smelt (Brail – Dip Net)	$16,532	$10,015	$6,517	$1,237	$872	$0	$0
Surfperch (Hook and Line)	$5,986	$3,230	$2,755	$842	$787	$462	$462
Urchin (Dive Captain)	—	—	—	—	—	—	—
Urchin (Walk-on Dive)	—	—	—	—	—	—	—
All Fisheries	**$11,472,598**	**$7,172,150**	**$4,300,448**	**$45,429**	**$52,283**	**$243,852**	**$100,973**
				% Reduction in Profit			
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—
Dungeness Crab (Trap)	100%	63%	37%	0.3%	1.3%	5.2%	1.6%
Herring (Gillnet)	100%	58%	42%	0.0%	0.0%	0.0%	0.0%
Rockfish (Fixed Gear)	100%	54%	46%	17.3%	0.0%	19.7%	19.7%
Salmon (Troll)	100%	59%	41%	2.0%	1.3%	3.6%	3.6%
Shrimp (Trap)	100%	63%	37%	0.0%	0.0%	0.0%	0.0%
Smelt (Brail – Dip Net)	100%	61%	39%	19.0%	13.4%	0.0%	0.0%
Surfperch (Hook and Line)	100%	54%	46%	30.6%	28.6%	16.8%	16.8%
Urchin (Dive Captain)	—	—	—	—	—	—	—
Urchin (Walk-on Dive)	—	—	—	—	—	—	—
All Fisheries	**—**	**—**	**—**	**1.1%**	**1.2%**	**5.7%**	**2.3%**

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

Table 5: Estimated annual net economic impact for Trinidad

Fishery	Baseline GER	Estimated Costs	Baseline NER (Profit)	RU1	RU2	SA1	SA2
				$ Reduction in Profit			
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—
Dungeness Crab (Trap)	$1,756,959	$1,105,140	$651,818	$0	$0	$7,115	$0
Herring (Gillnet)	—	—	—	—	—	—	—
Rockfish (Fixed Gear)	$19,776	$10,659	$9,117	$1,469	$902	$2,866	$2,865
Salmon (Troll)	$11,671	$6,854	$4,816	$12	$0	$146	$147
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**	**$1,481**	**$902**	**$10,127**	**$3,011**
				% Reduction in Profit			
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—
Dungeness Crab (Trap)	100%	63%	37%	0.0%	0.0%	1.1%	0.0%
Herring (Gillnet)	—	—	—	—	—	—	—
Rockfish (Fixed Gear)	100%	54%	46%	16.1%	9.9%	31.4%	31.4%
Salmon (Troll)	100%	59%	41%	0.2%	0.0%	3.0%	3.0%
Shrimp (Trap)	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—	—	—
Urchin (Dive Captain)	—	—	—	—	—	—	—
Urchin (Walk-on Dive)	—	—	—	—	—	—	—
All Fisheries	**—**	**—**	**—**	**0.2%**	**0.1%**	**1.5%**	**0.5%**

Table 6: Estimated annual net economic impact for Eureka

Fishery	Baseline GER	Estimated Costs	Baseline NER (Profit)	RU1	RU2	SA1	SA2
				$ Reduction in Profit			
Anchovy/Sardine (Lampara Net)	$44,428	$36,875	$7,553	$1,336	$327	$1,483	$327
Dungeness Crab (Trap)	$5,062,040	$3,184,061	$1,877,978	$10,092	$4,100	$21,446	$8,515
Herring (Gillnet)	$9,574	$5,553	$4,021	$255	$57	$284	$57
Rockfish (Fixed Gear)	$51,344	$27,673	$23,671	$6,347	$5,127	$7,228	$7,203
Salmon (Troll)	$202,095	$118,692	$83,402	$1,791	$294	$1,590	$1,590
Shrimp (Trap)	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	$106,148	$64,306	$41,842	$12,581	$8,935	$0	$7
Surfperch (Hook and Line)	$20,445	$11,034	$9,411	$2,841	$2,166	$2,300	$2,300
Urchin (Dive Captain)	—	—	—	—	—	—	—
Urchin (Walk-on Dive)	—	—	—	—	—	—	—
All Fisheries	**$5,496,074**	**$3,448,196**	**$2,047,879**	**$35,243**	**$21,006**	**$34,332**	**$20,000**
				% Reduction in Profit			
Anchovy/Sardine (Lampara Net)	100%	83%	17%	17.7%	4.3%	19.6%	4.3%
Dungeness Crab (Trap)	100%	63%	37%	0.5%	0.2%	1.1%	0.5%
Herring (Gillnet)	100%	58%	42%	6.4%	1.4%	7.1%	1.4%
Rockfish (Fixed Gear)	100%	54%	46%	26.8%	21.7%	30.5%	30.4%
Salmon (Troll)	100%	59%	41%	2.1%	0.4%	1.9%	1.9%
Shrimp (Trap)	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	100%	61%	39%	30.1%	21.4%	0.0%	0.0%
Surfperch (Hook and Line)	100%	54%	46%	30.2%	23.0%	24.4%	24.4%
Urchin (Dive Captain)	—	—	—	—	—	—	—
Urchin (Walk-on Dive)	—	—	—	—	—	—	—
All Fisheries	**—**	**—**	**—**	**1.7%**	**1.0%**	**1.7%**	**1.0%**

Table 7: Estimated annual net economic impact for Shelter Cove

Fishery	Baseline GER	Estimated Costs	Baseline NER (Profit)	RU1	RU2	SA1	SA2
				$ Reduction in Profit			
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—
Dungeness Crab (Trap)	$18,626	$11,716	$6,910	$6	$0	$2	$1
Herring (Gillnet)	—	—	—	—	—	—	—
Rockfish (Fixed Gear)	$14,575	$7,856	$6,720	$79	$47	$155	$154
Salmon (Troll)	$63,003	$37,003	$26,001	$121	$62	$125	$125
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**	**$205**	**$109**	**$283**	**$280**
				% Reduction in Profit			
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—
Dungeness Crab (Trap)	100%	63%	37%	0.1%	0.0%	0.0%	0.0%
Herring (Gillnet)	—	—	—	—	—	—	—
Rockfish (Fixed Gear)	100%	54%	46%	1.2%	0.7%	2.3%	2.3%
Salmon (Troll)	100%	59%	41%	0.5%	0.2%	0.5%	0.5%
Shrimp (Trap)	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—	—	—
Urchin (Dive Captain)	—	—	—	—	—	—	—
Urchin (Walk-on Dive)	—	—	—	—	—	—	—
All Fisheries	**—**	**—**	**—**	**0.5%**	**0.3%**	**0.7%**	**0.7%**

Table 8: Estimated annual net economic impact for Fort Bragg

Fishery	Baseline GER	Estimated Costs	Baseline NER (Profit)	RU1	RU2	SA1	SA2
				$ Reduction in Profit			
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—
Dungeness Crab (Trap)	$1,015,833	$638,967	$376,866	$20,759	$316	$14,240	$13,671
Herring (Gillnet)	—	—	—	—	—	—	—
Rockfish (Fixed Gear)	$143,137	$77,147	$65,990	$9,559	$4,604	$10,452	$9,900
Salmon (Troll)	$2,556,982	$1,501,744	$1,055,238	$21,643	$2,874	$20,121	$20,290
Shrimp (Trap)	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—	—	—
Urchin (Dive Captain)	$670,057	$322,505	$347,552	$29,681	$12,903	$22,403	$15,550
Urchin (Walk-on Dive)	$264,179	$79,254	$184,926	$16,590	$7,212	$12,522	$8,692
All Fisheries	**$4,650,189**	**$2,619,617**	**$2,030,572**	**$98,233**	**$27,910**	**$79,738**	**$68,102**
				% Reduction in Profit			
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—
Dungeness Crab (Trap)	100%	63%	37%	5.5%	0.1%	3.8%	3.6%
Herring (Gillnet)	—	—	—	—	—	—	—
Rockfish (Fixed Gear)	100%	54%	46%	14.5%	7.0%	15.8%	15.0%
Salmon (Troll)	100%	59%	41%	2.1%	0.3%	1.9%	1.9%
Shrimp (Trap)	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—	—	—
Urchin (Dive Captain)	100%	48%	52%	8.5%	3.7%	6.4%	4.5%
Urchin (Walk-on Dive)	100%	30%	70%	9.0%	3.9%	6.8%	4.7%
All Fisheries	**—**	**—**	**—**	**4.8%**	**1.4%**	**3.9%**	**3.4%**

Table 9: Estimated annual net economic impact for Albion

Fishery	Baseline GER	Estimated Costs	Baseline NER (Profit)	RU1	RU2	SA1	SA2
				$ Reduction in Profit			
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—
Dungeness Crab (Trap)	$2,401	$1,510	$891	$0	$0	$0	$0
Herring (Gillnet)	—	—	—	—	—	—	—
Rockfish (Fixed Gear)	$22,362	$12,053	$10,310	$226	$183	$193	$172
Salmon (Troll)	$4,362	$2,562	$1,800	$21	$0	$15	$15
Shrimp (Trap)	—	—	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—	—	—
Urchin (Dive Captain)	$226,722	$109,124	$117,599	$2,383	$1,039	$2,175	$1,647
Urchin (Walk-on Dive)	$105,897	$31,769	$74,128	$1,578	$688	$1,440	$1,091
All Fisheries	**$361,745**	**$157,018**	**$204,727**	**$4,207**	**$1,911**	**$3,823**	**$2,925**
				% Reduction in Profit			
Anchovy/Sardine (Lampara Net)	—	—	—	—	—	—	—
Dungeness Crab (Trap)	100%	63%	37%	0.0%	0.0%	0.0%	0.0%
Herring (Gillnet)	—	—	—	—	—	—	—
Rockfish (Fixed Gear)	100%	54%	46%	2.2%	1.8%	1.9%	1.7%
Salmon (Troll)	100%	59%	41%	1.2%	0.0%	0.8%	0.8%
Shrimp (Trap)	100%	63%	37%	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—	—	—
Urchin (Dive Captain)	100%	48%	52%	2.0%	0.9%	1.8%	1.4%
Urchin (Walk-on Dive)	100%	30%	70%	2.1%	0.9%	1.9%	1.5%
All Fisheries	**—**	**—**	**—**	**2.1%**	**0.9%**	**1.9%**	**1.4%**

Table 10: Estimated annual net economic impact for the NCSR

Fishery	Baseline GER	Estimated Costs	Baseline NER (Profit)	RU1	RU2	SA1	SA2
				$ Reduction in Profit			
Anchovy/Sardine (Lampara Net)	$44,428	$36,875	$7,553	$1,336	$327	$1,483	$327
Dungeness Crab (Trap)	$18,471,736	$11,618,862	$6,852,874	$41,440	$54,023	$247,844	$84,361
Herring (Gillnet)	$11,701	$6,787	$4,915	$255	$57	$284	$57
Rockfish (Fixed Gear)	$642,453	$346,264	$296,189	$48,881	$10,891	$56,400	$55,801
Salmon (Troll)	$3,027,616	$1,778,153	$1,249,463	$25,153	$4,221	$24,841	$24,999
Shrimp (Trap)	$251,315	$158,029	$93,286	$0	$0	$0	$0
Smelt (Brail – Dip Net)	$122,680	$74,322	$48,358	$13,818	$9,807	$0	$7
Surfperch (Hook and Line)	$26,431	$14,264	$12,167	$3,683	$2,953	$2,762	$2,762
Urchin (Dive Captain)	$896,780	$431,629	$465,151	$32,064	$13,942	$24,578	$17,197
Urchin (Walk-on Dive)	$370,076	$111,023	$259,053	$18,168	$7,900	$13,962	$9,782
All Fisheries	**$23,865,216**	**$14,576,208**	**$9,289,008**	**$184,798**	**$104,121**	**$372,154**	**$195,292**
				% Reduction in Profit			
Anchovy/Sardine (Lampara Net)	100%	83%	17%	17.7%	4.3%	19.6%	4.3%
Dungeness Crab (Trap)	100%	63%	37%	0.6%	0.8%	3.6%	1.2%
Herring (Gillnet)	100%	58%	42%	5.2%	1.2%	5.8%	1.2%
Rockfish (Fixed Gear)	100%	54%	46%	16.5%	3.7%	19.0%	18.8%
Salmon (Troll)	100%	59%	41%	2.0%	0.3%	2.0%	2.0%
Shrimp (Trap)	100%	63%	37%	0.0%	0.0%	0.0%	0.0%
Smelt (Brail – Dip Net)	100%	61%	39%	28.6%	20.3%	0.0%	0.0%
Surfperch (Hook and Line)	100%	54%	46%	30.3%	24.3%	22.7%	22.7%
Urchin (Dive Captain)	100%	48%	52%	6.9%	3.0%	5.3%	3.7%
Urchin (Walk-on Dive)	100%	30%	70%	7.0%	3.0%	5.4%	3.8%
All Fisheries	**—**	**—**	**—**	**2.0%**	**1.1%**	**4.0%**	**2.1%**

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). SA1 has the highest potential impact on the Dungeness crab fishery ($397,794), while RU1 has the lowest potential impact ($66,513).
- The salmon fishery sees the lowest range of potential impacts (in dollars). RU1 has the highest potential impact on the salmon fishery ($38,038), while RU2 has the lowest potential impact ($6,383).
- The rank order and relative differences for the round 2 proposals are similar for both GEI and NEI (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, RU2 is estimated to have the lowest potential GEI across the study region, while SA1 is estimated to have the highest potential GEI.

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

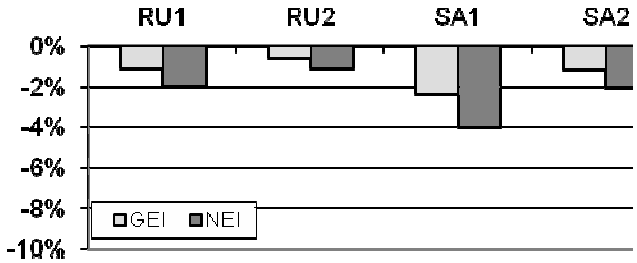
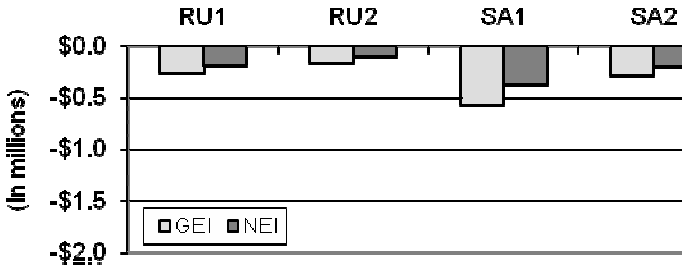


Figure 4: Estimated annual GEI ($ reduction in revenue) and NEI ($ reduction in profit) on commercial fisheries (in millions)



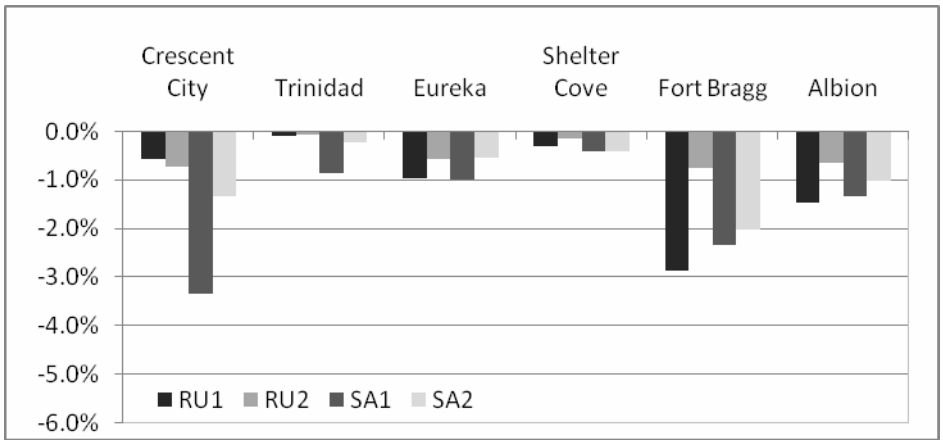
The potential impacts from each proposal are broken out by port in Table 11 and Figure 5. On average, Fort Bragg is the port estimated to see the highest potential GEI (as a percentage), while Trinidad is

estimated to see the lowest potential impact. Tables 12–18 show potential gross economic impacts by fishery for each port and for the NCSR.

Table 11: Estimated annual gross economic impact on commercial fisheries by port (reduction in revenue)

Port	Baseline GER	RU1	RU2	SA1	SA2
		$ Reduction in Revenue			
Crescent City	$11,501,714	$66,848	$83,517	$384,704	$155,382
Trinidad	$1,788,406	$2,114	$1,287	$15,731	$4,309
Eureka	$5,496,074	$53,816	$31,213	$54,363	$30,438
Shelter Cove	$96,205	$304	$162	$414	$411
Fort Bragg	$4,819,786	$138,360	$36,929	$112,482	$97,490
Albion	$361,745	$5,310	$2,424	$4,821	$3,695
NCSR	**$24,063,930**[6]	**$266,751**	**$155,533**	**$572,515**	**$291,725**
		% Reduction in Revenue			
Crescent City	100%	0.6%	0.7%	3.3%	1.4%
Trinidad	100%	0.1%	0.1%	0.9%	0.2%
Eureka	100%	1.0%	0.6%	1.0%	0.6%
Shelter Cove	100%	0.3%	0.2%	0.4%	0.4%
Fort Bragg	100%	2.9%	0.8%	2.3%	2.0%
Albion	100%	1.5%	0.7%	1.3%	1.0%
NCSR	**—**	**1.1%**	**0.6%**	**2.4%**	**1.2%**

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 12: Estimated annual gross economic impact for Crescent City

Fishery	Baseline GER	RU1	RU2	SA1	SA2
		$ Reduction in Revenue			
Anchovy/Sardine (Lampara Net)	—	—	—	—	—
Dungeness Crab (Trap)	$10,615,878	$16,985	$79,619	$329,092	$99,789
Herring (Seine)	$2,127	$0	$0	$0	$0
Rockfish (Fixed Gear)	$391,258	$44,525	$39	$50,668	$50,668
Salmon (Troll)	$189,503	$2,369	$1,497	$4,302	$4,283
Seaweed (Hand Harvest)	$29,116[7]	$0	$0	$0	$0
Shrimp (Trap)	$251,315	$0	$0	$0	$0
Smelt (Brail – Dip Net)	$16,532	$1,797	$1,266	$0	$0
Surfperch (Hook and Line)	$5,986	$1,171	$1,095	$642	$642
Urchin (Dive)	—	—	—	—	—
All Fisheries	**$11,501,714**	**$66,848**	**$83,517**	**$384,704**	**$155,382**
		% Reduction in Revenue			
Anchovy/Sardine (Lampara Net)	—	—	—	—	—
Dungeness Crab (Trap)	100%	0.2%	0.8%	3.1%	0.9%
Herring (Seine)	100%	0.0%	0.0%	0.0%	0.0%
Rockfish (Fixed Gear)	100%	11.4%	0.0%	13.0%	13.0%
Salmon (Troll)	100%	1.3%	0.8%	2.3%	2.3%
Seaweed (Hand Harvest)	100%	0.0%	0.0%	0.0%	0.0%
Shrimp (Trap)	100%	0.0%	0.0%	0.0%	0.0%
Smelt (Brail – Dip Net)	100%	10.9%	7.7%	0.0%	0.0%
Surfperch (Hook and Line)	100%	19.6%	18.3%	10.7%	10.7%
Urchin (Dive)	—	—	—	—	—
All Fisheries	**—**	**0.6%**	**0.7%**	**3.3%**	**1.4%**

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

Table 13: Estimated annual gross economic impact for Trinidad

Fishery	Baseline GER	RU1	RU2	SA1	SA2
		$ Reduction in Revenue			
Anchovy/Sardine (Lampara Net)	—	—	—	—	—
Dungeness Crab (Trap)	$1,756,959	$0	$0	$11,420	$0
Herring (Seine)	—	—	—	—	—
Rockfish (Fixed Gear)	$19,776	$2,096	$1,287	$4,090	$4,088
Salmon (Troll)	$11,671	$18	$0	$221	$222
Seaweed (Hand Harvest)	—	—	—	—	—
Shrimp (Trap)	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—
Urchin (Dive)	—	—	—	—	—
All Fisheries	**$1,788,406**	**$2,114**	**$1,287**	**$15,731**	**$4,309**
		% Reduction in Revenue			
Anchovy/Sardine (Lampara Net)	—	—	—	—	—
Dungeness Crab (Trap)	100%	0.0%	0.0%	0.7%	0.0%
Herring (Seine)	—	—	—	—	—
Rockfish (Fixed Gear)	100%	10.6%	6.5%	20.7%	20.7%
Salmon (Troll)	100%	0.2%	0.0%	1.9%	1.9%
Seaweed (Hand Harvest)	—	—	—	—	—
Shrimp (Trap)	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—
Urchin (Dive)	—	—	—	—	—
All Fisheries	**—**	**0.1%**	**0.1%**	**0.9%**	**0.2%**

Table 14: Estimated annual gross economic impact for Eureka

Fishery	Baseline GER	RU1	RU2	SA1	SA2
		$ Reduction in Revenue			
Anchovy/Sardine (Lampara Net)	$44,428	$3,181	$777	$3,532	$777
Dungeness Crab (Trap)	$5,062,040	$16,199	$6,581	$34,422	$13,668
Herring (Seine)	$9,574	$440	$99	$489	$99
Rockfish (Fixed Gear)	$51,344	$9,057	$7,317	$10,315	$10,279
Salmon (Troll)	$202,095	$2,708	$445	$2,405	$2,405
Seaweed (Hand Harvest)	—	—	—	—	—
Shrimp (Trap)	—	—	—	—	—
Smelt (Brail – Dip Net)	$106,148	$18,279	$12,982	$0	$11
Surfperch (Hook and Line)	$20,445	$3,952	$3,014	$3,200	$3,200
Urchin (Dive)	—	—	—	—	—
All Fisheries	**$5,496,074**	**$53,816**	**$31,213**	**$54,363**	**$30,438**
		% Reduction in Revenue			
Anchovy/Sardine (Lampara Net)	100%	7.2%	1.8%	8.0%	1.8%
Dungeness Crab (Trap)	100%	0.3%	0.1%	0.7%	0.3%
Herring (Seine)	100%	4.6%	1.0%	5.1%	1.0%
Rockfish (Fixed Gear)	100%	17.6%	14.3%	20.1%	20.0%
Salmon (Troll)	100%	1.3%	0.2%	1.2%	1.2%
Seaweed (Hand Harvest)	—	—	—	—	—
Shrimp (Trap)	—	—	—	—	—
Smelt (Brail – Dip Net)	100%	17.2%	12.2%	0.0%	0.0%
Surfperch (Hook and Line)	100%	19.3%	14.7%	15.7%	15.7%
Urchin (Dive)	—	—	—	—	—
All Fisheries	**—**	**1.0%**	**0.6%**	**1.0%**	**0.6%**

Table 15: Estimated annual gross economic impact for Shelter Cove

Fishery	Baseline GER	RU1	RU2	SA1	SA2
		$ Reduction in Revenue			
Anchovy/Sardine (Lampara Net)	—	—	—	—	—
Dungeness Crab (Trap)	$18,626	$9	$0	$4	$2
Herring (Seine)	—	—	—	—	—
Rockfish (Fixed Gear)	$14,575	$112	$67	$222	$220
Salmon (Troll)	$63,003	$183	$95	$189	$189
Seaweed (Hand Harvest)	—	—	—	—	—
Shrimp (Trap)	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—
Urchin (Dive)	—	—	—	—	—
All Fisheries	**$96,205**	**$304**	**$162**	**$414**	**$411**
		% Reduction in Revenue			
Anchovy/Sardine (Lampara Net)	—	—	—	—	—
Dungeness Crab (Trap)	100%	0.1%	0.0%	0.0%	0.0%
Herring (Seine)	—	—	—	—	—
Rockfish (Fixed Gear)	100%	0.8%	0.5%	1.5%	1.5%
Salmon (Troll)	100%	0.3%	0.2%	0.3%	0.3%
Seaweed (Hand Harvest)	—	—	—	—	—
Shrimp (Trap)	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—
Urchin (Dive)	—	—	—	—	—
All Fisheries	**—**	**0.3%**	**0.2%**	**0.4%**	**0.4%**

Table 16: Estimated annual gross economic impact for Fort Bragg

Fishery	Baseline GER	RU1	RU2	SA1	SA2
		$ Reduction in Revenue			
Anchovy/Sardine (Lampara Net)	—	—	—	—	—
Dungeness Crab (Trap)	$1,015,833	$33,319	$508	$22,856	$21,942
Herring (Seine)	—	—	—	—	—
Rockfish (Fixed Gear)	$143,137	$13,641	$6,570	$14,915	$14,128
Salmon (Troll)	$2,556,982	$32,729	$4,347	$30,428	$30,684
Seaweed (Hand Harvest)	$169,597	$0	$0	$0	$0
Shrimp (Trap)	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—
Urchin (Dive)	$934,237	$58,670	$25,505	$44,283	$30,736
All Fisheries	**$4,819,786**	**$138,360**	**$36,929**	**$112,482**	**$97,490**
		% Reduction in Revenue			
Anchovy/Sardine (Lampara Net)	—	—	—	—	—
Dungeness Crab (Trap)	100%	3.3%	0.1%	2.3%	2.2%
Herring (Seine)	—	—	—	—	—
Rockfish (Fixed Gear)	100%	9.5%	4.6%	10.4%	9.9%
Salmon (Troll)	100%	1.3%	0.2%	1.2%	1.2%
Seaweed (Hand Harvest)	100%	0.0%	0.0%	0.0%	0.0%
Shrimp (Trap)	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—
Urchin (Dive)	100%	6.3%	2.7%	4.7%	3.3%
All Fisheries	**—**	**2.9%**	**0.8%**	**2.3%**	**2.0%**

Table 17: Estimated annual gross economic impact for Albion

Fishery	Baseline GER	RU1	RU2	SA1	SA2
		$ Reduction in Revenue			
Anchovy/Sardine (Lampara Net)	—	—	—	—	—
Dungeness Crab (Trap)	$2,401	$0	$0	$0	$0
Herring (Seine)	—	—	—	—	—
Rockfish (Fixed Gear)	$22,362	$322	$262	$275	$246
Salmon (Troll)	$4,362	$32	$0	$23	$23
Seaweed (Hand Harvest)	—	—	—	—	—
Shrimp (Trap)	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—
Urchin (Dive)	$332,619	$4,956	$2,162	$4,524	$3,426
All Fisheries	**$361,745**	**$5,310**	**$2,424**	**$4,821**	**$3,695**
		% Reduction in Revenue			
Anchovy/Sardine (Lampara Net)	—	—	—	—	—
Dungeness Crab (Trap)	100%	0.0%	0.0%	0.0%	0.0%
Herring (Seine)	—	—	—	—	—
Rockfish (Fixed Gear)	100%	1.4%	1.2%	1.2%	1.1%
Salmon (Troll)	100%	0.7%	0.0%	0.5%	0.5%
Seaweed (Hand Harvest)	—	—	—	—	—
Shrimp (Trap)	—	—	—	—	—
Smelt (Brail – Dip Net)	—	—	—	—	—
Surfperch (Hook and Line)	—	—	—	—	—
Urchin (Dive)	100%	1.5%	0.7%	1.4%	1.0%
All Fisheries	**—**	**1.5%**	**0.7%**	**1.3%**	**1.0%**

Table 18: Estimated annual gross economic impact for the NCSR

Fishery	Baseline GER	RU1	RU2	SA1	SA2
		$ Reduction in Revenue			
Anchovy/Sardine (Lampara Net)	$44,428	$3,181	$777	$3,532	$777
Dungeness Crab (Trap)	$18,471,736	$66,513	$86,708	$397,794	$135,401
Herring (Seine)	$11,701	$440	$99	$489	$99
Rockfish (Fixed Gear)	$642,453	$69,754	$15,542	$80,484	$79,629
Salmon (Troll)	$3,027,616	$38,038	$6,383	$37,567	$37,805
Seaweed (Hand Harvest)	$198,714	$0	$0	$0	$0
Shrimp (Trap)	$251,315	$0	$0	$0	$0
Smelt (Brail – Dip Net)	$122,680	$20,076	$14,248	$0	$11
Surfperch (Hook and Line)	$26,431	$5,123	$4,109	$3,842	$3,842
Urchin (Dive)	$1,266,856	$63,626	$27,667	$48,806	$34,162
All Fisheries	**$24,063,930**[8]	**$266,751**	**$155,533**	**$572,515**	**$291,725**
		% Reduction in Revenue			
Anchovy/Sardine (Lampara Net)	100%	7.2%	1.8%	8.0%	1.8%
Dungeness Crab (Trap)	100%	0.4%	0.5%	2.2%	0.7%
Herring (Seine)	100%	3.8%	0.8%	4.2%	0.8%
Rockfish (Fixed Gear)	100%	10.9%	2.4%	12.5%	12.4%
Salmon (Troll)	100%	1.3%	0.2%	1.2%	1.2%
Seaweed (Hand Harvest)	100%	0.0%	0.0%	0.0%	0.0%
Shrimp (Trap)	100%	0.0%	0.0%	0.0%	0.0%
Smelt (Brail – Dip Net)	100%	16.4%	11.6%	0.0%	0.0%
Surfperch (Hook and Line)	100%	19.4%	15.5%	14.5%	14.5%
Urchin (Dive)	100%	5.0%	2.2%	3.9%	2.7%
All Fisheries	**—**	**1.1%**	**0.6%**	**2.4%**	**1.2%**

[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 four Round 2 draft 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 19) can also inform convergence among MPA proposals within a fishery and/or relative potential impacts between fisheries.

It should be noted that while potential impacts to the Fort Bragg and Crescent City Dungeness crab fisheries are considered statistically significant outliers in several proposals, the potential percentage impacts are relatively low. Similarly, practically speaking, surf perch (as a fishery) may be disproportionately impacted relative to other fisheries.

Table 19: Statistically significant disproportionately impacted commercial fisheries

Port	Fishery	MPA Proposal(s)	Estimated Impact on Stated Value of Total Fishing Grounds
Fort Bragg	Dungeness Crab	RU1, SA1, SA2	3.3%, 2.3%, 2.2%
Crescent City	Dungeness Crab	SA1	3.1%

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)

Draft MPA proposals vary considerably in their potential 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 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 20 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, SA1 is estimated to have

the highest potential NEI across the study region, while RU2 is estimated to have the lowest potential NEI.

Table 20: 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	SA1, SA2	0.3%	RU2	0.0%
Trinidad	SA1	3.6%	RU2	0.0%
Eureka	SA1	5.1%	RU2	4.1%
Shelter Cove	SA1	15.7%	RU1	9.8%
Fort Bragg	RU1	11.8%	RU2	2.0%
NCSR	SA1	**6.8%**	RU2	**3.5%**

The potential impacts from each proposal are broken out by port in Table 21. 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)

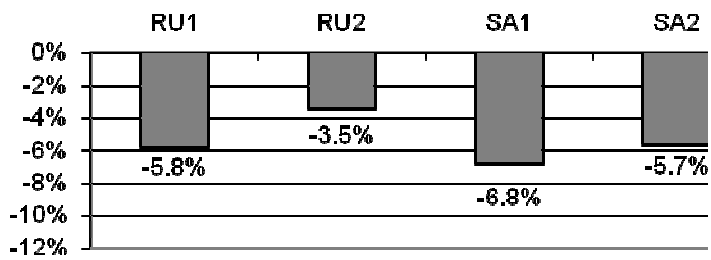


Table 21: Estimated annual net economic impact on CPFV fisheries by port (reduction in profit)

Port	Baseline GER	Estimated Costs	Baseline NER (Profit)	RU1	RU2	SA1	SA2
				% Reduction in Profit			
Crescent City	100%	51.8%	48.2%	0.2%	0.0%	0.3%	0.3%
Trinidad	100%	51.8%	48.2%	2.5%	0.0%	3.6%	1.2%
Eureka	100%	51.8%	48.2%	4.7%	4.1%	5.1%	4.7%
Shelter Cove	100%	51.8%	48.2%	9.8%	11.3%	15.7%	14.2%
Fort Bragg	100%	51.8%	48.2%	11.8%	2.0%	9.5%	8.0%
NCSR	**100%**	**51.8%**	**48.2%**	**5.8%**	**3.5%**	**6.8%**	**5.7%**

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 22 presents box plot analysis results.

The Fort Bragg Dungeness crab fishery is shown to be a statistically significant outlier (relative to other port-proposal combinations) under draft proposals RU1, SA1 and SA2. While there are no statistically significant outliners for Pacific halibut, practically speaking, the bi-modal nature of the potential impacts should be noted.

Table 22: Disproportionately impacted CPFV fisheries

Port	Fishery	MPA Proposal(s)	Estimated Impact on Stated Value of Total Fishing Grounds
Fort Bragg	Dungeness Crab	RU1, SA1, SA2	9.8%. 4.6%, 4.6%

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. For example, the rockfish/bottomfish fishery generally tends to see higher potential impacts across all ports and user groups for all the draft proposals relative to many (but not all) of the other fisheries considered; however, the potential impacts to this fishery across ports and user groups vary substantially.

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	RU1	RU2	SA1	SA2
Crescent City	Anchovy/Sardine (Lampara Net)	---	---	---	---
	Dungeness Crab (Trap)	0.6%	0.5%	1.3%	0.9%
	Herring (Gillnet)	0.0%	0.0%	0.0%	0.0%
	Rockfish (Fixed Gear)	10.8%	4.3%	14.2%	14.2%
	Salmon (Troll)	0.6%	0.5%	1.1%	1.1%
	Seaweed (Hand Harvest)[9]	0.0%	0.0%	0.0%	0.0%
	Shrimp (Trap)	0.0%	0.0%	0.0%	0.0%
	Smelt (Brail – Dip Net)	14.2%	4.0%	0.0%	0.0%
	Surfperch (Hook and Line)	7.3%	5.6%	7.3%	7.3%
	Urchin (Dive)	---	---	---	---
Trinidad	Anchovy/Sardine (Lampara Net)	---	---	---	---
	Dungeness Crab (Trap)	2.2%	1.8%	3.5%	2.4%
	Herring (Gillnet)	---	---	---	---
	Rockfish (Fixed Gear)	6.4%	3.6%	13.0%	12.9%
	Salmon (Troll)	0.5%	0.0%	1.3%	1.3%
	Seaweed (Hand Harvest)	---	---	---	---
	Shrimp (Trap)	---	---	---	---
	Smelt (Brail – Dip Net)	---	---	---	---
	Surfperch (Hook and Line)	---	---	---	---
	Urchin (Dive)	---	---	---	---
Eureka	Anchovy/Sardine (Lampara Net)	20.4%	5.0%	22.6%	5.0%
	Dungeness Crab (Trap)	1.4%	1.3%	3.1%	2.1%
	Herring (Gillnet)	15.6%	3.5%	17.4%	3.5%
	Rockfish (Fixed Gear)	9.6%	6.2%	13.6%	13.6%
	Salmon (Troll)	0.7%	0.6%	1.4%	1.4%
	Seaweed (Hand Harvest)	---	---	---	---
	Shrimp (Trap)	---	---	---	---
	Smelt (Brail – Dip Net)	10.4%	3.5%	0.0%	0.2%
	Surfperch (Hook and Line)	9.5%	2.6%	3.9%	3.9%
	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	RU1	RU2	SA1	SA2
Shelter Cove	Anchovy/Sardine (Lampara Net)	---	---	---	---
	Dungeness Crab (Trap)	0.4%	0.0%	0.1%	0.1%
	Herring (Gillnet)	---	---	---	---
	Rockfish (Fixed Gear)	6.6%	3.9%	12.9%	12.9%
	Salmon (Troll)	0.8%	0.4%	0.8%	0.8%
	Seaweed (Hand Harvest)	---	---	---	---
	Shrimp (Trap)	---	---	---	---
	Smelt (Brail – Dip Net)	---	---	---	---
	Surfperch (Hook and Line)	---	---	---	---
	Urchin (Dive)	---	---	---	---
Fort Bragg	Anchovy/Sardine (Lampara Net)	---	---	---	---
	Dungeness Crab (Trap)	2.1%	1.7%	3.6%	2.7%
	Herring (Gillnet)	---	---	---	---
	Rockfish (Fixed Gear)	8.4%	6.5%	10.8%	10.3%
	Salmon (Troll)	0.5%	0.4%	1.1%	1.1%
	Seaweed (Hand Harvest)[10]	0.0%	0.0%	0.0%	0.0%
	Shrimp (Trap)	---	---	---	---
	Smelt (Brail – Dip Net)	---	---	---	---
	Surfperch (Hook and Line)	---	---	---	---
	Urchin (Dive)	7.8%	4.7%	9.4%	7.8%
Albion	Anchovy/Sardine (Lampara Net)	---	---	---	---
	Dungeness Crab (Trap)	0.0%	0.0%	0.0%	0.0%
	Herring (Gillnet)	---	---	---	---
	Rockfish (Fixed Gear)	3.4%	3.2%	3.3%	3.0%
	Salmon (Troll)	0.5%	0.0%	0.4%	0.4%
	Seaweed (Hand Harvest)	---	---	---	---
	Shrimp (Trap)	---	---	---	---
	Smelt (Brail – Dip Net)	---	---	---	---
	Surfperch (Hook and Line)	---	---	---	---
	Urchin (Dive)	7.8%	4.7%	9.4%	7.8%

[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	RU1	RU2	SA1	SA2
Crescent City	Anchovy/Sardine (Lampara Net)	---	---	---	---
	Dungeness Crab (Trap)	0.2%	0.8%	3.1%	0.9%
	Herring (Gillnet)	0.0%	0.0%	0.0%	0.0%
	Rockfish (Fixed Gear)	11.4%	0.0%	13.0%	13.0%
	Salmon (Troll)	1.3%	0.8%	2.3%	2.3%
	Seaweed (Hand Harvest) [11]	0.0%	0.0%	0.0%	0.0%
	Shrimp (Trap)	0.0%	0.0%	0.0%	0.0%
	Smelt (Brail – Dip Net)	10.9%	7.7%	0.0%	0.0%
	Surfperch (Hook and Line)	19.6%	18.3%	10.7%	10.7%
	Urchin (Dive)	---	---	---	---
Trinidad	Anchovy/Sardine (Lampara Net)	---	---	---	---
	Dungeness Crab (Trap)	0.0%	0.0%	0.7%	0.0%
	Herring (Gillnet)	---	---	---	---
	Rockfish (Fixed Gear)	10.6%	6.5%	20.7%	20.7%
	Salmon (Troll)	0.2%	0.0%	1.9%	1.9%
	Seaweed (Hand Harvest)	---	---	---	---
	Shrimp (Trap)	---	---	---	---
	Smelt (Brail – Dip Net)	---	---	---	---
	Surfperch (Hook and Line)	---	---	---	---
	Urchin (Dive)	---	---	---	---
Eureka	Anchovy/Sardine (Lampara Net)	7.2%	1.8%	8.0%	1.8%
	Dungeness Crab (Trap)	0.3%	0.1%	0.7%	0.3%
	Herring (Gillnet)	4.6%	1.0%	5.1%	1.0%
	Rockfish (Fixed Gear)	17.6%	14.3%	20.1%	20.0%
	Salmon (Troll)	1.3%	0.2%	1.2%	1.2%
	Seaweed (Hand Harvest)	---	---	---	---
	Shrimp (Trap)	---	---	---	---
	Smelt (Brail – Dip Net)	17.2%	12.2%	0.0%	0.0%
	Surfperch (Hook and Line)	19.3%	14.7%	15.7%	15.7%
	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	RU1	RU2	SA1	SA2
Shelter Cove	Anchovy/Sardine (Lampara Net)	---	---	---	---
	Dungeness Crab (Trap)	0.1%	0.0%	0.0%	0.0%
	Herring (Gillnet)	---	---	---	---
	Rockfish (Fixed Gear)	0.8%	0.5%	1.5%	1.5%
	Salmon (Troll)	0.3%	0.2%	0.3%	0.3%
	Seaweed (Hand Harvest)	---	---	---	---
	Shrimp (Trap)	---	---	---	---
	Smelt (Brail – Dip Net)	---	---	---	---
	Surfperch (Hook and Line)	---	---	---	---
	Urchin (Dive)	---	---	---	---
Fort Bragg	Anchovy/Sardine (Lampara Net)	---	---	---	---
	Dungeness Crab (Trap)	3.3%	0.1%	2.3%	2.2%
	Herring (Gillnet)	---	---	---	---
	Rockfish (Fixed Gear)	9.5%	4.6%	10.4%	9.9%
	Salmon (Troll)	1.3%	0.2%	1.2%	1.2%
	Seaweed (Hand Harvest) [12]	0.0%	0.0%	0.0%	0.0%
	Shrimp (Trap)	---	---	---	---
	Smelt (Brail – Dip Net)	---	---	---	---
	Surfperch (Hook and Line)	---	---	---	---
	Urchin (Dive)	6.3%	2.7%	4.7%	3.3%
Albion	Anchovy/Sardine (Lampara Net)	---	---	---	---
	Dungeness Crab (Trap)	0.0%	0.0%	0.0%	0.0%
	Herring (Gillnet)	---	---	---	---
	Rockfish (Fixed Gear)	1.4%	1.2%	1.2%	1.1%
	Salmon (Troll)	0.7%	0.0%	0.5%	0.5%
	Seaweed (Hand Harvest)	---	---	---	---
	Shrimp (Trap)	---	---	---	---
	Smelt (Brail – Dip Net)	---	---	---	---
	Surfperch (Hook and Line)	---	---	---	---
	Urchin (Dive)	1.5%	0.7%	1.4%	1.0%

[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	RU1	RU2	SA1	SA2
Crescent City	California Halibut	---	---	---	---
	Dungeness Crab	0.0%	0.0%	0.0%	0.0%
	Pacific Halibut	---	---	---	---
	Rockfish/Bottomfish	1.3%	0.0%	2.2%	2.2%
	Salmon	0.9%	1.2%	2.4%	2.4%
Trinidad	California Halibut	19.5%	0.0%	2.3%	0.0%
	Dungeness Crab	0.0%	0.0%	0.0%	0.0%
	Pacific Halibut	1.9%	1.5%	2.2%	2.2%
	Rockfish/Bottomfish	2.2%	0.0%	9.3%	9.3%
	Salmon	0.0%	0.0%	5.1%	5.1%
Eureka	California Halibut	10.6%	0.0%	10.6%	0.0%
	Dungeness Crab	0.0%	0.0%	0.0%	0.0%
	Pacific Halibut	7.6%	4.6%	5.2%	5.2%
	Rockfish/Bottomfish	9.0%	9.0%	10.2%	10.2%
	Salmon	2.3%	2.3%	2.5%	2.5%
Shelter Cove	California Halibut	---	---	---	---
	Dungeness Crab	---	---	---	---
	Pacific Halibut	14.9%	20.7%	18.5%	17.8%
	Rockfish/Bottomfish	6.5%	3.9%	12.6%	12.6%
	Salmon	0.0%	0.0%	11.5%	7.0%
Fort Bragg	California Halibut	---	---	---	---
	Dungeness Crab	37.6%	0.0%	21.8%	21.8%
	Pacific Halibut	---	---	---	---
	Rockfish/Bottomfish	8.2%	5.8%	8.0%	5.7%
	Salmon	6.5%	0.0%	9.9%	5.5%

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

Port	Fishery	RU1	RU2	SA1	SA2
Crescent City	California Halibut	---	---	---	---
	Dungeness Crab	0.0%	0.0%	0.0%	0.0%
	Pacific Halibut	---	---	---	---
	Rockfish/Bottomfish	0.4%	0.0%	0.7%	0.7%
	Salmon	0.0%	0.0%	0.0%	0.0%
Trinidad	California Halibut	9.3%	0.0%	8.8%	0.0%
	Dungeness Crab	0.0%	0.0%	0.0%	0.0%
	Pacific Halibut	0.0%	0.0%	0.0%	0.0%
	Rockfish/Bottomfish	0.2%	0.0%	0.7%	0.7%
	Salmon	0.0%	0.0%	3.8%	3.8%
Eureka	California Halibut	1.5%	0.0%	1.5%	0.0%
	Dungeness Crab	0.0%	0.0%	0.0%	0.0%
	Pacific Halibut	3.0%	2.5%	2.7%	2.7%
	Rockfish/Bottomfish	10.9%	10.9%	12.7%	12.7%
	Salmon	2.1%	2.1%	2.3%	2.3%
Shelter Cove	California Halibut	---	---	---	---
	Dungeness Crab	---	---	---	---
	Pacific Halibut	16.3%	22.0%	19.9%	18.9%
	Rockfish/Bottomfish	5.8%	3.4%	9.8%	9.7%
	Salmon	0.0%	0.0%	5.6%	3.4%
Fort Bragg	California Halibut	---	---	---	---
	Dungeness Crab	9.8%	0.0%	4.6%	4.6%
	Pacific Halibut	---	---	---	---
	Rockfish/Bottomfish	7.7%	4.6%	8.2%	5.8%
	Salmon	9.2%	0.0%	8.5%	7.5%

Table A.5: Percentage area of total recreational fishing grounds affected by port for RU1

Port	User Group	Abalone	California Halibut	Dungeness Crab	Pacific Halibut	Rockfish/ Bottomfish	Salmon
Crescent City	Dive	0.0%	---	---	---	2.0%	---
	Kayak	---	---	---	---	---	---
	Private Vessel	---	6.3%	0.0%	6.0%	9.9%	0.7%
Trinidad	Dive	0.0%	---	---	---	0.0%	---
	Kayak	---	---	---	---	0.0%	---
	Private Vessel	---	9.6%	0.0%	0.0%	8.7%	0.0%
Eureka	Dive	1.4%	---	---	---	12.9%	---
	Kayak	---	---	---	---	---	---
	Private Vessel	---	16.3%	0.0%	3.8%	9.6%	0.0%
Shelter Cove	Dive	0.0%	---	---	---	0.0%	---
	Kayak	---	---	---	---	---	---
	Private Vessel	---	0.0%	0.6%	2.1%	11.1%	0.1%
Fort Bragg/ Albion	Dive	4.4%	---	0.0%	---	7.0%	---
	Kayak	---	---	---	---	15.8%	2.5%
	Private Vessel	---	6.3%	6.4%	8.1%	6.5%	0.9%

Table A.6: Percentage value of total recreational fishing grounds affected by port for RU1

Port	User Group	Abalone	California Halibut	Dungeness Crab	Pacific Halibut	Rockfish/ Bottomfish	Salmon
Crescent City	Dive	0.0%	---	---	---	0.6%	---
	Kayak	---	---	---	---	---	---
	Private Vessel	---	3.8%	0.0%	6.1%	2.4%	0.3%
Trinidad	Dive	0.0%	---	---	---	0.0%	---
	Kayak	---	---	---	---	0.0%	---
	Private Vessel	---	11.7%	0.0%	0.0%	1.9%	0.0%
Eureka	Dive	0.0%	---	---	---	15.6%	---
	Kayak	---	---	---	---	---	---
	Private Vessel	---	8.2%	0.0%	0.8%	11.2%	0.0%
Shelter Cove	Dive	0.0%	---	---	---	0.0%	---
	Kayak	---	---	---	---	---	---
	Private Vessel	---	0.0%	0.0%	0.8%	6.7%	0.1%
Fort Bragg/ Albion	Dive	3.3%	---	0.0%	---	7.0%	---
	Kayak	---	---	---	---	7.3%	0.5%
	Private Vessel	---	3.9%	7.8%	7.7%	9.3%	3.3%

Table A.7: Percentage area of total recreational fishing grounds affected by port for RU2

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%	0.0%	0.0%	3.6%	0.9%
Trinidad	Dive	0.0%	---	---	---	0.0%	---
	Kayak	---	---	---	---	0.0%	---
	Private Vessel	---	0.0%	0.0%	0.0%	5.4%	0.0%
Eureka	Dive	1.4%	---	---	---	12.9%	---
	Kayak	---	---	---	---	---	---
	Private Vessel	---	2.1%	0.0%	2.8%	9.6%	0.0%
Shelter Cove	Dive	0.0%	---	---	---	0.0%	---
	Kayak	---	---	---	---	---	---
	Private Vessel	---	0.0%	0.0%	0.7%	8.8%	0.0%
Fort Bragg/ Albion	Dive	2.9%	---	0.0%	---	4.4%	---
	Kayak	---	---	---	---	13.9%	0.0%
	Private Vessel	---	0.0%	0.0%	6.2%	2.6%	0.0%

Table A.8: Percentage value of total recreational fishing grounds affected by port for RU2

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%	0.0%	0.0%	0.0%	0.4%
Trinidad	Dive	0.0%	---	---	---	0.0%	---
	Kayak	---	---	---	---	0.0%	---
	Private Vessel	---	0.0%	0.0%	0.0%	0.8%	0.0%
Eureka	Dive	0.0%	---	---	---	15.6%	---
	Kayak	---	---	---	---	---	---
	Private Vessel	---	0.1%	0.0%	0.5%	11.2%	0.0%
Shelter Cove	Dive	0.0%	---	---	---	0.0%	---
	Kayak	---	---	---	---	---	---
	Private Vessel	---	0.0%	0.0%	0.2%	6.0%	0.0%
Fort Bragg/ Albion	Dive	1.4%	---	0.0%	---	3.6%	---
	Kayak	---	---	---	---	6.0%	0.0%
	Private Vessel	---	0.0%	0.0%	1.1%	4.3%	0.0%

Table A.9: Percentage area of total recreational fishing grounds affected by port for SA1

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%	0.0%	2.9%	8.6%	3.2%
Trinidad	Dive	0.0%	---	---	---	0.0%	---
	Kayak	---	---	---	---	0.0%	---
	Private Vessel	---	9.6%	3.0%	0.0%	8.7%	3.0%
Eureka	Dive	1.4%	---	---	---	14.7%	---
	Kayak	---	---	---	---	---	---
	Private Vessel	---	16.0%	0.1%	3.1%	11.0%	1.1%
Shelter Cove	Dive	0.0%	---	---	---	0.0%	---
	Kayak	---	---	---	---	---	---
	Private Vessel	---	0.0%	10.5%	8.4%	17.4%	5.6%
Fort Bragg/ Albion	Dive	7.5%	---	0.0%	---	12.2%	---
	Kayak	---	---	---	---	15.8%	3.8%
	Private Vessel	---	7.0%	4.3%	10.1%	5.7%	2.3%

Table A.10: Percentage value of total recreational fishing grounds affected by port for SA1

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%	0.0%	1.2%	2.9%	1.4%
Trinidad	Dive	0.0%	---	---	---	0.0%	---
	Kayak	---	---	---	---	0.0%	---
	Private Vessel	---	11.7%	0.2%	0.0%	4.0%	1.0%
Eureka	Dive	0.0%	---	---	---	17.7%	---
	Kayak	---	---	---	---	---	---
	Private Vessel	---	8.2%	0.0%	0.5%	13.1%	0.2%
Shelter Cove	Dive	0.0%	---	---	---	0.0%	---
	Kayak	---	---	---	---	---	---
	Private Vessel	---	0.0%	0.7%	10.6%	11.4%	5.8%
Fort Bragg/ Albion	Dive	4.9%	---	0.0%	---	8.2%	---
	Kayak	---	---	---	---	8.6%	0.9%
	Private Vessel	---	4.2%	4.2%	8.0%	8.1%	5.2%

Table A.11: Percentage area of total recreational fishing grounds affected by port for SA2

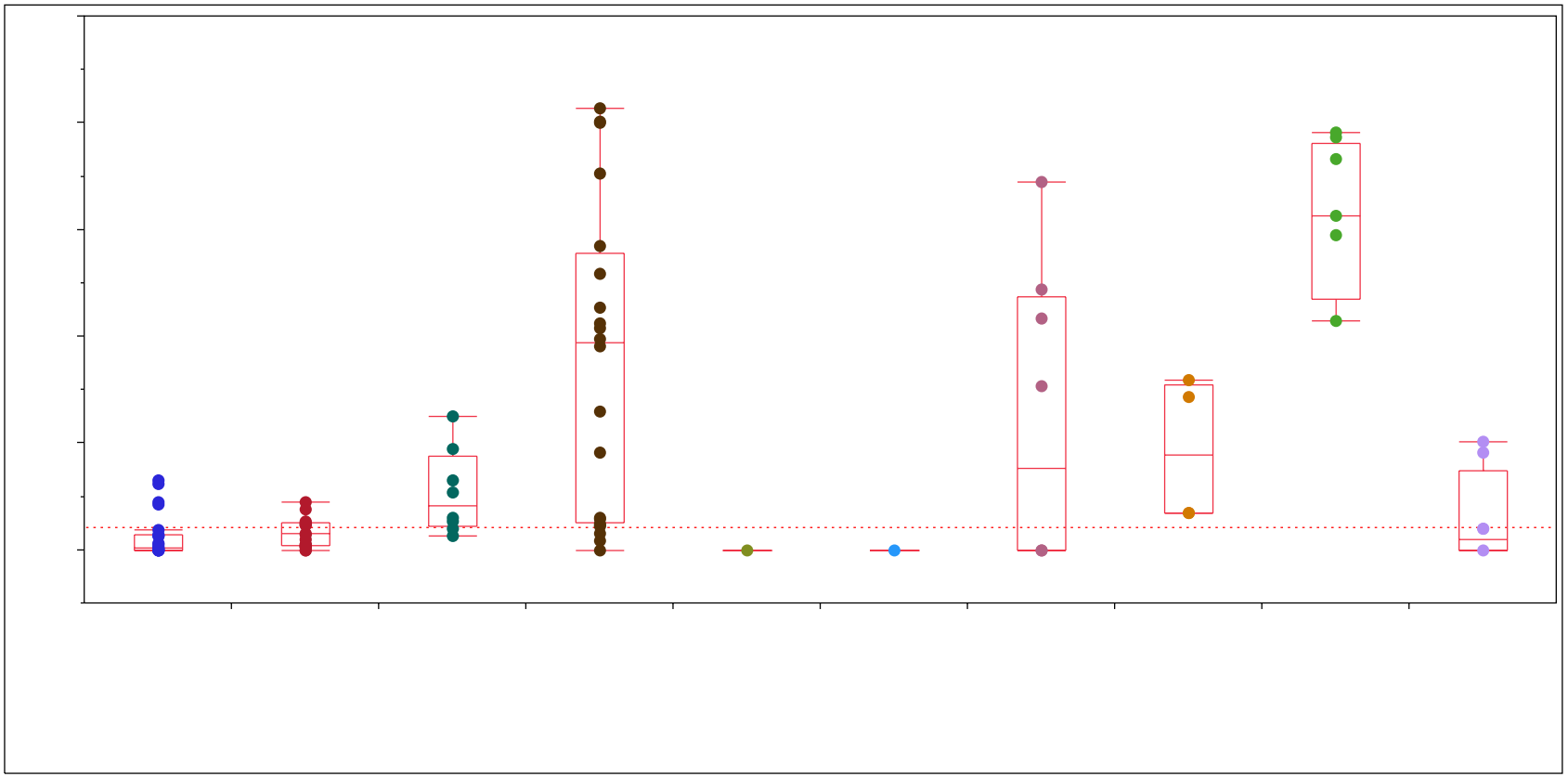
Port	User Group	Abalone	California Halibut	Dungeness Crab	Pacific Halibut	Rockfish/ Bottomfish	Salmon
Crescent City	Dive	0.0%	---	---	---	0.0%	---
	Kayak	---	---	---	---	---	---
	Private Vessel	---	0.0%	0.0%	2.9%	8.6%	3.2%
Trinidad	Dive	0.0%	---	---	---	0.0%	---
	Kayak	---	---	---	---	0.0%	---
	Private Vessel	---	0.0%	0.0%	0.0%	8.7%	3.0%
Eureka	Dive	1.4%	---	---	---	14.7%	---
	Kayak	---	---	---	---	---	---
	Private Vessel	---	2.1%	0.1%	3.1%	11.0%	1.1%
Shelter Cove	Dive	0.0%	---	---	---	0.0%	---
	Kayak	---	---	---	---	---	---
	Private Vessel	---	0.0%	10.5%	8.4%	14.5%	3.5%
Fort Bragg/ Albion	Dive	6.4%	---	0.0%	---	11.3%	---
	Kayak	---	---	---	---	10.9%	2.2%
	Private Vessel	---	7.0%	4.3%	10.1%	4.6%	1.6%

Table A.12: Percentage value of total recreational fishing grounds affected by port for SA2

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%	0.0%	1.2%	2.8%	1.4%
Trinidad	Dive	0.0%	---	---	---	0.0%	---
	Kayak	---	---	---	---	0.0%	---
	Private Vessel	---	0.0%	0.0%	0.0%	4.0%	1.0%
Eureka	Dive	0.0%	---	---	---	17.7%	---
	Kayak	---	---	---	---	---	---
	Private Vessel	---	0.1%	0.0%	0.5%	13.1%	0.2%
Shelter Cove	Dive	0.0%	---	---	---	0.0%	---
	Kayak	---	---	---	---	---	---
	Private Vessel	---	0.0%	0.7%	10.6%	9.4%	3.9%
Fort Bragg/ Albion	Dive	4.3%	---	0.0%	---	7.3%	---
	Kayak	---	---	---	---	5.8%	0.7%
	Private Vessel	---	4.2%	4.2%	8.0%	5.9%	3.9%

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 importance[13]. Please see Section 2.4 for further information on box plot analysis for the commercial fisheries as well as identification of the potential outliers.

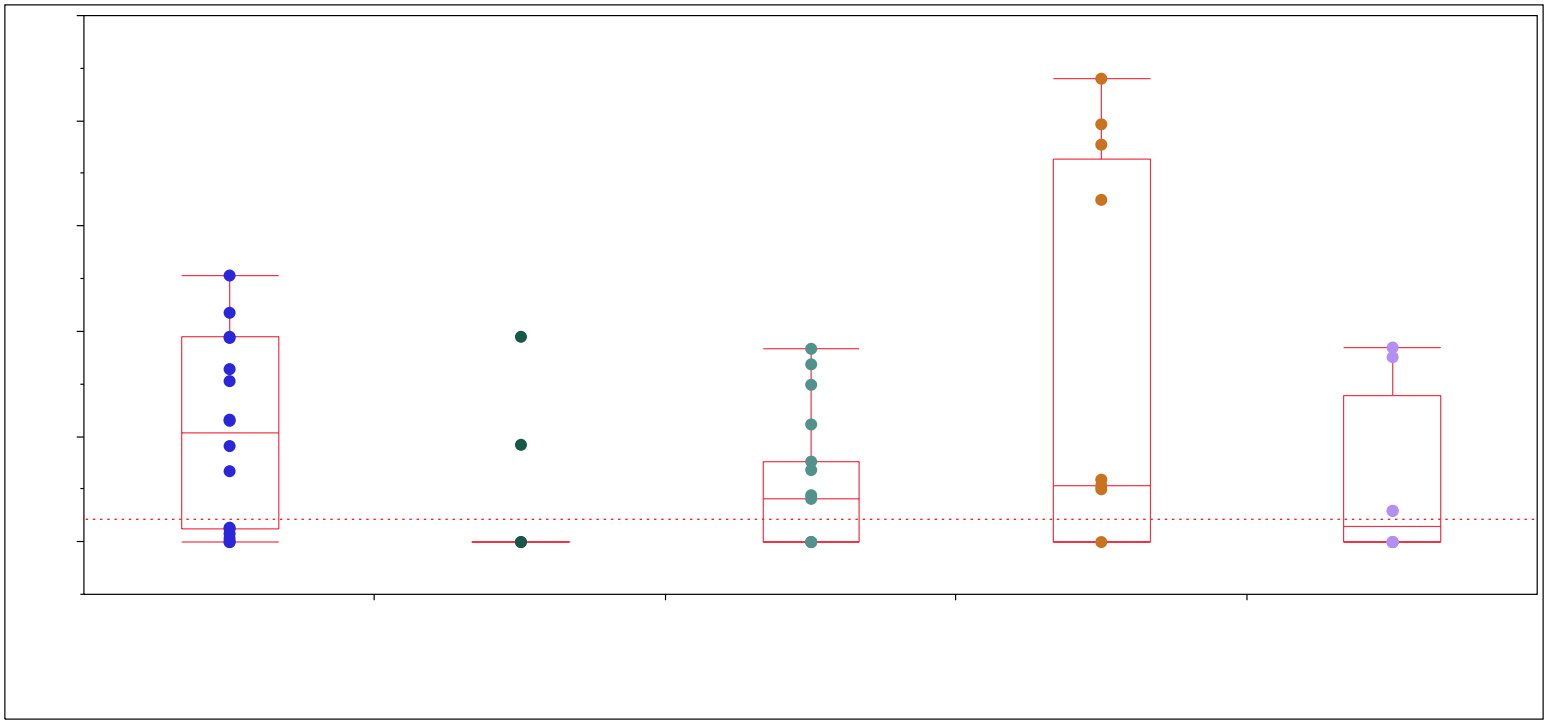


[13] For all species except seaweed – hand harvest, we used the Department of Fish and Game's landing data. For seaweed, which is recorded only by pounds landed on a region wide scale, we used the average gross economic revenue reported by our five seaweed survey respondents, who represent approximately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

0.25

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 2000–07[14] 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.