

California MLPA Master Plan Science Advisory Team

Summary of Potential Impacts of the February 2010 External Proposed MPA Arrays on Commercial and Recreational Fisheries in the North Coast Study Region

March 17, 2010

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 external proposed marine protected area (MPA) arrays on commercial and recreational fisheries in the MLPA 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 a series of Excel files provided to the MLPA Initiative.

To analyze the NCSR fisheries, the contractor for this project, Ecotrust, 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 shallow and deeper nearshore fish species, 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)

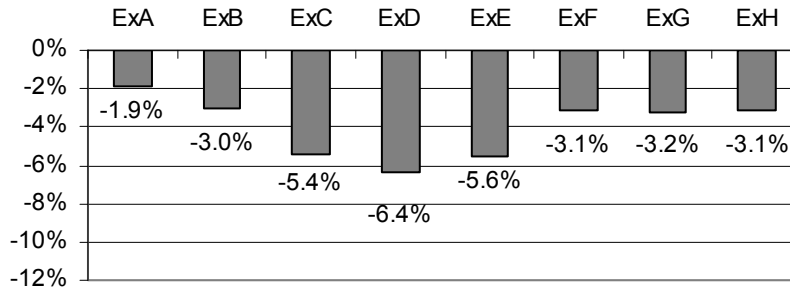


Table 1: Highest/lowest estimated annual net economic impact on commercial fisheries by port (% reduction in profit)⁴

| 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.

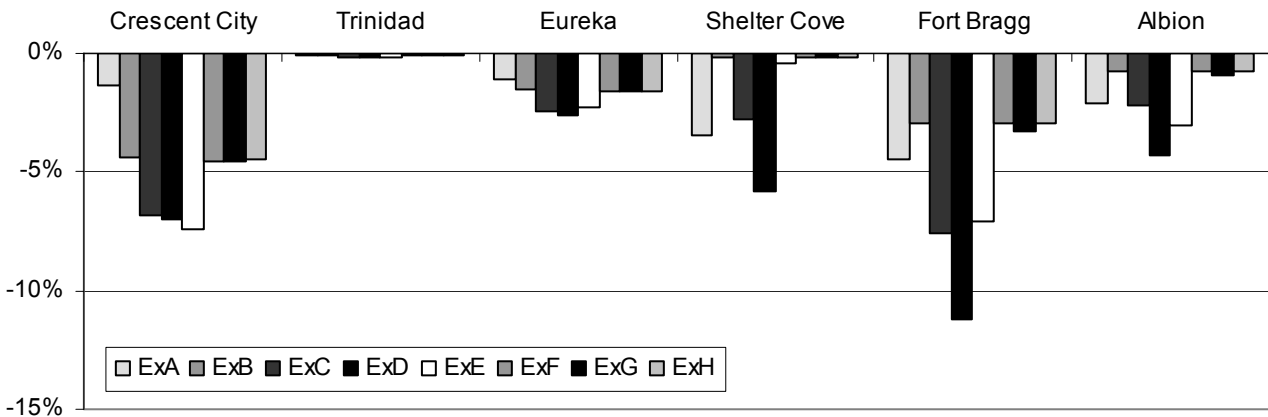
⁵ For an explanation of why net economic impacts can exceed 100%, please see Appendix A.

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 | ExA | ExB | ExC | ExD | ExE | ExF | ExG | ExH |
|---------------|-----------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | % Reduction in Profit | | | | | | | |
| Crescent City | 1.3% | 4.4% | 6.9% | 7.0% | 7.4% | 4.6% | 4.6% | 4.5% |
| 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)



*MLPA Master Plan Science Advisory Team
Summary of Potential Impacts of the February 2010 External Proposed MPAs on
Commercial and Recreational Fisheries in the North Coast Study Region
March 17, 2010*

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 |
| | | | | % Reduction in Profit | | | | | | | |
| 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 |
| | | | | % 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% | 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% |

*MLPA Master Plan Science Advisory Team
Summary of Potential Impacts of the February 2010 External Proposed MPAs on
Commercial and Recreational Fisheries in the North Coast Study Region
March 17, 2010*

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% |

*MLPA Master Plan Science Advisory Team
Summary of Potential Impacts of the February 2010 External Proposed MPAs on
Commercial and Recreational Fisheries in the North Coast Study Region
March 17, 2010*

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 |
| | | | | % Reduction in Profit | | | | | | | |
| 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 |
| | | | | % 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% | 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

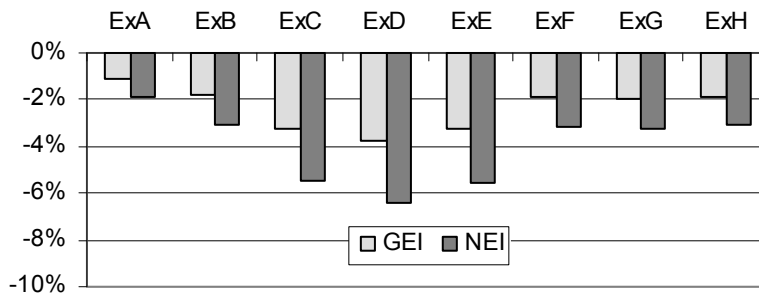
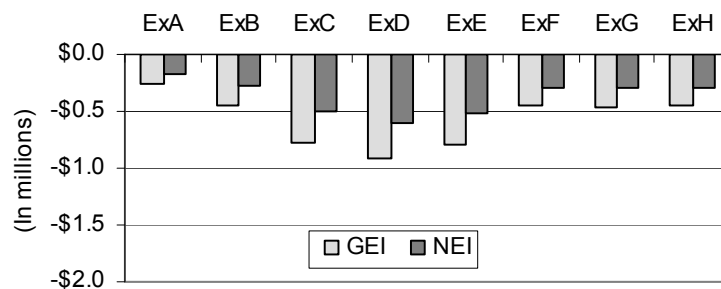


Figure 4: Estimated annual GEI (\$ reduction in revenue) and NEI (\$ reduction in profit) on commercial fisheries (in millions)



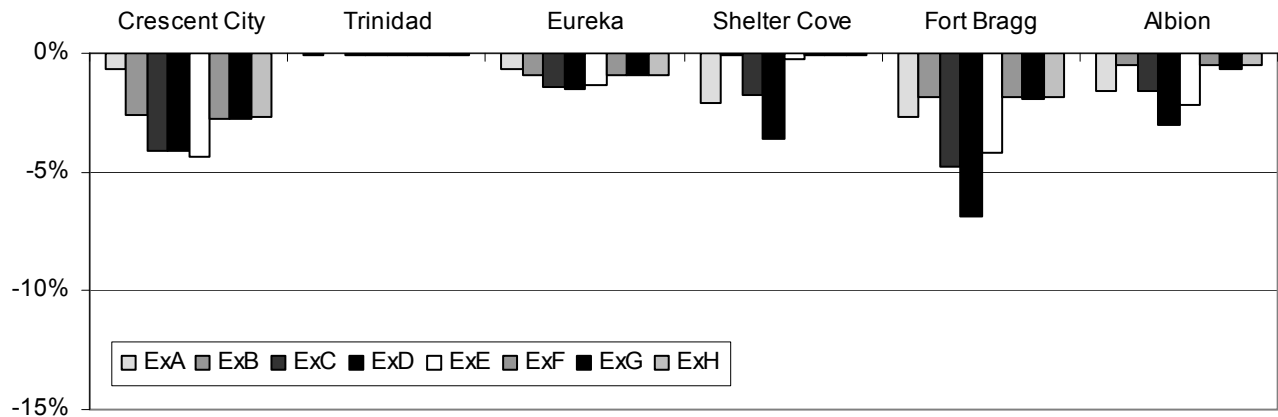
The potential impacts from each proposal are broken out by port in Table 10 and Figure 5. On average, Fort Bragg is the port estimated to see the highest potential GEI (as a percentage), while Trinidad is estimated to see the lowest potential impact.

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 |
| | | % Reduction in Revenue | | | | | | | |
| 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 |
| | | % Reduction in Revenue | | | | | | | |
| 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 shallow 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)

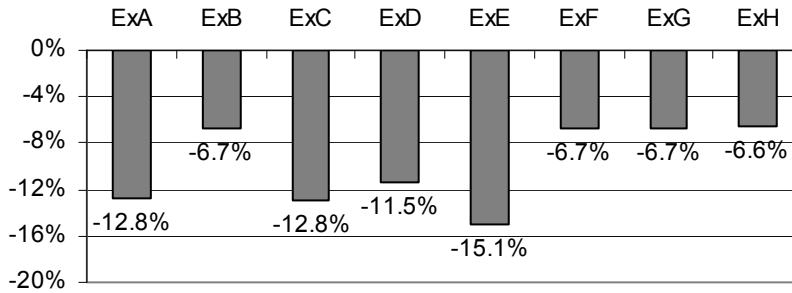


Table 20: Estimated annual net economic impact on CPFV fisheries by port (reduction in profit)

| 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

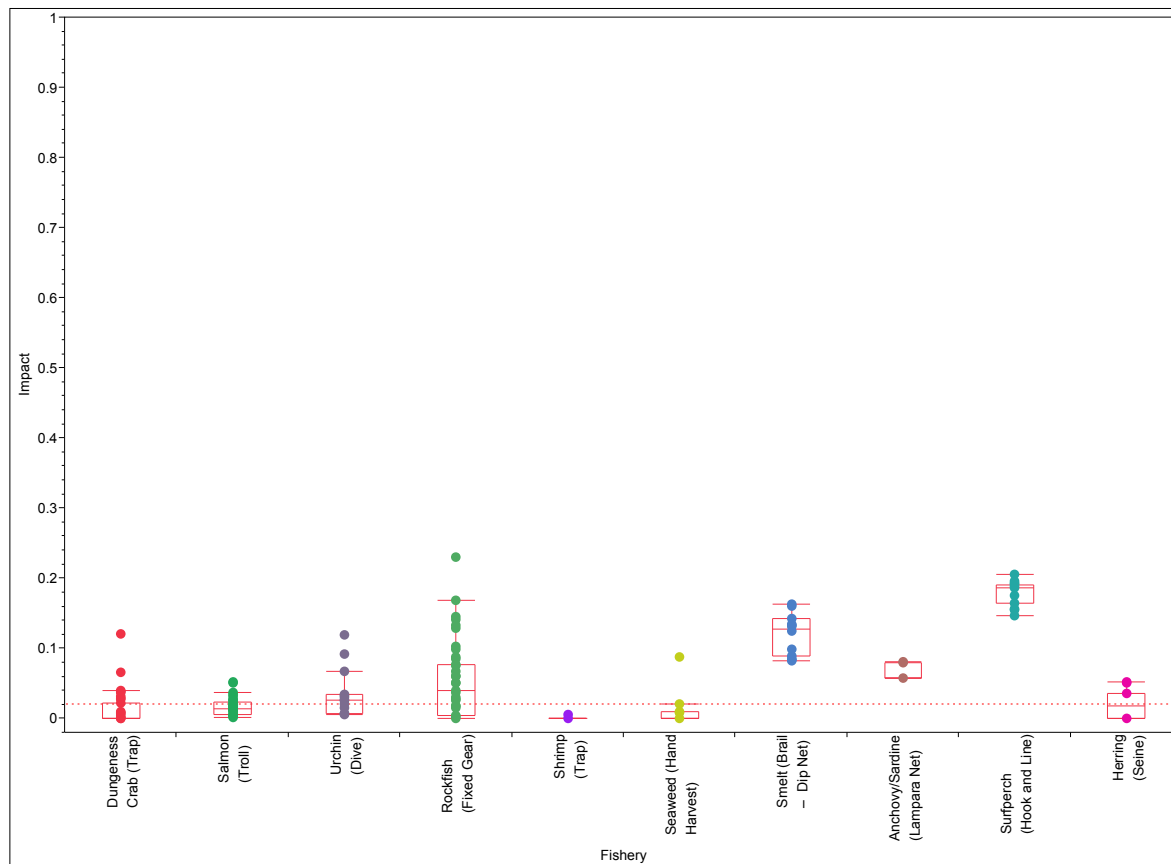
| Port | User Group | Abalone | California Halibut | Dungeness Crab | Pacific Halibut | Rockfish/ Bottomfish | Salmon |
|--------------------|----------------|---------|--------------------|----------------|-----------------|----------------------|--------|
| Crescent City | Dive | 0.0% | — | — | — | 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

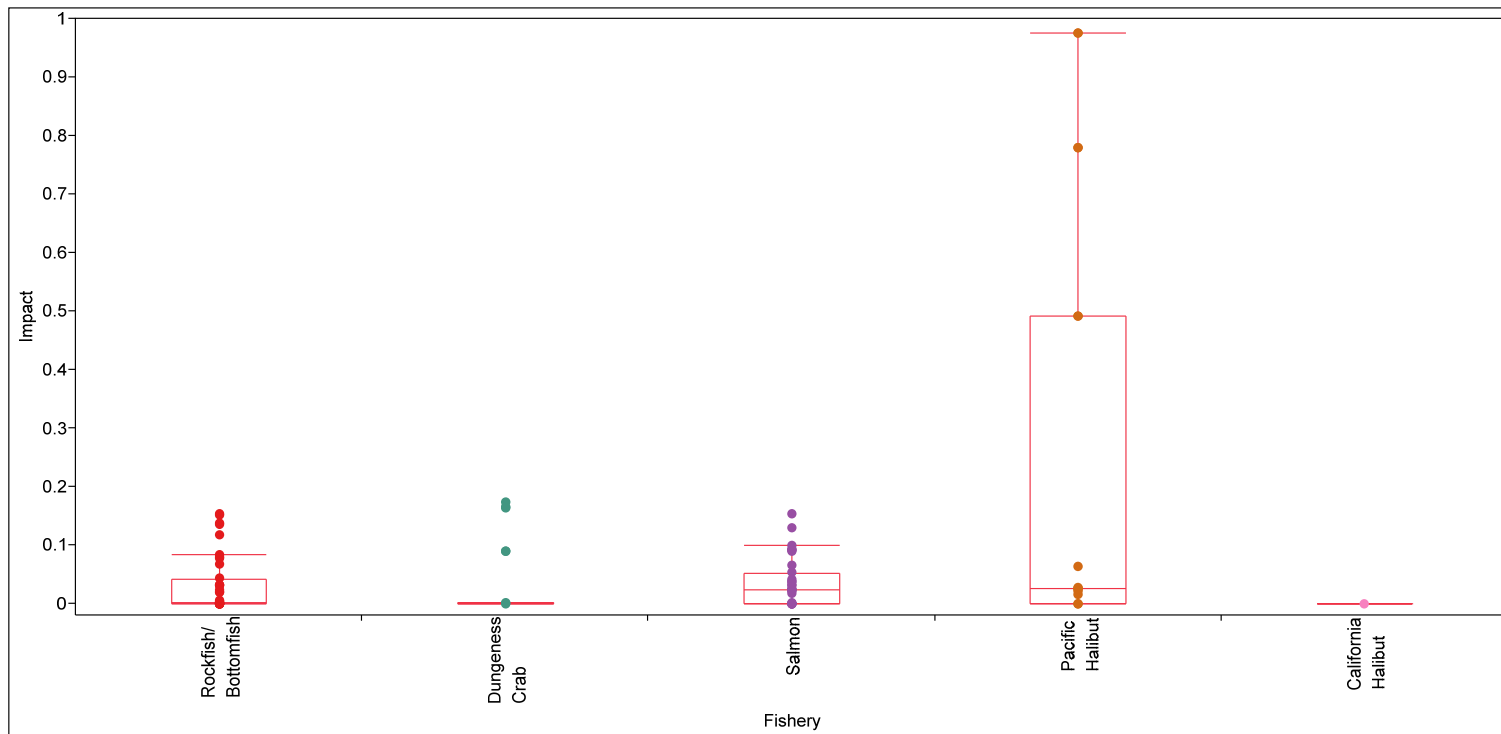
Each dot in Figure A.1 represents the potential impact of one MPA proposal on the stated value of fishing grounds in a specific port for a specific fishery (from Table A.2). All points not in a box or on a line are considered statistically significant outliers (i.e., port-fishery combinations that may 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 = $GER - \text{fixed costs} - \text{variable costs} = \$82,566 - \$83,457 - \$19,682 = -\$20,572$.

Net economic impact (NEI) after the MPA proposal (i.e., change in profit) is calculated as $BNER - NER$. In this case, $\$66,412 - (-\$20,572) = \$86,983$. 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.