NON-TRAWL SECTOR MANAGEMENT MEASURES: ANALYSIS TO SUPPORT THE DEVELOPMENT OF A RANGE OF ALTERNATIVES

In November 2019, the Pacific Fishery Management Council (Council) directed the Groundfish Advisory Subpanel (GAP) to develop the scope of action and draft a purpose and need statement for non-trawl area management during the GAP's March and April 2020 meetings. The GAP then submitted Informational Report 4 in June 2020 for Council consideration and scheduling of further scoping of the issues. In April 2021, the Council initiated a scoping process to address modifying existing the Non-Trawl Rockfish Conservation Area (NT_RCA) and developing measures to allow groundfish fishing inside the NT_RCA using only select gears that minimize bottom contact (Agenda Item F.3, Attachment 2).

At that meeting, the Council adopted a draft purpose and need statement and directed staff to analyze items related to relaxing restrictions in the NT_RCA as specified in Agenda Item F.3 Motion 3 to: 1) allow limited entry fixed gear (LEFG) and/or open access (OA) fishery sectors to operate within the current boundaries of the NT_RCA with approved hook-and-line gear, excluding bottom longline, pot/trap, and dinglebar gear and; 2) modify the current seaward and shoreward boundaries of the NT_RCA in specific management areas and allow LEFG vessels to fish within those boundaries.

This document analyzes a potential range of alternatives that may meet the purpose and need adopted by the Council, including some consideration of options related to gear configuration and fishing inside and outside of the NT_RCA on the same trip. Additionally, we provide a preliminary assessment of impacts (e.g., biological, socio-economic, etc.) and discuss overarching issues, such as mitigation measures, monitoring, and protected species for the Council to consider as it moves forward with the development and adoption of a range of alternatives.

Page Blank Intentionally

Contents

1. Introduction 1
   1.1 Purpose and Need Statement with Analytical Guidance 1
   1.2 Relevant Background 1
      1.2.1 Non-Trawl Rockfish Conservation Area Boundaries 1
      1.2.2 Exempted Fishing Permits 2
2. Potential Range of Alternatives 4
   2.1 No Action 4
      2.1.1 Limited Entry Fixed Gear 5
      2.1.2 Open Access 6
      2.1.3 Incidental Open Access (IOA) Fisheries 6
      2.1.4 Shorebased Individual Fishing Quota (IFQ) Gear Switching 7
      2.1.5 Non-trawl Rockfish Conservation Area 7
   2.2 Alternatives 8
      2.2.1 Alternative 1: Allow OA Vessels to Operate in the NT_RCA when using Approved Hook-and-line Gear 10
      2.2.2 Alternative 2: Allow LEFG Vessels to Operate within the NT_RCA when using Approved hook-and-line Gear to Fish to LEFG Trip Limits 11
      2.2.3 Alternative 3: Reconfiguration of NT_RCA Boundaries 12
3. Discussion 7
   3.1 Potential Biological Impacts 7
      3.1.1 Target Species 7
      3.1.2 Non-Target Species (Excluding Yelloweye Rockfish) 8
      3.1.3 Yelloweye Rockfish 9
      3.1.4 Conclusions 12
   3.2 Protected and prohibited species 13
      3.2.1 Short-tailed Albatross 14
      3.2.2 Humpback Whale 14
      3.2.3 Leatherback Sea Turtle 15
      3.2.4 Salmon 16
   3.3 Monitoring and Enforcement 17
   3.4 Socioeconomic impacts 20
      Alternative 1 22
      Alternative 2 23
      Alternative 3 25

3.5 Habitat 28
3.5.1 No Action 30
3.5.2 Alternative 1-2 31
3.5.3 Alternative 3 31
3.5.4 Habitat Mitigation 31
Appendix 1: Historical Boundaries of the West Coast NT_RCA 34
Appendix 2: Reference Maps 35
Appendix 3: Preliminary EFP Analysis 39

Table of Tables

Table 1. Select species allocation (mt), catch (mt) and percentage of catch to allocation for the Emley/Platt EFP 2013-2019. 4
Table 2. Non-trawl management areas and the current NT_RCA boundaries. 8
Table 3. Fixed gear and hook-and-line gear as defined at 660.11 under Fishing Gear 9
Table 4. Non-trawl management areas and the current non-trawl RCA boundaries compared to proposed NT_RCA boundaries. 13
Table 5. Depth contours, in fathoms (fm), in regulation: CFR 50 §§ 660.71-660.74 14
Table 6. Estimated square kilometers (km^2) of NT_RCA by management area under No Action and the proposed changes under Alternative 3. Depths in fathoms (fm) 14
Table 7. Square kilometers by ten fathom (fm) depth bins by management area. Shaded areas represent depth bins that are not currently part of the NT_RCA or the depth contour does not exist in regulation. 6
Table 8. Total non-trawl sector mortality (mt), non-trawl allocation (mt), and percent attainment of non-trawl allocations for selected shelf rockfish species, 2015-2019. Sources: GEMM for mortality, PacFIN SPEX database for allocations. 7
Table 9. Commercial non-trawl mortality for selected shelf species, 2017-2020. Sources: GEMM. 8
Table 10. 2021 Harvest guideline (HG) and annual catch target (ACT) for yelloweye rockfish in the non-trawl fishery in metric tons (mt). (after GMT's Rebuilding Species Scorecard) 9
Table 11. Yelloweye rockfish total mortality (discard mortality plus landings) in metric tons by year for selected fisheries for 2015-2020. (Sommers, 2021) 10
Table 12. Yelloweye rockfish total mortality (discard mortality plus landings for commercial fixed gear and recreational fisheries in mortality compared to non-trawl allocations 2015-2020 10
Table 13. Current 2021-2022 Yelloweye rockfish harvest specifications and projections for 2023-2032 in metric tons (mt). OFL and ABC projections based on the 2017 assessment using the new sigmas for 2020 and beyond. ACL projections based on an SPR harvest rate of 65%. (Source Agenda item C.8, Attachment 2, September 2021). 11
Table 14. Limited Entry Fixed Gear Observer Coverage Rates, 2010-2019 (Somers et al. 2021). Coverage rates are computed as the observed proportion of total groundfish landings, summarized from fish ticket landing receipts. 18
Table 15. Open Access Observer Coverage Rates, 2010-2019 (Somers et al. 2021). Coverage rates are computed as the observed proportion of total groundfish landings, summarized from fish ticket landing receipts. 19

Table 16. Average price per pound (2020$/lb) and total revenue (1000s of 2020$) for select midwater species landed by commercial fixed gear vessels, 2017-2020..... 21
Table 17. Average number of vessels and dealers with HKL landings in the OA groundfish fishery, excluding sablefish trips, north of 34° 27’ N. lat., 2017-2020. 22
Table 18. Ranking of port involvement (revenue as a percentage of coastwide revenue) in the OA HKL sector from 2017-2020. 23
Table 19. Average number of vessels and dealers participating in LEFG HKL fisheries by port group, 2017-2020. “C” denotes ports with fewer than three vessels and/or dealers over the time series. 24
Table 20. Ranking of port involvement (revenue as a percentage of coastwide revenue) north of 34° 27’ N. lat. for LEFG HKL fisheries, 2017-2020. 24
Table 21. Average number of vessels and dealers participating in non-sablefish OA fisheries with all gear types by IOPAC port group, 2017-2020. 25
Table 22. Ranking of port involvement (revenue as a percentage of coastwide revenue) north of 34° 27’ N. lat. for non-sablefish OA fisheries using all gear types, 2017-2020. 26
Table 23. Average number of vessels and dealers participating in LEFG non-sablefish fishery by IOPAC port group, 2017-2020. “C” denotes those port groups with fewer than three vessels or dealers participating over the time series. 27
Table 24. Ranking of port involvement (revenue as a percentage of coastwide revenue) north of 34° 27’ N. lat. for non-sablefish LEFG fisheries using all gear types, 2017-2020..... 27
Table 25. Summary of non-trawl gears used in the groundfish fishery and their effects on groundfish habitat, from Appendix C-1 of the Groundfish FMP. 30
Table 26. Essential Fish Habitat Conservation Area that do not allow bottom contact gear (§66.12(a)(16)). Note, there are no EFHCAs off Washington closed specifically to bottom contact gear. 32

Table of Figures

Figure 1. Illustration of gears used in current exempted fishing permits hook-and-line gear used in the NT_RCA. Illustration A - Emley/Platt EFP; Illustration B - Cook EFP; Illustration C/D – Real good Fish. 3
Figure 2. Washington NT_RCA shown with depth contours available in regulation from 30 to 100fm. 2
Figure 3. Maps for the NT_RCA between 46 16" N. lat. and 40 10" N. lat. showing current NT_RCA and proposed NT_RCA overlaid in crosshatch: a) 46°16 N. lat to Newport, OR; b) Newport, OR to Coos Bay, OR; 3) Coos Bay, OR to Pt. St. George, CA; and d) Pt. St. George, CA to 40°10” N. lat. 3
Figure 4. Maps for the NT_RCA between 40° 10" N. lat. and 38° 57" N. lat. showing current NT_RCA and proposed NT_RCA overlaid in crosshatch. 4
Figure 5. Maps for the current NT_RCA between 38° 57.5" N. lat and 34° 27 N. lat. with the proposed NT_RCA overlaid in crosshatch: a) 38° 57.5” N. lat. to south of San Francisco; b) South of San Francisco to South of Monterey; and c) South of Monterey to 34°27” N. lat..... 5
Figure 6. Annual groundfish landings by IOPAC port group by OA groundfish vessels on non-sablefish trips north of 34° 27’ N. lat. using HKL gear only, 2017-2020. 22
Figure 7. Annual groundfish landings by IOPAC port group by LEFG groundfish vessels on non-sablefish trips north of 34° 27’ N. lat. using HKL gear only, 2017-2020. Note: “N

OREGON" includes landings from Astoria and Newport, "S OREGON" includes Coos Bay and Brookings, and "FB/BB/SF" represents Fort Bragg, Bodega Bay, and San Francisco. 24
Figure 8. Annual OA groundfish landings by all gears excluding sablefish trips by port group, 2017-2020. Note Puget Sound and South/Central WA Coast port groups were removed for confidentiality purposes. 25
Figure 9. Groundfish landings (lbs) on LEFG non-sablefish trips using all gear types by port group, 2017-2020. Note: Landings into WA ports occurred in only 3 of 4 years, but were removed due to fewer than three vessels/dealers in a given year. Additionally, Coos Bay in 2019 was removed. 27

1. Introduction

1.1 Purpose and Need Statement with Analytical Guidance

The Council initiated the scoping process for the NT_RCA in April 2021 under Agenda Item F.3, and adopted the following draft purpose and need statement for public review:

> The purpose of these proposed actions is to provide access to additional areas that are currently closed to groundfish fishing inside the Non-Trawl Rockfish Conservation Area (RCA). The Non-Trawl sector is presently unable to access many species of shelf rockfish where they are most abundant. The actions are needed to provide increased attainment of available healthy shelf rockfish species that largely reside inside the Non-Trawl RCA, thereby increasing their utilization and economic value of the groundfish fishery. The actions are also needed to help diversify fishing strategies in light of restrictive salmon and crab opportunities, provide more stable, year-round fishing opportunity, and expand opportunities to supply seafood, while bringing financial benefit to fishermen, communities, and the infrastructures they support. The additional access might be provided by 1) moving the existing Non-Trawl RCA boundaries, and/or 2) allowing groundfish fishing inside the Non-Trawl RCA using only select gears that minimize bottom contact.

The Council also provided direction to staff regarding analyzing allowing limited entry fixed LEFG and/or OA vessels to operate within the NT_RCA under specific gear requirements as well as modifying the current NT_RCA boundaries. Specifically, the Council's April 2021 motion asked staff to:

1. Prioritize analysis of opening the existing non-trawl RCA to open access fisheries using hook-and-line gear, and excluding longline, dinglebar and pot/trap gear (Table 1, Option 1 in Supplemental GAP report F.3.a, April 2021)
2. Conduct a complementary analysis that considers how the LEFG fishermen can access their higher trip limits within the RCA, using hook-and-line gears.
3. Conduct a complementary analysis regarding RCA line modifications to allow LEFG access to areas of the RCA. (Supplemental GAP Report 1, Table 1, Options 2 and 3). In addition to GAP options described in Table 1, RCA line modifications may also include discrete changes to the 100 fm RCA boundary in Washington north of 46°16" N. lat.

1.2 Relevant Background

1.2.1 Non-Trawl Rockfish Conservation Area Boundaries

The NT_RCA is a coastwide, contiguous area bounded by specific latitude and longitude coordinates that approximate depth contours along the West Coast continental shelf and around

the islands off California.[1] The NT_RCA was initiated as part of an emergency rule in January 2003https://www.pcouncil.org/documents/2021/03/f-3-attachment-2-non-trawl-sector-groundfish-area-management-modifications-scoping-discussion-document.pdf to mitigate impacts to overfished groundfish species (Section 6.8 of the Groundfish Fishery Management Plan (FMP)). As of October 2021, with one exception, the groundfish species that were the main driver for creation of the NT_RCA have been rebuilt. The only species currently under a rebuilding plan is yelloweye rockfish and, based on the most recent stock assessment, should be rebuilt by 2029. Additionally, while the NT_RCA was not designed to mitigate impacts to habitat; however, it is likely this closure has had a positive impact on habitat.

In the 18 years since implementation, the seaward and shoreward depth boundaries of the NT_RCA have been modified multiple times (Appendix 1: Historical Boundaries of the West Coast) with the most recent changes occurring as part of the 2021-2022 harvest specifications and management measure process. The most recent changes were primarily off of California.[2] One notable change relevant to this action was to the NT_RCA between 40°10 N. lat and 46°16" N. lat. where the 30 to 40 fm depth bin within the NT_RCA was opened to fixed gear vessels. However, participants can only operate in this area with select hook-and-line gear, as the use of pot/trap, bottom longline, and dinglebar are prohibited in this depth range. Even though boundaries have been modified over the years, the NT_RCA still covers a large portion of the West Coast continental shelf, largely prohibiting LEFG and OA fishing operations from fishing healthy shelf rockfish stocks. Additionally, it is important to note that some NT_RCA portions are in state waters.

The depth range covered by the NT_RCA varies by groundfish management area. Washington has the widest depth closure range, from 0 to 100 fm; whereas the area South of 34°27" N. lat has the narrowest closure range, from 100-150 fm. However, as will be discussed in more detail in Section 2.1.5, the depth range does not necessarily equate to area coverage as shelf width varies along the coast. For example, just south of Cape Mendocino, CA the NT_RCA is approximately 1.2 km wide whereas at Pt St. George, CA, the NT_RCA is approximately 16 km wide. These two geographic points are within the same management area, approximately 90 miles apart.

1.2.2 Exempted Fishing Permits

Exempted fishing permits (EFPs) are not part of this action; however, there is crossover between the gear being tested in current EFPs and this action. The Council and the GAP have both referenced "EFP" gear as a hook-and-line configuration applicable to fishing within the NT_RCA. Three EFPs testing hook-and-line gear configurations are currently operating in the NT_ RCA: 1) San Francisco Community Fishing Association Rockfish Jig Fishing off California (Emley/Platt); 2) Cook Commercial Midwater Hook-and-line Rockfish (Cook); and 3) Monterey Bay EFP targeting Chilipepper Rockfish (Real Good Fish). We incorporate the details of these EFPs by reference.

A goal of these EFPs is to test gear that primarily targets midwater species by fishing the gear within the water column (Figure 1). A key component of the gear is it is to not be fished on the bottom (i.e., no bottom contact). The gear is either trolled (Cook and Real Good Fish EFPs) or

[1] NT_RCA coordinates that approximate depth contours specified at CFR 50 §§ 660.71-660.74.
[2] Refer to the 2021-2022 harvest specifications and management measures Environmental Assessment

jigged boat-side (Emley/Platt EFP) and are required to use artificial lures. Results from the EFPs are provided for Council review at the November meeting of odd years, or as requested.

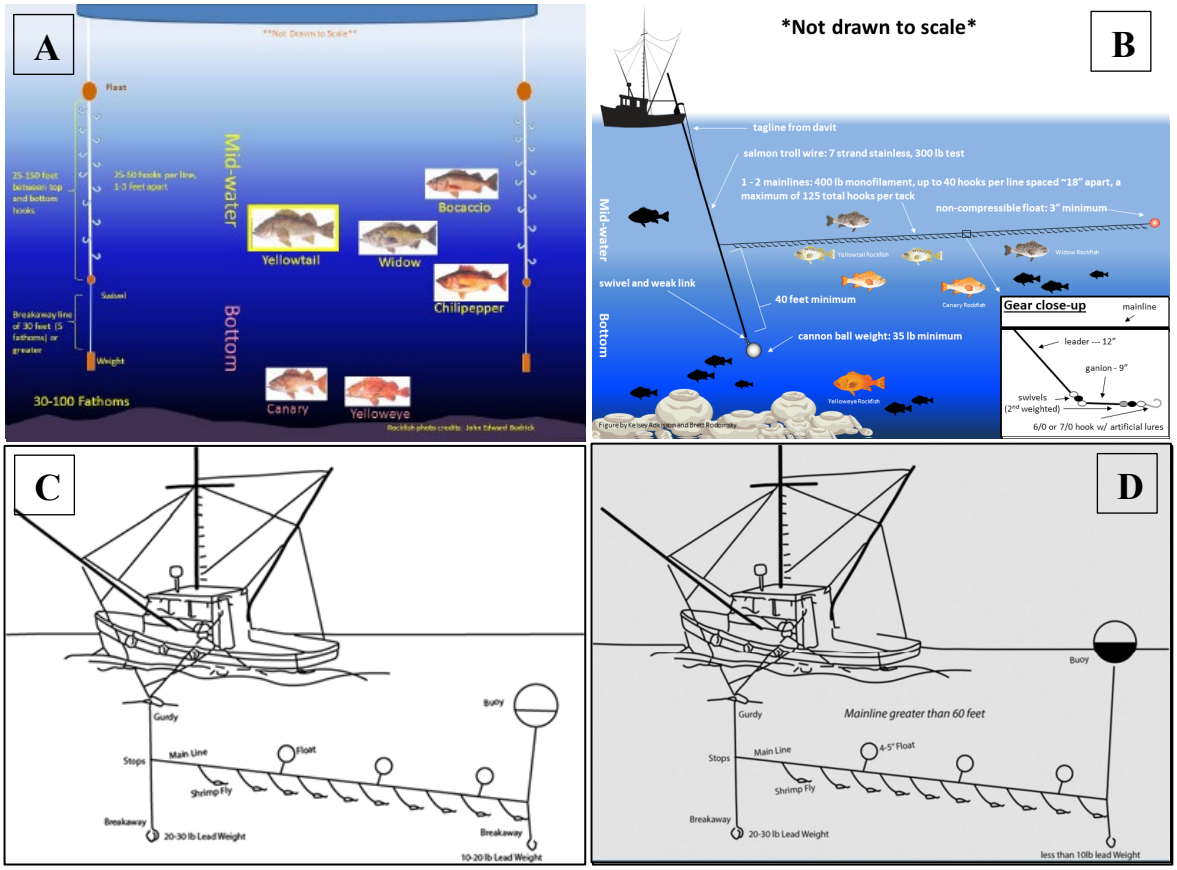

Figure 1. Illustration of gears used in current exempted fishing permits hook-and-line gear used in the NT_RCA. Illustration A - Emley/Platt EFP; Illustration B - Cook EFP; Illustration C/D – Real good Fish.

Appendix 3: Preliminary EFP Analysis provides an overview of the data submitted by EFP applicants, including initial discussions on yelloweye bycatch. In this preliminary and coarse investigation, yelloweye bycatch rates were most similar to the California Recreational sector. Spatial distribution of bycatch largely followed effort/catch patterns, and proximity to port.

It is difficult to draw coastwide conclusions from Appendix 3 as the primary data source is from the Emley/Platt EFP. The other EFPs are lacking data, which is likely a result of low participation. As the Emley/Platt EFP operated off areas northern central California and these data may not be representative of other areas. A key objective of Emley/Platt EFP was, in part, to

> "Test the success of this experimental commercial jig gear configuration at: 1) avoiding deep dwelling overfished rockfish stocks (canary and yelloweye) while selectively harvesting an abundant mid-water rockfish stock (yellowtail)..." Page 2

While it is beyond the scope of this report and action to determine the relative success of this EFP in obtaining its objectives, we can draw some conclusions from the data analysis shown in Appendix 3. In Table the allocations, catch, and percent of allocation are shown canary rockfish,

cowcod, yelloweye rockfish, and yellowtail S of 40°10 N. lat are shown. For the years 2013 through 2019, where 100% of trips were observed, this EFP caught 3.5 percent of their canary rockfish allocation, 11.1 percent of cowcod allocation, 25.9 percent of yelloweye allocation, and 10.3 percent of yellowtail S of 40°10" N. lat. allocation. However, by numbers, the dominant species was yellowtail rockfish S of 40°10" N. lat. These data show that gear and fishing method can catch yellowtail; however, it also can catch yelloweye as well as other demersal rockfish. It is important to note that, by number, yelloweye rockfish counts were low, a total of 16 for all years; however, like all groundfish, yelloweye are not managed by number.

Table 1. Select species allocation (mt), catch (mt) and percentage of catch to allocation for the Emley/Platt EFP 2013-2019.

	Allocation	Caught	Percent
Canary	8.00	0.28	3.5%
Cowcod	0.15	0.02	11.1%
Yelloweye	0.20	0.05	25.9%
Yellowtail	210.00	21.69	10.3%

The overall paucity of data across all EFPs makes it difficult to project what the impacts could be if this EFP were scaled up to a larger participant group. It may be likely this data is representative of what could be expected in this area; however, it is also equally as likely that it is not. These fishermen are experienced with this gear and fishing method but new entrants may need a learning curve and within such a learning period, the species composition of catch and bycatch may be different than what the EFP data has shown. Further, fishing north and south of the Emley/Platt fishing area with this gear type may produce different results altogether. The use of this gear as a means to access the NT_RCA may hinge upon Council risk policy regarding overfished stocks.

2. Potential Range of Alternatives

Based on the Council's April 2021 motion, we provide a potential range of alternatives that may meet the purpose and need of the action (See Section 1.1). This includes a No Action alternative that describes the current configuration of the NT_RCA and the fisheries that are subject to it. The three action alternatives would remove certain restrictions for non-trawl vessels and/or change the configuration of the NT_RCA. This discussion draft treats the three bullet points under the Motion as Alternatives, i.e., Alternative 1, 2, 3. Staff recognizes these are not Council approved Alternatives and list these options as such only for convenience in writing. Staff also notes these draft Alternatives may be combined, revised, or rejected by the Council.

2.1 No Action

The commercial groundfish non-trawl fishery comprises of two sectors, the LEFG and OA fisheries. The origins of these two sectors evolved out of the Amendment 6 process and subsequent management actions. These sectors are managed with cumulative groundfish trip limits by sector, gear restrictions, spatio-temporal restrictions, and depth-based management measures.

Under No Action, the NT_RCA would remain in place and the commercial non-trawl sectors would be prohibited from operating within those boundaries, except where specified in regulation.

Management of LEFG (§660 Subpart E) and OA fisheries (§660 Subpart F) are incorporated by reference, but management measures relevant to this action are summarized in the sections below.

2.1.1 Limited Entry Fixed Gear

The LEFG sector is a gear-endorsed limited entry sector which includes a limited access privilege program. [3] In order to fish in the LEFG sector, vessels are required to be registered to a LEFG permit. Each LEFG permit has a gear endorsement which designates the allowable gear type(s), longline or pot/trap (§660.25(3)(ii)), that can be used by the vessel. Meaning, if a LEFG vessel is to harvest the LEFG trip limit for a particular species or complex, it must use the gear for which it is endorsed. Specific management measures for the LEFG sector are defined at 50 CFR subpart E with LEFG groundfish trip limits found under the same subpart in Table 2 North and South.[4] Note that within the LEFG sector is the LEFG sablefish primary (tier) fishery, which is managed with tier limits (§660.25(b)(vi)(A)) rather than cumulative trip limits (§660.231). Vessels that participate in the tier fishery also may participate in the LEFG daily trip limit (DTL) fishery prior to or after the primary season.[5]

In addition to endorsed longline and pot gear, LEFG vessels can fish with non-trawl "open access gear to target groundfish, such as vertical hook-and-line" (§660.11[6], §660.330 (b)). For clarity, OA gear is defined under §660.11 as "all gear types except 1) longline or trap (or pot) gear fished with a vessel that has a limited entry permit affixed with a gear endorsement for that gear 2) Groundfish trawl." However, if a LEFG vessel switches to an OA gear when fishing, or only fishes OA gear on a trip, crossover provisions apply (§660.60(h)(7). This means that if vessels registered to a LEFG permit fish with OA gear at any time, they would be subject to the lower, more restrictive trip limit. In most cases, this would be the OA trip limits (§660.230 (b)(2)). In select situations, if the OA trip limit is higher than the LEFG limit, LEFG vessels would be restricted to the LEFG trip limit(§660.60(h)(7)(ii)).

Regardless of the gear type used by a vessel registered to an LEFG permit, any groundfish retained while using OA gear and/or during a crossover trip would count against the LEFG trip limit for that vessel in the designated period (§660.60(h)(7)(ii)(A). Finally, vessels are not allowed to retain two separate (i.e., LEFG and OA) trip limits (§660.60(h)(7)(ii)(A)) on the same trip. For example, if a LEFG vessel targets sablefish using its endorsed gear (e.g., longline) and then switches to OA gear (e.g., hook-and-line gear) to target yellowtail rockfish on the same trip, the vessel could only retain the OA trip limit of yellowtail and sablefish (if applicable) (§660.60(h)(7)(ii)(A)).

LEFG fishery participants are prohibited from operating within the boundaries of the NT_RCA and other specified Groundfish Conversation Areas (GCAs) and Essential Fish Habitat Conservation Areas (EFHCAs) regardless of gear type, unless transiting (§§660.212(c) *and* 660.230(d)(11)(iii)) or fishing for the "other flatfish complex" in the NT_RCA (§660.330(d)(12)(iv). Under §660.230(d), LEFG vessels allowed to operate "within a GCA (e.g., fishing for "other flatfish" with hook and line gear only) may not simultaneously have other gear

[3] Permit are described at 50CFR 660.25 and discussed in subpart E.
[4] See §660.11 Conservation Measures 1(vi)(B)
[5] See Agenda Item G2, Attachment 1, June 2021 for a complete description of the primary tier fishery and its relationship with other fisheries, including the daily trip limit (DTL) fisheries.
[6] Refer to open access gear in the definitions list

on board the vessel that is unlawful to use in the [LEFG] fishery." LEFG vessels are required to use vessel monitoring systems (VMS; §660.14(b)(1)) as a well as carry an observer if selected for coverage (§660.18).

2.1.2 Open Access

OA commercial fishing vessels are those that are not registered to a LE permit "which takes and retains, possesses or lands groundfish."[7] The OA sector is poorly delineated as this sector is comprised of vessels fishing multiple gear types (§660.330(b)), ranging from non-groundfish trawl gear to fixed gear and includes both targeted groundfish operations (e.g., sablefish DTL) and incidental open access fisheries (IOA), e.g., salmon troll, etc. Therefore, any vessel certified to commercially fish on the West Coast can fish under the OA trip limit regulations. Additionally, each state may have specific licensing requirements for OA vessels (e.g., state nearshore permits, salmon troll) that may further classify vessels in those states. For purposes of this document, and based on Council direction, we are only considering OA fixed gear vessels that target groundfish and are not including OA vessels that land incidental groundfish catch.. If this is the Council's intent with this action, it may be beneficial to specify the directed OA groundfish fishery as separate from the incidental open access groundfish fishery (discussed in Section 2.1.3 below).

The OA sector has specific trip limits that, in general, are lower than LEFG trip limits; however, the OA sector can fish to those limits with a wider variety of gear types (§660.30(b)). The current OA sector management measures and regulations are found at 50 CFR 660 subpart F with trip limits found in Table 3 North and South under the same subpart. OA vessels are also subject to crossover provisions (§660.60(h)(7)) though vessels cannot fish to LEFG limits without an LEFG permit.

Similar to LEFG vessels, directed groundfish OA vessels are prohibited from operating within the NT_RCA, and applicable GCAs (§660.330(d)(1-11) unless transiting(§660.33(d)(12)(i & ii), or fishing for "other flatfish" complex (§660.330(d)(12)(iv)) with hook-and-line gear, or operating within the 30 to 40 fm depth bin of the NT_RCA from 40° 10'N. lat. to 46° 16' N. lat. with hook-and-line gear as described above. Additionally, OA vessels are required to carry an observer when fishing groundfish in the exclusive economic zone (EEZ) (§660.14(b)(3) if selected for coverage by WCGOP (§660.18 and §660.316) and must also use a VMS if fishing in federal waters (§660.14).

2.1.3 Incidental Open Access (IOA) Fisheries

IOA fisheries are fisheries that do not directly fish on or target groundfish but can retain groundfish incidentally caught. The IOA fisheries that are allowed to retain groundfish are pink-shrimp non-groundfish trawl, ridgeback prawn trawl, sea cucumber trawl, California halibut, salmon troll, and directed commercial Pacific halibut.[8] With the exception of directed commercial halibut, these

[7] §660.11 Open Access fishery means the fishery composed of commercial vessels using open access gear fished pursuant to the harvest guidelines, quotas, and other management measures governing the harvest of open access allocations (detailed in §660.55) or governing the fishing activities of open access vessels (detailed in subpart F of this part). Any commercial vessel that is not registered to a limited entry permit and which takes and retains, possesses or lands groundfish is a participant in the open access groundfish fishery.

[8] §660.330(a), "Open access vessels that fish with non-groundfish trawl gear or in the salmon troll fishery north of 40°10′ N lat. are subject the cumulative limits and closed areas (except the pink shrimp fishery which is not subject to RCA restrictions) listed in Tables 3 (North) and 3 (South) of this subpart."

fisheries may operate in either portions of the NT_RCA (CA halibut, sea cucumber and ridgeback prawn) or in the entire NT_RCA (pink shrimp trawl and salmon troll). For the pink shrimp, sea cucumber, ridgeback prawn, and CA halibut fisheries, this action is not expected to have any impacts as vessels in these fisheries operate with trawl gear and therefore, these vessels are not subject to the NT_RCA. We therefore eliminate these fisheries from further discussion.

Two IOA fisheries may be impacted through this action with potential modifications of the NT_RCA boundaries - salmon troll and commercial halibut. Salmon troll vessels are allowed retain incidental limits of yellowtail rockfish while fishing both inside and outside the NT_RCA coastwide, lingcod while fishing in the NT_RCA north of 40° 10' N. lat., and are subject to OA trip limits when retaining groundfish on trips completely outside of the NT_RCA.[9] In the past, representatives from the salmon troll fishery have expressed they wish to retain other incidentally caught groundfish while in the NT_RCA. Salmon troll vessels cannot participate in the salmon troll fishery within the NT_RCA and then fish in the OA groundfish fishery or retain groundfish other than lingcod or yellowtail on the same trip (660.330(d)(12)(iii)). If retaining groundfish, vessels are required to have VMS.

The directed commercial non-tribal Pacific halibut fishery currently operates on 56-hour openings every other week starting the 4th week in June. Vessels are subject to the same non-trawl RCA regulations as groundfish OA vessels, regardless if retaining groundfish or not. As with salmon trollers, if the vessel retains any groundfish, they must have VMS.

2.1.4 Shorebased Individual Fishing Quota (IFQ) Gear Switching

Shorebased individual fishing quota (IFQ) trawl vessels utilizing fixed gear (i.e., "gear switchers") may also be impacted by this action (§660.24(k)). These vessels may use any legal non-trawl gear to participate in the non-trawl groundfish fishery but do not need gear endorsements as do LEFG vessels. Gear switching vessels are required to follow the same prohibitions (§616.212) and management measures(§660.230(d)) in place for LEFG, including any applicable gear restrictions (§§660.219 and 660.230(b)). These vessels are subject to GCA fixed gear provisions, including the NT_RCA, when fishing with the non-trawl gear. However, gear switching vessels are subject to other provisions that are required of the Shorebased IFQ program, including 100 percent monitoring (see 660.140(k)).

2.1.5 Non-trawl Rockfish Conservation Area

Under No Action, the current structure of the NT_RCA would not change (Table 2).[10] NT_RCA boundaries are not consistent along the coast, varying by management area. At present, the NT_RCA covers approximately 34,101 km^2 of the West Coast continental shelf, where it largely prohibits LEFG and OA fishing operations from fishing on midwater and shelf rockfish stocks. Full page maps of the Action area are provided in Appendix 2: Reference Maps and show the current NT_RCA by Management Area with the proposed NT_RCA overlaid in a crosshatch pattern.

[9] See Agenda Item F.1, Attachment 8, June 2020

[10] NT_RCA coordinates that approximate depth contours specified at CFR 50 §§ 660.71-660.74.

Table 2. Non-trawl management areas and the current NT_RCA boundaries.

Management Area	Current NT_RCA boundaries a/	Approximate Area of NT_RCA (sq km^2)
North of 46°16' N. lat.	Shoreline (0 fm) to 100fm	11,221
46°16' N. lat. to 40°10' N. lat.: b/	30 fm to 100 fm	15,933
40°10' N. lat. to 38°57.5' N. lat.:	30 fm to 125 fm	1,673
38°57.5' N. lat. to 34°27' N. lat.:	50 fm to 125 fm	5,254
South of 34°27' N. lat.: c/	100 fm to 150 fm	9,671

a/ Current NT_RCA boundary coordinates at 86 FR 14379, see Tables 2 & 3 -coordinates at §§ 660.71-660.74
b/ between 46°16 N. lat. and 40°10' N. lat., 30 to 40 fm fishing is only allowed with hook and line gear except bottom longline and dinglebar (§660.11)
c/also applies around islands

2.2 Alternatives

At their April 2021 meeting, the Council directed staff to potential means for the LEFG and OA sectors to access the NT_RCA. In the following analyses, we use the Council's F.3 Motion 3 (shown above) bullet points as a primer for each section (noted in italics) and largely isolate the motion's tasks into singular analyses.

The rationale for proposing these changes is to allow the LEFG and OA fleets greater opportunity to operate in depths where many shelf rockfish (e.g., chilipepper rockfish, yellowtail rockfish, etc.) tend to be abundant. While not the only reason, the current structure of the NT_RCA is a likely contributor to the low attainment of these species by the LEFG and OA sectors. The non-trawl sector has expressed a strong desire to return to historical fishing grounds to target under-utilized shelf species to diversify their fishing portfolio and add flexibility to their business operation.

The first two Alternatives direct staff to analyze opening of the NT_RCA to approved hook and line gear. Alternative 1 and Alternative 2, respectively, examines allowing the OA/LEFG sectors to operate within the NT_RCA with approved hook-and-line gear, excluding longline, dinglebar, and pot/trap gear. Alternative 2 also considers allowing LEFG vessels to fish to their sector's groundfish trip limits using approved hook-and-line gear. Alternative 3 would set new management area specific shoreward and seaward boundaries to narrow the NT_RCA.

Staff also notes the term "hook-and-line" gear is very general. Hook-and-line gear is defined as "one or more hooks attached to one or more lines. It may be stationary (commercial vertical hook-and-line) or mobile (troll)" (§660.11) and includes bottom longline, vertical hook and line, dinglebar, and troll gear (Table 3). The Council motion spoke to allowing vessels to fish hook-and-line gear, with the exception of longline and dinglebar, in the NT_RCA; thus, allowing vertical hook and line and troll gear to be fished within the NT_RCA. These gear types are defined as follows in 660.11:

> "(ii) ***Commercial vertical hook-and-line*** means commercial fishing with hook-and-line gear that involves a single line anchored at the bottom and buoyed at the surface so as to fish vertically….

(iv) ***Troll gear*** means a lure or jig towed behind a vessel via a fishing line. Troll gear is used in commercial and recreational fisheries."

Table 3. Fixed gear and hook-and-line gear as defined at 660.11 under Fishing Gear

Gear	Definition	Types
Bottom Contact Gear	Gear designed, or modified, to make contact with the bottom	Includes, but not limited to: • Trawl gear • Fixed gear • Set net • Dinglebar gear • Experimental gear designed/modified to make contact with the bottom
Fixed Gear	Anchored non-trawl gear	• Longline • Trap or pot • Set net • Stationary hook-and-line (includes vertical hook-and-line
Hook and Line Gear	Gear with one or more hooks attached to one or more lines, may be stationary or trolled.	• Bottom longline a/ b/ • Commercial vertical hook-and-line • Dinglebar • Troll gear

a/ means a stationary, buoyed, and anchored groundline with hooks attached, so as to fish along the seabed. It does not include pelagic hook-and-line or troll gear.
b/ Snap gear means a type of bottom longline gear where the hook and gangion are attached to the groundline using a mechanical fastener or snap

While these gear definitions are in line with what is currently allowed off Oregon from 30-40 fm, if Council intent was for this action to be more specific to the EFP styles of gear (i.e., non-bottom contact hook-and-line gear), that should be specified in the range of alternatives (see Section 2.2 for more discussion). This would exclude typical vertical hook-and-line type gears which are anchored to the bottom- but allow for trolling (similar to the Cook and Real Good Fish EFPs) and the EFP style of hook-and-line gear described in Emley-Platt above.

For this analysis, we use the Alternative's language and use the catch-all term 'approved hook-and-line' when referencing the gear type to be used within the NT_RCA. This term is inclusive of both vertical hook-and-line gear, troll gear, as well as the EFP style of gears described above.

Considerations in Developing Alternatives

During GAP, GMT, Council, and Enforcement Consultant (EC) discussions, multiple concerns were raised regarding vessels operating in the NT_RCA. These discussions centered around gear use and possible restrictions when fishing inside and outside the NT_RCA. Staff lists these concerns below and incorporates them into the sub-options below for Council consideration.

Regarding gear on-board:

a. Vessels shall only possess approved hook-and-line gear on-board the vessel when operating within the NT_RCA (same as No Action gear provisions outlined at §660.230(d) and 660.330(d)).
b. Vessels may carry multiple gears on-board when operating within the NT_RCA.

Regarding gear and area of operations

a. Vessels are allowed to operate either in the NT_RCA or outside the NT_RCA on a fishing trip, but not both (same as EFP terms and conditions)
b. Vessels are allowed to operate in both the NT_RCA and outside the NT_RCA on the same fishing trip

Additionally, noting the concerns of EC, we add a clause to the Alternatives that would require vessels to declare if they were going to fish within the NT_RCA.

2.2.1 Alternative 1: Allow OA Vessels to Operate in the NT_RCA when using Approved Hook-and-line Gear

Prioritize analysis of opening the existing non-trawl RCA to open access fisheries using approved hook-and-line gear, and excluding longline, dinglebar and pot/trap gear (Option 1 in the table at the end of Supplemental GAP report F.3.a).

No Action: OA vessels, except where and when allowed in regulation, are not allowed to operate within the NT_RCA.

Alternative: Allow OA vessels to operate inside NT_RCA to target groundfish with approved hook-and-line gear only. Vessels must declare their intent to fish within the NT_RCA prior to departure.

Fishing Area Sub-Options:

Sub-option A1:OA vessels may fish in either inside the NT_RCA or outside the NT_RCA on a trip, not both.

Sub-option A2: OA vessels may fish inside and outside the NT_RCA on a trip.

Gear On-Board Sub-Options

Sub-option B1: OA vessels shall only carry approved hook-and-line gear on-board vessel when fishing occurs in the NT_RCA. Vessels shall not switch gears during a fishing trip.

Sub-option B2: OA vessels shall be allowed to carry multiple gears onboard vessels when fishing in the NT_RCA. Only approved hook-and-line gear may be used inside the NT_RCA. Any OA gear may be used outside the NT_RCA.

We interpret the intent of this Alternative is to allow fixed gear groundfish directed OA (hereafter OA) vessels to operate within current NT_RCA boundaries (Table 2) with approved hook-and-line gear only off Oregon and California and bottom longline, pot/trap, and dingle bar gears would be prohibited from use in these areas. Based on Council and GAP discussions, we expect OA groundfish trip limits and species specific retention prohibitions (e.g., yelloweye, cowcod, etc.)

would remain consistent both inside and outside the NT_RCA. Additionally, regulations relating to VMS, declaration, observer coverage, etc. are expected to remain consistent with current regulation. Further, unless specified by the Council, regulations off Washington would remain the same as No Action (i.e., no fishing allowed within the NT_RCA).

Key decision points of this alternative are whether an OA vessel could fish both inside and outside the NT_RCA on the same trip and if the vessel can carry multiple gears or not if fishing occurs in the NT_RCA. Under current regulations, sections §660.230(d) and 660.330(d) respectively, [fixed gear] vessels allowed to operate "within a GCA (e.g., fishing for "other flatfish" with hook and line gear only) may not simultaneously have other gear on board the vessel that is unlawful to use in the [fixed gear] fishery." The Council may want to also consider that under the current EFP terms and conditions, vessels participating in EFPs may only participate in EFP activity (i.e., fishing inside the RCA with approved gear) and may not fish outside the RCA with any gear type, including the EFP described gear. This is the same regulation that is in place for non-groundfish fisheries (such as salmon troll) as outline in 660.330(d)(12)(iii): "If a vessel fishes in a non-groundfish fishery in the non-trawl RCA, it may not participate in any fishing for groundfish on that trip that is prohibited within the non-trawl RCA." Therefore, choosing Fishing Area Sub-Option A1 and Gear On Board Sub-Option B1 would result in an Alternative that is the closest to how the current EFPs and other limited fisheries operate under No Action.

However, the Council could also consider allowing vessels to carry multiple gear types on-board and/or fish both areas (Fishing Area Sub-Option A2 and Gear On Board Sub-Option B2). For example, an OA vessel could use pot gear outside the NT_RCA and approved hook-and-line gear inside the NT_RCA on the same trip. Under this scenario, it is possible that the vessel could catch the same species both inside and outside the NT_RCA, with different gear. If the Council is considering revising §660.230(d) and 660.330(d) to allow vessels to have multiple gears on board while fishing in the NT_RCA, it is important to note that at present, there are few avenues to determine what species were caught with what gear use with any certainty. Federally permitted fixed-gear vessels, except for nearshore vessels in Oregon, are not required to report via logbook[11] and are subject to limited monitoring (see Section 3.3 for more details). Allowing the carrying and use of both gear types on the same trip may result in enforcement having difficulties determining what gear was used by the vessels to catch fish in which area.

2.2.2 Alternative 2: Allow LEFG Vessels to Operate within the NT_RCA when using Approved hook-and-line Gear to Fish to LEFG Trip Limits

Conduct a complementary analysis that considers how the LEFG fishermen can access their higher trip limits within the RCA, using approved hook-and-line gears.

No Action: LEFG vessels, except where and when allowed in regulation, are not allowed to operate within the NT_RCA.

Alternative: Allow LEFG vessels to operate inside the NT_RCA with approved hook-and-line gear and fish gup to the LEFG trip limits. Vessels must declare their intent to fish within the NT_RCA prior to departure.

Fishing Area Sub-Options

[11] Agenda Item C.1.a, Supplemental NMFS Report 2, September 2021.

Sub-option A1:LEFG vessels may fish in either inside the NT_RCA or outside the NT_RCA on a trip, not both.

Sub-option A2:LEFG vessels may fish inside and outside the NT_RCA on a trip.

Gear On-Board Sub-Options

Sub-option B1: LEFG vessels can only carry approved hook-and-line gear on-board a vessel. Vessels shall not switch gears during a fishing trip.

Sub-option B2: LEFG vessels may carry multiple gears on-board. LEFG vessels may fish with approved gears both inside and outside the NT_RCA on the same trip. Only approved hook-and-line gear may be used inside the NT_RCA.

We interpret the intent of this Alternative is to allow vessels in the LEFG fishery to operate within current NT_RCA boundaries with approved hook-and-line gear only off Oregon and California This Alternative would prohibit the use of bottom longline, pot/trap, and dinglebar by LEFG vessels within the NT_RCA. However, LEFG vessels would be able to fish to their LEFG limits when using the approved hook-and-line gear in the NT_RCA, as opposed to No Action regulations, where they would be held to lower, more restrictive limits. LEFG trip limits would remain consistent with current regulations too; as would regulations specifying zero retention of prohibited species (e.g., cowcod, yelloweye rockfish, etc.). Further, unless specified by the Council, regulations off Washington would remain the same as No Action (i.e., no fishing allowed within the NT_RCA). Additionally, regulations relating to VMS, declaration, observer coverage, etc. are expected to remain in place..

The same questions regarding where vessels could fish on a trip and gear on board as noted above for OA apply to LEFG; however, there are concerns specific to LEFG vessels, trip limits, and multiple fishing areas. Alternative 2 states that LEFG vessels could use approved hook-and-line gear within the NT_RCA and fish to their LEFG trip limits. However, if an LEFG vessel were to be able to fish groundfish outside the NT_RCA on the same trip where they also fish within the NT_RCA, differential trip limits would apply. Under current regulation, crossover provisions require LEFG to fish to the lower limits when fishing with OA gear. Therefore, if the Council were to allow LEFG to fish to their limits within the NT_RCA, crossover provisions (50 CFR 660.60(h)(7)(ii)(A)) would need to change. If these provisions were to remain as they are currently, the LEFG vessel in this example could fish to LEFG limits inside the NT_RCA but only fish to the lower more restrictive limits outside the NT_RCA. However, if and when a LEFG vessel does crossover, the entire catch on the vessel must be within the lower more restrictive limits. This would negate the benefit of fishing within the NT_RCA as the LEFG vessel would still be held to crossover provisions. While there appears to only be a small subset of LEFG vessels that use OA gear currently outside the NT_RCA (see Section 3.4 for more discussion), this could create an issue for enforcement and prevent vessels from being able to harvest their actual LE limits if restricted to certain areas.

2.2.3 Alternative 3: Reconfiguration of NT_RCA Boundaries

Conduct a complementary analysis regarding RCA line modifications (Table 1, Options 2 and 3) to allow LEFG access to areas of the RCA. In addition to GAP options described in Table 1, RCA line modifications may also include discrete changes to the 100 fm RCA boundary in Washington north of 46°16' N. lat.

No Action: The NT_RCA boundaries shall not be changed under this Action.

Alternative: NT_RCA boundaries shall be set at:

> **Sub-option 1***: 60 fm shoreward and 80 fm seaward between 40°10' N. lat. and 34°27' N. lat.*
>
> **Sub-Option 2**: *40 fm shoreward and 80 fm seaward between 46° 16' and 40°10' N. lat.*
>
> **Sub-Option 3***: The NT_RCA boundaries off of Washington will be to [depths]*

The above sub-options reflect the GAP's recommendations. The Council may opt to modify these recommendations and could select different shoreward and seaward boundaries for management areas. Additionally, Staff developed this condensed language with the concept that this alternative could be combined with Alternative 1 and 2, as appropriate, to meet the intent of the GAP options.

No changes were proposed south of 34° 27' N. lat. under this alternative; however, the Council could make this recommendations as the process moves forward. Based on the motion, Staff focused on analyzing narrowing of the NT_RCA boundaries within the specific management areas North of 34°27" N. lat, including potential changes to the NT_RCA off of Washington as shown in Table 4 If the Council were to recommend NT_RCA boundary changes, it could use the boundaries described in regulation (Table 5) or the Council could recommend developing new depth contours for use as boundaries.

Table 4. Non-trawl management areas and the current non-trawl RCA boundaries compared to proposed NT_RCA boundaries.

Management Area	Current NT_RCA boundaries a/	Proposed NT_RCA boundaries
North of 46°16' N. lat.	Shoreline (0 fm) to 100fm	Not specified.
46°16' N. lat. to 40°10' N. lat.: b/	30 fm to 100 fm	40 fm to 80 fm d/
40°10' N. lat. to 38°57.5' N. lat.:	30 fm to 125 fm	60 fm to 80 fm d/
38°57.5' N. lat. to 34°27' N. lat.:	50 fm to 125 fm	60 fm to 80 fm d/
South of 34°27' N. lat.: c/	100 fm to 150 fm	No change

a/ Current NT_RCA boundary coordinates at 86 FR 14379, see Tables 2 & 3 -coordinates at §§ 660.71-660.74
b/ between 46°16 N. lat. and 40°10' N. lat., 30 to 40 fm fishing is only allowed with hook-and-line gear except bottom longline and dinglebar (§660.11)
c/also applies around islands
d/ coordinates approximating the 80fm depth contour are not in regulation.

In the GAP report, all non-trawl gear would be allowed to fish in the newly reopened areas previously within the NT_RCA. These gears include, bottom longline, pot/trap and dinglebar. Therefore, other fisheries outside of the LEFG and OA sectors, including IOA fisheries like Pacific halibut directed fishing as well as gear switching vessels in the IFQ sector, would be allowed to fish in these areas.

The GAP recommended in their report that the seaward depth boundary be set at 80 fm for all management zones between 46°16" N. lat. and 34°27" N. lat. This change would create a single, coastwide NT_RCA seaward boundary of 80 fm between 46°16" N. lat. and 34°27" N. However, an 80fm depth contour is not in regulation (Table 5). Therefore, the Council would need to either recommend developing this depth contour or select an alternate depth. However, to provide some

analytical information in the following descriptions, we use the closest adjacent depth contour in regulation, 75 fm.

Between 46°16" N. lat and 40°10" N. lat., the shoreward boundary would move out to 40 fm. If the Council were to adopt this new shoreward boundary for this management area, it may need to consider if the gear restrictions regarding bottom longline, trap/pot, and dinglebar gear, would remain in effect or if vessels could fish with all allowed fixed gear within this area. South of 40°10" N. lat. to 34°27" N. lat. the shoreward boundary would be continuous at 60fm.

Table 5. Depth contours, in fathoms (fm), in regulation: CFR 50 §§ 660.71-660.74

Depth Contour (fm)	CFR Section
10	§660.71(a)
20	§660.71(b)
25 a/	§660.71(c&d)
30	§660.71(e)
50	§660.72 (a)
60	§660.72(f)
75	§660.72(j)
100	§660.73(a)

a/ Queets River, WA to 42°N. lat.

We examine the area specific changes to the NT_RCA boundaries proposed under this Alternative. As the GAP or Council did not provide any recommendations on if or how the NT_RCA boundaries off of Washington may be modified, we only examined the boundary modifications from 46°16" N. lat. to 34°27" N. lat. by management area in Table 4. Excluding Washington, the NT_RCA from the 46°16" N. lat. to 34°27" N. lat. covers approximately 22,880 km^2. Using the 75 fm depth contour as a proxy, if the Council adopted all the boundary modifications as shown above in Table 6, the resulting area would be reduced by 10,906 km^2 , to 11,974 km^2.

Table 6. Estimated square kilometers (km^2) of NT_RCA by management area under No Action and the proposed changes under Alternative 3. Depths in fathoms (fm)

Management Area	Current boundaries	NT_RCA area: (km^2)	Proposed boundaries a/	NT_RCA area: (km^2)	Change in area (km^2)
North of 46°16' N. lat	Shoreline to 100fm	11,221	-	-	-
46°16' N. lat. to 40°10' N. lat.	30 fm to 100 fm	15,953	40 fm to 75 fm	9,905	6,048
40°10' N. lat. to 38°57.5' N. lat.:	30 fm to 125 fm	1,673	60 fm to 75 fm	460	1,213
38°57.5' N. lat. to 34°27' N. lat.:	50 fm to 125 fm	5,254	60 fm to 75 fm	1,609	3,645

a/ the GAP recommended a seaward boundary depth of 80fm; however, this depth contour is not in regulation, therefore, we use the next adjacent line in regulation, 75fm.

North of 46 16" N. lat. (Washington)

No specific changes the NT_RCA boundaries were proposed for Washington; however, the Council could reconfigure the shoreward or seaward boundaries of the current NT_RCA off of Washington to available latitude and longitude coordinates that approximate depth contours in regulation (Figure 2). If the Council desired to allow limited fishing off of Washington but not adjust the NT_RCA off of Washington, they could allow LEFG and OA vessels to operate within the NT_RCA as described under Alternative 1 and/or Alternative 2 above.

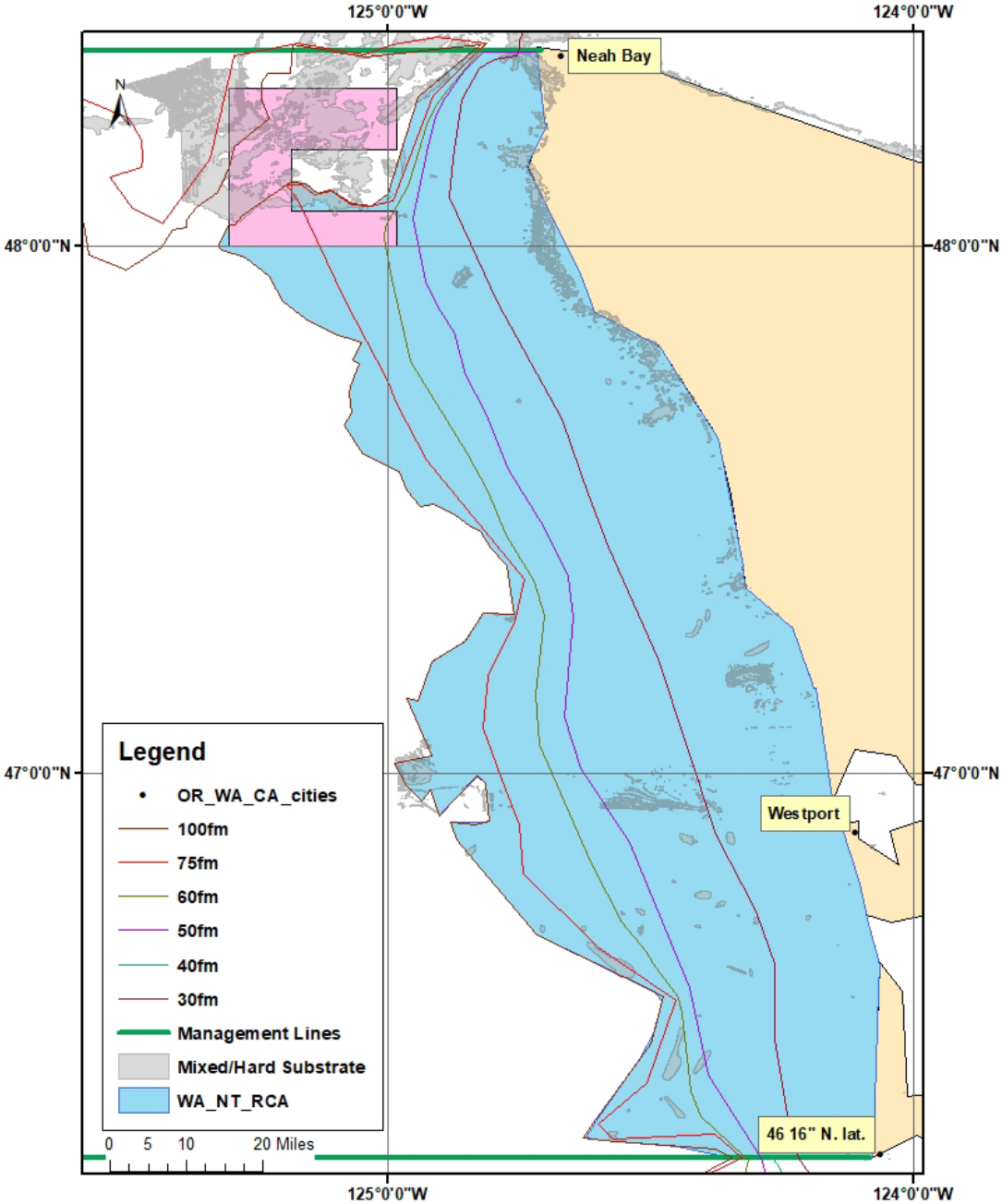

Figure 2. Washington NT_RCA shown with depth contours available in regulation from 30 to 100fm.

46°16' N. lat. to 40°10' N. lat.:

Under this Alternative, the seaward boundary would be reduced from 100 fm to 80 fm and the shoreward boundary would move from 30 fm to 40 fm (Figure 3). Using the 75 fm in regulation as the seaward boundary, as discussed above, the remaining NT_RCA would cover 9,905 sq km^2, reducing the footprint of the current NT_RCA in this area by 6,098 km^2

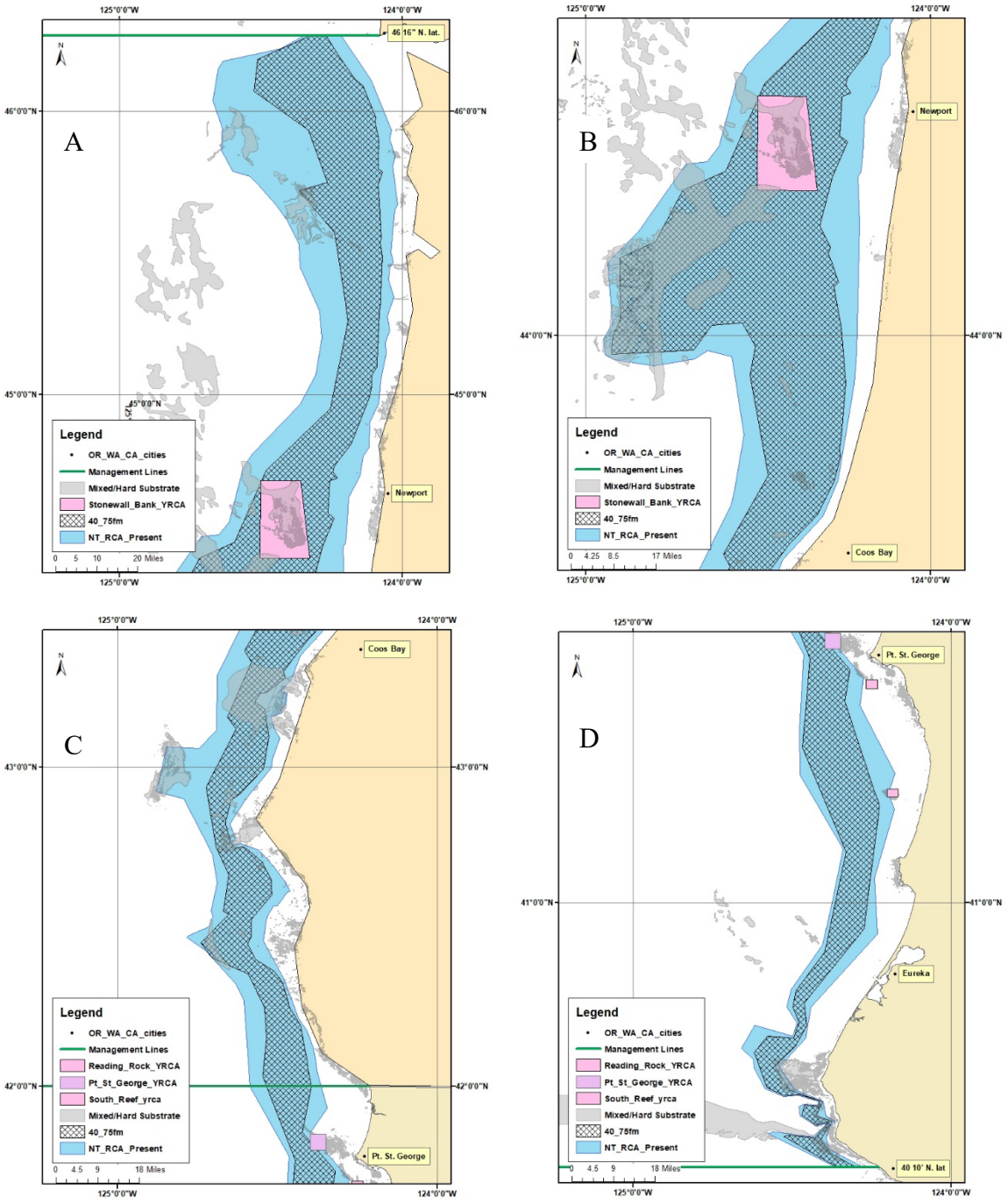

Figure 3. Maps for the NT_RCA between 46 16" N. lat. and 40 10" N. lat. showing current NT_RCA and proposed NT_RCA overlaid in crosshatch: a) 46°16 N. lat to Newport, OR; b) Newport, OR to Coos Bay, OR; 3) Coos Bay, OR to Pt. St. George, CA; and d) Pt. St. George, CA to 40°10" N. lat.

40°10" N. lat. and 38°57" N. lat.

Under this Alternative, the seaward boundary would change from to 125 fm to 80 fm and the shoreward boundary would move from 30 fm to 60 fm (Figure 4). Using the 75 fm in regulation as the seaward boundary, as discussed above, the remaining NT_RCA would cover 460 sq km^2, reducing the footprint of the current NT_RCA in this area by 1,213 km^2

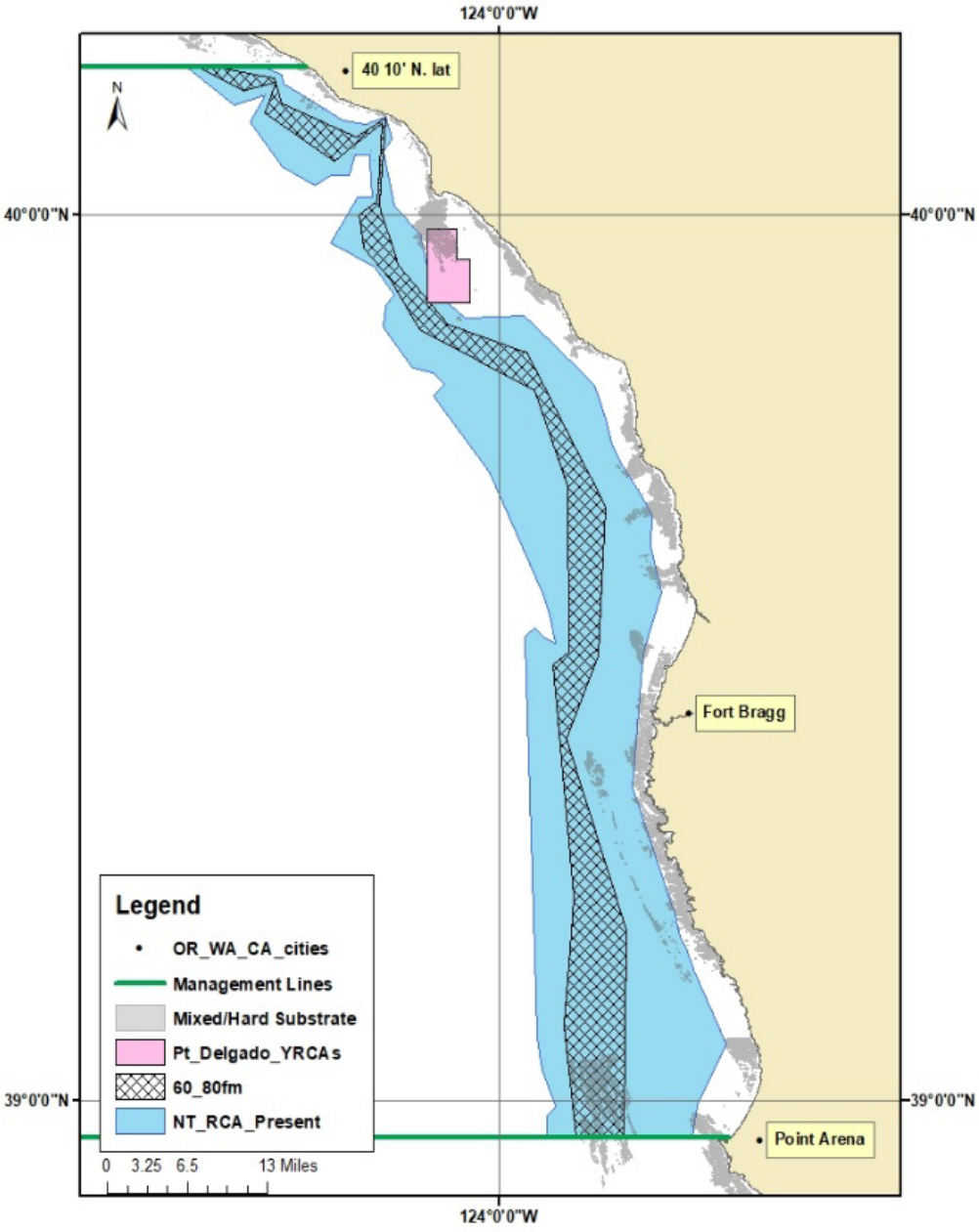

Figure 4. Maps for the NT_RCA between 40° 10" N. lat. and 38° 57" N. lat. showing current NT_RCA and proposed NT_RCA overlaid in crosshatch.

38°57" N. lat. to 34°27" N. lat

Under this Alternative, the seaward boundary would change from to 125 fm to 80 fm and the shoreward boundary would move from 50 fm to 60 fm (Figure 5). Using the 75 fm in regulation as the seaward boundary, as discussed above, the remaining NT_RCA would cover 1,609 sq km^2, reducing the footprint of the current NT_RCA in this area by 3,645 km^2

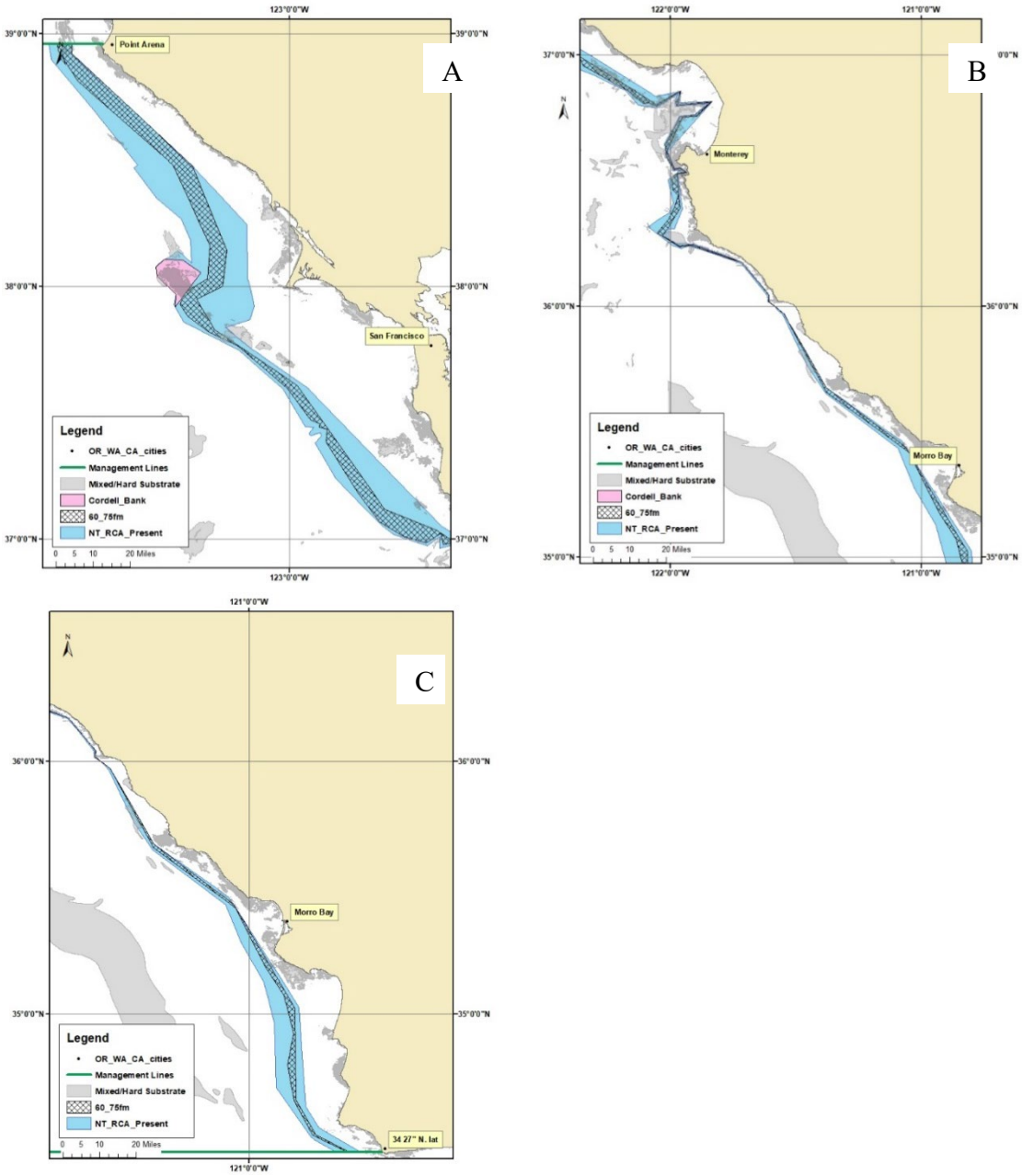

Figure 5. Maps for the current NT_RCA between 38° 57.5" N. lat and 34° 27 N. lat. with the proposed NT_RCA overlaid in crosshatch: a) 38° 57.5" N. lat. to south of San Francisco; b) South of San Francisco to South of Monterey; and c) South of Monterey to 34°27" N. lat.

South of 34°27" N. lat

The GAP report did not specify any changes to the NT_RCA south of 34°27" N. lat. Therefore, under this Alternative, the NT_RCA south of this point is expected to remain consistent with No Action with a shoreward boundary at 100 fm and a seaward boundary at 150 fm, including around the Channel Islands.

The above describes how much area is, at present, covered by the NT_RCA by management area, including how much NT_RCA would remain based on the GAP recommended boundaries. The Council could, however, opt to modify the NT_RCA boundaries to different depths than recommended by the GAP. Table 7 shows the area within 10 fm depth bins for each management area between 42°22' N. lat. and 34°27" N. lat.

Table 7. Square kilometers by ten fathom (fm) depth bins by management area. Shaded areas represent depth bins that are not currently part of the NT_RCA or the depth contour does not exist in regulation.

Management Area	20-30fm b/	30-40fm	30-50fm. a/ c/	40-50fm	50-60fm	75-100fm	75-125fm
North of 46°16' N. lat	1,352	1,064	2,341		1,008	1,859	2,712
46°16' N. lat. to 40°10' N. lat.		2,152		3,131	2,505	3,897	5,519
40°10' N. lat. to 38°57.5' N. lat.:		149		522	1 d/	434	540
38°57.5' N. lat. to 34°27' N. lat.:		1,622		2,476	1,717	1,276	1,930

a/ a coastwide 40 fm depth contour is not in regulation for Washington, therefore, we bin 30-50 fm
b/ the shoreward boundary of the RCA is 30 fm for areas between 46°16" N. lat and 34°27" N. lat
c/ there is a 40fm depth contour in regulation between 42 22' N. lat. to 46°16' N. lat. therefore the 30fm to 50fm is irrelevant for the management areas south of 42°22" N. lat.
d/may be inaccurate, these depths are very narrowly separated in this management area.

3. Discussion

3.1 Potential Biological Impacts

The following sections provide a preliminary assessment of the impacts relative to each Alternative on target species, non-target species (excluding yelloweye rockfish), and yelloweye rockfish.

3.1.1 Target Species

As described in the draft purpose and need, the goal of this action is to provide opportunity to harvest healthy, underutilized shelf rockfish stocks by commercial non-trawl vessels. Shelf midwater rockfish are largely managed within the shelf rockfish complex, however several commercially important stocks, e.g., bocaccio S of 40°10 N. lat., yellowtail rockfish N of 40°10 N. lat., etc., are managed as single species stocks. In general, attainment and mortality of non-trawl allocations of shelf species, which includes recreational fisheries, have been relatively low since 2015 (Table 8). An important point to consider is opportunities to target shelf stocks are relatively recent with the rebuilding of canary and bocaccio rockfish in 2017. Since that time, trip limits are continuing to increase and the NT_RCA was modified in the last two bienniums to provide additional opportunity however, data shows the overall commercial non-trawl mortality for midwater and shelf stocks has just begun to increase in the last year or two (Table 9**).** It appears, at least preliminarily, these mortality increases correlate with industry response to management measure changes in the last two biennial cycles.

Table 8. Total non-trawl sector mortality (mt), non-trawl allocation (mt), and percent attainment of non-trawl allocations for selected shelf rockfish species, 2015-2019. Sources: GEMM for mortality, PacFIN SPEX database for allocations.

Species	*Values*	*Year*					
		2015	2016	2017	2018	2019	2020
Bocaccio rockfish south of 40° 10’ N. lat.	Total Mortality	97.8	76.6	130.9	128.5	164.2	79.59
	Non-Trawl Allocation	258.8	268.7	472.2	442.3	1250.2	1197.80
	Attainment (%)	37.8%	28.5%	27.7%	29.1%	13.1%	6.6%
Canary rockfish	Total Mortality	55.1	46.9	129.9	122.1	139.0	140.31
	Non-Trawl Allocation	49.9	51.3	406.5	406.5	383.3	360.60
	Attainment (%)	110.4%	91.4%	32.0%	30.0%	36.3%	38.9%
Chilipepper south of 40° 10’ N. lat.	Total Mortality	7.1	5.9	3.7	4.8	19.7	20.40
	Non-Trawl Allocation	401.0	398.8	640.3	615.3	612.8	581.28
	Attainment (%)	1.8%	1.5%	0.6%	0.8%	3.2%	3.5%
Shelf rockfish north of 40° 10’ N. lat.	Total Mortality	17.2	16.8	28.9	29.8	36.7	28.02
	Non-Trawl Allocation	745.0	748.0	782.1	781.4	786.5	784.50
	Attainment (%)	2.3%	2.2%	3.7%	3.8%	4.7%	3.6%
Shelf rockfish south of 40° 10’ N. lat.	Total Mortality	533.4	421.9	540.2	523.6	738.5	361.29
	Non-Trawl Allocation	1383.0	1384.0	1383.6	1384.4	1357.3	1357.30
	Attainment (%)	38.6%	30.5%	39.0%	37.8%	54.4%	26.6%

Species	*Values*	*Year*					
		2015	2016	2017	2018	2019	2020
Widow rockfish	Total Mortality	7.7	3.8	9.5	33.2	29.2	9.82
	Non-Trawl Allocation	169.2	169.2	1196.1	1119.4	1042.4	985.55
	Attainment (%)	4.5%	2.2%	0.8%	3.0%	2.8%	1.0%
Yellowtail rockfish north of 40° 10' N. lat.	Total Mortality	52.2	46.9	64.6	77.5	83.9	102.58
	Non-Trawl Allocation	667.2	637.7	619.9	596.6	628.1	592.91
	Attainment (%)	7.8%	7.3%	10.4%	13.0%	13.4%	17.3%

Table 9. Commercial non-trawl mortality for selected shelf species, 2017-2020. Sources: GEMM.

Species	**2017**	**2018**	**2019**	**2020**
Bocaccio rockfish (South of 40°10' N. lat.)	5.6	8.1	15.8	29.9
Canary rockfish	5.2	3.9	4.8	12.2
Chilipepper rockfish (South of 40°10' N. lat.)	1.0	2.8	13.7	19.2
Minor shelf rockfish (North of 40°10' N. lat.)	5.3	3.7	4.8	3.1
Minor shelf rockfish (South of 40°10' N. lat.)	41.9	43.7	57.7	81.2
Vermilion rockfish	34.2	34.4	43.9	44.7
Widow rockfish	1.5	1.3	1.4	2.3
Yellowtail rockfish (North of 40°10' N. lat.)	1.2	1.5	1.6	2.2

Under the proposed Alternatives, it is reasonable to expect that if the NT_RCA opens to approved hook-and-line gear or is modified to open new areas, OA and LEFG sector effort will incrementally increase and result in a concomitant incremental increase in catch attainment and overall mortality. Time to develop fishing techniques and develop/reestablish markets would likely be necessary. The rate at which these increases will occur, or which species will be targeted, is highly uncertain at this point as there is little information that could serve to inform this analysis.

Alternative 3 as described above would modify the NT_RCA boundaries . The area outside the new NT_RCA boundaries could be subject to all fixed gear, which includes the aforementioned prohibited types. With all gear types allowed, it is reasonable to expect increases in attainments and mortality for other demersal rockfish species like greenstriped rockfish, rosy rockfish, etc., however, the same uncertainty as noted in the paragraph above, applies here.

3.1.2 Non-Target Species (Excluding Yelloweye Rockfish)

Similar to those target species, under No Action, non-target species attainment and mortality would likely increase. Many rockfish co-occur with other rockfish species and it is difficult to target a single species. While rockfish, except cowcod and yelloweye, have trip limits and could be landed, the question of which species would be retained is likely to be related to those species that are marketable. The unmarketable species would likely be discarded, thus increasing mortality for those species inadvertently. This, however, is not a new concern as fishermen discard bycatch currently. The question, however, is will there be an increased rate of discard of select species

over current discard rates. As will be discussed in Section 3.3, uncertainty of discards could be reduced if observer rates increased for the fixed gear fishery as a whole.

Additionally, a potential positive of reopening the NT_RCA is impacts on nearshore rockfish species and complexes may decrease as fishermen would be able to diversify their fishing strategies and target under attained shelf stocks as well. The OA sector, in general, fishes the inshore side of the NT_RCA due to vessel limitations, and OA impacts are differentially concentrated on the nearshore and shallower shelf stocks. Therefore, opening deeper water may allow some relief on these stocks and reduce overall impacts on them.

3.1.3 Yelloweye Rockfish

An overarching goal of this action is to increase attainment of groundfish within the LEFG and/or OA sectors while keeping bycatch of overfished stocks to a minimum through gear exclusions. Under all Alternatives, there is a concern with incidental yelloweye rockfish bycatch.

Yelloweye rockfish was declared overfished in 2002. The 2017 stock assessment, as well as the associated rebuilding analysis, indicate the stock is expected to be rebuilt by 2029. These reports are incorporated by reference and summarized here. Yelloweye co-occurs with other shelf rockfish as it is predominantly found on the continental shelf from 50-100 fm (i.e., within the bounds of the NT_RCA) and inhabit hard bottom, boulder fields, and rocky reefs. The yelloweye rockfish range encompasses the entire West Coast but increases in abundance from south to north. It remains a zero retention and prohibited species in the fixed gear fishery.

Yelloweye rockfish is managed via an annual catch limit (ACL) is reduced by off-the-top deductions to derive the harvest guideline (HG). The HG is allocated to trawl (8 percent) and non-trawl (92 percent). The non-trawl fishery allocation is subsequently divided into HGs and annual catch targets (ACTs) for each states (CA, OR WA) recreational fishery and for all fixed gear commercial fisheries (non-nearshore and nearshore). Table 10 shows the non-trawl allocation breakdown for 2021. The up-to-date impacts are provided each Council meeting under the groundfish inseason action agenda item, see Agenda Item C.7.1, Supplemental GMT Report 1, September 2021 Appendix 1 for the most recent report.

Table 10. 2021 Harvest guideline (HG) and annual catch target (ACT) for yelloweye rockfish in the non-trawl fishery in metric tons (mt). (after GMT's Rebuilding Species Scorecard)

	HG (mt)	ACT (mt)
Non-Trawl Allocation	37.9	29.5
Commercial		
Non-nearshore	7.8	6.2
Nearshore		
Recreational		
WA	9.7	7.5
OR	8.8	6.9
CA	11.4	8.9

As shown in Table 11,[12] total yelloweye rockfish mortality varies by sector and year. In general, non-trawl fixed-gear commercial fisheries are lower than recreational. Recreational bycatch mortality (all states combined) averages approximately 4.0 mt per year; whereas, commercial fixed gear (combined) averages approximately 0.7 mt per year. Except for 2017, yelloweye rockfish total mortality has been within non-trawl allocations (Table 12).

Table 11. Yelloweye rockfish total mortality (discard mortality plus landings) in metric tons by year for selected fisheries for 2015-2020. (Sommers, 2021)[13]

Fishery	2015	2016	2017	2018	2019	2020
Trawl a/	0.67	0.26	0.78	0.88	1.93	1.58
Nearshore OA	1.79	0.67	2.49	2.40	2.65	3.45
OA Fixed Gear - Hook & Line	0.18	0.13	1.50	0.37	0.22	0.11
LEFG DTL Hook & Line	0.00	0.13	0.00	0.31	0.06	0.48
LEFG Sablefish: Hook & Line	0.59	0.52	0.84	0.68	1.28	0.51
LEFG Sablefish - Pot	0.01	0.03	0.01	0.00	0.00	0.00
Washington Recreational	2.59	3.23	3.15	3.20	3.79	1.85
Oregon Recreational	3.18	2.37	4.27	4.01	5.04	6.56
California Recreational	1.65	1.24	4.52	4.99	6.16	1.95

a/ all trawl (whiting, bottom, etc.)

Table 12. Yelloweye rockfish total mortality (discard mortality plus landings for commercial fixed gear and recreational fisheries in mortality compared to non-trawl allocations 2015-2020

	Non-Trawl Allocation	Commercial Fixed gear	Recreational	Sum: Commercial + Recreational	Non-Trawl Allocation Attainment
2015	11.2	2.57	7.42	9.99	89.2%
2016	12.1	1.48	6.84	8.32	68.8%
2017	13.1	4.84	11.94	16.78	128.1%
2018	38.6	3.76	12.2	15.96	41.3%
2019	38.6	4.21	14.99	19.2	49.7%
2020	39.5	4.55	10.36	14.91	37.7%

The yelloweye rockfish population is scheduled to be rebuilt by 2029. Under the current harvest control rules and stock assessment, yelloweye OFL/ACLs are expected to incrementally increase over time (Table 13). With an increase in ACLs, allocations by sector should increase which may result in HG increases for the sectors. The stock may be more abundant in the NT_RCA under a

[12] These amounts are the sum of estimated discard mortality and landings data.

[13] Somers, K. A., J. Jannot, K. Richerson, V. Tuttle, N. B. Riley, and J. T. McVeigh. 2020. Estimated Discard and Catch of Groundfish Species in the 2018 U.S. West Coast Fisheries. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-NWFSC-154. DOI: 10.25923/z38p-sy40

rebuilt scenario, but whether abundance translates into a range-wide scenario or more localized scenario is uncertain.

Table 13. Current 2021-2022 Yelloweye rockfish harvest specifications and projections for 2023-2032 in metric tons (mt). OFL and ABC projections based on the 2017 assessment using the new sigmas for 2020 and beyond. ACL projections based on an SPR harvest rate of 65%. (Source Agenda item C.8, Attachment 2, September 2021).

Year	OFL (mt)	ABC (mt)	ACL (mt, SPR=0.65)	Harvest Guideline (mt)	Trawl Allocation (mt)	Non-Trawl Allocation (mt)
2021	97.49	83.45	50	41.15	3.29	37.89
2022	98.09	83.18	51	42.15	3.37	38.78
2023	122.70	103.07	65.6	–	–	–
2024	123.37	102.64	66.1	–	–	–
2025	124.06	102.23	66.5	–	–	–
2026	124.77	101.94	67.0	–	–	–
2027	125.51	101.54	67.3	–	–	–
2028	126.28	101.15	67.6	–	–	–
2029	127.08	100.90	67.9	–	–	–
2030	127.92	100.54	68.1	–	–	–
2031	128.80	100.33	68.4	–	–	–
2032	129.70	100.00	68.7	–	–	–

Dash indicates no values specified as of 10/26/2021

Under No Action, current trends of mortality for yelloweye rockfish are expected to remain similar; although as the stock rebuilds, there could be increased interactions. As the 2021-2022 groundfish harvest specifications and management measures Environmental Assessment (EA) details, LEFG and OA, combined, have been within their current allocations/HG, but those amounts are under current NT_RCA boundaries. Under the action alternatives though, yelloweye bycatch in the commercial non-trawl sector may increase; however, the extent to which it may increase is uncertain. Fishing within the NT_RCA, even with specialized gear, could increase the incidental bycatch as these sectors would be fishing in areas where yelloweye rockfish abundance is expected to be higher than areas currently accessible to the non-trawl sector. As described in Appendix 3, there has been bycatch of yelloweye rockfish on EFP trips using midwater hook and line gear. Further, under Alternative 3, the NT_RCA would be narrowed by opening specific depth bins commonly associated with yelloweye rockfish. Fishing in these depths could result in unexpected levels of yelloweye bycatch beyond what is projected in GMT models.

The Council has specified Yelloweye Rockfish Conservation Areas (YRCA)[14] along the West Coast. These areas are known hotspots of yelloweye abundance. The Council may wish to consider investigating the status of the YRCAs in conjunction with this action and if they could be used as a mitigation measure. YRCAs can be expanded, contracted, or developed.

[14] YRCA's are described at §660.70

3.1.4 Conclusions

Under No Action, the LEFG/OA sectors would remain prohibited from operating within the NT_RCA (noting exceptions for the other flatfish complex) and continue to operate under current management measures. Biological impacts of No Action for the non-trawl sector were described most recently in the associated environmental assessment (2021-2022 EA). The Council manages the fishery to harvest specifications (OFL, ABC, ACL, etc.) and uses management measures to attain, but not exceed, ACLs. The Council has multiple mitigation measures available to ensure landings are kept within ACLs, including trip limits and spatio-temporal closures. The Council has the opportunity at each meeting to review groundfish catch to-date and make recommendations that will maximize opportunity but simultaneously keep the fishery within species, or complex, specific ACLs.

Under the Alternatives, biological impacts are highly uncertain. An objective of this action and in particular, Alternatives 1 and 2, is to allow the non-trawl commercial sectors to operate within the NT_RCA using approved hook-and-line gear. Based on Council discussions, as well as GAP discussions, the type of hook-and-line gear would likely be similar to what is currently being used three EFPs (Real good Fish, Emley/Platt, and Cook). The EFP gear is designed to preferentially target midwater rockfish (e.g., chilipepper rockfish, yellowtail rockfish, etc.). This gear can be fished with low incidences of bottom contact; however, EFP data as shown in Appendix 3 have shown this gear does catch benthic species(e.g., lingcod, yelloweye rockfish, etc.) incidentally.

Under this action, it is reasonable to predict there could be an increase in currently under attained midwater rockfish (e.g., yellowtail rockfish, bocaccio, etc.) catch and mortality as the gear is designed to target these species. The rate at which these levels would increase is not certain given the unknowns related to such considerations as spatiotemporal distribution of the fleet relative to target species areas and processing infrastructure of ports. Effort may increase differentially along the coast and certain areas could see higher landings whereas other areas may see landings similar to No Action. In a general sense, it is possible that, on average, coastwide landings will increase incrementally; however, abrupt increases in catch in certain ports would not be unexpected. Additionally, there may be increase in non-target groundfish mortality through discard and/or retention. Mortality of non-target groundfish could impact management of groundfish complexes, e.g., Shelf Rockfish North. Meaning, if the target species is part of complex, there is likely to be concomitant catch in other species within the complex. Complexes are managed under an aggregate ACL and therefore it is possible that the aggregate ACL of the complex is attained before the ACL of any component stock which may require the Council to take action to limit, if not restrict, access to that complex.

A key concern in the non-trawl fishery is yelloweye rockfish bycatch and mortality. Catch and mortality of this species is closely watched by the Council and catch is reported to the Council under its routine inseason agenda item as the "yelloweye scorecard."[15] In recent years, LEFG and OA sector mortality has been within the HGs in recent years and these trends are expended to continue under No Action. Based on industry discussion, it is difficult to completely exclude one species of rockfish, as many species of rockfish tend to co-occur and are often caught together; however, gear types that have reduced bottom contact instances may reduce incidental yelloweye

[15] see page 10 of https://www.pcouncil.org/documents/2021/09/c-7-a-supplemental-gmt-report-1-2.pdf/for example of the scorecard

rockfish encounters. Prohibition of specific gear types may reduce yelloweye rockfish bycatch however, the use of hook-and-line gear may reduce, but not eliminate yelloweye rockfish bycatch.

Under Alternative 3, the Council may reduce the size of the NT_RCA. Fixed gear vessels could fish in newly opened areas outside the NT_RCA with all allowable gear types, including bottom longline, pot/trap gear, and dinglebar . An important item to note is in modifying the boundaries of the NT_RCA, areas previously covered by the NT_RCA would concomitantly reopen to LEFG and OA vessels, as well as to gear-switchers in the IFQ program and IOA fisheries such as the directed Pacific halibut.

The Council may wish to consider if additional catch mitigation measures are needed. The Council can prohibit fishing within the NT_RCA boundaries or change boundaries when conservation concerns must be addressed. While effective, closures of entire depth bins for a management area could negatively impact fishermen in areas that are not the source of the overages. The Council could consider developing Block Area Closures (BAC) as was done for Amendment 28 (§660.111). BACs are a type of GCA bounded by management lines and depth contours and are, at this point, restricted to the trawl fishery. They were designed in response to elimination of the trawl RCA and were based on the Council's desire to be able to respond to area specific incidences of trawl encounters with overfished and prohibited species. BACs allow the Council to close a specific area rather than an entire depth bin. A similar approach could be taken with reopening of the NT_RCA.

3.2 Protected and prohibited species

The Pacific Coast groundfish fishery operates under multiple Endangered Species Action (ESA) biological opinions (BiOps), including short-tailed albatross (STAL), leatherback sea turtle, humpback whale and salmonids. Each BiOp provides an Incidental Take Statement (ITS) which specifies Reasonable and Prudent Measures (RPM), terms and conditions (T&C) and biological thresholds of take. The Council is updated on a biennial biases by its Groundfish Endangered Species Workgroup (GESW) (e.g., G.4.a, Groundfish Endangered Workgroup Report, June 2021) or as appropriate. The most recent report presented take information through 2019. The biennial schedule allows the Council to address any necessary mitigation measures during the biennial harvest specifications and management measure process. The GESW noted in their June 2021 report to the Council that biological thresholds for these species have not been exceeded.

Additionally, the Groundfish FMP addresses Marine Mammal Protection Act (MMPA) and Migratory Bird Treaty Act (MBTA) species. Under the MMPA, directed west coast groundfish fisheries have consistently been categorized as Category III fisheries, meaning that they are "commercial fisheries determined by the [NMFS] Assistant Administrator to have a remote likelihood of, or no known incidental mortality and serious injury of marine mammals (GESW report, 2021)"

The BiOps for STAL, humpback whale, leatherback sea turtle, and Chinook and coho salmon are most germane to the action as these species have had take in the federally managed fixed gear fishery. Under No Action, there would be no change to current management measures related to the NT_RCA. Impacts beyond those predicted in the BiOp are not expected; however, while expectations of incidental take are low, they could occur. It should also be noted that other ESA

listed species occur in the action area; however, NMFS Sustainable Fisheries Division (SFD) determined, as stated in the 2015-2016 FEIS (page 121), that the groundfish fishery is not likely to adversely affect them or their critical habitat.

3.2.1 Short-tailed Albatross

The USFWS 2017 BiOp, which included STAL, established thresholds of no more than one STAL in two years or an average of no more than five birds per two-year period. Incidental take should not exceed an estimated five albatross in a two-year period or one observed albatross in a two-year period. Data from 2002-2019 showed one observed STAL take in 2011 off the West Coast in the sablefish fixed gear fishery (G.4.a, NMFS Report 6, June 2021). The Council recommended night-setting and streamer line requirements and night setting for longline vessels while fishing as mitigation measures for STAL, which NMFS implemented in 2020 (84 FR 67674).

Under all Alternatives, vessels could fish with approved hook-and-line gear in the NT_RCA. STAL and seabirds are known to strike baited hooks attached to longline and can become inadvertently hooked or entangled in the gear (USFWS, 2017). As noted above, hook-and-line gear is a broad category. . That hook-and-line was prohibited from being baited and instead used artificial lures which is assumed to reduce the likelihood of seabird interaction. To date, there were no seabird interactions observed under the EFPs, supporting the assumption of lower risk of seabird bycatch than other gear types.

Based on Council discussion, staff concluded hook-and-line gear purported for use under this action would be similar to the EFP gear being tested at present. During the review and approval process for the EFPs, NMFS was required to consider potential impacts from the EFP gear on ESA listed seabirds. Their findings indicated that the EFPs fell within the scope of the 2017 BiOp and the operation of the EFPs did not trigger any of the re-initiation criteria of the BiOp. They concluded the risk of seabird interactions with the hook-and-line gear are expected to be lower than with bottom longline and determined, in part, the EFPs are not expected to cause STAL to exceed take limits. Additionally, NMFS noted that all EFP gear would be required to use artificial lures, i.e., unbaited, and lures are generally associated with lower seabird interactions. If the gear remains consistent with those EFPs, impacts could be similar; however, the Council may need to consider if fishing within the NT_RCA is predicated on baited or unbaited gear.

3.2.2 Humpback Whale

The 2020 NMFS Humpback Whale BiOp established thresholds of five individuals observed or estimated in any one year or a 5-year running average of 2.34 individuals per year. Two documented takes from 2012 to 2019, one in the LEFG sablefish pot sector in 2014 and one in the OA sablefish pot fishery in 2016 (G.4.a, NMFS Report 4, June 2021). As part of the 2020 NMFS Biological Opinion for humpback, the T&Cs identified a role for the Council that will be based on outcomes from NMFS research into gear marking (T&C 1) and electronic monitoring (T&C 4). The conclusion of NMFS Protected Resources Division (PRD), as described in the Final Environmental Impact Statement (FEIS) regarding for the 2015-2016 groundfish biennial management measures, were:

> "… impacts of the Pacific Coast groundfish fishery, when combined with other human sources of serious injury/mortality, are not likely to substantially reduce the population abundance or the growth trend of the stock. The lack of substantial impacts on the

> CA/OR/WA humpback whale stock, combined with the increasing population trend for this listed entity, supports the conclusion that the proposed fishing will not reduce appreciably the likelihood of both survival and recovery of the species in the wild by reducing the reproduction, numbers, or distribution." Page 124

As noted above, humpback whales have become entangled in pot gear which is attached to a line that deploys a surface float. On the other hand, the hook-and-line gear relevant to this Action (i.e., EFP gear) generally fishes in a vertical[16] fashion, but can also be trolled. It is important to note, hook-and-line gear as defined in regulation includes 'vertical' hook-and-line gear which differs from EFP gear. Vertical hook-and-line gear, by definition, involves a single line anchored to the bottom and buoyed at the surface; between the buoy and the anchor, hooks are attached.

There have been no observed whale entanglements in groundfish hook-and-line gears, outside the NT_RCA, including vertical longline and bottom longline. There have also been no observed whale entanglements or interactions inside the NT_RCA under an EFP. Unlike pot gear or longline, the EFP hook-and-line gear is not a 'static' gear, in that the gear is fished while drifting or while the vessel is under power. Static gear, like pot gear, may result in whale entanglements simply because it does not move and whales swim into it. Whereas, approved hook-and-line gear is moving and can be retrieved by the vessel if whales are noted in the area or the vessel could actively avoid whales while trolling. Humpbacks could become incidentally entangled in this gear; however, the fact that vessels are able to move gear away from whales may reduce the risk of entanglement. Based on the EFP gear specifications and the fact that no whale interactions have occurred on EFP trips, we anticipate that whale impacts would be less than those observed by pot gear. The Council should evaluate in detail the specific impacts that may result from various gear configurations as they develop their preferred alternatives.

Further, under Alternative 3, the narrowing of the NT_RCA would reopen areas to all fixed gear types, including bottom longline and pot/trap gear. Humpback whale entanglements have occurred from pot gear and their migratory patterns may overlap with the areas reopened. The inherent stochastic nature of humpback whale interactions with this fishery and the unknowns related to potential fishery effort in newly reopened areas create uncertainty regarding potential interactions between humpback and the fishery.

As this action could reopen areas closed for nearly 20 years to some or all fixed gear, it should be expected that spatio-temporal distribution of the fleet will change to fish in currently closed areas of the NT_RCA. As noted in, the timing and distribution of humpback whales during their migration periods is somewhat known, yet, as described in the BiOp, "humpback whales could be present at any time of the year anywhere along the U.S. West Coast" and their presence "is likely to be higher during the late spring through the fall."

3.2.3 Leatherback Sea Turtle

The 2012 BiOp, that included leatherback sea turtle, specified a take limit of an average of 0.38 leatherbacks per year for the most recent five year period and up to one turtle in a single year. Between 2002 and 2019, one leatherback take occurred in 2008 in the OA fixed gear pot fishery and is the only observed take observed to date. Leatherback sea turtles have been sighted in the

[16] See EFP section above

LEFG sablefish fishery in 2007, the catch shares pot fishery in 2011, and OA fixed gear in 2014. As stated in Agenda Item G.4.a, NMFS Report 5, June 2021, no interactions were observed in the groundfish fisheries during the most recent five-year period (2015-2019). The conclusion of NMFS PRD, as described in the 2015-2016 FEIS regarding for the 2015-2016 groundfish biennial management measures, were:

> "…effects of the groundfish fishery, when combined with effects of other human sources in the action area, are not anticipated to result in an appreciable change in the population abundance or trend. A lack of an appreciable change in population abundance or trend supports the conclusion that the Pacific Coast groundfish fishery will not appreciably reduce the likelihood of both survival and recovery of the species in the wild by reducing the reproduction, numbers, or distribution. Likewise, a lack of substantial impact on the conservation value of critical habitat supports the conclusion that the proposed fishing will not adversely modify critical habitat." Page 125

Leatherback sea turtle observed sightings by fixed-gear fishing vessels is very low. Given the low sightings, projecting how reopening the NT_RCA may impact leatherback turtles is difficult even though the spatio-temporal distribution of leatherback is somewhat known (Agenda Item G.4.a, NMFS Report 5, June 2021). Additionally, similar to the descriptions above, it is unclear how or if hook-and-line gear would impact this species. There are no observed bycatch of leatherback sea turtles in groundfish hook-and-line gear, including the limited use of vertical hook-and-line outside of the RCA and inside the RCA under an EFP.

3.2.4 Salmon

Salmon are caught, incidentally, by fixed gear. There are 31 West Coast salmon and steelhead evolutionary significant units or distinct population segments in the action area covered in the most recent BiOp[17] for salmon in the groundfish fishery. The groundfish fishery operates under specific bycatch guidelines for Chinook and coho salmon as directed by the ITS for these species These thresholds for the non-whiting fishery, of which the fixed gear sector is a part, are 5,500 Chinook salmon and 560 coho salmon. The Council took action in 2019 (Agenda Item H.9, attachment 1, November 2019) to address the items in the BiOp for which it had a specified role. This action included preserving 500 Chinook salmon for all non-trawl fisheries by modifying trawl sector closure points.

Under No Action, salmon impacts are not expected to change. Non-trawl gears historically have minimal bycatch of salmon compared to trawl gears (Richerson, et al 2020). The Council is notified each meeting under the routine groundfish inseason agenda item as to levels of salmon bycatch in selected fixed gear and all trawl fisheries (e.g., Agenda Item C.7.a, Supplemental GMT Report 1, September 2021). However, inseason tracking of bycatch in the commercial non-trawl fisheries is not available.

Under all Alternatives, salmon impacts are unknown. Salmon move through depth bins in the NT_RCA, though there is a strong spatio-temporal correlation. While it is likely that salmon

[17] NMFS. 2017. Endangered Species Act (ESA) Section 7(a) (2) Biological Opinion; Reinitiation of Section 7 Consultation Regarding the Pacific Fisheries Management Council's Groundfish Fishery Management Plan. NMFS Consultation Number: F/WCR-2017-7552.

bycatch will continue to remain low for the commercial non-trawl sectors, the increase in allowable fishing area as well as a gear type that is similar to salmon troll gear may need a more detailed analysis. To date, only one Chinook salmon has been caught under an EFP (Emley-Platt EFP in 2014 as described in Appendix 3: Preliminary EFP Analysis). Although the Cook and Real good Fish EFPs test a trolled hook and line gear, the line is trolled at a slower speed than used for salmon.

Conclusion
Under the Alternative, it is difficult to predict protected species impacts as the current BiOps have not taken into account the potential shift of the fishery into the NT_RCA either in terms of fleet distribution, effort and/or gear type. The overall cumulative change to the fishery may require further analysis to better understand the potential impacts to these protected species. For Alternatives 1 and 2, we can look at the EFPs that tested non-bottom contact hook-and-line gears in the NT_RCA to inform potential protected species impacts. While the scope of these EFPs was limited in the areas that were fished coastwide and the overall number of trips of certain EFPs (e.g., Cook), there were no observed interactions with humpbacks, short-tailed albatross, or leatherback sea turtles. However, Alternative 3 would expand the fishable area for gears that have impacted protected species (i.e., pot gear from all groundfish fisheries). If all alternatives and sub-options are moved forward for analysis, an assessment of ESA coverage for the Groundfish fishery would be needed. This would include analyses of expected ESA effects and whether substantive changes to the fisheries warrant reinitiation of biological opinions that currently cover the fishery.

3.3 Monitoring and Enforcement
The LEFG/OA sectors are monitored through a variety of means that include landing records (i.e., fish tickets),observer data from the West Coast Groundfish Observer Program (WCGOP), and the use of declarations and VMS. This section attempts to provide a preliminary assessment of these elements and potential impacts from the alternatives that the Council may need to consider.

Additionally, sablefish landings, which may include other groundfish, are reported, via electronic tickets, within 24 hours of landing. All three states utilized electronic fish tickets for groundfish landings, although the timing requirements can vary by state. Sablefish landings specifically, which may include other groundfish, are required to be reported, via electronic tickets, within 24 hours of landing. Utilizing this landings data, attainments of HGs/shares/etc. for the two sectors are closely monitored by the GMT, state agencies, and NMFS. At each meeting, the Council can consider the most recent status of the fishery and if needed, could act through routine inseason action to maintain conservation goals for groundfish stocks, and adjust trip limits accordingly. However, if overages or situations occur between meetings, the Council is unable to react until a subsequent Council meeting.[18] The Council also could restore fishing prohibitions within the NT_RCA within specific management regions as well as adjust boundaries of NT_RCA seasonally "according to conservation needs." (§660.111)

However, landings data reveals only those species retained by the fishery. A key element lacking from these data are at-sea discards. WCGOP is, in part, designed to collect data on catch

[18] ODFW can take state action to change trip limits through the state rulemaking process for select nearshore stocks (black, blue/deacon, China, copper, quillback rockfish, cabezon and kelp greenling). Additionally, 50 CFR 660.60(c)(4) provides a process outside of the Council meeting for CDFW and NMFS to change select management measures for black, canary, and yelloweye rockfish.

composition, focusing on at-sea discards, protected species interactions, and fishing effort. Non-catch shares fixed gear fisheries such as the LEFG and OA sectors are not observed at 100 percent, unlike catch shares groundfish-targeting fisheries. On average, the LEFG sablefish fishery has average 34 percent coverage rate in the last decade, with non-sablefish endorsed trips seeing only six percent coverage[19] (Table 14). As there are fewer non-sablefish endorsed landings overall, this trend makes sense. OA landings are observed even less at five percent (Table 15). It is important to note, many OA vessels are unable to safely carry an observer due to size and other constraints. Therefore, observation rates may be low not just due to Council and NMFS WCGOP coverage targets, but also a reflection of the number of boats that meet observer safety requirements.

Groundfish trawl fishery observation rates were initially set, in part, based on recommendation from the Council to concentrate on groundfish-targeting trawl fisheries and later increased as part of catch shares implementation in the groundfish-targeting trawl fleet, which requires 100% monitoring of quota species catch. As detailed the most recent Groundfish Mortality Report (Agenda Item C.1.b, NMFS Report 1 and Report 2, September 2021), discard in the non-catch shares fixed gear fleet is estimated by applying the observed discard rate to the total fleet landings, resulting in less certainty in discard and mortality estimates compared to the 100 percent observed fleets.

Table 14. Limited Entry Fixed Gear Observer Coverage Rates, 2010-2019 (Somers et al. 2021). Coverage rates are computed as the observed proportion of total groundfish landings, summarized from fish ticket landing receipts.

Year	Sablefish LEFG			LEFG Non-sablefish
	All	Pot	LL	
2010	27%	28%	27%	10%
2011	25%	37%	21%	10%
2012	25%	35%	22%	5%
2013	20%	14%	22%	7%
2014	28%	31%	27%	5%
2015	47%	35%	41%	7%
2016	43%	14%	33%	4%
2017	35%	31%	37%	3%
2018	53%	72%	45%	4%
2019	42%	49%	39%	4%
2020	30%	47%	14%	2%
Avg	34%	36%	30%	6%

[19] Coverage rates are defined as the proportion of targeted landings associated with observed trips to the total targeted landings across all trips in the fleet, based on fish ticket data from the Pacific Fishery Information Network (PacFIN) (Somers, et. al 2021).

Table 15. Open Access Observer Coverage Rates, 2010-2019 (Somers et al. 2021). Coverage rates are computed as the observed proportion of total groundfish landings, summarized from fish ticket landing receipts.

Year	OA FG		
	All	Pot	LL
2010	3%	3%	3%
2011	6%	7%	5%
2012	5%	7%	4%
2013	4%	9%	2%
2014	6%	8%	5%
2015	5%	7%	5%
2016	6%	7%	5%
2017	7%	12%	4%
2018	7%	10%	5%
2019	6%	11%	4%
2020	4%	7%	3%
Avg	5%	8%	4%

Another mechanism that can be used to capture discard information is the use of logbooks. Fixed gear logbooks are being developed by NMFS (C.1.a, NMFS Report 1, September 2021). However, at present, federal LEFG/OA logbooks are not required. At the state level, however, the Oregon Department of Fish and Wildlife does require logbooks for their nearshore fixed gear fishery.

NMFS discussed the need for increased fixed gear fishery monitoring, especially in terms of a logbooks during the September 2021 meeting.[20]A key item they noted in developing these logbooks is determining how they will be applied to the OA sector. Meaning, the OA sector is composed of multiple gear and fisheries (e.g., salmon, pink shrimp, etc.) and some of these OA fisheries can retain incidental catch of groundfish. The Council may need to consider if logbooks are required for just the fixed gear, groundfish directed, OA fishery or if they would be applicable to the entire OA sector[21] when the non-trawl logbook agenda item is next scheduled.

While the fleet is required to have VMS when retaining groundfish and submit declaration reports, there are also enforcement concerns related to the action alternatives- and in particular Alternatives 1 and 2. The Enforcement Consultants (EC) have provided preliminary comments previously under Agenda Item F.3.a, Supplemental EC Report 1, April 2021. In that report, EC examines NT_RCA modifications, fishing within the NT_RCA, and declaration codes. Regarding NT_RCA boundary modifications, the EC prefers boundary changes rather than allowing fishing within the NT_RCA. If fishing is, however, allowed within the NT_RCA, the EC recommends in their report that:

[20] Agenda Item C.1.a, Supplemental NMFS Report 2
[21] See §660.60(h)(7)

> "… tight measures to facilitate monitoring be put in place for any fishing that is permitted within a conservation area. This includes continued limits on the type of gear that can be carried on board the vessel and restricting fishing to the NTRCA for the duration of the trip. The expanded use of observers or Electronic Monitoring may be appropriate in certain circumstances. The EC is concerned that without tight controls, effective monitoring and enforcement of the RCA would require a significant increase of resources."

Further, if fishing is allowed within the NT_RCA, declaration codes should be developed for vessels permitted to fish within the NT_RCA. This aspect would simplify enforcement in distinguishing vessels that are allowed to fish within the NT_RCA and those that are transiting.

Conclusions

Observer rates are an important concept for the Council to review as it considers changes to the NT_RCA. The current LEFG/OA observer rate may not be sufficient for the LEFG/OA sectors to operate within the NT_RCA, based on the conservative risk policies the Council uses to manage the groundfish fishery. A potential avenue to reduce uncertainty of discard estimates is for the Council could consider recommending NMFS increase observer coverage in the fixed gear sector as a whole or by sector as well as implementing a logbook requirement. Increases to the fixed gear observer coverage would likely increase the Council's understanding of this fishery's attributes while reducing relative uncertainty in catch, discard, and effort. However, based on Council discussions, it is likely that any changes to WCGOP processes may need to be developed to account for increased coverage and funding secured before implementing new coverage requirements on the fleet. The Council may wish to consider working concurrently with WCGOP as this action moves forward to better identify goals and objectives if they wish to increase coverage.

3.4 Socioeconomic impacts

Under No Action, economic benefits to industry and communities are likely to remain similar to recent years for the LEFG and OA sectors as the NT_RCA would remain under the current configuration. While recent bienniums have seen changes to the boundaries (described in Section 1.2.1 above) and increases in trip limits to support targeting of once overfished stocks such as canary and bocaccio rockfish, the inability to access higher concentrations of these species in the NT_RCA may limit overall growth. Table 16 below shows the average price per pound and associated ex-vessel revenue (2020$) for the species highlighted as target species under Section 0. Since 2017, the revenue for each of these species has generally increased for commercial fixed gear fisheries. Of note are bocaccio and canary rockfish, which saw increases of nearly or over double in revenue from 2018 to 2020. Additionally, vermilion rockfish appears to make up the majority of shelf rockfish south revenue.

Table 16. Average price per pound (2020$/lb) and total revenue (1000s of 2020$) for select midwater species landed by commercial fixed gear vessels, 2017-2020.

Species	2017		2018		2019		2020	
	Avg. $/lb	Revenue (1000s of $)	Avg. $/lb	Revenue (1000s of $)	Avg. $/lb	Revenue (1000s of $)	Avg. $/lb	Revenue (1000s of $)
Bocaccio	$2.08	$30.1	$2.60	$64.0	$1.91	$82.2	$1.62	$120.6
Chilipepper	$2.55	$16.4	$2.22	$14.0	$1.70	$53.2	$1.61	$71.4
Canary	$2.31	$50.9	$2.20	$51.0	$2.27	$75.9	$2.10	$126.5
Shelf Rockfish N	$1.91	$29.9	$2.00	$27.1	$2.35	$40.4	$1.90	$41.8
Shelf Rockfish S	$3.16	$400.9	$3.14	$524.3	$2.98	$547.2	$2.68	$629.2
Vermilion	$3.20	$330.8	$3.23	$417.7	$3.07	$447.6	$3.01	$444.9
Widow	$2.35	$13.5	$2.18	$7.6	$2.50	$11.8	$2.29	$14.2
Yellowtail Rockfish N of 40 10 N. lat.	$1.28	$10.9	$1.04	$8.1	$1.48	$15.3	$1.54	$15.2

Due to a lack of recent fishing activity in the proposed areas, it is difficult to quantify the economic impacts of the RCA adjustments. However, it is anticipated that each of the action alternatives would have a positive economic impact by restoring portions of historical fishing grounds and healthy midwater rockfish stocks. To provide a preliminary look at the communities that may be impacted by the action alternatives, the following series of figures and tables look at the participants and recent harvest trends in the OA/LEFG fisheries that are not targeting sablefish. While sablefish is one of the primary stocks targeted by non-trawl vessels, it is likely that the action alternatives would not provide much additional access to the sablefish stock- particularly north of 36° N. lat where it is already highly attained. Therefore, the focus of this section are those vessels, dealers, and communities that are involved with OA or LEFG fisheries targeting groundfish other than sablefish, such as midwater rockfish. For each alternative, the following information is provided for each Input-Output Model for Pacific Coast Species (IOPAC) port group north of 34° 27' N. lat. from 2017-2020:

- Annual groundfish landings
- Average number of vessels and dealers
- Ranking of a port groups involvement (measured as the ex-vessel value in a port as share of coastwide ex-vessel value) within the selected fishery.

For Alternatives 1 and 2, only trips using hook-and-line gear are reported as OA and/or LEFG vessels would only be able to use approved hook-and-line gear within the NT_RCA boundaries.[22] For Alternative 3, all gear types, including pot and longline, were included as the NT_RCA boundaries would be modified to allow any gear type to be used in newly reopened areas.

[22] Note that hook-and-line gear was defined using the PacFIN GEAR_NAME field. Tickets that were included were those where GEAR_NAME was "HOOK AND LINE" and "VERTICIAL HOOK AND LINE/PORTUGUESE LONGLINE".

Alternative 1

Under Alternative 1, OA vessels would be able to operate within the NT_RCA with approved hook-and-line gears. Brookings and Morro Bay appears to be the communities most likely to benefit by additional opportunity for OA hook-and-line vessels. These ports rank as the top two ports in terms of annual landings (Figure 6), average participants (Table 17), and rank as the most involved port groups in terms of OA hook-and-line fisheries (Table 18). Other port groups most likely to benefit from Alternative 1 include Fort Bragg, Monterey, and Tillamook.

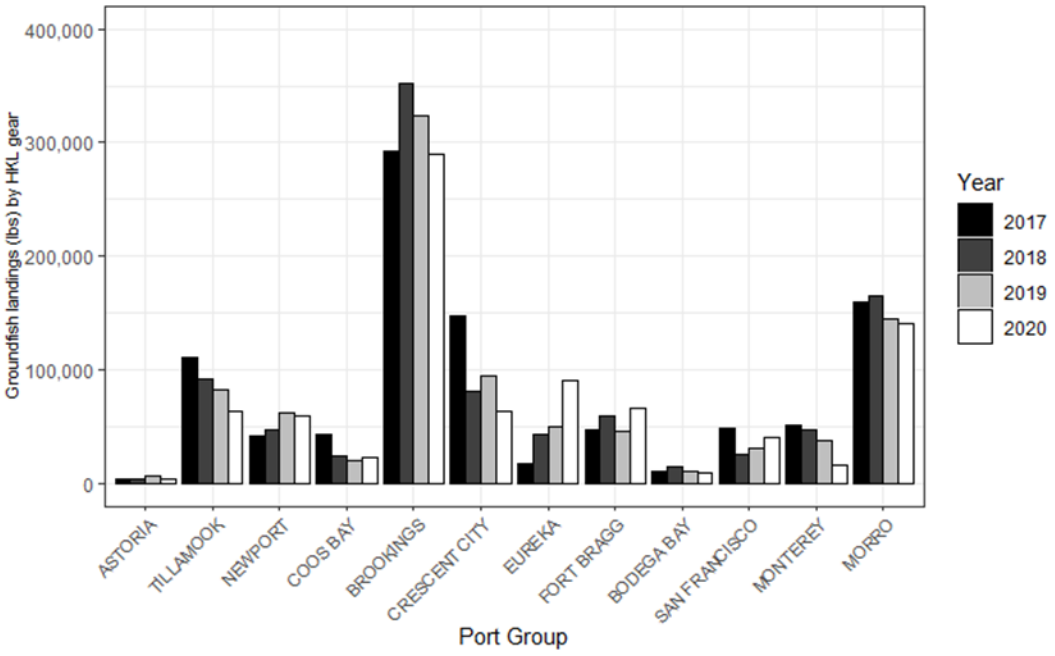

Figure 6. Annual groundfish landings by IOPAC port group by OA groundfish vessels on non-sablefish trips north of 34° 27' N. lat. using HKL gear only, 2017-2020.

Table 17. Average number of vessels and dealers with HKL landings in the OA groundfish fishery, excluding sablefish trips, north of 34° 27' N. lat., 2017-2020.

Average Number of	Astoria	Tillamook	Newport	Coos Bay	Brookings	Crescent City	Eureka	Ft. Bragg	Bodega Bay	San Francisco	Monterey	Morro Bay
Vessels	6	46	37	29	73	22	27	45	20	52	65	78
Dealers	4	18	18	17	19	12	18	20	16	42	27	19

Table 18. Ranking of port involvement (revenue as a percentage of coastwide revenue) in the OA HKL sector from 2017-2020.

Involvement Ranking	Port Group
1	Brookings
2	Morro Bay
3	Fort Bragg
4	Monterey
5	Tillamook
6	Crescent City
7	San Francisco
8	Newport
9	Eureka
10	Coos Bay
11	Bodega Bay
12	Astoria

Alternative 2

For Alternative 2, LEFG vessels would be able to access the NT_RCA with approved hook-and-line gear up to their LEFG limits. The series of graphics below provide the same set of statistics as shown above for OA vessels, but for LEFG vessels. Overall, there are very few LEFG vessels that participate using hook-and-line gear as vessels are held to the OA limits which are generally smaller (see Section 2.1.1 for more details). Due to confidentiality, the annual landings by LEFG vessels using hook-and-line gear had to be combined across regions in Figure 7. All port groupings had landings in each year and therefore zeros present in the figure represent confidential strata. Southern Oregon, mostly Brookings, had consistent landings across 2017-2020; although Crescent City and Eureka had the largest total annual landings. There were no occurrences of LEFG hook-and-line landings into Washington over the time series.

Table 20 provide some insight on individual port groups that may be most impacted by Alternative 2. In terms of participation, Brookings had the highest average participation, followed by Crescent City and Morro Bay. When considering involvement, on average, Crescent City and Brookings appear to have the strongest linkage to the fishery, when taking into account years of no landings by LEFG vessels using hook-and-line gear (i.e., averages included zeros).

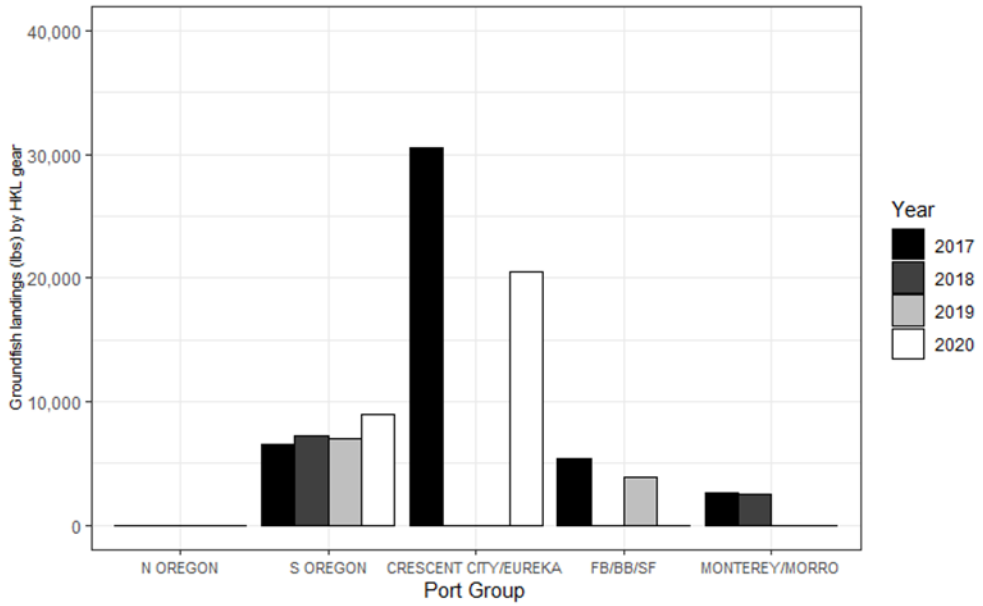

Figure 7. Annual groundfish landings by IOPAC port group by LEFG groundfish vessels on non-sablefish trips north of 34° 27' N. lat. using HKL gear only, 2017-2020. Note: "N OREGON" includes landings from Astoria and Newport, "S OREGON" includes Coos Bay and Brookings, and "FB/BB/SF" represents Fort Bragg, Bodega Bay, and San Francisco.

Table 19. Average number of vessels and dealers participating in LEFG HKL fisheries by port group, 2017-2020. "C" denotes ports with fewer than three vessels and/or dealers over the time series.

Avg. Number of	Newport	Coos Bay	Brookings	Crescent City	Eureka	Fort Bragg	Bodega Bay	San Francisco	Monterey	Morro Bay
Vessels	2	1	4	2	C	1	C	C	1	2
Dealers	2	1	5	3	C	2	C	2	1	3

Table 20. Ranking of port involvement (revenue as a percentage of coastwide revenue) north of 34° 27' N. lat. for LEFG HKL fisheries, 2017-2020.

Ranking of Port Involvement	IOPAC Port Group
1	Crescent City
2	Brookings
3	San Francisco
4	Morro Bay
5	Fort Bragg
6	Newport
7	Monterey
8	Coos Bay
9	Bodega Bay
10	Eureka

Alternative 3

Alternative 3 would potentially modify the NT_RCA boundaries north of 34° 27' N. lat. and therefore any commercial fixed gear vessel may be able to benefit from additional fishing opportunity on the shelf depending on the degree of opening. Beginning with the OA fisheries, Figure 8 shows the annual landings by IOPAC port group from 2017-2020 on non-sablefish OA trips utilizing any gear type. Note that annual landings overall increased by an average of 22 percent from Figure 6. Brookings and Morro Bay again appear to have strong linkages to the sector, with the greatest amount of landings, average participation, and involvement in recent years. However, when considering all gear types, Morro Bay appears to have a greater degree of involvement compared to Brookings, which was opposite of what was found for hook-and-line activity. Monterey, Fort Bragg, and Crescent City port groups appear to also be likely to benefit from additional opportunity for OA fixed gear vessels targeting species other than sablefish.

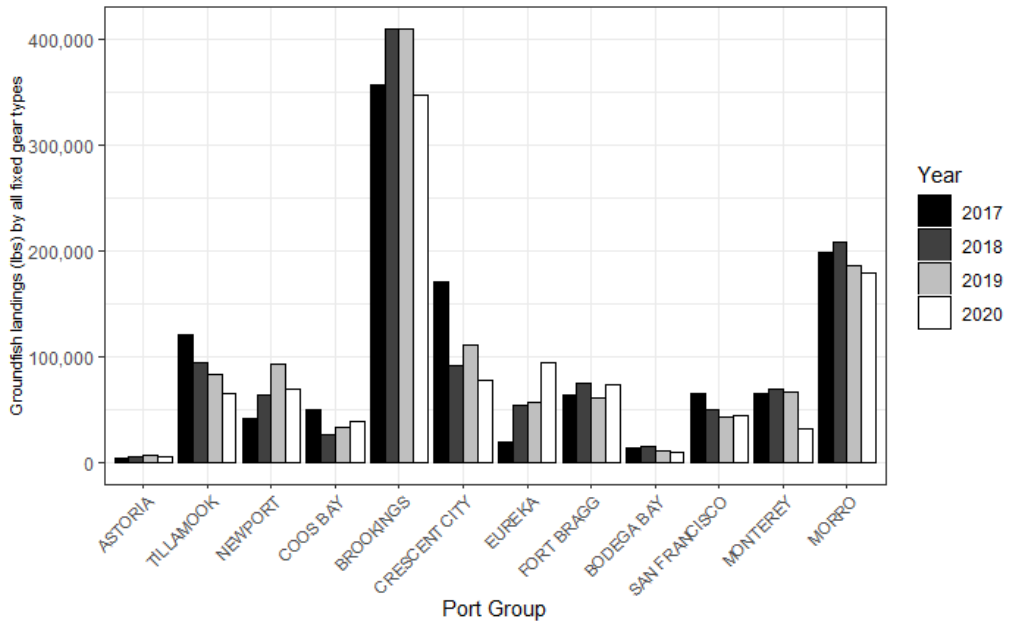

Figure 8. Annual OA groundfish landings by all gears excluding sablefish trips by port group, 2017-2020. Note Puget Sound and South/Central WA Coast port groups were removed for confidentiality purposes.

Table 21. Average number of vessels and dealers participating in non-sablefish OA fisheries with all gear types by IOPAC port group, 2017-2020.

Avg. Number of	Puget Sound	S and Central WA Coast	Astoria	Tillamook	Newport	Coos Bay	Brookings	Crescent City	Eureka	Ft. Bragg	Bodega Bay	San Francisco	Monterey	Morro Bay
Vessels	C	C	6	46	38	29	74	22	28	49	18	50	69	82
Dealers	C	C	4	18	18	18	19	12	18	21	15	44	28	20

Table 22. Ranking of port involvement (revenue as a percentage of coastwide revenue) north of 34° 27' N. lat. for non-sablefish OA fisheries using all gear types, 2017-2020.

Involvement Ranking	IOPAC Port Group
1	Morro Bay
2	Brookings
3	Monterey
4	Fort Bragg
5	Crescent City
6	San Francisco
7	Tillamook
8	Newport
9	Eureka
10	Coos Bay
11	Bodega Bay
12	Astoria
13	Puget Sound

For LEFG non-sablefish fisheries, the magnitude of groundfish caught with all gear types on an annual basis north of 34° 27' N. lat. is approximately 250 percent higher than that of hook-and-line gears. As LEFG vessels would be able to use their endorsed gear (longline or pot) to harvest up to their trip limits (again- higher than OA limits), this trend makes sense. Of note in Figure 9 is the large increases in groundfish landed into southern ports- which is likely due to the increases in trip limits in recent years (2019-2020 EA, Agenda Item H.10.a, Supplemental GMT Report 1, November 2019). While expanding to all gear types allowed for increased number of strata to be shown compared to Figure 7, there are still instances where ports had to be combined (e.g., Monterey with Morro Bay) or removed (i.e., WA ports and Coos Bay) to preserve confidentiality. Monterey and Brookings port groups are the most involved in this fishery sector (Table 24) and may be most likely to benefit from Alternative 3 for LEFG fisheries. Other ports that would likely benefit from moving the NT_RCA boundaries would be Brookings, Crescent City, and Newport.

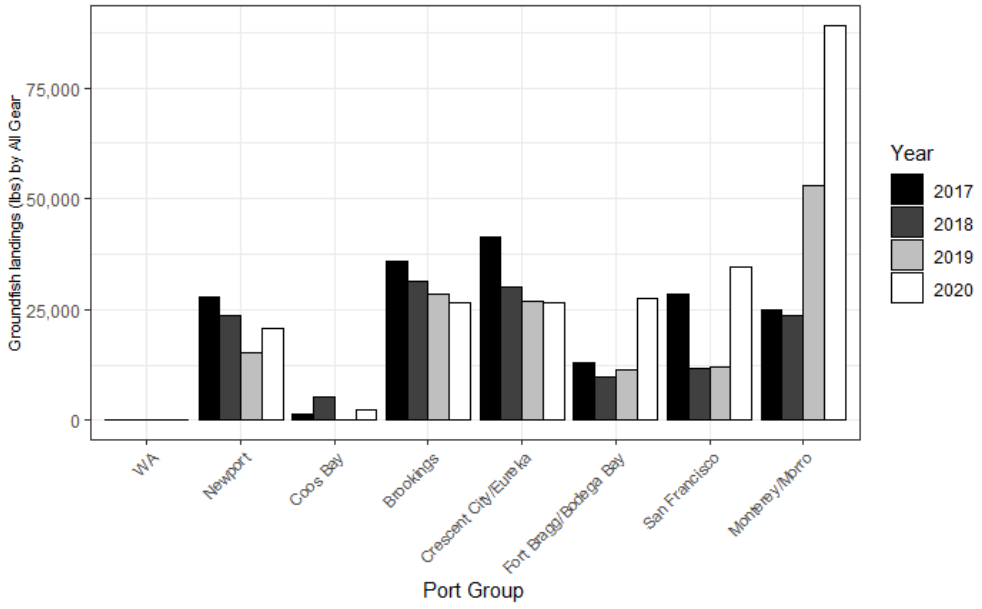

Figure 9. Groundfish landings (lbs) on LEFG non-sablefish trips using all gear types by port group, 2017-2020. Note: Landings into WA ports occurred in only 3 of 4 years, but were removed due to fewer than three vessels/dealers in a given year. Additionally, Coos Bay in 2019 was removed**.**

Table 23. Average number of vessels and dealers participating in LEFG non-sablefish fishery by IOPAC port group, 2017-2020. "C" denotes those port groups with fewer than three vessels or dealers participating over the time series**.**

Average Number of	North WA Coast	South and Central WA Coast	Astoria	Newport	Coos Bay	Brookings	Crescent City	Eureka	Fort Bragg	Bodega Bay	San Francisco	Monterey	Morro Bay
Vessels	C	C	C	8	3	6	4	1	4	2	6	5	5
Dealers	C	C	1	6	3	7	4	2	4	2	8	2	7

Table 24. Ranking of port involvement (revenue as a percentage of coastwide revenue) north of 34° 27' N. lat. for non-sablefish LEFG fisheries using all gear types, 2017-2020.

Ranking of Port Involvement	**IOPAC Port Group**
1	Monterey
2	Brookings
3	Crescent City
4	Newport
5	Fort Bragg
6	Morro Bay
7	San Francisco
8	Bodega Bay
9	Coos Bay
10	Eureka
11	Astoria
12	South and Central WA Coast
13	North WA Coast

3.5 Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) requires fishery management councils for each FMP to identify fishing activities that may adversely affect essential fish habitat (EFH) and to minimize adverse effects of those activities to the extent practicable. Impacts from fixed gear on bottom habitats are described in Appendix C-1 of the Groundfish FMP entitled "the Effects of Fishing on Groundfish Habitat (hereinafter Appendix C). Additionally, the GMT conducted an analysis for changes to the NT_RCA as part of the 2021-2022 groundfish biennial management process (Agenda Item F.1.a, Supplemental GMT Report 4, June 2020). Both reports are incorporated by reference.

Non-trawl gears can impact habitat to varying degrees, depending on the gear type, the type of benthic habitat in which they are deployed, and the concentration and intensity of fishing effort. The more common gears used in the LEFG/OA and their potential impacts are shown below Table 25. As detailed in Appendix C, fixed gear types can adversely affect bottom habitat through a variety of means, such as undercutting/overturning emergent organisms (e.g., sponges, corals), smothering, entanglement, etc.

Gear types that are designed to fish via lengthy bottom contact (i.e., longline, pot, etc.) may impact bottom habitats more than hook-and-line gear types, due to how the gear fishes. Longline and pot gear lay on the bottom, and therefore can land on biogenic substrate and damage habitat forming invertebrates (HFI) by crushing, damaging, or breaking. Additionally, these gears are subject to current movement which can cause the gear to be dragged across the bottom and overturn/undercut habitat forming invertebrates (HFI) such as sponges and corals.

As described in F.1.a, Supplemental GMT Report 4, Impacts for Non-Trawl RCA Proposals for 2021-2022, dinglebar gear includes a weight that is dragged along the bottom with trailing hooks. This gear type's impacts, however, are uncertain as there is a paucity of information on its use as there is no direct mention of habitat impacts of dinglebar technique in Appendix C. While it is likely this gear does impacts biogenic habitat, those impacts are, at present, unquantifiable. However, it is reasonable to expect dinglebar gear may impact HFIs (e.g., corals, sponges, etc.) through such potential mechanisms as crushing, snagging, displacement by hooking, and breaking of coral arms. The extent of these impacts and their relative detrimental effects though are highly uncertain at present.

In Appendix C, habitat related impacts of hook-and-line gear are only listed in the recreational sections, though this gear type is an analog of the commercial hook-and-line gear. That is hook-and-line gears are similar in their impacts to habitats for both recreational and commercial non-trawl gears (i.e., a weight hitting bottom), and that the main difference of commercial fishermen being able to use more hooks. Impacts of recreational hook-and-line gear may not be representative of how commercial hook-and-line gear may impact habitat as recreational anglers may specifically target several species of groundfish; whereas the commercial industry has indicated it wishes to specifically target mid-water stocks.

Hook-and-line gear types, such as rod and reel, vertical longline, etc., are generally fish by a vertical set of hook(s) attached to a weight at, or near, the terminal end of fishing gear. The gear

is deployed to fishing depth and 'jigs' up and down to attract fish. This gear can, however, strike the bottom in the course of being deployed and can impact biogenic habitats by crushing/breaking from weight strikes or entangle or hook HFI. Impacts from hook-and-line gear be concentrated in a smaller area and, overall, may impact less area than bottom longline or pot gear. Weights can impact biogenic habitat when lost or when contacting the bottom by crushing, displacing, and/or damaging habitat informing invertebrates. Lost or discarded line can become entangled in rocky and biogenic habitat and adversely affect organism growth.

Derelict gear can also adversely affect bottom habitat by such means as physical harm, occupying space that would otherwise support biota, and quality of environment. Hooks remaining attached to lost gear can "ghost fish" and become a source of hidden mortality. Biogenic substrates (e.g., HFI, kelp beds) are most at-risk from fixed gear impacts followed by hard bottom then soft sedimentary bottom. Overall, impacts to biogenic substrates are likely proportional to effort and gear type.

In terms of habitat type and risk from fixed gear, biogenic substrates (e.g., habitat forming invertebrates, kelp beds) are most at-risk followed by hard bottom then soft sedimentary bottom. Impacts are likely proportional to effort. In past Council documents on EFH (Appendix C), sensitivity scale of habitat to gear impacts and recovery time were developed. As described in the FMP Appendix C, habitat sensitivity and recovery time vary between habitat type, the following tables provide an overview of the impacts from fixed gear. Appendix C examined habitat sensitivity and recovery by gear type. Each have a different impact and recovery time on bottom substrate types. Across all bottom types, average impacts in terms of both habitat sensitivity for all types of fixed gear fall under the "minor impacts" category. Of the three general bottom type categories (hard, mixed, soft), hard bottom experiences is the most sensitive to fixed gear compared to the other two bottom types. Though counter to sensitivity, recovery time is lowest for hard substrates and highest for soft bottom. As noted in Appendix C, habitat recovers from fixed gear impacts at a faster rate from fixed gear than it does from trawl gear and is also, in general, less sensitive to fixed gear. However, Appendix C shows that in terms of fixed gear types, habitat is more sensitive and incurs a longer recovery time from longline and pot gear than other types of fixed gear types (e.g., hook-and-line).

Table 25. Summary of non-trawl gears used in the groundfish fishery and their effects on groundfish habitat, from Appendix C-1 of the Groundfish FMP.

Gear types subject to the NT_RCA	Method of fishing	Gear components that impact substrate	Substrates generally fished	Potential effects to habitat
Bottom longline	deployed on bottom	Anchors, weights, mainline.	Soft and hard bottom	Overturn, undercut, crush, break habitat and organisms, displace/disturb biogenic habitat
Pots/traps	deployed on bottom	pot, line.	Soft and hard bottom	Smother organisms, crush, biogenic habitat
Hook-and-line gears				
Dinglebar gear	Bounces on bottom	Dinglebar, hooks, line	Hard bottom, rocky reef	Overturn, undercut, crush, break habitat and organisms, displace/disturb biogenic habitat
Troll Gear	Trolling in upper water column	Weights	Primarily fished in water column	Crush/break biogenic habitat (from weights), entanglement
Vertical Longline (single or multi hook gangion, and weight)	Drift fishing "jigging" or trolled	Weights, hooks, line	All bottom types and water column	Damage to and displacement of biogenic habitat damage; entanglement

While it is likely habitat has benefited from the NT_RCA closure, this was not the intent of the closure. The purpose of the NT_RCA was to mitigate and minimize mortality of overfished stocks. Before the NT_RCA was implemented, the shelf was a focus of both trawl and non-trawl fishing effort. That effort changed with the implementation of both the trawl and non-trawl RCAs, shifting federal groundfish vessels out of those areas. Until Amendment 28, which eliminated the trawl RCA off Oregon and California, impacts on habitat in both RCAs from groundfish fisheries were limited to such events as NMFS surveys and a few directed groundfish fisheries (e.g., midwater trawl gear, etc.). The trawl RCA and NT_RCA overlapped in multiple depth bins. As trawl fishing has returned to what was formerly covered by the trawl-RCA, it is likely some areas of the NT_RCA are being fished by bottom trawl- although likely nearer to the seaward edges given the depths of the non-trawl RCA. Additionally, many non-groundfish fisheries (e.g., hagfish, spot prawn, etc.) and state-based fisheries that use bottom contact gear routinely operate in the NT_RCA.[23]

3.5.1 No Action

Under No Action, it is expected that fixed gear impacts on NT_RCA habitat are likely to remain similar to present impacts, as LEFG/OA operations will remain prohibited within the NT_RCA, except when/where allowed by regulation. Most effects to habitat by fixed gear will occur outside

23 See F.1.a, Supplemental GMT Report 4, Impacts for Non-Trawl RCA Proposals for 2021-2022

the existing NT_RCA boundaries. These impacts are discussed in Appendix C and may incrementally increase, or decrease, based on LEFG/OA effort related to the current trip and allocation limits for these sectors.

3.5.2 Alternative 1-2

Under the Alternatives, LEFG and/or OA vessels would be able to operate within the NT_RCA boundaries with approved hook-and-line gear only. Bottom longline, pot/trap gear, and dinglebar, would be prohibited. The approved hook-and-line gear, as described above, is designed to fish midwater, and reduce bottom contact; however, incidental bottom contact from weights, hooks, etc. may occur.

3.5.3 Alternative 3

Alternative 3 would narrow the NT_RCA. In the newly reopened depths, vessels could fish all legal gear types, including longline, pot, and dinglebar unless the Council specifies gear restrictions. Fishing outside the NT_RCA in newly reopened depths may add to the cumulative impacts of fixed gear along the coast.

Habitat impacts are likely to be incremental, at least initially, as the fishery returns to historical fishing grounds over time; however, impacts could be larger in areas of high effort and lower in areas of low effort. Fishing effort is highly dependent on port location. Areas closer to port or closer to ports with large LEFG/OA fishing populations, such as those highlighted in Section 3.4 may experience differential impacts when compared to areas farther away from port and/or ports with low populations of vessels. This concept is similar to localized depletion of target species in a fishery, where closer areas are targeted initially and moves out as target species become less numerous, smaller, etc. However, due to uncertainties of effort, especially in terms of both gear hours and types of gear used, it is difficult to predict what the overall impact to habitat will be and additional detailed analyses may be necessary to determine potential risks to habitat, including habitat forming invertebrates. It is important to also note that cumulative impacts to habitat from all forms of fishing would concomitantly increase with the return of fixed gear to the NT_RCA.

3.5.4 Habitat Mitigation

The Council has a primary tool available for use to mitigate habitat impact, EFH Conservation Areas (EFHCAs). EFHCAs are areas closed to certain types of fishing for the purpose of conserving and protecting designated EFHs. The Council has identified and created these discrete areas closures starting in 2005 to mitigate the adverse effects of fishing on groundfish essential fish habitat (FMP Section 6.86), established under Amendment 19. Amendment 19 included creation of EFHCAs closed to all bottom contact gears, which include gears used by non-trawl fisheries such as longlines and pots (Table 26). These EFHCAs do not vary seasonally and they are not usually modified through inseason or biennial management actions.

Multiple EFHCA areas closed to bottom contact gear are within the NT_RCA at present. It is important to note that even if NT_RCA boundaries change, EFHCA bottom contact gear closures will remain in effect as a mitigation measure. Boundary changes may also impact EFHCA closures that are specific to bottom trawl gear and would allow additional fishing in areas known to have sensitive habitats to the extent that conservation from the impacts of bottom trawl fishing was deemed necessary. The amount of overlap between EFHCAs (bottom trawl v. bottom contact) and the areas of the NT_RCA Alternative being scoped has not been quantified at this time.

Table 26. Essential Fish Habitat Conservation Area that do not allow bottom contact gear (§66.12(a)(16)).
Note, there are no EFHCAs off Washington closed specifically to bottom contact gear.

	Location
Oregon	• Thompson Seamount • President Jackson Seamount
California	• Richardson Rock • Davidson Seamount (fishing below 500 fm prohibited) • Judith Rock • Gull Island • Cordell Bank (within 50 fm isobath) • Scorpion • Anacapa Island • Skunk Point • South Point • Harris Point • Painted Cove • Carrington Point • Footprint • Santa Barbara

Conclusions
Based on information in Appendix C, commercial gear studies, and other studies, impacts to HFIs (e.g., corals, sponges, etc.) from fixed gear include crushing, snagging, displacement, or by hooking. Biogenic habitats are most at-risk from fishing gear impacts followed by hard substrate and lastly, soft sediments. Habitat may be impacted at different rates and in different ways based on gear type. Though it may be possible to predict what areas fishermen may fish, based on target species, the extent of these impacts and their relative detrimental effects are highly uncertain at present as what areas and the amount of fishing effort are unknown.

Under No Action, fixed gear impacts on habitat are likely to remain the same as present. The only LEFG/OA effort within the NT_RCA is targeted fishing for the other flatfish complex or within the 30-40 fm depth bin off Oregon for hook-and-line gear only. Additionally, outside the NT_RCA, effort and fishing location may shift seasonally or based on market conditions in order to target certain species, but is not expected to dramatically change. Those impacts were described in the 2021-2022 EA.

Under all Alternatives, if approved hook-and-line gear is fished as designed, to target midwater rockfish and with limited bottom contact, the impacts to benthic habitat within the NT_RCA are expected to be low; however, it is reasonable to presume there would be some impacts as weights may strike the bottom and incidental entanglements may occur. The relative lack of data though makes this projection highly uncertain. Under Alternative 3, the areas that would be reopened to all gear types would incur impacts; these habitat impacts would be greater than Alternative 1 and 2.

Increases in effort under all Alternatives is likely, though the spatio-temporal distribution of the effort by gear type inside NT-RCA and in newly opened areas outside the NT_RCA is unknown and will be challenging to estimate. It is likely impacts will incrementally increase, but whether the effort is clustered to localized areas or highly distributed along the shelf is uncertain.

The Council may wish to consider an in-depth habitat impact review of fixed gear impacts to identify the risks and what mitigation is warranted. The Council could also consider if expanding the gear prohibitions within existing EFHCAs and/or consider establishing new protected areas are warranted.

Appendix 1: Historical Boundaries of the West Coast NT_RCA

NT_RCA depth ranges from 2003 -2021 for commercial non-trawl fisheries by year and management area.. Recreational fisheries RCAs share similar depth boundaries, but are not addressed here or as part of this action. Highlighted items signify changes to NT_RCA boundaries

Year	North of 46° 16" N. lat.	46° 16" N .lat. to 45° 03.83" N. lat.	45°03.83" N. lat. to 43° 00" N. lat.	43° 00" N. lat. to 42° 00" N. lat	42° 00" N. lat. to 40° 10" N. lat.	40°10" N. lat. to 38° 57 N. lat.	38° 57 N. lat. to 34° 27" N. lat.	South of 34° 27" N. lat. -incl. islands
2003	shore -100; shore - 200	27 - 100; shore - 150	27 - 100; shore - 150	27 - 100; shore - 150	27 - 100; shore - 150	20 - 150; shore - 150	20 - 150; shore - 150	20 - 150; 30 - 150; shore - 150
2004	shore -100	30 - 100	30 - 100	30 - 100	30 - 100	30 - 150; 20 - 150	30 - 150; 20 - 150	60 - 150
2005	shore - 100	30 - 100	30 - 100	30 - 100	30 - 100	30 - 150; 20 - 150	30 - 150; 20 - 150	60 - 150
2006	shore - 100	30 - 100	30 - 100	30 - 100	30 - 100	30 - 150; 20 - 150	30 - 150; 20 - 150	60 - 150
2007	shore - 100	30 - 100	30 - 100	30 - 100	30 - 100	30 - 150	30 - 150	60 - 150
2008	shore - 100	30 - 100	30 - 100	30 - 100	30 - 100	30 - 150	30 - 150	60 - 150
2009	shore - 100	30 - 100	30 - 125[a]	20 - 100	20 - 100	30 - 150	30 - 150	60 - 150
2010	shore - 100	30 - 100	30 - 125[a]	20 - 100	20 - 100	30 - 150	30 - 150	60 - 150
2011	shore - 100	30 - 100	30 - 125[a]	20 - 100	20 - 100	30 - 150	30 - 150	60 - 150
2012	shore - 100	30 - 100	30 - 100	20 - 100	20 - 100	30 - 150	30 - 150	60 - 150
2013	shore - 100	30 - 100	30 - 100	30 - 100	20 - 100	30 - 150	30 - 150	60 - 150
2014	shore - 100	30 - 100	30 - 100	30 - 100	20 - 100	30 - 150	30 - 150	60 - 150
2015	shore - 100	30 - 100	30 - 100	30 - 100	20 - 100; 30 - 100	30 - 150	30 - 150	60 - 150
2016	shore - 100	30 - 100	30 - 100	30 - 100	30 - 100	30 - 150	30 - 150	60 - 150
2017	shore - 100	30 - 100	30 - 100	30 - 100	30 - 100	30 -125; 40 - 125	30 -125; 40 - 125	75 - 150
2018	shore - 100	30 - 100	30 - 100	30 - 100	30 - 100	40 - 125	40 - 125	75 - 150
2019	shore - 100	30 - 100	30 - 100	30 - 100	30 - 100	40 - 125	40 - 125	75 - 150
2020	shore - 100	30 - 100	30 - 100	30 - 100	30 - 100	40 - 125	40 - 125	75 - 150
2021	shore - 100	30 - 100[b]	30 - 100[b]	30 - 100[b]	30 - 100[b]	40 - 125	50 - 125	100 -150

a/ seaward reduced to 100 fm on directed Pacific halibut days

b/ 30-40 fm open to fixed gear, except operations must exclude bottom longline, pot/trap, and dinglebar

Appendix 2: Reference Maps

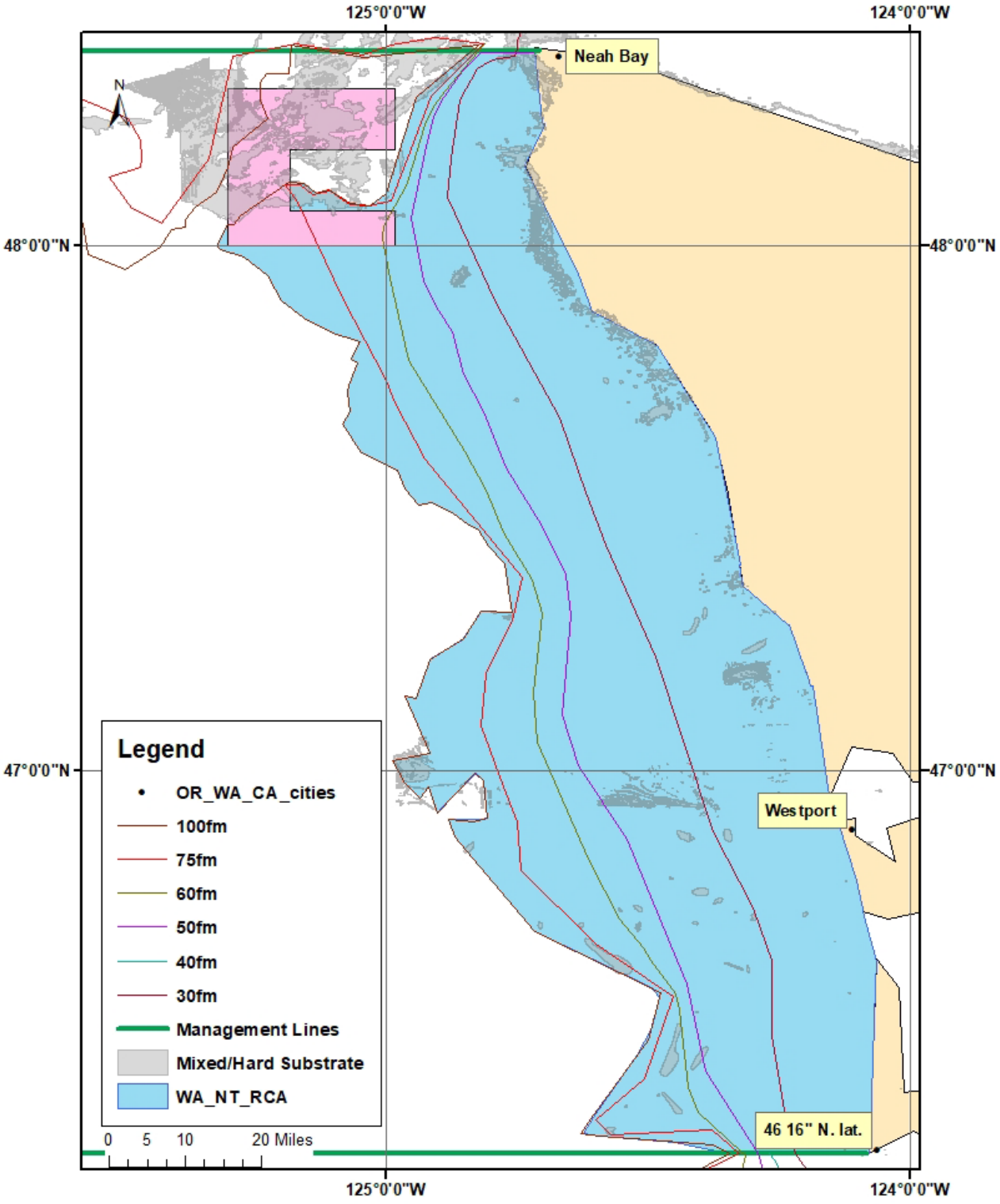

Figure A- 1. Map of Washington NT_RCA with 100, 75, 60, 50, 40, 30 fathom (fm) depth contours.

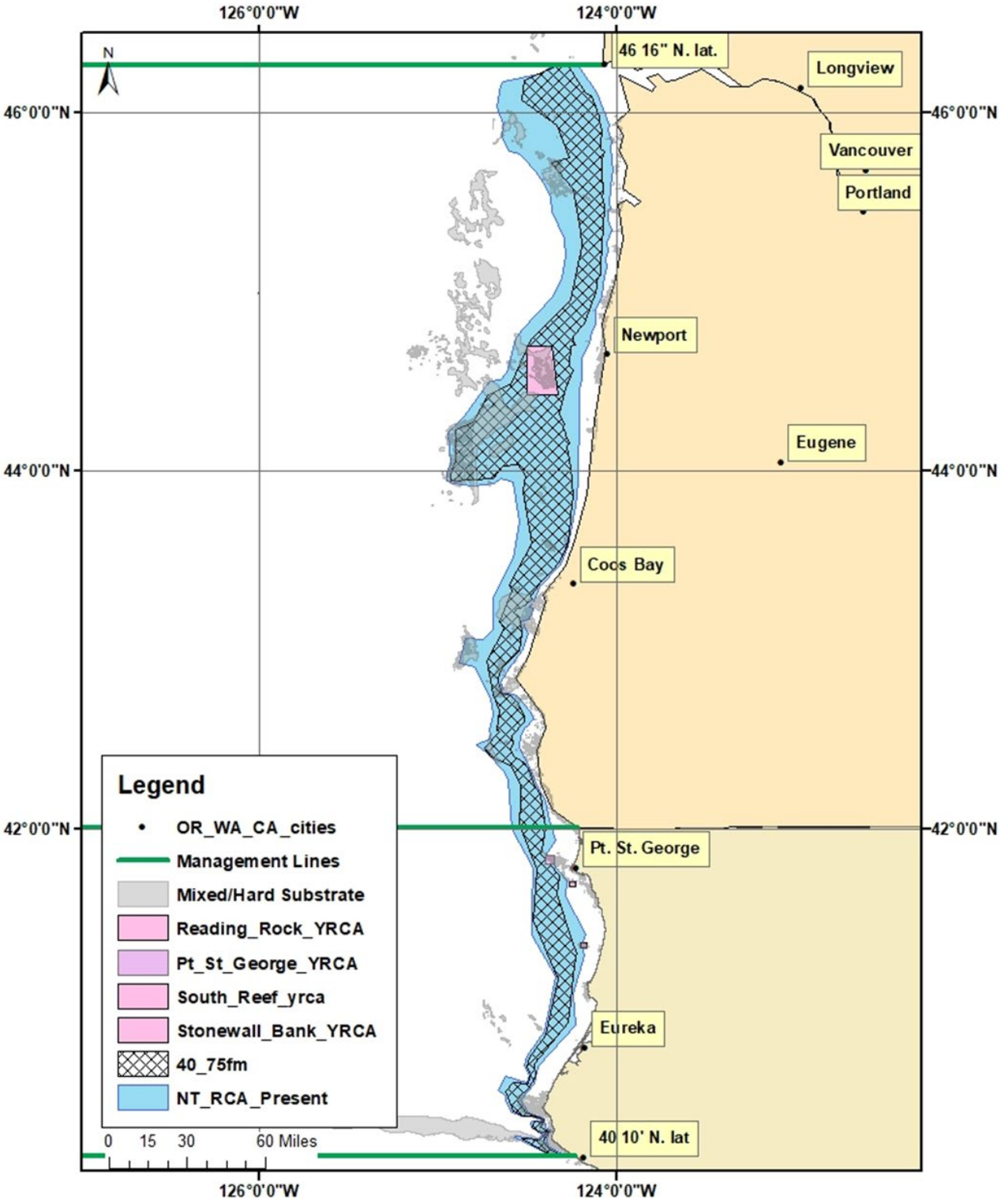

Figure A- 2. Map showing the NT_RCA for the management area between the Oregon/Washington border at 46 16" N. lat to 40 10" N. lat. Proposed NT_RCA shown in crosshatch patter.

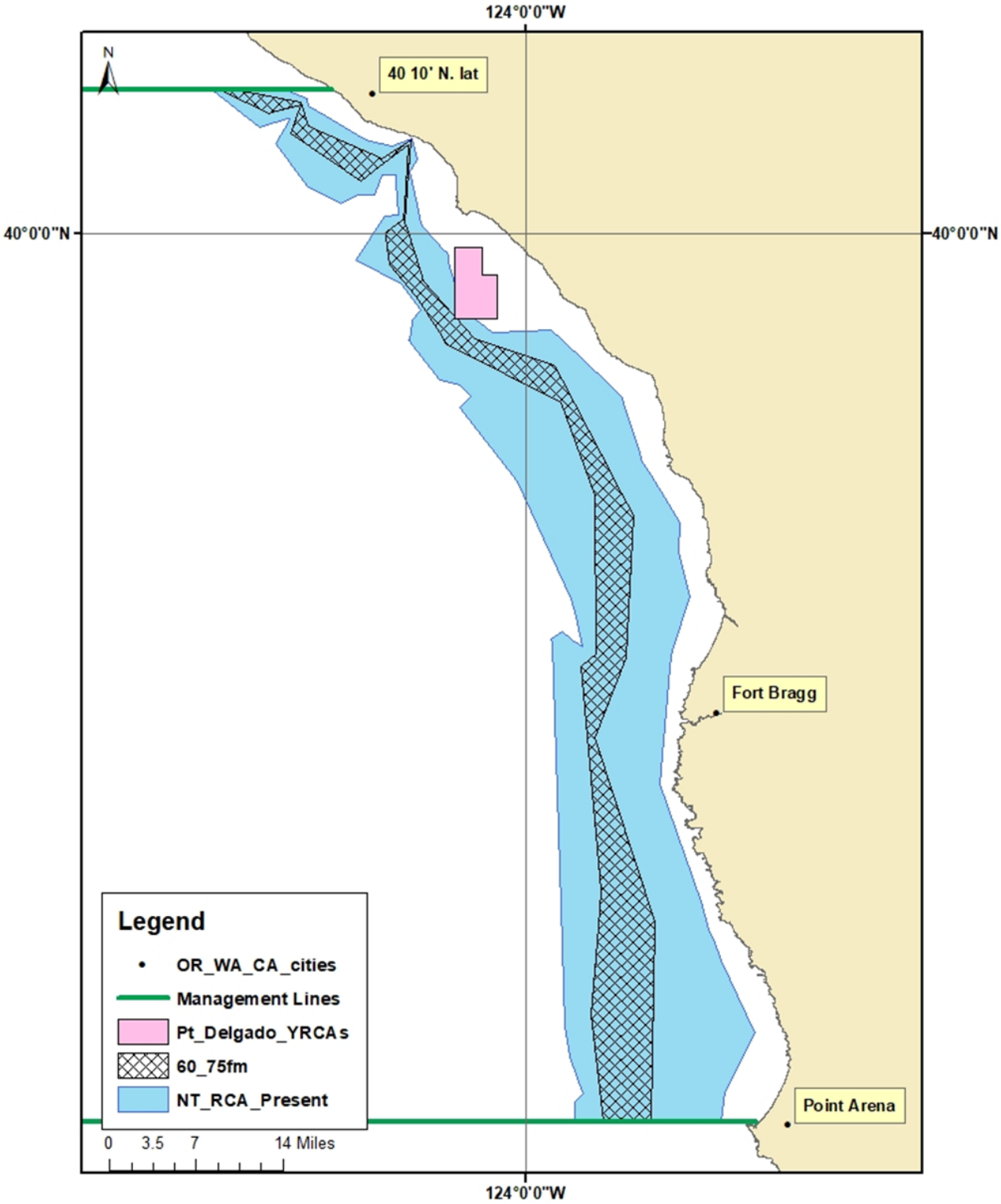

Figure A- 3. Map showing the NT_RCA for the management area between 40 10" N. lat. and 38 57.5" N. lat. Proposed NT_RCA shown in crosshatch pattern.

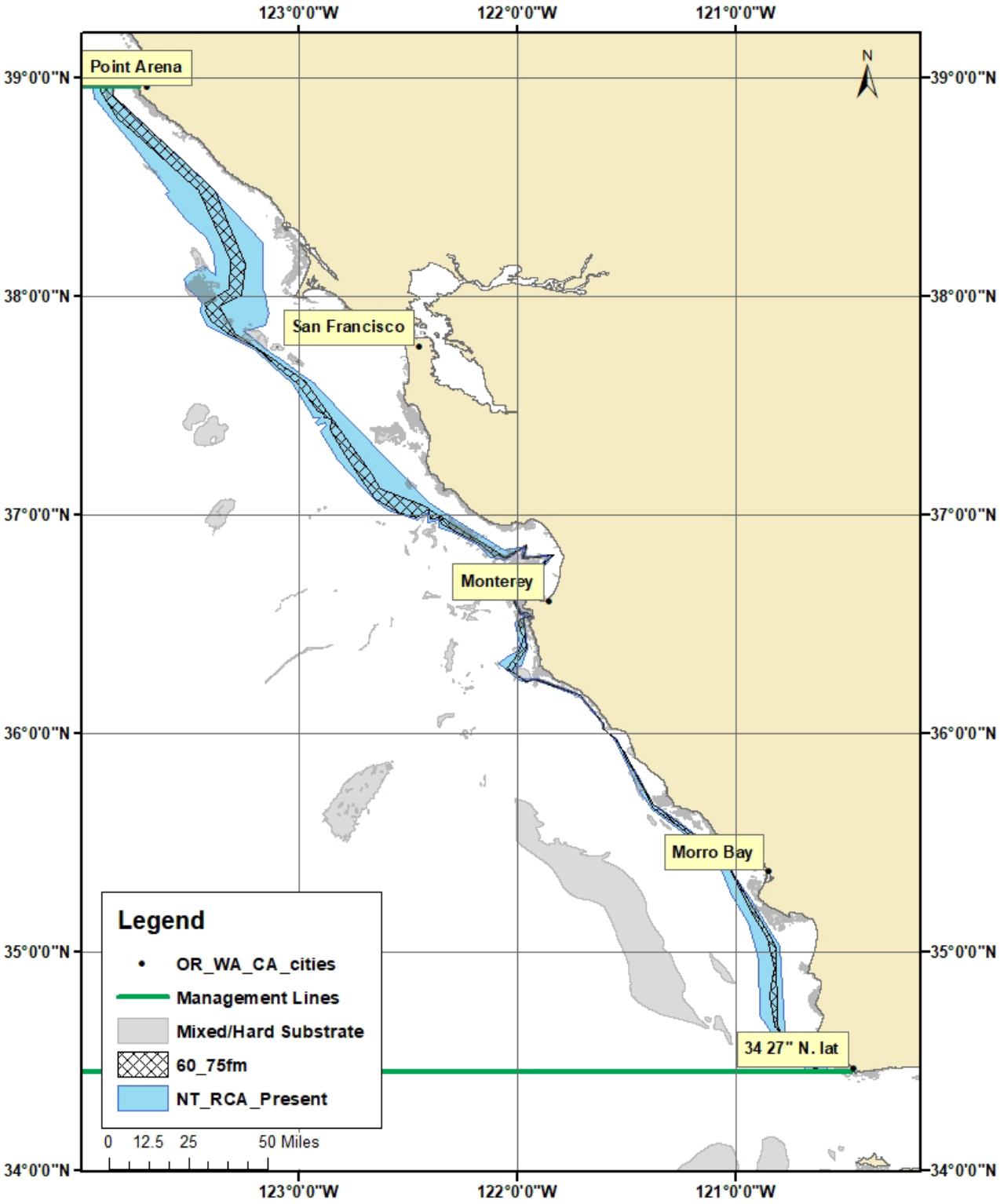

Figure A- 4. Map showing the NT_RCA for the management area between 38 57.5" N. lat. and 34°27" N. lat. Proposed NT_RCA shown in crosshatch pattern.

Appendix 3: Preliminary EFP Analysis

Data Summary and Characterization for Midwater, Groundfish EFPs Using Modified Hook-and-Line Gear

October 20, 2021

Sean E. Matson, Ph.D.

Summary

This brief report summarizes activity in three groundfish exempted fishing permits (EFPs), using modified hook-and-line gear configurations within the non-trawl RCA in California and Oregon, to target midwater rockfish species such as yellowtail, vermilion, and chilipepper rockfish (declared targets). The results are intended to help inform decision making by the Council, regarding forming a range of alternatives on this action, for the prospect of moving the EFP gear types forward into regulation. The three EFPs examined included the San Francisco Community Fishing Association EFP (Emley-Platt), the longest standing of the three and showing the most effort, running from 2013 through the present in California waters. The other two include Real Good Fish, also in California (Monterey Bay), and the Cook Hook-and-Line EFP in Oregon. Catch, effort and participation, spatial distribution, and bycatch are summarized. Effort, participation, and catch in these EFPs were relatively low. In this preliminary and coarse investigation, it was found that yelloweye bycatch rates were most similar, among the handful of sectors compared with, to the California Recreational sector. Spatial distribution of bycatch largely followed effort/catch patterns, and proximity to port.

Introduction

The purpose of this report is to summarize activity in three groundfish EFPs, using modified hook-and-line gear configurations within the non-trawl RCA in California and Oregon, to target midwater rockfish species such as yellowtail, vermilion, and chilipepper rockfish (declared targets). Results are intended to help inform decision making by the Council toward forming a range of alternatives on this action.

The three EFPs include the Emley-Platt, the longest standing of the three and showing the most effort, running from 2013 through the present in California waters. The others include Real Good Fish, also in California (Monterey Bay), and the Cook Hook-and-Line EFP in Oregon. The latter two have only taken place recently, from 2019 forward. Gear types fell under the descriptions "vertical longline" (most common), as well as "other hook and line" or "all troll gear", within observer data.

Data

The focal data for this report were haul-level, West Coast Groundfish Observer Program (WCGOP) data from 2013 through 2019, during a period with 100 percent observer coverage. The completeness of observer data during this period enabled a complete and relatively detailed picture of catch, location, bycatch rates, effort and so on. During 2020 and 2021, there were many unobserved trips due to the pandemic, producing a mixture of observed and self-reported discards, together with landings from fish tickets. Thus, 2020 and 2021 data were not used for most applications in the report. Participants in these EFPs have waived confidentiality, enabling granular data reporting and characterization herein.

Effort and participation

From 2013 through 2019, the Emley-Platt EFP showed an increasing trend in effort, beginning with just five trips in 2013, rising to nine the next year, falling to three per year in 2016 and 2017, before jumping to 18 trips in 2017, cresting at 54 trips in 2018, and with 25 trips in 2019 (Table A- 1). Thirty-five trips occurred in 2020 (30 of which were unobserved), and 23 have been reported so far in 2021, three of which were observed. Eight vessels participated in the EFP through 2019, beginning with two in 2013, dropping to one in 2015 and 2016, before increasing to four in 2017, five in 2018 and four in 2019. The Real Good Fish EFP showed two vessels participating for three trips in 2019, while the Cook EFP showed one vessel for one trip in 2019, one vessel and two trips in 2020, and no participation so far in 2021.

Catch

The highest annual average amounts of catch in the Emley-Platt EFP from 2013-2019 were for yellowtail rockfish (2.24 mt/year, CV = 86%), followed by vermilion (0.75 mt/year, CV = 188%), bocaccio (0.4mt/year, CV = 111%), chilipepper (0.32 mt/year, CV = 234%), and widow (0.27 mt/year, CV = 69%), as shown in Table A- 2. Real Good Fish EFP vessels caught mostly chilipepper in 2019 (0.65 mt), followed by bocaccio at 0.22 mt across three trips. The Cook EFP caught small amounts of canary, yellowtail, and widow rockfish on the one trip in 2019.

Sixteen yelloweye rockfish were caught from 2013-2019 in the Emley-Platt EFP, which is an average of 2.3 per year (CV = 83%), or 16.3 pounds per year (CV = 87%, Table A- 2). Only one Chinook salmon was caught, in 2014. No yelloweye or Chinook were caught by the Real Good Fish or Cook EFPs in 2019.

Table A-3 presents mean annual total catch (mt, lb), and mean annual fish count, in the Emley-Platt hook-and-line gear EFP for midwater vertical hook and line gear, from 2013-2019.

Spatial distribution

The Emley-Platt EFP has operated within a latitudinal range from 34.27º to 39.48º N. latitude, with a median of 37.8º N. latitude (N. lat., Figure A-5 5). Real Good Fish EFP vessels showed a much narrower range, from approx. 36.5º to 37º N. lat. with a median of 36.8º N. lat., and the Cook EFP from 43.2º to 46.2º N. lat., with a median of 44.6º N. lat. (Figure A-5 5, top panels).

The latitudinal range of Emley-Platt expanded most noticeably from 2017 on when the southern boundary was moved from Point San Pedro (37°35' N. lat.) to Point Conception (34°27' N. lat.). Emley-Platt EFP vessels have operated within a longitudinal range from 119.2º to 124.9º W. longitude, with a median of 123.3º W. longitude (Figure A-5 5). The longitudinal range also expanded from 2017 forward, predominantly shoreward. The longitudinal range of Real Good Fish EFP vessels (in observed hauls from 2019-20) has been from approx. 121.9º to 122.3º, with a median of 122.1º, and Cook EFP participation was distributed from 124.1º to 124.6º W. longitude, with a median of 125.5º (Figure A-5 5, bottom panels).

Emley-Platt EFP vessels have fished within a depth range from 9 to 84 fm with a median of 53 fm, and the annual range been similar among years (Figure A- 6). Fishing depth for the two Real Good Fish EFP vessels has been from 46 to 96 fm in 2019-20 with a median of 70 fm, with the Cook

EFP ranging from 33 to 89 fm, with a median of 57 fm. (Figure A- 6). Figure A- 7 shows a somewhat diagrammatic view of spatial distribution as a bubble plot of total groundfish catch by latitude, longitude, and EFP, highlighting the different areas of the coast in which each EFP has operated.

Figure A- 8 shows spatial distribution of combined hauls among EFPs, for total groundfish (left) and only yelloweye rockfish (right). Note that among the few yelloweye caught over the years in the Emley-Platt EFP, most appeared off San Francisco, which could easily have more to do with proximity to port than other factors. Yelloweye bycatch was also concentrated around Point Conception, and south of Cape Mendocino, which were focal points of groundfish effort in the EFP.

Bycatch

The annual mean yelloweye bycatch rate, estimated from all observed trips in the Emley-Platt EFPs from 2013-2019, as a proportion of total catch of all groundfish species, was 0.0016, with a CV of 96 percent. Although we struggled to find a valid comparison to make, due to mismatches in one or more factors, including gear, habitat, area, and target species, we attempted to place this rate within some sort of context. Therefore, we compared the bycatch rate with one recreational and three commercial sectors, the first of which was California Recreational, which showed a yelloweye bycatch rate of 0.002, with a CV of 746 percent. This comparison was the most similar by far. We also compared the bycatch rate to the Midwater Rockfish Trawl sector (observed and EM), due to similar targets, which showed a yelloweye bycatch rate of 0.0000001, with a CV of 138 percent, from 2015-2019 (years for which this sector was defined in the data). We also compared it with the Limited Entry (LE), Fixed Gear (FG), Daily Trip Limit (DTL) hook-and-line sector, and FG Open Access (OA) hook-and-line sector, which showed mean annual yelloweye bycatch rates of 0.00007 (CV = 159 percent), and 0.0006 (CV = 141 percent), respectively.

Acknowledgements

Thank you to staff of WCGOP at the NWFSC for data and consultation, including Dr. Kayleigh Somers, Tim Peretti, and Jon McVeigh. Thanks to John Wallace of the NWFSC, for lightning-fast support and assistance with the spatial plotting package for R, Imap, found at https://github.com/John-R-Wallace-NOAA/Imap. Thanks also to Lynn Massey at NMFS WCR.

Table A- 1. Summary metrics of interest for the Emley Platt EFP, over 100 percent observed years, 2013-2019.

Metric	2013	2014	2015	2016	2017	2018	2019	SUM
Trips (count)	5	9	3	3	18	54	25	117
Sets (hauls, count)	166	14	4	3	27	68	33	315
Total GF catch (mt)	1.63	3.63	0.91	0.53	5.35	12.35	5.42	29.82
Total haul hours	70.89	467.36	118.71	119.07	1154.1	2081.63	1091.23	5,102.99
Chinook count	0	1	0	0	0	0	0	1
Yelloweye count	2	2	0	0	5	4	3	16

Table A- 2. Summary metrics of interest for the Real Good Fish (RGF), and Cook EFPs, for the 100 percent observed year, 2019.

Metric	RGF	Cook
Trips (count)	3	1
Sets (hauls, count)	31	5
Total GF catch (mt)	1.05	0.17
Total haul hours	29.62	29.05
Chinook count	0	0
Yelloweye count	0	0

Table A- 3. Summary metrics of interest, including mean annual total catch (mt, lb), and mean annual fish count, in the Emley-Platt hook-and-line gear EFP for midwater vertical hook and line gear, from 2013-2019. Trips in years 2013-2019 were 100% observed.

	Mean total catch (mt)					Mean total catch (lb)					Mean Fish counts		
Species	Mean (mt)	Std. Dev.	CV (%)	Min.	Max.	Mean (lb)	Std. Dev.	CV (%)	Min.	Max.	Mean	Std. Dev.	CV (%)
Bank Rockfish	0.0002	0.0004	265%	0.0000	0.0012	0.37	0.98	265%	0.00	2.60	0.3	0.8	265%
Blue/Deacon Rockfish	0.0708	0.1128	159%	0.0000	0.3211	156.16	248.60	159%	0.00	707.92	98.6	161.6	164%
Bocaccio Rockfish	0.3950	0.4377	111%	0.0893	1.3457	870.82	964.90	111%	196.95	2966.71	212.1	267.4	126%
Canary Rockfish	0.0379	0.0424	112%	0.0045	0.1258	83.53	93.53	112%	9.92	277.28	35.9	42.9	119%
Chilipepper Rockfish	0.3193	0.7471	234%	0.0000	2.0087	703.89	1647.12	234%	0.00	4428.35	393.8	934.7	237%
Chinook (King) Salmon	0.0014	0.0038	265%	0.0000	0.0100	3.15	8.33	265%	0.00	22.05	0.1	0.4	265%
Common Thresher Shark	0.0018	0.0047	265%	0.0000	0.0125	3.95	10.45	265%	0.00	27.65	0.1	0.4	265%
Copper Rockfish	0.0004	0.0009	195%	0.0000	0.0023	0.97	1.90	195%	0.00	5.00	0.1	0.4	265%
Cowcod Rockfish	0.0007	0.0019	265%	0.0000	0.0050	1.58	4.18	265%	0.00	11.05	0.4	1.1	265%
Greenblotched Rockfish	0.0012	0.0024	207%	0.0000	0.0064	2.54	5.26	207%	0.00	14.05	1.7	4.1	240%
Greenspotted Rockfish	0.0092	0.0197	215%	0.0000	0.0533	20.19	43.36	215%	0.00	117.60	12.3	27.1	220%
Greenstriped Rockfish	0.0001	0.0002	172%	0.0000	0.0005	0.26	0.45	172%	0.00	1.00	0.4	0.8	184%
Lingcod	0.0639	0.0706	110%	0.0061	0.2003	140.89	155.63	110%	13.35	441.50	14.6	13.2	90%
Olive Rockfish	0.0266	0.0316	119%	0.0000	0.0913	58.65	69.60	119%	0.00	201.34	26.8	31.0	115%
Pyrosome Unid	0.0000	0.0000		0.0000	0.0000	0.00	0.00		0.00	0.00	0.0	0.0	
Quillback Rockfish	0.0002	0.0006	265%	0.0000	0.0017	0.54	1.42	265%	0.00	3.75	0.3	0.8	265%
Redbanded Rockfish	0.0001	0.0002	265%	0.0000	0.0005	0.14	0.38	265%	0.00	1.00	0.0	0.0	
Redstripe Rockfish	0.0025	0.0061	246%	0.0000	0.0162	5.43	13.37	246%	0.00	35.74	7.7	18.7	242%
Rosy Rockfish	0.0002	0.0004	265%	0.0000	0.0011	0.35	0.93	265%	0.00	2.45	0.7	1.9	265%
Shelf Rockfish Unid	0.0037	0.0054	145%	0.0000	0.0138	8.19	11.86	145%	0.00	30.50	0.0	0.0	
Shortbelly Rockfish	0.0002	0.0005	239%	0.0000	0.0015	0.50	1.20	239%	0.00	3.20	0.4	0.8	184%
Speckled Rockfish	0.0481	0.0643	134%	0.0007	0.1437	106.15	141.86	134%	1.55	316.72	46.3	62.1	134%
Squarespot Rockfish	0.0005	0.0008	177%	0.0000	0.0019	0.99	1.75	177%	0.00	4.25	1.4	2.7	189%
Stripetail Rockfish	0.0003	0.0007	265%	0.0000	0.0018	0.57	1.51	265%	0.00	4.00	0.0	0.0	
Vermilion Rockfish	0.7500	1.4130	188%	0.0000	3.8578	1653.45	3115.17	188%	0.00	8505.03	387.3	781.1	202%
Widow Rockfish	0.2761	0.1898	69%	0.0117	0.4496	608.70	418.38	69%	25.71	991.12	333.6	224.7	67%
Yelloweye Rockfish	0.0074	0.0064	87%	0.0000	0.0169	16.31	14.12	87%	0.00	37.33	2.3	1.9	83%
Yellowtail Rockfish	2.2442	1.9280	86%	0.3303	5.8414	4947.64	4250.58	86%	728.15	12878.06	2219.2	1972.4	89%

Table A- 4. Summary metrics of interest, including average annual total catch (mt, lb), and average annual fish count, in the Real Good Fish (CA) and Cook (OR) hook-and-line gear EFPs for midwater hook and line gear, in 2019; the only year for which trips were 100% observed.

EFP	Species	Total catch (mt)	Total catch (lb)	Avg Fish count
Real Good Fish EFP, Monterey Bay, CA	Bocaccio Rockfish	0.2176	479.61	142
	Chilipepper Rockfish	0.6556	1445.41	762
	Greenblotched Rockfish	0.0005	1.16	
	Vermilion Rockfish	0.0038	8.44	2
	Widow Rockfish	0.1701	375.00	157
Cook Midwater Hook-and-Line EFP, OR	Canary Rockfish	0.0970	213.76	66.5
	Widow Rockfish	0.0003	0.720	1
	Yellowtail Rockfish	0.0762	168.03	92.5

Table A- 5. EFP name, vessel name, and total groundfish catch, on trips aggregated by declared target and year, in hook-and-line gear EFPs for midwater hook and line gear, from 2013-2020. Years 2013 through 2019 were 100% observed; 2020 data are incomplete (unobserved trips not used).

EFP	Vessel	Target	2013	2014	2015	2016	2017	2018	2019	*2020
Emley-Platt (CA)	Annika	YTRK		3.42	0.91	0.53	2.16	4.30	1.38	
Emley-Platt (CA)	Capt Cook	YTRK	0.68	0.20						
Emley-Platt (CA)	High Hopes	YTRK	0.95							
Emley-Platt (CA)	Hook Up	CLPR						0.03		
Emley-Platt (CA)	Hook Up	VRML							0.00	
Emley-Platt (CA)	LuLu	YTRK					0.02	1.55		
Emley-Platt (CA)	MJ	CLPR						0.00		
Emley-Platt (CA)	MJ	YTRK						1.62	1.86	0.59
Emley-Platt (CA)	Smeagol	CLPR					2.62			
Emley-Platt (CA)	Smeagol	YTRK							1.00	0.65
Emley-Platt (CA)	Sunshine Lady	CLPR					0.55	4.60	0.74	
Emley-Platt (CA)	Sunshine Lady	VRML						0.28	0.44	
Emley-Platt (CA)	Sunshine Lady	(blank)						0.00		
Real Good Fish (CA)	Grinder	CLPR							0.17	0.50
Real Good Fish (CA)	Juliet	CLPR								0.00
Real Good Fish (CA)	Juliet	(blank)								0.00
Real Good Fish (CA)	Sea Harvest III	CLPR							0.88	
Cook (OR)	Carmillo	CNRY								0.00
Cook (OR)	Carmillo	YTRK								0.12
Cook (OR)	Juliet	YTRK							0.17	

*2020 data are incomplete (unobserved trips not used)

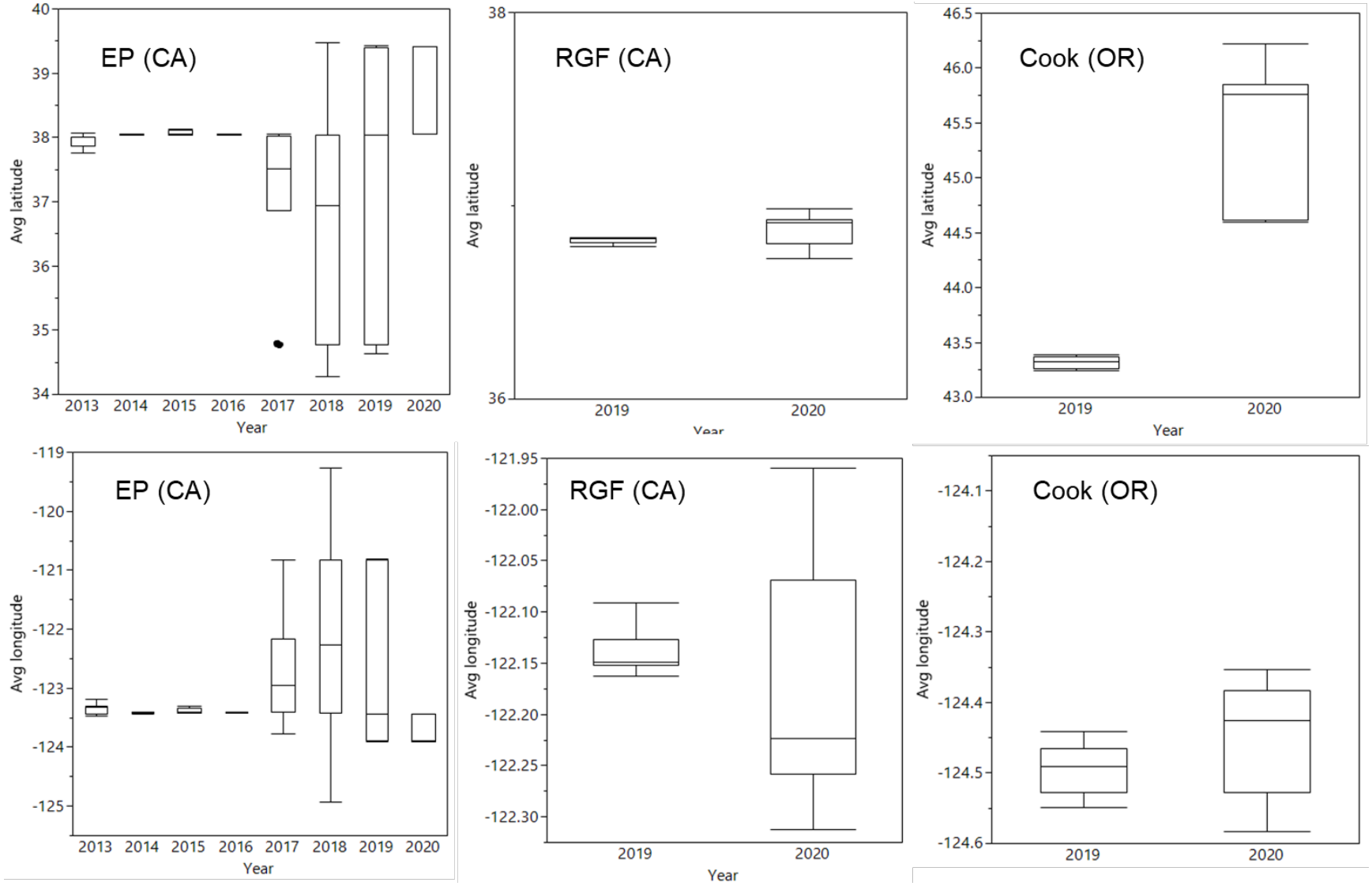

Figure A-5 5. Box-whisker plots of spatial fishing effort distribution, as haul latitude (top row) and longitude (bottom), by EFP and year. (EP=Emley/Platt, RGF=Real Good Fish)

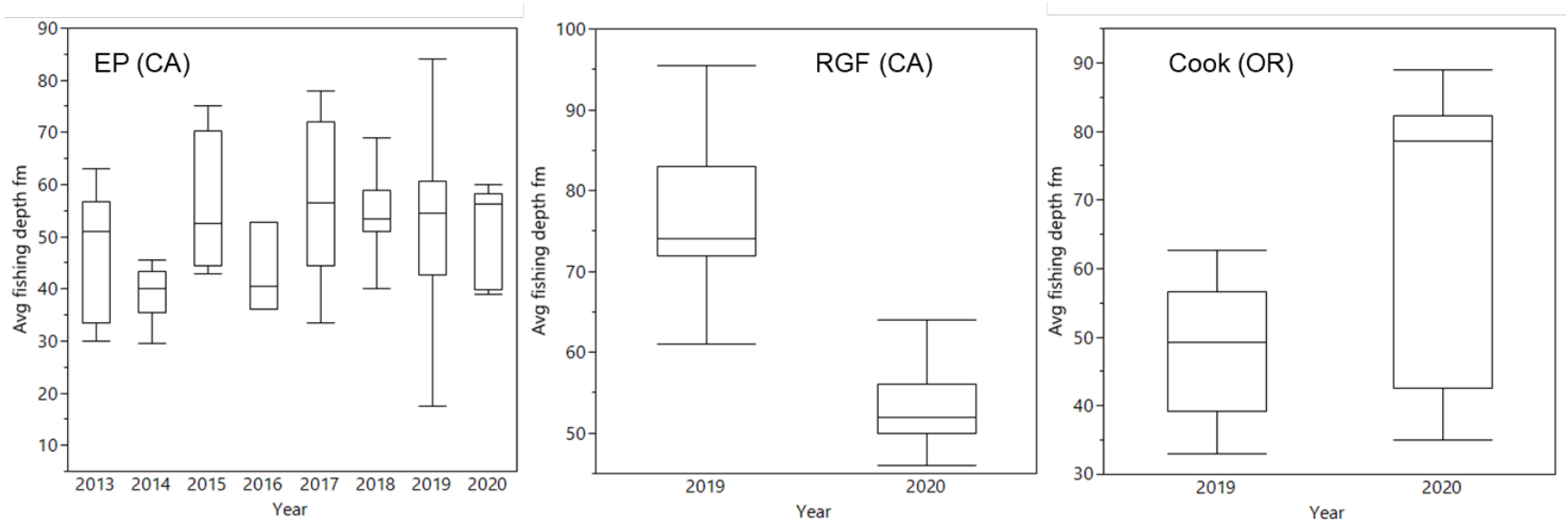

Figure A- 6. Box-whisker plots of mid-water fishing depth (fm), with hook-and-line gear, by EFP and year. EP = Emley-Platt, RGF = Real Good Fish.

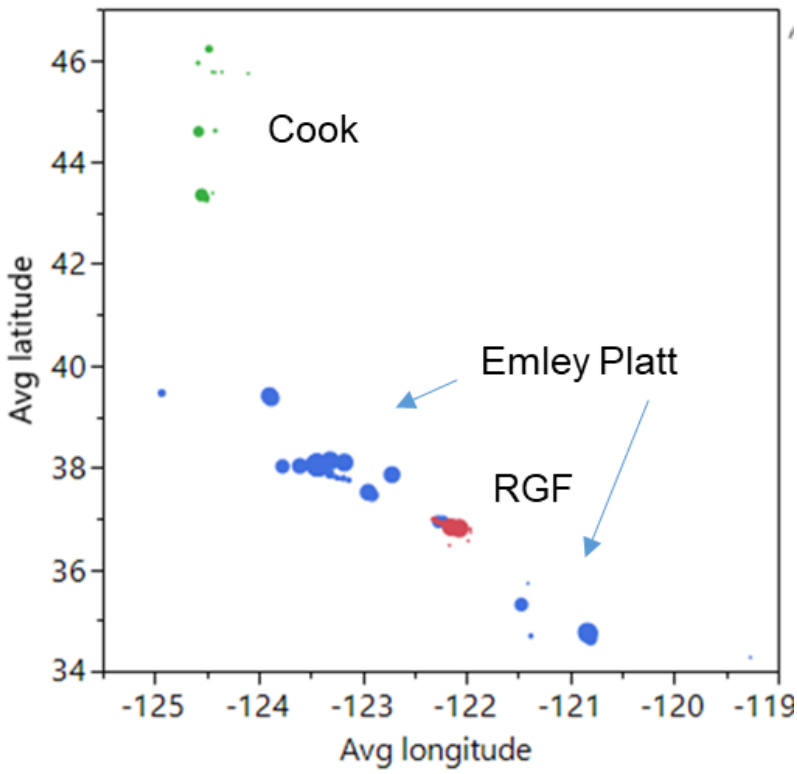
Cook
Emley Platt
RGF
Avg latitude
Avg longitude
46
44
42
40
38
36
34
-125
-124
-123
-122
-121
-120
-119

Figure A- 7. .

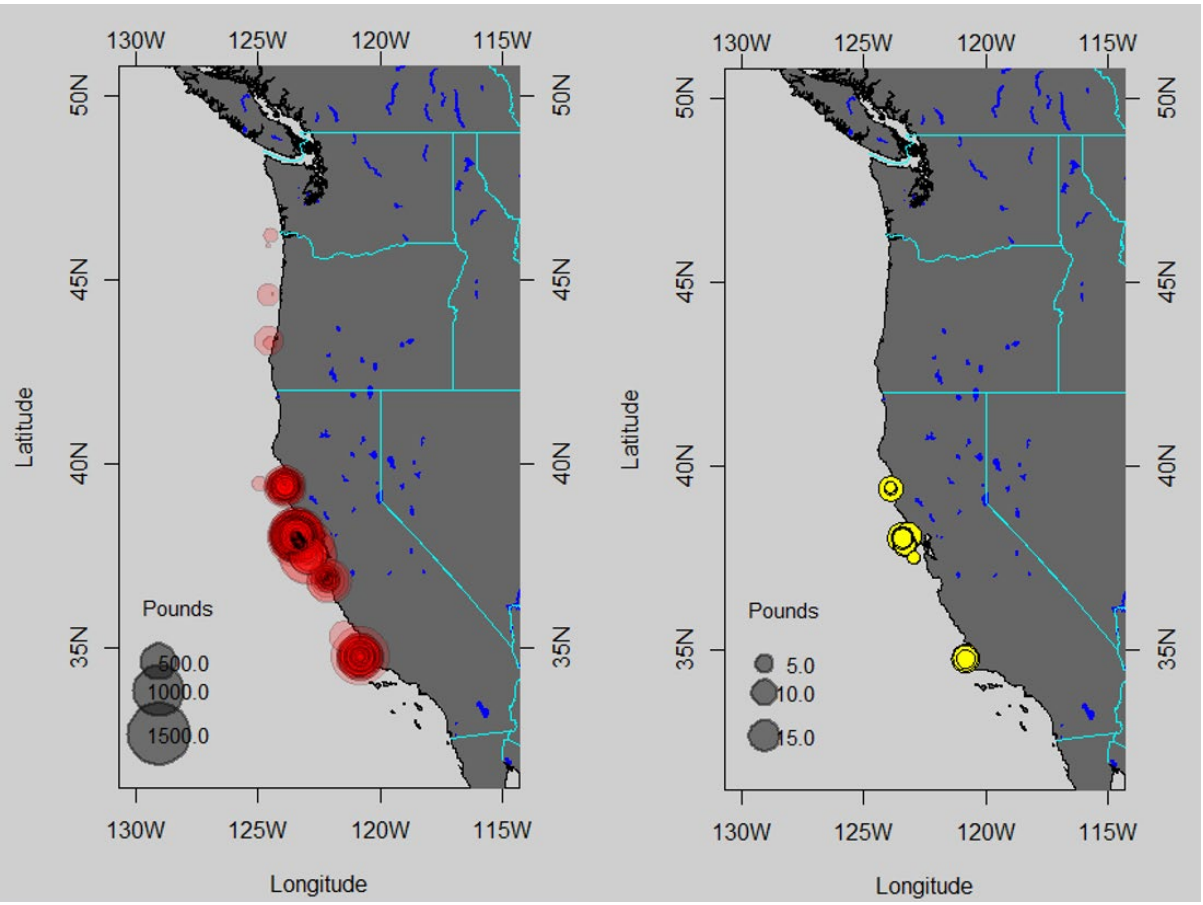

Figure A- 8. Bubble map plots showing spatial distribution of total groundfish catch (left panel), and total yelloweye rockfish catch (right panel), for combined data, among Emley-Platt, Real Good Fish, and Cook EFPs, from 2013-2019. The two separate plot scales are independent of one another; bubble size can only be compared within each panel, <u>not</u> between panels.