

Groundfish Exempted Fishing Permit Proposal:

Commercial Midwater Hook & Line Rockfish Fishing in the RCA off the Oregon coast

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Purpose and Goals

Purpose

Prior to the closure of the Rockfish Conservation Area (RCA), the area between 30 and 100 fathoms off the Oregon coast supported a commercial hook and line fishery for midwater rockfish species (i.e. yellowtail, widow, canary rockfish). Closure of the RCA in 2002 to protect overfished rockfish species (e.g. yelloweye and canary rockfish) restricted opportunities for commercial hook and line fishers to access these midwater rockfish stocks. With the rebuilding of canary rockfish complete, high quotas for midwater rockfish species, and low attainment of non-trawl allocations for yellowtail and widow rockfish (Table 1) potential again exists to optimize yields of these underutilized midwater rockfish species through gear configurations that mechanistically avoided habitats inhabited by demersal, protected, yelloweye rockfish. The purpose of the exempted fishing permit (EFP) proposal is to test a modified, midwater Vietnamese longline gear configuration that will be trolled to commercially harvest underutilized midwater rockfish species within the RCA. This gear is configured to minimize bycatch of yelloweye rockfish with built-in enforceable mechanisms to avoid the bottom. Additionally, this configuration has been historically successful for selectively harvesting these midwater rockfish species with low impacts to yelloweye rockfish in waters off Oregon.

Table 1. Non-trawl sector impacts on yellowtail and widow rockfish stocks compared to non-trawl allocations from 2013 – 2016. Note: total mortality from the West Coast Observer Program is only available through 2013, hence the mismatching year comparisons.

	Yellowtail Rockfish N of 40°10' (mt)	Widow Rockfish (mt)
2012 Non-Trawl Impacts	41.7	6.6
2013 Non-Trawl Impacts	39.4	20.1
2013 - 14 Non-Trawl Allocation	441.7	127.0
2015 - 16 Non-Trawl Allocation	667.2	169.2
Estimated Remaining Potential Yield:		
2015-16 Allocations minus 2013 Impacts	627.8	149.1

Goals

This EFP will comply with and advance the goals and mandates of the Magnuson-Stevens Act (MSA) by:

1. Allowing experimentation with a commercial gear configuration intended to both avoid bycatch of overfished yelloweye rockfish while facilitating optimized harvest of midwater rockfish stocks (yellowtail, widow, and canary rockfish), consistent with National Standards 1 and 9.
2. Permitting community access to historically utilized rebuilt fishery resources once important to the hook and line midwater rockfish fishery and coastal Oregon communities, consistent with National Standard 8.
3. Provide additional opportunity and spatial areas for Oregon hook and line groundfish fishers whose access has been constrained by the implementation of both the RCA, and lower impact quotas for overfished species (yelloweye and canary rockfish). Allowing access to underutilized stocks for hook and line fishers may relieve harvest pressure on exploited nearshore groundfish stocks.
4. Proposing a scientifically-based test and data collection on the performance of this experimental commercial gear configuration for:
 - a. selectively targeting and harvesting midwater rockfish stocks (i.e. yellowtail, widow, canary rockfish).
 - b. avoiding bycatch of the overfished yelloweye rockfish stock and other protected species.
 - c. potential future expansion into a viable, sustainable commercial fishery.

Disposition of Catch

Target species and legal incidental catch will be retained for sale. Incidental catch that may not be legally retained will be released alive, if possible, with descending devices. If desired by the Council, dead incidental catch of protected species can be retained for research and biological samples.

Justification

The implementation of the RCA in 2002 to protect overfished species has prevented commercial hook and line fishers from fishing in historically important areas for species that are currently underutilized (yellowtail, widow, and canary rockfishes). Gear types that have built-in mechanisms for keeping the gear off the bottom, such as, the non-hake midwater IFQ trawl and Oregon recreational longleader fishery, and are currently allowed access to these underutilized species. Authorized midwater gear types have demonstrated that built-in mechanisms for keeping fishing gear off the bottom will minimize the catch of yelloweye rockfish while allowing harvest levels adequate to support a fishery (Table 2). This EFP would allow commercial hook and line fishers to test a historically-used gear intended for targeting these underutilized stocks, while still meeting the goal of the RCA to avoid bycatch of yelloweye rockfish.

Table 2. Summary of percent catch of yelloweye rockfish and total fishery catch of all species for two midwater gear types

Fishery	Yelloweye Rockfish Catch (% of Total Catch)	Total Catch (mt)
Oregon Recreational Yellowtail EFP Catch (2009)	0.09	4.37
Non-hake Midwater Trawl IFQ (2013)	<0.01	20,944.82

Broader Significance

If this experimental gear configuration proves successful in intent, the goal is to allow commercial hook and line fishers using this gear type to fish for midwater rockfish species in the RCA. The creation of a hook and line fishery for these underutilized species would provide an additional portfolio option for fishers, such as Oregon's commercial open access and Nearshore Black & Blue Rockfish fleets. An additional hook and line fishery would also provide benefits to these small-scale fishing operations and associated coastal communities by providing additional opportunity to diversify fisher's portfolios. Diversity in fisher's portfolios may mitigate both harvest pressure on nearshore stocks while providing a buffer against possible future cuts to stocks, such as Chinook or coho salmon, upon which hook and line fishers rely.

Proposed Methods

In formulating the proposed methods for this EFP various specific objectives were considered including:

- **Creating a statistically valid sample size:** The methods proposed are aimed at providing sufficient numbers of fishing vessels, days, locations, tacks, fishing depths, gear measurements, and hook counts to formulate valid statistical conclusions about the ability of this gear configuration for both avoiding yelloweye rockfish bycatch and for harvesting midwater rockfish species in ratios to support a potentially viable future commercial fishery. A "tack" is the trolling equivalent of a tow, set, or drift.
- **Feasibility and efficiency:** Proposed methods must be economically viable for participants to cover the cost of (fuel, gear, bait, VMS, etc.) under this EFP.
- **Safety at-sea:** This consideration is paramount and the proposed methods of this EFP are designed to allow enough time each year for choosing safe weather days for fishing.
- **Precaution to minimize risk to protected resources:** Because overfished yelloweye rockfish will likely be encountered during EFP fishing, several precautionary measures are proposed to minimize and account for catch of protected species (see **Precautionary Measures**). These measures include 100 percent observer coverage.

Total Duration of the EFP

This EFP proposal is for a total of two years (2017-2018). During each year, up to 120 fishing days in total for all vessels combined are requested, based on sample size requirements necessary to demonstrate gear effectiveness, estimated sample sizes impacts to yelloweye rockfish (see **Estimated Harvest Amounts**), and resources available for observer coverage. Impacts to target and protected species will be monitored on a trip by trip basis and fishing will cease when impacts reach annual quotas.

Location of Fishing under the EFP

The area proposed for fishing is the RCA off the Oregon coast, from 30 to 100 fathoms, 42.00° to 46.26° N (Figure 1). For official coordinates demarcating the RCA area between the 30 – 100 fathom lines off Oregon see:

http://www.westcoast.fisheries.noaa.gov/fisheries/management/groundfish_closures/rockfish_areas.html

Prior to closure, the RCA was commercially fished for midwater rockfish species because this is the primary area inhabited by this underutilized species as demonstrated by habitat suitability maps in Appendix A.

Within the water column in the RCA, the proposed gear configuration will fish a minimum 30 feet off the bottom substrate. This specification is explicitly designed to minimize encounters with yelloweye rockfish while fishing at depths commonly inhabited by targeted midwater rockfish species. Specific mechanisms in the gear configuration insure gear stays 30 feet above the bottom (see **Description of the Proposed Gear Configuration**).

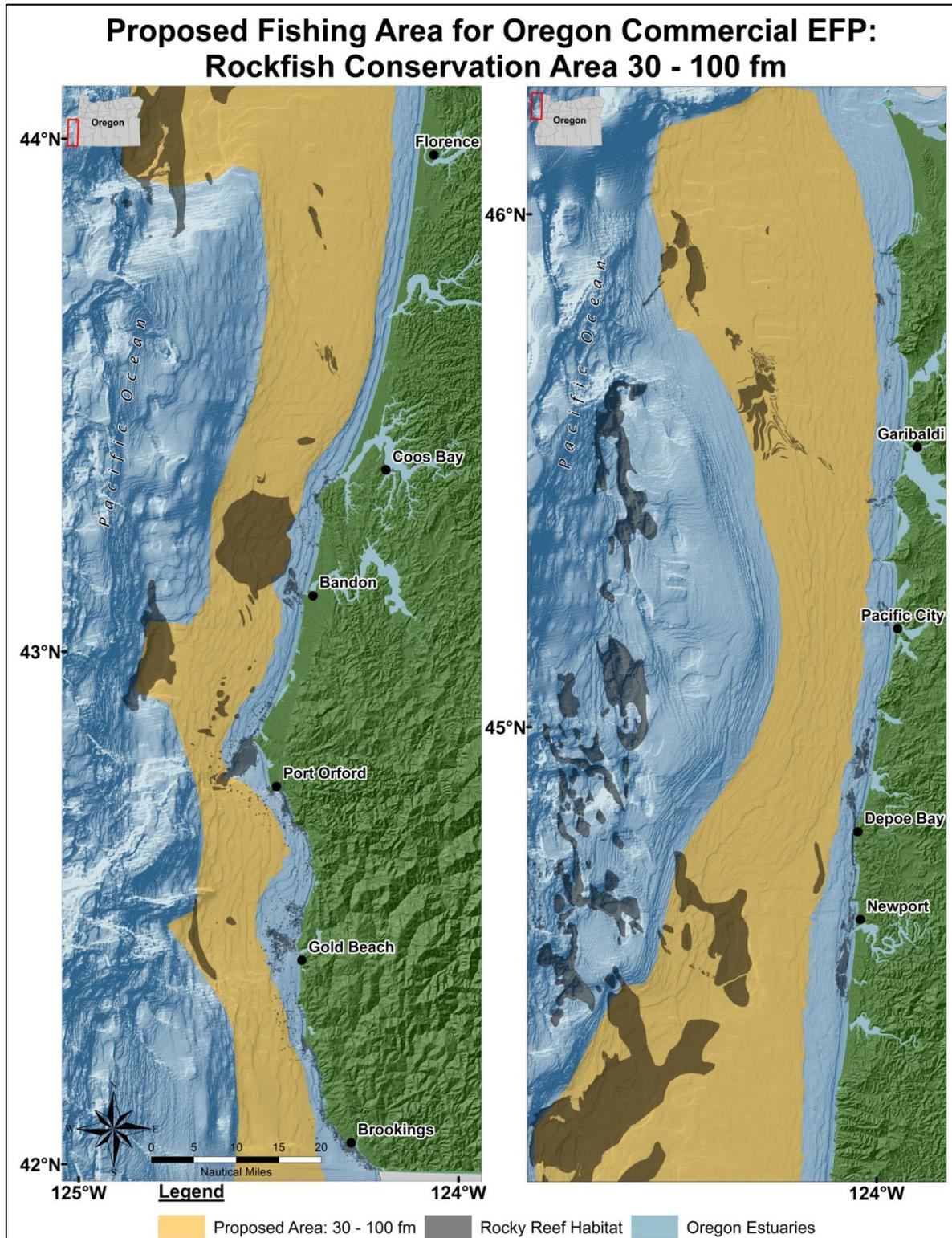


Figure 1. The proposed area for this commercial EFP fishing: the RCA off the Oregon coast 30 – 100 fm.

Description of the Proposed Gear Configuration

The proposed gear configuration is a “modified Vietnamese longline” gear type (Figure 2). This configuration combines elements of pelagic longline and salmon troll gears. This gear was used in the 1990’s to target these midwater rockfish species by some of the EFP participants. This configuration is highly adjustable for deployment in the water column and is efficient for targeting midwater schools of fish without coming close to benthic substrates. Details of the proposed gear configuration are below.

Specifications

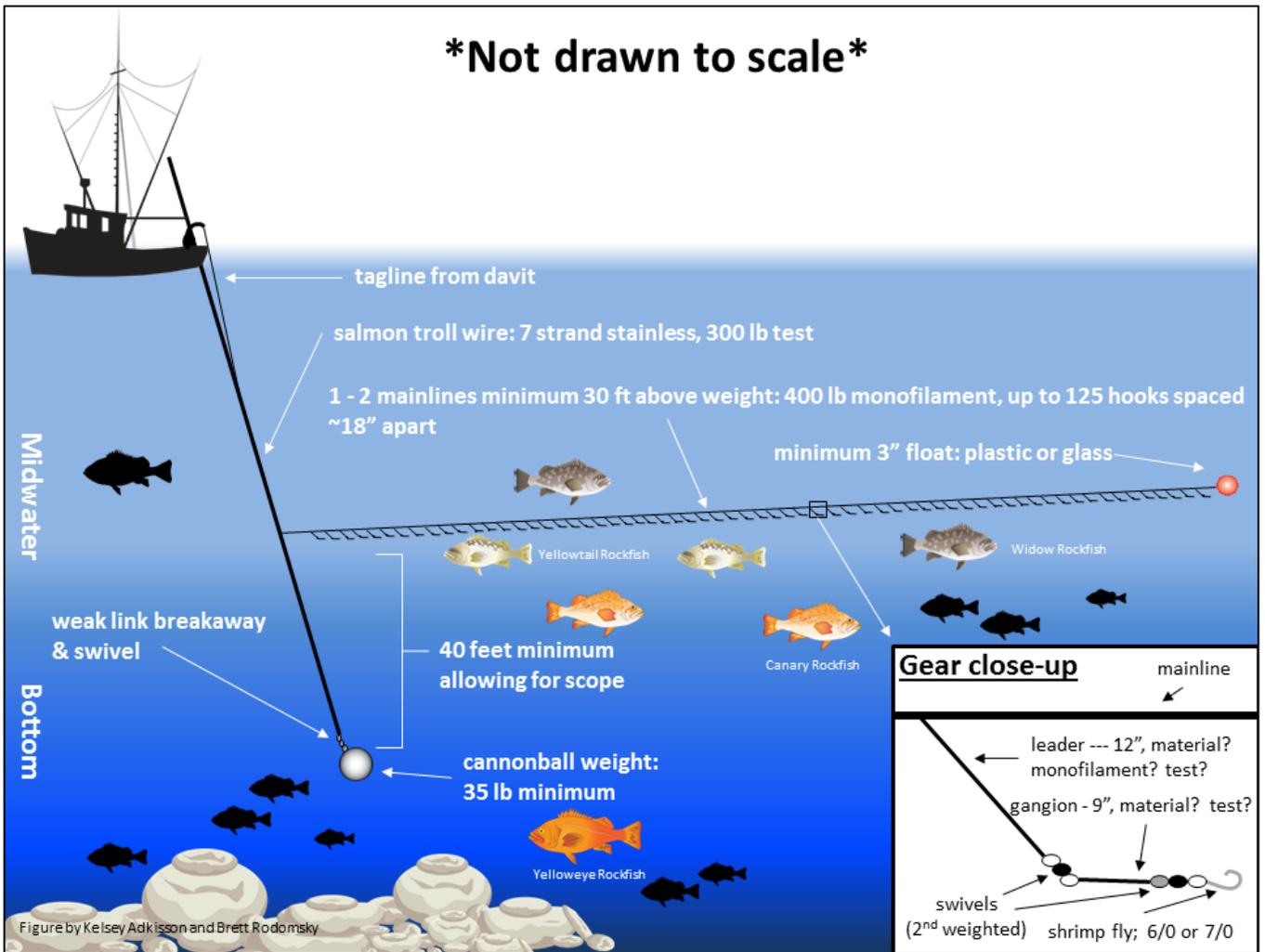
Each tack will consist of the following:

- 1) One or two steel salmon troll wires attached to the vessel’s gurdies.
- 2) Attached at the base of the troll wire, a weak line breakaway (line test to be determined).
- 3) Attached to the weak link breakaway will be a salmon troll cannonball at least 35 lbs.
- 4) Attached to the troll wire, at least 40 feet above the cannonball weight, one or two monofilament mainlines (400 lb. test). Fixing the mainline 40 feet above the cannonball allows for scope in the troll wire and is one built-in mechanism for keeping the gear at least 30 feet off the bottom.
- 5) Attached to the monofilament mainline, 25 – 125 leaders and gangions with weights, swivels, and 6/0 or 7/0 shrimp fly hooks
- 6) Attached to the terminal posterior end of each mainline is a non-compressible float a minimum of 3” in diameter, a second built-in mechanism for keeping the gear off the bottom.

Storage and Deployment

Storage and deployment of the gear configuration will be as follows:

- 1) Mainlines are coiled and stored in baskets, spooled on the boat’s gurdies, or portage reels.
- 2) Hooks can be placed on the basket rim, on the vessels “pinning rail”, or stored on the portage reels.
- 3) For deployment, the weak link and weight are attached to the non-fixed end of the troll wire. The non-compressible float at the non-fixed end of the mainline is thrown over board and the hooks peel off the pinning rail, basket rim, or portage reel.
- 4) When deployed from a moving vessel, the forward motion of the vessel, in combination with the cannonball weight forces the mainline down into the water column. The terminal float keeps the mainline straight, taught, and angled upwards at depths no deeper than the attachment height to the salmon troll wire above the breakaway providing another mechanism to keep this gear off the bottom.
- 5) The combination of the weak link breakaway and terminal float insures the gear will not get hung up on the bottom and will rise to the surface when the vessel is not in motion and loaded with fish.
- 6) If requested by the Council, a mainline can be attached below the 40 foot mark to function as a “control” for the mainline attached above 40 feet. This control line would only be attached for a limited number of tacks (1-2 per day?) to create a large enough sample size for statistical analysis while also minimizing overall yelloweye rockfish impacts.



Effort

Proposed fishing effort variables are summarized in Table 3. Effort variables were informed by EFP participants, some who fished this gear in the RCA in the 1990s. These effort variables, in combination with fish ticket and species composition data, were used to project estimated daily and annual catches from EFP fishing (see **Catch per Unit Effort, Estimated Harvest Amounts and Request EFP Quotas**).

Table 3. Proposed range of fishing effort variables for midwater rockfish EFP fishing.

Effort Variable	Range Proposed
Trip Length	1 - 3 days
Mainlines per Tack	1 - 2
Tacks per Day	10 - 15
Duration per Tack	0.5 - 1 hour
Total Time Gear Fishing per Day	6 - 12 hours
Hooks per Tack	25 - 125

Number of vessels covered under the EFP

The goal of this EFP is to cover as much of the RCA within waters off the Oregon coast as possible in search of target species and to simulate the activities of a fishery fleet. With this in mind, a total of 6 - 10 vessels from as many Oregon ports as possible will participate in this EFP. The participants plan to fish out of ports from Garibaldi in the north to Brookings in the south, covering areas of the RCA within this latitudinal extent. A total EFP fleet of 6 - 10 participating vessels balances the need to include as many vessels as possible to create a representative sample with the limitations imposed by resources necessary to cover the data collection and analysis efforts necessary for this EFP.

Species to be harvested (target and incidental)

The main fish species likely to be impacted by fishing under this EFP are listed in Table 4. The target midwater rockfish species include yellowtail, widow, and canary rockfish. Additionally, various species will be incidentally caught. These species have been identified through fish ticket and species composition data collected from landings from this gear type in the 1990s. Most notable, minimal amounts of yelloweye rockfish will likely be

Table 4. Target and incidental species likely to be impacted by EFP fishing listed below. Species were identified from fish ticket and species composition data collected from fishing with this gear type in the 1990s.

Species	Target or Incidental?	Overfished? Y/N	Depth Range (fm)
Yellowtail Rockfish <i>Sebastes flavidus</i>	Target	N	0 - 300
Widow Rockfish <i>S. entomales</i>	Target	N	0 - 300
Canary Rockfish <i>S. pinniger</i>	Target	N	0 - 232
Yelloweye Rockfish <i>S. ruberrimus</i>	Incidental	Y	8 - 300
Bocaccio <i>S. paucispinis</i>	Incidental	N	0 - 205
Splitnose Rockfish <i>S. diploproa</i>	Incidental	N	0 - 437
Redstripe Rockfish <i>S. proriger</i>	Incidental	N	7 - 232
Silvergray Rockfish <i>S. brevispinis</i>	Incidental	N	0 - 205
Shortbelly Rockfish <i>S. jordani</i>	Incidental	N	0 - 191
Redbanded Rockfish <i>S. babcocki</i>	Incidental	N	50 - 234
Yellowmouth Rockfish <i>S. reedi</i>	Incidental	N	75 - 200
Blue Rockfish <i>S. mystinus</i>	Incidental	N	0 - 300
Lingcod <i>Ophiodon elongatus</i>	Incidental	N	0 - 230
Chinook Salmon <i>Oncorhynchus tshawytscha</i>	Incidental	N	0 - 70
Coho Salmon <i>Oncorhynchus kisutch</i>	Incidental	N	0 - 70

caught while fishing under this EFP. Observers will census all fish caught during each trip resulting in 100 percent accounting per species (or as close to this as feasible) for all species impacted by this gear configuration.

Species Descriptions

For descriptions of the groundfish species to be targeted and caught during fishing under this EFP proposal, their life histories, and geographical ranges see part 2 of appendix B from the Pacific Coast Groundfish Fishery Management Plan here:

http://www.pcouncil.org/wp-content/uploads/GF_FMP_App_B2.pdf

For recent information on abundance and harvest specifications for the groundfish species that will likely be impacted by fishing under this EFP, see Chapter 2 of Harvest Specifications and Management Measures for 2015-16 Final Environmental Impact Statement here:

<http://www.westcoast.fisheries.noaa.gov/publications/nepa/groundfish/1516spexfeis.pdf>

Catch per Unit Effort, Estimated Harvest Amounts and Request EFP Quotas

Projected catch per unit effort per species (with standard deviations) was estimated on a daily basis for three catch scenarios: 453.6 kg (1,000 lbs), 680.4 kg (1,500 lbs), and 907.2 kg (2,000 lbs) per day (Table 5). This range of daily catch estimates was derived from the catch levels attained by EFP participants fishing this gear in the 1990’s (Gary Smith & Jeff Cox; pers. comm.). Estimates of catch composition were derived from fish ticket data from 145 landings from this gear type from EFP participants in 1995 - 2000. For market categories consisting of catch not identified to the species level on fish tickets, six species composition samples collected from this gear type in 1994 – 95 were applied to undifferentiated fish ticket market categories to arrive at species specific catch estimates. It should be noted that fishers were targeting yelloweye rockfish in the 1990s because there were no regulator or market reasons for avoiding this species (Gary Smith & Jeff Cox; pers. comm.). Therefore, landings on fish tickets from this time period reflect total catch, and the percentage of yelloweye rockfish caught under this EFP will likely be lower because fishers will be actively working to avoid yelloweye rockfish catch.

Table 5: Projected mean species composition (\pm 1 standard error) of catch based on effort from one day and three daily total catch scenarios: 1,000, 1,500, and 2,000 lbs per day (converted to kg). Projections were estimated from fish tickets from 145 landings from this gear type from 1995 – 2000 and 6 species composition samples collected from this gear type from 1994 – 95. Potential estimated daily catch scenarios provided by fishers with experience in this fishery with this gear type.

Projected Total Catch Scenario	Catch per Day (kg)		
	453.6	680.4	907.2
Species Composition			
Yellowtail Rockfish	148.1 (11.0)	222.1 (16.6)	296.2 (22.1)
Widow Rockfish	70.7 (7.3)	106.1 (11.0)	141.5 (14.6)
Canary Rockfish	125.7 (8.8)	188.5 (13.3)	251.3 (17.7)
Yelloweye Rockfish	4.2 (0.5)	6.4 (0.7)	8.5 (1.0)
Bocaccio	23.2 (2.7)	34.8 (4.1)	46.4 (5.4)
Yellowmouth Rockfish	5.4 (0.6)	8.0 (0.9)	10.7 (1.3)
Silvergray Rockfish	2.1 (0.2)	3.1 (0.4)	4.2 (0.5)
Redbanded Rockfish	2.1 (0.2)	3.1 (0.4)	4.2 (0.5)
Redstripe Rockfish	0.3 (0.1)	0.4 (0.1)	0.5 (0.1)
all other species	71.9 (4.4)	107.8 (6.6)	143.8 (8.7)

For estimates of annual harvest amounts per species under this EFP see table 6. Estimated catch was projected based on 3 possible scenarios: 30 fishing days, 60 days, and 120 days per year. Additionally, projections of catch were made for 3 possible daily catch averages: 453.6 kg (1000 lbs), 680.4 kg (1,500 lbs), and 907.2 kg (2,000 lbs).

Table 6. Estimates of annual harvest based on allocation of 3 different proposals for fishing days and 3 different average daily catches derived from table 4. In addition, requested quotas for EFP are presented based on the number of fishing days allowed.

		Catch per Day Scenario (kg)			
		454	680	907	
Proposed Fishing Days	Species	Projected Catch (kg)			Requested Quota for EFP (kg)
30	Total Catch	13,608	20,412	27,216	27,216
	Yellowtail Rockfish	4,443	6,665	8,886	8,886
	Widow Rockfish	2,123	3,185	4,245	4,245
	Canary Rockfish	3,770	5,655	7,539	7,539
	Yelloweye Rockfish	128	192	255	255
	Bocaccio	696	1,044	1,392	1,392
	Yellowmouth Rockfish	161	242	321	321
	Silvergray Rockfish	63	95	126	126
	Redbanded Rockfish	63	95	126	126
	Redstripe Rockfish	8	12	15	15
all other species	2,157	3,238	4,314	4,314	
60	Total Catch	27,216	40,823	54,431	54,431
	Yellowtail Rockfish	8,886	13,326	17,772	17,772
	Widow Rockfish	4,242	6,366	8,490	8,490
	Canary Rockfish	7,542	11,310	15,078	15,078
	Yelloweye Rockfish	252	384	510	510
	Bocaccio	1,392	2,088	2,784	2,784
	Yellowmouth Rockfish	324	480	642	642
	Silvergray Rockfish	126	186	252	252
	Redbanded Rockfish	126	186	252	252
	Redstripe Rockfish	18	24	30	30
all other species	4,314	6,468	8,628	8,628	
120	Total Catch	54,432	81,648	108,864	108,864
	Yellowtail Rockfish	17,772	26,652	35,544	35,544
	Widow Rockfish	8,484	12,732	16,980	16,980
	Canary Rockfish	15,084	22,620	30,156	30,156
	Yelloweye Rockfish	504	768	1,020	1,020
	Bocaccio	2,784	4,176	5,568	5,568
	Yellowmouth Rockfish	648	960	1,284	1,284
	Silvergray Rockfish	252	372	504	504
	Redbanded Rockfish	252	372	504	504
	Redstripe Rockfish	36	48	60	60
all other species	8,628	12,936	17,256	17,256	

Catch Accounting and Compliance

Precautionary Measures

A number of measures were considered and will be implemented for fishing under this EFP to insure accurate and precise catch estimates for all species impacted under EFP activities. In addition, these measures will facilitate safety and enforcement during EFP fishing. The proposed precautionary measures are:

- 1) **Observers:** Each trip will have an observer aboard who will sample all tacks resulting in 100 percent observer coverage for fishing activities covered under this EFP. A discussion is underway regarding resources to cover the cost of observing for the EFP.
- 2) **Harvest Caps:** Based on feedback from the Council and National Marine Fisheries Service (NMFS), each vessel will have either a daily harvest cap or a trip harvest cap for target species and yelloweye rockfish. If caps are attained based on catch accounting enumerated by the observer, fishing for the day or trip will cease.
- 3) **Catch Accounting and Trip Reports:** On a timeline specified by NMFS and ODFW, cumulative catch and trip reports will be provided after each trip (e.g. within 24 - 48 hours of the landing).
- 4) **Status and Evaluation Call before Each Trip:** Prior to each trip, participants will call ODFW to check that enough impacts remain under the EFP quotas for all species to allow for the planned trip. The call will also insure each vessel has the necessary observer coverage for the trip.
- 5) **Vessel Monitoring System (VMS) and Vessel Marking:** Prior to each trip, vessels will call the West Coast Groundfish Declaration Line to report the vessels intent. Each vessel will also display a banner reading "EFP Fishing" in 2 foot high letters.
- 6) **Yelloweye Rockfish Released with Descending Devices:** When yelloweye rockfish are released, these fish will be returned to depth using a descending device to increase chances of survival.

Data Collection and Analysis Methodology

Data Collection

The following data will be collected by observers for all fishing under this EFP:

Gear Configuration Data

- Mainline Material and Length
- Type, Size and Number of Hooks
- Distance between Hooks
- Weight Size
- Float Size
- Breakaway Line Material and Length
- * Depth recorders can be attached if desired

Set and Haul Data

- Start and End Tack GPS coordinates
- Start and End Tack Times
- Start and End Bottom Depth

Catch Data

- Tally Census of all Fish (and other organisms) Caught
- Species Identification of all Fish Caught
- Disposition of Landed and Discarded Fish
- Position of Each Fish Caught on Mainline (i.e. hook #)

Biological Data

- Subsample Fish Lengths and Weights per Tack (~20)
- Subsample Otoliths per Tack (3 - 5)
- Other Biological Samples (e.g. maturity, DNA, etc.)

Data Analysis

All data collected by observers during EFP fishing will be tabulated, summarized and analyzed by ODFW staff. To keep EFP impacts within allocated quotas, data from each trip for target, incidental, and protected species, such as yelloweye rockfish, will be tabulated within 48 hours of each landing, prior to any additional trips, to insure enough fish for each species is available.

In addition, ODFW staff will work towards various summaries, analyses, and projections to characterize effort, impacts, and statistical conclusions from data collected from the proposed gear configuration. Specifically, total catch under this EFP will be summarized. Additionally, summaries of gear configuration and biological data collected will be summarized and evaluated. Projections will be made to expand this data set to reflect possible impacts for a potential full-blown commercial hook and line fishery. If the Council chooses to allow the implementation of a control mainline attached below the 40 foot mark, statistical tests for significant differences (parametric or non-parametric) will be analyzed to identify whether the proposed configuration is effective in avoiding yelloweye rockfish catch when compared to catch from control mainlines.

Participation

Choosing Participants

Participants will be chosen for this EFP based on:

- 1) Ability to accommodate an observer (enough room in the life raft, current coast guard decal, a bunk for observers on multiple day trips, etc.).
- 2) Ability to fish the proposed gear type
- 3) An activated VMS onboard
- 4) Expressed interest in participating
- 5) Past experience fishing this gear configuration
- 6) No fishing violations in the last 3 – 5 years

Planned EFP Fishing by Participants

Fishing under this EFP will take place throughout the year in locations with habitat and populations of target species. Specific days for fishing will be left to the discretion of individual participants as long EFP quota remains. Because of the need for favorable weather conditions, markets, coordination with observers among other variables, the intent for fishing under this EFP is to allow participants flexibility in determining fishing trip timing and locations as long as all requirements for the permit are met.

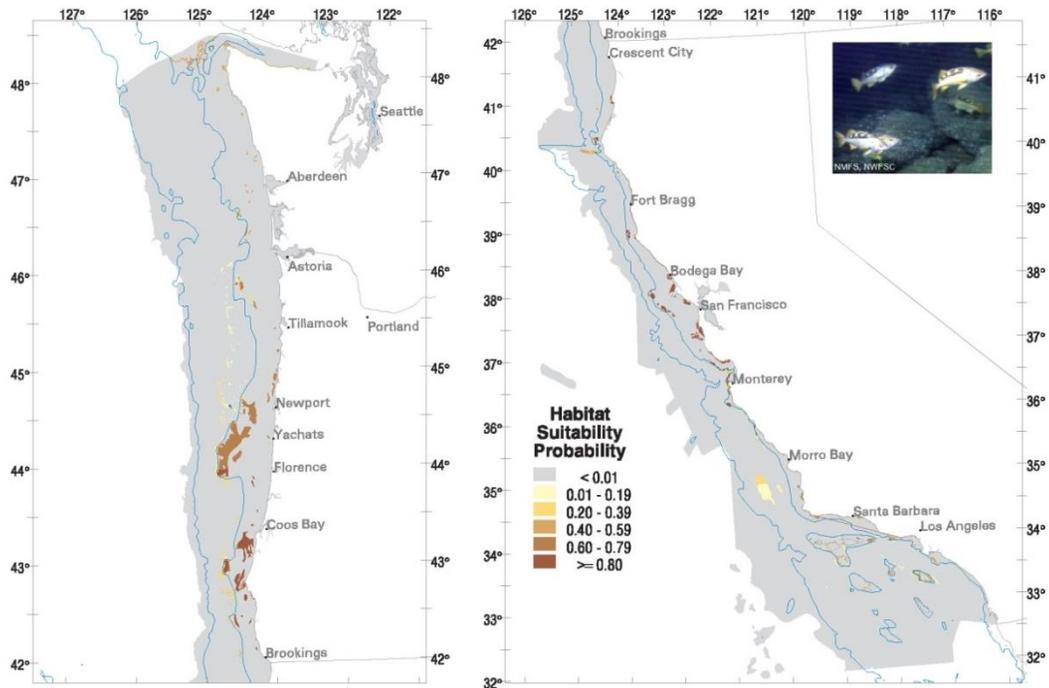
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Scott Cook

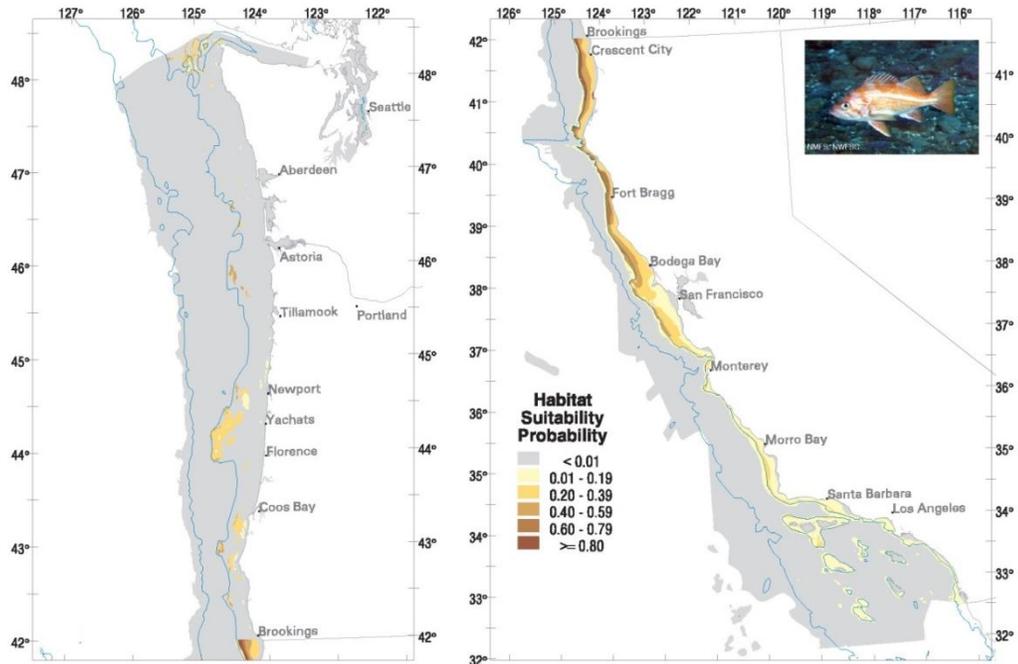
Appendix A: Habitat suitability maps for species potentially impacted by this EFP proposal.

Yellowtail Rockfish - Adult



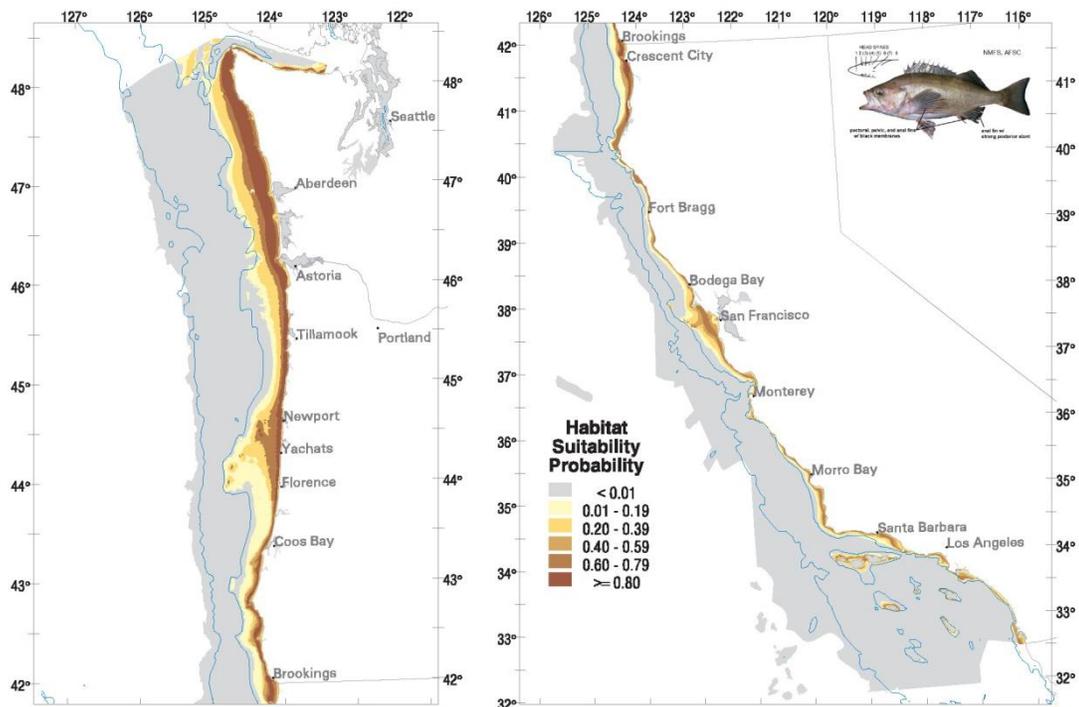
Habitat Suitability Probability data output from MRAG/University of Reading EFH model. Cartography by Sound GIS, map date: November 01, 2005
 Species/habitat association for benthic substrate derived from NMFS Habitat Use Database (HUD). Depth and latitude association derived from: HUD
 Groundfish FMP Appendix B.4

Canary Rockfish - Adult



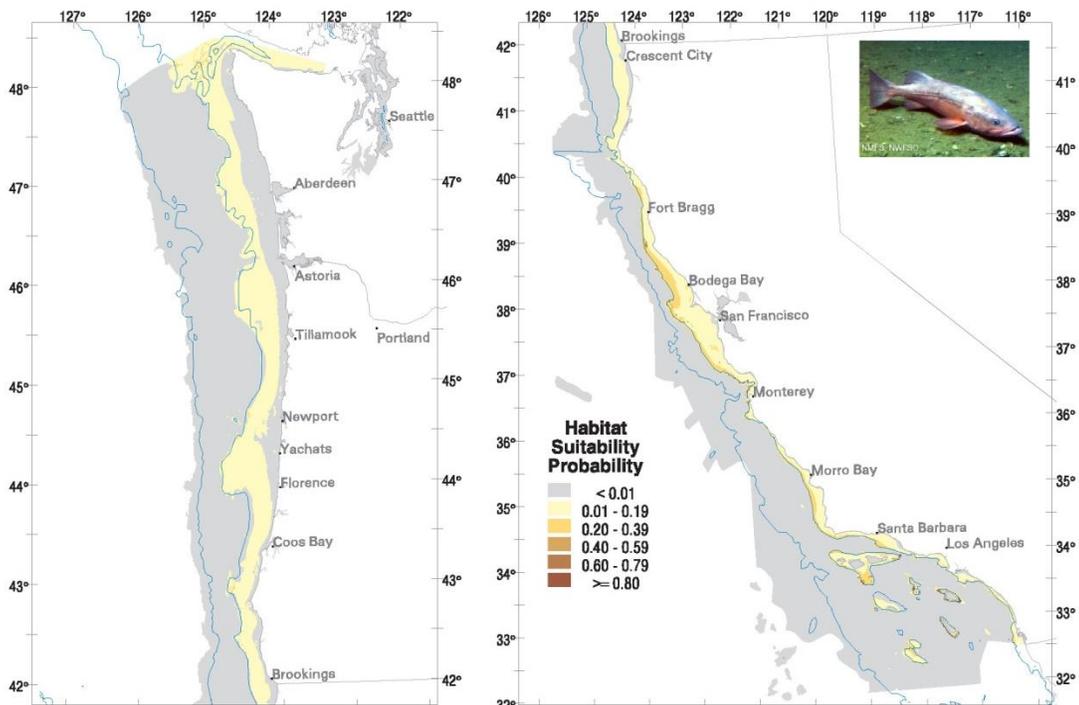
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 Species/habitat association for benthic substrate derived from NMFS Habitat Use Database (HUD). Depth and latitude association derived from: Survey+
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Widow Rockfish - Juvenile



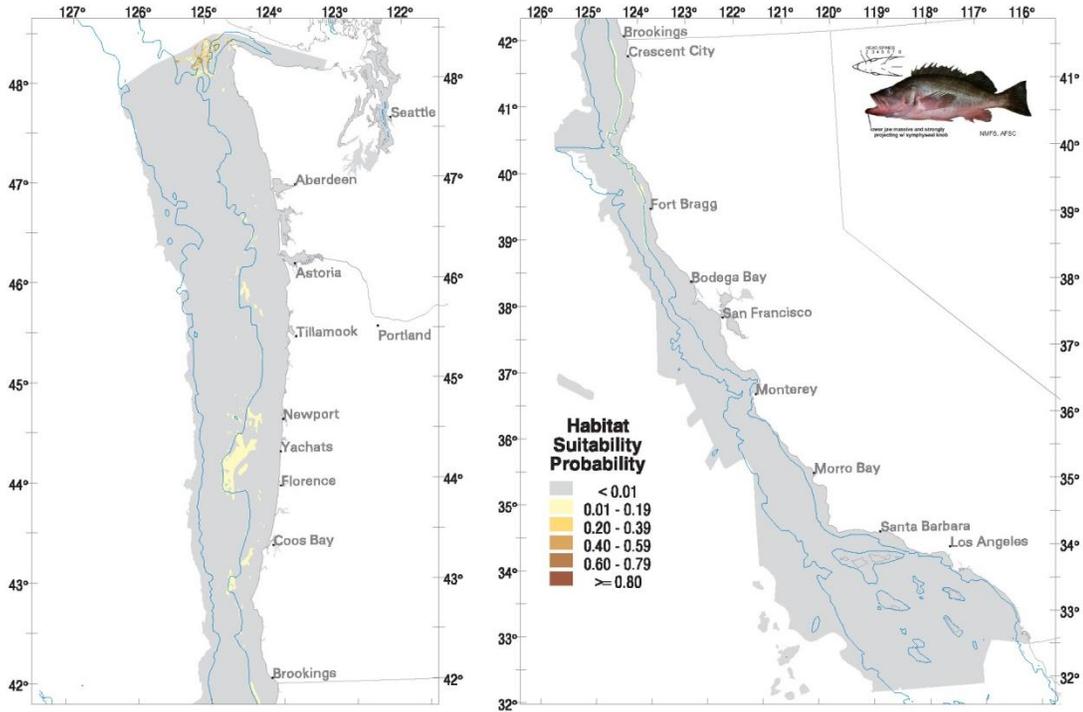
Habitat Suitability Probability data output from MRAG/University of Reading EFH model. Cartography by Sound GIS, map date: November 01, 2005
 Species/habitat association for benthic substrate derived from NMFS Habitat Use Database (HUD). Depth and latitude association derived from: HUD
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Bocaccio - Adult



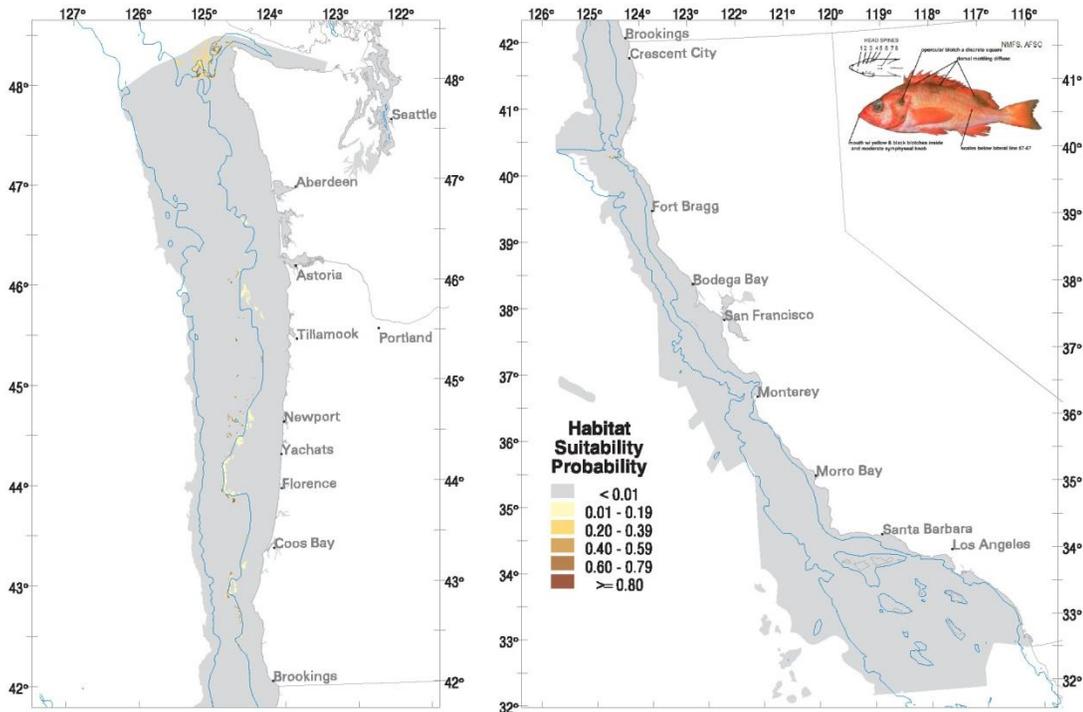
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 Species/habitat association for benthic substrate derived from NMFS Habitat Use Database (HUD). Depth and latitude association derived from: Survey+
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Silvergray Rockfish - Adult



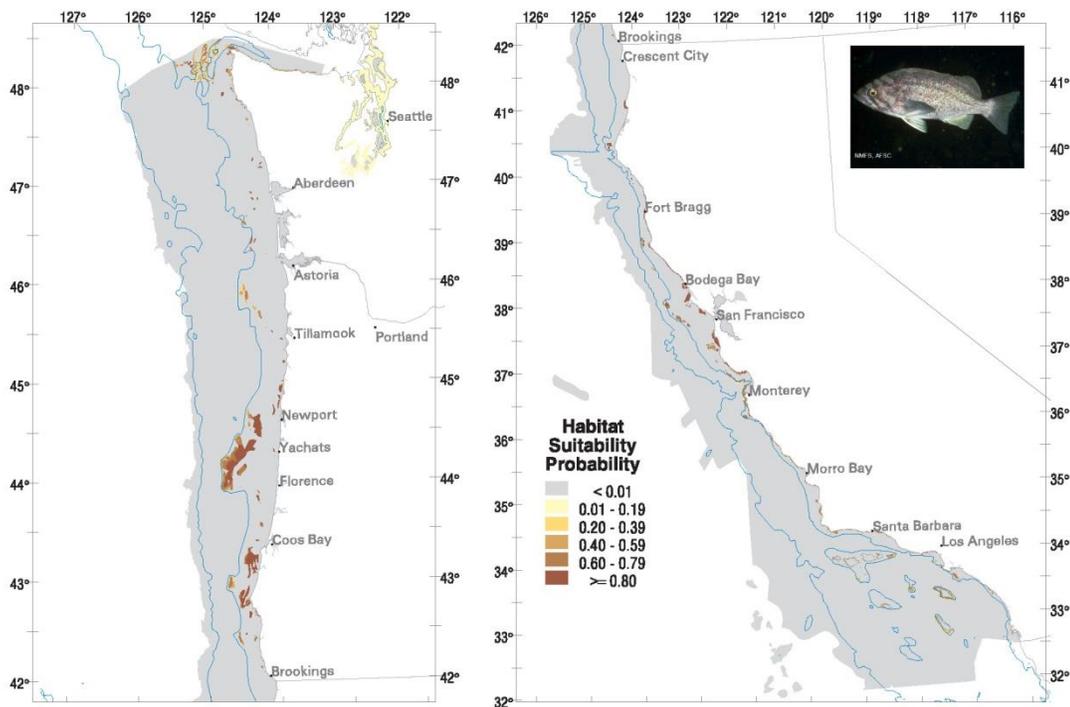
Habitat Suitability Probability data output from MRAG/University of Reading EFH model. Cartography by Sound GIS, map date: October 16, 2005
 Species/habitat association for benthic substrate derived from NMFS Habitat Use Database (HUD). Depth and latitude association derived from: Survey
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Yellowmouth Rockfish - Adult



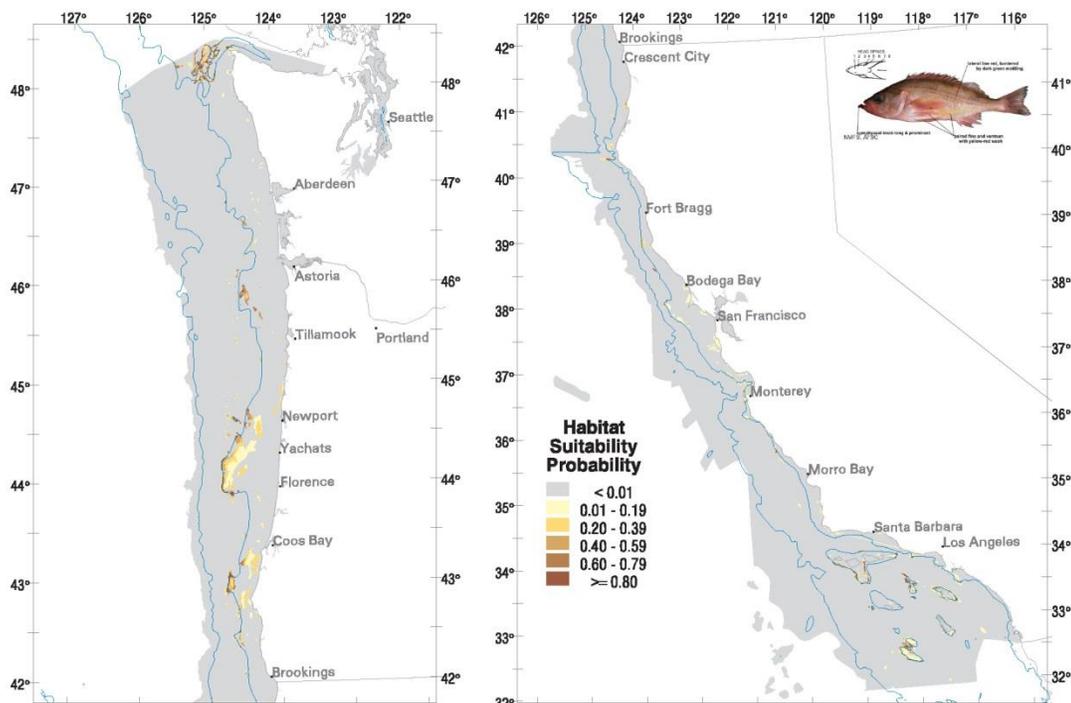
Habitat Suitability Probability data output from MRAG/University of Reading EFH model. Cartography by Sound GIS, map date: November 01, 2005
 Species/habitat association for benthic substrate derived from NMFS Habitat Use Database (HUD). Depth and latitude association derived from: HUD
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Blue Rockfish - Adult



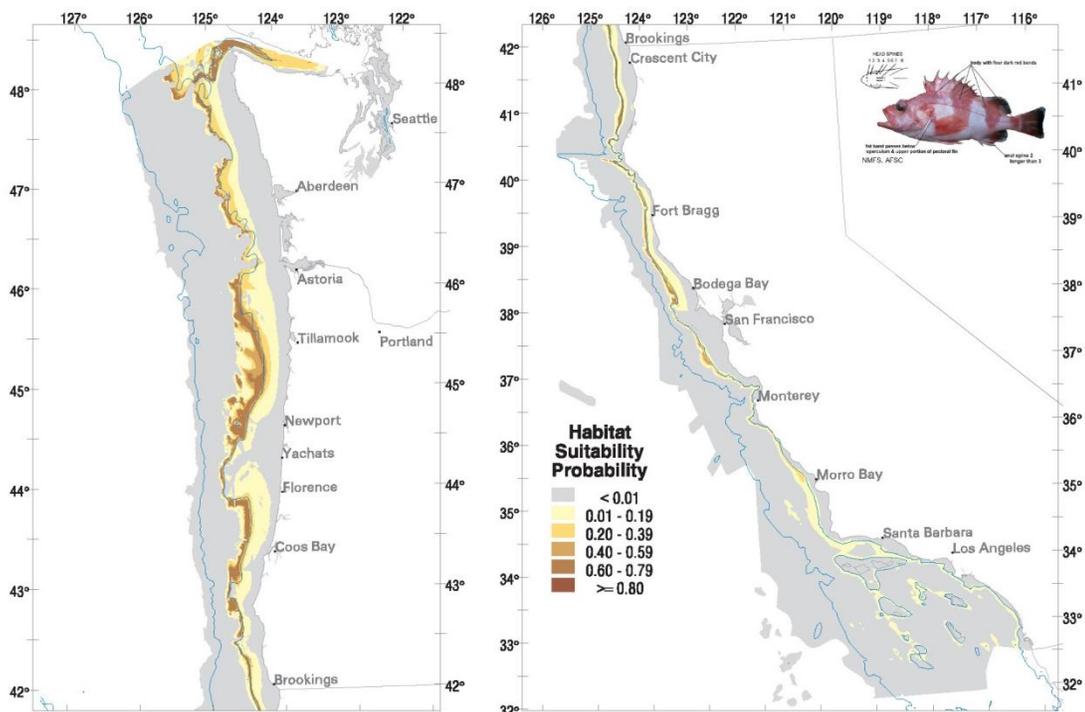
Habitat Suitability Probability data output from MRAG/University of Reading EFH model. Cartography by Sound GIS, map date: October 16, 2005
 Species/habitat association for benthic substrate derived from NMFS Habitat Use Database (HUD). Depth and latitude association derived from: HUD
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Redstripe Rockfish - Adult



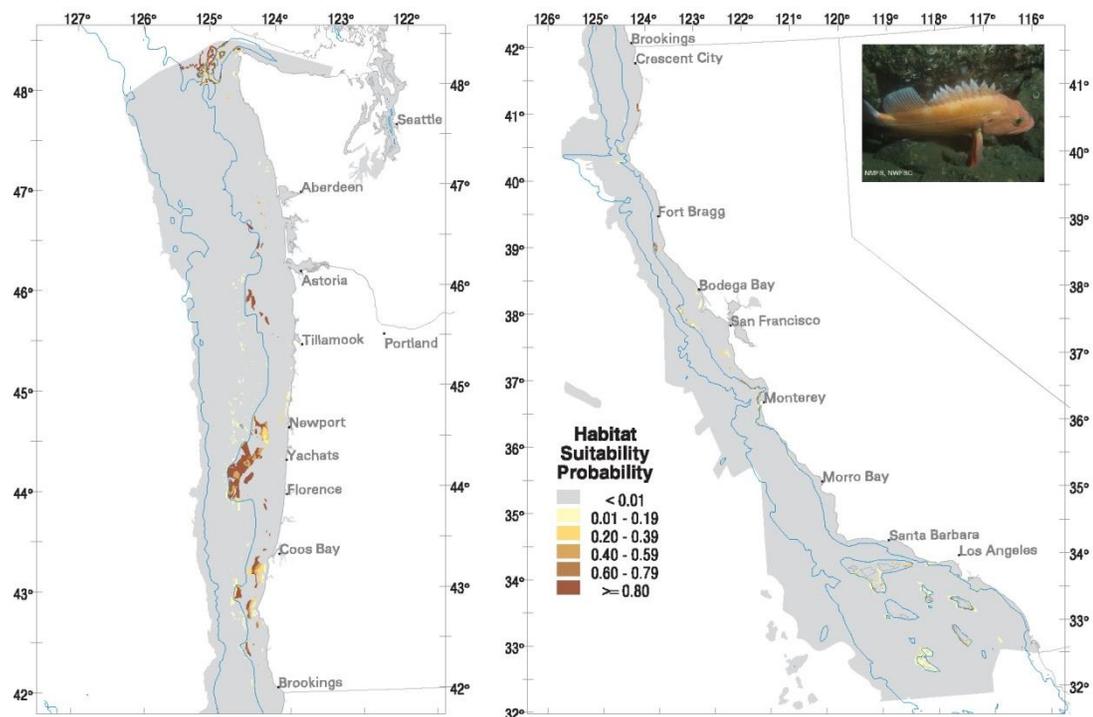
Habitat Suitability Probability data output from MRAG/University of Reading EFH model. Cartography by Sound GIS, map date: October 16, 2005
 Species/habitat association for benthic substrate derived from NMFS Habitat Use Database (HUD). Depth and latitude association derived from: HUD
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Redbanded Rockfish - Adult



Habitat Suitability Probability data output from MRAG/University of Reading EFH model. Cartography by Sound GIS, map date: October 16, 2005
 Species/habitat association for benthic substrate derived from NMFS Habitat Use Database (HUD). Depth and latitude association derived from: Survey
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Yelloweye Rockfish - Adult



Habitat Suitability Probability data output from MRAG/University of Reading EFH model. Cartography by Sound GIS, map date: November 01, 2005
 Species/habitat association for benthic substrate derived from NMFS Habitat Use Database (HUD). Depth and latitude association derived from: HUD
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