Groundfish EFP Proposal:
Yellowtail Rockfish Jig Fishing off California

Date of Application:

Applicants	Mailing address	Telephone #	Email
Community Fishing Association			
GAP member **PFMC**			
NMFS Technical Advisor	Mailing address	Telephone #	Email
Fisheries Biologist NMFS West Coast Region			

Changes from Previous EFP

This EFP application is substantially identical to that submitted for 2019-2020. The following are the changes made to the 2021-2022 EFP submitted in November 2019 and reviewed by the Council at its March 2020 meeting.

1. Updated the description under the Location of Fishing under this EFP (page 4) to reflect the correct area: 40º 10’ N. lat ’ to 34º 27’ N. lat.
2. Updated the set aside requests in Table 1 (page 11):
    a. Removed the set asides for the north of 40º 10’ N. lat stocks/stock complexes:
        i. Yellowtail Rockfish *Sebastes flavidus* N. of 40.10°: 10 mt
        ii. Minor Slope N of 40.10°: 1 mt
        iii. Minor Shelf N of 40.10°: 3 mt
    b. For lingcod N and S of 40.10°, removed the reference to north but left set-aside request unchanged.
    c. Changed black rockfish south of 46° 16’ N lat to black rockfish (CA).
    d. Changed the designations for bocaccio, canary, cowcod, and darkblotched rockfish from overfished to not overfished.
    e. Increased the set-aside request for cowcod from 0.015 mt to 0.5 mt.

Purpose and Goals

Purpose

To continue the EFP started in 2013-2014 for two more years (2021-2022). We are applying for this extension as the Council needs more information before putting this fishery into regulation.

This EFP would allow the commercial use of mid-water jig gear within the RCA in areas off California.
The recommendations on the jig gear included:

- extension of the southern boundary of the EFP area to Point Conception,
- the addition of three vessels to the original request,
- observer coverage on 30 percent of the trips combined with fishermen collecting and arranging for analysis of data on the other 70 percent of the trips.
- The set-asides for the commercial jig fishery were increased over previous years to accommodate the additional area and vessels for a total of 30 mt for chilipepper and 10 mt for bocaccio.
- Set-asides for other species were also recommended, as reflected in the commercial jig fish EFP.

West Coast fisheries have been increasingly restricted in state and federal waters over the last decade to reduce impacts from fishing. Yet, demand remains for fresh, local seafood. To harvest healthy and abundant fish stocks with less impact, conservation engineering and gear experimentation is needed. The purpose of this EFP is to test the potential for a new commercial jig gear configuration to harvest currently underutilized rockfish species (yellowtail) while avoiding overfished stocks to enhance optimum yield in the mixed stock West Coast groundfish fishery.

Goals

This EFP seeks to fulfill and comply with national mandates and goals of the Magnuson-Stevens Act (MSA) for fisheries, fisheries resources, and fishing communities by addressing specific conservation and management issues in the mixed stock groundfish fishery off of California.

1. Consistent with MSA National Standard 1 (optimum yield) and National Standard 9 (minimize bycatch), harvest abundant stocks while minimizing bycatch and providing for rebuilding of overfished stocks.
2. Consistent with the purpose of MSA to conserve and manage U.S. fishery resources to realize their full potential (i.e., by providing employment, food, and revenue to the nation) and consistent with MSA National Standard 8 (fishing communities), seek to develop and utilize gear technology that contributes to sustained participation of fishing communities while also preventing overfishing and ensuring rebuilding of overfished stocks.
3. Provide additional opportunity in the groundfish fishery off California that has been greatly constrained since rockfish conservation areas (RCAs) and lowered quotas were implemented to rebuild overfished species.
4. 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), and 2) providing enough harvest of abundant rockfish species to support, or at least contribute to, a commercial fishery off the West Coast in the long-term.

Disposition of Catch

Target species (yellowtail rockfish) and legal incidental catch, such as chilipepper rockfish, will be retained for sale. Fish not authorized for sale would be released alive if possible. If desired, incidental catch of certain species (e.g., canary and yelloweye) that cannot be released alive could be retained by the observer and provided to NMFS, CDFG, or other researchers.

Justification

The fishing grounds which have been historically accessible to portfolio fishermen in California's coastal communities are geographically identified as "shelf", and because of this, the gear used by these fishermen isn't useful for catching fish on the "slope" (depths greater than 100 fathoms-see Figure 5). The creation of the non-trawl rockfish conservation area (RCA) over the shelf (between 30 and 150 fathoms) has pushed fishermen outside their historical fishing grounds into deeper waters where fishing is no longer feasible with their current gear (see Appendix E).

In order to protect and rebuild overfished yelloweye and canary rockfish off California, depth and area closures were implemented off of California. Unfortunately, these closures have also prevented harvest of more abundant yellowtail rockfish that live higher in the water column. Combined with lower quotas, these measures caused many fishermen in California's coastal communities to switch fisheries and/or supplement their incomes in non-fishery jobs because they could no longer harvest the abundant groundfish stocks. If a gear could be developed capable of harvesting the more abundant mid-water species while avoiding catch of the overfished bottom dwellers, then the optimum yield of the fishery could be enhanced. There are currently no conservation concerns with yellowtail rockfish which is an under-utilized species.

In 2009, the Oregon Recreational Yellowtail Rockfish EFP, approved by the Council, was permitted to the Southern Oregon Sport Fishermen and Recreational Fishing Alliance (Oregon Chapter) for fishing in 2010 and 2011. Although not identical, this OR EFP is based on the same concept (i.e., placing hooks near the target species in mid-water and away from non-targets on the bottom). Therefore, it offers interesting insights of some relevance to this EFP application, particularly its catch composition and success at avoiding the non-target species. Under this EFP, 29 trips were made with an average of 11 anglers and 33 hooks per vessel (3 per line) were deployed on average. Reported catch of 4.3 mt (as of Aug. 1, 2011) was composed of roughly 62% Yellowtail, 23% Widow, 12% Canary and 3% other rockfish and 4kg of Yelloweye (2 fish) (see Appendix B). This catch is well below the 1 mt of Canary and 100 kg Yelloweye authorized for year two alone.

A similar design has been tested under this EFP with some modifications for use in a commercial fishery (e.g., number of hooks, size of weight) with great success. An EFP is necessary to test this gear because it is not currently authorized under the Groundfish FMP regulations and because continued experimental fishing conducted under this EFP renewal is proposed for areas that are currently closed to fishing. If the proposed modified vertical hook and line fishing technique continues to prove successful, this exempted fishing permit (EFP) would allow commercial fishermen to access historical fishing grounds targeting healthy rockfish stocks and would promote ecologically and economically sustainable fisheries in Central and Northern California.

Broader Significance

The long-term goal, if experiments prove successful, is to allow commercial jig fishing with this gear off the entire West Coast, including in the RCAs, by the Open Access and Limited Entry participants. If successful, this gear could also be used by the Nearshore fleet to avoid species of concern and could create a fishery that would fill out the portfolios of those who make up the bulk of the fishermen in the West Coast's coastal communities. The recreational fleet might also benefit from using a similar gear with fewer hooks, similar to the Oregon Yellowtail EFP previously mentioned. Thus, the benefits of this EFP would extend beyond the initial EFP participants.

Despite the generally depressed condition of many west coast groundfish stocks, there are some stocks that remain healthy. These healthier stocks could safely sustain increased harvest levels if they could be fished more cleanly and without bycatch of more depleted stocks. If stronger stocks could be targeted without increasing fishing mortality on depressed stocks, the West Coast commercial fishing fleet would have alternative fishing opportunities that would provide some economic relief to the industry while providing the public with highly desirable sustainably harvested local seafood.

Details

In determining the proposed specifications for this experiment, several factors have been considered.

- **Creating a statistically valid sample size** – allowing for a sufficient number of hooks, lines, days, vessels, and locations that can provide valid conclusions as to the success of this gear at avoiding overfished non-target species and harvesting the target yellowtail in sufficient quantity to allow for potential expansion of this gear to support future commercial fishing.
- **Feasibility and efficiency** – whether participants can at least cover the costs involved to perform these experiments (including observer costs, fuel, gear, and bait), even if no profit is made under the EFP.
- **Safety-at-sea** – ensuring participants can fish on days with safe weather conditions.
- **Precaution and minimizing risk** – Knowing that overfished rockfish could be encountered and because at least some of the fishing would take place in the RCA, several precautionary measures have been proposed.

With consideration of these factors, applicants are open to discussing modifications to this proposal with the GMT and GAP (e.g., # hooks, depth range, etc.).

Total Duration of the EFP

This EFP proposal is for a total of 2 years (2021-2022)

Location of Fishing under the EFP

The fishing will occur from 40º 10’ N. lat ’ to 34º 27’ N. lat., between 35 and 150 fathoms. Fishing will take place deeper than 35 fms to avoid hydrocorals (primarily *Stylaster spp.*) found mainly shallower than 30 fathoms. Locations for the EFP fishing have been chosen based on known yellowtail habitat, rather than lines of latitude or fathom lines and it is known that there is appropriate yellow-tail habitat in this area, i.e., high relief rocky reef deeper than 30 fathoms (see Appendix D).

Yellowtail rockfish is the target in this experiment because they are underutilized and because they are a mid-water species, whereas the overfished rockfish species of greatest concern tend to be more bottom associated. (i.e., canary and yelloweye). The hooks would be located only in the mid-water column based on the hypothesis that this will be in the range of yellowtail but out of range for canary and yelloweye rockfish, making it less likely that they would encounter the hooks.

Even though fishing under this EFP has occurred within the RCAs and it was a sensitive and delicate experiment, the past four years of 100% observer coverage and daily limits has shown there is little impact (see section on **Precautionary Measures**). Unfortunately, it is thought that yellowtail rock fish live primarily inside the RCAs and it would be useful to verify this assertion by reviewing fish ticket information from years prior to implementation of the RCAs. Recently, the Superintendent of the Cordell Bank National Marine Sanctuary reports seeing very large numbers (“clouds”) of

yellowtail rockfish on the “high spots” while in a submersible and saw no adult yelloweye and very few canary rockfish in this same area.

If the project proves successful in avoiding stocks of concern, then fishermen in other West Coast harbors may want to explore other appropriate habitat in their area. Much of the area proposed for this EFP is within the boundaries of the Gulf of the Farallones and Cordell Bank National Marine Sanctuaries. These sanctuaries are in support of this experiment. It has been 10 years since any fishing has taken place in this area, and the Sanctuaries’ superintendents are very interested in learning the results of this experiment.

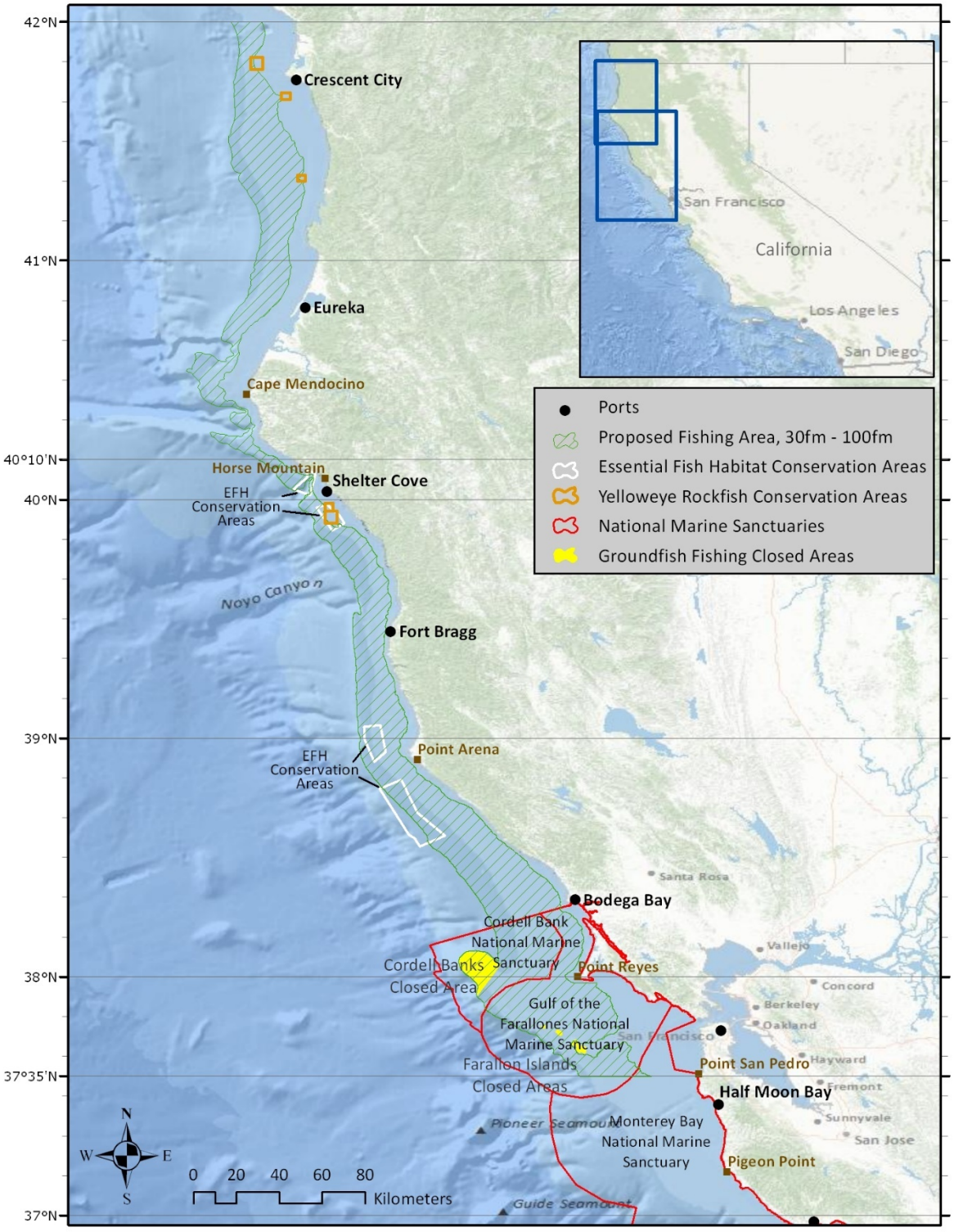


Figure 1. Chart of proposed EFP fishing area – Pigeon Point, CA, to CA/OR border.

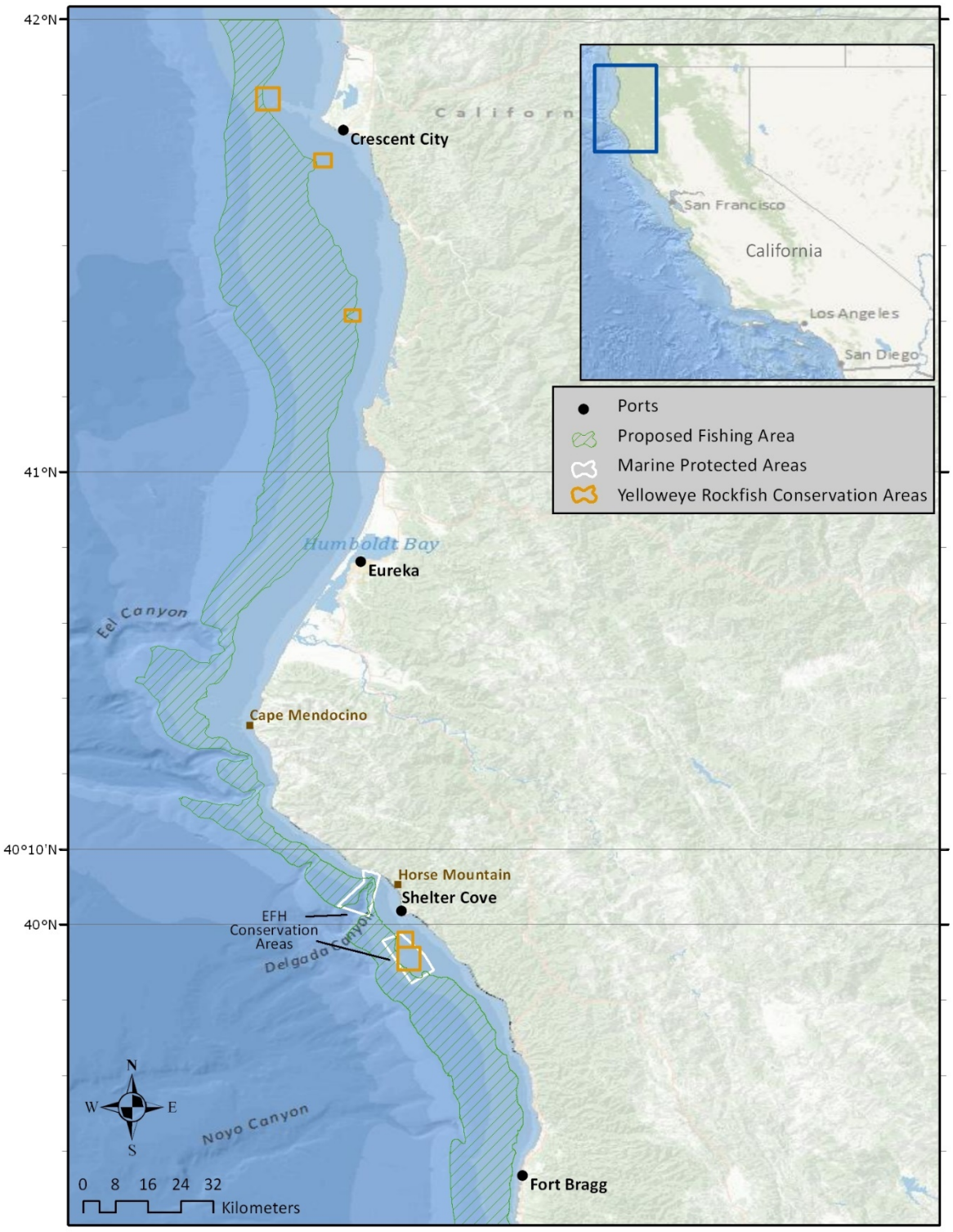


Figure 2. Chart of proposed EFP fishing area – Ft. Bragg, CA, to CA/OR border.

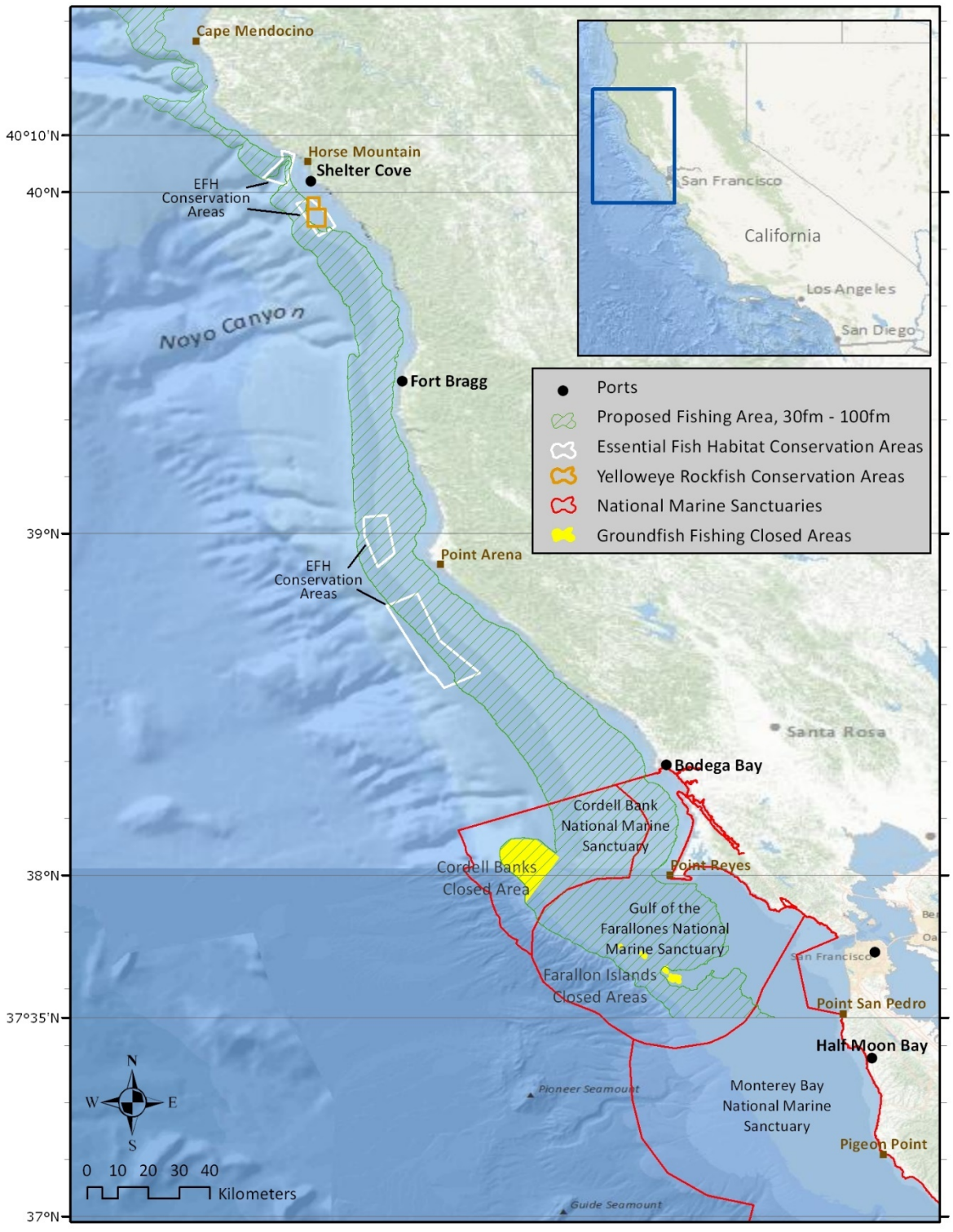


Figure 3: Chart of proposed EFP fishing area – Pigeon Point, CA, to Cape Mendocino, CA.

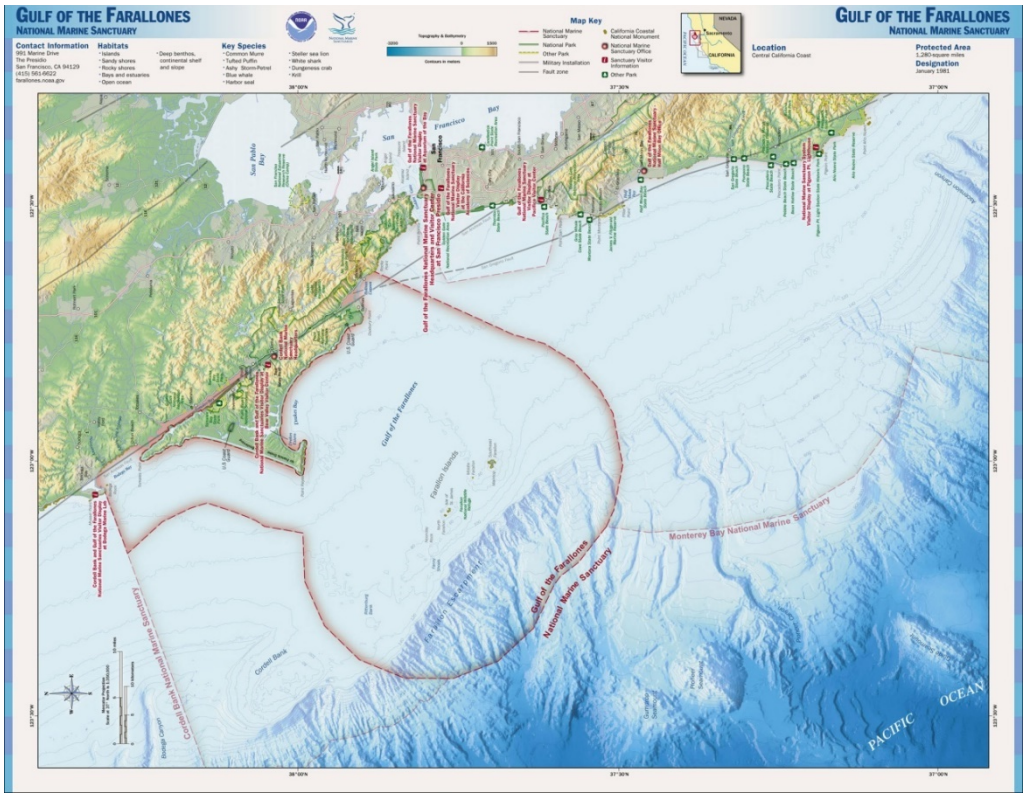


Figure 4: Detailed Chart of the Southern end of proposed fishing area

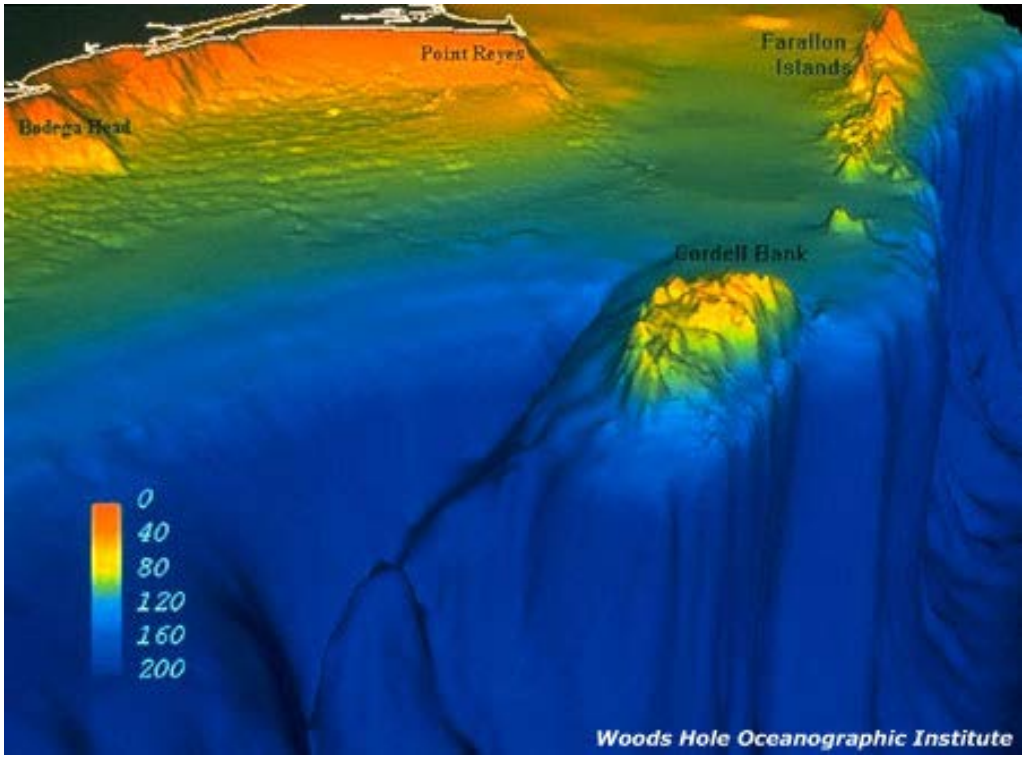


Figure 5: Depth of proposed fishing area

Description of the Gear to be Used

Specifications

- A vessel will fish up to four lines.
- Each line will consist of all of the following:
    1. a tuna cord mainline
    2. a float at least 3.5 inches in diameter, above the top hook to keep the gear from contacting the bottom, as suggested by the GMT in 2009; a monofilament ganion with 25 to 50 hooks (shrimp flies) each for a total of no more than 100 hooks, spaced 1-3 feet apart
    3. a weight of no more than 15 lbs
    4. a breakaway (lower test line) that is a minimum of 30 feet (5 fathoms) located between the lowest hook and the weight
    5. When two or more lines are used they may be deployed with different lengths of breakaway line.
- Still to be determined: weight and strength of the breakaway line.

Storage and Deployment

- The mainline can be coiled in a basket, wound on the reel of a fishing pole, or spooled on the boat's gurdies.
- The hooks can be placed on a "pinning rail" (usually a long piece of rubber with slots for the hooks) followed by the breakaway and the weight.
- After the weight is thrown overboard followed by the breakaway, the hooks will peel off the pinning rail.
- The float will be attached above the hooks as the gear is deployed.
- Once the fisherman feels the weight hit bottom, he immediately pulls the line up so that it does not drag on the bottom and to avoid tangling in the rocks.

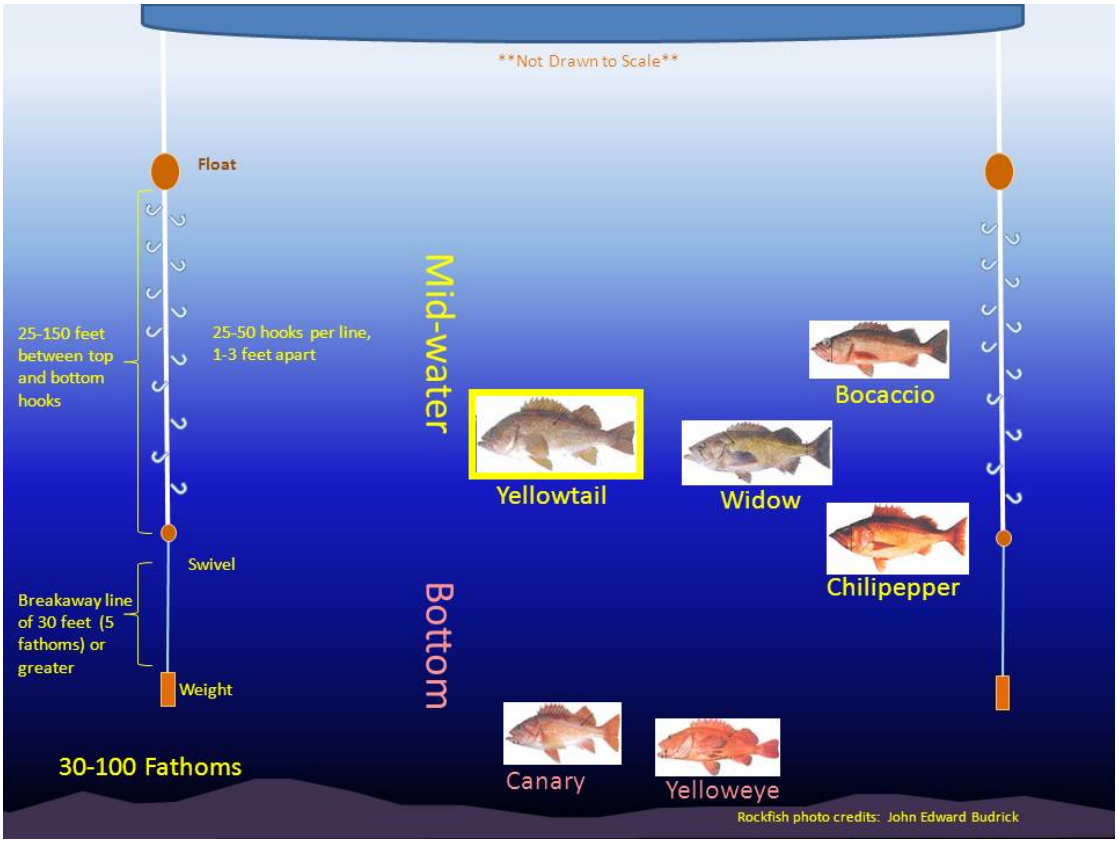


Figure 6. Conceptual drawing of the proposed gear

Effort

- *Trip length*:
  - Vessels out of Ft. Bragg and south – 4 to 5 days (2 day travel time, 2-3 fishing days);
  - Vessels out of Crescent City – 1 day
- *Drops per day*: TBD (depends on conditions), possibly 5 hours total drop time
- *Length of drop*: possibly 5 min to 30 minutes

Number of vessels covered under the EFP

A total of 7 vessels would participate in the study.

Species to be Harvested (target and incidental)

Table 1 provides an overview of the species that will be caught under the EFP, their status, and estimated catch amounts.

Table 1. Overview of Target and Incidental Species Caught under the EFP

Species	Target or Incidental?	Overfished? Y/N	Depth Range	Requested Amount of EFP Harvest (mt)
Bocaccio *Sebastes paucispinis*	Incidental	No	0-1050 ft (0-175 fms)	10
Canary Rockfish *Sebastes pinniger*	Incidental	No	0-900 ft (0-150 fms)	2
Cowcod *Sebastes levis*	Incidental	No	132-1620ft (22-270fms)	0.5

Darkblotched Rockfish *Sebastes crameri*	Incidental	No	240-1200ft (40-200fms)	0.1
Widow Rockfish *Sebastes entomales*	Incidental	No	0-1050 ft (0-175 fms)	9
Yelloweye Rockfish *Sebastes ruberrimus*	Incidental	Yes	150-1200 ft (25-200 fms)	0.06
Lingcod S of 40.10°	Incidental	No		1.5
Sablefish N of 36°	Incidental	No		1
Chilipepper S of 40.10° *Sebastes goodei*	Incidental	No	0-1080 ft (0-180 fms)	30
Splitnose Rockfish S of 40.10°	Incidental	No		1.5
Minor Slope S of 40.10°	Incidental	No		1
Minor Shelf S of 40.10° (includes Yellowtail rockfish)	Target	No		30
Black Rockfish (CA)	Incidental	No		1
Pacific Whiting	Incidental	No		1
Spiny Dogfish	Incidental	No		1

a. Species Descriptions

Descriptions of the **species life histories** can be found in Appendix B2 of the Pacific Coast Groundfish Fishery Management Plan.
http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/NEPA-Documents/upload/FMP-Appendix-B2.pdf

Updated information on **species abundance** can be found in Chapter 3 of the Proposed Harvest Specifications and Management Measures for the 2011-2012 Pacific Coast Groundfish Fishery and Amendment 16-5 to the Pacific Coast Groundfish Fishery Management Plan to Update Existing Rebuilding Plans and Adopt a Rebuilding Plan for Petrale Sole; Final Environmental Impact Statement. http://www.nwr.noaa.gov/Groundfish-Halibut/Groundfish-Fishery-Management/NEPA-Documents/upload/1112GF_SpexFEIS_100806-FINAL_feb21_.pdf

b. Estimated Harvest Amounts

Requested allocation is found in Table 1. To assist in determining potential harvest amounts, provided for consideration is an estimated range of CPUE and potential catch composition. Appendix A includes CPUE estimates, which was derived in order to consider the landings likely needed to cover costs of fishing under this EFP.

Catch data from 2013-2014 is listed in Table 1 and 2015-2016 data is listed in Table 2. In 2013-2014, the total catch was less than 10% of the allocation for each species with the exception of

yelloweye rockfish. In 2013 72% of the yelloweye allocation was caught, and 59% of the allocation was caught in 2014. During 2015-2016, catch composition was comprised of less than 5% for all species considered and less than 1% for most. There were no yelloweye caught during this experimental fishing period. Percentages of total catch by species can be seen in Table 3 for 2013-2014, and Table 4 for 2015-2016. Yellowtail, the target species, was the largest catch in all years and made up 60%, 77%, 82%, and 60 % of the total catch in 2013, 2014, 2015, and 2016 respectively. The average proportion of yellowtail catch relative to total catch for the combined four years is approximately 70%.

No other data exists from which to pull an exact catch composition estimate from this gear. However, some data may be informative and could possibly be considered as the best available proxies. A possible proxy may potentially be derived from the mix of species caught during the first two years of the Oregon Recreational Yellowtail Rockfish EFP. If considered appropriate and desirable to use, an attempt to analyze this data can be found in Appendix C. Under that EFP, the reported catch of 4.3 mt (as of Aug. 1, 2011) was composed of roughly 62% Yellowtail, 23% Widow, 12% Canary and 3% other rockfish and 4kg of Yelloweye (2 fish) (see Appendix B). Also, analysis of PacFIN data to look at block data from groundfish landings from relevant ports could be another potential source. However, limitations with this data include: the landings would encompass trawl and hook & line gear together, past landings data could reflect abundance issues (i.e., lower abundance because of overfished stocks), and concerns with the accuracy of block reporting. Landing data from 1992-1998 for all California Ports North of 37° were summed by DFG Block. The data show that most blocks within the proposed area have some yellowtail catch during the years prior to the RCA (See Appendix F).

Catch Accounting and Compliance

This EFP will incorporate a standardized data collection and reporting format. Under the terms of this EFP there will be 30% observer coverage. Fisheries Observers will collect data on fishing gear, location, catch, and disposition of catch.

Precautionary Measures

Given the potential to catch overfished species and by fishing in the RCA, the utmost caution has been taken with this experiment. The following measures are proposed and applicants are open to working with the PFMC, NMFS, and CDFG to implement others deemed necessary.

1. **Observers** – 30% observer coverage. While 100% coverage is the norm, this EFP has been in operation for 4 years. There have been no catches which continue to warrant this amount of coverage and the costs have made it extremely difficult to get sufficient data so we can move forward.
2. **Caps** – Based on input from the PFMC and NMFS, each boat will have either a ***daily*** or ***trip*** limit/cap of canary and yelloweye. If this cap is reached, based on catch accounting reports verified by the observer, fishing will cease for that day or trip.
3. **Trip reports and catch accounting** – On a timeline agreeable to NMFS and CDFG, trip and cumulative catch reports will be provided after each trip (e.g., within 48 hours).
4. **Status and evaluation call before each trip** – Before each vessel departs on a trip, a cumulative catch accounting report (i.e., running total for the season) and evaluation of the trips taken thus far will be reviewed to determine if another trip can be made and to discuss lessons learned (e.g., float sizes, bait, etc.). If it is likely that the allocated harvest cap would

be exceeded in the upcoming trip, then all fishing under the EFP will cease for the season. Participants on each call would include the EFP participants and could include NMFS (SF & OLE), CDFG (Marine Region & Enforcement) and National Marine Sanctuaries Service.

5. **VMS and Vessel Marking** – Before each trip a vessel will call the West Coast Groundfish Declaration Line to report the trip. (This procedure should work for both the EFP and for future use of this gear type). Vessels participating in this EFP will also display a banner with "EFP Fishing" written in 2 foot high letters.

Data Collection and Analysis Methodology

Data Collection

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

Gear Configuration

- Number of hooks and type
- Breakaway line length
- Weight size
- Distance between hooks
- Float size

Set and Haul Data:

- Position (GPS coordinates)
- Bottom Depth
- Time

Catch

- Species
- Total weight
- Length
- Biological Sampling (if applicable)
- Species
- position on line (e.g., hook #)
- Disposition (landings and discards)
- Count

Attachment of depth recorders may be used, as available.

If desired, incidental catch of certain species (e.g., canary and yelloweye) that cannot be released alive could be retained by the observer and provided to NMFS, CDFG, or other researchers for biological sampling.

Data Analysis

Catch per unit effort will be calculated based on hooks per hour fished. This will allow comparison between short and long drops and different gear configurations. The data will be reported on a trip by trip level. The catch data will be analyzed for CPUE of all species and each species individually.

We have received a grant to engage an undergraduate student to provide data analysis and to ensure statistically valid data. We have begun to make arrangements with Cal Poly for that student and his/her supervisor,

Participation

Choosing Participants

Vessels participating in this EFP will be chosen on their ability to accommodate an observer, which means having bunk space for overnight trips; a life raft for enough people and a coast guard decal and their willingness to maintain detailed catch data. Vessels will also be required to have VMS as required by the open access and limited entry groundfish regulations.

Planned EFP Fishing by Participants

Fishing will take place in appropriate habitats within the latitudes and fathom curves mentioned earlier. Finding these habitats is important to the success of the EFP. Weather conditions are critical for this type of fishing, which involves drifting (not too much wind or current), so times will be left to the discretion of the captains. It is likely that October will be the best time of year, but fishing would not be limited to October. The gear is as described earlier except that a vessel may choose to use less gear than authorized to check species composition prior to setting all gear.

Appendix A- CPUE Estimates

Catch per unit effort is calculated below using 1 hook per hour as a unit of effort. The assumed effort per day is 5 hours of actual fishing time (gear in the water). Therefore, total catch is calculated for various numbers of hooks and CPUE of either 1 fish (2kg) or 2 fish (4kg) per hook per hour five hours a day. These numbers are expanded for 30 and 45 fishing days (3 vessels) and 40 and 60

fishing days (4 vessels). The green highlighted fields represent the estimated catch required to meet expenses of $800/day.

Estimated effort for 3-6 vessels

One day of effort is approximately 5 hours of wet gear time

# of vessels	Days per vessel		Total Days	
	4 trips / vessel	6 trips / vessel	10 days/ vessel	15 days/ vessel
3	10	15	30	45
4	10	15	40	60
5	10	15	50	75
6	10	15	60	90

Assessment of estimated harvest for Year 1 of the EFP

Preferred Gear Configuration	$800 a day needed to cover expenses (Including Observer Coverage, Fuel, Bait, and Gear)	fish = all fish caught, not species specific	Amount that would cover expenses

Comparision of gear configuration by day and CPUE

			Possible CPUE Values in # of fish / hour		Possible CPUE Values in kg of fish / hour	
# of hooks/line (2 lines / boat)	Total # of hooks per boat	spacing between top hook and bottom hook (1-3 ft btwn hooks)	CPUE = 1 fish per hook per hour x 5 hours	CPUE = 2 fish per hook per hour x 5 hours	CPUE =l kg per hook per hour x 5 hours	CPUE = 2 kg per hook per hour x 5 hours
10	20	9-27ft	100	200	100	200
20	40	19-57ft	200	400	200	400
25	50	24-72ft	250	500	250	500
30	60	29-87ft	300	600	300	600
40	80	39-117ft	400	800	400	800
45	90	44-132ft	450	900	450	900
50	100	49-147ft	500	1000	500	1000
100	200	99-297ft	1000	2000	1000	2000

Conclusion: At least 50 hooks would be needed to meet expenses if CPUE was between 1 and 2 fish per hook per hour with 5 hours of wet gear time.

Comparision of number of hooks for 30 days of fishing

			Possible CPUE Values in # of fish / hour		Possible CPUE Values in kg of fish / hour	
# of hooks/line (2 lines / boat)	Total # of hooks per boat	total days	CPUE = 1 fish per hook per hour x 5 hours	CPUE = 2 fish per hook per hour x 5 hours	CPUE =l kg per hook per hour x 5 hours	CPUE = 2 kg per hook per hour x 5 hours
10	20	30	3000	6000	3000	6000
20	40	30	6000	12000	6000	12000
25	50	30	7500	15000	7500	15000
30	60	30	9000	18000	9000	18000
40	80	30	12000	24000	12000	24000
45	90	30	13500	27000	13500	27000
50	100	30	15000	30000	15000	30000
100	200	30	30000	60000	30000	60000

Conclusion: With 30 days of fishing, between 12 and 24 MT of fish would be harvested

Comparision of number of hooks for 45 days of fishing

			Possible CPUE Values in # of fish / hour		Possible CPUE Values in kg of fish / hour	
# of hooks/line (2 lines / boat)	Total # of hooks per boat	total days	CPUE = 1 fish per hook per hour x 5 hours	CPUE = 2 fish per hook per hour x 5 hours	CPUE =l kg per hook per hour x 5 hours	CPUE = 2 kg per hook per hour x 5 hours
10	20	45	4500	9000	4500	9000
20	40	45	9000	18000	9000	18000
25	50	45	11250	22500	11250	22500
30	60	45	13500	27000	13500	27000
40	80	45	18000	36000	18000	36000
45	90	45	20250	40500	20250	40500
50	100	45	22500	45000	22500	45000
100	200	45	45000	90000	45000	90000

Conclusion: With 45 days of fishing, between 18 and 36 MT of fish would be harvested

Comparision of number of hooks for 40 days of fishing

			Possible CPUE Values in # of fish / hour		Possible CPUE Values in kg of fish / hour	
# of hooks/line (2 lines / boat)	Total # of hooks per boat	total days	CPUE = 1 fish per hook per hour x 5 hours	CPUE = 2 fish per hook per hour x 5 hours	CPUE =l kg per hook per hour x 5 hours	CPUE = 2 kg per hook per hour x 5 hours
10	20	40	4000	8000	4000	8000
20	40	40	8000	16000	8000	16000
25	50	40	10000	20000	10000	20000
30	60	40	12000	24000	12000	24000
40	80	40	16000	32000	16000	32000
45	90	40	18000	36000	18000	36000
50	100	40	20000	40000	20000	40000
100	200	40	40000	80000	40000	80000

Conclusion: With 40 days of fishing, between 16 and 32 MT of fish would be harvested

Comparision of number of hooks for 60 days of fishing

			Possible CPUE Values in # of fish / hour		Possible CPUE Values in kg of fish / hour	
# of hooks/line (2 lines / boat)	Total # of hooks per boat	total days	CPUE = 1 fish per hook per hour x 5 hours	CPUE = 2 fish per hook per hour x 5 hours	CPUE =l kg per hook per hour x 5 hours	CPUE = 2 kg per hook per hour x 5 hours
10	20	60	6000	12000	6000	12000
20	40	60	12000	24000	12000	24000
25	50	60	15000	30000	15000	30000
30	60	60	18000	36000	18000	36000
40	80	60	24000	48000	24000	48000
45	90	60	27000	54000	27000	54000
50	100	60	30000	60000	30000	60000
100	200	60	60000	120000	60000	120000

Conclusion: With 60 days of fishing, between 24 and 48 MT of fish would be harvested

Appendix B- Oregon EFP Catch

In 2009, the Oregon Recreational Yellowtail Rockfish EFP, approved by the Council, was permitted by NMFS to the Southern Oregon Sport Fishermen and Recreational Fishing Alliance (Oregon Chapter) for fishing in 2010 and 2011. Although not identical, this OR EFP is based on the same concept (i.e., placing hooks near the target species in mid-water and away from non-targets on the bottom), and, therefore, offers interesting insights of relevance to this EFP application, particularly the catch composition and success at avoiding non-target species. Under this EFP, 29 trips were made with an average of 11 anglers and 33 hooks per vessel (3 per line) were deployed on average.

Oregon Recreational Yellowtail Rockfish EFP Catch

Year 1	kg	% of total	anglers	catch per angler day
Total	**2083**	**100**	**137**	**15.20437956**
Yellowtail	1657	79.54873	137	12.09489051
Widow	266	12.77004	137	1.941605839
Canary	129	6.192991	137	0.941605839
Yelloweye	0	0	137	0
Other (approx kg)	31	1.488238	137	0.226277372
Year 2	**kg**	**% of total**	**anglers**	**catch per angler day**
Total	**2283**	**100**	**169**	**13.50887574**
Yellowtail	1062	46.51774	169	6.284023669
Widow	722	31.62505	169	4.272189349
Canary	380	16.64477	169	2.24852071
Yelloweye	4	0.175208	169	0.023668639
Other (approx kg)	115	5.037232	169	0.680473373
Both	**kg**	**% of total**	**anglers**	**catch per angler day**
Total	**4366**	**100**	**306**	**14.26797386**
Yellowtail	2719	62.27668	306	8.885620915
Widow	988	22.62941	306	3.22875817
Canary	509	11.65827	306	1.663398693
Yelloweye	4	0.091617	306	0.013071895
Other (approx kg)	146	3.344022	306	0.477124183

Appendix C- Potential Harvest Estimates

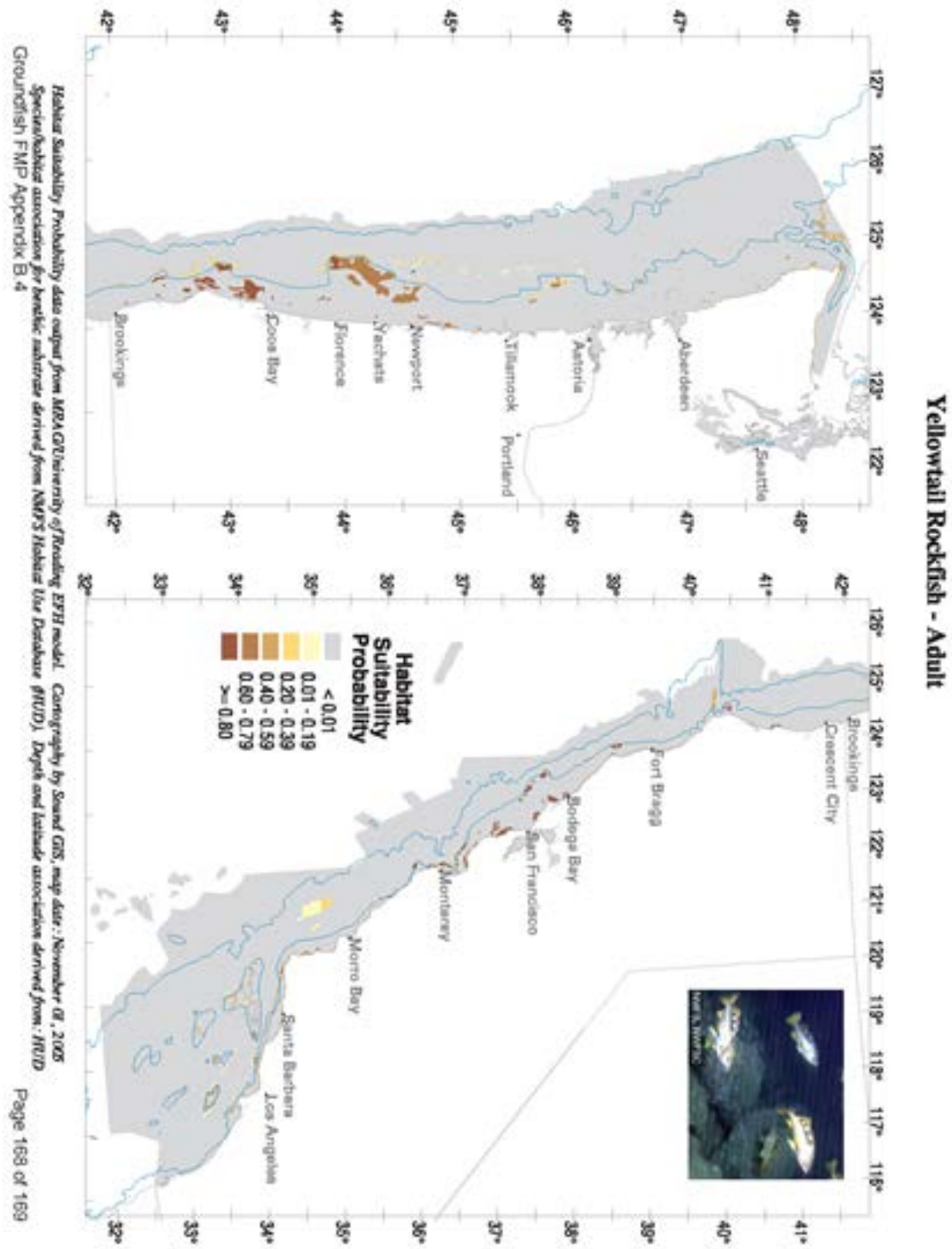
The estimates below are based on the catch composition from the Oregon Recreational Yellowtail Rockfish EFP (see Appendix B) and the estimated CPUE (see Appendix A).

Estimated Harvest		30 Days		45 Days		40 Days		60 Days	
Hooks	Species	CPUE = 1	CPUE = 2	CPUE = 1	CPUE = 2	CPUE = 1	CPUE = 2	CPUE = 1	CPUE = 2
50	Yellowtail	4670	9341	7006	14012	6227	12455	9340	18682
	Widow	1697	3394	2546	5092	2263	4525	3394	6788
	Canary	874	1748	1312	2623	1165	2331	1748	3496
	Yelloweye	7	13	10	21	9	17	14	26
	Other Rockfish	250	501	376	752	333	668	500	1002
80	Yellowtail	7473	14946	11209	22419	9964	19928	14946	29892
	Widow	2715	5431	4073	8146	3620	7241	5430	10862
	Canary	1398	2797	2098	4197	1864	3729	2796	5594
	Yelloweye	11	22	16	33	15	29	22	44
	Other Rockfish	401	802	601	1203	535	1069	802	1604
100	Yellowtail	9341	18683	14012	28024	12455	24911	18682	37366
	Widow	3394	6788	5092	10183	4525	9051	6788	13576
	Canary	1748	3497	2623	5246	2331	4663	3496	6994
	Yelloweye	13	27	21	41	17	36	26	54
	Other Rockfish	501	1003	752	1504	668	1337	1002	2006

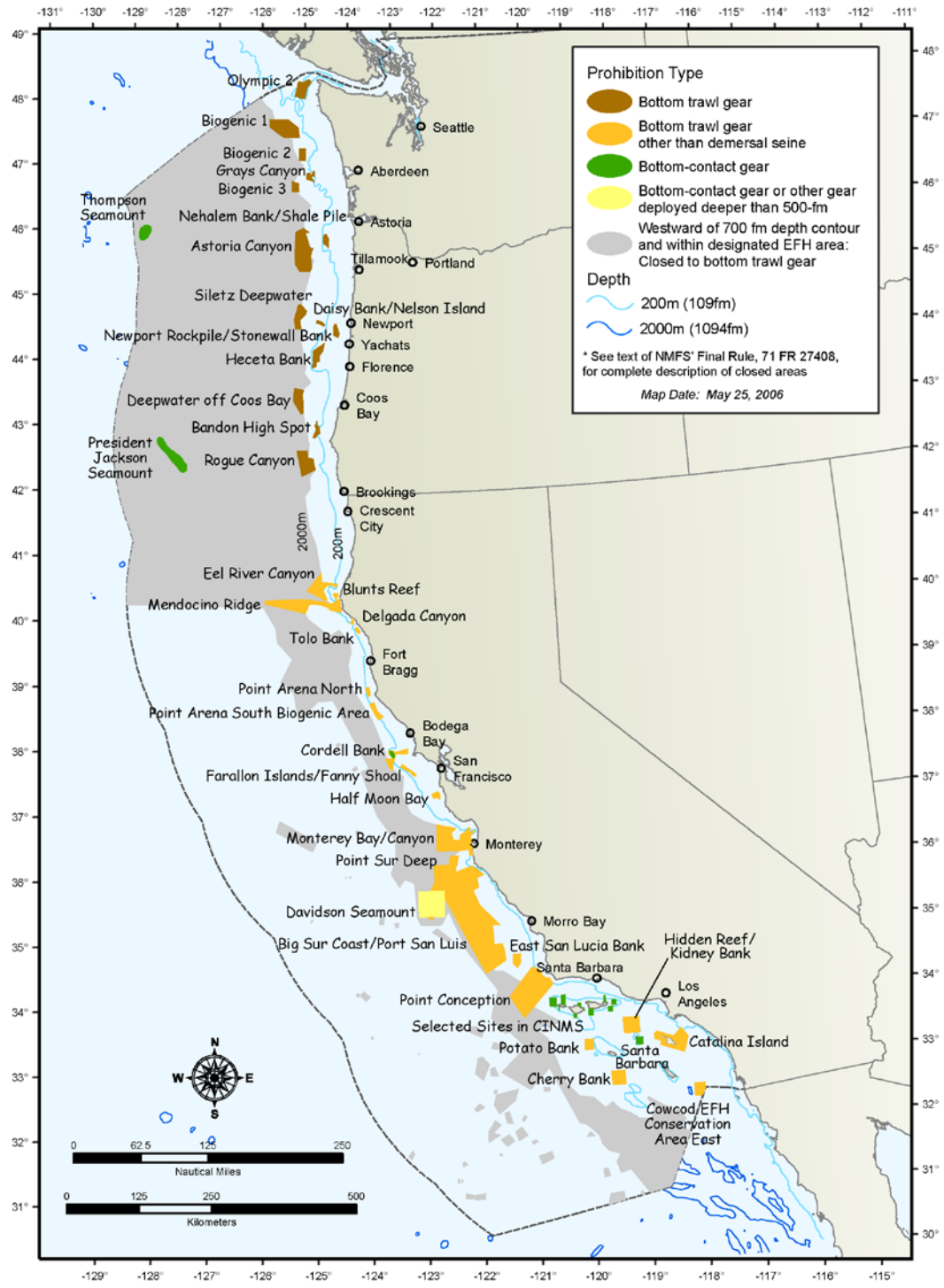
One day of effort is approximately 5 hours of wet gear time
All weights are in kg
CPUE = 1 (1 fish (2kg) per hook per hour five hours a day)
CPUE =2 (2 fish (4kg) per hook per hour five hours a day)

Appendix D- Adult Yellowtail Rockfish Habitat Suitability

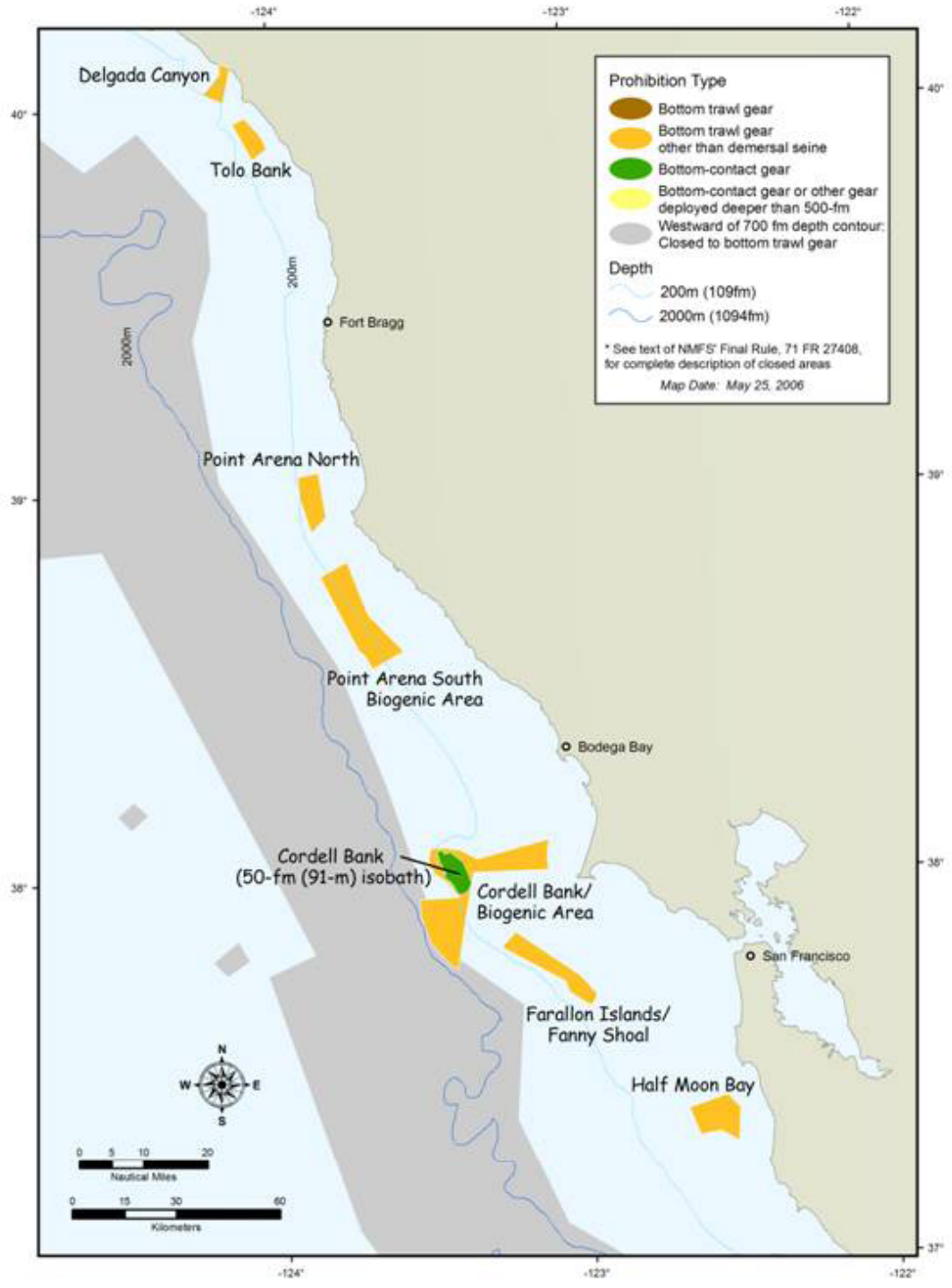
There is a high probability of suitable habitat for adult yellowtail rockfish within the proposed fishing area.



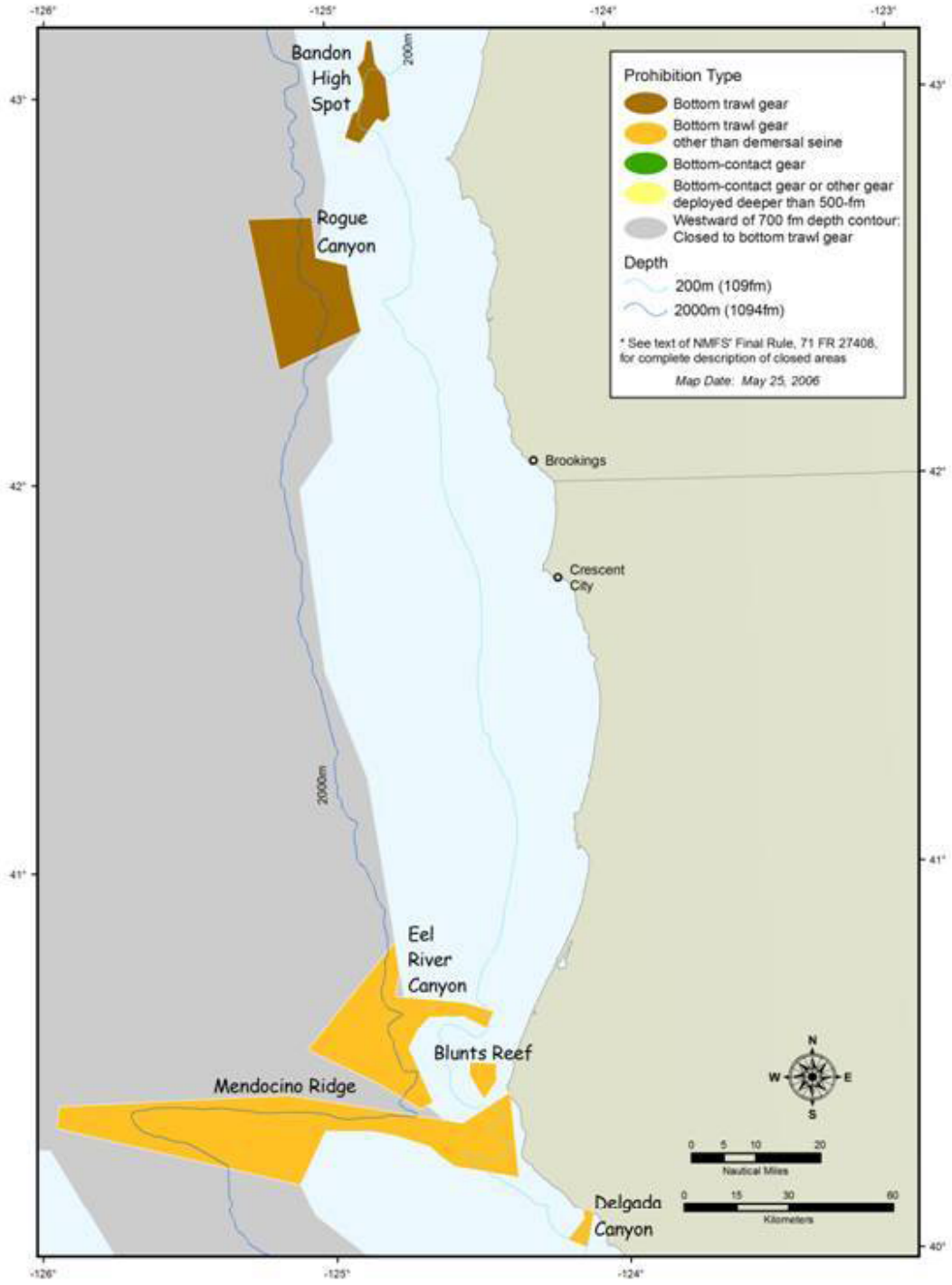
Appendix E- Essential Fish Habitat and Rockfish Conservation Areas



EFH area closures to protect Pacific Coast groundfish habitat - Coastwide.



EFH area closures to protect Pacific Coast groundfish habitat – Northern California.



EFH area closures to protect Pacific Coast groundfish habitat – Oregon and Northern California.

Table 1. 2013-2014 Catch composition and percent allocation harvested.

	2014			2013		
Catch Category	Allocation (mt)	Catch (mt)	% Allocation	Allocation (mt)	Catch (mt)	% Allocation
Bocaccio	3.000	0.30242	10.08%	3.000	0.09575	3.19%
Canary Rockfish	1.000	0.01706	1.71%	1.000	0.02094	2.09%
Cowcod	0.015	0.00000	0.00%	0.015	0.00000	0.00%
Darkblotched Rockfish	0.100	0.00000	0.00%	0.100	0.00000	0.00%
Widow Rockfish	9.000	0.41798	4.64%	9.000	0.43590	4.84%
Yelloweye Rockfish	0.010	0.00585	58.50%	0.010	0.00720	72.00%
Lingcod S of 42°	1.500	0.03980	2.65%	1.500	0.00000	0.00%
Sablefish N of 36°	1.000	0.00000	0.00%	1.000	0.00000	0.00%
Chilipepper S of 40.10°	10.000	0.00147	0.01%	10.000	0.00000	0.00%
Splitnose Rockfish S of 40.10°	1.500	0.00000	0.00%	1.500	0.00000	0.00%
Yellowtail Rockfish N. of 40.10°	10.000	0.00000	0.00%	10.000	0.00000	0.00%
Minor Slope N of 40.10°	1.000	0.00000	0.00%	1.000	0.00000	0.00%
Minor Slope S of 40.10°	1.000	0.00000	0.00%	1.000	0.00000	0.00%
Minor Shelf N of 40.10°	3.000	0.00000	0.00%	3.000	0.00000	0.00%
Minor Shelf S of 40.10° (includes Yellowtail rockfish)	30.000	2.68483	8.95%	30.000	0.88030	2.93%
Black Rockfish S of 46.16°	1.000	0.00000	0.00%	1.000	0.00000	0.00%
Pacific Whiting	1.000	0.00000	0.00%	1.000	0.00000	0.00%
Other Fish	1.000	0.01141	1.14%	1.000	0.03265	3.27%

Table 2. 2015-2016 Catch composition and percent allocation harvested.

	2016			2015		
Catch Category	Allocation (mt)	Catch (mt)	% Allocation	Allocation (mt)	Catch (mt)	% Allocation
Bocaccio	3	0.11916	3.97%	3	0.14608	4.87%
Canary Rockfish	1	0.00638	0.64%	1	0.00444	0.44%
Cowcod	0.015	0	0.00%	0.015	0	0.00%
Darkblotched Rockfish	0.1	0	0.00%	0.1	0	0.00%
Widow Rockfish	9	0.03035	0.34%	9	0.01387	0.15%
Yelloweye Rockfish	0.03	0	0.00%	0.03	0	0.00%
Lingcod S of 40.10°	1.5	0.05305	3.54%	1.5	0.01084	0.72%
Lingcod N of 40.10°	1.5	0	0.00%	1.5	0	0.00%
Sablefish N of 36°	1	0	0.00%	1	0	0.00%
Chilipepper S of 40.10°	10	0.00061	0.01%	10	0	0.00%
Splitnose Rockfish S of 40.10°	1.5	0	0.00%	1.5	0	0.00%
Yellowtail Rockfish N. of 40.10°	10	0	0.00%	10	0	0.00%
Minor Slope N of 40.10°	1	0	0.00%	1	0	0.00%
Minor Slope S of 40.10°	1	0	0.00%	1	0	0.00%
Minor Shelf N of 40.10°	3	0.00134	0.04%	3	0	0.00%
Minor Shelf S of 40.10° (includes Yellowtail rockfish)	30	0.31866	1.06%	30	0.80348	2.68%
Black Rockfish S of 46.16°	1	0	0.00%	1	0	0.00%
Pacific Whiting	1	0	0.00%	1	0	0.00%
Spiny Dogfish	1	0	0.00%	1	0	0.00%

Table 3. 2013-2014 Proportion of total catch by species.

Catch Category	2014 % Total Catch	2013 % Total Catch
Bocaccio	8.69%	6.50%
Canary Rockfish	0.49%	1.42%
Cowcod	0.00%	0.00%
Darkblotched Rockfish	0.00%	0.00%
Widow Rockfish	12.01%	29.60%
Yelloweye Rockfish	0.17%	0.49%
Lingcod S of 42°	1.14%	0.00%
Sablefish N of 36°	0.00%	0.00%
Chilipepper S of 40.10°	0.04%	0.00%
Splitnose Rockfish S of 40.10°	0.00%	0.00%
Yellowtail Rockfish N. of 40.10°	0.00%	0.00%
Minor Slope N of 40.10°	0.00%	0.00%
Minor Slope S of 40.10°	0.00%	0.00%
Minor Shelf N of 40.10°	0.00%	0.00%
Minor Shelf S of 40.10° (includes Yellowtail rockfish)	77.13%	59.77%
Black Rockfish S of 46.16°	0.00%	0.00%
Pacific Whiting	0.00%	0.00%
Other Fish	0.33%	2.22%

Table 4. 2015-2016 Proportion of total catch by species.

Catch Category	2016 % Total Catch	2015 % Total Catch
Bocaccio	22.50%	14.93%
Canary Rockfish	1.20%	0.45%
Cowcod	0.00%	0.00%
Darkblotched Rockfish	0.00%	0.00%
Widow Rockfish	5.73%	1.42%
Yelloweye Rockfish	0.00%	0.00%
Lingcod S of 40.10°	10.02%	1.11%
Lingcod N of 40.10°	0.00%	0.00%
Sablefish N of 36°	0.00%	0.00%
Chilipepper S of 40.10°	0.12%	0.00%
Splitnose Rockfish S of 40.10°	0.00%	0.00%
Yellowtail Rockfish N. of 40.10°	0.00%	0.00%
Minor Slope N of 40.10°	0.00%	0.00%
Minor Slope S of 40.10°	0.00%	0.00%
Minor Shelf N of 40.10°	0.25%	0.00%
Minor Shelf S of 40.10° (includes Yellowtail rockfish)	60.18%	82.10%
Black Rockfish S of 46.16°	0.00%	0.00%
Pacific Whiting	0.00%	0.00%
Spiny Dogfish	0.00%	0.00%