Stock Assessment of China Rockfish in 2015

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DRAFT SAFE

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Contents

Executive summary

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Stock

Blah blah Milton says China rockfish live to at least 79 years (Love et al. 2002).

Catches

Trends and current levels-include table for last ten years and graph with long term data

Table 1: Recent trend in beginning of the year biomass and depletion

Year	Spawning Biomass (mt)	~ 95% confidence interval
2004	1760	(478-3043)
2005	1727	(445-3010)
2006	1710	(427-2994)
2007	1695	(409-2980)
2008	1680	(392-2969)
2009	1672	(378-2965)
2010	1659	(359-2960)
2011	1660	(352-2968)
2012	1669	(353-2985)
2013	1673	(348-2998)

Data and assessment

date of last assessment, type of assessment model, data available, new information, and information lacking

Stock biomass

trends and current levels relative to virgin or historic levels, description of uncertainty-include table for last 10 years and graph with long term estimates

This is a test to see if I can reference Figure 1.

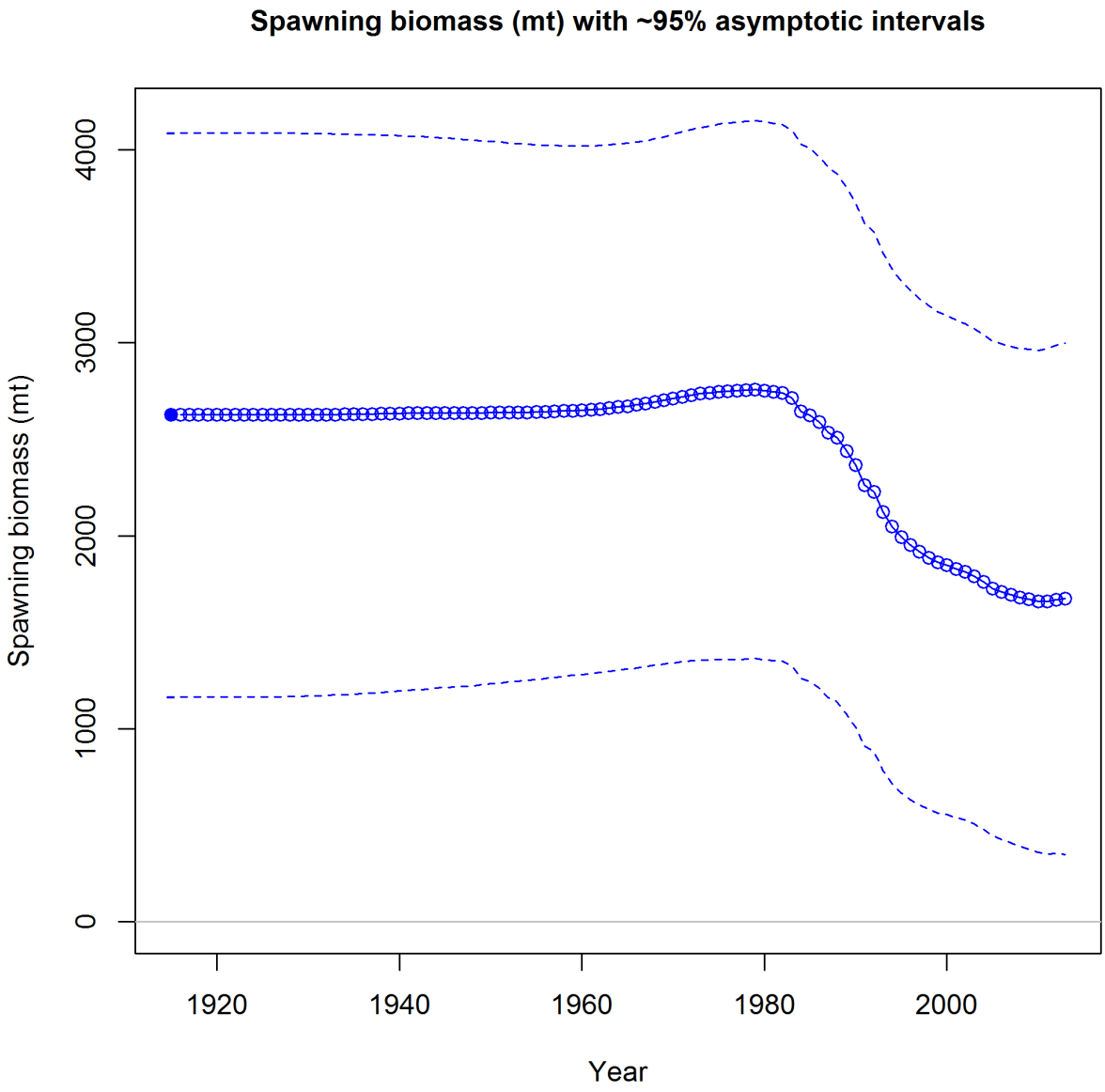

Figure 1: Time series of spawning biomass trajectory (circles and line: median; light broken lines: 95% credibility intervals) for China rockfish.

Recruitment

trends and current levels relative to virgin or historic levels-include table for last 10 years and graph with long term estimates

Exploitation status

exploitation rates, i.e., total catch divided by exploitable biomass, or the annual SPR harvest rate - include a table with the last 10 years of data and a graph showing the trend in fishing mortality relative to the target (y-axis) plotted against the trend in biomass relative to the target (x-axis).

Ecosystem considerations

Reference points

management targets and definition of overfishing, including the harvest rate that brings the stock to equilibrium at B40% (the BMSY proxy) and the equilibrium stock size that results from fishing at the default harvest rate (the FMSY proxy). Include a summary table that compares estimated reference points for SSB, SPR, Exploitation Rate and Yield based on SSBproxy for MSY, SPRproxy for MSY, and estimated MSY values (table i. on page 35 of attached Canary rockfish executive summary).

Management performance

catches in comparison to OFL, ABC and OY/ACL values for the most recent 10 years (when available), overfishing levels, actual catch and discard. Include OFL(encountered), OFL(retained) and OFL(dead) if different due to discard and discard mortality.

Unresolved problem and major uncertainties

any special issues that complicate scientific assessment, questions about the best model scenario, etc.

Decision table

projected yields (OFL, ABC and ACL), spawning biomass, and stock depletion levels for each year.* (Not required in draft assessments undergoing review.)

Research and data needs

identify information gaps that seriously impede the stock assessment.

Rebuilding projections

reference to the principal results from rebuilding analysis if the stock is overfished.* This section should be included in the Final/SAFE version assessment document but is not required for draft assessments undergoing review. See Rebuilding Analysis terms of reference for detailed information on rebuilding analysis requirements.

1 Introduction

1.1 Basic Information

Scientific name, distribution, the basis of the choice of stock structure, including regional differences in life history or other biological characteristics that should form the basis of management units.

1.2 Map

A map showing the scope of the assessment and depicting boundaries for fisheries or data collection strata.

1.3 Life History

Important features of life history that affect management (e.g., migration, sexual dimorphism, bathymetric demography).

1.4 Ecosysem Considerations

Ecosystem considerations (e.g., ecosystem role and trophic relationships of the species, habitat requirements/preferences, relevant data on ecosystem processes that may affect stock or parameters used in the stock assessment, and/or cross-FMP interactions with other fisheries). This section should note if environmental correlations or food web interactions were incorporated into the assessment model. The length and depth of this section would depend on availability of data and reports from the IEA, expertise of the STAT, and whether ecosystem factors are informational to contribute quantitative information to the assessment.

1.5 Fishery Information

Important features of current fishery and relevant history of fishery.

1.6 Summary of Management History

Summary of management history (e.g., changes in mesh sizes, trip limits, or other management actions that may have significantly altered selection, catch rates, or discards).

1.7 Managament Performance

Management performance, including a table or tables comparing Overfishing Limit (OFL), Annual Catch Limit (ACL), Harvest Guideline (HG) [CPS only], landings, and catch (i.e., landings plus discard) for each area and year

1.8 Fisheries off Canada, Alaska, and/or Mexico

Description of fisheries for this species off Canada, Alaska and/or Mexico, including references to any recent assessments of those stocks.

2 Assessment

2.1 Data

2.1.1 Fishery-Dependent Data: Landings

California Commercial Landings, 1969-2014

The CALCOM database was queried (February 20, 2015) for commercial landing estimates of China rockfish in California. Landings were stratified by year, quarter, live/dead, market category, gear group, port complex, and source of species composition data (actual port samples, borrowed samples, or assumed nominal market category). Total landings from the initial query span the years 1969-2014.

The majority of commercial China rockfish landings are made by vessels using hook-and-line gear (Fig. 2). However, landings estimates also include a large fraction of trawl-caught China rockfish from 1969-1988, which is unlikely given the species' preference for rocky habitat. The reported trawl catch was mainly from the Monterey port complex and was landed in the "China rockfish" market category (258).

An analysis of species composition data from port samples in market category 258, by gear type, revealed that the sampled trawl catch landed in the China rockfish market category contained mainly deeper-water species, including greenspotted rockfish (*Sebastes chlorostictus*), sometimes known as "chinafish." Species landed by hook-and-line gears in the China rockfish market category, on the other hand, consisted of a mixture of nearshore species (e.g. china, quillback, gopher, black-and-yellow, and brown; Fig. 3). When port samples are not available to estimate species composition in a stratum, and no samples are available to 'borrow' from an adjacent stratum, landings in a market category are assigned to the 'nominal' species category, in this case China rockfish.

Given the available species composition data from the trawl catch, and the fact that trawl gear is unlikely to be fished in China rockfish habitat, trawl-caught China rockfish were removed from the landings estimates in the current assessment. A similar analysis led to the removal of a small amount (about 5 mt) of landings by set-net and mid-water trawl gear groups.

In years prior to 1978, landing receipts are available for California but there are no associated port sample data. Typically, a ratio estimator (based on the expanded landings estimates in the earliest sampled years) is used to allocate catch to species in these early years. In the case of China rockfish, this procedure propagated the estimates of trawl-caught China backward in time to 1969 (Fig. 2). These ratio estimates of trawl-caught China rockfish were also removed from the final time series of landed catch.

The previous assessment of China rockfish (Cope et al. 2015) modeled two China rockfish populations, north and south of **fix this: 40-10** North latitude (roughly Cape Mendocino). The majority of landings occurred south of Cape Mendocino, and the revised estimates are substantially lower in early years, primarily due to the removal of trawl catch (Fig. 4).

California's commercial live-fish fishery began targeting nearshore rockfish species in the early 1990s (CDFG 2002). Live annual landings of China rockfish surpassed landings of dead fish by the late 1990s, due to the increased value of fish landed live (Fig. 5).

Landings by year and fishery, historical catch estimates, discards (generally specified as a percentage of total catch in weight and in units of mt), catch-at-age, weight-at-age, abundance indices (typically survey and CPUE data), data used to estimate biological parameters (e.g., growth rates, maturity schedules, and natural mortality) with coefficients of variation (CVs) or variances if available. Include complete tables and figures and date of extraction.

2.1.2 Title

Sample size information for length and age composition data by area, year, gear, market category, etc., including both the number of trips and fish sampled.

2.1.3 Title

All data sources that include the species being assessed, which are used in the assessment, and provide the rationale for data sources that are excluded.

2.1.4 Title

Clear description of environmental or ecosystem data if included in the assessment.

2.1.5 Fishery-Independent Data: sources considered, but not used in assessment

Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO) A total of 59 China rockfish were observed in 17,657 SCUBA transects conducted in the southern and central survey regions. Transects were conducted in Northern California and Oregon for two years (2010-2011), with a higher occurence of China rockfish (156 out of 956 transects).

2.2 History of Modeling Approaches Used for this Stock

2.2.1 Title

Response to STAR panel recommendations from the most recent previous assessment.

2.2.2 Title

Report of consultations with AP and MT representatives regarding the use of various data sources in the stock assessment.

2.2.3 Title

If environmental or ecosystem data are incorporated, report of consultations with technical teams that evaluated ecosystem data or methodologies used in the assessment.

2.3 Model Description

2.3.1 Title

Complete description of any new modeling approaches.

2.3.2 Title

Definitions of fleets and areas.

2.3.3 Title

Assessment program with last revision date (i.e., date executable program file was compiled).

2.3.4 Title

List and description of all likelihood components in the model

2.3.5 Title

Constraints on parameters, selectivity assumptions, natural mortality, treatment of age reading bias and/or imprecision, and other fixed parameters.

2.3.6 Title

Description of stock-recruitment constraints or components.

2.3.7 Title

Description of how the first year that is included in the model was selected and how the population state at the time is defined (e.g., B0, stable age structure, etc.).

2.3.8 Title

Critical assumptions and consequences of assumption failures.

2.4 Model Selection and Evaluation

2.4.1 Title

Evidence of search for balance between model realism and parsimony.

2.4.2 Title

Comparison of key model assumptions, include comparisons based on nested models (e.g., asymptotic vs. domed selectivities, constant vs. time-varying selectivities).

2.4.3 Title

Summary of alternate model configurations that were tried but rejected.

2.4.4 Title

Likelihood profile for the base-run (or proposed base-run model for a draft assessment undergoing review) configuration over one or more key parameters (e.g., M, h, Q) to show consistency among input data sources.

2.4.5 Title

Residual analysis for the base-run configuration (or proposed base-run model in a draft assessment undergoing review) e.g., residual plots, time series plots of observed and predicted values, or other approaches. Note that model diagnostics are required in draft assessments undergoing review.

2.4.6 Title

Convergence status and convergence criteria for the base-run model (or proposed base run).

2.4.7 Title

Randomization run results or other evidence of search for global best estimates.

2.4.8 Title

Evaluation of model parameters. Do they make sense? Are they credible?

2.4.9 Title

Are model results consistent with assessments of the same species in Canada and Alaska? Are parameter estimates (e.g., survey catchability) consistent with estimates for related stocks?

2.5 Response to STAR Panel Recommendations

Point-by-point response to the STAR panel recommendations

2.6 Base-Model(s) Results

2.6.1 Title

Table listing all explicit parameters in the stock assessment model used for base model, their purpose (e.g., recruitment parameter, selectivity parameter) and whether or not the parameter was actually estimated in the stock assessment model.

2.6.2 Title

Population numbers at age × year × sex (if sex-specific M, growth, or selectivity) (May be provided as a text or spreadsheet file).* Not required in draft assessment undergoing review.

2.6.3 Title

Time-series of total, 1+ (if age 1s are in the model), summary, and spawning biomass (and/or spawning output), depletion relative to B0, recruitment and fishing mortality or exploitation rate estimates (table and figures).

2.6.4 Title

Selectivity estimates (if not included elsewhere).

2.6.5 Title

Stock-recruitment relationship.

2.6.6 Title

OFL, ABC and ACL (and/or ABC and OY or HG) for recent years.

2.6.7 Title

Clear description of units for all outputs.

2.6.8 Title

Clear description of how discard is included in yield estimates.

2.6.9 Title

Clear description of environmental or ecosystem data if included in the assessment.

2.7 Uncertainty and Sensitivity Analyses

The best approach for describing uncertainty and the range of probable biomass estimates in groundfish assessments may depend on the situation.
Important factors to consider include:

2.7.1 Title

Parameter uncertainty (variance estimation conditioned on a given model, estimation framework, data set choice, and weighting scheme), including likelihood profiles for important assessment parameters (e.g., natural mortality). This also includes expressing uncertainty in derived outputs of the model and estimating CVs using appropriate methods (e.g., bootstrap, asymptotic methods, Bayesian approaches, such as MCMC). Include the CV of spawning biomass in the first year for which an OFL has not been specified (typically end year +1 or +2).

2.7.2 Title

Sensitivity to assumptions about model structure, i.e., model specification uncertainty

2.7.3 Title

Sensitivity to data set choice and weighting schemes (e.g., emphasis factors), which may also include a consideration of recent patterns in recruitment.

2.7.4 Title

Retrospective analysis, where the model is fitted to a series of shortened input data sets, with the most recent years of input data being dropped.

2.7.5 Title

Historical analysis (plot of actual estimates from current and previous assessments).

2.7.6 Title

Subjective appraisal of the magnitude and sources of uncertainty.

2.7.7 Title

If a range of model runs is used to characterize uncertainty it is important to provide some qualitative or quantitative information about relative probability of each. If no statements about relative probability can be made, then it is important to state that all scenarios (or all scenarios between the bounds depicted by the runs) are equally likely

2.7.8 Title

If possible, ranges depicting uncertainty should include at least three runs: (a) one judged most probable; (b) at least one that depicts the range of uncertainty in the direction of lower current biomass levels; and (c) one that depicts the range of uncertainty in the direction of higher current biomass levels. The entire range of uncertainty should be carried through stock projections and decision table analyses.

3 Reference Points

1. Unfished spawning stock biomass, summary age biomass, and recruitment, along with unfished spawning stock output.
2. Reference points based on $B_{40\%}$ for rockfish and roundfish and on $B_{25\%}$ for flatfish (spawning biomass and/or output, SPR, exploitation rate, equilibrium yield).
3. Reference points based on default SPR proxy (spawning biomass and/or output, SPR, exploitation rate, equilibrium yield).
4. Reference points based on MSY (if estimated) (spawning biomass and/or output, SPR, exploitation rate, equilibrium yield).
5. Equilibrium yield curve showing various BMSY proxies.

4 Harvest Projections and Decision Tables

*Not required in draft assessment undergoing review.

1. Harvest projections and decision tables (i.e., a matrix of alternative models (states of nature) versus management actions) should cover the plausible range of uncertainty about current stock biomass and a set of candidate fishing mortality targets used for the

stock. See section "*Uncertainty and Decision Tables in Groundfish Stock Assessment*" (this document, pp. 11-12) on how to define alternative states of nature. Management decisions in most cases represent the sequence of catches including estimate of OFL based on FMSY (or its proxy) and those obtained by applying the Council 40-10 harvest policy to each state of nature; however other alternatives may be suggested by the GMT as being more relevant to Council decision making. OFL calculations should be based on the assumption that future catches equal ABCs and not OFLs.

2. Information presented should include biomass, stock depletion, and yield projections of OFL, ABC and ACL for ten years into the future, beginning with the first year for which management action could be based upon the assessment.

5 Regional Management Considerations

1. For stocks where current practice is to allocate harvests by management area, a recommended method of allocating harvests based on the distribution of biomass should be provided. The MT advisor should be consulted on the appropriate management areas for each stock.

2. Discuss whether a regional management approach makes sense for the species from a biological perspective.

3. If there are insufficient data to analyze a regional management approach, what are the research and data needs to answer this question?

6 Research Needs

7 Acknowledgments

Include STAR panel members and affiliations as well as names and affiliations of persons who contributed data, advice or information but were not part of the assessment team. *** Not required in draft assessment undergoing review.**

8 Tables

9 Figures

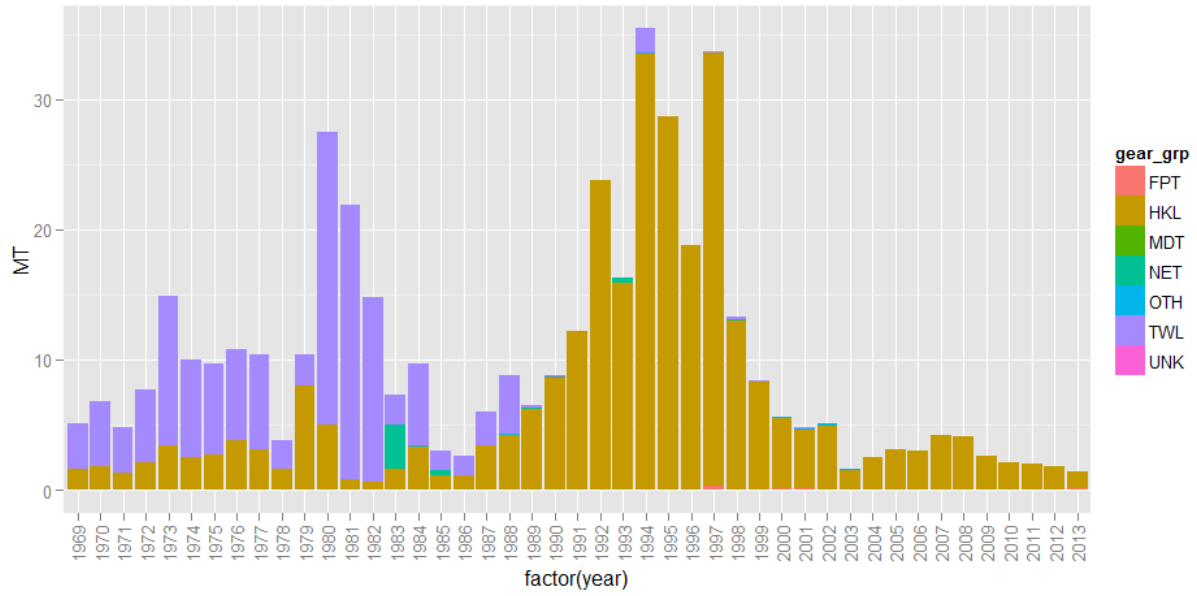

Figure 2: Estimated commercial landings of China rockfish (mt) by year and gear group (Source: CALCOM).

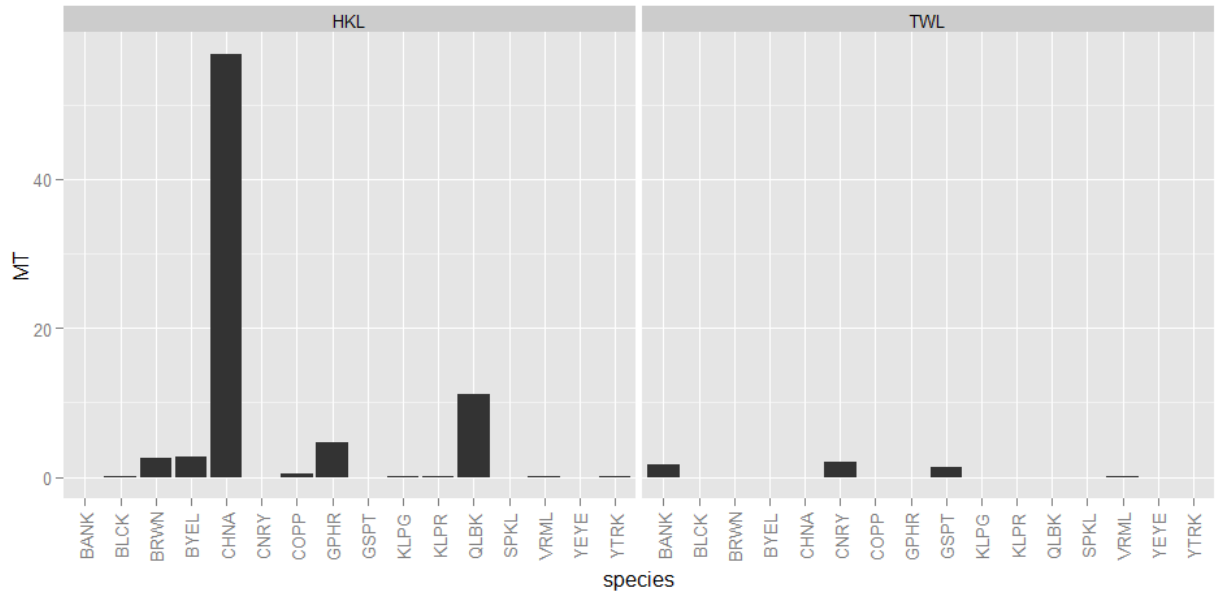

Figure 3: Commercial landings (mt) based on port samples in the China rockfish market category (258) by species and gear group, 1969-2013. Hook and line ("HKL") gears are landing nearshore species in this category, mainly China rockfish, whereas trawl ("TWL") gears landed species with a deeper depth distribution, and no China rockfish.

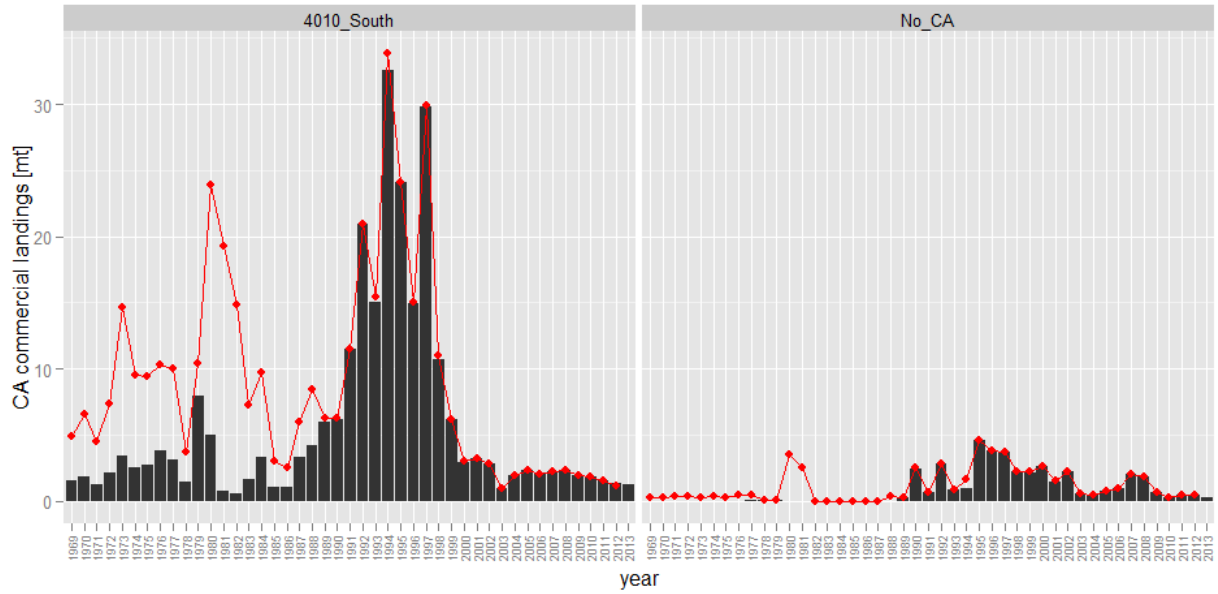

Figure 4: Revised California commercial landing estimates (mt) of China rockfish, north and south of Cape Mendocino, 1969-2013 (black bars). Estimates of California's annual landed commercial catch used in the 2013 stock assessment are plotted for comparison (red line).

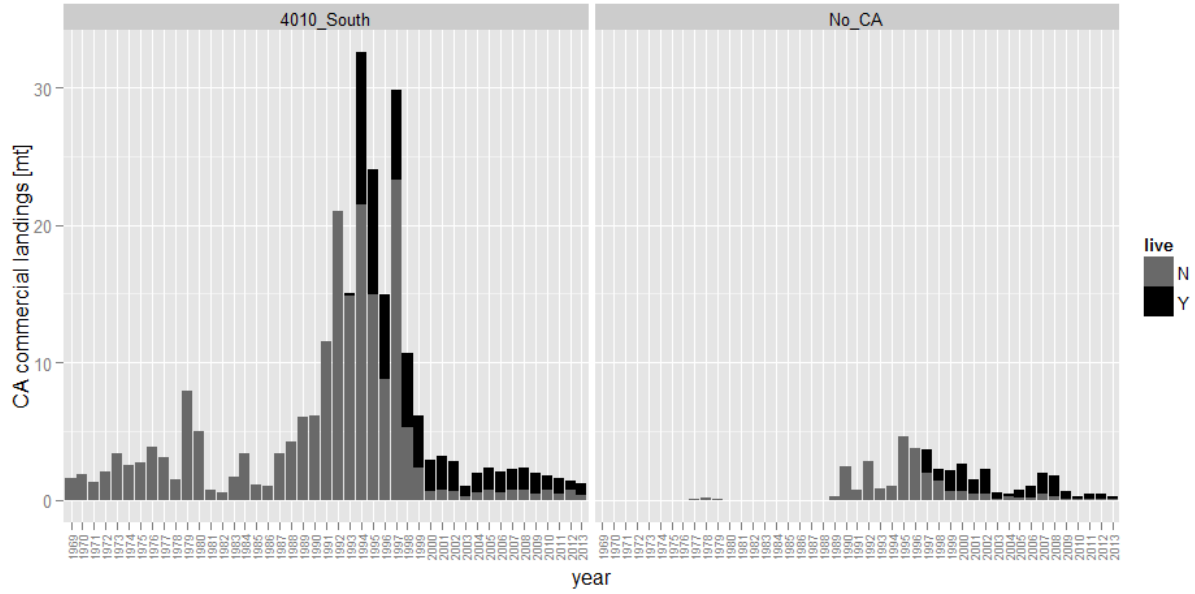

Figure 5: Revised commercial landing estimates (mt) of China rockfish landed live and dead, north and south of Cape Mendocino, 1969-2013.

Appendix A. SS data file

Appendix A1. Sub-headings in Appendix

Appendix B. SS control file

Appendix C. SS starter file

Appendix D. SS forecast file

Appendix E. Observed Angler Prediction

Beginning in 1992 Calrec Historic began tracking the number of observed anglers in its database, however the full data-set spans from 4/22/87 until 12/31/98. The goal of this analysis is to impute the number of observed anglers in the initial period of the dataset, from 4/22/87 until 7/9/92, when the observed number of active anglers was not yet being recorded.

The number of observed anglers is necessarily a subset of the number of total anglers; a quantity which is consistently recorded throughout the entire dataset. This suggests that a simple binomial regression model could be used to predict the mean number of observed anglers from the number of total anglers, in the initial period of the data. Binomial regression models of this general form were considered in this analysis, as well as a sensitivity analysis among the other potential covariates available in the dataset. Among the potential predictor variables in this study, effects related to the interviewer, trip date, and the trip's identification number (trip ID) number were considered for inclusion in the final model by pairwise comparison of fitted model AIC values as well as analysis of parameter significance.

Effects related to interviewer were found to be very significant, although due to the high turn-over rate of the interviewers in these data, interviewer specific effects are not useful for prediction here. However, the total number of present interviewers (one or two interviewers) was found to be strongly significant and was included in the final models as a categorical effect.

For imputing the observed number of active anglers for the early period of the dataset it is important to motivate an assumption of stationarity in the number of observed anglers through time. Thus trip date was considered for inclusion in the model to check for any possibility significance through time. Firstly, date was considered for inclusion in the model as a discrete time variable; secondly, a separate model was tested using only year as categorical variable to consider any temporal patterns. Given the number of total anglers, neither of the models considering temporal effects were able demonstrate that the number of observed anglers varied significantly through time. All models which included temporal effects produced higher overall AIC values, thus supporting the assumption of stationarity in time.

Trip ID was found to contribute a significant effect toward overall inference. Upon further investigation, trip ID was found to encode information about the number of consecutive outings for each interviewer followed by a decimal point and a unique numeric code for each interviewer. This suggests that by ignoring the numbers after the decimal point one could represent a measure of the generic interviewer experience. Inclusion of this variable was tested and is supported by the fitted AIC and parameter significance as a discrete experience variable. Although this variable was supported by the chosen model selection criteria, it was ultimately left out of the final models for further investigation of accuracy of the coding scheme.

Log Model:

$$y_{ij} \sim \beta_{0j} + \beta_{1j} \log(x_{ij}) + \epsilon_{ij} \quad \epsilon_{ij} \sim N(0, \sigma_j) \tag{1}$$

Binomial Log Model:

$$y_{ij} \sim B\Big(\; N_{ij}, \; \text{logit}\big(\beta_{0j} + \beta_{1j} \log(x_{ij})\big) \; \Big) \tag{2}$$

	`totAng`	`totAng + intNum`	`log(totAng) + intNum`
Normal	67387.29	65317.02	64636.72
Binomial	66099.40	63753.06	62498.83

The log model considers a typical normal linear model for each interviewer level, except it uses the log of the number of total anglers as a predictor rather than the raw numbers of total anglers. The log model has several nice features for prediction in this case. Firstly by regressing on the log of the total anglers it improves the correlation and relative homoscedasticity of the joint data and improves the accuracy of sensitivity analysis by improving the standard error estimates for each parameter. Secondly the log transformation introduces the expected mean prediction shape, by emphasizing order of magnitude differences in the total number of anglers. The binomial log model considers the observed angler counts as independent draws from a binomial given the know number of total anglers. The log transformation in the binomial case is justified over the traditional binomial glm for similar reasons as the normal log model, as well as simple AIC support of the transformation. All models and model selection criterion were computed using the standard `glm` function in the R software environment for statistical computing (R Development Core Team 2013).

The binomial log model was chosen for its low AIC value and reasonable mean predictions. Untransformed binomial models were considered, however they produce unreasonable observed angler predictions associated with the high numbers of total anglers. The log transformed Normal model provides mostly reasonable predictions, but is not supported by AIC when compared to the binomial models. Additionally transforms of Normal likelihood models have no distributional way of producing observed angler predictions which do not exceed the total number of anglers. If a Normal likelihood model were to gather AIC support, predictions may require truncation. These data contain considerable noise, likely due to the high interviewer turnover rate, which would most effectively be modeled by including appropriate additional predictors to control for these effects. At this point no additional predictors from this dataset were considered to be both sensitive and appropriate for use with prediction in this case.

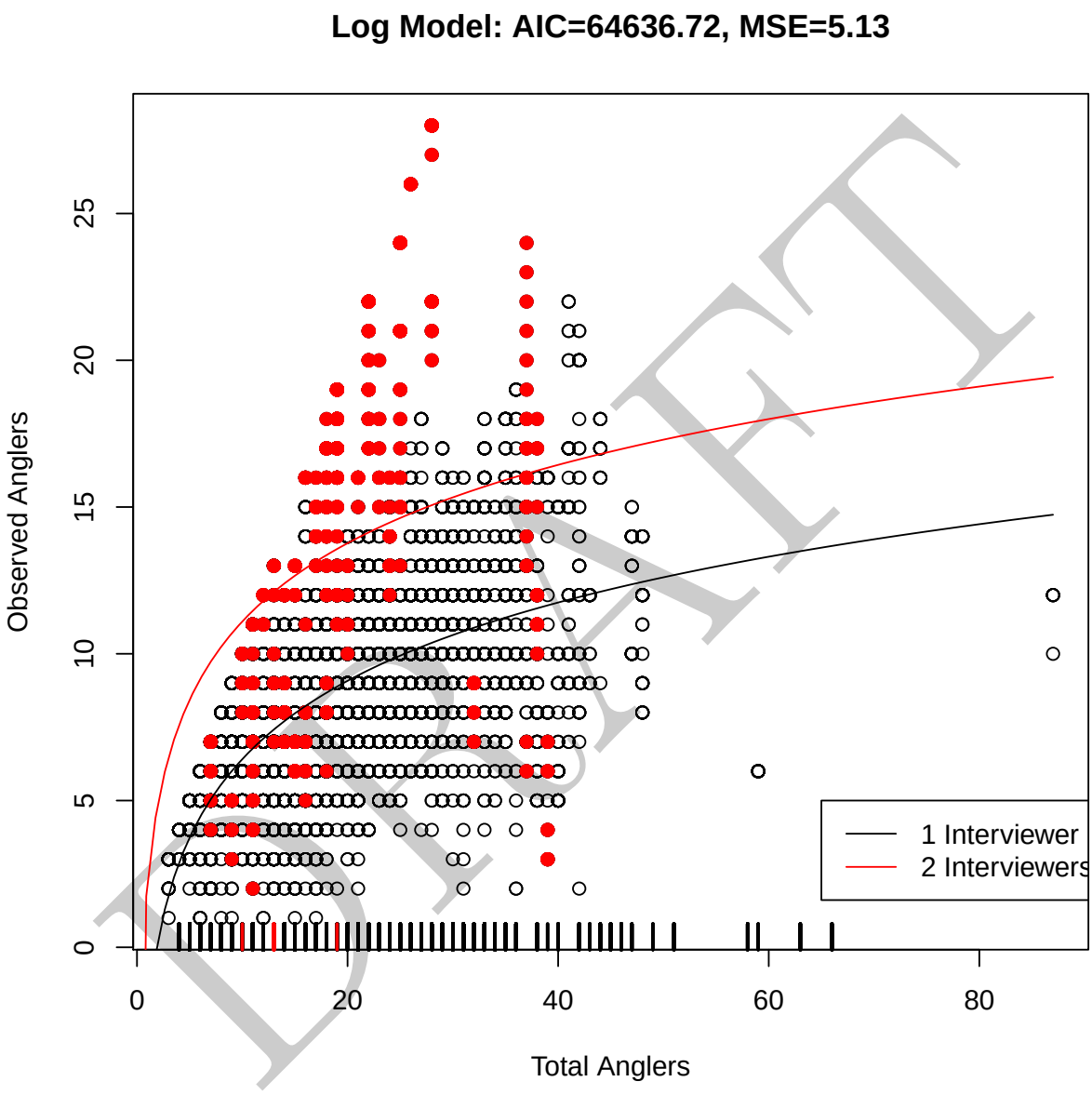

Figure E1: captions tell all the things

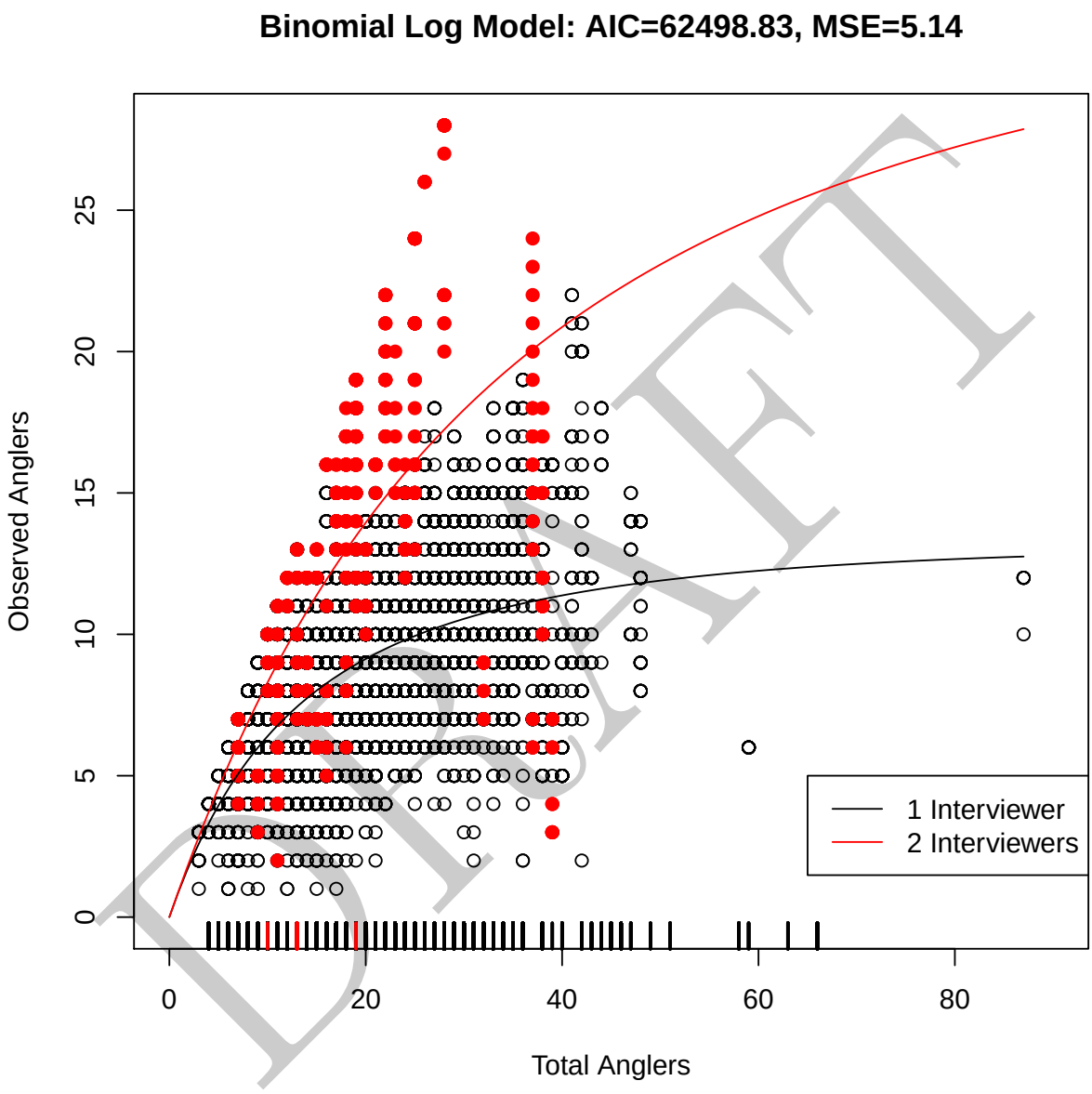

Figure E2: captions tell all the things

Appendix F. Reef Delineation and Selection Methodologies

9.1 Reef Delineation

We identified reefs as potential habitat for China Rockfish in California, Oregon and Washington using a variety of newly available spatial data sources, including 2, 3 and 5 m bathymetry, substrate, lithology and Habitat Suitability geodatabases. Available data sources varied by latitude. To delineate reefs from Point Conception to the Oregon border we used a 2 m binary raster layer (3 m for Cordell Bank) for substrate, where 1 = rough, and 0 = smooth habitat (California Seafloor Mapping Project, data available from: http://seafloor.otterlabs.org/index.html). Rough and smooth substrate was identified by CSMP using 2 rugosity indices based upon bathymetric data, surface:planar area (SA:PA), and vector ruggedness measure (VRM). We considered areas identified as 'rough' as reef habitat. For reefs named Asilomar, Cypress Point, Portuguese Ledge, and Point Joe only a portion of the reefs were mapped at the 2 m resolution, therefore to identify the remaining reef, we used either a 5 m resolution VRM dataset, where the VRM cutoff was greater than 0.001 (Young et al. 2010). For all reefs derived from either 2 m, 3 m or 5 m resolution, we applied a 5 m buffer around each reef habitat for potential error in positional accuracy and all reefs with an area greater than or equal to 100 m^2 were included. We identified seven reefs outside of the 2 m layer that contained a significant number of CPFV points, which we decided to include in the indices. Big Reef, Blunts Reef, Isle of St. James, Point Sur Deep, Sandhill Ledge, portions of San Gregario and Soap Bank reefs were located just outside of 2 m, 3 m and 5 m 'footprint', therefore for these reefs we used the 2005 Habitat Suitability Probability (HSP) geodatabase for China Rockfish (NMFS 2005). The HSP is a modeled output from Essential Fish Habitat geodatabase and is based upon habitat data, depth, and location, where input data are NMFS trawl datasets. In order to identify reef habitats from the Oregon border to Washington, we used a lithology shapefile (Goldfinger et al. 2014) that was based upon multiple seafloor mapping surveys including multibeam and sidescan sonar, sediment grab and core samples, and images. Seafloor types were classified according to established classification schemes (Greene et al. 1999). We considered the following lithology types as 'reef habitat:' Boulder, cobble, cobble mix, hard, rock, and rock mix. All spatial data was projected to NAD 1983 UTM Zone 10.

Reef systems were grouped and stratified by depth at a spatial scale biologically meaningful to China rockfish. China rockfish are typically sedentary and have high site fidelity, therefore we grouped reefs in consideration of how a China rockfish would experience its surroundings. Lea (1999) recaptured China rockfish in the same general location as where they were released, however a few individuals of other rockfish species (copper (*Sebastes caurinus*), gopher (*Sebastes carnatus*), olive (*Sebastes serranoides*) and yellowtail (*Sebastes flavidus*)) demonstrated movement up to 1.5 nautical miles (about 2,700 m), but all were captured within the same reef system. In the Puget Sound copper, brown and quillback were found

to have a home range less than $30m^2$ in high relief rocky areas (Matthews 1990). In other rockfish movement studies, China rockfish were tagged but never recaptured, or there was a sample size of 1 (Hannah and Rankin 2011), Hannah 2012). Using this limited information, we considered that China rockfish would swim no more than 200 m over smooth, sand, or muddy habitat to a neighboring reef, therefore if a reef was greater than ~200 m from rocky reef habitat it was considered a different reef system. If a reef system has contiguous habitat (no channels greater than 200 m) it remained intact, no matter how large the reef (Fig. [**?**],[**?**]). A small number of reefs were merged into 'super reefs' to accommodate 1980s-1990s CDFW location codes that overlapped multiple reefs [. Reef areas were calculated using the zonal stats tool in ArcGIS, stratified by the depth bins 0-19 m, 20-39 m, 40-59 m, 60-79 m, 80-99 m and greater than 100 m using the CSMP depth raster (2 m, 3 m or 5 m resolution). To get depths for those reefs outside the CSMP 'footprint' we used the NOAA Coastal Relief Model raster dataset (90 m) for California, and 100 m digital elevation model (DEM) bathymetry from the Active Tectonics and Seafloor Mapping Lab for Oregon.

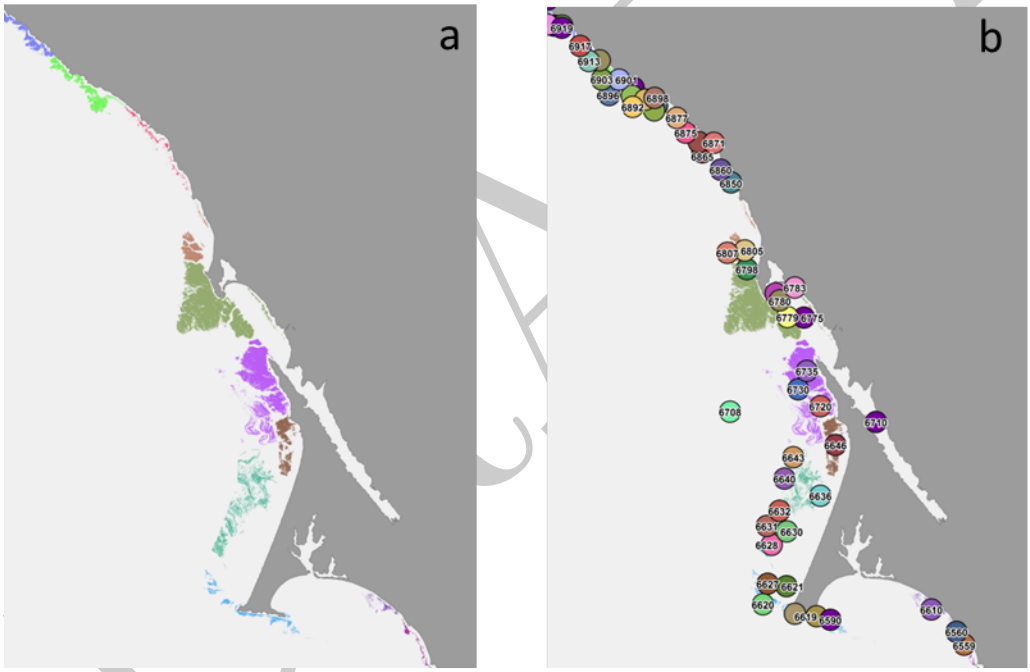

Figure F1: Map of the reefs near Pt. Reyes, CA (a) and overlaid with the fishing location codes from the CDFW 1987-1998 onboard observer program.

Regions were designated to gain appropriate sample sizes needed for modelling. For Oregon, region differences north and south of Florence were explored. In California, 12 regions north of Pt. Conception were defined as follows:

Region 1: Pt. Conception to Pt. Arguello
Region 2: Purisima Point to Pt. Sal
Region 3: San Luis Obispo Bay to Mill Creek (39.959° N)

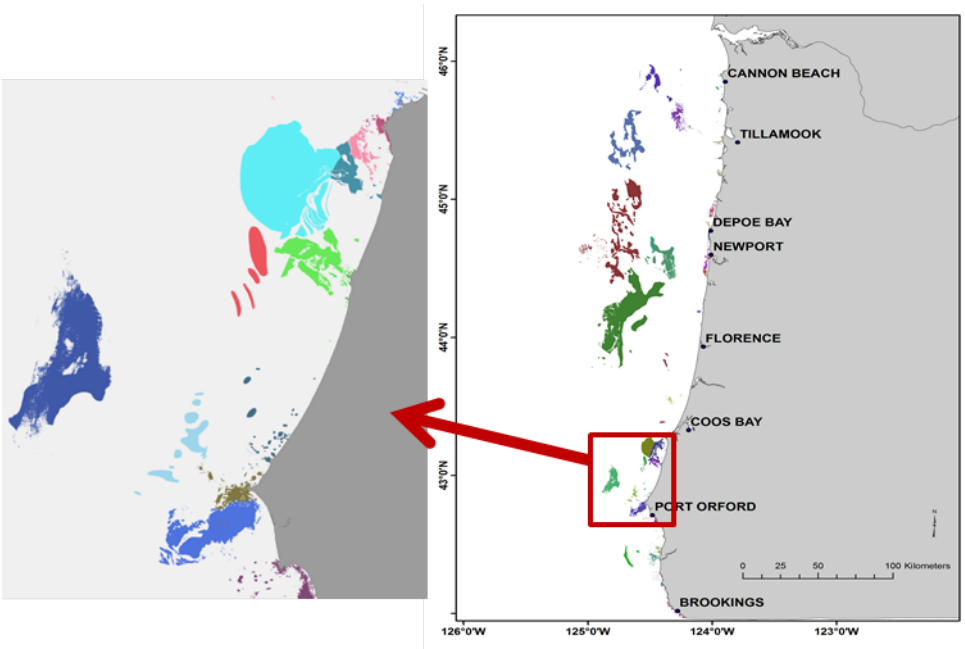

Figure F2: Example of the reefs in Oregon.

Region 4: Lopez Point to Monterey Peninsula
Region 5: Moss Landing to San Francisco Bay
Region 6: Farallon Islands
Region 7: Point Bonita to Drakes Bay
Region 8: Point Reyes to Point Arena
Region 9: Point Arena to south of Ten Mile River
Region 10: north of Ten Mile River to Cape Mendocino (40.16667° N)
Region 11: Cape Mendocino to Eel River
Region 12: Trinidad Head to CA/OR border

9.2 CPFV drift selection

During the 1987-1998 CDFW onboard observer program, fishing location was recorded as one of 459 location codes. When available, the observer also recorded coordinates, either latitude/longitude or Loran. The SWFSC converted all Loran coordinates to latitude/longitude. Using the fishing stops with available coordinates, we assigned a fishing location code to a reef. A handful of fishing location codes were obviously not associated with a reef, or a reef as identified in the above methods, and were not selected in the final dataset. If the coordinates spanned two reefs and we were unable to tell which reef was consistently fished for a given location code, we created aggregated the reefs. This most commonly occurred around the Monterey Bay peninsula. This was necessary as two-thirds of the fishing stops encountering China rockfish had no recorded coordinates and allowed us to retain all fishing location data.

Therefore, for the 1987-1998 CDFW data, any fishing location that was assigned to a reef was included in the analyses as one of the filters applied to the data.

For each CPFV location in the California 1999-2014 and Oregon 2001-2014 data we calculated depth, nearest reef, distance from reef, nearest MPA, distance from MPA using ArcGIS. Geoprocessing steps used were 'near' and 'extract values to points.' For consistency across databases, we used the starting location of the drift to determine if the drift was targeting fish associated with a reef. Drifts that had a distance of 0 m, i.e., were fishing directly on the reef, were included in analyses. Recognizing that some drifts begin adjacent to a reef with the intention of drifting on to the reef, as well as the fact that the starting location may not be recorded at the very start of a drift, we devised a method for including drifts within a certain distance of a reef.

We compiled a list of rockfish species that are strictly reef associated (black and yellow rockfish (*Sebastes chrysomelas*), canary rockfish (*Sebastes pinniger*), China rockfish (*Sebastes nebulosus*), cowcod (*Sebastes levis*), flag rockfish (*Sebastes rubrivinctus*), gopher rockfish (*Sebastes carnatus*), grass rockfish (*Sebastes rastrelliger*), greenblotched rockfish (*Sebastes rosenblatti*), kelp rockfish (Sebastes atrovirens}), quillback rockfish (*Sebastes maliger*), rosy rockfish (*Sebastes rosaceus*), starry rockfish (*Sebastes constellatus*), Treefish (*Sebastes serriceps*), vermilion rockfish (*Sebastes miniatus*), yelloweye rockfish (*Sebastes ruberrimus*)) (personal communication John Field and Tom Laidig, NMFS SWFSC). Using drifts that were greater than 0m from a reef and encountered one at least one of the fifteen species listed above, we calculated the depth for which 75% of the drifts were included. For Oregon this was 83 m, and for California it was 34 m for drifts within the 'footprint' and 141 m for drifts outside the 'footprint.' Any drift (with or without catch) greater than 83 m from a reef was excluded from the analyses.

Appendix G. Regulations Histories

9.3 Commerical Fisheries

9.3.1 Federal waters

For a list of the commercial regulations in federal waters see the Commercial Regulations Home Page, which is housed in the CALCOM database.

9.3.2 Washington

The following commercial regulations pertain to China rockfish species in washington and were provided by the Washington Department of Fish and Wildlife.

2008

The groundfish trawl fishery was closed in Washington from the seaward RCA boundary to the shore north of $48°10'N$ latitude to address increased encounters with yelloweye and canary rockfish

2002

Non-Trawl RCA closed from shore to 100 fm north of $46°16N$ latitude

1995

Commercial hook and line fishing in state waters (0-3 miles) was closed to preserve recreational fishing opportunities and avoid localized depletion; trawlers included in 1999

1992

Commercial hook and line limits reduced to 100 lbs north of Cape Alava and from Destruction Island to Leadbetter Pt.

9.3.3 Oregon

The following commercial regulations pertain to China rockfish in Oregon and were provided by the Oregon Department of Fish and Wildlife.

China rockfish are managed in teh Other Nearshore Rockfish complex

Harvest cap: Total amount in regulation allowed to be impacted in a fishery (for a given season) including both discard mortality and landed catch mortality. Prior to 2007 this term was synonymous with "landing cap."

Landing cap: Total amount in regulation allowed to be landed in a fishery (for a given season). Includes only landed catch mortality (known as a harvest cap before 2007).

9.3.3.1 Incidental Catch Limits in Other Fisheries (established in 2004) Non-permitted vessels: 15 lbs per day of black rockfish, blue rockfish, and nearshore fish, combined, for no more than one landing per day. These species must make-up 25% or less of landed poundage, and must be taken with gear legal in the permitted fishery.

Groundfish trawl fishery: Vessels may land no more than 1,000 lbs of dead black rockfish, blue rockfish, and nearshore fish combined per calendar year if these species make-up 25% or less of landing.

Non-profit aquaria or vessels contracted by non-profit aquaria may land black rockfish, blue rockfish, and nearshore fish for purposes of display or for conducting research on these species.

9.3.3.2 Regulations History A minimum size limit of 12 inches (measured from the tip of the snout to the extreme end of the tail) was implemented for China rockfish in 2000. A sorting requirement for China rockfish was implemented in 2003.

2014

Other Nearshore Rockfish landing cap: 14.3 mt

Other Nearshore Rockfish Period Limits:All Periods 700 lbs

Rockfish Conservation Area: fishing restricted to inside 30 fm

2013

Other Nearshore Rockfish landing cap: 14.3 mt (excluding tiger and vermillion rockfishes)

Other Nearshore Rockfish Period Limits:All Periods 700 lbs

Legal Gear Types: Hook and line (including pole and line, troll, longline, and stick gear) and pot gear (max 35 pots) if a Developmental Fisheries permit for Nearshore species using pot gear was issued in 2003

Rockfish Conservation Area: fishing restricted to inside 30 fm

2012

Other Nearshore Rockfish landing cap: 14.3 mt (excluding tiger and vermillion rockfishes)

Other Nearshore Rockfish Period Limits: All Periods 700 lbs

Rockfish Conservation Area: fishing restricted to inside 30 fm north of $43°N$, restricted to inside 20 fm from $42° - 43°N$

2011

Other Nearshore Rockfish landing cap: 14.3 mt (excluding tiger and vermillion rockfishes)

Other Nearshore Rockfish Period Limits: All Periods 700 lbs

Rockfish Conservation Area: fishing restricted to inside 30 fm north of $43°N$, restricted to inside 20 fm from $42° - 43°N$

2010

Other Nearshore Rockfish landing cap: 14.3 mt (excluding tiger and vermillion rockfishes)

Other Nearshore Rockfish Period Limits: All Periods 700 lbs

Rockfish Conservation Area: fishing restricted to inside 30 fm north of $43°N$, restricted to inside 20 fm from $42° - 43°N$

2009

Other Nearshore Rockfish landing cap: 14.3 mt (excluding tiger and vermillion rockfishes)

Other Nearshore Rockfish Period Limits: All Periods 700 lbs

Legal Gear Types: Hook and line (including pole and line, troll, longline, and stick gear) and pot gear (max 35 pots) if a Developmental Fisheries permit for Nearshore species using pot gear was issued in 2003

Rockfish Conservation Area: fishing restricted to inside 30 fm north of $43°N$, restricted to inside 20 fm from $42° - 43°N$

2008

Other Nearshore Rockfish landing cap: 12.0 mt (excluding tiger and vermillion rockfishes)

Other Nearshore Rockfish Period Limits:All Periods 700 lbs

Sorting Requirement for All Nearshore Rockfish to Species: first year of all nearshore rockfish recorded to species on commercial fish tickets

Rockfish Conservation Area: fishing restricted to inside 30 fm

2007

First year of commercial landing caps (formerly known as harvest caps)

Other Nearshore Rockfish landing cap: 12.0 mt (excluding tiger and vermillion rockfishes)

Other Nearshore Rockfish Period Limits: All Periods 600 lbs

Rockfish Conservation Area: fishing restricted to inside 30 fm

9/1: Other Nearshore Rockfish changes: Period 5 increase to 700 lbs; Period 6 increase to 700 lbs

11/28: Other Nearshore Rockfish change: Period 6 closed

2006

First and only year with 1-month trip limits

Other Nearshore Rockfish harvest cap: 13.5 mt (including tiger and vermillion rockfishes)

Other Nearshore Rockfish 1-month Period Limits: All Periods 200 lbs per month

Rockfish Conservation Area: fishing restricted to inside 30 fm

7/1: Other Nearshore Rockfish change: July increase to 300 lbs

8/11: Other Nearshore Rockfish changes: increase to 350 lbs per month for all remaining months

2005

Other Nearshore Rockfish harvest cap: 12.0 mt 16.0 mt (excluding tiger and vermillion Rockfishes, 13.5 mt including these fish)

Other Nearshore Rockfish Period Limits (Sub-limit from Black and blue Rockfish trip limits): (includes tiger and vermillion Rockfishes, sublimit of Black and blue Rockfish limit): All Periods: 450 lbs

Rockfish Conservation Area: fishing restricted to inside 30 fm

5/1: Other Nearshore Rockfish changes: Periods 3 thru 5 decrease to 325 lbs

10/11: Other Nearshore Rockfish changes: Period 5 and 6 increase to 400 lbs

2004

Permit required for vessels to land Black and blue Rockfishes and other nearshore fish identified in House Bill 3108

Nearshore logbook required for all vessels participating in the fishery

ODFW allowed to prescribe legal gear under this permit except: 1. Diving gear may not be used 2. Pots may not be used unless a vessel was previously issued a pot endorsement in the Interim Nearshore Fisheries Plan through the Developmental Fisheries Program during 2003

Other Nearshore Rockfish harvest cap: 16.0 mt (including tiger and vermillion Rockfishes)

Other Nearshore Rockfish 1-month Period Limits (Sub-limit from Black and blue Rockfish trip limits): (includes tiger and vermillion Rockfish), All Periods: 450 lbs

Rockfish Conservation Area: fishing restricted to inside 30 fm

9/28: Other Nearshore Rockfish change: Period 5 decrease to 100 lbs

11/1: Other Nearshore Rockfish change: Period 6 closed

2003

Commercial Nearshore Fishery (21 nearshore species) placed in the Developmental Fisheries Program

House Bill 3108 establishes formal management of the commercial nearshore fishery, comprised of landings of species on the 'nearshore fish' list beginning, January 1, 2004

Oregon Fish and Wildlife Commission first establishes harvest caps for nearshore species: Other Nearshore Rockfish harvest cap: 21.3 mt

Bi-monthly trip limits first put into place mid-season (July 16th) in 2003

Other Nearshore Rockfish (Sub-limit from Black and blue Rockfish): All periods 300 lbs

Rockfish Conservation Area: fishing restricted to inside 27 fm from January – October

2002

In October, the Pacfic Fishery Management Council adopted conservative harvest limits for 2003 equal to landings from 2000

Oregon Fish and Wildlife Commission directs the Marine Resources Program to evaluate a harvest reduction equal to or greater than 20

Interim commercial harvest management plan implemented place a cap on fishery participants and reduced the nearshore fleet by 50

National Marine Fishery Service begins collecting fishery-dependent data at-sea from vessels participating in the fishery

2000

Pacific City Open Access Minor Nearshore Rockfish Limit (including Black and blue Rockfish here): May 1 - September 30 limit 2,200 lbs per month of which no more than 700 lbs can be rockfish other than Black and blue Rockfishes

1997

New live fish markets in California accelerate growth of the Commercial Nearshore Fishery

1994

Early to mid 1990s

Commercial Nearshore Fishery develops as an open access fishery

9.3.4 California

The following commercial regulations pertain to China rockfish species in washington and were provided by the California Department of Fish and Wildlife. There has been a 12 inch minimum size limit on China rockfish since 2001. ####Gear Restrictions

2001

Hook and line limited to 150 hooks with 15 hooks per line within 1 mile of shore

1996

Finfish trap permit required

1994

Proposition 132 implemented to prohibit gill nets within state waters

1953

Legislation prohibits trawl within 3 miles of shore

9.3.4.1 Limited Entry Permit System and Trip Limits Trips limits now vary according to constraints from bycatch of canary adn yelloweye rockfishes

2003

Split into shallow and deep nearshore restricted access permits, with shallow nearshore permits in 4 regions and the deep nearshore permits statewide

Trip limits for restricted access fishery, with differential trip limits north and south of $40°10'N$ for both permits, and only the deep nearshore permits south of Point Conception

Subject to depth restrictions consitsten wit the shoreward non-trawl RCA

1999

Nearshore fishery permit requied

1994

Limited entry permits and open access fishery established for Sebastes complex

Limited entry and open access trip limits on the Sebastes complex

9.4 Recreational Fisheries

9.4.1 Washington

The following recreational regulations pertain to nearshore rockfish species in washington and were provided by the Washington Department of Fish and Wildlife.

9.4.1.1 North Coast (MCA 3 and 4) This area has a 20 fm depth restriction.

2014-2013

May 1 - Sept 30: No groundfish except, lingcod, Pacific cod and sablefish on days open to halibut fishing

2012-2011
June 1 - Sept 30: No roundfish except on days open to halibut fishing

2010-2009
May 21 - SepT 30: No groundfish except on days open to halibut fishing

2008-2007
May 21 - Sep 30: No grounfish

2006
May 21 - Setp 30: No rockfish or lingcod

9.4.1.2 South Coast (MCA 2) This area has a 30 fm depth restriction.

2014-2013
March 18 - June 15: No groundfish except rockfish; Pacific cod and sablefish allowed May 1 June 15; lingcod allowed on days open to halibut

2012-2011
March 18 - June 15: No groundfish except rockfish; Pacific cod and sablefish allowed May 1 June 15; lingcod allowed on days open to halibut

2010-2009
March 18 - June 15: No groundfish; Pacific cod and sablefish allowed May 1 June 15

2008-2007
March 18 - June 15: No groundfish; Pacific cod and sablefish allowed May 1 June 15

2006
March 18 - June 15: No rockfish or lingcod

9.4.1.3 Columbia River (MCA 1) This area has no depth restriction.

2014-2006
Year-round: No groundfish except Pacific cod and sablefish allowed with halibut on board

9.4.1.4 Daily Groundfish and Rockfish Limits Groundfish includes: rockfish, Pacific cod, flatfish (except halibut), lingcod, ratfish, sablefish, cabezon, greenling, sculpins, sharks, skates, and surfperch excluding shiner perch. There are sub-bag limits for lingcod (2) coastwide and cabezon (1) in Marine Area 4. The groundfish daily bag limit in Marine Area 4B was reduced to 10 in 2011.

2015-2011: 20 lbs/day

2010-1961: 15 fish

1960-1938: 12 fish

There is no minimum size limit for rockfish. Marine Area 4B bag limit allows retention of 6 blue and black rockfish only (2010-2015).

2015-1995: 20 lbs/day

1994-1992: 15 fish

1991-1961: 12 fish

1960-1954: 10 fish

9.4.2 Oregon

The following regulations pertain to nearshore rockfish species in Oregon and were provided by the Oregon Department of Fish and Wildlife. There were no bag limits prior to 1976. Gear restrictions have remained the same for all years, i.e., three hooks.

2015

All rockfish, greenlings, Cabezon, skates, and other marine fish species not listed in the 2015 Oregon Sport Fishing Regulations in the Marine Zone: 7-fish daily bag limit in aggregate, of which no more than three may be blue Rockfish and no more than one may be a Cabezon (when Cabezon is open), and no more than one may be a canary rockfish.

Retention of Yelloweye, Canary, China, Copper and Quillback rockfish is prohibited.

2014 - 2013

Same a 2012

2012

Rockfish, Cabezon, greenlings (10" min.), and other marine species not listed under Marine Zone in the Oregon Sport Fishing Regulations: 7 daily in aggregate of which no more than 1 may be a Cabezon April 1 – Sept. 30.

30-fathom curve: Seaward closed April 1-Sept. 30 [for groundfish group].

2011

Rockfish, Cabezon, greenling (10" min.), and other marine species not listed under Marine Zone in the Oregon Sport Fishing Regulations: 7 daily in aggregate of which no more than 1 may be a Cabezon April 1 – Sept. 30

40-fm curve: Seaward closed April 1-Sept. 30

7/21: Offshore of 20-fm line closed due to Yelloweye Rockfish impacts

8/13: Groundfish retention with nearshore halibut (central coast) prohibited

10/1: All depths reopened for groundfish (Yelloweye Rockfish impacts sufficiently slowed); Groundfish retention with nearshore halibut allowed again

2010

Same as 2009 including "rockfish" et al bag limit: 7 (misprinted in regulations booklet as 6)

Definition of "groundfish group" added

7/24: Offshore of 20-fm line closed through Dec. 31 due to Yelloweye Rockfish impacts

2009

Same as 2008 through April 30 (adopted late), then increase in "marine fish" bag limit

Rockfish, Cabezon, greenling (10" min.), and other marine species not listed: 6

40-fm curve: Seaward closed April 1-Sept. 30

5/1: "Rockfish" et al bag limit increased to 7 (in permanent rule)

2008

Same as 2007

7/7: "Rockfish" et al bag limit reduced from 6 to 5 and closed outside 20-fm line through Dec. 31 [sic – see 9/7 change] and flatfish closed outside 40-fm line through Dec. 31 [sic]

9/7: Return to preseason regs., i.e., "rockfish" et al bag limit back to 6 and waters closed offshore of 40-fm line only through Sept. 30 (open offshore Oct-Dec)

2007

Rockfish, Cabezon, greenling (10" min.), and other marine species not listed: 6

40-fm curve: Seaward closed April 1-Sept. 30

2006

Rockfish, Cabezon, greenling (10" min.), flounder, sole and other marine species not listed: 6

40-fm curve: Seaward closed June 1-Sept. 30

2005

Rockfish, Cabezon, greenling (10" min.), flounder, sole and other marine species not listed: 8

40-fm curve: Seaward closed June 1-Sept. 30

7/16: Rockfish et al bag limit reduced to 5

10/18: Black RF prohibited for boats, Grounfish closed seaward of 40 fm

2004

Rockfish, Cabezon, greenling (10" min.), flounder, sole and other marine species not listed: 10, no more than 1 P. Halibut

Retention of yelloweye rockfish and canary rockfish prohibite

40-fm curve: Seaward closed June 1-Sept. 30

9/3: Rockfish, lingcod and greenling prohibited

2003

Rockfish, Cabezon, greenling, flounder, sole and other marine species not listed: 10, no more than 1 Canary RF, 1 Yelloweye RF and 1 P. Halibut

11/21: ocean closed to GF outside 27-fm line

2002

Rockfish: 10, no more than 1 Canary RF and 1 Yelloweye RF

2001

Rockfish: 10, no more than 1 Canary RF

2000

Rockfish: 10, no more than 3 Canary RF

1999-1994

Rockfish: 15, no more than 10 Black Rockfish

1993-1986

Rockfish, Cabezon and greenling: 15

1985-1979

Other fish: 25, no more than 3 lingcod, 2 halibut and 15 rockfish/Cabezon/greenling

1978

Other fish: 10 Then effective 4/1 = - other fish: 25, no more than 3 lingcod, 2 halibut and 15 rockfish/Cabezon/greenling

1977

Other fish: 25, no more than 5 lingcod and 2 halibut

1976

Other fish: 25

9.4.3 California

CDFW Recreational Season Lengths and Depth Restrictions for Select California Groundfish (1999-2014)

The following are summarized recreational season and depth limit regulations for select California groundfish from 1999 through 2014, including most inseason changes. Information was compiled from California's sport fishing booklet and supplemental booklets, as well as some emergency rulemakings.

Nearshore rockfish is defined as: black, black-and-yellow, blue, brown, calico, China, copper, gopher, grass, kelp, olive, quillback, and treefish rockfishes.

Shelf rockfish is defined as: bocaccio, canary, cowcod, widow, yelloweye, yellowtail, shortbelly, bronzespotted, chameleon, chilipepper, dwarf-red, flag, freckled, greenblotched, greenspotted, greenstriped, halfbanded, honeycomb, Mexican, pink, pinkrose, pygmy, redstripe, rosethorn, rosy, silvergrey, speckled, squarespot, starry, stripetail, swordspine, tiger, and vermilion rockfishes.

Key:

	Allowed in all waters				
20	Depth closed greater than 20fm				
30	Depth closed greater than 30fm				
40	Depth closed greater than 40fm				
50	Depth closed greater than 50fm				
60	Depth closed greater than 60fm				
30-60	Depth open between 30-60fm				
	Closed	depth	In-season change		In-season closure

CALIFORNIA RECREATIONAL REGULATORY HISTORY, 1999

Statewide

California/Oregon Border to California/Mexico border

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings (rock, kelp), Ocean whitefish, Shelf rockfish, Lingcod, Sanddabs												

CALIFORNIA RECREATIONAL REGULATORY HISTORY, 2000

Northern Management Area

California/Oregon Border to Near Cape Mendocino (40° 10′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings (rock, kelp), Ocean whitefish, Shelf rockfish												
Lingcod[1]												
Sanddabs												

Central Management Area

Near Cape Mendocino (40° 10′ N lat.) to Lopez Point (36° 00′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
California scorpionfish, California sheephead, Cabezon, Greenlings, Ocean Whitefish												
Nearshore rockfish, Shelf rockfish												
Lingcod[1]												
Sanddabs												

Version 05/21/15

Figure G1

Southern Management Area
Lopez Point (36° 00′ N lat.) to US/Mexico Border

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
California scorpionfish, California sheephead, Cabezon, Greenlings (rock, kelp), Ocean whitefish												
Nearshore rockfish, Shelf rockfish												
Lingcod[1]												
Sanddabs												

Notes for 2000:
1. Statewide emergency lingcod closure in November and December; closure did not apply to shore-based anglers.

CALIFORNIA RECREATIONAL REGULATORY HISTORY, 2001

Northern Management Area [1, 2, 3]
California/Oregon Border to Near Cape Mendocino (40° 10′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings (rock, kelp), & Ocean whitefish												
Shelf rockfish[3], Lingcod[3]												
Sanddabs												

Central Management Area [1, 2, 3]
Near Cape Mendocino (40° 10′ N lat.) to Point Conception (34° 27′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish					20	20					20	20
California sheephead, Ocean whitefish												
Cabezon, Greenlings (rock, kelp)											20	20
Shelf rockfish[3], Lingcod[3]												
Sanddabs												

Southern Management Area [1, 2, 3]
Point Conception (34° 27′ N lat.) to the U.S./Mexico border

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish											20	20
California scorpionfish, Ocean whitefish	20	20									20	20
California sheephead												
Cabezon, Greenlings (rock, kelp)											20	20
Shelf rockfish[3], Lingcod[3]												
Sanddabs												

Notes for 2001:
1. Emergency action was taken by the Commission in order to conform to federal regulations; closures did not apply to shore-based anglers.
2. Inseason emergency closure on October 29 prohibited angling for shelf and slope rockfishes and lingcod. Possession of these fishes was prohibited in state waters. In waters less than 20 fathoms, fishing for nearshore rockfishes, California scorpionfish, cabezon, and greenlings continued to be permitted (including waters around offshore rocks and islands less than 20 fathoms). Fishing for California sheephead continued to be permitted in all waters except the Cowcod Conservation Areas.
3. On January 1, 2000 the California Fish and Game Commission adopted regulations to be effective through 2002 that closed lingcod, nearshore, and shelf rockfishes as follows: south of Lopez Point to the Mexico border Jan. - Feb.; and north of Lopez Point to Cape Mendocino Mar. - Apr. New regulations that superceded the regulations adopted January 1, 2000 went into effect Mar. 5, 2001. These new regulations included a different regional management boundary between the central and southern management areas – Point Conception instead of Lopez Point. Because of the delay in implementation (March instead of January), the area between Lopez Point and Point Conception was closed from Jan. 1 - Feb. 28, 2001 (as part of the southern area under the 2000 regulations). This area then was open to fishing from March

Figure G2

1- 4, 2001 (as part of the 2000 open fishing period for the southern area). However, once the 2001 regulations took affect on Mar. 5, 2001, this section of coast was closed again from Mar. 5 – Apr. 30 (as part of the central area under the 2001 regulations).

CALIFORNIA RECREATIONAL REGULATORY HISTORY, 2002

Northern Management Area [1, 2, 3]

California/Oregon Border to near Cape Mendocino (40° 10′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, Ocean whitefish, Shelf rockfish, Lingcod												
California sheephead[1]												
Cabezon[1]												
Greenlings (rock, kelp) [1]												
Sanddabs												

Central Management Area [1, 2, 3]

Near Cape Mendocino (40° 10′ N lat.) to Point Conception (34° 27′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish					20	20	20	20	20	20		
California sheephead[1]												
Cabezon[1]												
Greenlings (rock, kelp) [1]												
Ocean whitefish[2]							20	20	20	20	20	20
Shelf rockfish[2], Lingcod[2]					20	20	20	20	20	20		
Sanddabs												

Southern Management Area [1, 2, 3]

Point Conception (34° 27′ N lat.) to the U.S./Mexico border

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish[2]							20	20	20	20		
California sheephead[1]												
Cabezon[1]												
Greenlings (rock, kelp) [1]												
Ocean whitefish[2]							20	20	20	20	20	20
Shelf rockfish[2], Lingcod[2]							20	20	20	20		
Sanddabs												

Notes for 2002:

1. Inseason emergency closure took effect for greenlings on July 1, cabezon on July 29, and California sheephead on November 1. Closures do not apply to shore-based anglers, or spearfishing from shore or a man-made structure.
2. The emergency closure for shelf rockfish, lingcod, California scorpionfish, and ocean whitefish went into effect July 1. Nearshore fishing was still allowed in waters shallower than 20 fathoms for nearshore rockfishes, California scorpionfish, and ocean whitefish. There was a special allowance for two shelf rockfish ONLY if taken incidental to nearshore fishing in less than 20 fathoms EXCLUDING bocaccio, canary, cowcod, and yelloweye rockfish, which could not be taken.
3. Management Area boundaries changed January 10, 2002.

CALIFORNIA RECREATIONAL REGULATORY HISTORY, 2003

Northern Management Area [2, 3]

California/Oregon Border to near Cape Mendocino (40° 10′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish[3], California scorpionfish[3]												
California sheephead[2], Cabezon[2], Greenlings (rock, kelp) [2]												
Ocean whitefish												
Shelf rockfish[3], Lingcod[3]												
Sanddabs												

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Figure G3

Central Management Area [2, 3]

Near Cape Mendocino (40° 10′ N lat.) to Point Conception (34° 27′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
California scorpionfish[3]	20	20					20	20	20	20	20	
California sheephead[2]												
Cabezon[2], Greenlings (rock, kelp) [2]							20	20	20			
Ocean whitefish							20	20	20	20	20	20
Nearshore rockfish[3], Shelf rockfish[3], Lingcod[3]							20	20	20	20	20	
Sanddabs												

Southern Management Area [1, 2, 3]

Point Conception (34° 27′ N lat.) to the U.S./Mexico border

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
California scorpionfish[1, 3]	20	20					20	20	30	30	30	
California sheephead[2]												
Cabezon[2], Greenlings (rock,kelp) [2]							20	20	30			
Ocean whitefish							20	20	30	30	30	30
Nearshore rockfish[3], Shelf rockfish[3], Lingcod[3]							20	20	30	30	30	
Sanddabs												

Notes for 2003:

1. Fishing for California scorpionfish was allowed in less than 50 fathoms during July and August, only in the area of Huntington Flats, as defined by California Code of Regulations, Title 14, subsection 27.82(d)(7).
2. Inseason emergency closures on October 8 for cabezon, greenlings, and California sheephead to all recreational take in all waters at all depths..
3. Inseason emergency closure on December 8 for nearshore rockfishes, California scorpionfish, shelf rockfishes, and lingcod.

CALIFORNIA RECREATIONAL REGULATORY HISTORY, 2004

Northern Management Area [1, 2]

California/Oregon Border to near Cape Mendocino (40°10'N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California sheephead, Cabezon, Greenlings (rock, kelp), Ocean whitefish, Shelf rockfish					30	30	30	30	30	30	30	30
Black rockfish[1]						30	30	30				
Lingcod[2]					30	30	30	30	30	30		
Sanddabs												

North-Central Management Area [2, 3]

Near Cape Mendocino (40°10'N lat.) to Lopez Point (36°00'N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings (rock, kelp), Ocean whitefish, Shelf rockfish	30	30						20	20	20		
Lingcod[2]	30	30						20	20	20		
Sanddabs												

South-Central Management Area [2]

Lopez Point (36° 00′ N lat.) to Pt. Conception (34° 27′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings (rock, kelp), Ocean whitefish, Shelf rockfish	30	30			20	20		20	20	20	20	20
Lingcod[2]	30	30			20	20		20	20	20		
Sanddabs												

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Figure G4

Southern Management Area[2]
Pt. Conception (34° 27′ N lat.) to US/Mexico Border

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California sheephead, Cabezon, Greenlings (rock, kelp), Ocean whitefish, Shelf rockfish			60	60	60	60	60	60	30	30	60	60
California scorpionfish			60	60							60	60
Lingcod[2]			60	60	60	60	60	60	30	30		
Sanddabs												

Notes for 2004:
1. Inseason change on May 16 reduced rockfish bag limit to zero in May, and September through December.
2. Inseason change on April 1 decreased lingcod bag limit from two to one fish and increased size limit from 24 to 30 inches.
3. Inseason change on March 1 closed rockfish, lingcod and associated species on Cordell Bank (Marin County).

CALIFORNIA RECREATIONAL REGULATORY HISTORY, 2005

Northern Management Area[1]
California/Oregon Border to near Cape Mendocino (40° 10′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, Black rockfish, California sheephead, Greenlings (rock, kelp), Ocean whitefish, Shelf rockfish					30	30	30	30	30	30	30	30
Cabezon[1]					30	30	30	30	30	30	30	
Lingcod					30	30	30	30	30	30	30	
Sanddabs												

North-Central Management Area[1]
Near Cape Mendocino (40° 10′ N lat.) to Pigeon Point (37° 11′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California sheephead, Greenlings (rock, kelp), Ocean whitefish, Shelf rockfish							20	20	20	20	20	20
Cabezon[1]							20	20	20	20	20	
Lingcod							20	20	20	20	20	
Sanddabs												

Monterey South – Central Management Area[1]
Pigeon Point (37° 11′ N lat.) to Lopez Point (36° 00′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California sheephead, Greenlings (rock, kelp), Ocean whitefish, Shelf rockfish							20	20	20	20	20	20
Cabezon[1]							20	20	20	20	20	
Lingcod							20	20	20	20	20	
Sanddabs												

Morro Bay South – Central Management Area[1]
Lopez Point (36° 00′ N lat.) to Pt. Conception (34° 27′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon[1], Greenlings, Ocean whitefish, Shelf rockfish, Lingcod					40	40	40	40	40			
Sanddabs												

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Figure G5

Southern Management Area[1]
Pt. Conception (34° 27′ N lat.) to US/Mexico Border

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California sheephead, Greenlings, Ocean whitefish, Shelf rockfish			30-60	60	60	60	60	60	30	30	60	60
California scorpionfish										30	60	60
Cabezon[1]			30-60	60	60	60	60	60	30	30	60	
Lingcod				60	60	60	60	60	30	30	60	
Sanddabs												

Notes for 2005:
1. Inseason change on November 18 closed cabezon statewide for December.

CALIFORNIA RECREATIONAL REGULATORY HISTORY, 2006

Northern Management Area[1]
California/Oregon Border to near Cape Mendocino (40° 10′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, Black rockfish, California sheephead, Cabezon, Greenlings (rock, kelp), Ocean whitefish, Shelf rockfish					30	30	30	30	30	30	30	30
Lingcod					30	30	30	30	30	30	30	
Sanddabs												

North-Central Management Area [2, 3]
Near Cape Mendocino (40° 10′ N lat.) to Pigeon Point (37° 11′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings (rock, kelp), Ocean whitefish, Shelf rockfish							30	30	30	30	30	30
Lingcod							30	30	30	30	30	
Sanddabs												

Monterey South – Central Management Area [2, 3]
Pigeon Point (37° 11′ N lat.) to Lopez Point (36° 00′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings (rock, kelp), Ocean whitefish, Shelf rockfish							30	30	30	30	30	30
Lingcod							30	30	30	30	30	
Sanddabs												

Morro Bay South – Central Management Area [4]
Lopez Point (36° 00′ N lat.) to Pt. Conception (34° 27′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings (rock, kelp), Ocean whitefish, Shelf rockfish, Lingcod					40	40	40	40	40	40		
Sanddabs												

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Figure G6

Southern Management Area [5, 6]

Pt. Conception (34° 27′ N lat.) to US/Mexico Border

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings, Ocean Whitefish, Shelf rockfish			60	60	60	60	60	60	60	60	60	60
Lingcod				60	60	60	60	60	60	60	60	
Sanddabs												

Notes for 2006:

1. Inseason change on March 28 decreased the fishing depth limit from 40 to 30 fathoms in the Northern management area, and opened the months of November and December to recreational fishing (except for lingcod which was closed).
2. Inseason change on March 28 kept depth limit at 20 fathoms in the North-Central and Monterey South-Central management areas, but opened December to recreational fishing (except for lingcod which was closed).
3. Inseason change on July 1 liberated the fishing depth limit from 20 fathoms to 30 fathoms in the North-Central and Monterey South-Central management areas (except for lingcod which was cloased).
4. Inseason change on July 1 opened October to recreational fishing in the Morro Bay South-Central management area.
5. Inseason change on March 28 allowed recreational fishing in the Southern Management area during October (with 30 fathom depth limit), November (60 fathom depth limit), and December (60 fathom depth limit), except for lingcod which was closed to all fishing.
6. Inseason change on July 1 liberated the fishing depth limit from 30 fathoms to 60 fathoms in the Southern Management area for the remainder of the season (except for lingcod which remained closed in December).

CALIFORNIA RECREATIONAL REGULATORY HISTORY, 2007

Northern Management Area [1]

California/Oregon Border to near Cape Mendocino (40° 10′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, Black rockfish, Cabezon, Greenlings (rock, kelp), Shelf rockfish, Lingcod					30	30	30	30	30			
California sheephead, Ocean whitefish					30	30	30	30	30	30	30	30
Sanddabs												

North-Central Management Area [1]

Near Cape Mendocino (40° 10′ N lat.) to Pigeon Point (37° 11′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, Cabezon, Greenlings (rock, kelp), Shelf rockfish, Lingcod						30	30	30	30			
California sheephead, Ocean whitefish						30	30	30	30	30	30	
Sanddabs												

Monterey South – Central Management Area

Pigeon Point (37° 11′ N lat.) to Lopez Point (36° 00′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings (rock, kelp), Ocean whitefish, Shelf rockfish, Lingcod					40	40	40	40	40	40	40	
Sanddabs												

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Figure G7

Morro Bay South – Central Management Area
Lopez Point (36° 00′ N lat.) to Pt. Conception (34° 27′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings (rock, kelp), Ocean whitefish, shelf rockfish, Lingcod					40	40	40	40	40	40	40	
Sanddabs												

Southern Management Area [2]
Pt. Conception (34° 27′ N lat.) to US/Mexico Border

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California sheephead, Cabezon, Greenlings (rock, kelp), Ocean whitefish, Shelf rockfish			60	60	60	60	60	60	60	60	60	60
California scorpionfish	40	40	60	60	60	60	60	60	60	60	60	60
Lingcod				60	60	60	60	60	60	60	60	
Sanddabs												

Notes for 2007:
1. Inseason emergency closure on October 1 north of Pigeon Point (37°11′N. lat) for nearshore rockfish, black rockfish, cabezon, greenlings, shelf rockfish and lingcod.
2. Cowcod Conservation area (west of San Diego) was open to recreational fishing from March through December from shore to 20 fathoms (see http://www.dfg.ca.gov/marine/cowcod.asp)

CALIFORNIA RECREATIONAL REGULATORY HISTORY, 2008

Northern Management Area [1, 3]
California/Oregon Border to near Cape Mendocino (40° 10′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, Black rockfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish					20	20	20	20				
Lingcod					20	20	20	20				
Sanddabs												

North-Central North of Point Arena Management Area [1, 2, 3]
Near Cape Mendocino (40° 10′ N lat.) to Point Arena (38° 57′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod						20	20	20				
Sanddabs												

North - Central South of Point Arena Management Area [1, 2]
Point Arena (38° 57′ N lat.) to Pigeon Point (37° 11′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod						20	20	20	20	20	20	
Sanddabs												

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Figure G8

Monterey South – Central Management Area
Pigeon Point (37° 11′ N lat.) to Lopez Point (36° 00′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod					40	40	40	40	40	40	40	
Sanddabs												

Morro Bay South – Central Management
Lopez Point (36° 00′ N lat.) to Pt. Conception (34° 27′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod					40	40	40	40	40	40	40	
Sanddabs												

Southern Management Area [4]
Pt. Conception (34° 27′ N lat.) to US/Mexico Border

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish			60	60	60	60	60	60	60	60	60	60
California scorpionfish	40	40	60	60	60	60	60	60	60	60	60	60
Lingcod				60	60	60	60	60	60	60	60	
Sanddabs												

Notes for 2008:

1. Inseason change on May 9 decreased depth limit from 30 fathoms to 20 fathoms in the Northern and North-Central Management Areas.
2. Inseason emergency change on September 2 split the North-Central Management Area into two areas: North-Central North of Point Arena, and North-Central South of Point Arena.
3. Inseason emergency closure on September 2 for nearshore rockfish, California sheephead, California scorpionfish, cabezon, greenlings, Ocean whitefish, shelf rockfish and lingcod for the Northern and North-Central North of Point Arena Management areas.
4. Cowcod Conservation area (west of San Diego) was open to recreational fishing from March through December from shore to 20 fathoms (see http://www.dfg.ca.gov/marine/cowcod.asp)

CALIFORNIA RECREATIONAL REGULATORY HISTORY, 2009

Northern Management Area
California/Oregon Border to near Cape Mendocino (40° 10′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, Black rockfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod					20	20	20	20	20			
Sanddabs												

North-Central - North of Point Arena Management Area
Near Cape Mendocino (40° 10′ N lat.) to Point Arena (38° 57′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod					20	20	20	20				
Sanddabs												

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Figure G9

North-Central South of Point Arena Management Area
Point Arena (38° 57′ N lat.) to Pigeon Point (37° 11′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod							20	20	20	20	20	20		
Sanddabs														

Monterey South – Central Management Area
Pigeon Point (37° 11′ N lat.) to Lopez Point (36° 00′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod					40	40	40	40	40	40	40		
Sanddabs												

Morro Bay South – Central Management Area
Lopez Point (36° 00′ N lat.) to Pt. Conception (34° 27′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod					40	40	40	40	40	40	40		
Sanddabs												

Southern Management Area
Pt. Conception (34° 27′ N lat.) to US/Mexico Border

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish			60	60	60	60	60	60	60	60	60	60
California scorpionfish	40	40	60	60	60	60	60	60	60	60	60	60
Lingcod				60	60	60	60	60	60	60	60	
Sanddabs												

CALIFORNIA RECREATIONAL REGULATORY HISTORY, 2010

Northern Management Area
California/Oregon Border to near Cape Mendocino (40° 10′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, Black rockfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod					20	20	20	20				
Sanddabs												

North-Central - North of Point Arena Management Area
Near Cape Mendocino (40° 10′ N lat.) to Point Arena (38° 57′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod					20	20	20	20				
Sanddabs												

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Figure G10

North-Central South of Point Arena Management Area
Point Arena (38° 57′ N lat.) to Pigeon Point (37° 11′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod							30	30	30	30	30		
Sanddabs													

Monterey South – Central Management Area
Pigeon Point (37° 11′ N lat.) to Lopez Point (36° 00′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod					40	40	40	40	40	40	40		
Sanddabs													

Morro Bay South – Central Management Area
Lopez Point (36° 00′ N lat.) to Pt. Conception (34° 27′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod					40	40	40	40	40	40	40		
Sanddabs													

Southern Management Area
Pt. Conception (34° 27′ N lat.) to US/Mexico Border

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish			60	60	60	60	60	60	60	60	60	60
California scorpionfish	40	40	60	60	60	60	60	60	60	60	60	60
Lingcod				60	60	60	60	60	60	60	60	
Sanddabs												

CALIFORNIA RECREATIONAL REGULATORY HISTORY, 2011

Northern Management Area
California/Oregon Border to near Cape Mendocino (40° 10′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, Black rockfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod					20	20	20	20	20	20		
Sanddabs												

Mendocino Management Area
Near Cape Mendocino (40° 10′ N lat.) to Point Arena (38° 57′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod					20	20	20	20				
Sanddabs												

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Figure G11

San Francisco Management Area
Point Arena (38° 57′ N lat.) to Pigeon Point (37° 11′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod						30	30	30	30	30	30	30
Sanddabs												

Central Management Area
Pigeon Point (37° 11′ N lat.) to Pt. Conception (34° 27′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod					40	40	40	40	40	40	40	40
Sanddabs												

Southern Management Area
Pt. Conception (34° 27′ N lat.) to US/Mexico Border

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish			60	60	60	60	60	60	60	60	60	60
California scorpionfish	60	60	60	60	60	60	60	60	60	60	60	60
Lingcod			60	60	60	60	60	60	60	60	60	60
Sanddabs												

Notes for 2011:
1. As part of the biennial management specification process, the North-Central North of Point Arena Management area was renamed the Mendocino Management Area, the North-Central South of Point Arena Management Area was renamed the San Francisco Management Area, and the Monterey South-Central and Morro Bay South-Central Management Areas were combined into the Central Management Area.
2. Due to a delay in the federal regulatory process, recreational regulations for 2011 in California did not go into effect until June 11, 2011.

CALIFORNIA RECREATIONAL REGULATORY HISTORY, 2012

Northern Management Area
California/Oregon Border to near Cape Mendocino (40° 10′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, Black rockfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod					20	20	20	20	20	20		
Sanddabs												

Mendocino Management Area
Near Cape Mendocino (40° 10′ N lat.) to Point Arena (38° 57′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod					20	20	20	20				
Sanddabs												

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Figure G12

San Francisco Management Area
Point Arena (38° 57′ N lat.) to Pigeon Point (37° 11′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod						30	30	30	30	30	30	30
Sanddabs												

Central Management Area
Pigeon Point (37° 11′ N lat.) to Pt. Conception (34° 27′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod					40	40	40	40	40	40	40	40
Sanddabs												

Southern Management Area
Pt. Conception (34° 27′ N lat.) to US/Mexico Border

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish			60	60	60	60	60	60	60	60	50	50
California scorpionfish	60	60	60	60	60	60	60	60	60	60	50	50
Lingcod			60	60	60	60	60	60	60	60	50	50
Sanddabs												

Notes for 2012:

1. Sub-bag limit for greenling increased from two fish to 10 fish within the 10 fish daily RGC bag limit.
2. High encounter rates for cowcod in the SMA lead to inseason action to restrict anglers' maximum fishing depth from 60fm to 50fm.

CALIFORNIA RECREATIONAL REGULATORY HISTORY, 2013

Northern Management Area
California/Oregon Border to near Cape Mendocino (40° 10′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, Black rockfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod					20	20	20	20	20	20		
Sanddabs												

Mendocino Management Area
Near Cape Mendocino (40° 10′ N lat.) to Point Arena (38° 57′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod					20	20	20	20				
Sanddabs												

Version 05/21/15

Figure G13

San Francisco Management Area
Point Arena (38° 57′ N lat.) to Pigeon Point (37° 11′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod						30	30	30	30	30	30	30
Sanddabs												

Central Management Area
Pigeon Point (37° 11′ N lat.) to Pt. Conception (34° 27′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod					40	40	40	40	40	40	40	40
Sanddabs												

Southern Management Area
Pt. Conception (34° 27′ N lat.) to US/Mexico Border

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish			50	50	50	50	50	50	50	50	50	50
California scorpionfish	50	50	50	50	50	50	50	50	50	50	50	50
Lingcod			50	50	50	50	50	50	50	50	50	50
Sanddabs												

Notes for 2013-2014:

1. Season in Mendocino Management Area was extended two weeks from previous years.
2. More optimistic results from 2011 bocaccio stock assessment allowed increase of daily sub-bag limit from two fish to three fish, and removal of minimum size limit.

CALIFORNIA RECREATIONAL REGULATORY HISTORY, 2014

Northern Management Area
California/Oregon Border to near Cape Mendocino (40° 10′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod					20	20	20	20	20	20		
Sanddabs												

Mendocino Management Area
Near Cape Mendocino (40° 10′ N lat.) to Point Arena (38° 57′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfsh, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod					20	20	20	20				
Sanddabs												

Version 05/21/15

Figure G14

San Francisco Management Area
Point Arena (38° 57′ N lat.) to Pigeon Point (37° 11′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California scorpionfish California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod						30	30	30	30	30	30	30
Sanddabs												

Central Management Area
Pigeon Point (37° 11′ N lat.) to Pt. Conception (34° 27′ N lat.)

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod					40	40	40	40	40	40	40	40
California scorpionfish					40	40	40	40	40	40		
Sanddabs												

Southern Management Area
Pt. Conception (34° 27′ N lat.) to US/Mexico Border

Species	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Nearshore rockfish, California sheephead, Cabezon, Greenlings, Ocean whitefish, Shelf rockfish, Lingcod			50	50	50	50	50	50	50	50	50	50
California scorpionfish	50	50	50	50	50	50	50	50	50	50		
Sanddabs												

Notes for 2014:

1. Based on projected estimates for 2014, it was predicted that the California scorpionfish annual catch limit would be exceeded unless closed. Thus, in-season action was taken to close the fishery from November 15 through the end of year.

Appendix H.

blah blah blah if needed

Appendix I.

blah blah blah if needed

Appendix F.

blah blah blah if needed

References

CDFG. 2002. Review of Some California Fisheries for 2001: Market Squid, Sea Urchin, Dungeness Crab, Lobster, Prawn, Abalone, Groundfish, Swordfish and Shark, Coastal Pelagic Finfish, Ocean Salmon, Nearshore Live-Fish, Pacific Herring, White Seabass, and Kelp. California Cooperative Oceanic Fisheries Investigations Reports **43**: 13–30.

Cope, J., Dick, E., Maccall, A., Monk, M., Soper, B., and Wetzel, C. 2015. Data-moderate stock assessments for brown, China, copper, sharpchin, stripetail, and yellowtail rockfishes and English and rex soles in 2013. Pacific Fisheries Management Council, Portland, OR.

Goldfinger, C., Henkel, S., Romsos, C., and Andrea Havron, B.B. 2014. Benthic Habitat Characterization Offshore the Pacific Northwest Volume 1: Evaluation of Continental Shelf Geology. US Dept. of the Interior, Bureau of Ocean Energy Management, Pacific OCS Region. OCS Study BOEM 2014-662.

Greene, H.G., Yoklavich, M.M., Starr, R.M., O'Connell, V.M., Wakefield, W.W., Sullivan, D.E., McRea, J.E., and Cailliet, G.M. 1999. A classification scheme for deep seafloor habitats. *In* Oceanologica acta. pp. 663–678. doi: 10.1016/S0399-1784(00)88957-4.

Hannah, R.W., and Rankin, P.S. 2011. Site Fidelity and Movement of Eight Species of Pacific Rockfish at a High-Relief Rocky Reef on the Oregon Coast. North American Journal of Fisheries Management **31**(3): 483–494. doi: 10.1080/02755947.2011.591239.

Lea, R., McAllister, R., and VenTresca, D. 1999. Biological aspects of nearshore rockfishes of the genus Sebastes from Central California, with notes on ecologically related sport fishes. California Department of Fish and Game, Fish Bulletin **177**. Available from http://www.oac.cdlib.org/view?docId=kt4k4003mr/&brand=oac4/&doc.view=entire/_text.

Love, M., Yoklavich, M., and Thorsteinson, L. 2002. The rockfishes of the northeast Pacific. University of California Press, Berkeley, CA, USA.

Matthews, K. 1990. An experimental study of the habitat preferences and movement patterns of copper, quillback, and brown rockfishes (Sebastes spp.). Environmental Biology of Fishes **29**: 161–178. Available from http://link.springer.com/article/10.1007/BF00002217.

NMFS. 2005. Pacific Coast Fishery Management Plan: Essential Fish Habitat Designation and Minimization of Adverse Impacts: Final Environmental Impact Statement. Seattle, WA.

R Development Core Team. 2013. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL http://www.R-project.org/.

Young, M.A., Iampietro, P.J., Kvitek, R.G., and Garza, C.D. 2010. Multivariate bathymetry-derived generalized linear model accurately predicts rockfish distribution on Cordell Bank, California, USA. Marine Ecology Progress Series **415**: 247–261. doi: 10.3354/meps08760.