

# **Regional Habitat Assessment Prioritization for California Stocks**

*Report of the Southwest Regional Habitat Assessment  
Prioritization Working Group*

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## Introduction

The health and extent of marine habitats is vitally important to the maintenance of marine populations. The National Oceanic and Atmospheric Administration (NOAA) has a mandated responsibility to conserve and manage marine fisheries and their associated habitats. Habitat science is a vital component of a comprehensive fisheries management program, especially for ecosystem-based fisheries management. Significant gaps in NOAA's habitat science program impact NOAA's ability to provide high quality habitat science information.

In response to the ongoing need to improve NOAA's habitat science capacity, the National Marine Fisheries Service (NMFS) developed the *Habitat Assessment Improvement Plan* (HAIP; NMFS, 2010) to analyze the agency's habitat science needs and provide recommendations for moving forward. The HAIP outlines two major mandated needs within NMFS for habitat science: 1) use habitat assessments to reduce habitat-related uncertainty in stock assessments; and 2) improve the information upon which essential fish habitat (EFH) and habitat area of particular concern (HAPC) designations are based. As a first step towards building a comprehensive, coordinated national habitat science program, the HAIP outlines nine major recommendations. Two of these recommendations focus on issues related to prioritizing habitat science:

1. NMFS should develop criteria to prioritize stocks and geographic locations that would benefit from habitat assessments.
2. NMFS should identify and prioritize data inadequacies for stocks and their respective habitats, as relevant to information gaps identified in the HAIP.

The 1<sup>st</sup> National Habitat Assessment Workshop (NHAW), held in 2010, focused on implementation of the HAIP, and recommendations from this meeting supported moving forward with the prioritization approach described in the HAIP. Additionally, NHAW participants concluded that additional regional collaboration (between Fisheries Science Centers, Regional Offices, and others) is necessary to support and implement the HAIP and improve NMFS' habitat science capacity.

One of the first major steps toward implementation of the HAIP was convening the Habitat Assessment Prioritization Working Group (HAPWG) in 2011. The HAPWG is a national team of NMFS scientists and resource management specialists whose overall

### **What is a Habitat Assessment?**

*A habitat assessment is both the process and products associated with consolidating, analyzing, and reporting the best available information on habitat characteristics relative to the population dynamics of fishery species and other living marine resources. The ultimate goal of a habitat assessment is to determine the function of habitats in relation to fishery production and ecosystems, thereby supporting management decisions that are a mandated responsibility of NOAA.*

—Habitat Assessment Improvement Plan (NMFS, 2010)

goal was to develop a standardized set of criteria (and guidelines for application) for use in identifying stocks that would likely derive the greatest benefit from habitat assessments. The initial prioritization process developed by the HAPWG is described in detail in the *Habitat Assessment Prioritization* report (NMFS, 2011).

Noting the differences present between the various NMFS regions, and the fact that fishery management and science decision are largely made and implemented on a regional basis, the HAPWG recommended a process that would be carried out at the regional level. The Southwest Region was selected as the first region to work through the regional prioritization process and serve as a pilot study, testing the practical implementation of the prioritization criteria and guidelines outlined by the HAPWG. The Southwest Regional Habitat Assessment Prioritization Working Group (SW-RHAPWG) is made up of staff from the Southwest Fisheries Science Center and Southwest Regional Office with expertise in habitat ecology, stock assessment, and resource management, and supported by headquarters staff from the Office of Science and Technology's Assessment and Monitoring Division. The SW-RHAPWG solicited input from the Pacific Fisheries Management Council (PFMC), NOAA Restoration Center, and other regional experts as necessary to complete scoring for regional stocks.

A brief summary of the prioritization process is outlined in the box at right; for additional details, please see the complete description in NMFS, 2011. Regional priority lists, once complete, will collectively represent a national set of habitat science priorities for

### **Habitat Assessment Prioritization**

1. Scoring is split into two separate lists to support the main objectives outlined in the HAIP: Priorities for habitat science supporting stock assessments (Stock Assessment Theme), and priorities for EFH science (EFH Science Theme).
2. Scope is focused on Federally-managed fish stocks – geographic context is provided by stock area distributions and species habitat utilization patterns.
3. Process uses two types of criteria to consider each stock: Filter Criteria, which stocks must meet in order to be further considered in process; and Scorable Criteria, which assigns scores independently to each stock based on its qualifications against a set rubric.
4. Weighting factors may be applied to some or all criteria categories. However, weighting must be assigned prior to scoring and the HAPWG recommends weighting be used judiciously.
5. Once final scores for each theme are calculated, eligible stocks are sorted into high/medium/low priority categories as assigned by the regional groups.
6. Each regional group should present its results in a report that provides a summarized list of stocks for each theme area, an appendix containing a table of raw scores, and additional text as needed to explain or justify scores, identify knowledge gaps and suggest research, and provide other useful information.

Additional details on the prioritization process can be found in NMFS, 2011.

NMFS. These priorities can be used in a number of ways, including building new habitat science funding initiatives and informing strategic planning for habitat science – both at the regional and national levels. In practice, multiple considerations should be considered when planning habitat research and it is expected that the prioritized stock lists resulting from the regional habitat assessment prioritization exercises will serve as an important, but not exclusive, tool in strategic habitat science planning. Prioritized stock lists should be updated regularly (every 5 years) to revise priorities as needs shift, new habitat science results becomes available and research goals for priority stocks are achieved. This timeframe matches that for EFH reviews, provides stability over medium term for strategic planning of habitat research and allows regions to track gains through performance measures linked to priorities, and minimizes resources required for more frequent prioritization activities.

### **Creating the Southwest Region Stock List**

The HAPWG suggested that each regional group should prioritize the stocks for which it has primary stock assessment responsibilities, EFH responsibilities, or both. Stocks jointly managed by two NMFS regions may be represented in the prioritization process of either one or both regions at the discretion of regional leadership.

The SW-RHAPWG began with a list of all stocks managed by the PFMC, which included a total of 136 stocks from four Fishery Management Plans:

1. Coastal Pelagic Species (CPS)
2. Pacific Coast Groundfish (Groundfish)
3. Pacific Coast Salmon (Salmon)
4. U.S. West Coast Fisheries for Highly Migratory Species (HMS)

This original list of stocks included several ecosystem component stocks, stock complexes, and stocks under joint jurisdiction of the PFMC and the Western Pacific Fishery Management Council. Ecosystem component stocks were removed from further consideration – while they are listed in the FMP, they are not in the Fisheries Management Unit and not actively managed. The SW-RHAPWG made the decision to consider individual species instead of stock management complexes for scoring and prioritization. This decision was based on inconsistencies in coast-wide species groupings, and more importantly, the consideration that species listed within a complex would not all be scored consistently when taking into account the suite of scoring criteria.

To further narrow down the list for Southwest Region scoring, the SW-RHAPWG investigated several sources of information to ensure the process focused on stocks distributed in California. For groundfish, cumulative landings (Dick and MacCall, 2010) and descriptions of species distributions from the literature (for stocks that are not landed; see a review of this literature in Allen et al., 2006) were used to remove stocks that do not have significant levels of catch in

California (< ~2% California landings) or are not typically found in research surveys off California. Salmon stocks that spawn outside of California were likewise removed from further consideration. All CPS stocks on the list are distributed through California waters and were included in the final list. Similarly, all HMS stocks were also included based on California distributions, although a decision was made in the case of bigeye tuna to focus scoring on the Eastern Tropical Pacific substock instead of the basin-wide stock as this substock is more applicable to the Southwest Region management jurisdiction.

The final Southwest Region stock list for prioritization scoring included a total of 103 stocks: six CPS stocks, 77 groundfish stocks, nine salmon stocks, and 11 HMS stocks. Many of the stocks considered for Southwest Regional Prioritization have coast-wide distributions, and will likely also be considered during the prioritization process for the Northwest Region.

### **Sources of Data for Southwest Region Stocks**

The HAPWG recommends that each regional group compile appropriate information sources for the prioritization process prior to meeting. Regional groups are also advised to seek input from regional stock and habitat experts to gather the best available information and aid in the decision process. To this end, the SW-RHAPWG investigated a number of information sources prior to and during the scoring process. These sources included:

1. Data (stock lists, stock status, stock assessment results, resource surveys) from NOAA's *Species Information System* (SIS; <https://www.st.nmfs.noaa.gov/sis/>, login required; Public site: <https://www.st.nmfs.noaa.gov/sisPortal/>)
2. Cumulative catch data for Pacific Coast stocks (Dick and MacCall, 2010)
3. Species distributions in California (Allen et al. 2006)
4. Data (catch, price, and life history) collected in support of the NMFS Stock Assessment Prioritization process (Richard Methot, NMFS, pers. comm.)
5. Productivity-susceptibility analysis (PSA) for Groundfish (Cope et al., 2011)
6. PFMC Research and Data Needs document ([http://www.pcouncil.org/wp-content/uploads/Res\\_Data\\_Needs\\_2008\\_Final\\_OCT08.pdf](http://www.pcouncil.org/wp-content/uploads/Res_Data_Needs_2008_Final_OCT08.pdf))
7. PFMC Recommendations for off-year science improvements ([http://www.pcouncil.org/wp-content/uploads/G10a\\_ATT1\\_RECS\\_IMPROV\\_SEPT2011BB.pdf](http://www.pcouncil.org/wp-content/uploads/G10a_ATT1_RECS_IMPROV_SEPT2011BB.pdf))
8. Information on PFMC priorities (Chuck Tracy and John DeVore, PFMC, pers. comm.)
9. PFMC stock assessment shortlist (John DeVore, PFMC, pers. comm.)
10. Stock assessment reports and Stock Assessment and Fishery Evaluation (SAFE) documents (see <http://www.pcouncil.org/>)

11. EFH descriptions (see <http://www.pcouncil.org/> to download FMP EFH Appendices)
12. Trophic level information (<http://www.fishbase.org/>)
13. Groundfish diet and trophic level information (Love, 2011; Love et al., 2002)
14. Commercial catch data (including landings, ex-vessel price, ex-vessel revenue) from PacFIN ([http://pacfin.psmfc.org/pacfin\\_pub/data.php](http://pacfin.psmfc.org/pacfin_pub/data.php))
15. Commercial catch data from NOAA's Fisheries One Stop Shop/Fisheries of the United States (<https://www.st.nmfs.noaa.gov/apex/foss/f?p=114>)
16. Recreational fishing data from RecFIN (<http://www.recfin.org/>)
17. Information on commercial and recreational economic impacts (Cindy Thomson, SWFSC, pers. comm.)
18. Descriptions of ecosystem engineers (Jones et al., 1994)
19. Expert opinion of SW-RHAPWG members

### **Scoring Approaches Used for Southwest Region Stocks**

The SW-RHAPWG tried two approaches to scoring the list of stocks for California. The first approach was to consider all stocks from each of the four PFMC FMPs as a single unit, making comparisons against the entire stock list when considering each scoring criterion and rubric (Among FMP Scoring). Because of the variety of life history patterns, habitat relationships, and fisheries represented by species in the different FMPs, the SW-RHAPWG had concerns about making comparisons among stocks in different FMPs. This was a concern for all stocks, but in particular for evaluating the freshwater-dependent salmon stocks alongside obligate marine stocks. For example, certain criteria are based on relative biomass of stocks; salmon stocks may constitute the majority of biomass while in freshwater habitats, but a small proportion of marine biomass, and scoring depended on whether freshwater stages were considered.

To address these concerns, the working group used a second approach to score each stock against other members in a particular FMP. After scores were compiled for stocks within each of the four FMPs, the stocks were integrated into a single list for final ranking (Within FMP Scoring). Comparisons among the scores using both of these approaches revealed only small differences in the final scores for the list of stocks under consideration. Because there were only minor differences present and there was stronger scientific justification for the stocks under consideration, the SW-RHAPWG chose to use the Within FMP Scoring.

While the SW-RHAPWG decided to utilize the Within FMP Scoring approach, it is acknowledged that this approach does not solve all of the issues raised during the scoring process. For example, there were some instances where inconsistent scoring approaches were used for stocks within different FMPs out of necessity due to differences in data availability. Although a great deal of effort was made to align scoring as closely as possible, this still creates



the potential for discontinuities when stocks are re-aggregated into a single list for final ranking. It is also noted that while the results of the Within and Among FMP Scoring approaches were similar for the Southwest Region, differences may exist when applying these approaches to scoring stocks in other regions.

The following description of the SW-RHAPWG application of HAPWG scoring guidance pertains to this Within FMP Scoring approach. For all criteria listed below, additional details on scoring guidelines and interpretation can be found in the HAPWG document (NMFS, 2011).

Common Filter Criterion: FMP Stock Listed in the FSSI or is a Regional FMC ~~Research~~ Priority

*HAPWG Scoring Rubric:* To pass this filter for further consideration, a stock must be included in the management unit of a Federal FMP. The stock must also be included as one of the 230 stocks on the Fish Stock Sustainability Index (FSSI) list *or* be listed as a regional Fishery Management Council ~~research~~ priority.

*Southwest Application:* The SW-RHAPWG changed the phrasing of this scoring rubric, removing “research” from FMC priority for application to Southwest Region stocks to better encompass the idea that the stocks passing through this filter are important to the PFMC. Discussion of FMC priorities posed challenges for the SW-RHAPWG because the PFMC does not have a prescriptive list of priorities. Instead, the PFMC generates a narrative document (updated every five years) that describes research and data needs (PFMC, 2008); this document was difficult to interpret in the context of scoring stocks, and a number of other information sources were sought as supplemental information to guide decisions on FMC priorities.

Stocks were interpreted as PFMC priorities and passed through this filter if they met one of the following criteria: 1) stock is designated as non-retention; 2) stock is listed as Endangered or Threatened under the Endangered Species Act (ESA); 3) stock is assessed, an assessment has been attempted for the stock, or an assessment is planned or requested (e.g. on assessment shortlist); or 4) PSA vulnerability (V) score (Cope et al., 2011) is high. High V scores (available for groundfish stocks;  $V \geq 1.95$ ) likely represent overfished stocks and were therefore interpreted as PFMC priorities.

Although no salmon stocks are included on the FSSI list, and only two stocks are explicitly mentioned in the PFMC data needs summary (PFMC, 2008), the SW-RHAPWG decided it was not the intent of the HAPWG to exclude a majority of these stocks from consideration. Salmon stocks were therefore evaluated against the criteria originally used to create the FSSI list (see <http://www.nmfs.noaa.gov/sfa/statusoffisheries/SOSmain.htm> for more information); all of the salmon stocks under consideration met at least one of the criteria used to classify FSSI stocks, so all passed this filter because they exhibit the same characteristics as FSSI stocks.

### Theme-Specific Filter Criterion: Habitat Assessment Likely to Benefit Stock Assessment

*HAPWG Scoring Rubric:* To pass this filter for further consideration, a stock must be likely to be assessed in the next 5 years, ~~or be in the top quartile of stocks in the Stock Assessment Prioritization~~. Additionally, the stock's assessment must be likely to benefit from a habitat assessment [as described in the HAPWG].

*Southwest Application:* When considering this filter for the Stock Assessment Theme, the SW-RHAPWG omitted the phrase “or be in the top quartile of stocks in the Stock Assessment Prioritization” from scoring rubric language. Information from the Stock Assessment Prioritization was not yet available for the Southwest Prioritization process, and will not likely be available in the form of a prioritized or ranked list when it is complete. Therefore, this rubric was interpreted to consider stocks that are likely to be assessed and whose stock assessments likely would benefit from a habitat assessment in order to pass the filter. Both traditional fish stock assessments and assessments conducted for ESA status reviews were considered for the purposes of this filter criterion.

When evaluating “likely to be assessed in the next 5 years,” group members considered several criteria: stock has a planned assessment within the 5-year window (e.g. on assessment shortlist); stock is overdue for an update assessment (last assessment 2007 or earlier); or stock is rebuilding. With regard to expired stock assessments, the SW-RHAPWG groundfish experts noted that previously assessed stocks that are well above target biomass and are not heavily exploited would not usually be considered high priorities to the PFMC for re-assessment.

A stock assessment likely would benefit from information from a habitat assessment if the stock is well sampled in fishery-independent surveys. The SW-RHAPWG members noted that most or all stocks under consideration were at a minimum likely to benefit from survey improvements (resulting from improved habitat information), so no stocks were excluded from further consideration by the second part of this filter.

### Theme-Specific Filter Criterion: Habitat Assessment Likely to Inform EFH Science

*HAPWG Scoring Rubric:* To pass this filter for further consideration, a habitat assessment for the stock must be likely to be conducted within a region's EFH 5-year review schedule. In addition, the habitat assessment for this stock must be likely to define EFH, refine EFH, or improve the understanding of adverse effects of fishing or non-fishing activities on EFH.

*Southwest Application:* This filter was not useful as written for Southwest Region stocks. The first part of the rubric was difficult to interpret with regards to the likelihood that a habitat assessment would be conducted. A particular problem with regard to salmon stocks is that the units for delineating EFH (i.e. species-level) differ from the stock units defined by the FMP. Additionally, all PFMC stocks have EFH reviews that are either underway or will begin within the required 5-year window, so all stocks passed this filter. The SW-RHAPWG decided to be

more conservative with EFH interpretations for the EFH scoring criterion (see section on Theme-Specific Scorable Criterion: Habitat Assessment Likely to Advance EFH Information).

Theme-Specific Scorable Criterion: Benefits of a Habitat Assessment to Stock Assessment

*HAPWG Scoring Rubric:*

<b>Score</b>	<b>Rubric</b>
5	A habitat assessment for this stock is likely to result in an SAIP Level 5 stock assessment, an HAIP Tier 3 habitat assessment, or improve performance within an existing SAIP Level 5 or HAIP Tier 3 assessment.
4	A habitat assessment for this stock is likely to improve survey efficiency or efficacy, reduce sampling variability, or improve the analysis of fishery catch per unit of effort (CPUE) data that are likely to be used in a stock assessment.
1	A habitat assessment would provide new opportunities to develop stock assessment modeling or survey techniques that incorporate the relationships between habitat and population processes or data variability.

*Southwest Application:* The SW-RHAPWG did not find this criterion to be very useful, as written, for differentiating California stocks. No stocks qualified for the 5 point category because data would not be available in the near-term to support SAIP Level 5 or HAIP Tier 3 assessments. Differentiating the 4- and 1-point categories was challenging for a majority of stocks. The SW-RHAPWG decided to award 4 points to stocks whose assessments included data from existing fishery independent surveys (including escapement surveys in inland streams for salmon); stocks that are not regularly surveyed were awarded 1 point.

Theme-Specific Scorable Criterion: Habitat Assessment Likely to Advance EFH Information

*HAPWG Scoring Rubric:*

<b>Score</b>	<b>Rubric</b>
5	A habitat assessment would likely provide an initial definition of EFH <del>or an increase in understanding of adverse effects of fishing or non-fishing activities on EFH.</del>
4	A habitat assessment would likely provide an increase in information sufficient to increase between EFH levels of knowledge.
1	A habitat assessment would likely provide an increase in information within the existing EFH level of knowledge.

*Southwest Application:* This criterion, as written, was too vague to differentiate between Southwest Region stocks. To remedy this, the SW-RHAPWG made a change to the 5-point scoring category (see above). As originally written, all stocks would have scored 5 points for this criterion; by removing this language, only stocks currently lacking EFH descriptions received 5 points. Even with this change to the scoring rubric language, a majority of the Southwest Region stocks scored 4 points for this criterion. All salmon stocks received a score of 4 points based primarily on the potential to provide improved information on fish-habitat relationships (e.g. habitat-specific densities in freshwater habitats) for practitioners of EFH science; this was a different interpretation than described in the scoring rubric.

## Common Scorable Criterion: Fishery Status

### HAPWG Scoring Rubric:

Score	Rubric
5	Stock is overfished, approaching an overfished condition, experiencing overfishing, or is in a rebuilding or recovery plan.
3	Stock is below 80% of BMSY.
2	Stock is fully exploited (i.e. $F_{MSY} \geq F_C \geq 0.75 * F_{MSY}$ , or $ABC \geq \text{Total Catch} \geq 0.75 * ABC$ if no $F_{MSY}$ available).
1	Stock status is unknown, but credible information exists to suggest that the stock is at risk or vulnerable to overexploitation.
0	<b>Stock is not overfished, not approaching an overfished condition, not experiencing overfishing, or otherwise showing any evidence of overexploitation. Or, if stock status is unknown, evidence does not suggest that the stock is vulnerable to overexploitation.</b>

*Southwest Application:* Stock status data (i.e. overfished, approaching overfished, overfishing, rebuilding, B/BMSY, and F/FMSY), available from the SIS database, and ESA designations (<http://www.nmfs.noaa.gov/pr/species/esa/fish.htm>) were used to assign stocks points in categories for 2, 3, and 5 points. For the remaining categories (1 and 0 points), points were assigned to stocks in the FMP groups as follows:

- CPS: Based on expert opinion, no evidence was available to suggest overexploitation for any stocks (0 points).
- Groundfish: Stocks with PSA V scores  $\geq 2.0$  (scores  $\geq 1.95$  were rounded up) were awarded 1 point due to high vulnerability; all other stocks received 0 points.
- Salmon: No special consideration was given for stocks that are ESA candidate species or NOAA species of concern. In cases where salmon runs are not regularly assessed on an individual basis, information from indicator stocks (i.e. assemblage management) or neighboring runs was used.
- HMS: Points awarded based on expert opinion. Stocks considered underexploited (e.g. swordfish) got 0 points; all other stocks were given 1 point due to the transboundary, international nature of management.

The group also decided that this criterion, as well as all of the following common scorable criteria, would be more useful if a null (i.e. 0 points) category was clearly defined. Language has been added (in red text) to the rubric to reflect scoring interpretation for the Southwest process. The SW-RHAPWG found it unnecessary to add null categories to the theme-specific scorable criteria (i.e. Stock Assessment and EFH) because if a stock has passed through the related filters in the scoring process, then no stock should receive 0 points in those scoring categories.

Common Scorable Criterion: Regional FMC Research Priority

*HAPWG Scoring Rubric*

Score	Rubric
5	Research is identified for a stock by the regional FMC to address a pressing issue and satisfy the Federal requirements of the MSA.
3	Research is identified for a stock by the regional FMC to address ongoing needs to <del>maintain existing</del> of fishery management.
1	Research is identified for a stock by the regional FMC; however, it is not of immediate concern or necessary to manage a Federal fishery.
0	<b>Stock is not identified as a priority by the regional FMC.</b>

*Southwest Application:* The SW-RHAPWG found this criterion difficult to interpret as currently written – not every FMC has a priority “list.” There were also issues related to: 1) ESA-listed stocks; 2) bycatch and allocation; and 3) overfished stocks. To aid in interpretation of this criterion, the group considered both FMC research and management priorities; the SW-RHAPWG recommends that the national document be revised to reflect this change. The goal is to “prioritize stocks that are important to the regional FMC,” so emphasizing research seems unnecessary. Additional FMP-specific criteria were used to assign points to stocks as described below:

- CPS: Actively managed stocks, 5 points; monitored stocks, 3 points; all others, including prohibited stocks, 1 point.
- Groundfish: Scoring was based on PSA vulnerability scores, but scores were adjusted up one category for stocks that were considered to be obvious PFMC priorities (i.e. on assessment shortlist or assessed in the past two assessment cycles (2009 and 2011)). Points were assigned as follows:  $V \geq 1.95$  (high/very high), 5 points;  $1.75 \leq V < 1.95$  (medium), 3 points;  $V < 1.75$  (low), 1 point.
- Salmon: If a stock has the potential to constrain ocean salmon fisheries (i.e. a ‘choke stock’), 5 points; ESA-listed but not a choke stock as currently managed, 3 points; all other stocks, 1 point.
- HMS: Scores were based on priority issues for HMS stocks as listed in the 2011 HMS SAFE document (PFMC, 2011).

Common Scorable Criterion: Habitat Disturbance, Vulnerability, and Rarity

*HAPWG Scoring Rubric:*

<b>Additive Points</b>	<b>Rubric</b>	<b>Category</b>
+1	A large portion of the habitat of a fish stock is disturbed due to fishing activities <del>or other direct anthropogenic events.</del>	1
+1	A large portion of the habitat of a fish stock is disturbed <b>due to non-fishing anthropogenic activities</b> <del>as a result of natural disasters and indirect anthropogenic events.</del>	2
+1	The <b>primary</b> habitat of a <b>life stage of a</b> fish stock is vulnerable to disturbance based on a location that is accessible or heavily used, resulting in impacts to habitat.	3
+1	The <b>primary</b> habitat of a fish stock is vulnerable or slow to recover from disturbance.	4
+1	The <b>primary</b> habitat of a fish stock is demonstrably rare.	5

*Southwest Application:* Southwest Region stocks lacked hard data to aid in the scoring process for this criterion, so scoring for most categories relied on expert opinion.

- *CATEGORY 1 (FISHING IMPACTS):* The SW-RHAPWG found it problematic that fishing and non-fishing activities were combined into the same category, because it did not allow for differentiation between the two types of impacts. For application to California stocks, Category 1 was changed to only award points based on fishing impacts. Stocks that have a large portion of their habitat affected by fishing (e.g. shelf and slope groundfish) were awarded a point in this category.
- *CATEGORY 2 (NON-FISHING ACTIVITIES):* If this category is interpreted as the HAPWG guidance advises (i.e. to include climate change), then it is not useful for differentiating Southwest Region stocks because all stocks are expected to be affected by climate change to an extent and will score the same. The SW-RHAPWG also had some difficulty with the prescribed categorization of direct and indirect effects. To aid in application to California stocks, the text of the Category 2 rubric was changed to include both direct and indirect anthropogenic impacts. The SW-RHAPWG considered a range of impacts, including powerplant and desalination intake and effluent, point discharge, dredging, land- and water-use practices (for salmon), and excluded climate change impacts from consideration. Points were awarded based on expert opinion and EFH descriptions.
- *CATEGORY 3 (LOCATION-BASED HABITAT VULNERABILITY):* The SW-RHAPWG had some difficulty differentiating Categories 2 and 3 due to similarities in the descriptions, and had to carefully consider use vs. locality when assigning points. California has a large number of ports, and the coastal and marine environment is heavily used and disturbed relative to some other regions; therefore a majority of stocks off California could be considered vulnerable to disturbance. Although there is some variation along the California coast, this does not apply at the scale of stock areas. Points were awarded to

stocks with nearshore distributions, including those that use nearshore areas for spawning or early life stages. Salmon stocks that inhabit spawning rivers close to metro centers, agriculture, or other heavy used areas received a point for this category as well. Stocks that are highly mobile or distributed in depths deeper than most fishing activities did not receive a point.

- *CATEGORY 4 (HABITAT VULNERABILITY AND RECOVERY)*: For this category, the SW-RHAPWG emphasized that vulnerability or recovery of the habitat of a species (and not the species itself) should be considered when awarding points. Stocks were awarded points if their habitat is disturbed often, or is slow to recover; this included estuarine species and salmon, and excluded highly mobile species or stocks associated with soft bottoms.
- *CATEGORY 5 (HABITAT RARITY)*: A number of questions related to the issue of rarity were raised when discussing this scoring category. In addition to natural rarity, removal also can make a habitat rare. When considering removal vs. impacted habitats, the SW-RHAPWG decided that, for Southwest Region stocks, impacts do not make habitat ‘rare’ – if the habitat is at least partially functioning, it is available to support the stock at some level. Points were awarded in this category to stocks that associate with estuaries and rocky habitats; salmon stocks with a high percentage of historical habitats lying upstream of impassable dams also were assigned points.

Common Scorable Criterion: Habitat Dependence

*HAPWG Scoring Rubric:*

<b>Score</b>	<b>Rubric</b>
5	There is quantitative evidence that vital rates and productivity of a stock are dependent on habitat.
3	There is a measurable difference, attributable to habitat quality and/or quantity, in a stock’s density, population size, and/or an individual’s condition factor.
1	While uncertainty exists due to poor or conflicting data, there is a reasonable expectation for a measurable difference, attributable to habitat quality and/or quantity, in a stock’s density, population size, and/or an individual’s condition factor.
0	No evidence exists to suggest that a stock’s density, population size, or individual condition is linked to habitat quality and/or quantity.

*Southwest Application:* To aid in scoring, the SW-RHAPWG interpreted this scoring rubric as follows: habitat specialist, 5 points; highly associative, 3 points; habitat generalist, 1 point. This interpretation was necessary because the data for scoring specified in the HAPWG scoring guidelines was not available for a majority of Southwest Region stocks.

Common Scorable Criterion: Ecological Importance

*HAPWG Scoring Rubric:*

<b>Additive Points</b>	<b>Rubric</b>	<b>Category</b>
+1	The stock is an important predator. Based on current data from the region, the stock consumes a high number of species (top quartile) compared to other predators at that life stage.	1
+1	The stock is important prey. Based on current data from the region, the stock occurs in diets of a high number of species (top quartile) compared to other prey at that life stage.	2
+1	The stock has a high biomass. The stock currently has a high (top quartile) biomass in the best available metric, within the region of interest, and at a particular life stage.	3
+1	The stock is a habitat-altering species. It is known to create, modify, or maintain habitat functions.	4
+1	Evidence exists that in the region of interest the stock was historically abundant, or an important predator, prey, or ecosystem engineer.	5

*Southwest Application:* Data availability issues complicated the assignment of points for this criterion, and many categories ended up using biomass-related data in some form. Thresholds were selected for several categories out of necessity, although there was not complete agreement on this approach.

- *CATEGORY 1 (IMPORTANT PREDATOR):* For this category, the SW-RHAPWG considered stocks that were both important predators and abundant. Points were assigned to stocks that met both of the following conditions: 1) the species has a trophic level  $\geq 4.0$  (information available from <http://www.fishbase.org/>) or is piscivorous (groundfish data from Love, 2011; Love et al., 2002); and 2) the stock has a current stock biomass in the top quartile of stocks within its FMP.
- *CATEGORY 2 (IMPORTANT PREY):* The SW-RHAPWG decided that a stock must be abundant to be considered an important prey item. For CPS, groundfish, and HMS stocks, points were awarded to stocks that had unfished biomass in the top quartile of stocks within their own FMPs. Abundance (and therefore unfished biomass) of the various salmon stocks is uncertain prior to significant anthropogenic disturbance of freshwater habitats (c. 1850); salmon stocks instead were scored for this category based on estimates of current abundance (top quartile). Stocks that otherwise met the criteria for this category but are considered to be apex predators (i.e. large tunas and sharks) did not receive points because it was not feasible to classify such stocks as important ‘prey.’
- *CATEGORY 3 (HIGH STOCK BIOMASS):* There was some disagreement among members of the SW-RHAPWG about the best approach to scoring this category. Some members did not feel that current biomass is a reasonable indicator of ecological importance because this metric is influenced by the effects of fisheries and variable annual recruitment events.



Although it was not feasible for California stocks given time constraints, one approach that other regions might consider would be to calculate a moving average of recent biomass (during data gathering, in advance of scoring discussions), which would smooth out recruitment variability. In the end, the group decided to use estimates of unfished biomass within an FMP. Points were awarded to CPS, groundfish, and HMS stocks having unfished biomass within the top quartile of biomass in each FMP group. Estimates of current abundance were used for salmon stocks in lieu of unfished biomass, which is not available for these stocks.

- *CATEGORY 4 (HABITAT-ALTERING SPECIES)*: This category was scored on the basis of expert opinion. Abundance was not considered in assigning scores for stocks in this category. The SW-RHAPWG relied on descriptions of habitat-altering species in Jones et al. (1994).
- *CATEGORY 5 (HISTORICALLY ABUNDANT OR IMPORTANT)*: There is limited data on historical importance, so the SW-RHAPWG once again had to rely primarily on estimates of (unfished) biomass. Points were awarded to stocks in the CPS, groundfish, and HMS FMPs that had unfished biomass falling within the top quartile of stocks. All salmon stocks received points in this category based on evidence that their historical abundance was substantially higher than recent estimates and these stocks played significant roles in freshwater ecosystems.

Common Scorable Criterion: Economic, Social, and Management Value

*HAPWG Scoring Rubric:*

<b>Additive Points</b>	<b>Rubric</b>	<b>Category</b>
+1	The economic impacts of the commercial industry for this stock are in the top quartile (25%) of FMP stocks in the region.	1
+1	The economic impacts of recreational fishing for this stock are in the top quartile (25%) of FMP stocks in the region.	2
+1	The commercial fishery for the stock has high resource management importance.	3
+1	The recreational fishery for the stock has high resource management importance.	4
+1	The stock has high social value such as cultural importance or strong localized effects on community viability, or is necessary for subsistence.	5

*Southwest Application:* Scores were assigned for each category as follows.

- *CATEGORY 1 (ECONOMIC IMPACTS OF COMMERCIAL FISHERY)*: Scores in this category were based on 2008-2010 ex-vessel revenue data from the PacFin database as a proxy for commercial economic impacts. Commercial fishing data are available only by species, which was problematic for salmon, which were scored by individual stocks. Estimates of the contribution of different stocks to the total commercial catch in California, based on

limited coded wire tag information, were used to aid in scoring for these stocks. Across all FMPs, stocks with ex-vessel revenue > \$500,000 were awarded a point in this category.

- *CATEGORY 2 (ECONOMIC IMPACTS OF RECREATIONAL FISHERY)*: Original discussions for this category revealed a paucity of data on recreational economic impacts, and a preliminary decision was made to omit this category. However, upon further consideration, the SW-RHAPWG decided that recreational landings were a reasonable proxy for economic impacts. For CPS, groundfish, and HMS stocks, points were awarded to the top quartile of stocks based on RecFIN California recreational landings summed for 1980-2011. For salmon stocks, estimates of the contribution of different stocks to the total recreational catch in California were used to aid in scoring; a point was awarded to the top quartile of stocks based on their contribution to California recreational catch.
- *CATEGORY 3 (MANAGEMENT IMPORTANCE OF COMMERCIAL FISHERY)*: Points were awarded in this category based on expert opinion. For groundfish, all stocks affected by federal or state spatial closures received a point. All salmon stocks that are assessed and have conservation objectives that could limit fisheries (i.e. choke stocks) received a point.
- *CATEGORY 4 (MANAGEMENT IMPORTANCE OF RECREATIONAL FISHERY)*: The SW-RHAPWG assigned points in this category based on expert opinion. For groundfish, all stocks affected by federal or state spatial closures received a point. For salmon, all stocks that are assessed and have conservation objectives that could limit fisheries (i.e. choke stocks) received a point.
- *CATEGORY 5 (SOCIAL VALUE)*: This category was scored on the basis of expert opinion. Although the HAPWG specifies the intent of this category is to capture the top quartile of stocks, there was no clear way to achieve this because many California stocks have high social value. For groundfish, points were assigned to any targeted stocks that communities have relied on over time. All salmon stocks received points due to high social value and cultural importance.

### Weighting

The SW-RHAPWG did not apply any weighting scheme to the final scoring lists. The group recommends that future RHAPWGs give full consideration to the use of weighting schemes before the scoring process begins.

### Priority Categories

The SW-RHAPWG considered a number of approaches (e.g. percentage, break points, etc.) for creating high/medium/low priority bins for the final scoring lists. In the end, the group decided the approach that best reflected the importance of stocks on the list was to have a more inclusive high priority category. When comparing the percent ranks of the final scores, stocks were only

compared against the stocks that passed through the filters for each list (i.e. Stock Assessment Theme, EFH Science Theme); the SW-RHAPWG felt that stocks that are not priorities for habitat research (i.e. did not make it through the filters) should not be considered when compiling the final ranks. The following cutoffs were designated:

- High Priority = top 20% of scored stocks
- Medium Priority = between 50% and 20% of scored stocks
- Low Priority = lower 50% of scored stocks

## **Lessons Learned**

The SW-RHAPWG was the first region to work through the habitat assessment prioritization process described by the HAPWG. As the first region to work through the process, the Southwest Region was intended to serve as a pilot project to test the HAPWG process and investigate a series of questions outlined in the HAPWG document (2010).

*Is outlined process comprehensive, practical, and flexible in practice at the regional level?*

Criteria outlined by the HAPWG were not always prescriptive about the most appropriate metrics to apply. This was likely done in an effort to allow for regional flexibility, but it led to a number of ad hoc decisions by the SW-RHAPWG that may be difficult to replicate in other regions. Additionally, some metrics may vary between FMP stock groups for Southwest Region stocks due to data availability issues. Another issue that arose is the use of threshold values for some scoring categories in the absence of more prescriptive criteria (e.g. biomass, commercial fishery value) that may be considered arbitrary.

Data availability issues were another challenge. Some of the criteria as outlined by the HAPWG simply did not have data available for Southwest Region stocks to support scoring (economic impacts, habitat-linked productivity, etc.). Although data availability varies by region, these issues are likely to arise for other RHAPWGs as well. Lacking data to support scoring as described, best available proxies were used based on the opinion of the experts in the SW-RHAPWG. Several criteria were scored using some form of abundance or biomass data, which raises several potential issues: 1) potential duplication in scoring – higher biomass stocks receive higher scores simply due to abundance; 2) current abundance estimates are confounded for a majority of stocks due to fishery removals and other factors – this is a particular problem for salmon stocks influenced by the predominance of hatchery inputs; and 3) lack of knowledge of historical (unfished) biomass for many stocks, including salmon.

Breaking stocks out by NMFS region posed particular challenges on the Pacific Coast, where a single FMC manages stocks and many stocks have a coast-wide distribution. As the Northwest Region moves forward with its Regional Habitat Assessment Prioritization process, regional leadership may want to consider a coordinated approach with the SW-RHAPWG. Many stocks scored by the SW-RHAPWG are expected to likewise be prioritized by the Northwest Region as

well. However, it is not expected that stocks scored by both regions will necessarily receive the same scores or be ranked exactly the same way because of differences in regional priorities.

*Can outlined process be realistically implemented at regional level by a regional panel of experts? Is process manageable and efficient?*

Implementation of the regional prioritization process took much longer than the HAPWG envisioned. Additional effort to collect and review available information for regional stocks prior to scoring is important to streamline the process, but overall the SW-RHAPWG found this to be a fairly intensive process. The original proposed timeline (several preparatory conference calls followed by a two-day in person meeting) was not sufficient to finalize the scored stock lists.

*Is outlined process adequate for discriminating high priority stocks at the regional level?*

Although the outlined process did raise a number of challenges for the SW-RHAPWG, the general consensus of the group was that the final prioritized stock lists were a reasonable representation of habitat science priorities for the region.

### **Connections to the NOAA Habitat Blueprint**

The NOAA Habitat Blueprint provides a forward-looking framework for NOAA to think and act strategically across programs and with partner organizations to address the growing challenge of coastal and marine habitat loss and degradation. The Southwest Regional Habitat Assessment Prioritization supports each of the four main objectives of the Habitat Blueprint:

1. *Establish Habitat Focus Areas:* NOAA will select habitat focus areas in each region by identifying spatial intersections where collaboration among NOAA management and science programs and external partners will address multiple habitat-dependent objectives. Priority stocks identified by the SW-RHAPWG will be used to provide input into the process to identify focus areas for California. The robust set of criteria considered by the SW-RHAPWG during the prioritization process ensures that recommendations encompass a number of NOAA habitat-related priorities.
2. *Enhance Habitat Science:* The Habitat Blueprint calls for implementing a systematic and strategic approach to habitat science to inform effective decision-making. The SW-RHAPWG supports this by prioritizing NMFS' habitat science needs to allow for more strategic planning, better coordination with partners, and improved leveraging of resources.
3. *Strengthen Policy and Legislation:* To enhance NOAA's ability to achieve meaningful habitat conservation, NOAA will strengthen policy and legislation at the national level. Regional prioritization supports habitat policy by providing a strategic basis for habitat science. An improved scientific basis will also provide support for habitat-related policy initiatives.

4. **Implement Regional Habitat Initiatives:** The regional habitat initiatives explore new collaborative approaches for habitat science and conservation and test aspects of each of the three Habitat Blueprint approaches: focusing efforts in discrete places, linking science to management, and seeking policy efficiencies to inform future actions within the Habitat Blueprint. The two Southwest regional initiatives, Southern California Bight Habitat Assessment and San Francisco Bay Area Sentinel Site Cooperative, both contain stocks considered high priorities by the SW-RHAPWG.

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## Appendix A: Southwest Region Stock Priorities – Habitat Science Supporting Stock Assessment

FMP	Stock	Score	Priority
Pacific Coast Salmon	Chinook salmon - California Central Valley: Sacramento (fall)	33	High
Pacific Coast Groundfish	Bocaccio - Southern Pacific Coast	30	High
Pacific Coast Salmon	Chinook salmon - California Central Valley: Sacramento (winter)	28	High
Pacific Coast Salmon	Chinook salmon - Northern California Coast: Klamath (fall)	28	High
Pacific Coast Groundfish	Canary rockfish - Pacific Coast	27	High
Pacific Coast Groundfish	Cowcod - Southern California	27	High
Pacific Coast Groundfish	Yelloweye rockfish - Pacific Coast	27	High
Pacific Coast Salmon	Coho salmon - Oregon Production Index Area: Central California Coast	27	High
Pacific Coast Salmon	Coho salmon - Oregon Production Index Area: Northern California	27	High
Pacific Coast Salmon	Chinook salmon - Northern California Coast: Eel, Mattole, and Mad (fall/spring)	26	High
Pacific Coast Groundfish	Blue rockfish - California	24	High
Pacific Coast Salmon	Chinook salmon - California Central Valley: Sacramento (spring)	24	High
Pacific Coast Groundfish	Darkblotched rockfish - Pacific Coast	23	Medium
Pacific Coast Groundfish	Pacific ocean perch - Pacific Coast	23	Medium
Pacific Coast Groundfish	Petrable sole - Pacific Coast	22	Medium
Pacific Coast Groundfish	Shortspine thornyhead - Pacific Coast	20	Medium
Pacific Coast Groundfish	Yellowtail rockfish - Northern Pacific Coast (N 40°10')	20	Medium
Pacific Coast Groundfish	Yellowtail rockfish - Southern Pacific Coast (S 40°10')	20	Medium
Pacific Coast Salmon	Chinook salmon - Northern California Coast: Klamath (spring)	20	Medium
Pacific Coast Groundfish	China rockfish - Pacific Coast	19	Medium
Pacific Coast Groundfish	Copper rockfish - Pacific Coast	19	Medium
Pacific Coast Groundfish	Bank rockfish - California	18	Medium
Pacific Coast Groundfish	Brown rockfish - Pacific Coast	18	Medium
Pacific Coast Groundfish	Longspine thornyhead - Pacific Coast	18	Medium
Pacific Coast Groundfish	Pacific sanddab - Pacific Coast	18	Medium
Pacific Coast Groundfish	Sablefish - Pacific Coast	18	Medium
Pacific Coast Groundfish	Vermilion rockfish - California	18	Medium
Coastal Pelagic Species	Pacific sardine - Pacific Coast	17	Medium
Pacific Coast Groundfish	Aurora rockfish - Pacific Coast	17	Medium
Pacific Coast Groundfish	Sharpchin rockfish - Pacific Coast	17	Medium
Pacific Coast Groundfish	Stripetail rockfish - Pacific Coast	17	Medium
Highly Migratory Species <sup>1</sup>	Pacific bluefin tuna - Pacific	17	Medium
Pacific Coast Groundfish	English sole - Pacific Coast	16	Low
Pacific Coast Groundfish	Gopher rockfish - Northern California	16	Low
Pacific Coast Groundfish	Pacific hake - Pacific Coast	16	Low
Pacific Coast Groundfish	Chilipepper - Southern Pacific Coast	15	Low
Highly Migratory Species	Albacore - North Pacific	15	Low
Coastal Pelagic Species	Pacific chub mackerel - Pacific Coast	14	Low
Pacific Coast Groundfish	Black rockfish - Southern Pacific Coast	14	Low
Pacific Coast Groundfish	California scorpionfish - Southern California	14	Low
Pacific Coast Groundfish	Longnose skate - Pacific Coast	14	Low
Pacific Coast Groundfish	Rex sole - Pacific Coast	13	Low
Coastal Pelagic Species	Northern anchovy - Southern Pacific Coast	12	Low



## Appendix A: Southwest Region Stock Priorities – Habitat Science Supporting Stock Assessment

Pacific Coast Groundfish	Kelp greenling - California	12	Low
Highly Migratory Species	Yellowfin tuna - Eastern Tropical Pacific	12	Low
Highly Migratory Species	Thresher shark - North Pacific	11	Low
Coastal Pelagic Species	Opalescent inshore squid - Pacific Coast	10	Low
Pacific Coast Groundfish	Shortbelly rockfish - Pacific Coast	10	Low
Highly Migratory Species	Shortfin mako - North Pacific	10	Low
Highly Migratory Species	Swordfish - North Pacific	10	Low
Highly Migratory Species	Bigeye tuna - Eastern Tropical Pacific	9	Low
Coastal Pelagic Species	Jack mackerel - Pacific Coast	8	Low
Pacific Coast Groundfish	Starry flounder - Pacific Coast	8	Low
Highly Migratory Species	Blue shark - Pacific	8	Low
Highly Migratory Species	Skipjack tuna - Eastern Tropical Pacific	8	Low
Highly Migratory Species	Striped marlin - Eastern Tropical Pacific	7	Low
Coastal Pelagic Species	Krill - Pacific Coast	6	Low
Pacific Coast Groundfish	Big skate - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Black-and-yellow rockfish - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Blackgill rockfish - Southern California	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Bronzespotted rockfish - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Cabazon - California	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Calico rockfish - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	California skate - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Chameleon rockfish - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Dover sole - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Dwarf red rockfish - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Flag rockfish - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Freckled rockfish - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Grass rockfish - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Greenblotched rockfish - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Greenspotted rockfish - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Greenstriped rockfish - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Halfbanded rockfish - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Honeycomb rockfish - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Kelp rockfish - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Leopard shark - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Lingcod - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Mexican rockfish - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Olive rockfish - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Pacific grenadier - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Pink rockfish - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Pinkrose rockfish - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Pygmy rockfish - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Quillback rockfish - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Redbanded rockfish - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Rock sole - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Rosethorn rockfish - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Rosy rockfish - Pacific Coast	Not scored <sup>2</sup>	

## Appendix A: Southwest Region Stock Priorities – Habitat Science Supporting Stock Assessment

Pacific Coast Groundfish	Sand sole - Pacific Coast	Not scored <sup>2</sup>
Pacific Coast Groundfish	Speckled rockfish - Pacific Coast	Not scored <sup>2</sup>
Pacific Coast Groundfish	Splitnose rockfish - Pacific Coast	Not scored <sup>2</sup>
Pacific Coast Groundfish	Spotted ratfish - Pacific Coast	Not scored <sup>2</sup>
Pacific Coast Groundfish	Squarespot rockfish - Pacific Coast	Not scored <sup>2</sup>
Pacific Coast Groundfish	Starry rockfish - Pacific Coast	Not scored <sup>2</sup>
Pacific Coast Groundfish	Swordspine rockfish - Pacific Coast	Not scored <sup>2</sup>
Pacific Coast Groundfish	Tiger rockfish - Pacific Coast	Not scored <sup>2</sup>
Pacific Coast Groundfish	Tope - Pacific Coast	Not scored <sup>2</sup>
Pacific Coast Groundfish	Treefish - Pacific Coast	Not scored <sup>2</sup>
Pacific Coast Groundfish	Whitespeckled rockfish	Not scored <sup>2</sup>
Pacific Coast Groundfish	Widow rockfish - Pacific Coast	Not scored <sup>2</sup>
Pacific Coast Salmon	Chinook salmon - Northern California Coast: Smith (fall/spring)	Not scored <sup>2</sup>
Highly Migratory Species	Dolphinfish - Pacific	Not scored <sup>2</sup>

<sup>1</sup>Official name of FMP is U.S. West Coast Fisheries for Highly Migratory Species.

<sup>2</sup>Stock was not scored for Stock Assessment Theme because it did not meet one or both filter criteria.

## Appendix B: Southwest Region Stock Priorities – Essential Fish Habitat Science

FMP	Stock	Score	Priority
Pacific Coast Salmon	Chinook salmon - California Central Valley: Sacramento (fall)	33	High
Pacific Coast Groundfish	Bocaccio - Southern Pacific Coast	30	High
Pacific Coast Salmon	Chinook salmon - California Central Valley: Sacramento (winter)	28	High
Pacific Coast Salmon	Chinook salmon - Northern California Coast: Klamath (fall)	28	High
Pacific Coast Groundfish	Canary rockfish - Pacific Coast	27	High
Pacific Coast Groundfish	Cowcod - Southern California	27	High
Pacific Coast Groundfish	Yelloweye rockfish - Pacific Coast	27	High
Pacific Coast Salmon	Coho salmon - Oregon Production Index Area: Central California Coast	27	High
Pacific Coast Salmon	Coho salmon - Oregon Production Index Area: Northern California	27	High
Pacific Coast Salmon	Chinook salmon - Northern California Coast: Eel, Mattole, and Mad (fall/spring)	26	High
Pacific Coast Groundfish	Blue rockfish - California	24	High
Pacific Coast Groundfish	Widow rockfish - Pacific Coast	24	High
Pacific Coast Salmon	Chinook salmon - California Central Valley: Sacramento (spring)	24	High
Pacific Coast Groundfish	Darkblotched rockfish - Pacific Coast	23	High
Pacific Coast Groundfish	Pacific ocean perch - Pacific Coast	23	High
Pacific Coast Groundfish	Starry rockfish - Pacific Coast	23	High
Pacific Coast Groundfish	Yellowtail rockfish - Northern Pacific Coast (N 40°10')	23	High
Pacific Coast Groundfish	Yellowtail rockfish - Southern Pacific Coast (S 40°10')	23	High
Pacific Coast Groundfish	China rockfish - Pacific Coast	22	Medium
Pacific Coast Groundfish	Copper rockfish - Pacific Coast	22	Medium
Pacific Coast Groundfish	Petrable sole - Pacific Coast	22	Medium
Pacific Coast Groundfish	Bank rockfish - California	21	Medium
Pacific Coast Groundfish	Blackgill rockfish - Southern California	21	Medium
Pacific Coast Groundfish	Bronzespotted rockfish - Pacific Coast	21	Medium
Pacific Coast Groundfish	Brown rockfish - Pacific Coast	21	Medium
Pacific Coast Groundfish	Flag rockfish - Pacific Coast	21	Medium
Pacific Coast Groundfish	Greenblotched rockfish - Pacific Coast	21	Medium
Pacific Coast Groundfish	Greenspotted rockfish - Pacific Coast	21	Medium
Pacific Coast Groundfish	Lingcod - Pacific Coast	21	Medium
Pacific Coast Groundfish	Quillback rockfish - Pacific Coast	21	Medium
Pacific Coast Groundfish	Tiger rockfish - Pacific Coast	21	Medium
Pacific Coast Groundfish	Vermilion rockfish - California	21	Medium
Pacific Coast Groundfish	Cabazon - California	20	Medium
Pacific Coast Groundfish	Pink rockfish - Pacific Coast	20	Medium
Pacific Coast Groundfish	Redbanded rockfish - Pacific Coast	20	Medium
Pacific Coast Groundfish	Shortspine thornyhead - Pacific Coast	20	Medium
Pacific Coast Salmon	Chinook salmon - Northern California Coast: Klamath (spring)	20	Medium
Pacific Coast Groundfish	Chameleon rockfish - Pacific Coast	19	Medium
Pacific Coast Groundfish	Gopher rockfish - Northern California	19	Medium
Pacific Coast Groundfish	Honeycomb rockfish - Pacific Coast	19	Medium
Pacific Coast Groundfish	Leopard shark - Pacific Coast	19	Medium
Pacific Coast Groundfish	Speckled rockfish - Pacific Coast	19	Medium
Pacific Coast Groundfish	Longspine thornyhead - Pacific Coast	18	Medium

## Appendix B: Southwest Region Stock Priorities – Essential Fish Habitat Science

Pacific Coast Groundfish	Pacific sanddab - Pacific Coast	18	Medium
Pacific Coast Groundfish	Sablefish - Pacific Coast	18	Medium
Coastal Pelagic Species	Pacific sardine - Pacific Coast	17	Low
Pacific Coast Groundfish	Aurora rockfish - Pacific Coast	17	Low
Pacific Coast Groundfish	Black rockfish - Southern Pacific Coast	17	Low
Pacific Coast Groundfish	California scorpionfish - Southern California	17	Low
Pacific Coast Groundfish	Dover sole - Pacific Coast	17	Low
Pacific Coast Groundfish	Greenstriped rockfish - Pacific Coast	17	Low
Pacific Coast Groundfish	Rosethorn rockfish - Pacific Coast	17	Low
Pacific Coast Groundfish	Sharpchin rockfish - Pacific Coast	17	Low
Pacific Coast Groundfish	Stripetail rockfish - Pacific Coast	17	Low
Highly Migratory Species <sup>1</sup>	Pacific bluefin tuna - Pacific	17	Low
Pacific Coast Groundfish	Big skate - Pacific Coast	16	Low
Pacific Coast Groundfish	California skate - Pacific Coast	16	Low
Pacific Coast Groundfish	English sole - Pacific Coast	16	Low
Pacific Coast Groundfish	Pacific hake - Pacific Coast	16	Low
Coastal Pelagic Species	Northern anchovy - Southern Pacific Coast	15	Low
Pacific Coast Groundfish	Chilipepper - Southern Pacific Coast	15	Low
Pacific Coast Groundfish	Kelp greenling - California	15	Low
Pacific Coast Groundfish	Splitnose rockfish - Pacific Coast	15	Low
Pacific Coast Salmon	Chinook salmon - Northern California Coast: Smith (fall/spring)	15	Low
Highly Migratory Species <sup>1</sup>	Albacore - North Pacific	15	Low
Coastal Pelagic Species	Pacific chub mackerel - Pacific Coast	14	Low
Pacific Coast Groundfish	Longnose skate - Pacific Coast	14	Low
Pacific Coast Groundfish	Sand sole - Pacific Coast	14	Low
Pacific Coast Groundfish	Tope - Pacific Coast	14	Low
Highly Migratory Species <sup>1</sup>	Thresher shark - North Pacific	14	Low
Coastal Pelagic Species	Opalescent inshore squid - Pacific Coast	13	Low
Pacific Coast Groundfish	Rex sole - Pacific Coast	13	Low
Highly Migratory Species <sup>1</sup>	Shortfin mako - North Pacific	13	Low
Highly Migratory Species <sup>1</sup>	Yellowfin tuna - Eastern Tropical Pacific	12	Low
Coastal Pelagic Species	Jack mackerel - Pacific Coast	11	Low
Pacific Coast Groundfish	Starry flounder - Pacific Coast	11	Low
Pacific Coast Groundfish	Shortbelly rockfish - Pacific Coast	10	Low
Highly Migratory Species <sup>1</sup>	Swordfish - North Pacific	10	Low
Coastal Pelagic Species	Krill - Pacific Coast	9	Low
Pacific Coast Groundfish	Pacific grenadier - Pacific Coast	9	Low
Highly Migratory Species <sup>1</sup>	Bigeye tuna - Eastern Tropical Pacific	9	Low
Highly Migratory Species <sup>1</sup>	Blue shark - Pacific	8	Low
Highly Migratory Species <sup>1</sup>	Skipjack tuna - Eastern Tropical Pacific	8	Low
Highly Migratory Species <sup>1</sup>	Striped marlin - Eastern Tropical Pacific	7	Low
Highly Migratory Species <sup>1</sup>	Dolphinfish - Pacific	5	Low
Pacific Coast Groundfish	Black-and-yellow rockfish - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Calico rockfish - Pacific Coast	Not scored <sup>2</sup>	
Pacific Coast Groundfish	Dwarf red rockfish - Pacific Coast	Not scored <sup>2</sup>	

## Appendix B: Southwest Region Stock Priorities – Essential Fish Habitat Science

Pacific Coast Groundfish	Freckled rockfish - Pacific Coast	Not scored <sup>2</sup>
Pacific Coast Groundfish	Grass rockfish - Pacific Coast	Not scored <sup>2</sup>
Pacific Coast Groundfish	Halfbanded rockfish - Pacific Coast	Not scored <sup>2</sup>
Pacific Coast Groundfish	Kelp rockfish - Pacific Coast	Not scored <sup>2</sup>
Pacific Coast Groundfish	Mexican rockfish - Pacific Coast	Not scored <sup>2</sup>
Pacific Coast Groundfish	Olive rockfish - Pacific Coast	Not scored <sup>2</sup>
Pacific Coast Groundfish	Pinkrose rockfish - Pacific Coast	Not scored <sup>2</sup>
Pacific Coast Groundfish	Pygmy rockfish - Pacific Coast	Not scored <sup>2</sup>
Pacific Coast Groundfish	Rock sole - Pacific Coast	Not scored <sup>2</sup>
Pacific Coast Groundfish	Rosy rockfish - Pacific Coast	Not scored <sup>2</sup>
Pacific Coast Groundfish	Spotted ratfish - Pacific Coast	Not scored <sup>2</sup>
Pacific Coast Groundfish	Squarespot rockfish - Pacific Coast	Not scored <sup>2</sup>
Pacific Coast Groundfish	Swordspine rockfish - Pacific Coast	Not scored <sup>2</sup>
Pacific Coast Groundfish	Treefish - Pacific Coast	Not scored <sup>2</sup>
Pacific Coast Groundfish	Whitespeckled rockfish	Not scored <sup>2</sup>

<sup>1</sup>Official name of FMP is U.S. West Coast Fisheries for Highly Migratory Species.

<sup>2</sup>Stock was not scored for Stock Assessment Theme because it did not meet one or both filter criteria.

## Appendix C: Raw Scores for Southwest Region Stocks

Theme	Filter Criteria			Scorable Criteria											
	Both	SA	EFH	SA	EFH	Both	Both	Both					Both		
	FSSI Stock or FMC Priority	Likely to Benefit Stock Assessment	Likely to Inform EFH Science	Benefits to Stock Assessment	Likely to Advance EFH Info	Fishery Status	FMC Priority	Habitat Disturbance, Vulnerability, and Rarity					Habitat Dependence		
1								2	3	4	5	Total Score			
<b>Stock</b>															
<i>TOTAL POSSIBLE SCORE</i>	1	1	1	5	5	5	5	1	1	1	1	1	5	5	
<b>COASTAL PELAGIC SPECIES</b>															
Jack mackerel - Pacific Coast	1	1	1	1	4	0	3						0	1	
Krill - Pacific Coast	1	1	1	1	4	0	1						0	1	
Northern anchovy - Southern Pacific Coast	1	1	1	1	4	0	3			1			1	1	
Opalescent inshore squid - Pacific Coast	1	1	1	1	4	0	1	1		1			2	1	
Pacific chub mackerel - Pacific Coast	1	1	1	4	4	0	3						0	1	
Pacific sardine - Pacific Coast	1	1	1	4	4	0	5			1			1	1	
<b>PACIFIC COAST GROUND FISH</b>															
Aurora rockfish - Pacific Coast	1	1	1	4	4	1	5	1		1	1		3	3	
Bank rockfish - California	1	1	1	1	4	3	5	1		1	1	1	4	3	
Big skate - Pacific Coast	1	0	1		4	1	5	1		1			2	3	
Black rockfish - Southern Pacific Coast	1	1	1	1	4	0	3			1	1	1	3	3	
Black-and-yellow rockfish - Pacific Coast	0	0	1												
Blackgill rockfish - Southern California	1	0	1		4	3	5	1		1	1	1	4	3	
Blue rockfish - California	1	1	1	4	4	3	5			1	1	1	3	5	
Bocaccio - Southern Pacific Coast	1	1	1	4	4	5	5	1		1	1	1	4	5	
Bronzespotted rockfish - Pacific Coast	1	0	1		4	1	5	1		1	1	1	4	5	
Brown rockfish - Pacific Coast	1	1	1	1	4	1	5		1	1	1	1	4	3	
Cabazon - California	1	0	1		4	0	3		1	1	1	1	4	5	
Calico rockfish - Pacific Coast	0	0	1												
California skate - Pacific Coast	1	0	1		4	1	5	1		1			2	3	
California scorpionfish - Southern California	1	1	1	1	4	0	1			1	1	1	3	5	
Canary rockfish - Pacific Coast	1	1	1	4	4	5	5	1		1	1	1	4	3	
Chameleon rockfish - Pacific Coast	1	0	1		5	1	5	1		1	1	1	4	3	
Chilipepper - Southern Pacific Coast	1	1	1	4	4	0	1	1		1	1	1	4	3	
China rockfish - Pacific Coast	1	1	1	1	4	1	5			1	1	1	3	5	

## Appendix C: Raw Scores for Southwest Region Stocks

	Filter Criteria			Scorable Criteria										
Theme	Both	SA	EFH	SA	EFH	Both	Both	Both					Both	
Stock	FSSI Stock or FMC Priority	Likely to Benefit Stock Assessment	Likely to Inform EFH Science	Benefits to Stock Assessment	Likely to Advance EFH Info	Fishery Status	FMC Priority	Habitat Disturbance, Vulnerability, and Rarity					Habitat Dependence	
								1	2	3	4	5		Total Score
<i>TOTAL POSSIBLE SCORE</i>	1	1	1	5	5	5	5	1	1	1	1	1	5	5
Copper rockfish - Pacific Coast	1	1	1	1	4	1	5			1	1	1	3	5
Cowcod - Southern California	1	1	1	4	4	5	5	1		1	1	1	4	5
Darkblotched rockfish - Pacific Coast	1	1	1	4	4	5	5	1		1	1	1	4	3
Dover sole - Pacific Coast	1	0	1		4	0	3	1		1			2	3
Dwarf red rockfish - Pacific Coast	0	0	1											
English sole - Pacific Coast	1	1	1	4	4	0	3	1	1	1	1		4	3
Flag rockfish - Pacific Coast	1	0	1		4	1	5	1		1	1	1	4	5
Freckled rockfish - Pacific Coast	0	0	1											
Gopher rockfish - Northern California	1	1	1	1	4	0	3			1	1	1	3	5
Grass rockfish - Pacific Coast	0	0	1											
Greenblotched rockfish - Pacific Coast	1	0	1		4	1	5	1		1	1	1	4	5
Greenspotted rockfish - Pacific Coast	1	0	1		4	1	5	1		1	1	1	4	3
Greenstriped rockfish - Pacific Coast	1	0	1		4	0	5	1		1	1		3	3
Halfbanded rockfish - Pacific Coast	0	0	1											
Honeycomb rockfish - Pacific Coast	1	0	1		4	1	5	1		1	1	1	4	3
Kelp greenling - California	1	1	1	1	4	0	1			1	1	1	3	3
Kelp rockfish - Pacific Coast	0	0	1											
Leopard shark - Pacific Coast	1	0	1		4	1	5		1	1	1	1	4	3
Lingcod - Pacific Coast	1	0	1		4	0	3	1		1	1	1	4	3
Longnose skate - Pacific Coast	1	1	1	4	4	0	1	1		1			2	3
Longspine thornyhead - Pacific Coast	1	1	1	4	4	0	3	1		1			2	3
Mexican rockfish - Pacific Coast	0	0	1											
Olive rockfish - Pacific Coast	0	0	1											
Pacific grenadier - Pacific Coast	1	0	1		4	0	3						0	1
Pacific hake - Pacific Coast	1	1	1	4	4	2	3						0	1
Pacific ocean perch - Pacific Coast	1	1	1	4	4	5	5	1		1	1		3	3
Pacific sanddab - Pacific Coast	1	1	1	4	4	0	3	1	1	1			3	5

## Appendix C: Raw Scores for Southwest Region Stocks

Theme  Stock	Filter Criteria			Scorable Criteria										
	Both  FSSI Stock or FMC Priority	SA  Likely to Benefit Stock Assessment	EFH  Likely to Inform EFH Science	SA  Benefits to Stock Assessment	EFH  Likely to Advance EFH Info	Both  Fishery Status	Both  FMC Priority	Both  Habitat Disturbance, Vulnerability, and Rarity					Both  Habitat Dependence	
								1	2	3	4	5		Total Score
<i>TOTAL POSSIBLE SCORE</i>	1	1	1	5	5	5	5	1	1	1	1	1	5	5
Petrale sole - Pacific Coast	1	1	1	4	4	5	5	1		1			2	3
Pink rockfish - Pacific Coast	1	0	1		4	1	5	1		1	1	1	4	5
Pinkrose rockfish - Pacific Coast	0	0	1											
Pygmy rockfish - Pacific Coast	0	0	1											
Quillback rockfish - Pacific Coast	1	0	1		4	1	5			1	1	1	3	5
Redbanded rockfish - Pacific Coast	1	0	1		4	1	5	1		1	1	1	4	5
Rex sole - Pacific Coast	1	1	1	4	4	0	3	1		1			2	3
Rock sole - Pacific Coast	0	0	1											
Rosethorn rockfish - Pacific Coast	1	0	1		4	1	5	1		1	1		3	3
Rosy rockfish - Pacific Coast	0	0	1											
Sablefish - Pacific Coast	1	1	1	4	4	2	3	1		1			2	1
Sand sole - Pacific Coast	1	0	1		4	0		1	1	1			3	5
Sharpchin rockfish - Pacific Coast	1	1	1	4	4	1	5	1		1	1		3	3
Shortbelly rockfish - Pacific Coast	1	1	1	4	4	0	1	1					1	1
Shortspine thornyhead - Pacific Coast	1	1	1	4	4	0	5	1		1			2	3
Speckled rockfish - Pacific Coast	1	0	1		4	1	5	1		1	1	1	4	3
Splitnose rockfish - Pacific Coast	1	0	1		4	0	5	1		1	1		3	1
Spotted ratfish - Pacific Coast	0	0	1											
Squarespot rockfish - Pacific Coast	0	0	1											
Starry flounder - Pacific Coast	1	1	1	1	4	0	1	1	1	1	1		4	1
Starry rockfish - Pacific Coast	1	0	1		4	1	5	1		1	1	1	4	5
Stripetail rockfish - Pacific Coast	1	1	1	4	4	1	5	1		1	1		3	3
Swordspine rockfish - Pacific Coast	0	0	1											
Tiger rockfish - Pacific Coast	1	0	1		4	1	5	1		1	1	1	4	5
Tope - Pacific Coast	1	0	1		4	1	5	1		1	1		3	1
Treefish - Pacific Coast	0	0	1											
Vermilion rockfish - California	1	1	1	1	4	1	5	1		1	1	1	4	3



### Appendix C: Raw Scores for Southwest Region Stocks

	Filter Criteria			Scorable Criteria										
Theme	Both	SA	EFH	SA	EFH	Both	Both	Both					Both	
Stock	FSSI Stock or FMC Priority	Likely to Benefit Stock Assessment	Likely to Inform EFH Science	Benefits to Stock Assessment	Likely to Advance EFH Info	Fishery Status	FMC Priority	Habitat Disturbance, Vulnerability, and Rarity					Habitat Dependence	
								1	2	3	4	5		Total Score
<b>TOTAL POSSIBLE SCORE</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>5</b>	<b>5</b>
Whitespeckled rockfish	0	0	1											
Widow rockfish - Pacific Coast	1	0	1		4	1	5	1		1	1	1	4	3
Yelloweye rockfish - Pacific Coast	1	1	1	4	4	5	5	1		1	1	1	4	5
Yellowtail rockfish - Northern Pacific Coast (N 40°10')	1	1	1	1	4	0	5	1		1	1	1	4	3
Yellowtail rockfish - Southern Pacific Coast (S 40°10')	1	1	1	1	4	0	5	1		1	1	1	4	3
<b>PACIFIC COAST SALMON</b>														
Chinook salmon - California Central Valley: Sacramento (fall)	1	1	1	4	4	5	5		1	1	1	1	4	5
Chinook salmon - California Central Valley: Sacramento (spring)	1	1	1	4	4	5	3		1	1	1	1	4	5
Chinook salmon - California Central Valley: Sacramento (winter)	1	1	1	4	4	5	5		1	1	1	1	4	5
Chinook salmon - Northern California Coast: Eel, Mattole, and Mad (fall/spring)	1	1	1	4	4	5	5		1		1		2	5
Chinook salmon - Northern California Coast: Klamath (fall)	1	1	1	4	4	2	5		1		1		2	5
Chinook salmon - Northern California Coast: Klamath (spring)	1	1	1	4	4	2	3		1		1	1	3	5
Chinook salmon - Northern California Coast: Smith (fall/spring)	1	0	1		4	1	1				1		1	5
Coho salmon - Oregon Production Index Area: Central California Coast	1	1	1	4	4	5	5		1	1	1		3	5
Coho salmon - Oregon Production Index Area: Northern California	1	1	1	4	4	5	5		1	1	1		3	5
<b>HIGHLY MIGRATORY SPECIES</b>														
Yellowfin tuna - Eastern Tropical Pacific	1	1	1	1	1	2	3						0	1
Albacore - North Pacific	1	1	1	1	1	1	5						0	1
Bigeye tuna - Eastern Tropical Pacific	1	1	1	1	1	2	3						0	1

## Appendix C: Raw Scores for Southwest Region Stocks

	Filter Criteria			Scorable Criteria										
Theme	Both	SA	EFH	SA	EFH	Both	Both	Both					Both	
Stock	FSSI Stock or FMC Priority	Likely to Benefit Stock Assessment	Likely to Inform EFH Science	Benefits to Stock Assessment	Likely to Advance EFH Info	Fishery Status	FMC Priority	Habitat Disturbance, Vulnerability, and Rarity					Habitat Dependence	
								1	2	3	4	5		Total Score
<i>TOTAL POSSIBLE SCORE</i>	1	1	1	5	5	5	5	1	1	1	1	1	5	5
Blue shark - Pacific	1	1	1	1	1	2	3						0	1
Dolphinfish - Pacific	1	0	1		1	1	1						0	1
Pacific bluefin tuna - Pacific	1	1	1	1	1	5	5						0	1
Shortfin mako - North Pacific	1	1	1	1	4	1	5			1			1	1
Skipjack tuna - Eastern Tropical Pacific	1	1	1	1	1	1	3						0	1
Striped marlin - Eastern Tropical Pacific	1	1	1	1	1	1	3						0	1
Swordfish - North Pacific	1	1	1	1	1	0	5						0	1
Thresher shark - North Pacific	1	1	1	1	4	1	5			1			1	1

## Appendix C: Raw Scores for Southwest Region Stocks

Theme	Scorable Criteria											Total Score - SA Theme	Total Score - EFH Theme	
	Both						Both							
	Ecological Importance						Economic, Social, and Management Value							
Stock	1	2	3	4	5	Total Score	1	2	3	4	5	Total Score		
<i>TOTAL POSSIBLE SCORE</i>	1	1	1	1	1	5	1	1	1	1	1	5	35	35
<b>COASTAL PELAGIC SPECIES</b>														
Jack mackerel - Pacific Coast		1			1	2	1					1	8	11
Krill - Pacific Coast		1			1	2			1			1	6	9
Northern anchovy - Southern Pacific Coast		1	1		1	3	1		1		1	3	12	15
Opalescent inshore squid - Pacific Coast		1			1	2	1		1		1	3	10	13
Pacific chub mackerel - Pacific Coast		1			1	2	1	1	1		1	4	14	14
Pacific sardine - Pacific Coast		1	1		1	3	1		1		1	3	17	17
<b>PACIFIC COAST GROUND FISH</b>														
Aurora rockfish - Pacific Coast						0			1			1	17	17
Bank rockfish - California						0			1		1	2	18	21
Big skate - Pacific Coast						0					1	1		16
Black rockfish - Southern Pacific Coast						0		1	1	1	1	4	14	17
Black-and-yellow rockfish - Pacific Coast														
Blackgill rockfish - Southern California						0			1		1	2		21
Blue rockfish - California						0		1	1	1	1	4	24	24
Bocaccio - Southern Pacific Coast	1	1			1	3		1	1	1	1	4	30	30
Bronzespotted rockfish - Pacific Coast						0			1	1		2		21
Brown rockfish - Pacific Coast						0		1	1	1	1	4	18	21
Cabazon - California						0		1	1	1	1	4		20
Calico rockfish - Pacific Coast														
California skate - Pacific Coast						0					1	1		16
California scorpionfish - Southern California						0		1	1	1	1	4	14	17
Canary rockfish - Pacific Coast		1			1	2		1	1	1	1	4	27	27
Chameleon rockfish - Pacific Coast						0			1			1		19
Chilipepper - Southern Pacific Coast						0		1	1		1	3	15	15
China rockfish - Pacific Coast						0		1	1	1	1	4	19	22

## Appendix C: Raw Scores for Southwest Region Stocks

Theme	Scorable Criteria											Total Score - SA Theme	Total Score - EFH Theme	
	Both						Both							
	Ecological Importance						Economic, Social, and Management Value							
Stock	1	2	3	4	5	Total Score	1	2	3	4	5	Total Score		
<i>TOTAL POSSIBLE SCORE</i>	1	1	1	1	1	5	1	1	1	1	1	5	35	35
Copper rockfish - Pacific Coast						0		1	1	1	1	4	19	22
Cowcod - Southern California						0		1	1	1	1	4	27	27
Darkblotched rockfish - Pacific Coast						0			1		1	2	23	23
Dover sole - Pacific Coast		1	1		1	3	1				1	2		17
Dwarf red rockfish - Pacific Coast														
English sole - Pacific Coast					1	1					1	1	16	16
Flag rockfish - Pacific Coast						0			1	1		2		21
Freckled rockfish - Pacific Coast														
Gopher rockfish - Northern California						0		1	1	1	1	4	16	19
Grass rockfish - Pacific Coast														
Greenblotched rockfish - Pacific Coast						0			1	1		2		21
Greenspotted rockfish - Pacific Coast						0		1	1	1	1	4		21
Greenstriped rockfish - Pacific Coast						0			1		1	2		17
Halfbanded rockfish - Pacific Coast														
Honeycomb rockfish - Pacific Coast						0			1	1		2		19
Kelp greenling - California						0		1	1	1	1	4	12	15
Kelp rockfish - Pacific Coast														
Leopard shark - Pacific Coast						0				1	1	2		19
Lingcod - Pacific Coast	1	1			1	3		1	1	1	1	4		21
Longnose skate - Pacific Coast	1	1			1	3					1	1	14	14
Longspine thornyhead - Pacific Coast	1	1	1		1	4	1				1	2	18	18
Mexican rockfish - Pacific Coast														
Olive rockfish - Pacific Coast														
Pacific grenadier - Pacific Coast						0					1	1		9
Pacific hake - Pacific Coast	1	1	1		1	4	1				1	2	16	16
Pacific ocean perch - Pacific Coast					1	1			1		1	2	23	23
Pacific sanddab - Pacific Coast						0		1		1	1	3	18	18

## Appendix C: Raw Scores for Southwest Region Stocks

Theme	Scorable Criteria											Total Score - SA Theme	Total Score - EFH Theme	
	Both						Both							
	Ecological Importance						Economic, Social, and Management Value							
Stock	1	2	3	4	5	Total Score	1	2	3	4	5	Total Score		
<i>TOTAL POSSIBLE SCORE</i>	1	1	1	1	1	5	1	1	1	1	1	5	35	35
Petrale sole - Pacific Coast						0	1		1		1	3	22	22
Pink rockfish - Pacific Coast						0			1			1		20
Pinkrose rockfish - Pacific Coast														
Pygmy rockfish - Pacific Coast														
Quillback rockfish - Pacific Coast						0			1	1	1	3		21
Redbanded rockfish - Pacific Coast						0			1			1		20
Rex sole - Pacific Coast						0					1	1	13	13
Rock sole - Pacific Coast														
Rosethorn rockfish - Pacific Coast						0			1			1		17
Rosy rockfish - Pacific Coast														
Sablefish - Pacific Coast	1	1	1		1	4	1				1	2	18	18
Sand sole - Pacific Coast						0					1	1		14
Sharpchin rockfish - Pacific Coast						0			1			1	17	17
Shortbelly rockfish - Pacific Coast		1	1		1	3						0	10	10
Shortspine thornyhead - Pacific Coast	1	1	1		1	4	1				1	2	20	20
Speckled rockfish - Pacific Coast						0			1	1		2		19
Splitnose rockfish - Pacific Coast					1	1					1	1		15
Spotted ratfish - Pacific Coast														
Squarespot rockfish - Pacific Coast														
Starry flounder - Pacific Coast						0					1	1	8	11
Starry rockfish - Pacific Coast						0		1	1	1	1	4		23
Stripetail rockfish - Pacific Coast						0			1			1	17	17
Swordspine rockfish - Pacific Coast														
Tiger rockfish - Pacific Coast						0			1	1		2		21
Tope - Pacific Coast						0						0		14
Treefish - Pacific Coast														
Vermilion rockfish - California						0		1	1	1	1	4	18	21

### Appendix C: Raw Scores for Southwest Region Stocks

Theme	Scorable Criteria											Total Score - SA Theme	Total Score - EFH Theme	
	Both						Both							
	Ecological Importance						Economic, Social, and Management Value							
Stock	1	2	3	4	5	Total Score	1	2	3	4	5	Total Score		
<b>TOTAL POSSIBLE SCORE</b>	1	1	1	1	1	5	1	1	1	1	1	5	35	35
Whitespeckled rockfish														
Widow rockfish - Pacific Coast	1	1			1	3		1	1	1	1	4		24
Yelloweye rockfish - Pacific Coast						0		1	1	1	1	4	27	27
Yellowtail rockfish - Northern Pacific Coast (N 40°10')	1	1			1	3		1	1	1	1	4	20	23
Yellowtail rockfish - Southern Pacific Coast (S 40°10')	1	1			1	3		1	1	1	1	4	20	23
<b>PACIFIC COAST SALMON</b>														
Chinook salmon - California Central Valley: Sacramento (fall)	1	1	1	1	1	5	1	1	1	1	1	5	33	33
Chinook salmon - California Central Valley: Sacramento (spring)				1	1	2					1	1	24	24
Chinook salmon - California Central Valley: Sacramento (winter)				1	1	2			1	1	1	3	28	28
Chinook salmon - Northern California Coast: Eel, Mattole, and Mad (fall/spring)				1	1	2			1	1	1	3	26	26
Chinook salmon - Northern California Coast: Klamath (fall)	1	1	1	1	1	5	1	1	1	1	1	5	28	28
Chinook salmon - Northern California Coast: Klamath (spring)				1	1	2					1	1	20	20
Chinook salmon - Northern California Coast: Smith (fall/spring)				1	1	2					1	1		15
Coho salmon - Oregon Production Index Area: Central California Coast				1	1	2			1	1	1	3	27	27
Coho salmon - Oregon Production Index Area: Northern California				1	1	2			1	1	1	3	27	27
<b>HIGHLY MIGRATORY SPECIES</b>														
Yellowfin tuna - Eastern Tropical Pacific	1		1		1	3			1		1	2	12	12
Albacore - North Pacific	1		1		1	3	1	1		1	1	4	15	15
Bigeye tuna - Eastern Tropical Pacific	1					1			1			1	9	9

**Appendix C: Raw Scores for Southwest Region Stocks**

	Scorable Criteria											Total Score - SA Theme	Total Score - EFH Theme	
Theme	Both						Both							
Stock	Ecological Importance					Total Score	Economic, Social, and Management Value							Total Score
	1	2	3	4	5	Total Score	1	2	3	4	5	Total Score		
<i>TOTAL POSSIBLE SCORE</i>	1	1	1	1	1	5	1	1	1	1	1	5	35	35
Blue shark - Pacific	1					1						0	8	8
Dolphinfish - Pacific	1					1						0		5
Pacific bluefin tuna - Pacific	1		1		1	3			1		1	2	17	17
Shortfin mako - North Pacific	1					1						0	10	13
Skipjack tuna - Eastern Tropical Pacific			1		1	2						0	8	8
Striped marlin - Eastern Tropical Pacific	1					1						0	7	7
Swordfish - North Pacific	1					1	1		1			2	10	10
Thresher shark - North Pacific	1					1			1			1	11	14