

User Guide and Conclusions: *Groundfish Essential Fish Habitat Synthesis Report*

Because the amount of information in the *Phase I Essential Fish Habitat Report* (Phase I Report) and its companion, *Groundfish Essential Fish Habitat Synthesis Report* (Synthesis Report), may be daunting, we present some approaches for using the Synthesis Report in both developing and evaluating future proposals to change Essential Fish Habitat (EFH) boundaries.

The NMFS Synthesis Report is not a comprehensive EFH analysis, but rather provides summaries and some interpretation of newly available information that supplements previous EFH work and can be used by stakeholders to assess and propose changes to existing spatial management boundaries. The report is intended to set the stage for proposals to articulate any perceived need for changes and to lay the groundwork for Groundfish EFH Request for Proposals. We provide five types of analyses or summarizations: a) the spatial distribution of physical and biogenic habitats of the West Coast across bioregions, depth zones, and areas with different regulatory protections; b) the association of representative species with habitat characteristics including depth, temperature and substrate; c) the distribution of fishing and non-fishing threats across habitat types; d) analyses of the overlap of high likelihood of species occurrence and threats to habitat; and e) a summary of the diets of select groundfishes.

All documents, as well as the underlying data layers for the Synthesis Report, are available online:

- Phase I Report:
www.pcouncil.org/groundfish/background/document-library/pacific-coast-groundfish-5-year-review-of-efh/
- Synthesis Report:
www.pcouncil.org/wp-content/uploads/D6b_NMFS_SYNTH_ELECTRIC_ONLY_APR2013BB.pdf
- Synthesis data layers and data developed during Phase 1:
<http://efh-catalog.coas.oregonstate.edu/synthesis>
- Groundfish EFH Environmental Impact Statement (2006):
www.nwr.noaa.gov/publications/nepa/groundfish/final_groundfish_efh_eis.html.

1. User Guide

Below are suggestions for using the Synthesis Report with respect to EFH consideration.

- **Read this document, look closely at both the Phase 1 Report and Synthesis Report, and consider information from the original groundfish EFH EIS.**

A primary purpose of the Synthesis Report is to provide summarized data that are useful to the development of proposals for changes to EFH and/or regulatory measures to minimize adverse effects to EFH. We have worked to lay out our analyses sequentially; they should form the foundation of proposals. For topics that are not considered in this report, the Phase 1 Report and the initial EIS contain useful information.

- **Look at the distribution of habitats in areas with and without protections.**

Different types of habitats (by depth, by substrate type, by biogeographic region) are differentially subject to fishing regulations and other protections. A logical argument for any change in EFH or related spatially-driven protections includes an articulation of the relative amount of different types of protected and unprotected habitat.

- **Assess protections relevant to individual species.**

We focused on 6 ecologically distinct groundfish species that were selected to be generally representative of the west coast groundfish complex. Our analyses reveal that virtually all the marine habitat along the US West Coast is likely to have a high probability of occurrence for the subadult through adult stage of at least one of these species. [Note that since species are not distributed randomly, we use the probability of occurrence based on habitat characteristics as a proxy for habitat preferences.] Moreover, the value of all areas will likely increase as additional life stages and species are more quantitatively considered. Because species are distributed across habitat types, any difference in protections among habitat types will have varying impacts on species, depending on their affinity to particular habitats. In some cases, such as when a species is subject to very little fishing pressure or other non-fishing stressors, this variance may be acceptable, at least to some stakeholders. Alternately, stakeholders may feel that protections for habitats where certain species are likely to be found are insufficient. Examining: a) the habitat characteristics associated with particular groundfish species; and b) the protections for habitats of those types (as described above) provides a first cut at whether particular species are likely to be affected by the differences in habitat protections.

- **Identify areas of low and high impacts from fishing and other stressors.**

Current levels of impact from both fishing and other threats to habitat can affect the degree of risk or protection that is tolerable to stakeholders or the Council. For example, areas or habitats that are relatively unaffected by human activities may be in little need of additional EFH-related protection; however, if such areas are important for some species, they might be protected now to prevent future degradation. Some habitats or areas subject to both high fishing pressures and high levels of other impacts could be considered for regulations to improve the overall quality of the habitat.

- **Assess the correspondence of threats with habitats among species.**

Ultimately, it is the combination of habitat type, the probability of seeing a species in that habitat, and the threats to which a habitat is subjected, that should inform decisions about changes to existing EFH protections. Protecting areas in which there is a low probability of occurrence for a particular species will have little impact on the long-term persistence and productivity of a species. Thus, probability of occurrence, and associations of species with habitat characteristics can be used to prioritize areas for species of particular concern. The combination of current ecological importance and fishing pressure allows stakeholders to evaluate how much ‘important’ habitat has fishing protection. The inclusion of non-fisheries stressors allows consideration of the suitability of areas for protection. For example, managers may choose to protect areas of the highest quality by prioritizing areas subject to low levels of pollution over areas with high levels of these threats. Or, they may determine that non-fishing threats are so great in some areas that reductions in fishing pressure might be needed to maintain the health of the species. Our ‘occurrence by exposure’ graphs provide a means of gauging how much total habitat is and is not protected where there is a high probability of finding a species.

- **Consider the major prey species of groundfish only when proposing prey-based changes to EFH.**

The definition of EFH includes waters and substrate necessary to fish for feeding, and the presence of prey makes waters and substrate function as feeding habitat. Therefore, activities, both fishing and non-fishing, that reduce the availability of a major prey species, either through direct harm or capture or through adverse impacts to the prey species’ habitat, may be considered adverse effects on EFH if such activities reduce the quality of EFH. While abundant prey can be an important component of EFH, the prey species themselves cannot be designated as EFH. In addition, EFH cannot be designated for prey species that are not managed by the Council.

In this synthesis, we reviewed the available quantitative data for a representative subset of groundfish species and identified their major prey species, with greater taxonomic resolution than in the 2005 EFH designation process. Proposals that address prey abundance and availability (i.e., the quality of the foraging habitat) should focus on these major prey types, at this taxonomic resolution.

2. Conclusions

Below are some noteworthy conclusions that can be drawn from the data.

- *Areas in which there is a high probability of occurrence vary among species; all areas are likely important when the entire assemblage of 91 groundfishes is considered.* Overall, habitat areas important for each of the six representative species do not necessarily coincide; thus together, they cover virtually all locations along the coast. Identifying single areas that are important for all species is unlikely, and defining spatial management boundaries may involve prioritization and trade-offs. [Both models in this report rely heavily on bottom trawl survey data, although one also included visual survey data.]
- *Areas with fishing protections vary geographically.* A large proportion of all habitat along the US West Coast is included in EFH conservation areas. However, the bottom trawl closure of seabed seaward of 700 ftm accounts for the majority of the conservation area; ~10% of the upper slope and shelf areas have such protections.
- *Fishing effort is disproportionate geographically.* Fishing pressure from federally observed groundfish fisheries is highest in the Northern region, and is heavily concentrated on the upper slope and shelf over soft habitats along the entire coast.
- *Patterns of fishing pressure have remained moderately stable over the previous decade, but have likely varied over longer time periods.* Areas designated as EFH conservation areas tend to be areas that had relatively low fishing pressure from the groundfish fishery for several years before Amendment 19 was implemented, which established EFH boundaries and conservation areas in 2006, and continue to have relatively low fishing pressure. However, many of those areas may have received greater fishing pressure before the 2000 trawl footrope restriction and the implementation of Rockfish Conservation Areas. There does appear to be some displacement of trawling activity from the RCAs to areas more seaward.
- *EFH conservation areas protect some groundfish species from fishing more than others.* The proportion of habitat where there is a high probability of occurrence for one of six representative groundfish species that is also included within an EFH conservation area varies widely among species. Those species that occur in rocky or deeper areas (yelloweye rockfish, sablefish, and longspine thornyhead)

have a relatively higher proportion of their ‘high probability’ habitat included within the EFH conservation areas than fish that are generally found in shallower or softer habitats (petrale sole, greenstriped rockfish, darkblotched rockfish)..

- *Fishing pressure was high in high-probability habitat for adults of some groundfish species but not others.* Species vary in the coincidence of habitat suitability and fishing pressure from the groundfish fishery. Sablefish has the highest proportion of areas that are heavily targeted by the fishery and also have a high probability of occurrence. Petrale sole has high probability of occurrence and high fishing pressure near the mouth of the Columbia River (Washington/Oregon border) and near San Francisco, California, but areas of lower fishery pressure (from federally observed fisheries) near shore. The estimated threat to yelloweye rockfish is generally low since yelloweye have a high probability of occurrence only in areas with a low exposure to bottom trawl fishing.
- *Habitat areas of particular concern (HAPCs) are more exposed to high non-fisheries pressures than other areas.* On average, HAPCs and non-HAPC areas are similar in the total level of non-fisheries threat experienced. However, both cumulatively and with respect to individual threats, HAPCs have a greater proportion of areas exposed to ‘high’ non-fisheries threats than were present in non-HAPC areas. This is largely due to HAPCs in shelf areas exposed to land-based threats, and their selection to address non-fishing impacts.
- *The level of taxonomic diversity of prey was significantly improved for 11 groundfish species over the level of information presented in the Phase 1 Report.* However, quantitative information on diet composition is limited for most of the other 80 species in the groundfish FMP. Additional studies are needed to establish trophic linkages for these species throughout the California Current system.
- *Current EFH conservation areas protect many deep-sea coral and sponge habitats, but additional areas remain open to some or all bottom contact gears.* There are numerous sites outside EFH conservation areas where corals and sponges have been observed in relative high abundance; the known distribution of corals and sponges is heavily influenced by how they are sampled.
- *Diet composition differed substantially among these 11 groundfish species.* Such information should not be combined among species for subsequent analysis.
- *Other sources of data are important.* Our analyses did not consider young-of-the-year juveniles or biogenic habitat other than corals and sponges. Information in the 2005 compilation of information for groundfish EFH designation is therefore still relevant. Similarly, the HSP designations made in that effort may be useful for considering habitats potentially important for all life stages.

- *Next steps for future habitat-related analyses include (but are not limited to):* 1) determining the coincidence of non-fishing pressures and high-probability habitats, 2) quantifying key prey species for remaining 80 species of FMP groundfishes; 3) evaluating habitat associations for key prey species, 4) further evaluating the association between groundfishes and biogenic habitats; and 5) incorporating community metrics (such as diversity) into habitat association models. In addition, impacts of climate change are expected to cause shifts in the locations of preferred habitats for different species due to changes in temperature, dissolved oxygen, or acidity, and future reviews of EFH should evaluate the potential need to change EFH designations to accommodate such habitat shifts.

3. Errata

The Synthesis Report includes an older version of Figure 4b.2. Below is the correct figure.

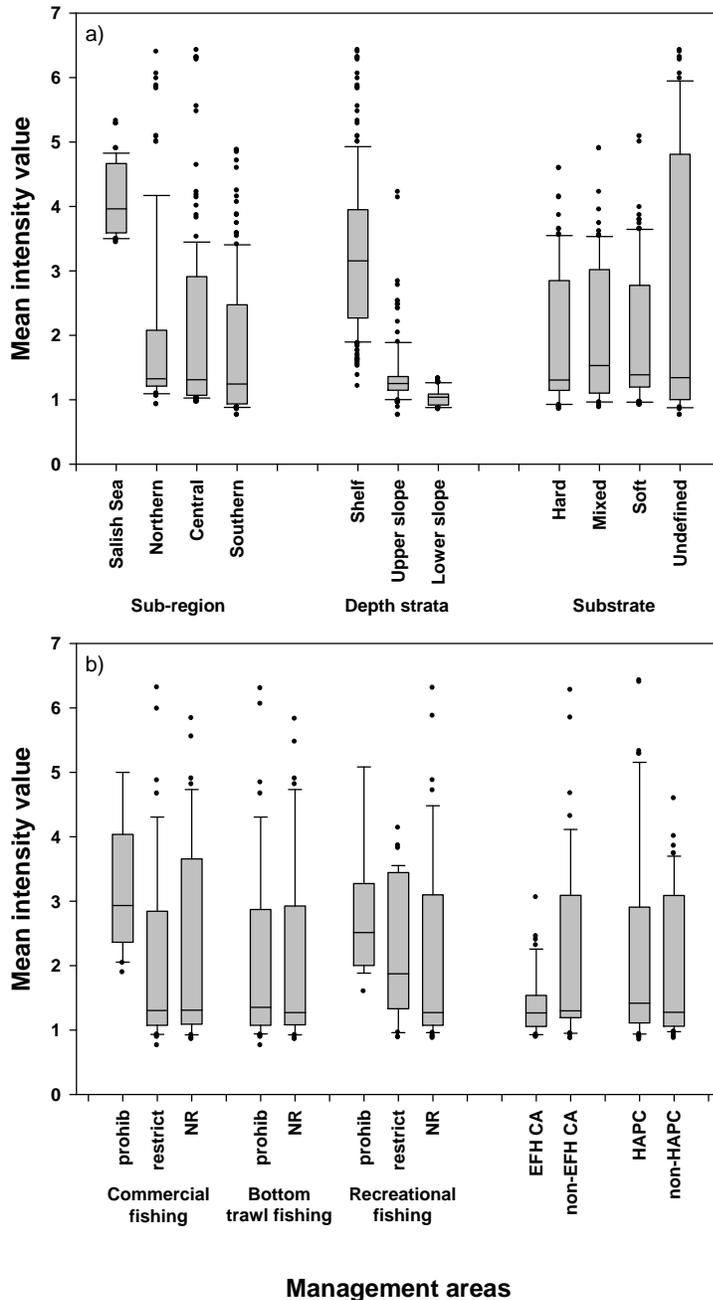


Figure 4b.2. Mean intensity values of combined pressures across a) sub-regions, depth strata, substrate, and b) management areas. The shaded box indicates the 25th to 75th percentile, the line within the box marks the median, the whiskers indicate the 10th and 90th percentiles, and the dots indicate all outliers. prohib: type of fishing is prohibited; restrict: type of fishing is restricted; NR: type of fishing has no restrictions; EFH CA: essential fish habitat conservation areas for West Coast groundfish; HAPC: habitat areas of particular concern. Fishing restrictions include areas within EFH CA, rockfish conservation areas (RCAs), and state territorial sea restrictions.