

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON
BIENNIAL HARVEST SPECIFICATIONS FOR 2015-2016 GROUND FISH FISHERIES

Estimating OFL for Species in the “Other Fish” Complex

The SSC reviewed Agenda Item H.6.a, Supplemental Attachment 6 that describes a procedure for calculating overfishing limits (OFLs) for some species for which OFLs were requested. The method applies F_{MSY} harvest rate proxies to estimates of stock biomass from the NWFSC West Coast Bottom Trawl Survey. This method was used during the previous biennial harvest specification cycle to provide OFLs for big skate, California skate, ratfish, and Pacific grenadier. The SSC endorses the approach, but notes that the method makes the strong assumption that the survey catchability coefficient is 1.0 and likely results in a conservative OFL for species such as grenadier whose geographic range extends into depths beyond the survey area. Also, the OFLs for these species should be updated as additional survey data become available.

OFL Values for Kelp Greenling and Cabezon

There are no OFLs for kelp greenling off Oregon and Washington or for cabezon off Washington in the current table of proposed OFL values (Agenda Item H.6.a, Attachment 1). It may be possible to develop DB-SRA estimates for these stocks. The SSC was informed that (time permitting) Dr. E.J. Dick would: (a) assemble the needed catch history data; (b) send it to agency staff in Oregon and Washington to confirm the acceptability of the catch histories; and then (c) derive the DB-SRA estimates by early December 2013. However, his top priority would be to complete the rebuilding analysis for cowcod. The SSC will review the DB-SRA estimates of OFL values for these species during a conference call that will be scheduled for December.

Category Designation for the Rougheye / Blackspotted Rockfish Assessment

The SSC revisited the decision that was made at the September meeting to designate the new stock assessment for rougheye rockfish as a category 1 assessment. Given that the assessment is for a complex of two species (rougheye and blackspotted rockfish) and given that there is insufficient information available to confirm that these species have similar vulnerability to the fishery and rates of biological productivity, the SSC recommends that the assessment be classified as a category 2 assessment. Both the ABCs and decision table will be updated to reflect this change.

OFLs for Canary Rockfish

The OFLs for canary rockfish originally included in the September briefing book were not endorsed by the SSC in its September statement because of concerns that they may have been incorrect (Agenda Item G.7.b, Supplemental SSC Report, September 2013). Subsequent investigation of the calculations found that the values originally presented in the September briefing book are correct and the SSC recommends these values.

OFLs for Cowcod

The OFL for cowcod in the Conception area will be derived from the completed rebuilding analysis. The OFL for the Monterey area will be derived from an application of DB-SRA using a distribution for depletion for cowcod in the Conception area as a prior to estimate the OFL.

These OFL decisions will be a part of the SSC Groundfish Subcommittee conference call discussions planned for December.

OFL Recommendations

The SSC recommends the OFLs and assessment category assignments that are presented in the revised table of harvest specifications for 2015 and 2016 (Agenda Item H.6.a, Supplemental Attachment 7). The OFLs for brown, China and copper rockfish will be determined by the Council's decision regarding the management boundaries. The table includes some species that are not currently included in the FMP but are under consideration with regard to revisions to the stock complexes (e.g., Aleutian skate).

Ecosystem Considerations in Tier 1 Environmental Impact Statement

The SSC discussed the findings of the SSC's Ecosystem-Based Fishery Management Subcommittee (SSC-ES), which met on October 30 with members of the California Current Integrated Ecosystem Assessment Team and the Groundfish Management Team, to discuss the use of ecosystem models to inform the Tier 1 Environmental Impact Statement (EIS) (see attached). The Atlantis model was deemed the only ecosystem model currently capable of contributing to the Tier 1 EIS. Atlantis covers the area from Point Conception to Cape Flattery and thus excludes the Southern California Bight. The model can be used to evaluate ecosystem effects associated with harvest but not the effects of fishing on habitat. Some groundfish stocks are modeled individually while others are grouped into larger functional groups. Three west coast applications of Atlantis have been published in the peer-reviewed literature.

The SSC recommends that published findings from Atlantis regarding ecosystem effects of groundfish harvest be considered for their relevance to the Tier 1 EIS. Atlantis should also be used directly in the Tier 1 EIS to evaluate the ecosystem effects of a limited number of catch projections representing low and high states of nature. Because ecosystem effects may not be fully realized until after the 10-year Tier 1 projection period, the SSC recommends that Atlantis extend the catch projections for at least another 20 years based on the fishing mortality rates experienced in the tenth year of the projection period. The SSC requests that the Atlantis modelers consult informally with the SSC-ES this winter regarding the types of ecosystem indicators that they anticipate providing for the Tier 1 analysis.

The use of Atlantis in the Tier 1 EIS represents a first exploratory use of ecosystem models for Council decision making. Atlantis outputs should be interpreted qualitatively rather than quantitatively. Although Atlantis is also capable of evaluating economic and social effects, in the interest of time and pending further review of the model, the SSC recommends that its use for this Tier 1 analysis be limited to ecosystem effects. The SSC recommends a thorough review of Atlantis to more fully understand its capabilities and limitations. Dr. Isaac Kaplan (NWFSC) is expected to complete the documentation needed for such a review by June 2014. Results of the review would not be available in time to inform the Tier 1 analysis but could be useful for future specifications cycles.

Report of the Ecosystem Subcommittee Meeting on Ecosystem Considerations in the Groundfish Harvest Specification EIS Analysis

The SSC Ecosystem-Based Management Subcommittee met on October 30 with members of the NOAA California Current IEA Team (Drs. Phil Levin and Isaac Kaplan of the NWFSC, Drs. John Field and Brian Wells of the SWFSC), Mr. John DeVore, and Messrs. Corey Niles and Dan

Erickson (Groundfish Management Team) to discuss the general analytical approach to be used in the Tier 1 Environmental Impact Statement (EIS) and the potential ecosystem effects that could be incorporated into that analysis.

The Tier 1 EIS is being prepared as part of the 2015-2016 harvest specifications process to help alleviate the arduous analytical and procedural workload that currently occurs in each biennial cycle. The Tier 1 EIS will analyze the effects of a range of plausible catch streams over the next 10 years, although ecosystem impacts may be assessed over longer timeframes. Beginning in 2017-2018, catch alternatives that fall within this range could be evaluated by reference to the Tier 1 analysis. The Tier 1 EIS could be modified before the end of the 10-year period, should new information become available that substantively changes the catch projections or the data and methods used to analyze the effects of those projections. The Subcommittee supports the general approach being proposed for the Tier 1 EIS.

Dr. Isaac Kaplan provided a summary of existing ecosystem models which could potentially inform future Council actions, and outlined features of the Atlantis model. The Subcommittee then considered these presentations in the context of the needs for the Tier 1 EIS analysis.

Apart from the Atlantis model, there are four models which have been applied to the US West Coast:

- The Ecosim model of the California Current was originally developed by Dr. John Field. This model covers the US West Coast north of Point Conception, and represents 63 functional groups, including 17 groundfish species. This model, unlike Atlantis, is not spatially-structured, but could form the basis for an evaluation of the impacts of future catch series on ecosystem characteristics. A concern with this model is that it was parameterized in the early 2000s. Substantial changes to our understanding of the biomass and dynamics of species off the West Coast have occurred since then. Although work is underway to update the model, a reparameterized model will not be available in time for the Tier 1 EIS analysis.
- EcoTran is a model for Oregon which includes more than 80 functional groups, and focuses on lower trophic level processes. Like Ecosim, EcoTran is non-spatial. However, it does account for uncertainty due to parameterization and input data. This model is not currently set up to conduct projections so is not suitable for a Tier 1 EIS analysis.
- ROMS-COSINE is a model which can be used to represent benthic habitat based on physical features. This model could provide input for other models. However, as it does not currently include groundfish, it is not suitable for a Tier 1 EIS analysis.
- NEMURO-SAN is a fine-scale model which represents the dynamics of the lower trophic levels. However, it currently focuses on the coastal pelagic food web, and only includes two fish species making it unsuitable as the basis for Tier 1 EIS analysis.

These models each include features which may be useful as the Council moves forward to take ecosystem considerations into account. However, none of these models is immediately useful nor could they be suitably modified in time for use in the Tier 1 EIS analysis. In contrast, the Atlantis model for the West Coast has been developed specifically to conduct evaluations of fisheries management policy. Atlantis is capable of representing multiple trophic levels spatially and includes modules which allow fisheries and fisheries management actions to be modeled. Atlantis can be used to obtain a better understanding of fisheries, management systems, social and economic behavior and climate impacts on entire ecosystems. The model has been

implemented for a number of ecosystems worldwide. Three implementations for the west coast of North America and one for Northeast U.S. have been published in the peer-reviewed literature.

The Atlantis model for the U.S. West Coast covers the region from Cape Flattery to Point Conception and models 51 biological functional groups, including 21 fish groups. It can allow for multiple fisheries and a variety of management controls. The Atlantis model is best suited of the models reviewed for conducting analyses for the Tier 1 EIS. The Subcommittee recommends that the Atlantis model be incorporated into the Tier 1 EIS by discussing the results of published research using the Atlantis model, and by a limited set of model runs that evaluate the ecosystem impact of catch projections from single species models. The SSC EBFM subcommittee has the following recommendations in relation to the analyses for evaluating the impact of catch streams on ecosystem characteristics.

- The results should be reported largely qualitatively (for example as changes which are near zero, small and negative, large and negative) and the focus should be on between-scenario variation in results rather than the results as predictions of the future.
- The focus for the evaluation should be on ecosystem impacts even though Atlantis can provide social and economic outputs, due to the added workload of providing these latter outputs and the short time frame for completing the Atlantis runs. Social and economic effects will be included as usual in the biennial specifications analysis.
- Atlantis is not designed to evaluate fisheries impacts on habitat; other analytical methods would be needed to evaluate those impacts in the Tier I EIS.
- Analysts should consult with Council Advisory Groups including the SSC to ensure the set of model outputs reflect Council issues and concerns.
- The number of scenarios should be kept to a minimum. Atlantis can implement the control rules used for managing West Coast species, or can be run with a pre-specified series of catches. However, the control rule option has not been tested for the West Coast. It would therefore be advisable to run the model for pre-specified series of catches.
- The impacts on the ecosystem may only occur well after ten years. Projections should therefore be undertaken in which the catches for the first ten years of the projection period are based on the catch streams reported in decision tables and the catches for the eleventh and subsequent years determined by setting the fishing mortality by species equal to that for the tenth year of the projection period.
- Catches should be assigned spatially rather than using a model of fleet dynamics under catch shares.
- The number of catch scenarios should be minimized, for example by creating a “high” catch scenario in which the catches by species are set to those for high state of nature and a high P^* , and another “low” catch scenario in which the catches by species are set to those for low state of nature and a low P^* . If the results are qualitatively the same for these two scenarios, there is confidence that they will be robust across a range of future catch series.
- Atlantis requires the specification of spatial closure scenarios. Projections should be conducted for existing spatial closures and the extreme scenario of no spatial closures.

The results from ecosystem models are often sensitive to their specifications. Ideally therefore, projections should be conducted for as many ecosystem models as is possible to assess which results are consistent across ecosystem models. The only alternative model which is sufficiently well developed to allow robustness of results to be evaluated is the Ecosim model. However, this model would need to be updated before it could be used for comparative studies, and it is unlikely that this will be possible before March 2014.

The Subcommittee recommends that a full review of the Atlantis model be conducted. This will not be possible before the March 2014 Council meeting when results are needed to support the Tier 1 EIS. This review could be organized by the NWFSC, or under the existing Council process for methodology reviews. The SSC and CIE experts could be involved in the review irrespective of how it is undertaken. However, a Council-sponsored review would allow for more involvement of the public as well as Council Advisory Bodies, and would foster a better understanding of the appropriate use of ecosystem models in the Council process.

PFMC
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