

A Guide to the Preparation of Alaska Groundfish SAFE Report Chapters

Alaska Fisheries Science Center

September 27, 2012

Introduction

The BSAI and GOA Groundfish FMPs require that separate drafts of the SAFE reports be produced each year in time for the October and December meetings of the North Pacific Fishery Management Council. These drafts are assembled at meetings of the Groundfish Plan Teams held in September and November.

To ensure adequate time for internal review of stock assessments, a pair of due dates will be established annually. These due dates typically will precede the respective Plan Team meetings by three to four weeks.

The following guidelines govern the preparation of individual stock assessment chapters for the two drafts.

Guidelines Pertaining to the September SAFE Report

It is not always necessary to produce a chapter for the September SAFE report. In general, it is assumed that authors will be able to discern whether any changes in the stock assessment resulting from incorporation of the available new information are substantial enough to require review by the Plan Teams and SSC. Authors are strongly encouraged to collect and analyze new information prior to the relevant due date to ensure that the implications of such information are thoroughly evaluated.

A chapter may not be necessary for the September SAFE report if the above conditions do not apply, if no new information is available, or if preliminary analyses of new information fail to indicate any substantial changes from the previous assessment.

If a stock is not already being managed under Tiers 1-3 and a chapter is produced for the September SAFE report, the chapter should include all sections listed in the "Outline of SAFE Report Chapters" below, except that the last item in the "Projections and Harvest Alternatives" section ("Recommendation of F_{ABC} and ABC for coming year") should be omitted.

In all cases, consideration should be given to **all** applicable SSC and Plan Team comments from the previous assessment(s). Chapters should be submitted by the relevant due date.

Guidelines Pertaining to the November SAFE Report

A chapter should be produced for the November SAFE report in all cases except for stocks or stock complexes that the AFSC, after consultation with the Plan Teams and SSC, has placed on a biennial assessment cycle. The chapter should include all sections listed in the "Outline of SAFE Report Chapters" below. The Outline is intended to provide a consistent structure and logical flow for stock assessments conducted at the AFSC for the groundfish fisheries of the BSAI and GOA. Some variation from this outline is permissible if warranted by limitations of data or other extenuating circumstance. However, it is particularly important that all of the items listed under "Projections and Harvest Alternatives" be included to the maximum extent possible, in that many of these are critical to the fishery management process. Consideration should be given to **all** applicable SSC and Plan Team comments from the previous assessment(s). Chapters should be submitted by the relevant due date.

Please **omit** any headers, page numbers, and footers on the version of drafts submitted for dissemination to the Plan Teams or Council. They will be added afterwards. Use of section heading styles in Word

(heading 1, heading 2, etc.) and “normal” style¹ for main text is encouraged. Please allow 1 inch margins (72 points) and be sure the tables or figures don’t overlap the margins. Please use the chapter numbers as they appear in the tasking memo.

Outline of SAFE Report Chapters

Title

Please use the following convention: “Assessment of the *Myfish* stock in the *Gulf of Alaska*” for single-stock assessments and “Assessment of the *Myfish* stock complex in the *Gulf of Alaska*” for multi-stock assessments (replacing italicized text appropriately).

Executive Summary

Summary of Changes in Assessment Inputs

List of changes (if any) in the input data

List of changes (if any) in the assessment methodology. **This is one of the most important sections of the SAFE report.** Common mistakes in this section include: 1) listing something that *has not* changed, and 2) *not* listing something that *has* changed.

Summary of Results

Text table showing M ; recommended Tier; projected total biomass (give age range); female spawning biomass; equilibrium female spawning biomass values for B_0 and B_{MSY} (Tier 1 only) or $B_{100\%}$, $B_{40\%}$, and $B_{35\%}$ (Tier 3 only); F_{OFL} ; the maximum allowable value for F_{ABC} ; the recommended value for F_{ABC} ; OFL ; the maximum allowable ABC, and the recommended ABC. State whether the stock or complex is being subjected to overfishing, is currently overfished, or is approaching a condition of being overfished.

Compare all of the above to the corresponding values from last year’s final assessment (or final specifications, if different from the assessment values). Tier-specific templates for this table are shown on the following pages (note that the “x” in “age x+” should be replaced with the appropriate value for stocks in Tiers 1 or 3; and cells with “current year...” should be replaced with the appropriate number, where “current year” means *this year*).

¹ Normal style should default to 11 point times new roman and is found under style options (under menu or by ctrl-shift-s)

Tier 1 Template

Quantity	As estimated or <i>specified last year for:</i>		As estimated or <i>recommended this year for:</i>	
	current year	current year + 1	current year + 1	current year + 2
<i>M</i> (natural mortality rate) Tier Projected total (age $x+$) biomass (t) Female spawning biomass (t) Projected B_0 B_{MSY} F_{OFL} $maxF_{ABC}$ F_{ABC} OFL (t) maxABC (t) ABC (t)				
Status	As determined <i>last year for:</i>		As determined <i>this year for:</i>	
	current year - 2	current year - 1	current year - 1	current year
Overfishing		n/a		n/a
Overfished	n/a		n/a	
Approaching overfished	n/a		n/a	

Tier 3 Template

	As estimated or <i>specified last year for:</i>		As estimated or <i>recommended this year for:</i>	
Quantity	current year	current year + 1	current year + 1	current year + 2
<i>M</i> (natural mortality rate) Tier Projected total (age x+) biomass (t) Female spawning biomass (t) Projected <i>B</i> _{100%} <i>B</i> _{40%} <i>B</i> _{35%} <i>F</i> _{OFL} <i>maxF</i> _{ABC} <i>F</i> _{ABC} OFL (t) maxABC (t) ABC (t)				
Status	As determined <i>last year for:</i>		As determined <i>this year for:</i>	
	current year - 2	current year - 1	current year - 1	current year
Overfishing		n/a		n/a
Overfished	n/a		n/a	
Approaching overfished	n/a		n/a	

Tier 5 template

	As estimated or <i>specified last year for:</i>		As estimated or <i>recommended this year for:</i>	
Quantity	current year	current year + 1	current year + 1	current year + 2
<i>M</i> (natural mortality rate) Tier Biomass (t) <i>F</i> _{OFL} <i>maxF</i> _{ABC} <i>F</i> _{ABC} OFL (t) maxABC (t) ABC (t)				
Status	As determined <i>last year for:</i>		As determined <i>this year for:</i>	
	current year - 2	current year - 1	current year - 1	current year
Overfishing		n/a		n/a

- Management history (including key changes which may have influenced assessment procedures; selectivity of commercial fishing gear; or distribution of catch by gear, area, or season.)

Data

(If the data for any particular component described here are so voluminous that the corresponding tables would comprise more than 2 pages, the tables may be placed on an ftp site referenced in the chapter.)

For Tiers 1-3, insert a text table summarizing the data used in the assessment model (source, type, years included)

Data which should be presented as time series (starting no later than 1977, if possible):

Fishery:

- Total catch, partitioned by strata used in the assessment model, if any
- Catch at age or catch at length (including sample sizes), as appropriate

Survey:

- Survey biomass estimates
- Survey numbers at age or numbers at length (including sample sizes), as appropriate

Other time series data used in the assessment:

- Time-varying biological data (e.g., annual weight at age, length at age) should be included for stocks/complexes managed under Tiers 1-3; optional for stocks and complexes under Tiers 4-6

Analytic Approach

Model Structure

Description of overall modeling approach (e.g., age/size structured versus biomass dynamic, maximum likelihood versus Bayesian)

If standardized software (e.g., Stock Synthesis) is used, give reference to technical documentation where variables and equations are described. If standardized software is not used, then list variables and equations used in the assessment model in tables or appendices as appropriate.

Discussion of changes in model structure since the previous assessment

Parameters Estimated Outside the Assessment Model

(Use the above heading for Tiers 1-3)

Parameter Estimates

(Use the above heading for Tiers 4-6)

List of parameters that are estimated independently of others (e.g., the natural mortality rate, parameters governing the maturity schedule, parameters governing growth [length at age, weight at length or age]—if not estimated inside the assessment model)

Description of how these parameters are estimated (methods do not necessarily have to be statistical; e.g., M could be estimated by referencing a previously published value)

Parameters Estimated Inside the Assessment Model

(This section should be omitted for Tiers 4-6)

List of parameters that are estimated conditionally on those described above (e.g., full-selection fishing mortality rates, parameters governing the selectivity schedule, parameters governing growth if estimated inside the assessment model)

Description of how these parameters are estimated (e.g., error structures assumed, list of likelihood components)

Results

Model Evaluation

(This section should be omitted for Tiers 4-6)

Description of alternative models included in the assessment, if any (e.g., alternative M values or likelihood weights; **note that the model most recently accepted by the SSC, either after reviewing the previous year's final assessment or the current year's preliminary assessment, must be included**)

Description of criteria used to evaluate the model or to choose between alternative models, including the role (if any) of uncertainty

Evaluation of the model, if only one model is presented; or evaluation of alternative models and selection of final model, if more than one model is presented

List of final parameter estimates, **with confidence bounds** or other statistical measures of uncertainty if possible (if the set of parameters includes quantities listed in the "Time Series Results" section below, the values of these quantities should be presented in the "Time Series Results" section rather than here)

Schedules, if any, defined by final parameter estimates

Time Series Results

(This section should be omitted for Tiers 4-6. For Tiers 1-3, items in this section pertain to the authors' recommended model. If the structure of the recommended model differs substantively from the model most recently accepted by the SSC after reviewing either last year's final SAFE report or the current year's preliminary SAFE report, a set of parallel results for the previously accepted model should be included in an attachment.)

Definition of biomass measures used (e.g., age range used in the "age+" biomass)

Definition of recruitment measures used (e.g., numbers at age 3)

Table of estimated biomass time series, including age+ biomass and spawning biomass, **with confidence bounds** or other statistical measure of uncertainty if possible. The time series included in this **table should end with estimates for the projection year**. Include estimates from previous SAFE for retrospective comparison.

Table of estimated recruitment time series, including average of year classes spawned after 1976, **with confidence bounds** or other statistical measure of uncertainty if possible. Include estimates from previous SAFE for retrospective comparisons

Table of estimated numbers at age or numbers at length.

Conduct within-model retrospective analysis by rerunning the authors' recommended model successively, dropping data one year at a time. Specifically, the analysis should include:

1. Running retrospectives back 10 years (e.g., back to 2002 for the 2012 assessment),
2. Plotting spawning biomass for each model run on a single figure, and
3. Plotting relative changes referenced to the terminal model run.

Graph of estimated biomass time series, with confidence bounds if possible

Graph of estimated fishing mortality versus estimated spawning stock biomass, including applicable OFL and maximum F_{ABC} definitions for the stock. Biomass should be scaled relative to B_{MSY} for Tier 1 stocks and $B_{35\%}$ for Tier 3 stocks. Fishing mortality should be scaled relative to the arithmetic mean of F_{MSY} for Tier 1 stocks and $F_{35\%}$ for Tier 3 stocks.

Harvest Recommendations

(Items in this section pertain to the authors' recommended model or approach. If the structure of the recommended model or approach differs substantively from the model or approach most recently accepted by the SSC after reviewing either last year's final SAFE report or the current year's preliminary SAFE report, a set of parallel results for the previously accepted model or approach should be included in an attachment.)

List of parameter and stock size estimates (or best available proxies thereof) required by limit and target control rules specified in the fishery management plan

Specification of F_{OFL} (Tiers 1-5 only), OFL, and the maximum permissible F_{ABC} (Tiers 1-5 only) or maximum permissible ABC (Tier 6 only)

For Tiers 1-3, include:

- List of standard harvest scenarios and description of projection methodology
- Table of 13-year projected catches corresponding to the alternative harvest scenarios, using stochastic methods if possible (mean values or other statistics may be shown in the case of stochastic recruitment scenarios)
- Table of 13-year projected spawning biomass corresponding to the alternative harvest scenarios, using stochastic methods if possible (mean values or other statistics may be shown in the case of stochastic recruitment scenarios)
- Table of 13-year projected fishing mortality rates corresponding to the alternative harvest scenarios, using stochastic methods if possible (mean values or other statistics may be shown in the case of stochastic recruitment scenarios)

Discussion of information and rationale, if any, that might warrant setting ABC below the maximum permissible level

Recommendation of F_{ABC} and ABC for upcoming year and the next.

If area apportionment of ABC or OFL is used or recommended, include a subsection titled "Area Allocation of Harvests," with results and details of the apportionment scheme(s) for upcoming year and the next.

State whether:

1. The stock/complex is being subjected to overfishing (determined by comparing the catch from the most recent complete year to the specified OFL for that year),
2. The stock/complex is overfished (Tiers 1-3 only), and
3. The stock/complex is approaching a condition of being overfished (Tiers 1-3 only).

Ecosystem Considerations

(Authors are encouraged to use information contained in the Ecosystem Considerations chapter to assist them in developing stock-specific analyses and to recommend new information for inclusion in future versions of the Ecosystem Considerations chapter. Time series currently contained in the Ecosystem

Considerations chapter may simply be referenced rather than duplicated here. In cases where stock-specific time series or relationships are used, this information should be included here rather than in the Ecosystem Considerations chapter.)

Ecosystem Effects on the Stock

The following factors should be discussed:

Prey availability/abundance trends (historically, in the present, and in the foreseeable future). These prey trends could affect growth or survival of a target stock.

- 1) Predator population trends (historically, in the present, and in the foreseeable future). These trends could affect stock mortality rates over time.
- 2) Changes in habitat quality (historically, in the present, and in the foreseeable future). Changes in the physical environment such as temperature, currents, or ice distribution could affect stock migration and distribution patterns, recruitment success, or direct effects of temperature on growth.

Fishery Effects on the Ecosystem

The following factors should be discussed:

- 1) Fishery-specific contribution to bycatch of prohibited species, forage (including herring and juvenile pollock), HAPC biota (in particular, species common to the target fishery), marine mammals, birds, and other sensitive non-target species (including top predators such as sharks, expressed as a percentage of the total bycatch of that species).
- 2) Fishery-specific concentration of target catch in space and time relative to predator needs in space and time (if known) and relative to spawning components.
- 3) Fishery-specific effects on amount of large-size target fish.
- 4) Fishery-specific contribution to discards and offal production.
- 5) Fishery-specific effects on age at maturity and fecundity of the target species.
- 6) Fishery-specific effects on EFH non-living substrate (using gear specific fishing effort as a proxy for amount of possible substrate disturbance).

Data Gaps and Research Priorities

List areas where a significant improvement in the amount of available information would likely result in a significant improvement in the quality of the assessment and the estimates of critical parameters.

Literature Cited

List all references cited in the assessment (and make sure that the current assessment cites appropriate previous assessments containing any analyses that are still mentioned but no longer included in the current assessment).

Omit all references not cited in the assessment (i.e., vestigial references from previous assessments).