Stock/assemblage:

Outline of SAFE Report Chapters

Executive Summary

Summary of Major Changes

- ❑ Changes (if any) in the input data
- ❑ Changes (if any) in the assessment methodology
- ❑ Changes (if any) in the assessment results, including projected biomass, ABC, and OFL

Responses to SSC Comments

- ❑ Responses to SSC comments specific to this assessment (for each comment that is addressed in the main text, list comment and give name of section where it is discussed; if the SSC did not make any comments specific to this assessment, say so)
- ❑ Responses to SSC comments on assessments in general (for each comment that is addressed in the main text, list comment and give name of section where it is discussed; if the SSC did not make any comments on assessments in general, say so)

Introduction

- ❑ Scientific name(s)
- ❑ Description of general distribution(s)
- ❑ Description of management unit(s) (be sure to include any spatial and/or seasonal management measures).
- ❑ Evidence of stock structure(s), if any
- ❑ Description of life history characteristics relevant to stock assessments (e.g., special features of reproductive biology(ies))

Fishery

- ❑ Description of the directed fishery(ies)
- ❑ Information on bycatch and discards
- ❑ Summary of historical catch distributions
- ❑ Table showing time series of ABC, TAC, and total catch; accompanied by a list of recent relevant management or assessment changes that have influenced choice of ABC; selectivity of commercial fishing gear; or distribution of catch by gear, area, or season (e.g., changes in mesh size, gear allocations, harvest strategy, or modeling approach)

Data (Items in this section should be presented in tabular form.)

Data which should be presented as time series (starting with 1977):

- ❑ Total catch, partitioned by strata used in the assessment model, if any
- ❑ Catch at age or catch at length, as appropriate
- ❑ Survey biomass estimates
- ❑ Survey numbers at age or numbers at length, as appropriate
- ❑ Other time series data (e.g., predator abundance, fishing effort)
- ❑ Sample sizes (e.g., numbers of age or length samples by year, gear, and area)

Data which may be aggregated over time:

- ❑ Length at age
- ❑ Weight at length or weight at age

Analytic Approach

Model Structure

- ❑ Description of overall modeling approach (e.g., age/size structured versus biomass dynamic, maximum likelihood versus Bayesian)
- ❑ Reference for software used (e.g., Synthesis, AD Model Builder)
- ❑ Description of, or reference for, population dynamic representations used in the model (e.g., Baranov catch equation, Brody length-at-age equation)
- ❑ Discussion of changes in any of the above since the previous assessment

Parameters Estimated Independently

- ❑ List of parameters that are estimated independently of others (e.g., the natural mortality rate, parameters governing the maturity schedule)
- ❑ 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 Conditionally

- ❑ List of parameters that are estimated conditionally on those described above (e.g., full-selection fishing mortality rates, parameters governing the selectivity schedule)
- ❑ Description of how these parameters are estimated (e.g., error structures assumed, list of likelihood components)

Model Evaluation

- ❑ Description of alternative models, if any (e.g., alternative M values or likelihood weights)
- ❑ 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(s) and selection of final model, if more than one model is presented
- ❑ List of final parameter estimates, with confidence intervals or other statistical measures of uncertainty if possible (if the set of parameters includes quantities listed in the "Results" section below, the values of these quantities should be presented in the "Results" section rather than here)
- ❑ Schedules, if any, defined by final parameter estimates

Results

- ❑ Definition of biomass measures used (e.g., biomass at ages 3 and above)
- ❑ Definition of recruitment measures used (e.g., numbers at age 3)
- ❑ Definition of fishing mortality measures used (e.g., full-recruitment F multiplied by average selectivity for ages 3 and above)
- ❑ Table of estimated biomass time series (starting with 1977), including spawning biomass as one measure, with confidence bounds or other statistical measure of uncertainty if possible. Include estimates from previous SAFE for retrospective comparisons
- ❑ Table of estimated recruitment time series (starting with 1977), including average, with confidence bounds or other statistical measure of uncertainty if possible. Include estimates from previous SAFE for retrospective comparisons
- ❑ Table of estimated catch/biomass time series (starting with 1977), with confidence bounds or other statistical measure of uncertainty if possible.
- ❑ Graph of estimated biomass time series, with confidence bounds if possible
- ❑ Graph of the estimated fishing morality versus estimated spawning stock biomass, including applicable *OFL* and maximum F_{ABC} definitions for the stock.

Projections and Harvest Alternatives

- ❑ 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} , *OFL*, the upper bound on F_{ABC}, and other applicable measures (if any) relevant to determining whether the stock is overfished
- ❑ List of standard harvest scenarios and description of projection methodology
- ❑ Table of 12-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 12-year 5-year (or 10-year, if the stock is overfished) 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 12-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, if any, that might warrant setting ABC below the upper bound
- ❑ Recommendation of F_{ABC} and ABC for coming year.
- ❑ Subsection titled "Area Allocation of Harvests" and provide results and details of any apportionment schemes that are used.

Ecosystem Considerations

- ❑ Discussion of any ecosystem considerations (e.g., relationships with species listed under the ESA, prohibited species concerns, bycatch issues, refuge areas, and gear considerations).

See Guidelines for optional tables summarizing the following subsections:

Ecosystem Effects on Stock

There are several factors that should be considered for each stock in this subsection. These include:

- ❑ Prey availability/abundance trends (historically and in the present and foreseeable future).
- ❑ Predator population trends (historically and in the present and foreseeable future).
- ❑ Changes in habitat quality (historically and in the present and foreseeable future). These would primarily be changes in the physical environment such as temperature, currents, or ice distribution that could affect stock migration and distribution patterns, recruitment success, or direct effects of temperature on growth.

Fishery Effects on the Ecosystem

In this section the following factors should be considered:

- ❑ Fishery-specific contribution to bycatch of prohibited species, forage (including herring and juvenile pollock), HAPC biota (in particular, species common to *YourFishery*), marine mammals and birds, and other sensitive non-target species (including top predators such as sharks, expressed as a percentage of the total bycatch of that category of bycatch.
- ❑ 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.
- ❑ Fishery-specific effects on amount of large size target fish.
- ❑ Fishery-specific contribution to discards and offal production.
- ❑ Fishery-specific effects on age-at-maturity and fecundity of the target species.
- ❑ 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*

Summary

Table showing:

- ❑ M
- ❑ Tier (previous year or recommended)
- ❑ Projected total biomass (give age range)
- ❑ Female spawning biomass for next year
- ❑ Equilibrium female spawning biomass values for B100%, B40%, B35% and B0 (if available from stock-recruit relationship)
- ❑ F_{OFL}
- ❑ Maximum allowable value for F_{ABC}
- ❑ Recommended value for F_{ABC}
- ❑ OFL
- ❑ Maximum allowable ABC
- ❑ Recommended ABC

❑ Literature Cited

Other comments/notes: