NOAA FISHERIES

Alaska Fisheries Science Center

Theme II: Is the assessment process efficient, effective and clearly described, including terms of reference for assessment reports?

Grant Thompson and Chris Lunsford

March 24, 2014

Background

- See "*Assessments Conducted by AFSC, by Update Type and Tier, 2009-2013*"
- 6 NPFMC FMPs
  - Of which AFSC contributes assessments to 3
- 50 groundfish assessments (BSAI and GOA)
  - 35 single stocks and 15 stock complexes
  - "Assessments" do not always map neatly into ACLs, OFLs, or SAFE chapters
- 4 crab assessments

a) Is there an explicit terms of reference for conducting and reporting assessments?

- See "*AFSC Stock Assessment and Fishery Evaluation Guidelines*" (9 pages)
  - This is for groundfish; similar document for crabs
- Not so much for conducting as reporting
- Guidelines vary with tier
  - See Theme I presentation for details on tier system

b) Do reports provide a complete description of the work and a concise summary? (1 of 2)

- Introduction
- Description of the fishery
- Description of the data
- Analytic approach
  - Model structure, Parameter estimates (inside and outside model)
- Results
  - Model evaluation, Time series, Harvest recommendations
- Ecosystem considerations
  - Ecosystem effects on the stock, Fishery effects on the ecosystem
- Data gaps and research priorities
- Literature cited

b) Do reports provide a complete description of the work and a concise summary? (2 of 2)

- Tier 3 summary table (BSAI northern rockfish)

Quantity	As estimated or specified last year for: 2013	2014	As estimated or recommended this year for: 2014	2015
M (natural mortality rate)	0.0413	0.0413	0.0413	0.0413
Tier	3a	3a	3a	3a
Projected total (age 3+) biomass	195,446	195,779	196,519	197,541
Female spawning biomass (t)				
Projected	84,697	83,784	84,237	83,698
$B_{100\%}$	147,918	147,918	147,918	147,918
$B_{40\%}$	59,167	59,167	59,167	59,167
$B_{35\%}$	51,771	51,771	51,771	51,771
F_{OFL}	0.079	0.079	0.079	0.079
$maxF_{ABC}$	0.063	0.063	0.063	0.063
F_{ABC}	0.063	0.063	0.063	0.063
OFL (t)	12,187	12,024	12,077	11,943
maxABC (t)	9,850	9,322	9,761	9,652
ABC (t)	9,850	9,322	9,761	9,652
Status	As determined last year for: 2011	2012	As determined this year for: 2012	2013
Overfishing	No	n/a	No	n/a
Overfished	n/a	No	n/a	No
Approaching overfished	n/a	No	n/a	No

c) Do assessments adequately and incrementally build upon past assessments and reviews?

- For each preliminary/final draft, Team/SSC provide comments
  - See "*Example of Plan Team and Scientific and Statistical Committee Communications to Authors*"
- Comments/responses result in a series of incremental changes
  - See "*Evolution of Pacific Cod Assessments*"
  - Pacific cod assessments represent an extreme example
    - Listing the models presented since 2005 requires 16 pages
  - Factors determining which models undergo the most revision:
    - Data availability
    - Proximity of catch to ABC
    - Value of fishery
    - "Proving ground" for new approaches

d) Are there clear protocols for delivering draft assessment products to peer reviews?

- Stay tuned for full description under Theme III
- Briefly, for each (optional) preliminary and (required) final draft:
  - Author submits draft to in-house reviewer
  - Author responds to in-house reviewer comments
    - Team review draft posted on Web
  - Author presents assessment to Team
    - SSC review draft posted on Web (similar to Team draft)
  - Team chair presents assessment to SSC
- Briefly, for CIE reviews:
  - Detailed terms of reference and background documents required far in advance of review

e) Are assessment scientists involved in, but not burdened by, preliminary data preparation?

- Preliminary data preparation covered in 2013 review
- Survey, age, observer, and catch data collected and prepared mostly by scientists in other programs
- Assessment scientists consulted ahead of time for certain aspects of data collection:
  - Sample design and size, sub-sampling, priorities

f) Are there protocols for consistently dealing with technical issues? (1 of 4: calibration of catchability)

- Catchability *calibration* conducted by others (RACE)
  - Consultation with assessment authors
  - E.g., Kotwicki et al. (2013, 2014): adjusting for density-dependent effects on nominal catchability
- Protocols for catchability *estimation* less clear
  - Alternatives include setting Q=1, estimating freely, estimating with an informative prior
    - Little protocol for specifying informative priors

f) Protocols for dealing with technical issues? (2 of 4: domed, time-varying selectivity; natural mortality)

- Little official protocol at present; practices vary
- Selectivity:
  - Assessments usually assume that at least one fishery or survey exhibits asymptotic selectivity
  - May be constant over all time, constant within each block of years, or annually varying with a constraint
- Natural mortality (*M*):
  - Usually assumed constant over time and age
    - Some sex-specific estimates
  - Usually based on literature or life history
    - Occasionally estimated by likelihood profile

f) Protocols for dealing with technical issues (3 of 4: estimation of stock productivity)

- Stock productivity estimated for only a few stocks
  - Little official protocol at present
  - See *"Recruitment Working Group Report"* for a not-yet-official protocol
    - Especially items B2, B3, and B5
- Tier system implies protocol to some extent
  - E.g., set $F_{MSY}=F_{35\%}$ if F_{MSY} cannot be estimated
  - See Theme I presentation for details

f) Protocols for dealing with technical issues? (4 of 4: characterization of uncertainty)

- SAFE guidelines require reporting measures of uncertainty for:
  - Final parameter estimates
  - Biomass time series
  - Recruitment time series
- Standard procedure for evaluating alternative harvest scenarios deals with uncertainty in future recruitment
  - E.g., see EBS Pacific cod assessment, linked under *"Example Stock Assessments"*
    - Especially pages 259-261 and Tables 2.28-2.33
- Tier system implies protocol to some extent
  - E.g., Tier 1 buffer varies directly with uncertainty by formula

g) Are there protocols for conducting sensitivity analyses and evaluation of risk?

- Team/SSC often request multiple models
  - E.g., alternative values for catchability, *M*
- SAFE guidelines allow for, but do not require, multiple models
- Tier systems based in part on risk assessment
  - Groundfish Tier 1 buffer based on decision-theoretic optimization
  - Crab Tiers 1-4 buffer based on 49% chance of exceeding true-but-unknown OFL

Strengths, challenges, and solutions

- Strengths:
  - High level of throughput
  - Clear expectations in SAFE guidelines
  - Multiple levels of review (up to six per year, more for Pcod)
- Challenges:
  - Sometimes difficult for authors to find Team/SSC comments
  - Compliance with SAFE guidelines less than perfect
  - Team chairs have to master 2000-page document in 2 weeks
- Solutions:
  - Provision of Team/SSC comments in standard, concise form
  - Certification by authors and in-house reviewers that SAFE guidelines and reviewer comments have been addressed
  - Allow remote participation by authors in SSC meetings