

**EXTRACT FROM THE THIRTEENTH SESSION OF THE SCIENTIFIC COMMITTEE  
(IOTC-2010-SC13-R; PAGES 221-222)**

**APPENDIX X**

**GUIDELINES FOR THE PRESENTATION OF STOCK ASSESSMENT MODELS**

A set of guidelines for the presentation of stock assessment models and results was agreed by the SC. These guidelines attempt to ensure greater transparency and facilitate peer-review of models employed in the provision of advice on the status of the stocks. Scientists presenting model runs should provide to the Secretariat a copy of all input and output files and of the executable file or files used. These will be archived for future testing and replication. Scientists are encouraged to freely share the source code of the methods used.

Documents should describe the available data and mention, if necessary, data sources or observations not included in the analysis. When referring to datasets provided by the Secretariat, the date, coverage and precise database should be mentioned. Data sources not previously seen by a Working Party might need their own document presenting them. This includes standardized CPUE series or other data sources processed prior to use.

The population dynamics that are modelled and the techniques used should be clearly presented including a description of the partition, annual cycle, and other relevant population processes.

Alternative scenarios and retrospective analyses should ideally be carried and, if included, a description of the motivation for the selection of base and alternative cases should be added, giving detail of how the alternative case assumptions differ from those of the base case. The description of any retrospective analyses should cover the assumptions involved and results obtained. Projections should be similarly documented.

**Documentation guidelines**

***Software inspection and archival***

- Input and output files of all alternative runs or scenarios presented should be made available during the meeting for inspection by interested members and for later archiving by the Secretariat. Ideally, these should be stored together with a copy of the software used in the analysis. When this is not possible due to licensing issues, a complete reference of the versions of both software and operating system employed should be made. Similarly, confidential inputs need not be provided but they should be documented and identified.
- Software used should ideally be open sourced using an appropriate license, or at least be made available to interested parties for inspection under a limited license. If closed source software is used, this should be clearly justified and sufficient tests as to its validity and reliability, under similar circumstances as those under which it will be used in IOTC-related work, should be carried out and its results made available.
- Comprehensive testing, including regression testing and testing of the influence of various assumptions, is greatly encouraged in all cases.

***Observations***

- Describe the available data and mention, if necessary, data sources or observations not included in the analysis. When referring to datasets provided by the Secretariat, indicate the date, coverage (years, fleets, areas), and precise database (*e.g.* NC, CE).

- Data sources not previously seen by a Working Party might need their own document presenting them. This includes standardized CPUE series or other data sources processed prior to use.

### **Standardized CPUE indices of abundance**

- Description of data pre-processing (*e.g.* treatment of outliers, selection of core areas if applicable)
- Efforts should be made to describe temporal and spatial patterns in the data, identifying gaps or sudden operational changes that lead to an unbalanced design.
- Software and specific function calls
- Standard diagnostic plots (residuals, leverage plots, etc)
- Parameter values, including error estimates
- For complicated models, a stepwise progression from simpler models should be documented to help identify confounding, and a distinction between statistical significance and practical significance.
- Efforts should be made to circulate these analyses well in advance of the relevant working party to allow discussion, and timely implementation in the stock assessment analyses.

### **Population dynamics**

- Describe the population dynamics that are modelled and the techniques used including a description of the partition (age/length/sex groups, maturity, spatial structure, movement dynamics, if necessary), annual cycle (time steps, growth assumptions, natural and fishing mortality functions, recruitment, and sequence of those), and relevant population processes. Fixed parameters should be identified and documented. Emphasis should be placed in describing the formal statistical methods applied, including modelling methods, and form, limits and assumptions of both free and derived parameters.

### **Statistical methods**

- Describe of the formal statistical methods, including
  1. Software name, version number, bibliographic references and source
  2. Maximum likelihood or objective function
  3. Bootstrap assumptions and MCMC algorithm, if used.
- Describe the free parameters used by the model, including
  1. Name and description of the parameter
  2. Details of the estimation bounds/functional relationships with other parameters
  3. Details of the prior assumed (if any), and source of the prior
  4. Weightings for likelihood terms
  5. Adjustment of variance by scaling/adding process error
  6. Penalties
- Describe the derived parameters used by the model, including
  1. Name, description and definitions of derived parameters (be precise with those that have alternative definitions, *e.g.*, B<sub>0</sub>, MSY, BMSY)
  2. Details of any bounds/functional relationships with other parameters.
  3. Details of any priors assumed (including source).

### **Scenarios and retrospective analyses**

- Alternative scenarios and retrospective analyses should be carried when possible and, if included, a description of the motivation for the selection of base and alternative cases should be added, giving detail of how the alternative case assumptions differ from those of the base case. Description of any retrospective analyses, should cover the assumptions involved and results obtained. Projections should be similarly documented.