

Benchmarks at ICES

In short

An **ICES Benchmark Workshop** is an intense process for evaluating the current data and assessment methodology and proposed improvements outside of the annual assessment environment. It should include experts and stakeholders from outside the ICES community to broaden the idea and data pool to improve assessment quality and enhance credibility.

The **goal of a benchmark** is consensus agreement on an assessment methodology that is to be used in future update assessments, laid down in a stock annex¹. This assessment methodology can be an analytical assessment, but can also be non analytical, for instance based on trends in an assessment or in a selected set of (survey) indicators, with or without forecasts. The result will be the 'best available' method that ICES advice can be based on.

The **Stock Annex** describes the methodology agreed by the benchmark workshop and the assumptions on which this is based. If an expert group finds that assumptions are no longer valid, or that new data or methods available might improve the assessment, experts are asked to put forward proposals for changes in the methodology and a renewed benchmark. Typically, a stock should be benchmarked every 3-5 years to keep pace with changing situations.

In order to be flexible to changing situations an **Intermediate Benchmark Protocol**² was set up to deal with short term adaptations in assessment methodology. IBPs generally deal with reviewing of earlier work, or concluding on work that started off at earlier benchmarks.

Benchmark proposals can come from ICES working groups, and will be decided on by ACOM approximately 1.5 years before the workshop takes place to allow for enough preparation time. Expert groups are asked to make a schedule of future benchmarks in order to bring proposals to the table in good time.

Benchmark workshops

A Benchmark workshop is set up around a group of stocks with similar issues that need to be dealt with.

Members consist of:

- Stock assessment experts
- Data collection experts
- Experts on ecosystem / environment / fisheries information
- Stakeholders
- External experts (invited by ICES on the basis of the issues at hand)

The preparation of the actual workshop (at least 6 months before the actual meeting) is guided by an ICES convener, a stock expert from the ICES community. The technical chair during the workshop is one of the external experts. The external experts are invited by ICES and are responsible for guiding the meeting on a scientific level (also during the preparation) and in the end auditing the resulting stock annexes.

¹ Annex 1 Stock Annex

² Annex 2 IBP

The meeting typically has an 8 day structured along the lines of:

- (day 1)- Review of current methods and data
- (day 2)- Consideration of proposals of new input data
- (day 3)- open day
- (day 4)- Review of proposals for new methods
- (days 5-6)- Analysis of candidate methods and reference points
- (days 7-8)- Report preparation and adoption.

If needed, a Data Compilation Workshops (DCW) can be planned a couple of months in advance of a benchmark workshop.

Engaging stakeholders in Benchmark Workshops

Stakeholders are invited to be members of the workshops to inform the group. Science-stakeholder partnerships usually bring information to the table via the scientists, but anecdotal information is welcomed also. Experience shows that stakeholders mainly take part in the data collection part of the meeting, but they are of course welcome to actively participate as their contributions are potentially valuable. The product of the workshop (report including decisions on future data sets and methods to be used as the basis of advice) will be solely the responsibility of ICES participants (nominated by member countries or invited by ACOM, including independent experts).

Scientists that work for stakeholders may participate in the same manner as other stakeholders, or they may be nominated by a member country if the country thinks they can contribute scientifically. Scientist working for stakeholders can be nominated to Expert Groups by a member country, and the same practice may occur for Benchmark Workshops.

Enhancing integration and the ecosystem approach

Benchmark Workshops are an opportunity for enhancing integration and the ecosystem approach. This might be achieved by identifying new scientific knowledge, data sets and/or modeling methods that could be integrated in to the benchmark framework for preparing advice. ACOM is working on improving this part of the benchmark results.

Annex 1 The Stock Annex: the result of a benchmark

Stock Annex template
 (Grey text is examples or additional comments
 – to be deleted in final versions)

Stock Annex

Stock specific documentation of standard assessment procedures used by ICES.

Stock
 Working Group:
 Date: (month.year of last revision)
 Revised by (meeting /stock coordinator name).....

A. General

- A.1. Stock definition
- A.2. Fishery
- A.3. Ecosystem aspects

B. Data

- B.1. Commercial catch
- B.2. Biological
- B.3. Surveys (use the ICES surveys acronym)
- B.4. Commercial CPUE
- B.5. Other relevant data

C. Assessment: data and method

Model used:
 Software used:

Model Options chosen:

Input data types and characteristics: (table below is just an example; adapt the description of input accordingly)

Type	Name	Year range	Age range	Variable from year to year Yes/No
Caton	Catch in tonnes			
Canum	Catch at age in numbers			
Weca	Weight at age in the commercial catch			
West	Weight at age of the spawning stock at spawning time.			
Mprop	Proportion of natural mortality before spawning			
Fprop	Proportion of fishing mortality before spawning			
Matprop	Proportion mature at age			
Natmor	Natural mortality			

Tuning data:

Type	Name	Year range	Age range
Tuning fleet 1			
Tuning fleet 2			
Tuning fleet 3			
....			

D. Short-Term Projection

Model used:

Software used:

Initial stock size:

Maturity:

F and M before spawning:

Weight at age in the stock:

Weight at age in the catch:

Exploitation pattern:

Intermediate year assumptions:

Stock recruitment model used:

Procedures used for splitting projected catches:

E. Medium-Term Projections

Model used:

Software used:

Initial stock size:

Natural mortality:

Maturity:

F and M before spawning:

Weight at age in the stock:

Weight at age in the catch:

Exploitation pattern:

Intermediate year assumptions:

Stock recruitment model used:

Uncertainty models used:

1. Initial stock size:
2. Natural mortality:
3. Maturity:
4. F and M before spawning:
5. Weight at age in the stock:
6. Weight at age in the catch:
7. Exploitation pattern:
8. Intermediate year assumptions:
9. Stock recruitment model used:

F. Long-Term Projections

Model used:

Software used:

Maturity:

F and M before spawning:

Weight at age in the stock:

Weight at age in the catch:

Exploitation pattern:

Procedures used for splitting projected catches:

G. Biological Reference Points

	<i>Type</i>	<i>Value</i>	<i>Technical basis</i>
MSY Approach	MSY B_{trigger}	xxx t	Explain
	F_{MSY}	Xxx	Explain
Precautionary Approach	B_{lim}	xxx t	Explain
	B_{pa}	xxx t	Explain
	F_{lim}	Xxx	Explain
	F_{pa}	Xxx	Explain

(Only include latest reference points, add some text if necessary)

H. Other Issues

H.1. Historical overview of previous assessment methods (this subsection is optional. See example below.)

Summary of data ranges used in recent assessments:

Data	2006 assessment	2007 assessment	2008 assessment	2009 assessment
Catch data	Years: 1978–(AY-1) Ages: 1–8+	Years: 1978–(AY-1) Ages: 1–8+	Years: 1978–(AY-1) Ages: 1–8+	Years: 1978–(AY-1) Ages: 1–8+
Survey: A_Q1	Years: 1985–AY Ages: 1–7	Years: 1985–AY Ages 1–7	Years: 1985– AY Ages 1–7	Years: 1985– AY Ages 1–7
Survey: B_Q4	Years: 1996–(AY-1) Ages: 1–5	Years: 1996– AY-1) Ages 1–7	Years: 1996– AY-1) Ages 1–7	Years: 1996– AY-1) Ages 1–7
Survey: C	Not used	Not used	Not used	Not used

AY – Assessment year

(The historic perspective, as well as all the other section on the stock annex, should only update in a benchmark workshop. If there is any reason to deviate from the stocks annex, this should be explain in the Working Group report and only update this deviation in the historic perspective after consultation with ICES Secretariat and WG Chair).

I. References

Annex 2 The Inter Benchmark Protocol (ACOM, 28-4-2009)

PROTOCOL FOR “BENCHMARKING” METHODOLOGIES BETWEEN BENCHMARK WORKSHOPS

Introduction

The term benchmark refers to methodology for assessing a fish stock that is the result of an intense process to decide on the most appropriate scientifically defensible way of interpreting or using biological knowledge, available data, and models to address management needs. ACOM agreed that benchmark methodologies should be decided in workshops conducted separately from sessions of expert groups that conduct assessments. Benchmark workshops can also be used to evaluate options for integrating new scientific results and ecosystem considerations into methodologies used to give advice. The workshops include experts from outside of the ICES community to broaden the idea pool available as the basis for a benchmark and to enhance credibility. The results of a benchmark are recorded in a stock annex. Expert groups then update assessments according to the agreed methodology in the stock annex.

While benchmark workshops are the preferred approach for benchmarking methodologies, there are circumstances where methodology needs to be improved and it is impractical to conduct a benchmark workshop. This protocol covers these circumstances.

Neither benchmark workshops nor application of this protocol are intended to inhibit expert groups from thinking creatively and showing initiative when it comes to improving methods. However, benchmark workshops and this protocol are intended to formalize the process by which changes in methodology are agreed in order to assure quality, consistency and documentation.

Applicability of the Protocol

ACOM reaffirms that benchmark workshops are the normal way of benchmarking stock assessment methodology. Therefore, application of this protocol should not be common. The protocol applies to:

1. Completion of methodological improvements that were initiated or described by a benchmark workshop,
2. Discovery of an error or flaw in the current methodology such that continuing its use is not scientifically defensible,
3. A scientific breakthrough (in terms of data, methodology or knowledge) that specifically addresses an acknowledged weakness in the current methodology.
4. As a preparatory step for a benchmark workshop, such as to decide on the appropriate stock assessment units.

Rarely is the protocol applicable when a benchmark workshop for the stock is planned within one year, except when number 4 is applicable.

The Protocol

Application of the protocol is usually triggered by the chair of a stock assessment expert group. However, there may be unusual circumstances that lead another member of the ICES scientific community to initiate the process (e.g., the discovery of an apparent error that is not acknowledged by the expert group).

The protocol embodies the following characteristics:

1. Its application must be justified.
2. ACOM decides when the protocol will be applied
3. It should be applied well in advance of the Expert Group meeting that is intended to apply the results.
4. A proposed change in methodology must be thoroughly documented such that qualified scientists understand it and have enough documentation to apply it (including the ability to reproduce results produced by the methodology's proponent).

5. The proposed methodology (item 4) will be subjected to peer review.

The protocol is as follows:

1. The initiator of the protocol submits a written proposal for applying the protocol to the ACOM Chair. The justification must include:
 - A description of the problem to be addressed.
 - The reason the problem needs to be addressed prior to the next benchmark for the stock.
 - Action(s) to be taken to resolve the problem. One proposed action must be preparation of a document (that fulfils characteristic 4 above) describing proposed changes in methodology, with a “worked example(s).” In some cases, a focused workshop might be justified to refine or examine the proposed methodology. However, workshops must be designed to act on well documented proposals. “Brainstorming sessions” are not allowed under this protocol. Another proposed action must be a process for revising the appropriate stock annex if application of the protocol results in agreed changes.
 - Proposed schedule of events taking account of the time requirements stated in the steps below.
2. The Chair of ACOM circulates the justification to ACOM with his or her recommendation.³ ACOM will be given at least one week to comment. If any ACOM member objects, there will be an ACOM Web Conference to decide on the matter.
3. If the justification is accepted (by the ACOM Chair and/or ACOM in according to number 2), the initiator will be instructed to implement the actions included in the proposal, as modified by the ACOM Chair and/or ACOM (according to step 2).
4. The outcome from step 3 will be subjected to a peer review organized by the ACOM Chair and the Secretariat. There will be at least two peer reviewers, but for changes that are likely to have a substantial impact on advice, there should be at least three peer reviewers, including at least one external reviewer. At least two weeks will be allowed for the peer review. In some cases, independent experts may be included in a workshop evaluating a proposed change in methodology in lieu of a peer review following a workshop (i.e., integrated instead of sequential peer review).
5. The results of peer reviews and a recommendation (e.g., to accept or reject the proposed change in methodology) from the ACOM chair will be circulated to ACOM for comment. ACOM will be given at least one week to comment. If any ACOM member disagrees with the recommendation, there will be an ACOM Web Conference to decide on the matter.
6. The ACOM chair will inform the Chair of the appropriate expert group of the outcome of step 5. This must occur at least one month in advance of the expert group meeting to allow preparation for implementing changes. If necessary, the expert group may be granted up to two additional meeting days to take account of additional work associated with implementing the changes. However, additional meeting days will only be granted if identified as an element of the proposed actions in step 1, and if the process is initiated far enough in advance so that the outcome is known at least two months in advance of the expert group meeting.⁴

³ The ACOM chair’s recommendations will take account of consultation with ACOM Vice Chairs.

⁴ The extra time in advance of the Expert Group meeting is intend to give members more time to adjust their schedules to attend a longer meeting. They should be aware of the possibility of the need for additional days much earlier based on the identification of this possibility in the justification.