ICES TCSAA REPORT 2014

Report of the ICES Training Course: Stock Assessment (Advanced) (TCSAA)

3–7 November 2014

ICES International Council for the Exploration of the Sea

CIEM Conseil International pour l'Exploration de la Mer

International Council for the Exploration of the Sea
Conseil International pour l'Exploration de la Mer

H. C. Andersens Boulevard 44–46
DK–1553 Copenhagen V
Denmark
Telephone (+45) 33 38 67 00
Telefax (+45) 33 93 42 15
www.ices.dk
info@ices.dk

Recommended format for purposes of citation:

ICES. 2014. Report of the ICES Training Course: Stock Assessment (Advanced) (TCSAA), 3–7 November 2014.

The document is an ICES Training course report

Contents

Participants at the course "Stock Assessment (Advanced)", 3–7 November 2014, ICES HQ, Copenhagen. The course was given by Jan Jaap Poos, IMARES, the Netherlands and Arni Magnusson, Marine Research Institute, Iceland.

Report of the ICES Training Course Stock Assessment (Advanced) 3–7 November, 2014

by

Jan Jaap Poos and Arni Magnusson

1 Summary

This was the third offering of the training course "Stock Assessment (Advanced)" under the ICES Training Programme. 12 students from 10 countries participated in the course (Annex 1). From the perspective of the instructors, the course was a success. Overall, the participants rated the course positively, and some adjustments can improve the knowledge and skill transfer to the trainees (see 2 Recommendations).

The course is taught in R and ADMB. Practically speaking, R has become the lingua franca for statistical computation and most participants had experience with R. To help the participants in obtaining sufficient background knowledge on R, a short introductory course in R was sent around before the course. Still, some students arrived at the course with little knowledge on R. For these students, the course was probably hard to follow, but much care was taken that everybody managed to do all exercises in R. The course consisted of a number of elements:

1) An introduction to population dynamics in stock assessments
2) Explanation on how observations follow from the population dynamics, including the Baranov equation, survey time series, and plus-group dynamics
3) Exploratory data analysis for stock assessment data
4) An introduction to likelihoods
5) An introduction to optimizers
6) Creating an assessment in R and ADMB
7) Estimating parameter uncertainty in stock assessments
8) Reference point estimation
9) Bayesian theory

Because of time constraints, multi-species stock assessments and tagging were not covered. Also, there was only a limited amount of time for participants to use their own data. Still, several participants used the opportunity to apply the methods taught in the course on their data.

Feedback from students was solicited using a course evaluation questionnaire (Annex 2). Feedback was received from 11 participants. Results indicate that the amount of material covered and degree of difficulty was between "average" and "too much". The quality of the course outline was considered "very good". Teaching and learning support was overall considered to be "High". The overall evaluation was generally found to be between "Average" to "Very good", with the median of the overall rating of the course being "Very good".

The new touch-sensitive monitor (by the presentation desk) turned out to be quite an effective tool for teaching, once the instructors had learned how it works. It combines the features of a monitor and a drawing board, so it uses the wall space efficiently. Not only does it provide the ability to sketch diagrams, e.g. as a response to a question, but also to save all such diagrams in a multi-page PDF which was uploaded to the Sharepoint at the end of the course.

Individual feedback from trainees to the question "Good features of this course/suggestions for improvement" resulted in:

- Classroom setting is not favourable for smaller groups.
- good: providing useful and applicable software code that can be used by participants in day-to-day life or even just to practice. The course was building

up throughout the week with both background theory and accompanying scripts. This makes the learning process easier by supporting the material with useful exercises. improvements: Sometimes there were too extreme jumps (e.g. going from full model R scripts that are understandable by most participants to the equal features in ADMB, which is not so frequently used). The structure of the provided code could also be made easier be storing them is a folder structure based on contents rather than by course day. The course started off very well in terms of structure. However, as the week progressed, it seemed that more and more ad hoc material was used and the connection was not so clear anymore. For example, at first, it was clear that the "Lab" PowerPoint slides provided the background for the exercises. However, this was not the case later on and the exercise/program structure started to deviate to what was previously planned or done in previous courses. This was somehow detrimental to the ability to follow the idea behind the course material and theory presented.

- Practical sessions were good, it helped me to understand the theory a bit better.
- Maybe some more teaching on surplus production models, models which are not age based.
- I really like the course, the initial global view, the parameter optimization and uncertainty treatment, the introduction to admb and the reference points introduction. However, I miss to go into the Harvest Control Rules. I know there is limited time, but introducing the HCR would make the course more comprehensive. Thanks anyway for an excellent course.

2 Recommendations

From the comments in the questionnaires the following recommendations can be taken

- Create a gentle introduction to ADMB using simple MLE examples such as linear and non-linear regression, and a surplus production model on day 3
- Bring back the Harvest Control Rule Session
- Make sure that all software (including ADMB) is installed on the participants computer before arrival.

Following up on these recommendations should create a more structured course, where the increase in complexity of material is more gradual.

Like last year we conclude that moving from R slowly to ADMB on Wednesday, and essentially staying in ADMB for the rest of the course, is the essence of "advanced stock assessment". Some might argue that the course could start in ADMB on Monday - to avoid confusion and repetition - but the current approach is beneficial for the majority of participants, who were experienced in R and were happy to see how ADMB gave them the same answers, and more.

We tried to give participants the opportunity to use the assessments on their own data. However, participants did not take up this challenge. Maybe using the stock assessment on data that the participants bring is too ambitious for the course: using synthetic data poses enough of a challenge already.

3 Course description

Contexts and level

This is an advanced course in fisheries stock assessment modelling where we show the generic properties of various methods used to generate historical stock abundance and mortality rate estimates. The course includes uncertainty estimation of relevant parameters. It is aimed at scientists who have some foundation in the fundamentals of stock assessments.

We examine various assumptions as well as strength and weaknesses of different methods. The course will take you through the different steps that are part of any stock assessment. First: exploratory data analysis and the potential information content in the available data; Second: we discuss setting up structured population dynamic models. As a third step, we link these population dynamics models to existing data by calculating model predictions for catch, survey, and other relevant types of data. Finally, we discuss and demonstrate several tools that can help in fitting the models to data, such as different optimizing/sampling tools, and importantly, we discuss how to estimate and present uncertainties in the stock assessment models.

In response to comments from last years' course we added more comments to the examples that we gave to participants, and we put more focus on "good practices" during the course.

Objectives

The general objective of the course is to train stock-assessment scientists and advisors in population dynamics and advanced stock assessment. The course intends to put theory into practice as much as possible by working on examples from different angles.

4 Course programme and instructors

The five-day course is organized as a series of morning sessions that focus on theoretical concepts and afternoon work sessions. These work sessions are completed in different software environments such as R and AD model builder (see flr-project.org and admb-project.org). Programme in Annex 3.

Instructors:

Jan Jaap Poos,
Wageningen IMARES
PO Box 68
1970 AB IJmuiden
janjaap.poos@wur.nl

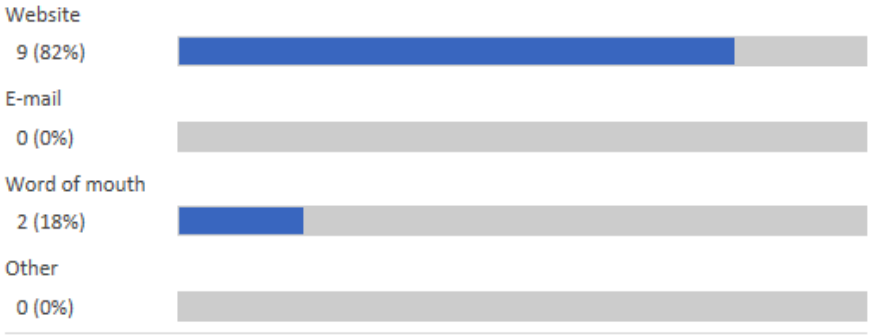
Arni Magnusson,
Marine Research Institute,
Skulagata 4, PO Box 1390,
121 Reykjavik, Iceland
Tel.: (+354) 575 2000
Email: arnima@hafro.is

Annex 1: List of participants

	Name	Country	E-mail
1	Jan Jaap Poos	Netherlands	Janjaap.Poos@wur.nl
2	Arni Magnusson	Iceland	arnima@hafro.is
3	Claire Moore	Ireland	CLAIRE.MOORE@research.gmit.ie
4	Sascha Fässler	Switzerland	sascha.fassler@wur.nl
5	Andreas Sundelöf	Sweden	Andreas.Sundelof@havochvatten.se
6	Alfonso Pérez-Rodríguez	Spain	perezra@imr.no
7	Jay Dieterich	United States of America	jdiete1@tigers.lsu.edu
8	Anna Chrysafi	Greece	anna.chrysafi@helsinki.fi
9	AnnDorte Burmeister	Denmark	anbu@natur.gl
10	Ruben Verkempynck	Belgium	ruben.verkempynck@wur.nl
11	Pedro Sousa	Portugal	pedro.sousa@sustainablefish.org
12	Nanette Hammeken Arboe	Greenland	naha@natur.gl
13	Rodney Govinden	Seychelles	rgovinden@sfa.sc
14	Paul Dolder	UK	paul.dolder@cefas.co.uk

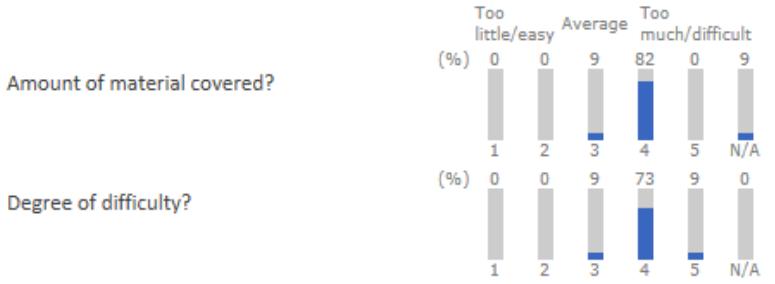
Annex 2: Response on the course evaluation questionnaire

1. _____
How did you hear about this course?



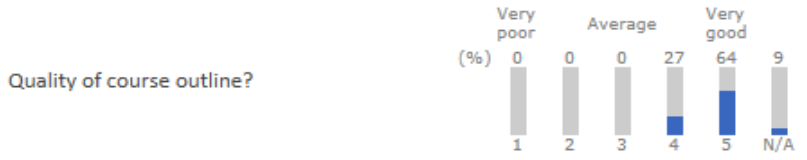
Total: 11

2. _____
Course content



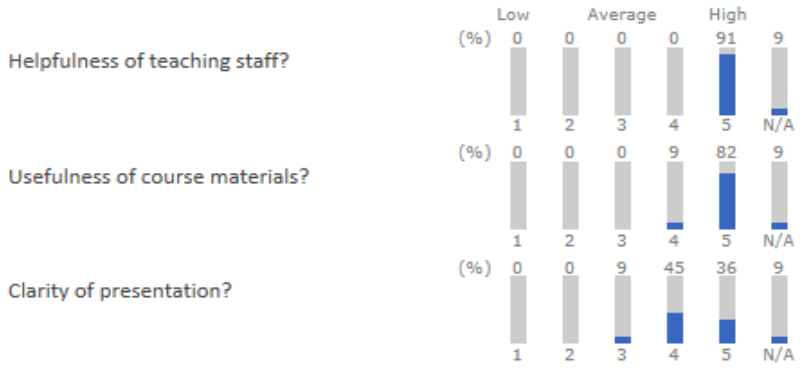
Total: 11

3. _____
Course Organization



Total: 11

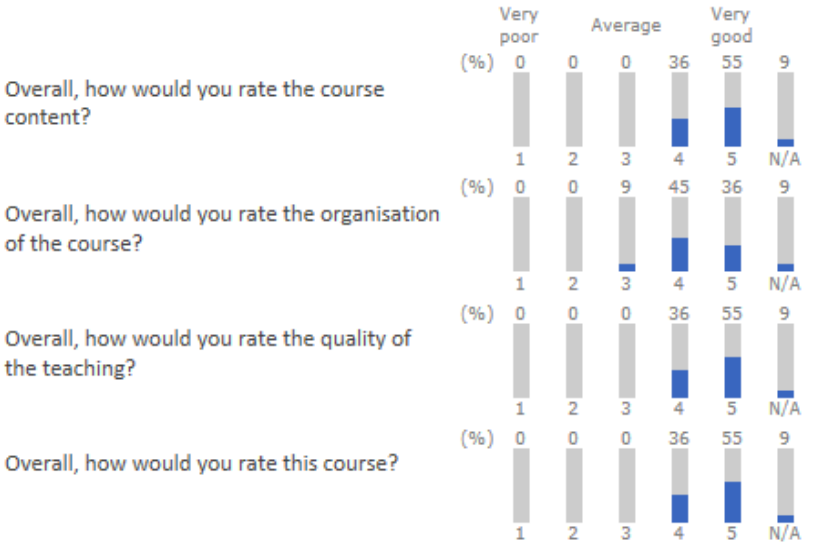
4. _____
Teaching and Learning Support



Total: 11

5. _____

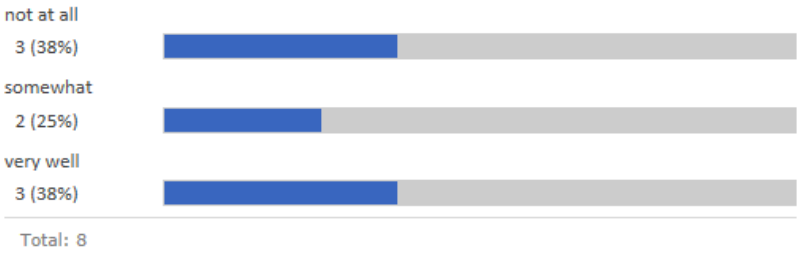
Overall Evaluation



Total: 11

7. _____

Have you taken any other ICES training courses? If so, how well did they prepare you for this course?



Total: 8

8. Do you feel you have benefited from networking opportunities on the course?

Total: 11

9. Comments

Total: 1

10. Did you participate in the course dinner on Thursday evening?

Yes

9 (82%)

No

2 (18%)

Total: 11

11. Would you prefer the course dinner to take place in the city centre, or at the course location (at own expense)?

At the course venue

3 (33%)

In the city centre

6 (67%)

Total: 9

12. More comments

Total: 0

Annex 3: Course Programme

Monday, 3 November 2014	
9.00 – 9.15	1.0 Welcome ICES Staff
9:15 -9:45	1.1 Lecture introduction to course
9:45 – 10:00	**Tea/Coffee**
10:00 – 11:00	1.2 Lecture introduction to stock assessment
11:00-12:00	1.3 Lecture population dynamics
12:00-13:00	**Lunch**
13.00 – 14.00	1.4 Lab population dynamics I
15.30 – 16.00	**Tea/Coffee**
16.00 – 18.00	1.5 Lab population dynamics II
18.00 – 20.00	*Icebreaker*
Tuesday, 4 November 2014	
9. 00 – 10.15	Lecture likelihood estimations
10.15 – 10.45	**Tea/Coffee**
10.45 – 13.00	Lecture optimizers
13.00 – 14.00	**Lunch**
14.00 – 15.00	Lab optimizers
15.00 – 15.30	**Tea/Coffee**
15.30 – 17.30	Lab stock assessment in R
Wednesday, 5 November 2014	
9:00 – 9:30	Lab stock assessment in R II
9.30 – 10.15	Lectures uncertainty estimation in likelihood approaches
10.15– 10.45	**Tea/Coffee**
10.45 – 13.00	Lab uncertainties in R assessment
13.00 – 14.00	**Lunch**

14.00 – 15.00	Lab stock assessment in ADMB
15.00 – 15.30	**Tea/Coffee**
15.30 – 18.00	Lab stock assessment in ADMB
18.15 – 22.00	Course dinner (optional, expenses to be covered by participants)
Thursday, 6 November 2014	
9.00 – 10.15	Lab assessment in ADMB
10.15 – 10.45	**Tea/Coffee**
10.45 – 13.00	Lecture on Bayesian statistics
13.00 – 14.00	**Lunch** & Group photo
14.00 – 15.00	Lab MCMC in ADMB
15.00 – 15.30	**Tea/Coffee**
15.30 – 16.30	
16:30 – 18:00	Lab in Bayesian statistics
Friday, 7 November 2014	
9.00 – 10.15	Lecture on reference points
10.15 – 10.45	**Tea/Coffee**
10.45 – 12.30	Lab on reference points
12.30 – 13.30	**Lunch**
13.30 – 14.30	Lecture on tagging
14.30 – 17:00	Questions and answers, evaluation, Bring your own data