

# TCSAA REPORT 2018

ICES TRAINING COMMITTEE

## Report of the Training course Stock assessment Advanced

5-9 November 2018

ICES Headquarters, Denmark

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**ICES**

International Council for  
the Exploration of the Sea

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Conseil International pour  
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## 1 General

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This was the fifth offering of the training course “Stock Assessment (Advanced)” under the ICES Training Programme. 25 students participated in the course. From the perspective of the instructors, the course was a success. Overall, the participants rated the course positively.

The course is designed to teach participants the inner workings of stock assessments. This is done by showing the structure of different stock assessments in R and TMB. TMB is a powerful tool for linking models to data. Meanwhile, R was chosen because it is the lingua franca for statistical computation. Most participants had experience with R. To help those participants who were not well versed in R, a short online introductory course in R was sent around before the course. The course consisted of a number of elements:

1. An introduction to (age-structured) 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 TMB
7. Estimating parameter uncertainty in stock assessments using various methods
8. Reference point estimation
9. Stochastic projection of stocks
10. Using tagging data in stock assessments
11. Length-structured stock assessment models

At the last day, there was time reserved for participants to use their own data, and some of the participants indeed managed to apply the course material to their own data.

Feedback from students was solicited using a course evaluation questionnaire (Annex 2). Feedback was received from 21 participants. Overall, the course was well received, with an average score of 4.6 on a scale of 1-5. The quality of the teaching was equally well scored (average of 4.6 on a scale from 1-5). With respect to the course content, the training course did meet the expectations (average score of 4.5 on a scale of 1-5).

One issue during the course was that we needed one hour to make TMB working on all computers. Although we had instructed everybody to install TMB prior to the course, we were surprised to find that it did not work for a substantial number of participants. In the end we managed to make all software work for all computers. The issue of initially failing TMB software was also commented on by one of the participants. In the future instructors should improve the instructions on installing and testing TMB.

Individual feedback from trainees to the question “What did you like best of find most useful about the training course?” resulted in:

- Detailed code, time to work on participants own interests.
- Using the same data for different assessment models.
- Explanation of the theoretical background of the assessment models.
- Working examples of stock assessment models, which were clearly explained and dissected.
- The course was very good at getting deeper insights in stock assessments.
- Right mix of lecture teaching, practical exercises with expert assistance.

- Having all scripts and methods to go through later and compare with own models.
- Everything was useful. It provides a general idea how the models work.
- A very good combination of mathematic and biology, very wide coverage of topics.
- 
- In response to the question “General response on the training course” the participants answered:
- 
- Installation of TMB: send participant s a script to test the installation of TMB and make sure that Rtools is correctly installed before the start of the course.
- Overall, the course is well organized. if anything, introducing more advanced topics (e.g., TMB) slightly earlier might allow us spending more time to understand these fully.
- It would have been useful to have an introduction to the most commonly used stock assessment models used at ICES. This would be directly usable for participants of the ICES stock assessment working groups.
- Only comment, some participants had difficulty getting files off the share-point in a convenient manner i.e. Library>File Explorer not working on their pc. So files loaded individually which was time consuming.
- Very well conducted.
- Very good course. I really enjoyed it.
- very nice course, best I had so far in ICES. The course had wide coverage of topics, the 2 instructors make a very good match in teaching: one on mathematics and one on practice. Teaching pace was excellent' understandable for people with varying background and levels. Strong recommendation.

For other/remaining comments, see Annex 2.

## 2 Recommendations

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The evaluation does result in a number of recommendations from the participants.

It seems that at least one participant was interested in a course on the “commonly used” assessments in ICES. Our course is specifically not set up to do this (but rather to teach from principles). Given that SAM is the commonly used method for age-structured assessments, there seems to be a need for running that course.

There was one suggestion to make sure that TMB was working for all participants at the start of the course, and to start TMB examples earlier on in the course. That should indeed be considered in the course.

### **3 Course description**

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#### **3.1 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. The results of the stock assessments are contrasted against reference points, which are estimated by the participants. 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 takes participants 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. We discuss the evaluation of the model fit to the data. Then, 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. Finally, the stock assessment results are used to calculate reference points and to forecast stock dynamics in the short term.

#### **3.2 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

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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 TMB (see [flr-project.org](http://flr-project.org) and <https://github.com/kaskr/adcomp/wiki>). Programme in Annex 3.

**Instructors:**

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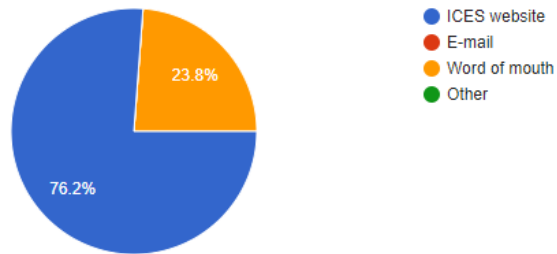
## Annex 1: List of participants

NAME	ADDRESS
Jan Jaap Poos, <b>Instructor</b>	Wageningen University and Research, The Netherlands
Rich Hillary, <b>Instructor</b>	CSIRO, Australia
Adam Delargy	Bangor University
Adriana Nogueira-Gassent	Greenland Institute of Natural Resources
Aina Carbonell	Spanish Oceanographic Institute. Balearic Oceanographic Centre
Alessio Veneziano	Cefas
Andy Lawler	Cefas
Anika Guðlaugsdóttir	Marine and Freshwater Institute Iceland
Bart Vanelander	Research Institute for Agriculture, Fisheries and Food
Benoit Berges	Wageningen Marine Research
Chun Chen	Wageningen Marine Research
Daisuke Goto	IMR
Elzbieta Baranowska	Marine and Freshwater Institute Iceland
Florian Berg	IMR
Jan Horbowy	National Marine Fisheries Research Institute
Katie Thomas	Marine Institute
Klaas Sys	Ghent University / Flanders Research Institute for Agriculture, Fisheries and Food
Konstantina Dimitrakopoulou	IMR
Lies Vansteenbrugge	Research Institute for Agriculture, Fisheries and Food
Magnus Thorlacius	Marine and Freshwater Institute Iceland
Rosana Ourens	Cefas
Sindre Vatnehol	IMR
Sofie Nimmegeers	Research Institute for Agriculture, Fisheries and Food
Søren Lorenzen Post	DTU-Aqua
Stefan Kalogirou	Swedish Agency for Marine and Water Management
Stefanie Haase	Thünen Institute of Baltic Sea Fisheries
Tanja Miethe	Marine Scotland Science

## Annex 2: Training course evaluation questionnaire

### How did you hear about this course?

21 responses



### Comments

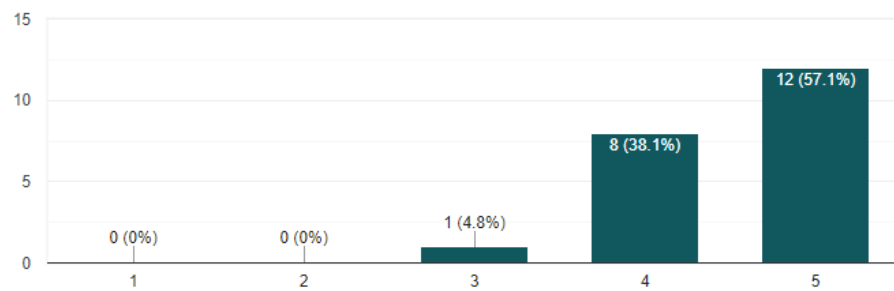
1 response

From colleges

### Course content

### Did the Training course meet your expectations?

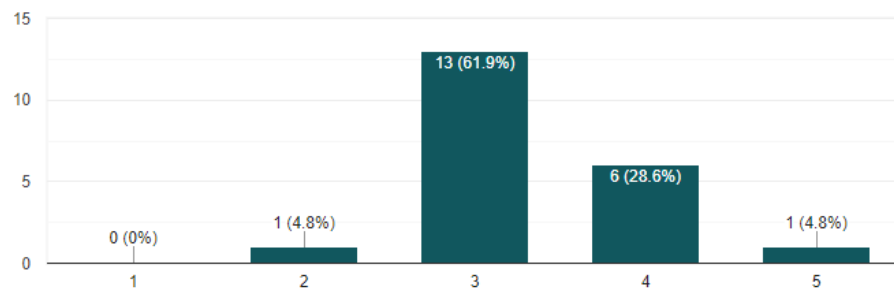
21 responses



### Was the level of instruction appropriate?

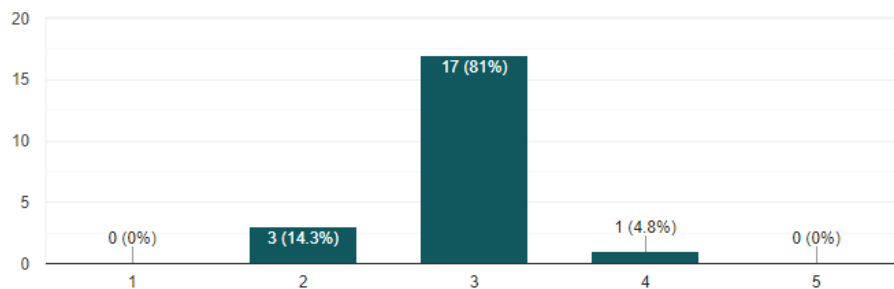


21 responses



### Was the length of the training course appropriate?

21 responses



### Comments

- Shouldn't be shorter, the level of difficulty is high, but that is what I expected from an advanced course.
- The mathematics of some presentations was difficult to follow

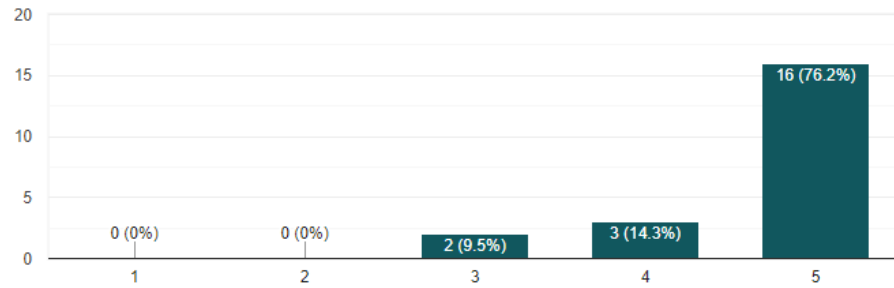
### What did you like best or find more useful about the training course?

- Detailed code, time to work on participants own interests
- Using the same data for differenet assessment models
- Explanation of the theoretical background of the assessment models
- Working examples of stock assessment models, which were clearly explained and dissected
- The course was very good at getting deeper insights in stock assessments.
- Right mix of lecture teaching, practical excercise with expert assistance
- Having all scripts and methods to go through later and compare with own models.
- Everything was useful. It provides a general idea how the models work
- A very good combination of mathematic and biology, very wide coverage of topics

## Course Organization

Inscription to the training course and communication with organizers were efficient.

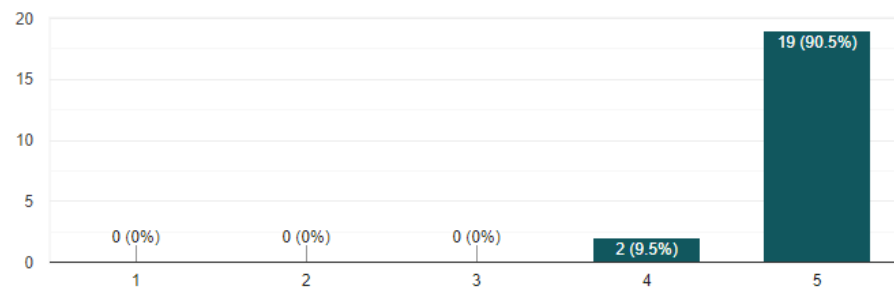
21 responses



## Teaching and Learning Support

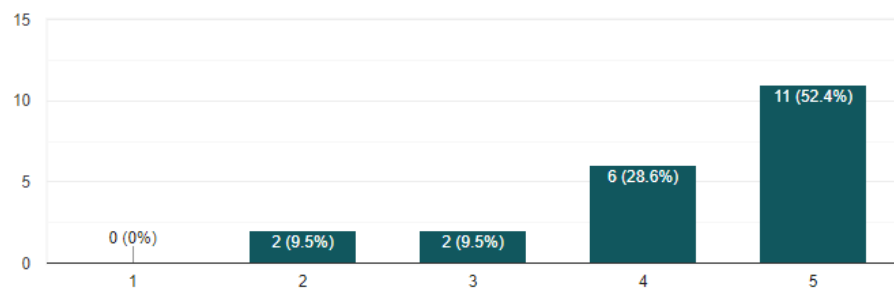
The instructors were helpful, informative, and approachable.

21 responses



The working documents were presented in a way that facilitated learning.

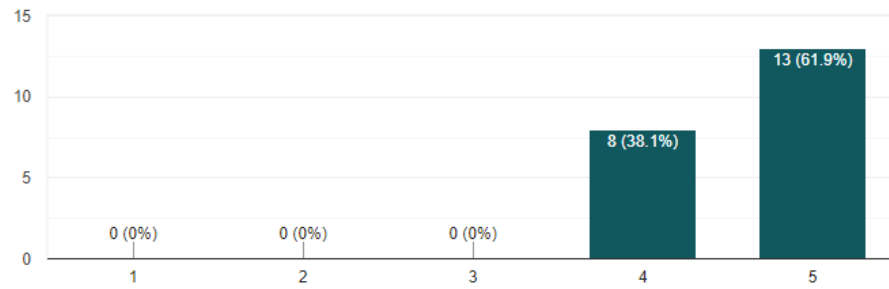
21 responses



## Overall Evaluation

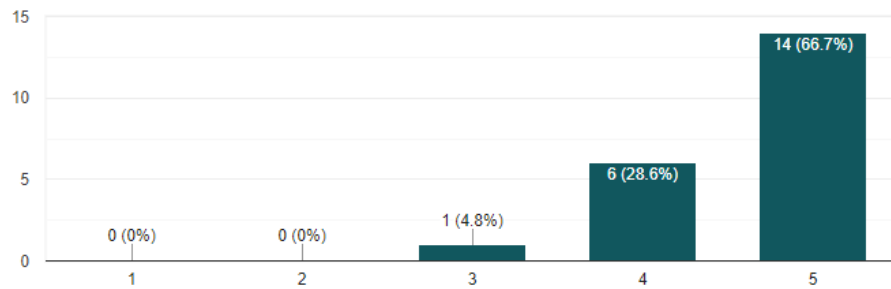
Overall, how would you rate this training course?

21 responses



Overall, how would you rate the quality of the teaching?

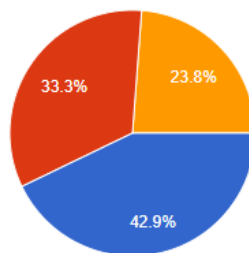
21 responses



Have you taken any other ICES training courses?



21 responses

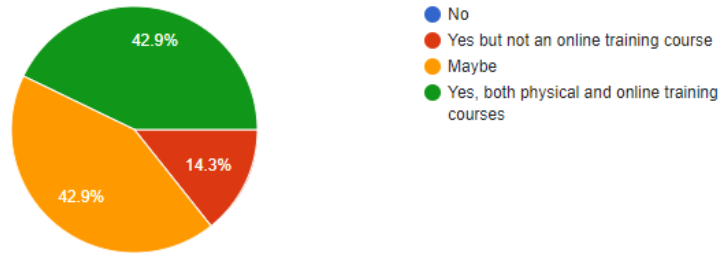


- Yes
- No
- Not with ICES, but I have attended other training courses related to my expertise.

### Would you be interested in another training course within ICES?



21 responses



### If yes, which topic would you be interested in?

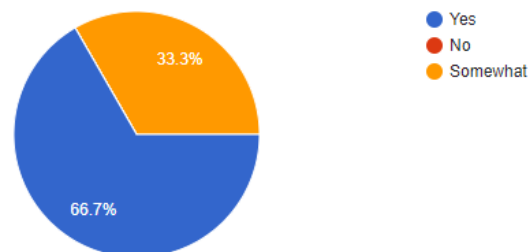
11 responses

Management Strategy Evaluation, Bayesian approaches to stock assessment, Multispecies/ ecosystem models
modeling
stock assessment
C++ in fisheries modelling
bayesian statistics
Statistical analysis of fisheries
introduction to SAM
Assessment methods for data poor species
analysis of tagging data
fisheries ecology and management; machine learning

## Social Event

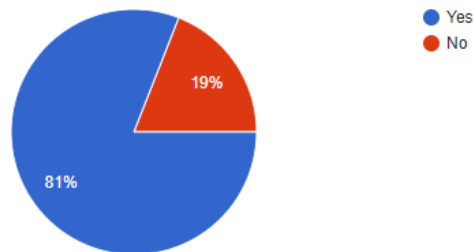
### Do you feel that you have benefited from networking opportunities on the course?

21 responses



## Did you participated in the course dinner on Thursday evening ?

21 responses



## General comments on the Training Course

8 responses

Installation of TMB: send participants a script to test the installation of TMB and make sure that Rtools is correctly installed before the start of the course

Overall, the course is well organized. if anything, introducing more advanced topics (e.g., TMB) slightly earlier might allow us spending more time to understand these fully.

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