

ICES TCSAI 2011 REPORT

Report of the Training Course: Stock Assessment Introduction (TCSAI2011)

20-24 June 2011

ICES Headquarters, Copenhagen



ICES

International Council for
the Exploration of the Sea

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Conseil International pour
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Participants at the course “Introduction to Stock Assessment” conducted 20-24 June 2010 at ICES Headquarters in Copenhagen. The course was given by Steven Cadrin, USA (instructor) and Ernesto Jardim (assistant instructor).

Report of the ICES training course:

“Stock Assessment – Introduction”

by

Steve Cadrin and Ernesto Jardim

Summary

The fourth offering of introductory stock assessment in the ICES Training Programme was conducted 20-24 June 2011 at ICES Headquarters in Copenhagen. The same course was offered in August 2009, January 2010 and June 2010. Twenty-nine students participated in the fourth course. Ernesto Jardim replaced Iago Mosqueira as the co-instructor to teach the R-programming portion for this fourth offering of the course. From the perspective of the instructors, the course was a success.

An ambitious outline of topics was taught, from simple model fitting and biological production to commonly used stock assessment methods (biomass dynamics model, virtual population analysis and statistical catch-at-age model) as well as biological reference points, stochastic long-term projection, harvest control rules and management strategy evaluation. Each day was scheduled with lectures on stock assessment concepts each morning and application of stock assessment models during afternoon assignments. Students completed assignments by programming in Excel and R.

The number of students was appropriate. Students represented 21 countries, including 12 member countries (Belgium, Canada, Estonia, Germany, Greenland, Netherlands, Norway, Portugal, Spain, Sweden, UK, and USA) and nine others (Algeria, Argentina, Chile, Colombia, Greece, Hong Kong, Italy, Japan, Kuwait) including several young ICES working group members. Many students in this fourth class were less experienced in modelling and statistics than students in previous classes, but the class completed all assignments and more difficult applications in Excel and R.

For the first time, lectures were recorded using WebEx as an experiment. The instructor wore a remote microphone and shared the desktop of the presentation laptop. Recorded lectures will be viewed to evaluate the possibility of offering ICES Training Courses online via WebEx.

Feedback from 22 students was recorded using the course evaluation questionnaire. Results indicate that the amount of material covered was “average” (27%) to “too difficult (5%), with most responding “above average” (68%). Degree of difficulty was “average” (36%) to “above average” (64%). Quality of the course outline, the course description, helpfulness of teaching staff, usefulness of course materials, clarity of presentation, course content, and quality of teaching were “average” (5-9%) to “very good” (68-86%).

Most students heard about the course from the ICES website (55%) or colleagues (33%). Seven students responded that they had taken other ICES training courses; three of them thought the previous course prepared them 'somewhat' for this course, four replied 'not at all.'

Individual comments and suggestions were:

- "Excellent course. Some of it was review for me, some of it was new. I'm looking forward to working my way through all the R code and reviewing the course material in more detail. The instructors gave very clear explanations and provided a great and relaxed teaching/learning atmosphere. One thing that may have helped understanding is if additional reading materials on the topics covered had been provided prior to the course. I'm very happy with the course overall."
- "The course could benefit (and suffer in other areas) from using more time on applying the methods to data - especially using FLR."
- "The level of instruction in R was a little difficult. I am a slightly experienced user but was lost at times. Perhaps in the future, if people are around a similar level, less could be covered or the pace of teaching could be slowed. Otherwise the course was fantastic and will be very useful to me in my career!"
- "Really enjoyed it. I would suggest the modelling be taught more hands-on (with students coding themselves) but perhaps this isn't possible due to time constraints. Thanks for a great course!"
- "For students with no background on R, the contents covered on R were too difficult to comprehend. Perhaps it would be useful to cover some materials on the R programming language."
- "Extremely informative course, very helpful instructors, open for discussion. It might be helpful to give the chance to download zip files before a break so that people less experienced with R can take their time to check if the script is running without missing the start of the session."
- "Great to have two instructors = 1 for stock assessment theory/methods, another for implementation with programming language. Easy-going, ultra-professional, uber-knowledgeable, friendly instructors."
- "It is a formidable task to attempt to teach so many concepts and analytical techniques in such a short time. Certainly some of these challenges cannot be overcome; however, I think Steve and Ernesto did a superb job in covering a lot of material. I certainly feel that the course fulfilled its objectives for me. I had some difficulty following the r-lectures, but they may not be because of the lecture itself but rather because I had no prior understanding of r."
- "This training course is one of the best courses I have ever attended!"
- "A very complete course for beginners, and gives much an idea of what they need and what they should do in their job and what parts to improve in the future. Good introduction in R. Maybe there should be a little more of basics about R, just to understand better the examples of the source code (i.e. definition of some basic things, like variables, syntax, ...). Maybe ad a little more detailed documentation of what is going on within the source code and the procedures that are running. Also a good thing could be a little document with the description or a list of principal R instructions that will be used during the course."

- “The lectures were excellent and in general the quality of the course was very good. The detailed explanations, repetition and logical build up of all models/methods really made me learn a lot. Good mixture of lectures and practical assignments. However, some of the R/FLR talks did not seem to fit the level of the audience very well, and I therefore sometimes felt it was not the best use of the (limited) time. I also got a bit annoyed by the time schedule that was given. I don't mind long days and working to 18h was fine. However, when it is not at all realistic to end at 16, it is just causing frustration to hand out a time schedule that gives the impression that it ends earlier. It's a minor thing, I guess, but I just like to know what to expect. I also think it is too late to wait with lunch until 13:30, by then I'm starving.”

All students attempted all of the assignments in both Excel and R, and R is becoming a more essential aspect of the course. The greater use of programming in this class should help students to be better prepared for ICES work and the advanced ICES courses. One reason for the better preparation of students in recent stock assessment courses may be that students who need a more conceptual and less quantitative understanding may be registering for the class for stakeholders “Opening the box: Stock assessment and fisheries advice for stakeholders, NGOs and policy-makers. 5-7 October 2010.”

A more detailed course schedule allowed refinement of the course material. Lectures were modified to be approximately one hour, and lectures were separated by a break, a demonstration of model application, or an assignment. The refined schedule helped to break up the long days into more tolerable portions, and to limit the amount of information material to the time available. Friday afternoon was reserved as a time for reviewing topics, general discussion on stock assessment issues and completing unfinished assignments from earlier in the week.

Revisions to the course also appeared to be effective. Communication with students before class regarding software installations, preparations for statistics and programming, and bringing example data helped to elevate the level of material and approaches used in the course. Students appeared to take advantage of having the lecture material available before the course. Given that early communication with students and access to the share point appeared to help students, earlier review of applicants, acceptance and communications may help further.

The partnership of instructors was effective, with complementary skills for helping students to understand difficult topics and debugging various programming problems. Once again, the ICES secretariat gave the course participants a warm welcome, and provided a pleasant working environment that will help to promote future involvement in ICES by the students.

Recommendations

1. Start the process of student selection and acceptance earlier to give students a longer period to prepare for the course with access to the sharepoint and recommended readings.
2. The detailed lecture outline should be revised so that the topic of projection is presented before management strategy evaluation (e.g., that portion of the Friday lecture should be presented on Thursday morning).

Course description

Objective

The general objective of the course is to train stock assessment scientists and advisors in basic population dynamics and stock assessment. The course is intended not only to present the theoretical elements but also to guide participants on how to put theory into practice through case studies and hands-on exercises on the computer. Specific objectives are:

- 1) Understanding the role of stock assessment in fisheries science
- 2) Familiarity with conventional stock assessment models
- 3) Experience in basic model building and parameter estimation

By the end of the course, the participants will:

- Be aware of single species assessment methods as applied to North Atlantic fisheries.
- Understand the data collection needs for different assessment methods.
- Be familiar with indicators and reference points, both biological and economic, as tools in fisheries management.
- Be introduced to the application of methods for multigear and multispecies assessment.
- Develop knowledge on bioeconomic fisheries processes by using simulation models to improve scientific advice for managers.

This course provides instruction, demonstration and exercises in population modelling, as applied to fishery resources. Stock assessment synthesizes information on life history, fishery monitoring and resource surveys using mathematical models of population dynamics. Results from stock assessments are used to determine stock size, sustainability of the fishery and evaluate the consequences of alternative fishery management actions. First principles of population dynamics are reviewed from the perspective of model building, and several dimensions of complexity are explored. A wide range of conventional stock assessment methods are introduced.

There are two general goals of the course. The first is to provide a sound foundation in the fundamentals of stock assessment. Stock assessment modelling continues to advance at a rapid pace. However, understanding the basics of population dynamics is necessary to develop an intuition for fisheries models, for accurate interpretation and model development. Therefore we will emphasize a conceptual understanding, supported by quantitative applications that are designed to illustrate model properties.

The second goal of the course is to prepare students to take the next steps in a stock assessment career: learning the advanced aspects needed for their particular applications.

The ICES Training Programme also includes courses in advanced stock assessment, Bayesian techniques for stock assessment, Management Strategy Evaluation and Ecosystem Modelling for Fisheries Management. Therefore, advanced topics and programming skills will be introduced in preparation for more advanced ICES courses or to approach the same topics through self-learning.

Course Programme and Instructors

The five-day course is organized as a series of morning sessions that are focused on theoretical concepts and afternoon sessions on more applied concepts associated with assignments and work sessions. All of the assignments will be completed in Excel, but the same analyses will be demonstrated in R, an open-source, statistical programming language (see flr-project.org).

Day	Lecture	Topic
Monday	1	Introduction & objectives
	2	Model fitting
		assignment: stock-recruit
Tuesday	3	Biological Production
	4	Biomass dynamics
		assignment: production
Wednesday	5	Demographics
	6	Virtual population analysis
		assignment: VPA
Thursday	7	Simulation
	8	Statistical catch at age
		assignment: SCAA
Friday	9	Reference points
	10	Projection
		assignment: MSY

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