

# ICES TCSAI REPORT 2012

## Report of the ICES Training Course: Stock Assessment (Introduction) (TCSAI)

9-13 July 2012



**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](http://www.ices.dk)  
[info@ices.dk](mailto:info@ices.dk)

Recommended format for purposes of citation:

ICES. 2012. Report of the ICES Training Course: Stock Assessment (Introduction) (TCSAI), 9–13 July 2012, 17 pp.

The document is an ICES Training course report

© 2012 International Council for the Exploration of the Sea

## Contents

---

1	Summary .....	2
2	Recommendations .....	4
3	Course description.....	5
4	Course programme and instructors .....	6
	Annex 1: List of participants.....	7
	Annex 2: Course Evaluation .....	12



Participants at the course “Stock Assessment (Introduction)”, 9–13 July 2012, Danish National Museum, Copenhagen. The course was given by Steve Cadrin, University of Massachusetts (UMASS), USA (middle, #16 from left) and Iago Mosqueira, European Commission – Joint Research Center, Italy (in the back, #8 from left).



**Report of the ICES Training Course Stock Assessment (Introduction),  
9–13 July, 2012**

**by**

**Steven Cadrin and Iago Mosqueira**

## 1 Summary

---

This was the fifth offering of the training course “Stock Assessment (Introduction)” under the ICES Training Programme. 29 students from 11 countries participated in the course (Annex 1). From the perspective of the instructors, the course was a success although some adjustments can improve the knowledge and skill transfer to the trainees (see 2 Recommendations).

Some students arrived at the course with little instruction on R or Excel Solver. Apparently the pre-course information that had been distributed before the prior courses was not communicated this time. Some time was lost on the first day to install solver and bring students ‘up-to-speed’ with R. Therefore, it would help to resume the practice of advising students to install Excel Solver and R before the course. Required skills could be added to the pre-course notices, and a set of more detailed material could also be prepared to help students meet those requirements.

Despite the slow start, the class accomplished more in this course than all four previous offerings in the course. In 2011 the statistical-catch-at-age assignment was replaced with management-strategy-evaluation, but this class had time to do both assignments. The instructors were also able to cover advanced topics, such as likelihood methods.

Feedback from students was solicited using a course evaluation questionnaire (Annex 3). Results indicate that the amount of material covered and degree of difficulty was “average” to “too much”, course outline and organization (i.e. document detailing course aims, content, organization of teaching, assignments, reading, assessment, etc.) was “very good,” helpfulness of teaching staff, usefulness of course materials and clarity of presentation were “average” to “high.” Overall, the course content, organization and quality of teaching were “good” to “very good.” Individual feedback from trainees to the question “Good features of this course/suggestions for improvement”:

- The exercises are well spaced and very helpful. The R sessions will be helpful for myself in time but I feel that not having any experience with R should not deter people from taking the course.
- Very informative and constructive assignments (both in excel and R) suggestions: to show the practice of the content through generic research studies or published work diverse from fisheries experiences. More interaction with students to see their needs from the course for better applications in their work.
- The assignments were really good. It would have been useful to have more time to look into the results.
- Some of the lectures were really intense, for example the one on MSY (Thursday afternoon) presenting lots of contents in a relatively short time. I really had problems following that one, for me too many concepts, presented in a relatively short amount of time....
- The course was really well delivered, a huge amount of material covered but done in a very accessible way. Sure I need to go and do a lot of reading/reviewing now but I think the course has given me a great basis from which to start. I agree that it’s really important to try to understand the theory behind all the models. R was mainly lost on me, but I appreciate it is a great tool that I need to get to grips with. I also appreciate that it is

something I can only really learn by using. Teaching staff were very approachable, adaptable and keen to help. Overall it's been great thank you. It's a real shame we didn't get our preparatory packs, I think that would have been very helpful. I would like some take away exercises, so I could re-practice what we have already done this week with different datasets and a 'completed' excel sheet to check what I did. That would be good to reinforce the week I think.

- Very good organization of the material. Excellent lectures, both teachers. Suggestions for improvement. Instead of presenting the R solutions AFTER the assignments, use this time to let students explore the models, in either R/Excel. Today it seems like people are just finishing up with the assignments and there is little time for exploring the models, which must be the main goal of the course. As of now the implementation of the models are in focus. It is helpful to write your own code from a general pseudo code but some more time should be given for exploratory exercises to really focus on the subject content.
- I suppose that we are in a shift in the use of calculating tool (EXCEL or R based) and it's why we do both. I like to suggest that Monday morning was used to teach R – now the presentation of R script is hard to follow if you not are familiar with R. I think the teacher was doing a great job trying to balance, but how to deal with lack of R knowledge of students needs to improve.
- A quick intro to R (30 minutes) would have been helpful on day 1 for those of us who never use R. I felt like we jumped into the software quite quickly without any introduction at all, which just made me highly confused. Explaining the different windows, how to use the software, simple commands, etc. would have been really useful for me.
- I expected more workshops in R-coding. The scripts that were used were useful to illustrate a nice structure of coding in R, but I would have wanted a more dynamic growth of the R-scripts, as was done in the excel spreadsheets, in order to run the MSE simulations at the end of the course and understanding the effects of model manipulations. This warrants some previous experience in R and could be specified in the prerequisites for the course. An R-light option could be to have one longer workshop in R to for example modify A VPA to make projections depending on assumptions. This would offer more experienced R-users with a fairly simple task, and more inexperienced users with an opportunity to see the efficiency in R to compute models and plot output data as model assumptions are relaxed, or modified. Each course day could start with a summary of accumulated covered material, such that the course material covered so far is repeated quickly.
- On a separate note I think this evaluation survey is badly written and does not really solicit feedback in such a useful way, for example I think there was a huge amount covered on the course, far more than average, but I wouldn't say it was too much. It's not necessarily the same thing and the question should be rewritten to ensure what you want to find out is what is being answered.

## 2 Recommendations

---

- 1) Pre-course notices to students should include instructions to install Excel Solver and R before the course.
- 2) Required skills could also be added to the pre-course notices, with a set of materials to help students in achieving these skills, including suggested readings and tutorials on R.
- 3) The questions in the generic course evaluation should be reviewed by the Training Group.

### 3 Course description

---

#### Contexts and level

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 and sustainability of the fishery, and evaluate the consequences of alternative fishery management actions. First principles of population dynamics are reviewed from the perspective of modelling biological production, and several dimensions of complexity are explored. A wide range of conventional stock assessment methods are introduced.

The course has two general goals. The first is to provide a sound foundation in the fundamentals of stock assessment. Stock assessment modelling is advancing at a rapid pace. However, understanding the basics of population dynamics is necessary to develop an intuition for fishery models, for accurate interpretation and appropriate 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 Program 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.

#### Objectives

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 in putting theory into practice through case studies and hands-on exercises on the computer. Specific objectives are:

- 1) understanding the role of stock assessment in fishery 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 fishery management;
- develop knowledge of population and fishery processes by using simulation models to improve scientific advice for managers.

## 4 Course programme and instructors

---

The programme was circulated to all participants prior to the course, and is available for download from the ICES Share Point Site.

The programme was designed with an about even split between lectures/discussions and tutorials.

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	Statistical catch-at-age
	8	Projection & Reference Points
Assignment: MSY		
Friday	9	Simulation
	10	Management Strategy Evaluation
Assignment: MSE		

### Instructors:

Steve Cadrin, University of Massachusetts (UMASS)  
 Department of Fisheries Oceanography  
 School for Marine Science & Technology  
 200 Mill Road  
 Fairhaven MA 02719 USA  
 1 508 910–6358

Iago Mosqueira  
 European Commission. Joint Research Center, Institute for the Protection and Security of the Citizen (IPSC)  
 Maritime Affairs Unit – FISHREG  
 TP 051, Via Enrico Fermi 2749  
 I-21027 Ispra (VA), Italy

## Annex 1: List of participants

NAME	ADDRESS	TELEPHONE/FAX	E/MAIL
<b>Steve Cadrin Instructor</b>	University of Massachusetts (UMASS) Department of Fisheries Oceanography School for Marine Science & Technology 200 Mill Road Fairhaven MA 02719 USA	+1 508 910-6358	scadrin@umassd.edu
<b>Iago Mosqueira Instructor</b>	European Commission – Joint Research Center, Institute for the Protection and Security of the Citizen (IPSC) Maritime Affairs Unit – FISHREG TP 051, Via Enrico Fermi 2749 I-21027 Ispra (VA), Italy		
<b>Søren Anker Pedersen – Coordinator for Training</b>	ICES H. C. Andersens Boulevard 44–46 1553 Copenhagen V Denmark	+45 33 38 67 00	sorenap@ices.dk
Patrik Jonsson	Swedish University of Agricultural Sciences (SLU) Department of Aquatic Resources / Institute of Marine Research SLU Havs fiskelaboratoriet Turistgatan 5 SE- 453 30 Lysekil Sweden	+46(0)10-478 4029	patrik.jonsson@slu.se
Charef Aymen	European Commission - Joint Research Centre (JRC) Institute for Protection and Security of the Citizen (IPSC) Maritime Affairs UNIT Bldg 5A, TP 051 Via Enrico Fermi 2749 21027 Ispra (Va), Italy	+39 0332786719	aymen.charef@jrc.ec.europa.eu <a href="http://fishreg.jrc.ec.europa.eu/home">http://fishreg.jrc.ec.europa.eu/home</a>
Uwe Krumme	Johann Heinrich von Thünen-Institut, Federal Research Institute for Rural Areas, Forestry and Fisheries Institute of Baltic Sea Fisheries Alter Hafen Süd 2 18069 Rostock Germany	+49-381-8116148	uwe.krumme@vti.bund.de

NAME	ADDRESS	TELEPHONE/FAX	E/MAIL
Sven Stötera	Johann Heinrich von Thünen-Institut, Federal Research Institute for Rural Areas, Forestry and Fisheries Institute of Baltic Sea Fisheries Alter Hafen Süd 2 18069 Rostock Germany	+49-381-8116148	sven.stoetera@web.de
Savas Kilic	Republic of Turkey Ministry of Food Agriculture and Livestock Konyaalti District Directorate of Food Agriculture and Livestock Ögretmenevleri Mah. 18. Cad. No:19/2, 07000 Konyaalti / Antalya / Turkey	15147338915	savasyay@gmail.com
Gwladys Lambert	Bangor University, UK School of Ocean Sciences Askew Street Menai Bridge LL59 5AB UK	+44 1248388225	osp801@bangor.ac.uk
Irene Huse	Institute of Marine research, Ground fish group POBox 1870 Nordnes, NO-5870 Bergen, Norway	+47 55 23 68 22	irene.huse@imr.no
Jonathan Gillson	Centre for Environment, Fisheries & Aquaculture Science (Cefas) Fisheries - Stock Assessment and Fishery Management Pakefield Road Lowestoft Suffolk NR33 0HT UK	+44 (0)1502 524345	jonathan.gillson@cefas.co.uk
Esben Sverdrup-Jensen	Danish Pelagic Producers Organisation Willemoesvej 2, 9850 Hirtshals Denmark	+45 61660978	es@pelagisk.dk
Silvia Angelini	ISMAR - CNR, Ancona Fish and Aquaculture Largo Fiera della Pesca, 2 60125 Ancona Italy	+39 338 5830506	silvia.angelini@an.ismar.cnr.it

NAME	ADDRESS	TELEPHONE/FAX	E/MAIL
Patricia Bianchi	Marine Stewardship Council Policy Development 1-3 Snow Hill London EC1A 2DH UK	+44 (0) 20 7246 890	patricia.bianchi@msc.org
Ashley Apel	Environmental Defense Fund Oceans Program – Ocean Innovations and Catch Share Design Center teams 123 Mission St., 28th Fl. San Francisco, CA 94105 USA	+1 415-293-6122	ashleymapel@gmail.com
Sergio Vitale	National Research Council, Institute for coastal marine environment sections of Mazara del Vallo via Luigi Vaccara, 61, I-91026 Mazara del Vallo, TP Italy		sergio.vitale@iamc.cnr.it
Konstantinos Tsagarakis	Hellenic Centre for Marine Research Institute of Marine Biological Resources Ag. Kosmas, 166 04 Hellinikon Athens, Greece	+30 2109856702	kontsag@hcmr.gr
Vita Gancitano	National Research Council (CNR) - Institute for Coastal Marine Environment(IAMC) Via Luigi Vaccara, 61 91026 Mazara del Vallo, Italy	+39 0923 948966;	vita.gancitano@iamc.cnr.it
Juan Pedro Monteagudo	OPAGAC Management Department Ayala 54, 2A, 28001 Madrid Spain	+34 662102730	opagac@arrakis.es
Giulia Gorelli	Institut de Ciències del Mar - CSIC Recursos Marinos Renovables Passeig Marítim de la Barceloneta, 37-49, 08003, Barcelona Spain	+34 689 781 186	gorelli@icm.csic.es

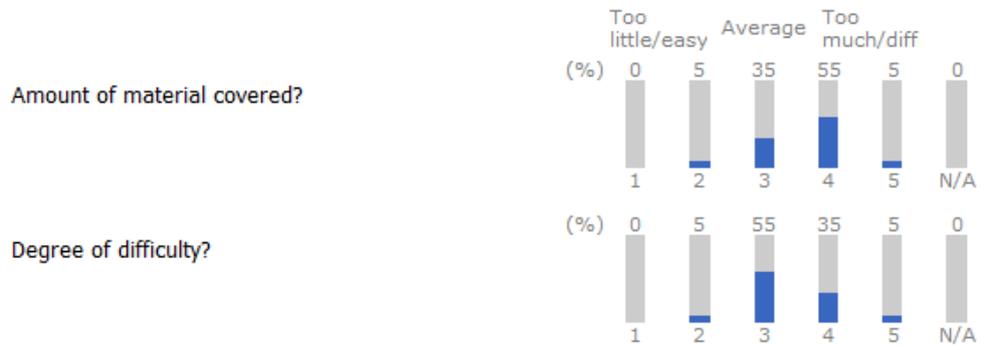
NAME	ADDRESS	TELEPHONE/FAX	E/MAIL
Viola Neumann	DTU Aqua National Institute of Aquatic Resources Section for Population Ecology and Genetics Technical University of Denmark Charlottenlund Slot Jægersborg Allé 1 2920 Charlottenlund Denmark	+45 35883388	vneu@aqua.dtu.dk
Kristin von Kistowski	Pew Environment Group EU Marine Programme (CFP Reform) Assmannshauser Str. 17 14197 Berlin Germany		kristin@kistowski.de
Anna Madriles Helm	COFAD GmbH Consultants for Fishery, Aquaculture and Regional Development Obere Stadt 47 82362 Weilheim Germany	+49 881 901 1517 1	anna.madriles@cofad.de
Andreas Sundelöf	Swedish University of Agricultural Sciences, SLU Department of Aquatic Resources Havs fiskelaboratoriet, SLU Turistgatan 453 30 Lysekil Sweden	+46 (0) 10 4784059	Andreas.Sundelof@slu.se
Hans Nilsson	Swedish University of Agricultural Sciences Department of Aquatic Resources Institute of Marine Research Havs fiskelaboratoriet, Turistgatan 5, SE-45034 Lysekil, Sweden	+46 104784040	hans.nilsson@slu.se
Enrique Pardo	Ronda de Segovia, 2 8B 28005 Madrid Spain	+34 656675655	enrique.pardodiaz@gmail.com
Mathieu Lundy	Agri-Food & Biosciences Institute Fisheries and Aquatic Ecosystems Branch Newforge Lane Belfast BT9 5PX Northern Ireland		m.lundy@qub.ac.uk

NAME	ADDRESS	TELEPHONE/FAX	E/MAIL
Sofia Carlshamre	Swedish University of Agricultural Sciences/Institute of Marine Research Department of Aquatic Resources SLU- Havsfiskelaboratoriet Turistgatan 5 453 30 Lysekil Sweden	+46 (0)10 4784015	sofia.carlshamre@slu.se
Katja Ringdahl	Swedish University of Agricultural Sciences Institute of Marine research Department of Aquatic Resources Turistgatan 5 SE-453 30 Lysekil Sweden	+46 10 478 40 43	katja.ringdahl@slu.se
Martha Robertson	Fisheries and Oceans Canada Salmonids Section 80 East White Hills Road PO Box 5667 St. John's, NL, A1C 5X1 Canada	+1 709-772-4553	Martha.Robertson@dfo-mpo.gc.ca
Holger Haslob	von Thünen Institute for Sea Fisheries Assessment Palmaille 9, 22767 Hamburg, Germany	+49 40 38905 179	holger.haslob@vti.bund.de
Katherine Yates	University of Ulster Environmental Science Research Intitute School of Environmental Sciences Cromore Road Coleraine BT52 1SA Northern Ireland	028 7032 4085	yates-k1@email.ulster.ac.uk
Vaishav Soni	ICES H. C. Andersens Boulevard 44-46 1553 Copenhagen V Denmark	+45 33 38 67 00	vaishav.soni@ices.dk

## Annex 2: Course Evaluation

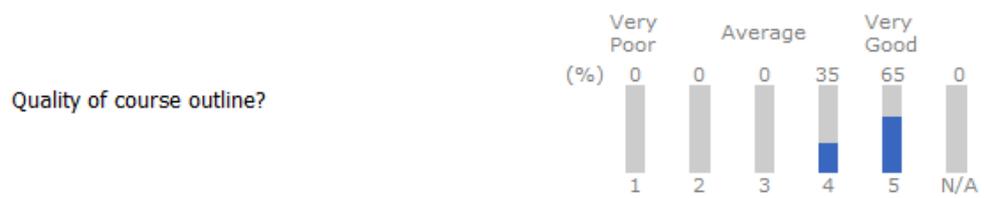
---

### 2. Course Content

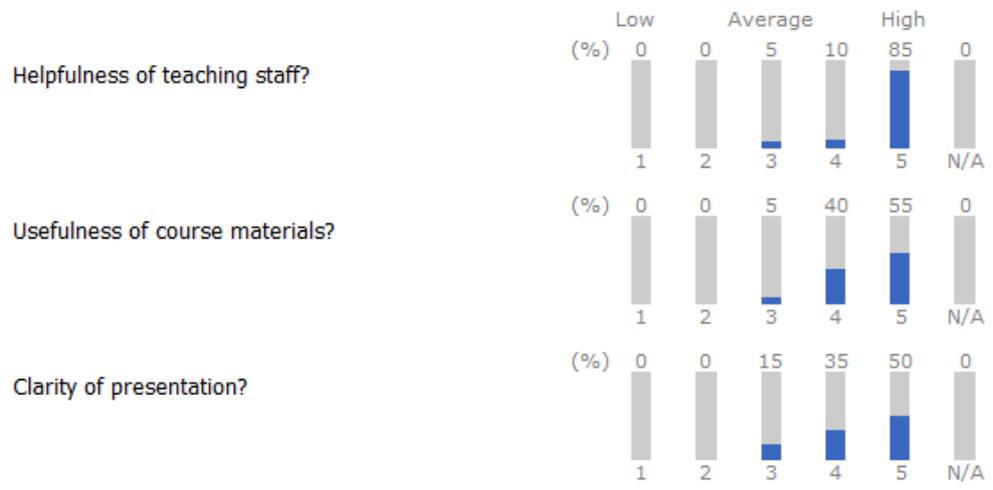


Total: 20

### 3. Course Organization

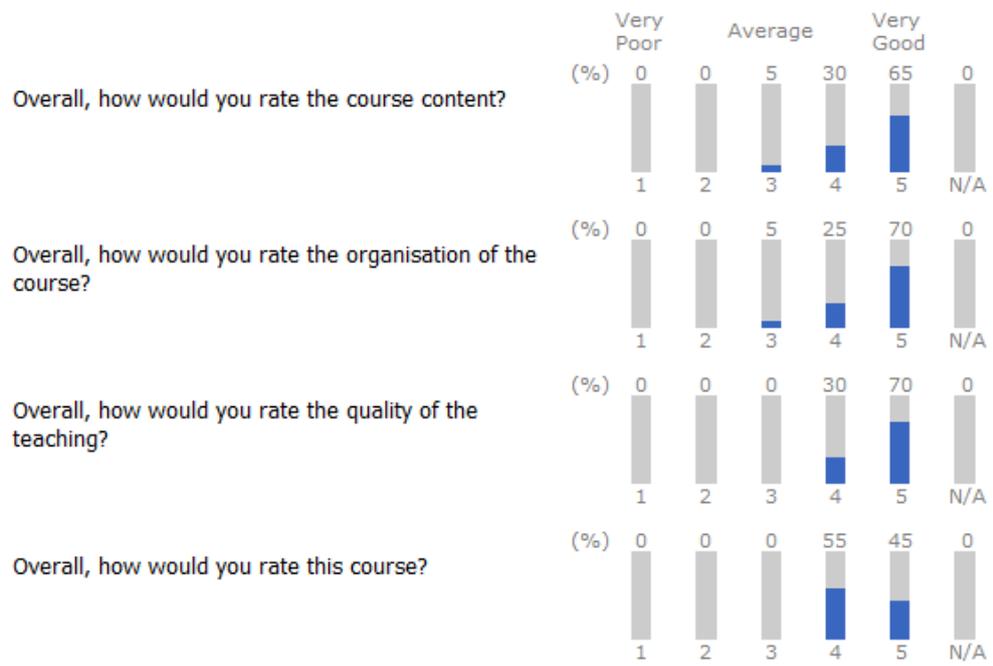


**4. Teaching and Learning Support**



Total: 20

**5. Overall Evaluation**



Total: 20