



## ICES Training programme

The International Council for the Exploration of the Sea (ICES) offers courses led by high-profile scientists and instructors. Visit the [ICES Training web page](#).

### Stock assessment (advanced)

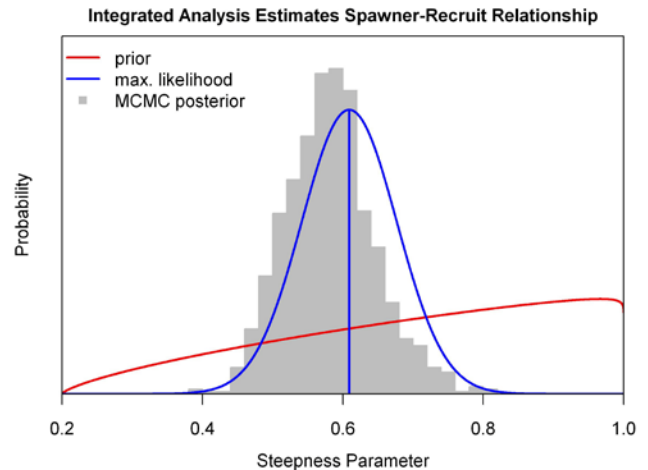
#### Objective and level

The general objective of this course is to provide additional training for stock assessment scientists who are familiar with the basic techniques of fishery stock assessment. The course will present the mathematical background to the techniques, as well as software packages developed to implement those techniques. Trainees will apply the techniques to case studies relevant to the ICES area. The specific learning objectives for the course are:

- 1) Understanding the principles behind constructing population dynamics models and identifying their associated estimation methods.
- 2) Experience using techniques to summarize and plot fisheries data.
- 3) Experience with the XSA through FLR.
- 4) Experience with Integrated Analysis through Stock Synthesis which estimates confidence distributions for stock abundance and productivity parameters (see Figure).
- 5) Familiarity with decision analysis as a means of summarizing the outcomes from stock assessments.

By the end of the course, the participants will:

- Be able to summarize raw fisheries and survey data in a form that can be included in common stock assessment packages.
- Be aware of stock assessment methods based on Virtual Population Analysis and Integrated Analyses, as well as how and when to apply these methods.
- Have a working knowledge of XSA and Stock Synthesis.
- Be able to use the results from stock assessments to document the trade-offs between alternative catch limits given stock assessment uncertainties.



#### Course dates

1-5 February 2010. The five-day course will run in morning and afternoon sessions.

#### Venue

International Council for the Exploration of the Sea  
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You can find more information about:

ICES HQ [here](#)

Hotels close to ICES [here](#)

The hostel adjacent to ICES [here](#)

#### Fee

The fee for the course is €500. This covers only tuition.

#### Organization

The course is organized by the ICES Secretariat as part of the ICES Training programme.

The course and course materials are provided by Chris Darby, CEFAS, James Ianelli, NOAA/AFSC, and Richard Methot, NOAA/NWFSC.

The course includes applied examples, case studies, and hand-on exercises on the computer.

Participants are required to **bring their own laptops** to connect to ICES network, with Excel, Excel Solver, and the program “R” installed.

## Admission and registration

The course is designed for a maximum of 25 participants. The working language is English.

Please register online:

[www.ices.dk/iceswork/training/registration/](http://www.ices.dk/iceswork/training/registration/)

You will receive a message acknowledging receipt of your application within one week.

The deadline for the submission of applications is 12 December 2009.

## Instructors

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## Contact ICES Secretariat for more information

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## Programme

The five-day course is organized as a series of morning and afternoon sessions. Hands-on exercises will be linked to each topic and scheduled throughout the course. Assignments will be conducted in the open-source programming language R, the FLR package, and the SS package.

Day	Lecture	Topic
Monday	1	Introduction to example data set; summarizing data – I
	2	Introduction to XSA / Integrated analysis
Tuesday	3	Summarizing data – II
	4	Introduction to decision analysis
Assignment	Data manipulation in R	
Wednesday	5	XSA, random effects approach, semi-separable integrated analysis (e.g. Bering Sea pollock)
Assignment	Compare XSA runs to alternatives	
Thursday	6	Integrated Analysis – Stock Synthesis
	7	Decisions in stock assessment: Selectivity, weighting, tunings, model selection
Assignment	Integrated Analysis – Stock Synthesis	
Friday	8	Integrated analysis with size data
	9	Summarize assessment outcomes in a decision table
Assignment	Summarize assessment outcomes in a decision table	
Friday	10	Extended Integrated Analysis: additional SS considerations
	10	How to choose methods and assumption
Assignment	Sensitivity analysis to alternative model assessments	

## Additional information

**XSA:** Extended Survivors Analysis (XSA) is a VPA calibration approach that focuses on the relationship between catch-per-unit-effort and population abundance. The model fits linear or power relationships for log catchability, using a least-squares-based algorithm, using inverse variance weighting to down-weight noisy time series.

**Integrated Analysis (IA):** Models that take an integrated analysis approach work as age-structured simulations of the population’s biological dynamics as affected by the fisheries. An observation submodel is added to this simulation to provide

expected values for a potentially great diversity of data types. A likelihood-based objective function quantifies goodness of fit. Building the IA models in AD Model Builder allows for efficient estimation of many parameters and for inference of a confidence interval for derived quantities, such as the level of sustainable fishing mortality and forecasts of future catch levels that would match that level of fishing mortality. Stock Synthesis, a highly flexible IA model, will be presented and used to demonstrate a range of implementations.

**Decision Analysis:** Alternative management scenarios (including near-term catch levels) require evaluation relative to uncertain assessment results. For general management practices (such as TAC-control rules), decision analyses will cover medium- to long-term considerations with extensions into full

Management Strategy Evaluation (MSE) approaches. For short-term TAC scenarios, the course will illustrate how near-term prognoses for alternative decisions can be used given assessment and implementation uncertainties. Where applicable, models that account for multispecies technical interactions will be presented and compared with empirical methods for considering alternative management measures. Formal risk-analytical methods (with loss functions) will be contrasted with the alternative of presenting multiple trade-offs. These will focus on aspects of the transparency of decision-making processes.