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The following is a draft timetable for a potential in-house training course to increase the quantitative and modelling skills of scientific staff of the Australian Antarctic Division.

Developing quantitative skills within the Australian Antarctic Division Science Branch

Proposal

by

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Aim
To develop quantitative expertise within existing staff to meet the demands of ecological modelling, analysis or research results, stock assessment and the evaluation of research and management strategies.

Plan
A three year professional development program is proposed, consisting of one two day workshop per term, weekly tutorials and self-educational exercises. It is also proposed that the program be cyclical such that new staff could join the program at any time and that after three years the program would recommence.

Involvement
A core group would comprise staff on contracts of at least 5 years and for which this work will be a formal component of their performance agreement. Other staff (short term contracts) can be involved in the tutorials but would not be able to attend the workshops. A second group could comprise post-graduate students associated with the AAD or the ACE CRC.

Methods
The weekly activities would involve 0.5 day tutorials combined with individual work on specific exercises related to AAD and CRC research questions. The workshops are expected to be near the end of each term as hands on practical courses. They would deal with the basics of the term topic and bring together the tutorial information in a two day group exercise illustrating the relationships between the principles developed during the term.

Benefits
This is a long-term program (3 years) to improve the quantitative skills of AAD scientific staff. Not only will it broaden the capability of staff, it will also enable staff to understand some of the recent developments in quantitative methods and how the methods might be used to improve their work. It will also facilitate discussion amongst staff on the broader aspects of the AAD science activities.

Costs

The immediate cost is in preparing the course and materials. As much of the work will be via tutorials then it is envisaged that 1 ASL spread over 3 years should be sufficient. It would be useful to have one workshop each year facilitated by an expert from interstate (~$5,000 for a two-day workshop) to enable an exchange of ideas on how to apply these methods.

Timetable

Each year will be divided into three terms, with each term focussing on a specific topic with examples derived from the work plan of the AAD and ACE CRC. As budgets permit, experts may be brought from interstate to help deliver the workshops.

Term Topic	Details	Workshop	Dates
1) Basic statistics refresher	Univariate statistics Multivariate statistics Non-parametric statistics Exploratory statistics	Hypothesis testing, data analysis, exploration, graphics, Using the R statistical language as the basis for the course	March-April 2006
2) Statistical modelling	Model development, Generalised linear models Analysing time series	Time-trends in CPUE, abundance data	May-June 2006
3) Maximum likelihood models	Developing likelihood models, diagnostics	Building likelihood models for estimating parameters	August-September 2006
4) Bayesian statistics	Extending maximum likelihood to Bayesian. MCMC Diagnostics	Application of Bayesian statistics in fisheries	March-April 2007
5) Stock assessment methods	Historical methods of stock assessment Current methods Precautionary approach	Comparing different methods	May-June 2007
6) Population dynamics	Matrix and dynamic population modelling	Constructing simple populations models Including fisheries in population models	August-September 2007
7) Ecosystem modelling	Different approaches to modelling ecosystems Food web modelling	Constructing simple food web models Sensitivity of model outcomes to starting conditions	March-April 2008
8) Management Strategy Evaluation	Operating models, assessment methods and management controls Formulating decision rules	Evaluating simple harvest strategies	May-June 2008
9) Research design	Designing experiments (power analyses) Designing monitoring programs to determine time trends in populations	Evaluating simple research designs using simulation models	August-September 2008