

Fisheries modeling classes

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This class will use lectures and practical computer labs to teach students how to fit maximum likelihood models to data for the management and conservation of natural resources. The first part of the course will be run in Excel 13-15 April; the second component will use the statistical programming language R and will be run 2-3 June.

Fundamentals of Fisheries Models & Assessment 13-15 April

Those participating in this course are expected to have a working knowledge of Excel spreadsheets. Advanced skills will be taught. Knowledge of statistics will be a bonus, e.g. normal and lognormal distributions, and likelihood functions.

13 April 1-5pm

Lecture 1: modeling overview, introduction to age-structured models

Lab 1: age-structured elephant example

14 April 9am-12pm

Lecture 2: non-linear minimization and sum of squares; introduction to likelihoods

Lab 2: sum of squares and Eastern Pacific gray whales

14 April 1-4pm

Lecture 3: maximum likelihood and likelihood profiles; likelihood and AIC

Lab 3: likelihood profiles and hake fits

15 April 9-1pm

Lecture 4: depensation, extinction risk and catastrophes

Lab 4: AIC and detecting regime shifts

Advanced Fisheries Models & Assessment 2-3 June

Participants will need to be experienced in R programming, in other words be able to program for-loops, save data in vectors and matrices, write functions, and read data from csv files, at a minimum.

Knowledge of statistics will be useful, e.g. normal and lognormal distributions, likelihood functions, Bayesian statistics.

It is highly advised that R modeling participants should have attended Fundamentals of Fisheries Models & Assessment. There will be a lunch break on both days, but no food is provided.

2 June 9am-12pm

Lecture 1: spatial modeling and MPAs

Lab 1: Intro R; maximum likelihood fitting in R to Antarctic blue whales

2 June 1-4pm

Lecture 2: harvesting strategies; simulation and estimation

Lab 2: simulation and estimation, catch status plots

3 June 9am-12pm

Lecture 3: Bayesian methods lecture I

Lab 3: Spatial modeling and marine protected areas

3 June 1-4pm

Lecture 4: Bayesian methods lecture II

Lab 4: Bayesian yelloweye rockfish