

FISH 507 Spring 2016
Ray Hilborn

Age structured models in fisheries stock assessment

Instructor:

Ray Hilborn

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Office: 352b Fishery Sciences

Office Hours: by appointment

Credits 4 CR/NC

Course web site:

Meeting times: March 21-25 All Day. Rest of quarter for UW students Monday and Wednesday 2:30-4:30 for lab section. Lectures will be available on line.

Final Exam None

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1. Introduction

Age structured models form the basis of most stock assessments for commercially important species in U.S. as well as in Canada, Europe, Australia and New Zealand. Parameter estimation, analysis of uncertainty and evaluation of alternative harvest strategies for age structured models constitutes the core of most fisheries population dynamics and has become a highly specialized field. The purpose of this course is to provide students with an intensive course in these models so they are prepared to participate in stock assessments as conducted by NMFS and other agencies.

We will concentrate on statistical catch-at-age models, and treat in detail (1) selectivity patterns for surveys and fisheries, (2) appropriate likelihoods for indices of abundance and proportion-at-age, (3) estimation of year class strengths and stock recruitment relationships, (4) technical aspects of assuring convergence in fitting data, (5) evaluation of uncertainty using MCMC, and (6) evaluation of alternative policies.

The course is designed for students already familiar with basic age-structured models, maximum likelihood and Bayesian analysis. In order to make the course available to students from outside UW, the course will be offered with a 1 week intensive 24/7 session, the week of 21-25 March 2016, and then subsequent lectures and homework will be offered remotely with 2 2-hour lab sessions for students in residence at UW.

Students from UW will register for this course as a normal graduate student, students from outside UW desiring academic credit can register as non-matriculated students, and as there is space available, others can attend the course but not be given academic credit.

Non-credit attendance will be offered on a space available basis and priority will go to NOAA employees. Enrollment will be limited to 25.

2. Course Objectives

The objective of this course is to provide training so that participants can conduct an age structured stock assessment using the Stock Synthesis program, and be familiar with the key diagnostics, assumptions, and some alternative software packages.

3. Course Policies

To request academic accommodations due to disability, please contact Disabled Student Services indicating your needs and inform me as soon as possible about special accommodations. Disabled Student Services, 448 Schmitz, Box 355839, 206-543-8925 (Voice/TTY), uwdss@u.washington.edu

Plagiarism, cheating, and other misconduct are serious violations of your contract as a student. You are expected to know and follow the University's policies regarding academic integrity.

4. Course Requirements and Grading

This course will be offered as a credit no credit. Students attending and completing all homework assignments will be given credit.

5. Method of instruction

The intensive one week will consist of a mix of lectures and labs. All participants must have a laptop computer capable of running the SS3 software. There will be 10 follow up lectures available on-line and four homework assignments that will be turned in via email.

The course will begin with input files that are already prepared. A major part of the course will be students inputting their own data in SS3 and doing analysis of their own stock.

6. Course Schedule

Time	Topic
Monday March 21 am	Overview of statistical catch at age models Historical integrated models, variation between countries and regions
Monday March 21 am	Types of data, and input for assessment models

Monday March 21 pm	Introduction to SS3 and initial model runs using a prepared input file, start building input file of new stock
Monday March 21 evening	Open laboratory
Tuesday March 22 am	Priors: recruitment, selectivity and q
Tuesday March 22 am	Recruitment assumptions
Tuesday March 22 pm	Get input file of new stock running
Tuesday March 22 evening	Open Laboratory
Wednesday March 23 am	Selectivity
Wednesday March 23 am	Data weighting
Wednesday March 23 pm	MPD and diagnostics of new stock
Wednesday March 23 evening	Open laboratory
Thursday March 24 am	Model Selection and Diagnostics, simplification of model structure so parameters are estimable
Thursday March 24 am	Using Length Data
Thursday March 24 pm	MCMC of new stock, start input file for their own stock
Thursday March 24 evening	Open Laboratory
Friday March 25 am	Projections
Friday March 25 am	Overview of alternative software
Friday March 25 pm	Students present their own stock issues
Friday March 25 evening	Celebrate
Remote Lecture 1	Spatially structured models
Remote Lecture 2	Using size composition and estimating growth
Remote Lecture 3	Incorporating tag-recapture data
Remote Lecture 4	What is informative in stock assessment data
Remote Lecture 5	Other Case Studies
Remote Lecture 6	icelandic Saithe
Remote Lecture 7	Other Case Studies
Remote Lecture 8	The CASAL package
Remote Lecture 9	Example: Pacific Halibut
Remote Lecture 10	Example: Orange Roughy
Remote Homework 1	A spatial model
Remote Homework 2	Students own stock basic MPD
Remote Homework 3	Students own stock sensitivities and Bayes Posterior
Remote Homework 4	Students own stock looking at projections