Biology of Wildlife Populations

Spring 2004 **NRES 450/850**

Time & Location: Lecture MWF 0900-0950 NRH 203
Lab M 1400-1630 ANS A222
Prerequisites: BIOS 320 or permission of the instructor
Instructor: Drew Tyre, Assistant Professor
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Office Hours: 1000-1200 MTWTh, or by appointment

Course Description

Principles of population dynamics as they relate to the management of wildlife populations including game and non-game fish and wildlife species. Development of age- or stage-structured population models and their use in evaluating management strategies for wildlife. Understanding sources of stochasticity in population dynamics and their consequences for management.

The course will use a problem-based learning format.

Textbook
Akçakaya, HR, Burgman, MA, and Ginzburg, LR. 1999. *Applied Population Ecology*, Sinauer Associates.

Course Objectives

By the end of this course, students should be able to:

1) describe the four sources of uncertainty in population dynamics, and their consequences for management;
2) construct an age or stage based population projection matrix, given basic life history data on a species;
3) describe the difference between forecasting and predicting population dynamics;
4) evaluate alternative management strategies, given a relevant population model;
5) identify the assumptions made in a variety of single and two species models, and describe the consequences of violations of those assumptions;
6) describe the changes in vital rates that lead to population regulation; and
7) relate changes in vital rates to variation in habitat characteristics.

This course will:

1) provide an opportunity to discuss current issues and research in wildlife and fisheries management;
2) provide experience working in teams to solve reality-based problems;

3) provide each student with the knowledge base needed to effectively use or evaluate population models in wildlife management.

Course Schedule

Date	Lecture Topic	Lab Topic	Readings / Assignments
Jan 12	Intro to Course; Management decisions & consequences	NO LAB	APE: 1.1, 8.1, 8.2
14	Principles of population dynamics		
16	1st Case: Kangaroo Island Koalas		Koala case study materials (in class)
19	HOLIDAY	NO LEC/LAB	APE: 1.2 – 1.4
21	Review of exponential growth & decline		
23	Seven steps to a successful management model		
26	Demographic & environmental uncertainty	Modelling exponential growth in Excel	APE: 2.1 – 2.3
28	Parameter and model uncertainty		
30	Effects of disease on population dynamics		
Feb 2	Putting on the brakes: population regulation	Adding uncertainty to models in Excel	APE: 3.1-3.4
4	Discussion: you can't believe everything you read in a journal		Murray (2000) handout
6	2nd Case: Putting it together – managing overabundant species		Case 1 Learning Reports due in class; Case 2 study materials (in class)
9	Combining economic costs in a model	Logistic growth models in Excel	APE: 8.3, 8.4
11	Group work*		
13	Modelling sampling of populations		
16	Group presentations of problem components	Group work*	
18	Group presentations of model output		
20	3rd Case: Impact of sturgeon fishery on endangered pallid sturgeon – Identification of learning issues		Case 2 Learning Reports due in class
23	Harvest & compensatory mortality	Harvest models in Excel	APE 3.6
25	Age Structured models		APE 4.1-4.4
27	Age Structured models from life table data		APE 4.6, 4.7.2
Mar 1	Eigenanalysis of structured models	Age structured models in Excel	APE 4.5
3	Stage-structured models		APE 5.1-5.5
5	Density dependence in		

	Age/Stage-structured models		
8	Spatially structured population models	Density dependent age-structured models	APE: 6.1-6.2
10	Environmental correlations		
12	EXAM #1 in class (short answer)		
15 – 19	SPRING BREAK		
22 – 26	Guest Lectures, TBA	NO LAB	
29	4th Case: Harvesting Amazon blue-fronted parrots	Introduction to RAMAS EcoLab	Case 3 Learning Report due in Class; Case 4 study materials (in class)
31	Guest lecture on CITES / ESA ?		
Apr 2	In class debate: allow trade in parrots or not		Exercise 6.1 due in class
5	Group work*	Group lab work*	APE: 7.1- 7.4; APE
7	Group presentations of problem components		
9	Measures of risk		
12	Quantifying variation	Group lab work*	APE: 4.7.3
14	Group presentations of preliminary model results		
16	Sensitivity analysis		APE: 5.6
19	Statistical power and environmental detection	Group lab work*	
21	Group work*		
23	Group work*		Essay on Parrot Harvesting due in class
26	Final group presentations or additional topics if requested/required	NO LAB	
28			
30	Review Q & A		

*Instructor will be present for group work sessions to assist learning teams.

Grading (450 only)

Exams (2): 20%
Learning Reports (3): 30%
Essay on parrot harvesting: 20%
Discussion / Lab summaries (8): 20%
Participation* in group presentations / discussions / debates: 10%

*Participation will be scored out of 2 for each opportunity – 0 for no participation, 1 for expected level of participation, 2 for exemplary participation. Examples of expected participation include presenting material when called upon to do so, asking a question of another group. Examples of exemplary participation include: volunteering to present material on behalf of the group, fielding questions, or asking multiple intelligent questions of other groups.

Grading for 850 will be different – see instructor for details.