

## Course Syllabus: BIOL 1470 – Conservation Biology – Fall 2009

Conservation Biology is the scientific study of the phenomena that affect the maintenance, loss, and restoration of biological diversity. Topics covered include: 1) the impacts of global warming, species invasions, and habitat destruction on biodiversity, 2) strategies developed to combat these threats, and 3) a consideration of key economic and ethical tradeoffs. Special attention will be paid to current debate and controversy within this rapidly emerging field of study.

**Objectives:** To introduce students to the field of conservation biology. To enable them to make informed conservation decisions of local, national and international concern.

**Discussion Sections:** Wednesdays (Times and place to be determined)

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**Required Text:** Essentials of Conservation Biology, Fourth Edition, by R.B. Primack

### Curriculum Schedule:

<u>Week 1:</u> Sept 10 – Course Introduction	<u>Required Reading:</u> None
<u>Week 2:</u> Sept 15 – <u>Guest Lecture: Ethics and conservation</u> Sept 16 – <i>No discussion sections</i> Sept 17 – <u>Guest Lecture: Metapopulation dynamics and conservation</u>	Chapters 1 & 6 <i>None</i> None
<u>Week 3:</u> Sept 22 – The nature and function of biological diversity Sept 23 – <i>Discussion I: Functioning of novel ecosystems</i> Sept 24 – Distribution of biodiversity	Chapter 2 <i>See below</i> Chapter 3
<u>Week 4:</u> Sept 29 – Earth history and changes in species distributions Sept 30 – <i>Discussion II: “Re-wilding”</i> Oct 1 – Speciation	None <i>See below</i> None
<u>Week 5:</u> Oct 6 – Over exploitation, habitat destruction, and extinction Oct 7 – <i>Discussion III: Tropical deforestation and extinction</i> Oct 8 – Global climate change and extinction	Chapters 7-9 <i>See below</i> None
<u>Week 6:</u> Oct 13 – <b>Exam I</b> Oct 14 – <i>Discussion IV: Extinction risk from climate change</i> Oct 15 – Species invasions, part I – large scale patterns and issues	<i>See below</i> Chapter 10
<u>Week 7:</u> Oct 20 – Species invasions, part II – local scale patterns and issues Oct 21 – <i>Discussion V: Invasions, ethics and objectivity</i> Oct 22 – Species saturation and change in species diversity Oct 23 – <b>Individual Summaries Due</b>	None <i>See below</i> None
<u>Week 8:</u>	

Oct 27 – <u>Guest Lecture: Infectious disease and the wildlife trade</u>	Jones <i>et al.</i> 2008
Oct 28 – <u>Discussion VI: Climate change and infectious disease</u>	<i>See below</i>
Oct 29 – Minimum viable populations and extinction debt	Chapters 11-12
<u>Week 9:</u>	
Nov 3 – Translocation and managed relocation	Chapter 13
Nov 4 – <u>Discussion VII: Managed relocation</u>	<i>See below</i>
Nov 5 – Conservation management	Chapters 14 & 17-19
<u>Week 10:</u>	
Nov 10 – Designing terrestrial reserves	Chapters 15-16
Nov 11 – <u>Discussion VIII: Dissecting a multiple species HCP</u>	<i>See below</i>
Nov 12 – Designing marine reserves	None
<u>Week 11:</u>	
Nov 17 – <b>Exam II</b>	None
Nov 18 – <u>Discussion IX: Advocacy and conservation</u>	<i>See below</i>
Nov 19 – Environmental law and policy	Chapter 21
<u>Week 12:</u>	
Nov 24 – No lecture – <b>Draft Term Paper Due</b>	None
Nov 25 – <i>No discussion sections</i>	<i>None</i>
Nov 26 – No lecture - Thanksgiving Holiday	None
<u>Week 13:</u>	
Dec 1 – Environmental economics and sustainable development	Chapters 4-5 & 20
Dec 2 – <u>Discussion X: Religion, human welfare and conservation</u>	<i>See below</i>
Dec 3 – Agenda for the future	Chapter 22
<u>Week 14:</u>	
Dec 8 – No lecture (reading period)	None
Dec 9 – <i>No discussion sections (reading period)</i>	<i>None</i>
Dec 10 – No lecture (reading period) – <b>Term Paper Due</b>	None
Dec 21 – 2PM - <b>Final Exam</b>	

### **Required Readings For Lecture:**

Chapters in Conservation Biology, as listed in the schedule & on Oct 27 – Jones et al. 2008. Global trends in emerging infectious diseases. *Nature* 451: 990-994

### **Required Readings For Discussion Sections:**

#### **Discussion I: Functioning of Novel Ecosystems**

Janzen, D. 1985. On ecological fitting. *Oikos* 45: 308-310.

Gray, A. 2004. The parable of Green Mountain: massaging the message. *Journal of Biogeography* 31: 1549-1550.

Hobbs, R. J. et al. 2009. Novel ecosystems: implications for conservation and restoration. *Trends in Ecology and Evolution* (in press)

Wilkinson, D.M. 2004. The parable of Green Mountain: Ascension Island, ecosystem construction and ecological fitting. *Journal of Biogeography* 31: 1-4.

Wilkinson, D.M. 2004. Do we need a process-based approach to nature conservation? Continuing the parable of Green Mountain Ascension Island. *Journal of Biogeography* 31: 2041-2042.

#### **Discussion II: “Re-wilding”**

Donlan, J. *et al.* 2005. Re-Wilding North America. *Nature* 436: 913-914.

Janzen, D.H. and Martin, P.S. 1981. Neotropical anachronisms: The fruits the Gomphotheres ate. *Science* 215: 19-27.

Various replies in *Nature* (2005) to Donlan et al. ("re-wilding") article

#### Discussion III: Tropical deforestation and extinction

Brook, B.W. et al. 2006. Momentum drives the crash: Mass extinction in the tropics. *Biotropica* 38: 302-305.

Laurance, W.F. 2007. Have we overstated the tropical biodiversity crisis? *Trends in Ecology and Evolution* 22: 65-70.

Wright, S.J. and Muller-Landau, H.C. 2006. The future of tropical forest species. *Biotropica* 38: 287-301.

Wright, S.J. and Muller-Landau, H.C. 2006. The uncertain future of tropical forest species. *Biotropica* 38: 443-445.

#### Discussion IV: Extinction risk from climate change

Skelly, D.K. et al. 2007. Evolutionary responses to climate change. *Conservation Biology* 21:1353-1355.

Thomas, C.D. et al. 2004. Extinction risk from climate change. *Nature* 427:145-148.

Various replies in *Nature* (2004) to Thomas et al. (climate-based extinction).

#### Discussion V: Invasions, ethics and objectivity

Brown, J.H. and Sax, D.F. 2004. An Essay on some topics concerning invasive species. *Austral Ecology* 29:530-536.

Brown, J.H. and Sax, D.F. 2005. Biological invasions and scientific objectivity: Reply to Cassey et al. 2005. *Austral Ecology* 30:481-483.

Cassey, P. et al. 2005. Concerning invasive species: Reply to Brown and Sax. *Austral Ecology* 30:475-480.

Ricciardi, A. 2007. Are modern biological invasions an unprecedented form of global change? *Conservation Biology* 21: 329-336.

#### Discussion VI: Climate change and infectious diseases

Lafferty, K.D. 2009. The ecology of climate change and infectious diseases. *Ecology* 90: 888-900.

Various replies to Lafferty 2009 – *Ecology* 90: 901-933.

#### Discussion VII: Managed relocation

Ricciardi, A. and Simberloff, D. 2009. Assisted colonization is not a viable conservation strategy. *Ecology* 90: 248-253.

Various Replies to Article – *Trends in Ecology and Evolution* 24: 471-477

#### Discussion VIII: Dissecting a Multiple Species Habitat Conservation Plan

Specific MSHCP to be examined is TBA

#### Discussion IX: Advocacy and conservation

Chan, K.M.A. 2007. Value and advocacy in conservation biology: crisis discipline or discipline in crisis? *Conservation Biology* 22:1-3.

Lackey, R.T. 2007. Science, scientists, and policy advocacy. *Conservation Biology* 21:12-17.

Noss, R.F. 2007. Values are a good thing in conservation biology. *Conservation Biology* 21:18-20.

#### Discussion X: Religion, human welfare and conservation

Awoyemi, S.M. 2008. The Role of religion in the HIV/AIDS intervention in Africa: A possible model for conservation biology. *Conservation Biology* 22:811-813.

Chan, K.M.A. et al. 2007. When agendas collide: Human welfare and biological conservation. *Conservation Biology* 21:59-68.

Wilhere, G.F. 2007. The how-much-is-enough myth. *Conservation Biology* 22:514-517.

<http://www.arcworld.org/> (spend at least 20 minutes on this site)

### **Grading Policy:**

Quizzes on Lecture Readings – 10% of final grade  
Exam I – 15% of final grade  
Exam II – 15% of final grade  
Final Exam – 20% of final grade (this will be a cumulative exam)  
Term Paper – 20% of final grade  
Discussion Section – 20% of final grade (quizzes and participation)

### **Attendance at Discussion Sections:**

Attendance and active participation in discussion sections is mandatory; each missed discussion section will result in 0 points for participation and the quiz of the day. Quizzes will be held at the beginning of discussion sections; if you are late you will miss the opportunity to take the quiz and receive 0 points on the quiz.

### **Make-up Examinations:**

There will be no make up examinations with the following exceptions: 1) an agreement reached between the student and instructor prior to the examination, and 2) an unplanned event, such as a medical condition, traffic accident, et cetera, together with appropriate evidence of the event.

### **Term Paper:**

All term papers will be completed as group projects (with approximately six individuals per group). Each term paper will be completed in the form of a “review article” within the journal *Conservation Biology*. Information about the manuscript length and format are available online at the journal’s website. A lottery will be conducted during the second full week of classes to assign a ranking to each student. Students will then pick one of the five review topics listed below – once a topic has six team members it will be closed to additional students (further details of this process will be described in class). The five topics available include:

1. Habitat corridor effectiveness – particularly of large corridors as opposed to smaller ones characterized by over-passes and the like.
2. Genetic diversity of non-native populations.
3. Patterns of polyploid speciation events involving non-native populations.
4. Patterns in translocations of species outside the native range for conservation purposes – excluding the study of reptiles and amphibians (which were recently reviewed).
5. Evaluating the conservation value of farmed land managed to be biodiversity friendly.

An individual could suggest another topic, but it needs to be approved by the instructor and there must be six students willing to work on the topic.

Each review paper will review a minimum of 90 studies relevant to the topic; this does not include background literature that sets the context for the work. Each student will be responsible for summarizing 15 data papers (i.e., those that comprise the analysis or review per se) and 5 papers that help set the context for the work. No overlap among these papers is permitted among students, i.e. each student on a team will read and summarize different papers. Each context paper will be described in a short paragraph (150-200 word length), which summarizes the work and explains how it informs the larger work of the team. Each data paper that is summarized will contain a one sentence description of each of the following items: 1) place of study, 2) focal unit of study, 3) principal finding or result, 4) secondary finding or result, 5) implications for the topic of review.

Each student will submit their set of paper summaries to the group. These summaries will also be submitted to the professor and graded. Team members will work together to produce the review paper, which will also be graded. Half of any individual’s grade will come from their summaries and half from the paper itself.

**Summaries are due Oct. 23; Draft term paper is due Nov. 24; Final paper is due Dec. 10**