
BIO 307 BIODIVERSITY & CONSERVATION BIOLOGY LECTURE
SPRING 2010 MWF 11:00-11:50AM ROOM SC 139

[W]e seem ultimately always thrown back on individual ethics as the basis of conservation policy. It is hard to make a man, by pressure of law or money, do a thing which does not spring naturally from his own personal sense of right and wrong.

Aldo Leopold (1937) Conservationist in Mexico, *American Forests*, March 1937.

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Office Hours: Wednesdays 9:00-10:00AM, 1:00-2:00PM

Prerequisites: BIO 235 Ecology, Evolution, & Genetics

Credits: 3.0

LA Course: Writing II, Global Studies

Course Description: This course is an overview of the science of conservation and will cover 1) the nature of conservation biology and the definition, origin, global patterns, and value of biodiversity, 2) the threats to biodiversity, 3) how these threats effect the genetic and demographic processes of small populations, and 4) an introduction to the methods used to manage and restore biodiversity.

Course Goals: This course is overview of the science of conservation and will cover

1. introductory concepts, which include the nature of conservation biology, and the definition, origin, global patterns, and value of biodiversity ,
2. the ecological and evolutionary concepts and principles that make up the fundamental concepts and principles of conservation biology
3. the threats to biodiversity including habitat destruction and fragmentation, invasive species, overexploitation, and disease,
4. population and species level processes, such as the genetics and demographic processes of small populations
5. how to protect and restore biological diversity, such as the design, establishment, and management of protected areas, restoration ecology, the process of establishing new populations, and *ex situ* conservation strategies (e.g., use of zoos and aquaria).
6. And the “human factor.”

Course Outcomes & Assessment: Upon completion of the course, students will

1. demonstrate critical analysis skills through the analysis and interpretation of conservation case studies. Assessment: case study/literature presentation and discussion, analysis of a case study (research paper).
2. demonstrate effective communication skills, both through the written word and oral presentation, by communicating the threats and consequences of the loss of biodiversity and possible ways to halt or reverse these threats. Assessment: exams, case study/literature presentation and discussions, analysis of a case study (research paper).
3. demonstrate the ability to engage in critical analysis in the reading and discussion of primary literature from the biological sciences. Assessment: group discussion of assigned primary literature articles related to conservation biology.
4. understand and respond to issues of local, national, and global significance through the knowledge that the causes of and solutions to the loss of biodiversity have a cultural and societal context. Assessment: exams, case study/literature presentation and discussions.

Required Text: Hunter, M.L. and J. Gibbs. 2007. Fundamentals of Conservation Biology. 3rd edition. Blackwell Science, Malden, MA.

Required Readings: Will be assigned as appropriate throughout the semester.

Class Attendance: Regular attendance is expected. You are responsible for all covered material and assignments made.

Readings/Assignments: It is expected that students will read the assigned material prior to attending class and complete all assignments by the due dates. The grades for assignments turned in late will be lowered by 10 pts of the original value for *each day* the assignments are late, and none will be accepted after the assignment has been returned to the rest of the class.

NOTE: All assignments are to be submitted by email as a MS Word attachment and are due by *midnight* of the due date. All students are required to use their Cedar Crest College email account. I will not accept attachments or respond to emails from non-Cedar Crest.

Makeup Policy for Exams: If you miss an exam, you do not automatically qualify for a make-up exam. If you must miss the exam for a legitimate, but unforeseen, reason, let me know as soon as possible; your absence will be considered unexcused until I receive notification from the Dean of Student Affairs that the absence was judged to be unavoidable due to serious illness/medical emergency or family emergency. **Please note** that the Dean of Student Affairs only certifies that the absence was unavoidable and due to one of the above reasons. This is to maintain student confidentiality. It is solely up to the instructor to excuse an absence. If you do miss the exam for a valid reason, you will be able to take a make-up, which must be done within 1-week of the exam date, unless the reason for your absence makes this impractical.

Extra-credit: There will be ***NO*** extra-credit assignments given. All students are expected to put maximum effort into scheduled assignments. If you are having difficulty, see me and we will schedule one-on-one tutoring sessions.

Student Responsibilities (750 total points):

1. **Participation (50 pts):** This course will be concept based and will rely heavily on discussion to introduce the material. We will also discuss many of the *Topics for Discussion* found in each chapter, as well as readings from the primary literature. Every student will be expected to contribute to these discussions. All questions and readings that I assign can be used on exams.
2. **Exams (350 pts.).** There will be three (3) essay exams. The last exam will be scheduled during final exam week. The final exam will not be cumulative and will be worth 150 points. The other exams will be worth 100 points each.

Exam I	26 February
Exam II	9 April
Exam III	Final Exams Week

3. **Research paper (200 pts.).** You will be required to write a 10-15 page (not counting literature cited page; only full pages are counted; double-spaced, 2.5 cm (1 inch) margins) research paper. The paper will consist of the following sections:
 - **REGION AND HABITAT:** Pick a region of the world outside the United States (e.g., Central America) and a habitat from that region (e.g., tropical moist forest). Describe the ecology the ecology of the habitat (climate, biome type, important species, important ecological relationships) as an introduction to the region and habitat for someone who is not familiar with it and as a foundation for the rest of the paper.
 - **ECOLOGICAL THREATS:** Identify and discuss the major threats to that region and habitat (i.e., IHOP). A significant discussion on how global climate change will affect the region/habitat must be included as one of the threats. Be sure to introduce each threat by describing what it is, what causes it, and why it is a concern. In this discussion you must also identify 5 species that are either **CRITICALLY ENDANGERED (CR)**, **ENDANGERED (EN)**, **VULNERABLE (VU)**, or **NEAR THREATENED (NT)** (at least one species from each) as determined by the IUCN Red List (<http://www.redlist.org/>) from that habitat and discuss how they will be affected by these threats.
 - **MANAGEMENT/CONSERVATION:** Develop (with literature support) a management/conservation plan for the habitat and species. You must also include a reason to conserve the habitat and species. To do this, identify and discuss the direct and/or indirect value of the habitat and each species. Be sure to support this with sources.
 - In addition, you are required pick 8 references from primary and secondary (no more than 2) sources related to your paper. These will be submitted as an **annotated bibliography** (you may use more references for your paper but only need to annotate 8). When you annotate the source include the following:
 - Copy of the paper
 - The purpose/hypothesis of the study
 - A discussion of the approach/methods the authors used in the study

- Results and conclusions
- Why this study is relevant to your paper

Serial drafts are required (see schedule for due dates). A minimum of 8 references (primary and secondary sources) is required; you may not use more than 1 Internet source and this does not count as part of the required 8 sources. Of the required 8 sources, no more than 2 can be from a secondary source.

Research Paper Schedule & Points		
Region & biome	5 pts.	1 February
Species list: status & value	10 pts.	15 February
Annotated bibliography	40 pts.	1 March
Draft	45 pts.	12 April
Final Paper	100 pts	29 April

4. **Issues Journal (100 pts; 20 pts. per entry [10 pts/issue]).** You will keep a journal in which you will report on conservation issues and your response to them. **These will be due every other week on Friday.** Each entry will consist of **two (2) issues** from two separate sources (one for each week). The source of these issues can be from the news media (newspapers, TV news, radio, and magazines), scientific journals (popular or professional), or the Internet. The issues must be current, i.e., no older than 1 month from the date entered. I will be looking for thoughtful reflections that integrate both emotional and intellectual response to the issue, as well as a lucid description of the issue and how it relates to class topics and discussions. Please date each entry. There is a minimum of 1 page per issue. These are due 5, 19 February; 5, 19 March and 16 April.
5. **Presentation (50 pts.).** A 10-minute PowerPoint presentation summarizing the findings from your research paper, covering habitat, threats, value, and plan. A detailed description will be handed out by Spring Break. Presentations will be done in lab.

Assessment

I use the following rubrics in grading essay questions and writing assignments. The point totals are then calculated. For example, if an essay question is worth 20 pts. and I consider the answer to be worth a B, the student will get 17 points for that essay (i.e., 0.85 x 20). I will assign +/- when appropriate.

Writing Grading Rubric

"A" work (95%)--students fulfilled the requirement (answered the assigned questions, references, etc.), all concepts are explained correctly and fully, shows depth of knowledge, was able to integrate concepts, developed a coherent and compelling argument, grammar, sentence structure, spelling etc. at level expected for a college student ; voice is appropriate for scientific audience.

“B” work (85%)-- similar to A work but lacks depth and integration of knowledge, writing is good but some minor errors, concepts are not fully explained

“C” work (75%)--work is merely adequate; followed assignment, information accurate but information is regurgitated, there is a lack of development of concepts and arguments, answer is not complete, problems with writing

“D” work (65%)-- is not adequate in one major area (information, writing, etc.) but demonstrates adequacy in other areas

“F” work (55%)-- is unacceptable--does not follow assignment, information is incorrect or incomplete, writing is substandard, etc.

Presentation Grading Rubric

I follow the following rubric to assign grades for participation:

A= Participated in most class discussions and demonstrated understanding of readings and questions.

B=Participated in many class discussions and demonstrated understanding of reading and issues.

C=Participated occasionally or occasionally demonstrated understanding of reading and issues.

D=Participated rarely or rarely demonstrated understanding of reading and issues.

F=Did not participate or did not demonstrate understanding of questions and readings

Grades

Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	F
Points	697.5	675	652.5	622.5	600	577.5	547.5	525	502.5	472.5	<472.5

The above are the minimum points needed for each grade. Grades are calculated as a range, e.g., a B+=652.5-674.9. *Grades will not be curved or rounded up.*

Honor Code

I fully support the Cedar Crest College Honor Code and the Classroom Protocol code as stated in the Student’s Guide Book (Section A.I).

Plagiarism

Plagiarism is a serious offense. In academia, few offenses are considered more serious. As such, I fully support the College’s policy on plagiarism. Please see the Student’s Guide (Section A.I) for a definition of plagiarism and the College’s policy on plagiarism. Students who are found to have committed plagiarism will be required to redo the assignment or will get an F for that assignment, based on the severity of the offense. Under certain situations, those who have committed plagiarism may be suspended or expelled from the College. All cases will be reported to the Provost.

College Accommodations Policy

Students with documented disabilities who may need academic accommodations should discuss these needs with their professors during the first two weeks of class. Students with disabilities who wish to request accommodations should contact the Advising Center.

FINAL EXAM POLICY

Your obligations for this course include attendance at the final exam, on the day and time scheduled by the Registrar's Office. You should not make travel arrangements until the final exam schedule is published; if you must make plans early, you should schedule your travel after the last final exam day. I will not accommodate request to take the final exam on a date other than the date the exam is scheduled on.



Topics to be covered.

Corresponding pages are in parentheses. Outside material (OM) will supplement the textbook.

Theme	Chapter
INTRODUCTION TO CONSERVATION BIOLOGY & THE BIODIVERSITY CRISIS	
Conservation Ethics	1 (10-13)
What is Conservation Biology?	1 (14-21)
UNDERSTANDING BIOLOGICAL DIVERSITY	
What is biodiversity? A Deeper Look	2 (22-24)
<i>Genetic Diversity</i>	5 (86-98)
<i>Phenotypic Diversity</i>	OM
<i>Species Diversity</i>	2 (24-29); 3 (34-40)
<i>Ecosystem Diversity & Landscapes</i>	4 (65-70; 80-85)
CASE STUDY: MANGROVE SWAMPS	4 (83-84)
Where is the world's biodiversity?	OM
How much biodiversity exists?	3 (36-40)
Why is biodiversity important?	3 (40-66), 4 (70-77), 5(98-99)
CASE STUDY: THE NEEM TREE	3 (61-62)
THE BIODIVERSITY CRISIS	
Historical perspective & the current biodiversity crisis	6 (114-120)
CASE STUDY: THE K-T EXTINCTION	6 (116)
CASE STUDY: The Permian Extinction	6 (117)
Vulnerability to extinction	7 (130-150)
Ecological consequences of extinction	4 (77-80), OM
FOUNDATIONAL PARADIGMS	
Theory of Island Biogeography	8 (175)
Theory of Metapopulation Biology	7 (135-139), OM
The Non-equilibrium Paradigm (dynamic ecology): Habitat heterogeneity and patch dynamics	OM
Declining Population Paradigm (IHOP)	
<i>Invasive species</i>	10, OM
CASE STUDY: WILL THE BROWN MARMORATED STINKBUG BECOME AN INVASIVE SPECIES?	OM
<i>Habitat loss & fragmentation</i>	8 (158-181)
CASE STUDY: MADAGASCAR	8 (181-182)
<i>Overexploitation:</i>	9
CASE STUDY: QUEEN CONCH (<i>STROMBUS GIGAS</i>)	OM
<i>Pollution & habitat degradation</i>	8 (150-158)
CASE STUDY: GLOBAL CLIMATE CHANGE	6 (121-128)
CASE STUDY: RACHEL CARSON & <i>SILENT SPRING</i>	OM
Small Population Paradigm	

Small population phenomena (AKA THE FOUR HORSEMEN OF THE EXTINCTION APOCALYPSE)

CASE STUDY: THE CHEETAH 7 (143-145), 5 (99-105)

CASE STUDY: THE HEATH HEN & THE 7 (108-109)

EXTINCTION VORTEX

7 (146)

MAINTAINING AND RESTORING BIODIVERSITY

Conservation Strategies

Reserve Selection, Design & Management

CASE STUDY: VIETNAM CONSERVATION AREAS 11

Restoration Ecology: Restoring Ecosystems 11 (247-250)

CASE STUDY: AREA DE CONSERVACIÓN 12 (270-280)

GUANACASTE OM

Managing Populations 13

CASE STUDY: THE IBEX 5 (97-98)

CASE STUDY: THE MACAWS OF TAMBOPATA OM

Ex Situ Conservation: Zoos, Gardens, & Aquariums 14

CASE STUDY: THE ARABIAN ORYX 14 (324)

SPECIAL TOPIC: MARINE CONSERVATION BIOLOGY OM

CASE STUDY: THE GULF OF MAINE 9 (199-202)

CASE STUDY: MARINE PROTECTED AREA NETWORKS

& THE SAPODILLA CAYES MARINE RESERVE

(BELIZE) OM

SPECIAL TOPIC: BEHAVIORAL ECOLOGY & CONSERVATION

5 (106); OM

CASE STUDY: SEA TURTLES AND PHOTOPOLLUTION OM

CASE STUDY: ALLEE EFFECT IN QUEEN CONCH OM

CASE STUDY: RETAINING NATURAL BEHAVIORS IN CAPTIVITY: GOLDEN LION TAMARINS, WHOOPING CRANES, & CALIFORNIA CONDORS OM