

BIOLOGY 406 and 629, EVSS 629, Fall 2015
CONSERVATION BIOLOGY

College of Charleston, Department of Biology, Fall 2015

Lecture: 8:30-9:20 M,W, and F. HWWE 307

Final: 8:00-11:00 AM, Friday, December 11, 2015

Instructor: Dr. Arch McCallum

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Office hours: by appointment, usually available after class

Course Description: Biologists study the natural world at many levels of a hierarchy. This course focuses on biology at the level of the whole organism and above, in the context of a planetary environment that is over-exploited by humans. What explains the abundance and distribution of different organisms? How does human activity influence their abundance and distribution? How have groups of organisms diverged over time? Are we in the midst of a mass extinction, and what should we do about it? How does science aid our ability to conserve biodiversity? This dual emphasis on action and understanding derives from conservation biology's unique role as a value-laden science. Whether the values of conservation biology should include intrinsic valuation of nature is now being discussed vigorously within the field. We will join that debate.

Our study of conservation biology will have three focal questions: (1) What has gone wrong? (2) What can we do to correct it? (3) Why should we correct it? Is it a simple matter of enlightened self-interest, or do we have a deeper obligation to nature that derives from outside humanity? To establish context, we will review the current and past glories of biodiversity. Our study of the decline of biodiversity will be informed by our foundation in ecology and genetics. The solutions, though, are political and cultural as well as scientific. We will explore all avenues to conserving and restoring biodiversity. Finally, we will search our own minds, hearts, and souls to understand the need, if any, for conservation biology.

Course Structure: Different people learn in different ways. This course features a variety of learning activities to achieve redundancy, and hence success, in transmitting the core values and information of Conservation Biology from the academic establishment to the students.

Lecture: Lecture periods are thrice a week for 50 minutes each. Lectures will cover the basics of macro-evolution, ecology, and population genetics, as well as the applications of these fields to understanding the problems of populations and ecosystems at risk. In addition, conservation ethics, economics, and policy will be summarized. Two high-weight exams will encourage students to make the most of lecture.

Lowcountry Natural History: There is no substitute for knowing and being able to name the species we are trying to save. We are blessed to have a wide variety of biomes, both terrestrial and aquatic, within a short distance of Charleston. They include currently endangered species, and they recently included others that are now extinct. Others flourish, so the whole spectrum is here. All students at the 400 or higher level in the CofC Biology department should already be well acquainted with these species and ecosystems; for those who are not, it is now time to catch up. Accordingly, a list of approximately 200 species and ecosystems that every local Conservation Biologist should know will be provided to all students in this course, along with access to slide shows that introduce them and provide recognition cues. Students will be given a grade-free pre-test on these taxa and systems in September, and will take the multiple-choice final test at the end of the semester. For those who are not satisfied with their score on this test, a retest will be given at the time of the final exam. An optional Saturday field trip to see these species and communities will be offered.

World Geography: The central problem of Conservation Biology is extinction. Extinction is not just a temporal phenomenon, the end for all time of a phylogenetic lineage. It is also a spatial phenomenon: the local extinction of a species changes ecosystem structure and thereby ecosystem function. Should Conservation Biology be more concerned with the functioning of local ecosystems and their utility to people, or with the pruning and wholesale destruction of branches of the phylogenetic tree, as has occurred five times previously in the history of life. To fully comprehend the natural and unnatural phenomena that Conservation Biology covers, we must know the geography of planet earth, both present and past, as reflected in maps. Accordingly, a list of approximately 100 physical features of Charleston County, South Carolina, the United States, and the world that every local Conservation Biologist should know will be provided to all students in this course, along with access to materials that introduce them and provide recognition cues. Students will be given a grade-free pre-test on these features in September, and will take the multiple-choice final test at the end of the semester. For those who are not satisfied with their score on this test, a retest will be given at the time of the final exam.

Book Report: Each student will read and report (5 pp., double-spaced) on a popular book on any subject related to conservation of wild nature. The objective is a good read that amplifies the student's knowledge, understanding, and sympathy for the living world. The book must be at least 200 pages in length. Full instructions for the report will be provided on OAKS. That document contains a list of books that may be read without prior approval. If you want to read one of the many other books that are relevant, email the instructor for approval. The finished report is due October 26, 2015, at 5 PM. All written assignments will be submitted electronically to a dropbox on OAKS.

Before and after Essay. Each student will write two 5 page (digital, double-spaced) essays on your vision for the optimal distribution of biodiversity on Planet Earth. The Before Essay will be due at 5 PM, September 7, 2015, and will reveal your vision going into the course. The After Essay will be due no later than 12 Noon on December 15, 2015, and should be a re-assessment of your vision after having taken the course. There is no correct answer. The grade on both the Before and After versions of the essay will be based on the thoughtfulness, ingenuity, and articulateness of your exposition.

Term Paper: A 10 to 20-page (double-spaced) term paper on a subject of interest to the student will be due at the end of the semester. Each student must submit to the instructor a 1-page (more or less) proposal for the term paper subject by the end of September. The quality of this proposal will be incorporated in the midterm grade for the course. Every student, and especially graduate students, should strive to make this paper publishable in the peer-reviewed scientific literature. Check the Commentaries in *Conservation Biology* for examples of how an idea and a literature review can advance the field. A couple of examples of topics: “Signature sounds in animals and their uses for monitoring.” “Do ‘culturally significant units’ exist, and do they deserve conservation attention?” While these sound like opinion pieces, they could not succeed without thorough literature review. Grad students are encouraged to select topics that advance their research programs.

Extra Work for Graduate Credit: Grant Proposal: Each student taking the course for 600-level credit will produce a grant proposal by the end of the semester. Ideally, this will be a real proposal that is actually submitted to a funding source. For that reason, the requirements for this assignment will be flexible enough for the proposal to comply with guidelines of the funding entity. An annotated list of funding sources will be due by mid-semester. Each 600-level student should consult with the instructor early in the semester about the need and potential for funding, and shortly after submission of the annotated list about completing the assignment.

Exams: There will be two exams, one near the middle of the semester that will figure importantly into the midterm grade, which is unofficial and advisory. The other will be taken at the scheduled time for the final exam. Each exam will include some 30 multiple choice questions, which will be very specific and objectively graded. A list of terms covered on these questions will be handed out at least one week in advance of the exam. Each exam will also include several short answer and essay questions that will cover major topics covered in lecture. Sample questions of both types will be provide to students. The first exam will include material from Kolbert, while Marris will be covered in the second exam.

Course Objectives:

- understand and practice science as a way of knowing.
- understand how ecosystems function and sustain life on earth
- be able to recognize and to classify signature species of local ecosystems and representative species from all branches of the tree of life

- know where to find major biomes and signature species locally and on planet earth
- know what has caused extinction of biological lineages and depauperization of local ecosystems in the past and what can be done about it in the present and future
- consider the ethical dimensions of human-caused extinction of other species, and learn to apply ecological and evolutionary principles to the conservation of biodiversity

Required Reading: *The Sixth Extinction*, by Elizabeth Kolbert, MacMillan; *The Rambunctious Garden*, by Emma Marris, Bloomsbury USA.

Supplemental Text: *Essentials of Conservation Biology*, 6th edition. 2014. Richard Primack. Sinauer Associates. Full of facts, graphs, and illustrations. Not required but a good addition to the library of a future conservation biologist.

Supplemental Text: *Principles of Conservation Biology*, 3rd edition. Croom, Meffe, and Carroll. Sinauer Associates. Very detailed, but a little out of date. Useful for the professional.

Prerequisites: **Biology 111, 112, 211, 305, 341**

COURSE POLICIES

Communication – Students are responsible for knowing and complying with all announcements made by the instructor during the regularly scheduled hours of Lecture. Additionally, documents needed for completing required (and optional) work will be available on OAKS. Check OAKS frequently for newly uploaded or recently revised documents. Finally, the instructor will send emails to the entire class as needed to inform students of changes of schedule, interesting seminars, materials needed for class, etc. It's a good idea to check your cofc email shortly before each class.

Lecture – You are expected to attend every lecture. If you must be absent, please inform the instructor in advance and visit him during office hours if you have any questions about the lecture you missed.

Exams – If you know in advance of an unavoidable conflict with a scheduled exam, talk to the instructor about it during the first two weeks of the semester. Scheduled exams that are missed without prior permission cannot be made up except in the case of a true medical emergency *suffered on the day of the exam*. SNAP students are requested to make arrangements with the instructor well in advance of exams.

ACADEMIC INTEGRITY

Academic integrity is important to the College of Charleston community. In addition, this course asks you to perform tasks like a professional biologist, and you will be required to uphold the standards of integrity expected in the profession. Plagiarism, lying, cheating or attempted cheating are violations of the College's honor code and will be dealt with accordingly. Please be absolutely sure that you understand what the honor code requires of you (refer to pages 10-12 of the student handbook, <http://cofc.edu/generaldocuments/handbook.pdf>). If you have any questions or concerns about honor code expectations or about how to avoid violations, please consult with the instructor.

Any honor code violations that occur will be handled as outlined in the student handbook.

- (a) For lesser or unintentional offenses, the student will be asked to sign a form acknowledging an understanding of the mistake. This form will be kept on file by the Dean of Students, and a second such violation will automatically result in an honor court hearing.
- (b) More serious cases of suspected academic dishonesty will be reported to the Dean of Students and forwarded to the honor board. Severe punishments are mandatory if found in violation of the honor code, including an XF for the course, a mark that indicates failure due to academic dishonesty.

Plagiarism: Plagiarism is any use of words or ideas produced by another person without proper attribution, and includes failing to paraphrase adequately or to cite sources properly. Whether intentional or unintentional, plagiarism is forbidden by the honor code. Please consult the instructor if you have any questions or concerns about how to use and cite sources.

Re-using work: Please be aware that re-submitting work that you or anyone else has done for this or any other class or project is a violation of the honor code, even if the work is revised. On the other hand, graduate students are urged to use the term paper and grant proposal required for this course to further their research programs, and this will undoubtedly lead to some redundancy. Consult the instructor for guidance.

ASSESSMENT

Your grade in this course will be based on the components shown below. These components will be worth the following percentages of your final grade:

Biology 406 (undergraduates)

<u>Course component</u>	<u>% of grade</u>
<i>Lowcountry Natural History</i>	10%
<i>Book Report</i>	10%
<i>Essay</i>	10%
<i>Map Sense</i>	10%
<i>Term Paper</i>	15%
<i>MidTerm Exam</i>	20%
<i>Final Exam</i>	25%
Total	100%

Biology 629 and Environmental Studies 629 (graduate students)

<u>Course component</u>	<u>% of grade</u>
<i>Lowcountry Natural History</i>	10%
<i>Book Report</i>	10%
<i>Essay</i>	10%
<i>Map Sense</i>	10%
<i>Term Paper</i>	10%
<i>MidTerm Exam</i>	20%
<i>Final Exam</i>	20%
<i>Proposal</i>	10%
Total	100%

Grading policy –

A:	93.0-100.0%
A-:	90.0 - 92.9%
B+:	87.0 - 89.9%
B:	83.0 - 86.9%
B-:	80.0 - 82.9%
C+:	77.0 - 79.9%
C:	73.0 - 76.9%
C-:	70.0 - 72.9%
D+:	67.0 - 69.9%
D:	63.0 - 66.9%
D-:	60.0 - 62.9%
F:	0.0 - 59.9%