

# **Conservation Biology (ECOL 406R/506R)**

aka GEOS 406R/506R, RNR 406R/506R  
**Syllabus fall 2007** (21 August 2007, subject to change)



**William A. Calder III, 1934–2002**  
(EEB professor, taught this course until 2002)

**Bill Calder, Rocky Mountain Biological Station, Gothic, CO.**  
Photograph taken in July 1999 by Lorene Calder.

## ***Introduction***

Welcome to Conservation Biology, a three-unit course designed to present principles of conservation biology. Lectures, discussions, and other in-class activities will introduce information that is relevant to the conservation of biological diversity. This information will be derived from the arenas of biology, ecology, policy, economics, and law. Upon completion of this course, students should be able to use knowledge of conservation biology to make informed decisions to guide their personal and professional lives.

Conservation Biology (ECOL 406/ECOL 506) is a senior- and graduate-level course. If you have not completed the catalog pre-requisites for this course, you can expect to have difficulty grasping some concepts and you will likely have to undertake some independent research to "catch up."

This course also has a one-unit lab (ECOL 406L/506L) which is strongly recommended to enhance your learning experience, but is not required. However, if you are enrolled in the lab you must be enrolled in the lecture.

## ***Instructor***

**Kevin E. Bonine**, Ph.D., kebonine@u.arizona.edu  
Biological Sciences East (BSE) 1D (in the basement)  
Office Hours in BSE 1D, 11-noon Tues and noon-1pm Thurs, or by appointment.  
Office phone: 626-0092, Home phone: 751-1349 (please call before 9pm or after 7am)  
email:

## ***Graduate Teaching Assistant***

**Cathy Hulshof**, hulshof@email.arizona.edu  
Office hours: Mon and Wed 2-3, location TBA, and by appointment.

## ***Meeting Times***

LECTURE: Tuesday and Thursday 1400-1530h in MINES 225.  
LAB (only for 406L/506L): Friday 1230-1530 (nominally in KOFFL 410, but we rarely meet there).  
We will usually be meeting on the S or W Side of BSE to take a van into the field.  
See lab schedule for lengthened labs and multi-day labs.

## ***Course Materials***

**Van Dyke, Fred.** 2003. *Conservation Biology: Foundations, Concepts, Applications*. McGraw-Hill, New York. 413+xvii pages. (Available at UA Bookstore - <http://www.uofabookstores.com/uaz/>)

Other required readings will be available as pdf files placed on the course website. We will be adding or changing readings as the course progresses so please ask in class and/or check the course website often for updates.

We plan to place on reserve in the Science Library a copy of your Van Dyke text and a copy of the second edition of Meffe, G.K., and Carroll, C.R. 1994. *Principles of Conservation Biology*. Sinauer Associates, Sunderland, Massachusetts. These, as well as other optional readings, we will try to make available to you, or point out, during the semester.

**Web Site**

We will maintain a course website ([http://eebweb.arizona.edu/eeb\\_course\\_websites.htm](http://eebweb.arizona.edu/eeb_course_websites.htm)) with readings, assignments, schedules, announcements, etc. Appropriate powerpoint lectures will likely be posted to the website the day after they are given.

**406R Course Work**

Lecture exams (two midterms @ 100 pts each, final 150 pts)	350
Semester creativity project (15 pts for grading criteria; 100 for project)	115
Participation in lecture, quizzes	50
Writing assignments (two of four at 33.3 pts each)	67
Seminar attendance and summary	33
Short debates (two/three at 25 pts each)	<u>50</u>
<b>Total Points</b>	<b>665</b>

**Graduate Student 506R Course Work**

Same as 406R but with higher expectations for quality and sophistication of work and a modified debate role - you will be organizing and coaching the debate factions.

**Grading**

Assignments are due *no later than the beginning of lecture* on the due date, unless otherwise noted. Late assignments will be penalized 10% for each day they are late (this includes being late to lecture on the due date). There will be no 'make up' exams or 'extra credit'. We realize that you have lives (cars do break down, people die, stuff happens). In exceptional cases, and if arrangements are made in advance, we will consider your unique situation.

Grades will generally be distributed as follows (any curving will not be "against you"):

≥ 90%	A
80-89%	B
70-79%	C
60-69%	D
≤ 59%	F

Keep in mind the following, adapted from J.M. Williams (1993, Clarifying grade expectations, The Teaching Professor 7(7):1):

The "A" Student--An Outstanding Student

\* Attendance: "A" students have virtually perfect attendance. Their commitment to the class resembles that of the instructor.

\* Preparation: "A" students are prepared for class. They always read the assignment. Their attention to detail is such that they occasionally catch the instructor in a mistake.

\* Attitude: "A" students have a winning attitude. They have both the determination and the self-discipline necessary for success. They are curious and they show initiative. They do things they have not been told to do.

\* Talent: "A" students have something special. It may be exceptional intelligence and insight. It may be unusual creativity, organizational skills, commitment--or a combination thereof. These gifts are evident to the instructor and usually to the other students as well.

\* Results: "A" students make high grades on assignments--usually the highest in the class. Their work is a pleasure to grade.

Please re-familiarize yourself with policies against plagiarism, etc., within the UA Student Code of Academic Integrity: <http://studpubs.web.arizona.edu/policies/cacaint.htm>  
Students caught cheating may be penalized by failing the relevant assignment or exam, failing the course, or being expelled.

*Students with Disabilities:*

If you anticipate the need for reasonable accommodations to meet the requirements of this course, you must register with the Disability Resource Center (Disability Resource Center 1224 East Lowell Street Tucson, Arizona 85721, Phone: (520) 621-3268 V/TTY Fax: (520) 621-9423, E-mail: [uadrc@email.arizona.edu](mailto:uadrc@email.arizona.edu)) and request that the DRC send the instructor official notification of your accommodation *by the beginning of the 3<sup>rd</sup> week of class*. If you do not talk with us by the third week of class then we will not make any accommodations for you. Please plan to meet with us by appointment or during office hours to discuss accommodations and how the course requirements and activities may impact your ability to fully participate. All related discussions will remain confidential.

**Attendance**

You are expected to attend each lecture and each discussion/laboratory session prepared and ready to contribute. Quizzes may be used to motivate your attendance and participation if necessary (**50 pts**), and also to assess your learning. All holidays or special events observed by organized religions will be honored for those students who indicate affiliation with that particular religion. Absences pre-approved by the UA Dean of Students (or Dean's designee) will also be honored.

**Class meeting suggestions:**

Please consider employing these suggestions (borrowed from Guy McPherson) during class discussions:

1. Listen carefully to others before speaking
2. Challenge and refute ideas, not people
3. Focus on the best ideas, not on being the best, or "winning"
4. Before adding your own contribution, practice listening by trying to formulate in your own words the point that the previous speaker made
5. Speak whenever you wish (without interrupting!) even though your ideas may seem incomplete
6. Avoid disrupting the flow of thought by waiting until the present topic reaches its natural end before introducing a new issue
7. If you wish to introduce a new topic, warn the group that what you are about to say will address a new topic and that you are willing to wait to introduce it until people are finished commenting on the current topic
8. Give encouragement and approval to others

Please be aware of the UA policies against threatening behavior by students:  
<http://policy.web.arizona.edu/~policy/threaten.shtml>

**Course Work Details**

**Writing Assignments (33.3 points each, two of four assignments in bold in lecture schedule below)**

Turn in no more than one piece of paper (typed, double spaced, min. 2cm margins, min. 10 point font – you may use both sides of the paper if needed). Be concise, but convey sophisticated knowledge of subject matter, include relevant examples and citations, and show that you have thought about and integrated material. Two thirds of your grade will come from content, the other 1/3 from your ability to express yourself appropriately in English.

**In-class Debates (2x25=50 points)**

We will have three in-class debates this semester. The goal is to have you practice public speaking, defend your arguments with data, and learn about some of the contentious conservation issues out there. To make each debate more manageable, the class will be divided into thirds. One third will not actively participate in the debate, one third or more will actively debate the issue, and one third or less will evaluate (in oral and

written format) and assess the merits of each debating interest group. Therefore each individual student is involved in two of the three debates. However, material from each of the debates and the relevant readings will be fair game for exams. The enrolled graduate students will also be involved in the debates, but as organizers and coaches of each debating interest group. Each graduate student will be involved in two of the three debates. Before each debate, the debaters and involved graduate students will meet with the instructors for more detailed instructions (several weeks before the debate) and with each other to prepare arguments.

1. Should the Flat-tailed Horned Lizard (*Phrynosoma mcallii*) be ESA listed? (US, AZ, CA, Sonora, residents, CBD, USFWS, US military, etc.)
2. Tumacacori Highlands, Wilderness or Not? (Sky Island Alliance, local resident, US Border Patrol, Coronado National Forest, tourist, etc.)
3. Galapagos, How to Manage? (fisherman, tourist, native resident, Quito official, researcher, former Guayaquil resident, etc.)

### Lecture Exams (350 points)

There will be two midterm examinations and a final examination. The final will be cumulative. Topics covered in the lecture period, by guest speakers, and in the assigned readings will be fair game. Format will be mixed and may include: matching, fill-in, multiple choice, short answer, and essay. We may occasionally have some portion of an exam as a short take-home essay. Be prepared to synthesize ideas, rather than just regurgitate information. There will be no make-up exams. Exams will be closed book and closed notes.

Exams will be administered in a modified cooperative manner. First, each student will complete the exam as an individual and will submit this test for grading -- the resulting score will be the base score. Then, students will complete a portion of the exam in small groups. Bonus points will be added to each individual's base score, and the number of bonus points will depend on the score of the group, as shown below.

Group score and bonus points added to each base score:

>95%	add	5%
90.01-95	add	4%
85.01-90	add	3%
80.01-85	add	2%
75.01-80	add	1%

### STUDENT CREATIVITY PROJECTS (115 points) (Adapted from Guy McPherson, 2002)

You are responsible for developing a substantial, original piece of art or literature that incorporates at least one major theme of conservation biology. Examples include painted, sketched, quilted, or sculpted art, photography, poems, songs, plays, and short stories. Performance art is encouraged, but make sure you clear this in advance (so we budget time for it during class). You may work in a group of up to 3 students if your project requires a high level of effort. Bear in mind that each person in the group is responsible for understanding each component of the project; therefore, the group must work together and plan well enough in advance to give each member an opportunity to thoroughly review the final project.

Because assessment of art and literature is inherently subjective, projects will be co-graded by students and the instructors.

If you are working on a "literature" project, we encourage you to read several of the works of these authors, and potentially to model your writing efforts after them: Edward Abbey, William Bartram, Wendell Berry, Charles Bowden, John Burroughs, Rachel Carson, Annie Dillard, Marjory Stoneham Douglas, Robinson Jeffers, Joseph Wood Krutch, Aldo Leopold, Barry Lopez, Peter Matthiessen, Simon Ortiz, John McPhee, William Least Heat Moon, Gary Paul Nabhan, David Quammen, Gary Snyder, Henry David Thoreau, David Rains Wallace, Opal Stanley Whiteley, Terry Tempest Williams, and Ann Zwinger.

If you complete a project that involves written materials, we will expect you to demonstrate excellent writing skills. Written projects must be typewritten and double-spaced. Please use no binders, folders, or fasteners except a staple in the upper left-hand corner.

Each project can be reviewed as many times as you would like before final submission. You must allow 2 weeks for each review (i.e., it will take us 2 weeks to return your submission); therefore, no projects will be reviewed less than 2 weeks before the due date. We will review draft projects for content, but we will not provide editorial reviews of drafts. We encourage you to seek editorial reviews from peers.

You will propose the criteria and the weights that will be used to evaluate your project. For example, you may want to employ the following criteria, and associated weights: link to conservation (30%), creativity (30%), effort (30%), artistry (i.e., is it evocative, aesthetically pleasing? 10%). We encourage you to propose alternative criteria and associated weights. Please submit these one class period (i.e., **27 Nov**) before projects are due. Everyone, including you, will grade your project based on your criteria.

Projects will not be blind-graded, but they will be co-graded: the grade you and your peers assign your project will have equal or greater weight than the grade assigned by the instructor. Late projects, or those that do not follow the prescribed format, will not be graded. Projects will be displayed at a public forum on **29 November**. Please plan to come to class early that day and stay late if possible so we can have more interaction with the public.

**Seminar Attendance and Summary (33.3 points)**

Once during the semester you are required to attend a scientific seminar and write up a one-piece-of-paper summary. We will alert you to possible seminars (there are many!). The only caveat is that you must turn in your *write-up within 2 weeks* of attending the seminar. On your paper please provide the name of the presenter, title of presentation, and date & location of seminar. Again, appropriate use of English and indication of comprehension and thought will factor into your grade for this assignment.



**Tentative 2007 Class Schedule** (30 class meetings + final exam)  
**See course website for updated topics and readings as the semester progresses.**

**Date, Topic**

(Reading; please complete before class; other readings will be added)

**Tues Aug 21**, Introductions and photos; Syllabus, philosophy, and context  
(Ecological footprint for Thursday, <http://www.earthday.net/footprint/index.asp>,  
[http://www.rprogress.org/ecological\\_footprint/footprint\\_FAQs.htm](http://www.rprogress.org/ecological_footprint/footprint_FAQs.htm))  
(Optional: Bill Calder Memorium from The Auk, 2003; available on course website)

**Thurs Aug 23**, Discuss Ecological Footprint; What is conservation biology?  
(Van Dyke CH1; Noss 1999)  
(optional: Meffe and Carroll 1997, Chap 1)

**Tues Aug 28**, Conservation Ethics and Rationale  
(Van Dyke CH3; Callicott, Chap 2 of Meffe and Carroll 1997)

**Q1) Should 'intrinsic' or 'instrumental' values be the basis for conservation? Why?** (VanDyke Ch. 3  
might be good place to begin; **due Aug 30**)

**Thurs Aug 30**, Conservation Ethics and Rationale  
(Van Dyke CH3; Leopold readings)

**Tues Sep 04**, Biodiversity  
(VanDyke CH4; Costanza et al. 1997, Nature)  
(Driessen 2004, DDT, Malaria, EcolImperialism)

**Thurs Sep 06**, The Four Spikes  
**Guy McPherson** (Walther et al. 2002, National Geographic Article)

**Tues Sep 11**, Biodiversity and Threats  
(VanDyke CH4; and pp. 207-213)

**Q2) Is the endangered species act (ESA) the correct approach for US conservation efforts? Why or why not?** (see Van Dyke Ch 2 for place to begin; **due 13 Sep**)

**Thurs Sep 13**, History of conservation biology/Legislation  
(Van Dyke CH2)

**Tues Sep 18**, Sonoran Desert Conservation Plan  
**Brian Powell** (see website for readings)

**Thurs Sep 20, DEBATE I**  
Should the Flat-tailed Horned Lizard (*Phrynosoma mcallii*) be ESA listed?

**Tues Sep 25**, Paradigms and Theories, Island Biogeography, Metapopulations  
(Van Dyke CH5)

**Thurs Sep27, Exam 1 (through ~20 Sept. over CH1-4 and associated readings)**

**Tues Oct 02, Aquatic Conservation in the Desert (Arizona Fishes)**

**Scott Bonar** (Van Dyke pp. 230-248, and TBA)

**Thurs Oct 04, Global Turtle Conservation**

**Ed Moll** (see website for chapter of his book)

**Q3) Which unit of biology deserves protection? Why?** (begin by looking at text and thinking about genes/alleles, individuals, populations, species, or ecosystems as focus of conservation effort; **due 09 Oct**)

**Tues Oct 09, Conservation Genetics**

**Taylor Edwards** (Van Dyke CH6)

**Thurs Oct 11, Populations, PVA, MVP**

(Van Dyke CH7)

**Tues Oct 16, Invasive Species**

**Kathy Gerst** (Van Dyke pp. 188-193)

**Thurs Oct 18, Habitat and Reserve Design**

(Van Dyke CH8)

**Tues Oct 23, DEBATE II**

Tumacacori Highlands, Wilderness or Not?

**Thurs Oct 25, Landscape Conservation and Sky Island Alliance**

**Matt Scroch** (Intro, followed by Q & A) (readings TBA)

**Tues Oct 30, Conservation Practices, Ecosystem Management**

(Van Dyke CH10; Donlan et al. 2005, Pleistocene Rewilding)

**Thurs Nov 01, Exam 2 (through ~30 October; covers CH5-8 and associated readings)**

**Tues Nov 06, Preparing for Loihi**

**Rob Robichaux** (?)

**Thurs Nov 08, Dry Forest Conservation**

**Cathy Hulshof** (reading TBA)

**Q4) Choose a developing country outside N. America. Describe how the obstacles facing conservation practitioners in that country are both similar to and different from conservation challenges in the U.S. (due 13 Nov)**

**Tues Nov 13, Reconciliation Ecology. Ecological Restoration**

(see website for readings; Van Dyke Ch. 11)

**Thurs Nov 15, DEBATE III**

Galapagos, How to Manage? (see VanDyke Ch 9 pp.248-264 for useful marine conservation info)

**Tues Nov 20, Professional Panel**

**Margi Brooks (NPS), Mima Falk (USFWS), Dave Gori (TNC)** (Van Dyke CH13)

**Thurs Nov 22**

Thanksgiving (**no class**)

**Tues Nov 27, Exhibit criteria due, Economics and Sustainable Development**

(Van Dyke CH12)

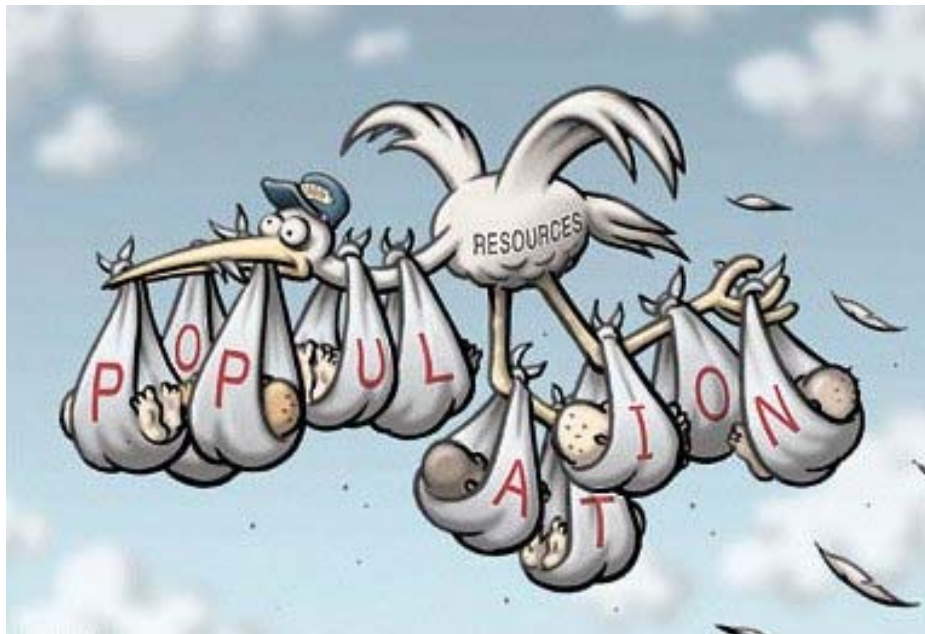
**Thurs Nov 29 Creativity EXHIBIT (Public) - art/literature project due today, peer grading**

**Please try to come early and stay late.**

**Tues Dec 04, Last Lecture; Wrap-Up, Sustainability, Course evaluations**

(reading TBA)

**Thurs Dec 13, Cumulative Final Exam: 1400-1600h (aka 2-4pm)**



<http://www.goalsforamericans.org/gallery/v/cartoons/3-3-05Overpopulation.jpg.html>