

## **Conservation Biology (ECOL 406R/506R)** aka GEOS 406R/506R, RNR 406R/506R **Syllabus fall 2004 (subject to change)**

### ***Introduction***

Welcome to Conservation Biology. This three-unit course is 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.

office: Biological Sciences East (BSE) 1D (in the basement)

Office Hours in BSE 1D Wed. 1300-1400h and Thurs. 1400-1500h, or by appointment.

Office phone: 626-0092, Home phone: 751-1349 (please call before 9pm or after 6am)

email: [kebonine@u.arizona.edu](mailto:kebonine@u.arizona.edu)

### ***Teaching Assistant***

**Kathy Gerst**

Office hours in KOFFL 410 Tues. 1400-1500h and by appointment. Extra hours to be added during periods of high demand.

Contact information: [katgerst@email.arizona.edu](mailto:katgerst@email.arizona.edu)

### **UA WEBSITE information**

ECOL 406R -- Conservation Biology (3 units)

Description: Biological principles applied to protection and recovery of threatened and endangered species and the processes which link species in natural ecosystems. Biological basis for conservation laws and regulations. Distribution, valuation and sustainable production of biodiversity benefits for humanity. This is a Writing Emphasis Course. Grading: Regular grades are awarded for this course: A B C D E.

Prerequisite(s): satisfaction of the Mid-Career Writing Assessment (MCWA) or the former upper-division writing proficiency requirement (UDWPE); ECOL 182, ECOL 302; Concurrent registration, ECOL 406R.

Identical to: GEOS 406R, RNR 406R. May be convened with: ECOL 506R. Usually offered: Fall.

ECOL 406L -- Conservation Biology in the Field (1 unit)

Description: Problem-solving, discussion, and field trips (binoculars required).

Grading: Regular grades are awarded for this course: A B C D E. Special course fee required: \$25.

Course includes 1 or more field trips. Prerequisite(s): Concurrent registration, ECOL 406R.

Identical to: RNR 406L, GEOS 406L. May be convened with: ECOL 506L. Usually offered: Fall.

ECOL 506R -- Conservation Biology (3 units)

Graduate-level requirements include a research paper.

Identical to: GEOS 506R, RNR 506R. May be convened with: ECOL 406R. Usually offered: Fall.

ECOL 506L -- Conservation Biology in the Field (1 unit)

Graduate-level requirements include participation as team leaders. Two 3-day weekend trips March-April. Identical to: RNR 506L, GEOS 506L. May be convened with: ECOL 406L. Usually offered: Fall.

### ***Meeting Times***

LECTURE: Tuesday and Thursday 1230-1345h in MINES 225.  
LAB (only for 406L/506L): Friday 0900-1150h in KOFFL 410.  
See lab schedule for lengthened labs and multi-day labs.

***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

***Course Materials***

**Van Dyke, Fred.** 2003. *Conservation Biology: Foundations, Concepts, Applications*. McGraw-Hill, New York. 413+xvii pages.  
(Available at Scholar's Bookstore [2644 E. Speedway, 326 3115; about \$85])

Other required readings will be available as pdf files via the University of Arizona library electronic reserve system, or placed on the course website. We will be adding readings as the course progresses so please ask in class and/or check the course website often for updates.

We have also placed on reserve in the Science Library a copy of the second edition of Meffe, G.K., and Carroll, C.R. 1994. *Principles of Conservation Biology*. Sinauer Associates, Sunderland, Massachusetts. This and other optional readings we will try to make available to you, or point out, during the course of the semester.

***Web Site***

We will maintain a course website (<http://eebweb.arizona.edu/Links/Classes.html>) with 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	150
Participation in Role-Playing Exercises and Student-led Discussions (~3x25 pts) (~25 points for quizzes and participation)	100
Critical Article/Seminar Write-Ups (2 x 50 pts)	100
<b>Total Points</b>	<b>700</b>

***Graduate Student 506R Course Work***

Same as 406R with the addition of 20 more points on each exam (3x20) and an additional written research project (150 pts) for a grand total of 910 points (=700+60+150).

***Grading***

Assignments are due *no later than the beginning of lecture* on the due date. Late assignments will be penalized 10% for each day they are late (including being late to lecture). 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

Any student with a documented disability who feels they may need academic adjustments or accommodation is requested to speak with the instructor by the 2nd week of class. All related discussions will remain confidential. Students should contact the S.A.L.T. Center for Learning Disabilities (Old Main, Room 135; 621-1242) or the Center for Disability Related Resources (2nd and Cherry; 621-3268) prior to discussions with the instructor. These offices will verify the need for special services.

### ***Attendance***

You are expected to attend each lecture ready to contribute, having read the appropriate material.

### ***Course Work Details***

#### **Lecture Exams**

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 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 (for final exam, multiply all scores by a factor of 1.5).

Group score and bonus points added to each base score:

>95	add	10
90.01-95	add	8
85.01-90	add	6
80.01-85	add	4
75.01-80	add	2

I expect strict adherence to the UA Code of Academic Integrity during all exams. Exams will be closed book and closed note.

#### **Critical Article/Seminar Write-Ups (2 x 50 points)**

You should read two scientific articles pertinent to conservation biology. Write up a two page (typed and double spaced) summary of each article. One short write-up is due no later than **07 October**, the other is due no later than **07 December**. Please contact the instructor if you have questions about the appropriateness of a specific article you are considering reading.

In your write-up please be sure to address the following: What was the hypothesis (or hypotheses) being tested? Are there biases evident in the article? Can you describe any errors in the author's logic or methods? What was the conclusion of the article with respect to the hypothesis? Do you agree with the author's findings? In an ideal world (e.g., unlimited funding and time) how would you suggest improvements to the research reported in this article? Please turn in a **copy of the abstract** of the article with your write-up.

Attending an appropriately scientific research seminar is also an appropriate way to fulfill one of these two assignments. Be sure to answer the same questions in your write-up. Ask the instructor if you are unsure about the appropriateness of a given seminar. We will attempt to announce relevant seminars as we become aware of them.

### **STUDENT PROJECTS** (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 instructor.

Among the authors who effectively incorporate natural history into literature are 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, Gary Snyder, Henry David Thoreau, David Rains Wallace, Opal Stanley Whiteley, Terry Tempest Williams, and Ann Zwinger. Particularly if you are working on a "literature" project, I encourage you to read several of the works of these authors, and potentially to model your writing efforts after them.

If you complete a project that involves written materials, I 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, aesthetic? 10%). We encourage you to propose alternative criteria and associated weights. Please submit these during the class period (30 Nov) before projects are due. Everyone, including you, will grade your project based on your criteria. Note that projects will be displayed in class.

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. Projects are due at the beginning of the lecture on 08 December. Late projects, or those that do not follow the prescribed format, will not be graded.

### **Graduate Student 506R Written Research Project**

This paper will be your opportunity to research a topic of interest to you that is appropriate for a conservation biology class. You will be expected to synthesize relevant information from the primary literature (containing original, peer-reviewed research results) in a well-written paper. Collecting and adding additional new data would be welcomed, but is not required. You will be graded in two stages: topic and annotated references (12 October; 25 pts.), and final submission (23 November; 125 pts.). This paper should be written in the format (including citations and literature cited) of articles in Conservation Biology and should be 10+ double-spaced pages in length. Please discuss topics of interest with the instructors.

## **Tentative 2004 Class Schedule** (29 Class meetings)

See course website for updated topics and readings as the semester progresses.

### Date

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

Aug 24

Introductions and photos  
Syllabus, philosophy, and context  
(Ecological footprint)

Aug 26

What is conservation biology?  
(Van Dyke CH1; Noss 1999)  
(optional: Meffe and Carroll 1997, Chap 1)

Aug 31

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

Sep 2

Conservation Ethics and Rationale  
(Van Dyke CH3; Leopold readings)

Sep 7

History of conservation biology/Legislation  
(Van Dyke CH2)  
**Sherry Barrett**, TENTATIVE, Field Director of the Tucson USF&W Office

Sep 9

History of conservation biology/Legislation  
(Van Dyke CH2; Leopold readings)

Sep 14

**Role playing exercise** (SDCP or Ironwood NM)  
Students will represent various interests and debate merits of proposals. Afterward, students will write up very short summary identifying which groups did well, and why, which groups did poorly, and why, and what information was lacking to make informed decisions.

Sep 16

Biodiversity  
(VanDyke CH4)

Sep 21

Paradigms and Theories  
(Van Dyke CH5)

Sep 23  
Paradigms and Theories  
(Van Dyke CH5)

Sep 28  
**Exam 1** (through ~23 Sept. over CH1-5 and associated readings)

Sep 30  
Populations  
(Van Dyke CH7)  
**David Hall**, (local aquatic desert populations (turtles, frogs, fish) and their conservation)

Oct 5  
Conservation Genetics  
(Van Dyke CH6)  
**Melanie Culver** (Mt. Lions etc.)

Oct 7  
Conservation Genetics  
(Van Dyke CH6)  
First **article/summary write-up due**

Oct 12  
Biodiversity/Genetic Diversity  
(Van Dyke CH4, CH6)  
**Rob Robichaux** (Hawaiian Silversword Alliance)  
**506R topic and annotated refs due**

Oct 14  
Invasive Species  
(Van Dyke CH7)  
**Kathy Gerst** (invasive riparian plants)

Oct 19  
Population Viability Analysis , Minimum Viable Population Size  
(Van Dyke CH7)

Oct 21  
Habitat and Reserve Design  
(Van Dyke CH8)  
**Bill Mannan**

Oct 26  
Conservation Practices  
(Van Dyke CH10)

Oct 28  
Conservation Practices (Aquatic)  
(Van Dyke CH9)  
**student-led lecture** (5 topics, multiple students per topic, but only one student per topic selected to present; prepare in groups outside of class?)

Nov 2  
Global Climate Change  
(Walther et al. 2002, Hayhoe et al. 2004)

Nov 4

Sonoran Desert Conservation Plan  
(Van Dyke CH7,8,10)

**Bob Steidl** (how the scientists came up with the proposed plan)

Nov 9

**Exam 2** (covers CH6-10 and associated readings)

Nov 11

Veteran's Day (**no class**)

Nov 16

Professional Panel  
(Van Dyke CH13)

**Margi Brooks (NPS), Mima Falk (USFWS), Dana Backer/Dave Gori (TNC)**

Nov 18

Restoration Ecology/Practicing Conservation Biology  
(Van Dyke CH11; Ehrlich, Noss, Robichaux, Rosenzweig, Soulé, etc.)

**Student-led** debate about conservation biology and restoration ecology; student groups assigned to support the point of view of a well-known conservation biologist

Nov 23

The four spikes

**Guy McPherson**

**506R Written Research Project due**

Nov 25

Thanksgiving (**no class**)

Nov 30

Economics and Sustainable Development  
(Van Dyke CH12)

**Exhibit criteria due.**

Dec 2

**EXHIBIT** - art/literature project due today, peer grading

Dec 7

Last Lecture

Wrap-Up, Sustainability, Course evaluations

Second **article/summary write-up due.**

Dec 16

Cumulative **Final Exam:** 1100-1300h, Thursday

Conservation Biology Lab Schedule 2004, Meets Friday 9-noon (14 potential meetings)

27 Aug. Tumamoc Hill and Introduction, **VAN**

03 Sept. No lab (Labor Day on 06 Sept.)

10 Sept. Rillito and NEPA, **VAN**

17 Sept. Tucson Mountain Park, diversity indices, **VAN**

24 Sept. Computer Time: Island Biogeography, Population Growth, **COMPUTER LAB (meet in ECE206)**

01 Oct. Mt. Lemmon **all day, VAN**

leave campus 0700h

Rex Adams and graduate student representative from Lab of Tree-Ring Research

08 Oct. San Pedro and Chiricahuas, **2 day, VAN** 08-09 Oct.

leave campus 0600h

Valere and Joe Austin

meet in Douglas 0930h with Valere on Friday 08 Oct

Mrs. Valere Austin will take us around on the 8<sup>th</sup> at San Bernardino ranch in Mexico and then Nogalito (part of Cajon Ranch) and then back to Coronado to cookout and camp (USFS land) in the evening. In the morning of the 9<sup>th</sup> she can show us around Coronado. Stop at San Pedro House on way home.

15 Oct. Sewage Treatment / Santa Cruz / Sweetwater Wetland (**extra time?**), **VAN**

22 Oct. Computer Time: MVP, Sea Turtle Populations, **COMPUTER LAB (meet in ECE206)**

29 Oct. Crecencio Elenes and TerraCycle Farm (**extra time**), **VAN**

meet in Rio Rico at 1000h for talk from Crecencio, labor 1100-1200h, lunch 1200h, campus 1400h

05 Nov. No lab

12 Nov. No lab (Veteran's Day on 11 Nov.)

19 Nov. Organ Pipe, Pinacate, CEDO, **3 day, VAN** 19-21 Nov

leave campus 6am on Friday 19 Nov., return evening of Sunday 21 Nov.

26 Nov. Thanksgiving Holiday – No lab

03 Dec. Oral Presentations in **KOFFL 410**, PROJECTOR for powerpoint

For field trips involving **vans** we will meet at the appointed time on the south side of BSE (4<sup>th</sup> and Highland).