

ANBE/BIOL 415 – CONSERVATION BIOLOGY

Autumn 2009

<http://www.facstaff.bucknell.edu/abrahmsn/bi415/>

"Teach your children what we have taught our children, that the earth is our mother. Whatever befalls the earth, befalls the children of the earth. If we spit upon the ground we spit upon ourselves. This we know. The earth does not belong to us; we belong to the earth...."

Attributed to Chief Seattle, 1855

Instructor:

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Course Objectives:

- To engender a sense of understanding of environmental problems, create a sense of purpose and direction for solutions to those problems, and develop an involvement in conservation biology
- To provide an up-to-date synthesis and understanding of the multiple disciplines relating to the conservation of living organisms
- To encourage thought, reflection, and action among students interested in fields related to conservation biology

Expectations:

Class attendance for every class meeting is expected as is stated in the Bucknell University Student Handbook. Each student should be prepared for class by reading the assigned materials before class. Failure to adequately prepare for class can adversely affect students' performance in the course. Cell phones must be turned off on entering class and kept off for the duration of class.

Academic-honesty Policy:

I expect that every student has read and understood Bucknell's academic-honesty policy and technological-use policy and strict adherence to both of these policies is expected. Each student will need to carefully prepare assignments with these policies in mind. If there are any questions throughout the semester, please ask me BEFORE any assignment is submitted.

Assignments:

Journal Summaries (3)	Sep 9, 16, 25
Student-led Discussions (8)	Sep 14, 21, 30, Oct 19, 26, Nov 2, 9, & 18
Special Biology lectures: Dr. Jim Marden	Sep 18
Term Project Outline & Bibliography due	Oct 2
Midterm Examination	Oct 9
Letter to Congress or State Legislature	Oct 28
Oral Term-Project Presentations	Nov 20-Dec 7
Term Project Paper due	Dec 7
Final Examination (Comprehensive)	Week of Dec 10-17

To reduce impacts on forest resources, journal summaries, term-project outlines & bibliographies, and letters to Congress are submitted to SafeAssign in Blackboard; no hardcopies are submitted. Only the term-project paper is submitted both electronically to SafeAssign and in hardcopy (single-spaced with 1" margins; pages printed back-to-back).

Grading:

Journal Summaries and Letter to Congress	10%
Midterm Examination	20%
Class participation and leadership of assigned discussion	20%
Term Project including oral presentation of project	25%
Final Examination	25%

Assigned Readings:

Primack, Richard B. 2006. *Essentials of Conservation Biology*, 4th Edition.
Sinauer Associates, Sunderland, MA. ISBN 0-87893-720-X
Original journal articles

COURSE CONTENT:**Part I. Major Issues That Define Conservation Biology****Aug 26-Sep 2**

1. Course expectations
2. What is conservation biology?
3. What is biological diversity?
4. Where is the World's biological diversity found?

Readings:

Primack, R.B. 2006. Chapters 1, 2, and 3.
Leopold, A. 1933. The Conservation Ethic. *Journal of Forestry* 31: 634-643.

Part II. Valuing Biodiversity**Sep 4-16**

4. Ecological economics and direct economic values
5. Indirect economic values
6. Ethical values

Readings:

Primack, R.B. 2006. Chapters 4, 5, and 6.
Balmford, A., A. Bruner, P. Cooper, R. Costanza, S. Farber, R.E. Green, M. Jenkins, P. Jefferiss, V. Jessamy, J. Madden, K. Munro, N. Myers, S. Naeem, J. Paavola, M. Rayment, S. Rosendo, J. Roughgarden, K. Trumper, and R.K. Turner. 2002. Economic reasons for conserving wild nature. *Science* 297: 950-953.
Kareiva, P., A. Chang, and M. Marvier. 2008. Development and conservation goals in World Bank projects. *Science* 321: 1638-1639.
Newmark, W.D. 2008. Isolation of African protected areas. *Frontiers in Ecology and Evolution* 6:321-328.

Special Events: Two lectures by Dr. Jim Marden, Penn State University**Sep 18**

“Informing Conservation Biology with Functional Genomic Tools and Organismal Physiology” 9 am, in class

“Functional Genomics of Coupled Ecological and Evolutionary Dynamics: Alleles and Mechanisms Associated with Butterfly Metapopulation Dynamics” noon, Biology Department seminar

Part III. Threats to Biodiversity**Sep 18-Oct 5**

7. Early mass extinction & current rates of extinction
8. Vulnerability to extinction
9. Habitat destruction, fragmentation, degradation, and global climate change
10. Overexploitation, invasive species, & disease

Readings:

Primack, R.B. 2006. Chapters 7, 8, 9, and 10.
Chapin, F.S.III, J.T. Randerson, A.D. McGuire, J.A. Foley, and C.B. Field. 2008. Changing feedbacks in the climate-biosphere system. *Frontiers in Ecology and Evolution* 6:313-320.
Gore, A. 2008. *A generational challenge to repower America* (27-min)
http://www.wecansolveit.org/pages/al_gore_a_generational_challenge_to_repower_america/
Lenoir, J., J. Gegout, P. Marquet, P. de Ruffray, and H. Brisse. 2008. A significant upward shift in plant species optimum elevation during the 20th Century. *Science* 320: 1768-1771.
Nature editorial. 2008. A task of terawatts. *Nature* 454:805.
Schiermeier, Q., J. Tollefson, T. Scully, A. Witze, and O. Morton. 2008. Electricity without carbon. *Nature* 454:816-823.

Part IV. Conservation at the Population and Species Levels**Oct 7-19**

11. Problems in small populations
12. Applied population biology
13. Establishing new populations
14. *Ex situ* conservation strategies

Readings:

Primack, R.B. 2006. Chapters 11, 12, 13, and 14.

Price, P.W., W.G. Abrahamson, M.D. Hunter, and G. Melika. 2004. Using gall wasps on oaks to test broad ecological concepts. *Conservation Biology* 18: 1405-1416.

Special Events: 350 Climate Action Festival (See www.350.org)**Oct 14-17**

See campus announcements for details

Part V. Practical Applications**Oct 21-Nov 4**

15. Establishing protected areas
16. Designing networks of protected areas
17. Managing protected areas
18. Outside protected areas
19. Restoration ecology

Readings:

Primack, R.B. 2006. Chapters 15, 16, 17, 18, and 19.

Arendt, R.G., A.E. Hutchinson, H.M. Harper, and S. Kuter. 1997. Growing greener: putting conservation into local codes. *Natural Lands Trust*. 17 pp.

Chazdon, R.L. 2008. Beyond deforestation: restoring forests and ecosystem services on degraded lands. *Science* 320: 1458-1460.

Part VI. Conservation and Human Societies**Nov 6-18**

20. Conservation and sustainable development at the local and national levels
21. An international approach to conservation and sustainable development
22. An agenda for the future

Readings:

Primack, R.B. 2006. Chapters 20, 21, and 22.

McMichael, A.J., C.D. Butler, and C. Folke. 2003. New visions for addressing sustainability. *Science* 302: 1919-1920.

Part VII. Student Term Project Presentations**Nov 20-Dec 7**