

**ENVIRONMENTAL STUDIES/ECONOMICS 55:  
NATURAL RESOURCE & ECOLOGICAL ECONOMICS**

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| Winter 2009              | Prof. Richard B. Howarth   | Tutor: Caitlin Pierce '09    |
| Lecture: MWF 10:00-11:05 | Office hours: Tu 1:00-3:00 | Office hours by appointment  |
| X-hour: Th 12:00-12:50   | 106 Fairchild, 646-2752    | 107A Fairchild               |
| Classroom: Carpenter 13  | RBHowarth@Dartmouth.edu    | Caitlin.Pierce@Dartmouth.edu |

**Course Description:** This course examines the use of economic concepts and methods in the management of natural resources and ecological systems. Topics including welfare economics, common pool resources, nonmarket valuation, and discounting procedures are developed and applied to problems such as fisheries management, forest management, and biodiversity conservation. The course explores the links between economic growth, resource depletion, and global environmental change and the use of economic and ecological indicators in measuring and achieving sustainable development. Emphasis is placed on both the disciplinary aspects of economic analysis and the role of economics in interdisciplinary problem-solving.

**Prerequisites:** The course is aimed at students who have a basic knowledge of environmental issues (Environmental Studies 2 or 3), microeconomics (Economics 1), and good math skills (Mathematics 3). While students with weaknesses in one of these areas can succeed in the course, a grasp of either basic economics or calculus is essential.

**Course Requirements:** Course evaluations will be based on four homework assignments (10%), a midterm (30%), a final examination (30%), and a 6-8 page paper that will be due on Friday, March 6 (30%). Papers will summarize and critique a research article that is pertinent to the themes explored in the course. See the "Guidelines for Final Papers" on p. 5 below.

**Readings:** The textbook for this course is Eban Goodstein's *Economics and the Environment* (5<sup>th</sup> edition, John Wiley, 2008). Older versions of the textbook are also OK. Both the text and a supplementary reader are available for purchase at Wheelock Books. Copies will also be placed on reserve in the Environmental Studies library in 108 Fairchild.

**Disabilities:** Students with learning, psychological, or physical disabilities should contact the instructor after class or during office hours to discuss the accommodations they require to succeed in the course.

**Academic honor:** Students may discuss assignments with each other provided that the work they submit for credit is their own. For a math problem, this means that a student should understand each step involved in the solution and be able to reproduce it independently. Papers must be written by the student and reflect his or her own interpretation of the subject matter. Under Dartmouth's Academic Honor Principle, it is impermissible to give or receive assistance during an examination.

## Class Schedule

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- M 1/5 Introduction/overview  
Reading: Goodstein, ch. 1
- W 1/7 Economics, ethics, and policy analysis  
Reading: Goodstein, ch. 2
- F 1/9 The market mechanism  
Reading: E.E. Zajac, "The Concept of Economic Efficiency," Chapter 2 in *The Political Economy of Fairness*, MIT Press, Cambridge, Massachusetts, 1995.
- M 1/12 Market failure  
Reading: Goodstein, ch. 3
- W 1/14 Property rights and missing markets  
Reading: Goodstein, ch. 4
- F 1/16 Externality theory (**Homework #1 due**)  
Reading: Goodstein, ch. 5
- M 1/19 *No Class – MLK Day*
- W 1/21 Economics of the fishery  
Reading: J.R. Kahn, "Fisheries," Chapter 11 in *The Economic Approach to Environmental and Natural Resources*, Thomson South-Western, Mason, Ohio, 2005.
- Th 1/22 Working with Excel (optional X-hour)
- F 1/23 Issues in fisheries management  
Reading: W.E. Schrank, "The Newfoundland Fishery: Ten Years after the Moratorium," *Marine Policy*, vol. 29, pp. 407-420, 2005.
- M 1/26 Cost-benefit analysis  
Reading: Goodstein, ch. 8
- W 1/28 Contingent valuation (**Homework #2 due**)  
Reading: R. Bandara and C. Tisdell, "The Net Benefit of Saving the Asian Elephant: A Policy and Contingent Valuation Study," *Ecological Economics*, vol. 24, pp. 93-107, 2004.

- F 1/30 Valuing ecosystem services  
Reading: Millennium Ecosystem Assessment, “Summary for Decision-Makers,” pp. 1-24 in *Ecosystems and Human Well-Being*, Island Press, Washington, 2005.
- M 2/2 Income and well-being  
Reading: Goodstein, ch. 11
- W 2/4 Critiques of cost-benefit analysis  
Reading: M. Sagoff, “Environmental Economics and the Conflation of Value and Benefit.” *Environmental Science and Technology*, vol. 34, pp. 1426-1432, 2000.
- F 2/6 **Midterm examination**
- M 2/9 Discounting and natural capital  
Reading: Goodstein, pp. 97-100; J. Broome, “The Ethics of Climate Change,” *Scientific American*, vol. 298, pp. 97-102, 2008.
- W 2/11 Nonrenewable resources  
Reading: J. Kuuluvainen and O. Tahvonen, “The Economics of Natural Resource Utilization,” pp. 106-135 in *Principles of Environmental and Resource Economics* (H. Folmer, H.L. Gabel, and H. Opschoor, eds.), Edward Elgar, Brookfield, Vermont, 1995.
- Th 2/12 Discounting and conservation (X-hour)  
Reading: C. Clark, “The Economics of Overexploitation,” *Science*, vol. 181, pp. 630-634, 1973.
- F 2/13 *No Class – Winter Carnival*
- M 2/16 Critiques of discounting  
Reading: D. Parfit, “Energy Policy and the Further Future: The Social Discount Rate,” ch. 2 in *Energy and the Future* (D. MacLean and P.G. Brown, eds.), Rowman and Littlefield, Totowa, New Jersey, 1983.
- W 2/18 “Limits to Growth”? (**Homework #3 due**)  
Reading: D.H. Meadows, D.L. Meadows, and J. Randers, “Beyond the Limits: An Executive Summary,” *Bulletin of Science, Technology, and Society*, vol. 13, pp. 3-14, 1993.
- F 2/20 Economic sustainability  
Reading: R.M. Solow, “Sustainability: An Economist’s Perspective,” pp. 179-187 in *Economics of the Environment* (R. Dorfman and N.S. Dorfman, eds.), Norton, New York, 1993.

- M 2/23 Resource scarcity and industrial ecology  
Guest lecturer: Mike Gerst, Thayer School of Engineering  
Reading: TBA
- W 2/25 Natural resource accounting  
Reading: Goodstein, ch. 6
- F 2/27 Net national welfare (**Homework #4 due**)  
Reading: P.A. Lawn, "A Theoretical Foundation to Support the Index of Sustainable Economic Welfare (ISEW), Genuine Progress Indicator (GPI), and Other Related Indexes," *Ecological Economics*, vol. 44, pp. 105-118, 2003
- M 3/2 Strong sustainability, stewardship, and the precautionary principle  
Reading: Goodstein, ch. 7
- W 3/4 Environmental issues in developing countries  
Reading: Goodstein, ch. 21
- F 3/6 Trade and the environment (**Final paper due**)  
Reading: Goodstein, ch. 22
- M 3/9 Summary/review
- F 3/13 **Final examination**  
8:00 a.m., location to be announced
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## GUIDELINES FOR FINAL PAPERS

### Paper Topics

Your final paper should *summarize* and *critically assess* a journal article that is relevant to this course. You could choose to focus on an article that examines some aspect or application of natural resource economics from a disciplinary perspective. Or you could choose an article that analyzes a natural resource or environmental issue from an interdisciplinary perspective that involves some economics. Either way, you should carefully think through the following questions regarding the article you select:

- What research question(s) does the article address?
- What methods or approach do the authors use to answer this question?
- What findings or conclusions does the article present?

In researching and writing your paper, you'll want to read and cite additional sources that address the topical issue, techniques, and/or theories considered in the article you are reviewing. ***A total of ten sources is a good goal*** to shoot for with an emphasis on ***published books and journal articles***. If you were reviewing Bandara and Tisdell's article on the benefits of elephant conservation (see the reading for 1/28), for example, you'd want to do research on both the contingent valuation method and the challenges presented by human-wildlife interactions. This would put you in a position to critically discuss the paper's strengths and weaknesses.

### Sources

If you're interested in finding a journal article on a particular topic, try doing a subject or title word search using the [Web of Science](#). This is a powerful tool that provides abstracts and online access to articles along with citations to related works. [Search360](#) is a related search engine that is worth checking out.

Alternatively, you could browse for articles in journals such as [Ecological Economics](#), [Energy Economics](#), [Environmental and Resource Economics](#), the [Journal of Environmental Economics and Management](#), or [Land Economics](#). Interdisciplinary journals include (for example) [Energy Policy](#), [Conservation Biology](#), and [Climatic Change](#). The specific source doesn't matter as long as the article in question is both interesting to you and relevant to the course. Most journals at Dartmouth can be accessed from the [eResources](#) page on the library web site.

### Style

1. Papers should be ***6-8 pages*** in length with ***one-inch margins, double spacing, and 12-point fonts***.
2. ***Include page numbers*** throughout your document.
3. Please pay attention to the following ***guidelines for references and citations***:
  - When citing an article, book, or other work, give the author's name and the year of publication in the body of your paper.
  - At the end of your paper, provide a bibliography that lists the author, date, and title of each cited work. For journal articles, give the volume and page numbers of each cited paper. For books, give the city and publisher.
  - *If in doubt, follow the reference style used in the Goodstein text.*