

# NATURAL RESOURCE AND ENVIRONMENTAL ECONOMICS

## ECON 440, Winter 2022, Section 1

**Professor:** C. Arden Pope, III  
**Office:** Economics Dept. 2102 West View Building, BYU  
**Phone:** 801-422-2157; E-mail: [cap3@byu.edu](mailto:cap3@byu.edu)

**TA :** Luca Sivers; e-mail: [Lucasivers@gmail.com](mailto:Lucasivers@gmail.com)

**Lectures:** MW 2:00 - 3:15; HBL 3710

<b>Grading:</b>	Midterm Exam	30%
	Final Exam	30%
	Reading Journal	20%
	<u>In-Class Participation, Quizzes, etc.</u>	<u>20%</u>
	Total	100%

### Course outline and Reading Assignments

Dates	Class Plan	Reading
Jan 3,5	Introduction. What is natural resource/enviroecon? Scarcity? Anthropocentric? What are models? Basic neo-classical economic model.	**Intermediate-level micro-economics text chapter on general equilibrium and welfare econ. [Example: Nicholson and Snyder. Microeconomic Theory. 10 ed. Thomson. 2008 (13 <sup>th</sup> chapter). Make sure to study the chapters on general equilibrium and welfare. <b>A-1 (Fair game: Jan 5)</b>
Jan 10,12	Summary of welfare economics, efficiency, pareto optimality.	<b>Externality Debates:</b> *Coase, Ronald. The problem of Social Cost. J Law Econ Oct 1960;3:1-44. **Haab, Tim. What is the Coase Theorem, really? Posted on Environmental Economics at: <a href="http://www.env-econ.net/2006/01/what_is_the_coa.html">http://www.env-econ.net/2006/01/what_is_the_coa.html</a>
Jan 19,24	Property rights, bundle of rights	*McChesney FS. Coase, Demsetz, and the Unending Externality Debate. Cato Journal. Winter 2006;26:179-200.
Jan 26,31	Classes of resources, goods, and services	<b>A-2 (Fair game: Jan 26)</b>
Feb 2,7	Approaches to reach efficiency. Improved property rights, Coase's Theorem. Taxation, Regulation, Public ownership etc.	<b>Common Property Debates:</b> **Hardin G. The Tragedy of the Commons. Science 1968(Dec);162:1243-1248. **Dietz, Ostrom, Stern. The Struggle to Govern the commons. Science 12 2003(Dec);302:1907-12. <b>A-3 (Fair game: Feb 7)</b>
Feb 9,14	What is value? (TWP, marginal, average, market prices, market value). Cow vs. Elk	*White MV. Doctoring Adam Smith: The Fable of the Diamonds and Water Paradox. History of Political Economy 2002;34(4):659-683. <b>A-4 (Fair game: Feb 14)</b>
Feb 16	Exercises in use of non-market valuation. Value of Life	**Robinson LA, Hammitt JK. Research Synthesis and the Value per Statistical Life. Risk Analysis 2015;35:1086-1100. <b>A-5 (Fair game: Feb 16)</b>
<b>Feb 22</b>	<b>Midterm Exam</b>	----
Feb 23,28	Population Growth and the Environment  <b>NOTE: Reading Journal for A-1 through A-6 to be turned in during class on Feb 28</b>	**Diamond J. Easter's End. Discover. August 1995. ( <a href="https://www.discovermagazine.com/planet-earth/easters-end">https://www.discovermagazine.com/planet-earth/easters-end</a> ) **Garlinghouse T. Rethinking May 2020. ( <a href="https://www.sapiens.org/archaeology/easter-island-collapse/">https://www.sapiens.org/archaeology/easter-island-collapse/</a> ) ** Don't Panic – The Facts About Population (1hr long video) <a href="https://www.gapminder.org/videos/dont-panic-the-facts-about-population/">https://www.gapminder.org/videos/dont-panic-the-facts-about-population/</a> **Roser, Ritchie, Ortiz-Ospina. World Population Growth. 2019. Posted online at "Our World in Data" at: <a href="https://ourworldindata.org/world-population-growth">https://ourworldindata.org/world-population-growth</a> <b>A-6 (Fair game: Feb 28)</b>

March 2,7	Global warming, Contribution of economic analysis	<p>*Climate Change 2021, Synthesis Report, Summary for Policymakers. At: <a href="https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SP_M.pdf">https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SP_M.pdf</a></p> <p>**Weitzman, Martin L. Fat Tails and the Social Cost of Carbon. The American Economic Review 2014;104:544-546.</p> <p>**Greenstone, Michael et al. Developing a Social Cost of Carbon for US Regulatory Analysis: A Methodology and Interpretation. Review of Environmental Economics and Policy 2013;7(volume 7, issue 1):23-46.</p> <p><b>A-7 (Fair game: March 7)</b></p>
March 9	Optimal wilderness or wild lands	<p>** Loomis JB. Economic Values of Wilderness Recreation and Passive Use: What We Think We Know at the Beginning of the 21<sup>st</sup> Century. 2000</p> <p>*U.S. General Accounting Office. Wilderness, effects of designation on economy and grazing in Utah. Dec. 1992.</p> <p><b>A-8 (Fair game: March 9)</b></p>
March 14,16, 21,23,28	Estimating external health costs of air pollution. Value of one more year of life expectancy? Economics and public policy.	<p><b>Historical:</b></p> <p>***"The Fog" Eleven Blue Men and Other Narratives of Medical Detection. Little Brown &amp; co. 1953 (Handout)</p> <p><b>A-9 (Fair game: March 14)</b></p> <p><b>Selected examples of modern studies:</b></p> <p>* Particulate air pollution and daily mortality on Utah's Wasatch Front. EHP 1999;107:567-573. (Daily time-series, count data, Poisson regression).</p> <p>*Ischemic heart disease events triggered by short-term exposure to fine particulate air pollution. Circulation. 2006;114:2443-2448. (Case-crossover, binary data, conditional logistic regression).</p> <p>*Lung cancer, cardiopulmonary mortality and long-term exposure to fine particulate pollution. JAMA 2002;287:1132-1141. (Prospective cohort, survival data, Proportional Hazard model).</p> <p>*Effects of reduction in fine particulate pollution on U.S. county life expectancies. NEJM 2009;360:376-86 (Natural experiment, continuous data, simple first-difference regression with clustering).</p> <p><b>A-10 (Fair game: March 21)</b></p> <p><b>Exposure-response/Marginal cost of exposure:</b></p> <p>* Lung cancer and cardiovascular disease mortality associated with ambient air pollution and cigarette smoke: shape of the exposure-response function. EHP 2011</p> <p>**Health benefits of air pollution abatement policy: role of the shape of the concentration-response function. JAWMA 2015</p> <p><b>A-11 (Fair Game: March 28)</b></p>
March 30, April 4,6	Optimal Control Theory, allocation of depletable natural resources	<p>**Individual vs Social Discount rates in Allocating Depletable Natural Resources over time. Econ Let. 1989;29:257-264. (Handout)</p> <p>**Gollier C, Weitzman ML. How should the distant future be discounted when discount rates are uncertain? Eco Let. 2010;107:350-353. (Note for more related see: Weitzman ML. Risk-adjusted gamma discounting. JEEM 2010;60:1-13)</p>
April 11	Old Growth Forests/Economic Sources of Environmental Polarization	<p><b>A-12 (Fair game: April 11)</b></p>
	<b>NOTE: Reading Journal for A-7 through A-12 to be turned in during class on April 11<sup>th</sup>.</b>	
April 13	Environmental Economics, Ethics, Stewardship	---
<b>FINAL EXAM:</b> Dec 15, 2:30 pm – 5:00 pm		

**Readings and reading journal:** You are expected to keep up on the readings and be prepared to discuss them in class. In addition, you will keep a reading journal of assigned readings. There are 12 reading assignments (A-1 through A-12) that involve 1 or more papers and/or reports. The reading journal should consist of a heading stating the assigned reading, the percentage of the reading material that you read, and the date you completed the reading. You will then present a paragraph that summarizes the reading or readings for that assignment followed by one full type-written page that briefly discusses the reading materials and provides comments and thoughts regarding the papers. For assignments with multiple papers, it is important to discuss how the papers were related and your insights gleaned from reading the papers as a group. The first half of the reading journal is due **Feb 28<sup>th</sup>** and the second half **April 11<sup>th</sup>** (see table above). A template for the reading journal is provided on BYU Learning Suite. This template has links to most of the readings.

**In-class quizzes/class reports:** In-class quizzes, test-like questions, short essays, etc. will be given often and factor heavily into your grade. In the table that outlines the class lectures and readings there are dates when quizzes on the reading material are “Fair game.” Quizzes on previous lectures are always fair game, but quizzes directly on the material in the readings will not be given until the day of or following the “fair game” date. An \* indicates that I expect you to quickly read the material and understand the basics of the material and \*\* indicates that I expect you to have read the material carefully and will give quizzes and test questions accordingly.

**Examinations:** There will be one mid-term and a final. The midterm exam cannot be taken late. An early mid-term exam will be given for university approved travel and with prior permission from the professor. The final exam must be taken during the final exam time. No make-up, late, or late-with-fee exams.

## **Student Learning Outcomes for Economics 440**

Econ 440 students will:

1. Utilize economic principles and models to address private and public policy issues related to allocating natural resources and environmental amenities
2. Demonstrate an active understanding of the following elements of economic theory as it relates to natural resource and environmental economics:
  - Welfare economics and concepts of pareto optimality, efficiency, and equity
  - The role of property, property rights, and the bundle of rights concept
  - The role of externalities, common property resources, and public goods
  - Concepts and measures of economic value including non-market valuation
3. Demonstrate a basic knowledge of the role of markets and market failure with regards to the allocation of natural resources and environmental amenities
4. Gain a basic understanding of the effects and relative merits of public environmental policy efforts, including cap-and-trade schemes, Pigouvian taxes, regulation, and public ownership and/or management
5. Become knowledgeable about and be able to use economic principles and non-market valuation techniques to address a variety of continuing and contemporary natural resource and environmental issues. These issues may include, but are not exclusive to:
  - Population growth and the environment
  - Global warming
  - Wilderness protection and related public lands issues
  - Air pollution and public health
  - Intergenerational allocation of soil, forest, and other depletable natural resources
  - Impacts of environmental features on property values

# University Policies

## Honor Code

In keeping with the principles of the BYU Honor Code, students are expected to be honest in all of their academic work. Academic honesty means, most fundamentally, that any work you present as your own must in fact be your own work and not that of another. Violations of this principle may result in a failing grade in the course and additional disciplinary action by the university. Students are also expected to adhere to the Dress and Grooming Standards. Adherence demonstrates respect for yourself and others and ensures an effective learning and working environment. It is the university's expectation, and every instructor's expectation in class, that each student will abide by all Honor Code standards. Please call the Honor Code Office at 422-2847 if you have questions about those standards.

## Preventing & responding to Sexual Misconduct

In accordance with Title IX of the Education Amendments of 1972, Brigham Young University prohibits unlawful sex discrimination against any participant in its education programs or activities. The university also prohibits sexual harassment-including sexual violence-committed by or against students, university employees, and visitors to campus. As outlined in university policy, sexual harassment, dating violence, domestic violence, sexual assault, and stalking are considered forms of "Sexual Misconduct" prohibited by the university.

University policy requires all university employees in a teaching, managerial, or supervisory role to report all incidents of Sexual Misconduct that come to their attention in any way, including but not limited to face-to-face conversations, a written class assignment or paper, class discussion, email, text, or social media post. Incidents of Sexual Misconduct should be reported to the Title IX Coordinator at [t9coordinator@byu.edu](mailto:t9coordinator@byu.edu) or (801) 422-8692. Reports may also be submitted through EthicsPoint at <https://titleix.byu.edu/report> or 1-888-238-1062 (24-hours a day).

BYU offers confidential resources for those affected by Sexual Misconduct, including the university's Victim Advocate, as well as a number of non-confidential resources and services that may be helpful. Additional information about Title IX, the university's Sexual Misconduct Policy, reporting requirements, and resources can be found at <http://titleix.byu.edu> or by contacting the university's Title IX Coordinator.

## Student Disability

Brigham Young University is committed to providing a working and learning atmosphere that reasonably accommodates qualified persons with disabilities. If you have any disability which may impair your ability to complete this course successfully, please contact the University Accessibility Center (UAC), 2170 WSC or 422-2767. Reasonable academic accommodations are reviewed for all students who have qualified, documented disabilities. The UAC can also assess students for learning, attention, and emotional concerns. Services are coordinated with the student and instructor by the UAC. If you need assistance or if you feel you have been unlawfully discriminated against on the basis of disability, you may seek resolution through established grievance policy and procedures by contacting the Equal Employment Office at 422-5895, D-285 ASB.