UNIVERSITY OF OREGON

Environmental Studies

Winter 2012

ENVS 335 – Allocating Scarce Environmental Resources

Lectures: T, Th 10:00-11:50 am, McKenzie 125 (capacity: 80) CRN: 22559 Credits: 4
Final Exam: **8:00 am, Thursday, March 22, 2012** (no student may take the final *prior* to its scheduled time, so plan any spring break travel accordingly)
Grading options: graded for Majors; optional for all other students

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Brief Course Description:

Considerations for the design of environmental and natural resources policies and regulations: balancing society's preferences and the costs of environmental protection and resource conservation.

Expanded Course Description:

Earth does not have enough resources to permit humans to have as much of everything as they might want. For better or worse, we are the dominant species; other species currently have standing only insofar as humans care about them. In this capacity, we must often make difficult choices about how the earth's environmental and natural resources are managed. For example, forests can be preserved in their natural state, harvested selectively and sustainably, clear-cut, or turned into farms, housing developments or shopping malls. Lax pollution regulations can permit industry to prosper, allowing higher wages, lower consumer prices and bigger investment returns for people who are saving for their retirements, or pollution can be tightly controlled to improve human health outcomes and protect ecological systems and their services.

Different constituencies have different levels of desire for each of the range of possible management outcomes. The benefits or costs to individual humans under different management scenarios may be modest but widespread, or they may be large and concentrated among fewer people. The benefits may also accrue to very different groups of people than those who bear the costs. There are often benefits and costs from the way resources are managed that spill over onto third parties—who are not directly involved in the decisions that have been made and who therefore do not have any weight given to their preferences in these choices. Likewise, many resources belong to everyone but no one, and sustainable management is often fundamentally impossible without government intervention in the form of policies and regulations.

We will explore how environmental and natural resource management decisions are made. Given that we need to use at least some natural resources to survive, it is not possible to completely eliminate all mining, fishing, or logging. Likewise, it is not possible to reduce all forms of pollution to zero. But how much of each of these activities is too much? We will examine some pragmatic criteria and some evidence which can be used to help guide decision-makers who are responsible for setting policies and regulations. We will pay particular attention to circumstances when government intervention is essential because private incentives definitely cannot be relied upon to yield socially desirable outcomes.

Position of this course in the UO curriculum:

Environmental Studies majors sometimes have little prior exposure to the principles behind incentive-based strategies for environmental management via government policies and regulations. The academic discipline of economics concerns the allocation of scarce resources among competing uses. But many people with little or no exposure to the discipline tend to confuse economics with some of the behaviors that economists study. Environmentalists often do not distinguish between economists and the owners/managers of profit-maximizing corporations (who are perceived to ignore environmental damages because they only care about the "bottom line"). This is like rejecting the field of criminology because you are opposed to crime.

A basic familiarity with economics is crucial to an understanding of environmental and natural resource policies. However, introductory courses in economics rarely spend more than one or two lectures on applications to the environment or natural resources, and they are designed primarily to equip students with all of the analytical tools needed to continue in the economics major. While EC 333 (Resource and Environmental Economic Issues) is offered at least once each year at the University of Oregon, EC 333 has EC 201 (Introduction to Economic Analysis: Microeconomics) as a prerequisite, and it is taught at a more analytically rigorous level. This course (ENVS 335) is targeted specifically to ENVS majors and covers only the most-relevant material from EC 201 and a portion of the more-accessible material from EC 333, supplemented with policy-related readings and references to current events. This course is intended to function as "just enough economics" for the ENVS undergraduate major. It is not a substitute for EC 201.

Necessary skills:

The course will require no algebra and no calculus. However, it will be important to have a rudimentary understanding of simple graphs and how they can be used to describe how one thing depends on another. For a graph that shows the relationship between y on the vertical axis and x on the horizontal axis, participants will need to be comfortable with the idea that slope = rise/run = the change in y for a one-unit change in x.

Textbooks/Readings:

There is no single textbook for this course, although we will draw two or more chapters from each of the following books. None of these books has been explicitly ordered as a text, although a course reader is being assembled which will include copies of the relevant sections (at a price which includes the legally necessary copyright clearance fees).

Field, Barry C. (2008) *Natural Resource Economics: An Introduction*, 2nd edition, Long Grove, Illinois: Waveland Press.
Field, Barry C. and Martha K. Field (2009) *Environmental Economics: An Introduction*, 2nd edition, New York: Irwin/McGraw-Hill
Goodstein, Eban (2005) *Economics and the Environment*," 4th edition, John Wiley & Sons
Stavins, Robert N (ed.) (2005) *Economics of the Environment: Selected Readings,* 5th edition, New York: W.W. Norton and Company
Champ, Patricia A., Kevin J. Boyle, and Thomas C. Brown (eds) (2003) *A Primer on Nonmarket Valuation*, Dordrecht, Netherlands: Kluwer Academic Publishers.

Links to readings not included in the course reader have been placed on Blackboard (Bb) under "Additional Readings" currently filed under Course Documents. These linked readings can also be accessed directly via UO's digital subscriptions for the corresponding journals. Selected newspaper "clippings" on relevant current events will sometimes be archived (only for the duration of the course) on Blackboard. Relevant items for specific lecture topics will be drawn to your attention as we go along.

Required readings will be targeted to average roughly 60 pages per week of relatively straightforward prose. See the Student Engagement Inventory at the end of this syllabus.

Tentative course outline, roughly by week:

Topics may be substituted or supplemented according to student demand, at the discretion of the instructor.

1. [Lectures 1 and 2, January 10 and 12, 2012] A smattering of philosophy; idealism vs. pragmatism; humans as the dominant species (for better or worse); how can we measure what humans *are willing to give up* for improved or preserved environmental quality? What about natural human impatience and discounting the future? [Problem Set #1 will be handed out during the SECOND lecture on January 12 and will be due on THURSDAY, Jan. 19; 6 2/3 % of course grade]
    a. Carver, Thomas N. (1920) "Wealth and Well-Being" Chapter II in *Elementary Economics*. Boston: Ginn and Company; p. 8-15, especially p. 8-9 {motivation for the title of Adam Smith's 1776 *Wealth of Nations*} [2 pages-Reader]
    b. Fullerton, Don, and Robert Stavins (1998) "How economists see the environment," *Nature*, 395, p. 433-434 [2 pages, in Blackboard (Bb)]
    c. Roughgarden, J. (2001) "Guide to Diplomatic Relations with Economists," *Bulletin of the Ecological Society of America*, 82, p. 85-88. {An ecologist explains economists} [4 pages, Bb]
    d. Grafton, R. Quentin and John C.V. Pezzey (2005) "Economics of the Environment," Chapter 4 in *Understanding the Environment: Bridging the disciplinary divides*, R. Quentin Grafton, Libby Robin and Robert J. Wasson (eds.) Sydney, Australia: UNSW Press. p. 40-56 {a partial substitute for Jaeger reading below} [17 pages-Reader].
    e. Jaeger, William K. (2005) "Economic Analysis in Brief," Chapter 1 in *Environmental Economics: for tree huggers and other skeptics*. Washington: Island Press. p. 1-13 {a partial substitute for the Grafton reading above} [13 pages-Reader]

f. Field, Barry C. (2008) *Natural Resource Economics: An Introduction*, 2nd edition, Long Grove, Illinois: Waveland Press. Chapter 3, "Willingness to Pay/Demand", p. 41-56 [16 pages-Reader]
g. Goulder, Lawrence H. and Robert N. Stavins (2002) "Discounting: An Eye on the Future," *Nature* (419) p. 673-674. [2 pages, Bb]
h. *OPTIONAL*: Hackett, Steven C. (1998) *Environmental and Natural Resources Economics: Theory, Policy, and the Sustainable Society*. Armonk, NY: M.E. Sharpe. Chapter 2: "Value Systems and Economic Systems," p. 17-31 {alternative philosophical frameworks} [16 pages-Reader]

2. [Lectures 3 and 4, January 17 and 19, 2012] How can we measure what humans *would have to give up* for improved or preserved environmental quality? Engineering costs versus other considerations; principles of welfare assessment; arguments for and against the use of formal benefit-cost analysis as an input to environmental decision-making; environmental regulation in practice in the U.S.; the safety standards, cost-effectiveness, efficiency [Problem Set #2 will be handed out on January 24 and will be **due on TUESDAY, Jan. 31**; 6 2/3 % of course grade]

a. Goodstein, Eban S. (2005) "Measuring the Costs of Environmental Protection," Chapter 9.0-9.4, 9.6 in *Economics and the Environment*," 4e, John Wiley & Sons. p. 164-179, 184-185. [18 pages-Reader] supplemented by recent research findings (Greenstone et al. 2010, and Walker, 2011, too technical for assigned reading, but findings will be summarized in class)
b. Palmer, Karen, Wallace E. Oates, and Paul R. Portney (1995) "Tightening Environmental Standards: The Benefit-Cost or the No-Cost Paradigm?" *Journal of Economic Perspectives*, 9(4): 119-132. [34 pages Bb]
c. Arrow, Kenneth J, Maureen L. Cropper, George C. Eads, Robert W. Hahn, Lester B. Lave, Roger G. Noll, Paul R. Portney, Milton Russell, Richard Schmalensee, V. Kerry Smith, Robert N. Stavins (1996) "Is There a Role for Benefit-Cost Analysis in Environmental, Health, and Safety Regulation?" *Science* (272) p. 221-222 (April 12). [2 pages Bb]
d. Goodstein, Eban (2005) "The Efficiency Standard," Chapter 4 in *Economics and the Environment*," 4e, John Wiley & Sons, p. 49-65 [17 pages-Reader]
e. Goodstein, Eban (2005) "The Safety Standard," Chapter 5 in *Economics and the Environment*," 4e, John Wiley & Sons, p. 66-82 [17 pages-Reader]
f. *OPTIONAL*: Kelman, Steven (1981) "Cost-Benefit Analysis: An Ethical Critique," AEI Journal on Government and Society Regulation Jan/Feb, p. 33-40, replies in Mar/Apr, reprinted as Chapter 14 in Robert N. Stavins (ed.) Economics of the Environment: Selected Readings, p. 260-275 including replies [16 pages-Reader]
g. *OPTIONAL*: U.S. Environmental Protection Agency, Guidelines for Preparing Economic Analyses, December 17, 2010. {This is a huge document, 272 pages; for now, just *browse* the Table of Contents, p. i-v, to understand scope of benefit-cost analyses} [5 pages Bb]

3. [Lectures 5 and 6, January 24 and 26, 2012] What costs are we willing to incur to protect ecological systems and their services? Travel cost methods, property value methods, survey-based methods; the challenges of heterogeneous resources; how *welfare*

assessment differs from *impact* assessment. [Material up to the end of the lecture and readings for January 26 will be eligible for inclusion on the first Midterm, which will be on Thursday, February 2]

a. Parsons, George R. (2003) "The Travel Cost Model," Chapter 9.1-9.2 in Patricia A Champ, Kevin J. Boyle, and Thomas C. Brown (eds) *A Primer on Nonmarket Valuation*, Dordrecht, Netherlands: Kluwer Academic Publishers. p. 269-296. {just skim the more-technical details in section 2.2.8: Estimate the Model, and section 2.2.9: Calculate Access Value} [27 pages-Reader]
b. Taylor, Laura O. (2003) "The Hedonic Method," Chapter 10 in Patricia A Champ, Kevin J. Boyle, and Thomas C. Brown (eds) *A Primer on Nonmarket Valuation*, Dordrecht, Netherlands: Kluwer Academic Publishers. Sections 1, 2.0 (skip 2.1), 3, 3.1-3.3, the words in section 4, skim section 6 (VSL estimation), read section 7. [about 30 pages-Reader]
c. Carson, Richard T. (2000) "Contingent Valuation: A User's Guide," *Environmental Science and Technology* (34) p. 1413-1418. [6 pages Bb]
d. *OPTIONAL*: Hanley, Nick, Robert E. Wright, and Vic Adamowicz (1998) "Using Choice Experiments to Value the Environment," *Environmental and Resource Economics* 11, p. 413-428. [15 pages Bb] {an early example; don't worry about the math…read around it if necessary}
e. Dickie, Mark (2003) "Defensive Behavior and Damage Cost Methods," Chapter 11 in Patricia A Champ, Kevin J. Boyle, and Thomas C. Brown (eds) *A Primer on Nonmarket Valuation*, Dordrecht, Netherlands: Kluwer Academic Publishers. {section 1, 3.1-3.2, 3.6; 4-6 (Cost-of-illness method)} [21 pages-Reader]
f. *OPTIONAL*: *(Application)* Carson, Richard T., Robert C. Mitchell, Michael Hanemann, Raymond J. Kopp, Stanley Presser, Paul A. Ruud (2003) "Contingent Valuation and Lost Passive Use: Damages from the Exxon Valdez Oil Spill," *Environmental and Resource Economics* 25, p. 257-286 [30 pages Bb]
g. *OPTIONAL: (Application)* A rather thorough example of a consulting report prepared by Cesar Environmental Economics Consulting (a company described on the website of the Coral Reef Alliance: http://www.coral.org/node/1520). Cesar, Herman S.J. "Coral Reefs: Their Functions, Threats and Economic Value" [26 pages, Bb]
h. *OPTIONAL: (Public understanding)* Fiona Harvey, "UK green spaces worth at least 30 billion pounds a year in health and welfare, report finds," The Guardian, 2 June 2011. (including public commentary on this article) [2 page article, many pages of public comments, Bb]
i. *OPTIONAL: (Interdisciplinarity)* Polasky, S., and K. Segerson (2009) Integrating Ecology and Economics in the Study of Ecosystem Services: Some Lessons Learned, vol. 1. Palo Alto, *Annual Review of Resource Economics*, pp. 409-434 [26 pages, Bb awaiting availability]

4. [Lectures 7 and 8, January 31 and February 2, 2012] Valuation of human health risks. What costs are we willing to incur due to regulations designed to reduce *risks* to human life and health? Hazard pay for dangerous jobs, expenditures to avoid or avert health effects, survey methods; differences by type of risk and characteristics of the affected population; why life insurance and health insurance premiums don't tell us what we need to know. **Midterm 1 (February 2, starting at 10:00 am sharp; 20% of course grade) –**

1 hour long (rather than a full class period), covering material to end of the lecture on January 26 (lecture 6); exam will take first half of the lecture period.

a. Hammitt, James K. (2000) "Valuing Mortality Risk: Theory and Practice," *Environmental Science and Technology* 34, p.1396-1400. [5 pages Bb]
b. U.S. EPA (2010) *Guidelines for Preparing Economic Analyses*, Appendix B: Mortality Risk Valuation Estimates, p. B1-B6 [6 pages Bb]
c. Dickie, Mark and John List (2006) "Economic Valuation of Health for Environmental Policy: Comparing Alternative Approaches. Introduction and Overview," *Environmental and Resource Economics* 34, p.339-346. {overview of papers in a special issue on this topic; VSL versus QALYs} [7 pages Bb]
d. Cameron, Trudy Ann (2010) "Euthanizing the Value of a Statistical Life," *Review of Environmental Economics and Policy* 4(2), 161-178. {A case for changing the misleading terminology used by economists} Browse the supplementary material (quotes) associated with this article [18 pages Bb].
e. Johnson, F. R. (2011) "Why Not Real Economics?," *Pharmacoeconomics*, 5 pp.
f. *OPTIONAL*: *(Application of environmental valuation measurements)* Muller, N. Z., R. Mendelsohn, and W. Nordhaus (2011) "Environmental Accounting for Pollution in the United States Economy," *American Economic Review,* **101** (5), 1649-1675 [27 pages; concentrate on the non-technical portions]

5. [Lectures 9 and 10, February 7 and 9, 2012] Managing pollution: external costs; legal rights and the potential for negotiated solutions; liability; why compensatory damages in natural resources lawsuits don't necessarily tell us what we need to know; getting the most "bang for the buck" in efforts to clean up the environment; command-and-control methods, green taxes (and the potential for a double dividend). [Problem Set #3 will be handed out on February 9 and will be due on Feb. 16; 6 ⅔ % of course grade]

a. Field, Barry C. and Martha K. Field (2009) *Environmental Economics: An Introduction*, Chapter 10 "Decentralized Policies: Liability Laws, Property Rights, Voluntary Action," p. 194-211. [17 pages-Reader]
b. Field, Barry C. and Martha K. Field (2009) *Environmental Economics: An Introduction*, Chapter 11 "Command-and-Control Strategies: The Case of Standards," p. 212-231. [20 pages-Reader]
c. Field, Barry C. and Martha K. Field (2009) *Environmental Economics: An Introduction*, Chapter 12 "Incentive-Based Strategies: Emission Charges and Subsidies," p. 232-254. [19 pages-Reader]
d. Goodstein, Eban S. (2005) "Measuring the Costs of Environmental Protection," Chapter 9.5 in *Economics and the Environment*," 4e, John Wiley & Sons. p. 179-183 {remainder of chapter above: the double dividend} [5 pages-Reader].

6. [Lectures 11 and 12, February 14 and 16, 2012] Managing stationary sources of pollution; tradable permits (e.g. cap-and-trade), emissions permits versus ambient permits; emission reduction credits; the sulfur allowance program to control acid rain; the RECLAIM program in Los Angeles; carbon trading. [Material up to the end of the lecture and readings for February 16 will be eligible for inclusion on the first Midterm, which will be on Thursday, February 23]

a. Field, Barry C. and Martha K. Field (2009) *Environmental Economics: An Introduction*, Chapter 13 "Incentive-Based Strategies: Transferable Discharge Permits," p. 255-271. [17 pages-Reader]
b. Sandel, Michael J. (1997) "It's Immoral to Buy the Right to Pollute," editorial in the New York Times, December 15, p. A29, and replies printed December 17, 1997. Reprinted as Chapter 18 in Robert N. Stavins (ed.) *Economics of the Environment: Selected Readings*, p. 355-358 including replies. [4 pages-Reader]
c. Stavins, Robert N. (2008) "A Meaningful U.S. Cap-and-Trade System to Address Climate Change," *Harvard Environmental Law Review* 32(2), 293-371. {especially Section 1, p. 293-305, Section 5, p. 353-357 (common objections and responses), Appendix, p. 359-371 (more details on past and current examples of cap-and-trade mechanisms) [30 pages Bb]
d. *OPTIONAL:* Stavins climate policy blog: http://belfercenter.ksg.harvard.edu/analysis/stavins/
e. *OPTIONAL*: Stavins, Robert N. (2008) "A Meaningful U.S. Cap-and-Trade System to Address Climate Change," *Harvard Environmental Law Review* 32(2), 293-371. {the actual proposal} p. 305-353. [48 pages Bb]

7. [Lectures 13 and 14, February 21 and 23, 2012] Managing mobile sources of pollution; why vehicle-miles travelled tend to be greater than socially optimal; CAFE standards; fuel economy versus safety arguments; emissions standards; MTBE, ethanol, biofuels and unintended consequences. **Midterm 2 (February 23 starting at 10:00 am sharp; 20% of course grade)** – 1 hour long (rather than a full class period), Covering material to end of the lecture on February 16 (lecture 12); exam will take first half of the lecture period.

a. Anas, A., and R. Lindsey (2011) "Reducing Urban Road Transportation Externalities: Road Pricing in Theory and in Practice," *Review of Environmental Economics and Policy,* **5** (1), 66-88. [22 pages Bb]
b. Anderson, S. T., I. W. H. Parry, J. M. Sallee, and C. Fischer (2011) "Automobile Fuel Economy Standards: Impacts, Efficiency, and Alternatives," *Review of Environmental Economics and Policy,* **5** (1), 89-108. [20 pages, Bb]
c. *OPTIONAL*: Parry, I. W. H. (2009) Pricing Urban Congestion, vol. 1. Palo Alto, *Annual Review of Resource Economics*, pp. 461-484. [23 pages, Bb, awaiting availability]
d. *OPTIONAL: (example of a CGE model)* Schneider, Uwe and Bruce A. McCarl (2003) "Economic Potential of Biomass Based Fuels for Greenhouse Gas Emission Mitigation," *Environmental and Resource Economics* 24, 291-312. {use of a computable general equilibrium model—read for the factors which are considered, not the details of the model; focus on sections 1-3, and beginning of section4.} [22 pages Bb]
e. *OPTIONAL: (inventory of major CGE models)* Kretschmer, B., and S. Peterson (2010) "Integrating bioenergy into computable general equilibrium models - A survey," *Energy Economics,* **32** (3), 673-686. {Concentrate on sections 1 and 2} [3 pages Bb].

8. [Lectures 15 and 16, February 28 and March 1, 2012] Managing exhaustible resources; incentives for management of privately owned mines or wells and for mining or drilling operations on public lands; property rights and the fact that extracting and using a ton of

ore (drum of oil) now means it won't be there later when you might need it more; the rationale for royalty payments, stumpage charges. [Problem Set #4 will be handed out on February 28 and will be due on March 6; 6 2/3 % of course grade]

a. ***Field, Barry C. (2008) *Natural Resource Economics: An Introduction*, 2nd edition, Long Grove, Illinois: Waveland Press, Exhibit 7-2, page 119 {how US sells public domain resources} [1 page-Reader]
b. Field, Barry C. (2008) *Natural Resource Economics: An Introduction*, 2nd edition, Long Grove, Illinois: Waveland Press, Chapter 10: Mineral Economics, p. 169-192 [23 pages-Reader]
c. *OPTIONAL*: Field, Barry C. (2008) *Natural Resource Economics: An Introduction*, 2nd edition, Long Grove, Illinois: Waveland Press, Chapter 11: Energy, 193-218 [25 pages-Reader]
d. *OPTIONAL:* Rogers, H. (2011) "Shale gas-the unfolding story," *Oxford Review of Economic Policy,* **27** (1), 117-143. {A lot of institutional information and recent history, but not so much on economic methodologies; supply of unconventional natural gas. See especially "Introduction" p. 117-119; "Potential constraints…" p. 129-133} [7 pages, Bb]

9. [Lectures 17 and 18, March 6 and 8, 2012] Managing renewable but depletable resources which are spatially fixed; commercial exploitation of forests; slash-and-burn; silviculture and forests as crops; multiple-use management and non-timber values of forests

a. Field, Barry C. (2008) *Natural Resource Economics: An Introduction*, 2nd edition, Long Grove, Illinois: Waveland Press, Chapter 12: Forest Economics, p. 219-238 [20 pages-Reader]
b. *OPTIONAL:* Chiabai, A., C. M. Travisi, A. Markandya, H. Ding, and P. Nunes (2011) "Economic Assessment of Forest Ecosystem Services Losses: Cost of Policy Inaction," *Environmental & Resource Economics,* **50** (3), 405-445 [40 pages Bb]
c. *OPTIONAL:* Mercer, D. E., D. Cooley, and K. Hamilton. (2011) "Taking Stock: Payments for Forest Ecosystem Services in the United States." Forest Trends/Ecosystem Marketplace; U.S. Department of Agriculture, Forest Service. {Executive Summary, Introduction, Methodology and Data; Conclusions, pages iv-6; 35-36; just browse remainder} [7 pages Bb]

10. [Lectures 19 and 20, March 13 and 15, 2012] Managing renewable but depletable and often open-access resources: commercial and recreational fisheries; wild fisheries, mariculture and aquaculture; maximum sustained yield versus efficient management versus free-for-all exploitation; high-grading, by-catch, costly enforcement; gear restrictions, taxes on fishing effort, individual transferable quotas (ITQs), individual transferable share quotas (ITSQs);

Environmental equity from an economic perspective (overview; distributional consequences of environmental regulations).

a. Field, Barry C. (2008) *Natural Resource Economics: An Introduction*, 2nd edition, Long Grove, Illinois: Waveland Press, Chapter 13: Marine Resources, p. 239-260 [21 pages-Reader]

b. Grafton, R. Q., R. Arnason, T. Bjorndal, D. Campbell, H. F. Campbell, C. W. Clark, R. Connor, D. Dupont, R. Hannesson, R. Hilborn, J. E. Kirkley, T. Kompas, D. E. Lane, G. R. Munro, S. Pascoe, D. Squires, S. I. Stenshamn, B. R. Turris & Q. Weninger (2006) "Incentive-based approaches to sustainable fisheries," *Canadian Journal of Fisheries and Aquatic Sciences,* **63**, 699-710. [12 pages Bb]
c. Costello, Christopher, Steven D. Gaines, and John Lynham (2008) "Can Catch Shares Prevent Fisheries Collapse?" *Science* 321, 1678-1681. [4 pages Bb]
d. Heal, Geoffrey, and Wolfram Schlenker (2008) "Sustainable Fisheries," Nature 455, 23 October, 1044-1045. [2 pages Bb]
e. Wolverton, A. (2009) "Effects of Socio-Economic and Input-Related Factors on Polluting Plants' Location Decisions," *B E Journal of Economic Analysis & Policy,* **9** (1) {Sections 1 and 2, p.1-8, Conclusions, p. 27} [9 pages Bb]
f. *OPTIONAL*: Smith, Martin D., Frank Asche, Antle G. Guttormsen, Jonathan B. Weiner (2010) "Genetically Modified Salmon and Full Impact Assessment," *Science* 330,1052-1053 [2 pages Bb]
g. *OPTIONAL*: National Ocean Economics Program non-market values inventory [website, Bb]
h. *OPTIONAL*: Maguire, Kelly, and Glenn Sheriff (2011) "Comparing Distributions of Environmental Outcomes for Regulatory Environmental Justice Analysis," *International Journal of Environmental Research and Public Health,* **8** (5), 1707-1726 [20 pages, Bb]

Final Exam (8:00 am, Thursday, March 22, 2012; 40% of course grade) – 2 hours long; Primarily material from lectures 13 to 20, but some earlier material.

Requirements and Grading:

Best 3 of 4 homework sets @ 6 $^{2}/_{3}$ %	= 20%
Two in-class midterms @ 20%	= 40%
Final exam	= 40%

	100%

Homeworks must be turned in when they are due. In lieu of make-ups for missed assignments, we will automatically drop your single lowest score, which may include zeros for missing or late assignments.

Classroom exams are closed-book. It may take us up to one week to complete the grading process. Exams must be written as scheduled. There will be no make-up midterm exams; with a legitimate documented excuse, scores on the other course requirements will be reweighted. No one may write an exam *prior* to its scheduled time. Please plan accordingly for any travel over the quarter break. As noted above, our final exam is *8:00 am on the Thursday* of exam week in the Winter quarter of 2012.

In a sufficiently large introductory class at the 300 level where students display a typical distribution of effort levels, I generally expect to give roughly 60% A's and B's. I reserve the grade of A+ for distinctly exceptional performance relative to the rest of the class and I have

rarely given more than one or two such grades in any class, regardless of size. Unfortunately, a few students typically earn rather low grades, too, in some cases because they underestimate the amount of attention the course requires. As an economist, however, I am entirely sympathetic that students have many different demands on their time, and different priorities for this class relative to their other coursework. To a certain extent, I view course grades as reflective of the amount of time and effort that students have decided to devote to the course, in whatever manner is optimal for them personally. Remember that help is available during office hours or by appointment with either the GTF or the professor.

My grading rubric is generally as follows:

A = shows strong understanding of almost all of the big ideas introduced in the course (although these students might not have picked up on every one of the more esoteric points)
B = shows good understanding of a majority of the biggest ideas in the course, but may display some gaps in understanding for a few of them
C = shows good understanding of some ideas, but reveals a worrisome cause for concern about their understanding of other ideas
F = relatively little evidence that enrollment in the course has produced much value-added in terms of the student's understanding of the issues; inability to invoke the ideas introduced in the course in the relevant contexts.

Student Engagement Inventory
It comes as a surprise to some students, but at UO, "student engagement" hours must total 120 hours per term for a 4-credit course. This means that for the median UO student, there is an expectation that to succeed in a 4-credit course, you should be able to devote an average of 12 hours per week to the material. That is 8 hours each week outside of your attendance at lectures. (Remember that only 50% of UO students are above the median, by definition.)

Activity	Elaboration	Expected Hours
Course attendance	Verified periodically (i.e. when exams and/or homework sets are not collected during lectures on days when they are returned)	40 hours (4 hours per week)
Assigned readings	Course reader (selected book chapters), Blackboard-archived journal articles; news items; supplementary instructor notes	60 hours (6 hours per week)
Homework sets	Mixed formats: short answers (up to a couple of paragraphs, relevant diagrams), occasionally use non-trivial multiple choice questions to conserve on grading hours	20 hours (5 hours for each of four assignments)