

Natural Resource Economics

Course Objective: This course presents an economic analysis of renewable and nonrenewable natural resources. Concepts include static and dynamic efficiency, equity, property rights, discounting, market failure, non-market valuation, and sustainability. The course will cover current and proposed policies for resource management such as transferable quotas, taxes, subsidies, regulations, and public versus private ownership. Prerequisites include Economics 201 and calculus.

Office Hours: Office hours will be held in Vollum 227 on Mondays and Wednesdays from 3:15-4:15 and Thursdays from 4:00-5:00. Students who are unable to come during these times are encouraged to make an appointment.

Text and Required Readings: The text for this course is *The Economics of Natural Resource Use* (2nd edition) by John M. Hartwick and Nancy D. Olewiler. In addition to the text, students are responsible for the required readings on the attached list and for additional readings that will occasionally be announced in class. Students are expected to contribute to class discussions by finding examples of current natural resource issues in the business, financial, and general press and posting these readings on the course Moodle site.

Evaluation: Evaluation will be based on a midterm examination, a comprehensive final examination, participation in a group project, three homework assignments and class participation. Every student is expected to contribute meaningfully to every class session.

Collaboration: All work submitted during this course is expected to reflect your effort. You are encouraged to work with friends, tutors and the instructor on assignments. However, when the time comes to write your assignment, it must be your work and should be written in words that reflect your understanding of the problem.

Citations: Citations should be used when appropriate and should follow the guidelines in the Economic Department Citation Guide, which is available on the class Moodle site.

Materials on Reserve: The following texts are on 2-hour reserve.

Easton, Thomas A. and Theodore D. Goldfarb (editors). 2003. *Taking Sides: Clashing Views on Environmental Issues* (10th edition). Guilford, CT: McGraw-Hill/Dushkin.

Hartwick, John M. and Nancy D. Olewiler. 1998. *The Economics of Natural Resource Use* (2nd edition). Reading, MA: Addison-Wesley.

Iudicello, Suzanne, Michael Weber, and Robert Wieland. 1999. *Fish, Markets and Fishermen: The Economics of Overfishing* Washington, DC: Island Press.

Pikitich, Ellen K., Daniel D. Huppert and Michael P. Sissenwine (editors). 1997. *Global Trends: Fisheries Management* Bethesda, MD: American Fisheries Society Symposium 20.

Outline and Reading List

I. Introduction (August 31, September 2 and 4)

Hartwick and Olewiler, Chapter 1.

The Economist. 2001. "Poverty and Property Rights: No Title." (March 31) 20-22.

Goodnough, Abby. 2009. "In Maine, Tensions Over Ailing Lobster Industry." *The New York Times* (August 22).

The Economist. 1999. "Economics Focus: Deep Discount." (June 26) 90.

Tol, Richard S.J. 2009. "The Economic Effects of Climate Change." *Journal of Economic Perspectives* 23(2): 29-51.

*Heal, Geoffrey. 2009. "Climate Economics: A Meta-Review and Some Suggestions for Future Research." *Review of Environmental Economics and Policy* 3(1): 4-21.

*Portney, Paul R. and John P. Weyant (eds.). 1999. *Discounting and Intergenerational Equity* Washington, D.C.: Resources for the Future.

II. Sustainability and Resource Scarcity (September 9 and 11)

Hartwick and Olewiler, Chapter 2.

Christensen, Jon. 2005. "Are We Consuming Too Much?" *Conservation In Practice* 6(2).

Lange, Glenn-Marie. 2003. "Policy Applications of Environmental Accounting." *Environmental Economics Series Paper No. 88 The World*

Bank Environment Department (January). Please read sections 1, 2, 6 & 7.

Perrings, Charles. 1998. "Policy Forum: Environmental Scares - the Club of Rome Debate Revisited." *Environment and Development Economics* 3: 491-537.

*Arrow, K. et al. 2004. "Are We Consuming Too Much?" *Journal of Economic Perspectives* 18(3): 147-172.

*El Serafy, Salah. 1997. "Green Accounting and Economic Policy." *Ecological Economics* 21: 217-229.

* Living on Earth. 2004. "Measuring our Worth." (April 9).

*Slade, Margaret. 1982. "Trends in Natural-Resource Commodity Prices: An Analysis of the Time Domain." *Journal of Environmental Economics and Management* 9: 122-137.

*Vincent, Jeffrey R. 2000. "Green Accounting: From Theory to Practice." *Environment and Development Economics* 5: 13-24.

III. Land (September 14 and 16)

Hartwick and Olewiler, Chapter 3 (pages 57-75)

Phillips, Justin and Eban Goodstein. 2000. "Growth Management and Housing Prices: The Case of Portland, Oregon." *Contemporary Economic Policy* 18(3): 334-344.

McConnell, Virginia and Margaret Walls. 2009. "U.S. Experience with Transferable Development Rights." *Review of Environmental Economics and Policy* 3(2): 288-303.

IV. Water (September 18)

Hartwick and Olewiler, Chapter 3 (pages 75-end)

Neuman, Janet C. 2004. "The Good, The Bad, and The Ugly: The First Ten Years of the Oregon Water Trust." *Nebraska Law Review* 83:432-484.

Barba, Alisa. 2007. "Struggling Over Water Series" *National Public Radio* (June 11).

PBS Video. 1997. *Cadillac Desert: An American Nile* (video 2).

*Brewer, Jedidiah, Robert Glennon, Alan Ker and Gary Libecap. 2007. "Transferring Water in the American West: 1987-2005." *University of Michigan Journal of Law Reform* 40(4): 1021-1053.

*Ceililo Falls and the Remaking of the Columbia River *Oregon State University, Oregon Sea Grant Program (DVD)*.

*Young, Robert A. 2005. *Determining the Economic Value of Water: Concepts and Methods* Washington, DC: Resources for the Future.

V. Ecosystem Services (September 21, 23 and 25)

Bockstael, Nancy E., A. Myrick Freeman, III, Raymond J. Kopp, Paul R. Portney, and V. Kerry Smith. 2000. "On Measuring Economic Values for Nature." *Environmental Science & Technology* 34(8): 1384-1389.

Boyd, James and Spencer Banzhaf. 2007. "What are Ecosystem Services? The Need for Standardized Environmental Accounting Units." *Ecological Economics* 63(2-3): 616-626.

National Academies of Sciences. 2004. "Executive Summary: Valuing Ecosystem Services: Toward Better Environmental Decision-Making." Washington, DC: National Academies Press. Pages 1-16.

National Academies of Sciences. 2004. "Translating Ecosystem Functions to the Value of Ecosystem Services: Case Studies." Washington, DC: National Academies Press. Pages 156-178.

David Evans and Associates, Inc. and ECONorthwest. 2004. Comparative Valuation of Ecosystem Services: Lents Project Case Study. Report prepared for City of Portland, Watershed Management Program.

ECONorthwest. 2009. Economic Arguments for Protecting the Natural Resources of the East Buttes Area in Southeast Portland. Report prepared for the City of Portland Bureau of Environmental Services.

VI. Fisheries

A. Introduction to Fisheries (September 28)

Garcia, S.M. and C. Newton. 1997. "Current situation, trends, and prospects in world capture fisheries." Pages 3-27 in E.L. Pikitch, D.D. Huppert, and M.P. Sissenwine, editors. *Global Trends: Fisheries Management*.

Worm, Boris et al. 2006. "Impacts of Biodiversity Loss on Ocean Ecosystem Services." *Science* 314 (5800): 787-790.

Dean, Cornelia. 2006. "Study Sees 'Global Collapse' of Fish Species." *The New York Times* (November 3).

Howe, Kevin. 2006. "Oceans' Early Demise Disputed: Fishers, Other Marine Experts Say Pessimistic Report Unduly Alarmist." *Monterey County Herald* (November 11).

Tierney, John. 2006. "Where The Tuna Roam." *The New York Times* (November 4).

* The Oregon Story: Fishing *Oregon Public Broadcasting* (video)

B. Theory of Fisheries (September 30, October 2 and 5)

Hartwick and Olewiler, Chapter 4.

Grafton, R.Q., T. Kompas and R.W. Hilborn. 2007. "The Economics of Overexploitation Revisited." *Science* 318: 1601.

*Iudicello, Suzanne, Michael Weber, and Robert Wieland. 1999. *Fish, Markets and Fishermen: The Economics of Overfishing* Washington, DC: Island Press. Chapters 1-3.

C. Regulating Fisheries (October 7 and 9)

Hartwick and Olewiler, Chapter 5.

Iudicello et al. *Fish, Markets and Fishermen: The Economics of Overfishing*, Chapter 4 "The Effects of Subsidies."

Sutinen, J. G. and J.R. Gauvin. 1989. "An Econometric Study of Regulatory Enforcement and Compliance in the Commercial Inshore Lobster Fishery of Massachusetts." Pages 415-428 in P.A. Neher, R. Arnason and N. Mollett, editors. *Rights Based Fishing*. Boston, MA: Kluwer Academic Publishers.

*Beddington, J.R. and D.J. Agnew and C.W. Clark. 2007. "Current Problems in the Management of Marine Fisheries." *Science* 316: 1713-1716.

*Bromley, Daniel W. (editor) 1992. *Making the Commons Work: Theory, Practice, and Policy*. Institute for Contemporary Studies: San Francisco, CA.

*Crutchfield, J.A. 1979. "Economic and social implications of the main policy alternatives for controlling fishing effort." *Journal of Fisheries Research Board of Canada* 36: 742-752.

*Farrow, S. 1996. "Marine Protected Areas: Emerging Economics." *Marine Policy*. 20 (6): 439-446.

*Holland, D.S. and R. J. Brazee. 1996. "Marine Reserves for Fisheries Management." *Marine Resource Economics*. 11: 157-171.

*Iudicello et al. *Fish, Markets and Fishermen: The Economics of Overfishing*, Chapter 5 "Managing Fisheries Rationally: Framework and Tools"

*Ostrom, Elinor. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge, UK: Cambridge University Press.

*Sanchirico, James N. and James E. Wilen. 2000. "The Impacts of Marine Reserves on Limited-Entry Fisheries." *Resources for the Future Discussion Paper* 02-69.

*Smith, Martin D. and James E. Wilen. 2002. "The Marine Environment: Fencing the Last Frontier." *Review of Agricultural Economics* 24 (1) 31-42.

D. Quotas and Cooperatives (October 12)

Major, P. 1997. "A government prospective on New Zealand's experience with ITQs." Pages 264-269 in E.L. Pikitch, D.D. Huppert, and M.P. Sissenwine, editors. *Global trends: fisheries management*. American Fisheries Society Symposium 20. Bethesda, Maryland.

Ecotrust Canada. 2009. "A Cautionary Tale About ITQs in BC Fisheries." Briefing 8.

Kitts, Andrew W. and Steven F. Edwards. 2003. "Cooperatives in U.S. Fisheries: Realizing the Potential of the Fishermen's Collective Marketing Act." *Marine Policy* 27: 357-366.

*Casey, K.E., C.M. Dewees, B.R. Turriss, and J.E. Wilen. 1995. "The Effects of Individual Vessel Quotas in the British Columbia Halibut Fishery." *Marine Resource Economics*. 10 (3): 211-230.

*Iudicello et al. *Fish, Markets and Fishermen: The Economics of Overfishing*, Chapter 6: Case Studies.

E. Recreation Value (October 14)

Layman, R. C., J. R. Boyce, and K. R. Criddle. 1996. "Economic Valuation of the Chinook Salmon Sport Fishery of the Gulakana River, Alaska, Under Current and Alternate Management Plans." *Land Economics*. 72 (1): 113-128.

Johnston, Robert J., Thomas A. Grigalunas, James J. Opaluch, Marisa Mazzotta, and Jerry Diamantedes. 2002. "Valuing Estuarine Resource Services Using Economic and Ecological Models: The Peconic Estuary System Study." *Coastal Management* 30(1): 47-65.

*Bell, Kathleen, Daniel Huppert, and Rebecca Johnson. 2003. "Willingness to Pay for Local Coho Salmon Enhancement in Coastal Communities." *Marine Resource Economics* 18(1): 15-32.

VII. Environmental Resources

A. Theory and Policies (October 26, 28 and 30)

Hartwick and Olewiler, Chapter 6.

Hahn, Robert W. 2009. "Greenhouse Gas Auctions and Taxes: Some Political Economy Considerations." *Review of Environmental Economics and Policy* 3(2): 167-188.

Fullerton, Don and Daniel Karney. 2009. Does Environmental Protection Hurt Low-Income Families?" *AERE Newsletter* 29(1): 27-32.

*Portney, Paul R., Ian W.H. Parry, Howard K. Gruenspecht and Winston Harrington. 2003. "Policy Watch: The Economics of Fuel Economy Standards." *Journal of Economic Perspectives* 17(4): 203-217.

*Scarborough, Brandon. 2007. "Trading Forest Carbon: A Panacea or Pipe Dream to Address Climate Change?" (July) *PERC Policy Series* Issue Number PS-40.

*Coase, Ronald H. 1960. "The Problem of Social Cost." *Journal of Law and Economics* 3: 1-44.

B. Applications (November 2, 4 and 6)

Hartwick and Olewiler, Chapter 7

Loomis, John B. 1996. "How Large is the Extent of the Market for Public Goods: Evidence From a Nationwide Contingent Valuation Survey." *Applied Economics* 28: 779-782.

Pacala, S.W. E. Bulte, J.A. List and S.A. Levin. 2003. "False Alarm over Environmental False Alarms." *Science* 301 (August): 1187-1188.

Hill, Jason, Erik Nelson, David Tilman, Stephen Polasky and Douglas Tiffany. 2006. "Environmental, Economic, and Energetic Costs and Benefits of Biodiesel and Ethanol Biofuels." *Proceedings of the National Academy of Sciences* 103(30): 11206-11210.

Davis, Lucas W. 2008. "The Effect of Driving Restrictions on Air Quality in Mexico City." *Journal of Political Economy* 116(1): 38-81.

*Butters, Gerard et al. Reply to Steven Kelman. Pages 136-137 in Glickman and Gough (eds.), *Readings in Risk*.

*Diamond, Peter A. and Jerry A. Hausman. 1994. "Contingent Valuation: Is Some Number Better than No Number?" *Journal of Economic Perspectives* 8 (Fall) 45-64.

*Freeman, A. Myrick. 2003. *The Measurement of Environmental and Resource Values: Theories and Methods* (2nd edition). Washington, D.C.: Resources for the Future.

*Hanemann, W. Michael. 1994. "Valuing the Environment Through Contingent Valuation." *Journal of Economic Perspectives* 8 (Fall) 19-43.

*Huppert, Daniel D. 1999. "Snake River Salmon Recovery: Quantifying the Costs." *Contemporary Economic Policy* 17 (4): 476-491.

*Kelman, Steven. Cost-Benefit Analysis: An Ethical Critique. Pages 129-136 in Glickman and Gough (eds.), *Readings in Risk*.

*Murdoch, William, Stephen Polasky, Kerrie A. Wilson, Hugh P. Possingham, Peter Kareiva, and Rebecca Shaw. 2007. Maximizing Return on Investment in Conservation. *Biological Conservation* 139: 375-388.

*Pindyck, Robert S. 2007. "Uncertainty in Environmental Economics." *Review of Environmental Economics and Policy* 1(1): 45-65.

*Portney, Paul R. 1994. "The Contingent Valuation Debate: Why Economists Should Care." *Journal of Economic Perspectives* 8 (Fall) 3-17.

VIII. Nonrenewable Resources

A. Theory (November 9, 11, 13 and 16)

Wick, Katherina and Erwin Bulte. 2009. "The Curse of Natural Resources." *Annual Review of Resource Economics* 1 (Volume publication date October 2009).

Hartwick and Olewiler, Chapter 8

Hartwick and Olewiler, Chapter 9

Livernois, John. 2009. "On the Empirical Significance of the Hotelling Rule." *Review of Environmental Economics and Policy* 3(1): 22-41.

*Brown, Stephen P.A. and Daniel Wolk. 2000. "Natural Resource Scarcity and Technological Change." *Economic and Financial Review*, Federal Reserve Bank of Dallas (First Quarter) 2-13.

*Slade, Margaret E. and Henry Thille. 2009. "Whither Hotelling: Tests of the Theory of Exhaustible Resources." *Annual Review of Resource Economics*

B. Application: Recycling (November 18)

Tierney, John. 1996. "Recycling is Garbage." *The New York Times Magazine* (June 30) 24- 29.

Denison, Richard A. and John F. Ruston. "Recycling is not Garbage." Pages 278-284 in *Taking Sides: Clashing Views on Controversial Environmental Issues* (10th edition).

Kinnaman, Thomas C. 2006. "Policy Watch: Examining the Justification for Residential Recycling." *Journal of Economic Perspectives* 20(4): 219-232.

IX. Energy

A. Government Policies (November 20)

Sharp, Phil. 2009. "Reflections on Three Decades of Energy Policy." *Resources* (Winter/Spring): 3-4.

Gillingham, Kenneth, Richard G. Newell and Karen Palmer. 2009. "Energy Efficiency Economics and Policy." *Annual Review of Resource Economics* 1 (Volume publication date October 2009).

B. Oil (November 23)

Deffeyes, K.S. *Hubbert's Peak: The Impending World of Oil Shortage*. Princeton, NJ: Princeton University Press. Chapter 1.

Maugeri, Leonardo. 2009. "Understanding Oil Price Behavior through an Analysis of a Crisis." *Review of Environmental Economics and Policy* 3(2): 147-166.

Toth, Ferenc L. and Hans-Holger Rogner. 2006. "Oil and Nuclear Power: Past, Present and Future." *Energy Economics* 28: 1-25.

C. Renewables (November 25)

Palmer, Karen and Dallas Burtraw. 2005. "Cost-Effectiveness of Renewable Electricity Policies." *Energy Economics* 27: 873-894.

Blonz, Joshua A., Shalini P. Vajjhala and Elena Safirova. 2008. "Growing Complexities: A Cross-Sector Review of U.S. Biofuels Policies and Their Interactions." RFF Discussion Paper 08-47.

Jacobson, Mark Z. 2009. "Review of Solutions to Global Warming, Air Pollution, and Energy Security." *Energy & Environmental Science* 2:148-173.

*Alekkett, K. and C.J. Campbell. 2003. "The Peak and Decline of World Oil and Gas Production." *Minerals and Energy – Raw Materials Report* 18(1): 5-20.

X. Forestry

A. Theory (November 30 and December 2)

Hartwick and Olewiler, Chapter 10 (pages 307-325)

Englin, Jeffrey. 1990. "Backcountry Hiking and Optimal Timber Rotation." *Journal of Environmental Management* 31:97-105.

Creedy, J. and A. D. Wurzbacher. 2001. "The Economic Value of a Forested Catchment with Timber, Water and Carbon Sequestration Benefits." *Ecological Economics*. 38: 71-83.

*Brazee, R. and R. Mendelsohn. 1998. "Timber harvesting with fluctuating prices." *Forest Science*. 34: 359-372. Pages 175-188 in R. A. Sedjo, editor. *Economics of Forestry*. Ashgate Press, Burlington: VT.

*Reed, W.J. 1984. "The effects of the risk of fire on the optimal rotation of a forest." *Journal of Environmental Economics and Management*. 11: 180-190. Pages 145-156 in R. A. Sedjo, editor. *Economics of Forestry*. Ashgate Press, Burlington: VT.

B. Government Policies (December 4, 7 and 9)

Hartwick and Olewiler, Chapter 10 (pages 325-341).

The Oregon Story "Rethinking the Forests" Oregon Public Broadcasting (video).

Brown, G.M. and Shogren J.F. 1998. "Economics of the Endangered Species Act." *Journal of Economic Perspectives* 12(3): 3-20.

Angelsen, Arlid and David Kaimowitz. 1999. "Rethinking the Causes of Deforestation: Lessons from Economic Models." *The World Bank Research Observer* 14(1): 73-98.

Portney, Paul R. 2008. "The (Not So) New Corporate Social Responsibility: An Empirical Perspective." *Review of Environmental Economics and Policy* 2(2): 261-275.

*Clawson, M. 1979. "Forests in the Long Sweep of American History." *Science* 204: 1168-1174. Pages 229-236 in R. A. Sedjo, editor. *Economics of Forestry*. Ashgate Press, Burlington: VT.

*Hagen, Daniel A., James W. Vincent, and Patrick G. Welle. 1992. "Benefits of Preserving Old-Growth Forests and the Spotted Owl." *Contemporary Policy Issues* 10 (April) 13-26.

*Harrison, S., J. Bennett and C. Tisdell. 2002. "The Role of Non-market Valuation in Forest Management and Recreation Policy." *Economic Analysis and Policy* 32 (2): 1-10.

*Montgomery, C. A., G. M. Brown, Jr. and D. M. Adams. 1994. "The Marginal Cost of Species Preservation: the Northern Spotted Owl." *Journal of Environmental Economics and Management*. 26: 111-128.

Pages 429-446 in R. A. Sedjo, editor. *Economics of Forestry*. Ashgate Press, Burlington: VT.

*Rose, S. K. and D. Chapman. 2003. "Timber harvest adjacency economies, hunting, species protection, and old growth value: seeking the dynamic optimum." *Ecological Economics*. 44: 325-344.

*Simpson, R. D., R. A. Sedjo and J. W. Reid. 1996. "Valuing biodiversity for use in pharmaceutical research." *Journal of Political Economy*. 104: 163-185. Pages 447-470 in R. A. Sedjo, editor. *Economics of Forestry*. Ashgate Press, Burlington: VT.

Soules, M. C. 2002. "An Analysis of Northwest Forest Plan Use Allocations." *Natural Resources Journal* 42 (2): 353-383.

*Van Rensburg, T. M., G. A. Mill, M. Common and J. Lovett. 2002. "Preferences and Multiple use Forest Management." *Ecological Economics*. 43: 231-244.

*Wolf, Robert E. 1989. "National Forest Timber Sales and the Legacy of Gifford Pinchot: Managing a Forest and Making it Pay." *University of Colorado Law Review* 60: 1037-1078.

Assignment List, Due Dates, and Exam Schedule

The following is a list of assignments and due dates. All assignments are due in class on the date listed below. In fairness to other students, late assignments will be penalized 1/2 grade for each day or partial day past the due date. Assignments handed in more than 5 days after the due date will not be accepted.

The comprehensive final exam will be given during finals week. This examination is currently scheduled for Tuesday, December 15 from 9am to noon, but may change due to scheduling conflicts. The exact date and time of the final will be confirmed in the second part of the semester by the Registrar's Office.

Examinations:

Midterm Examination	Friday, October 16
Final Examination	currently scheduled for Tuesday, December 15 (9am-noon)

Problem Sets:	Distributed	Due
Problem Set #1	September 16	September 23
Problem Set #2	October 7	October 14
Problem Set #3	November 18	November 25

Project Assignments:	Due
Project Preference	September 30
Project Update	October 30
Section Rough Drafts Due	November 30
Final Sections Due	December 9