Addis Ababa University

Faculty of Business and Economics
Department of Economics

ECON674 — P. LeBel
Economics of Natural Resources — Spring 2009
PA-423 — MW 13:00-16:00

Course Description

This course links economic analysis of the technology and economics of natural resources to environmental quality. The focus is on the structure of domestic and international natural resource markets, how pricing is derived, and how utilization of natural resources is related to choices involving environmental quality.

Course Objectives

The Economics of Natural Resources integrates expanding knowledge of global climate change with the role of extractive industries in the economy. As such, it draws on various models by natural scientists with those developed by economists to provide an integrated framework for understanding the relationships between natural resource dynamics and the environment. Descriptive, geometric, and quantitative methods will be used throughout the course. Class sessions, which are based on a student's prior reading of assigned materials, require a significant degree of student participation. Extensive use will be made of the course website, located at:

http://netdrive.montclair.edu/~lebelp/Econ674NatResEconomics.html

A student who has completed this course is expected to demonstrate a mastery of essential concepts and analytical skills in several key areas. The most important of these areas are:

1. An overview of natural resource industries; minerals, forestry, marine, land, and energy that includes an economic measure of their absolute and relative size in key economies around the world;
2. An examination of analytical tools and models used in natural resource economics: laws of thermodynamics, basic welfare economics and the optimal role of the state, open access, common pool, and common property resources, static and dynamic optimization of exhaustible and renewable natural resources, sustainable resource concepts and models, externalities, property rights, optimal taxes and subsidies, static and dynamic economic efficiency;
3. An overview of alternative views of the role of the public sector, with emphasis on the economic functions of the public sector in general and those that pertain to natural resource economics and global warming in particular;

4. An examination of the science of global climate change, including various sources of current and evolving projections such as those of the IPCC, the Stern Report, and others;
5. An examination of alternative strategies that address the key areas of natural resource economics and global warming within a national and international framework;
6. An analysis of recent national and international initiatives within the framework of economic policy alternatives, including the Rio Accords of 1992, the Kyoto Accords of 1992, and others.

A student's knowledge in each of the above areas will be tested in a mid-term and final examination, in periodic case studies and in a research paper built on a literature review and analysis of a topic suitable to the preparation of a graduate thesis. A student who has successfully mastered both theory and methodological applications in these areas will be well prepared to pursue both direct career experience, as well as continuing study in Economics and/or related fields.

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Policies and Procedures:

Grading weights:	Students will be evaluated in the following manner:
Mid-Term examination	20% (essays and objective format)
Final examination	40% (cumulative, essays and objective)
Classroom participation	10%
Research paper:	30%

Make-up examinations: None.
Office Hours: TBA
Other Contacts: Telephone (TBA)
e-mail: LeBelp@mail.montclair.edu.

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ECON674 P. LeBel
Economics of Natural Resources Spring 2009

Syllabus

Texts: Tom Tietenberg. *Environmental and Natural Resource Economics,* seventh edition. (New York: Pearson Addison-Wesley Publishing Company, 2007).
Nick Hanley, Jason F.Schogren, and BenWhite. *Environmental Economics, in Theory and Practice.* (Hampshire, U.K.: Macmillan International paper edition, 1997).
Jon M. Conrad and Colin W. Clark. *Natural Resource Economics: Notes and Problems.* (New York: Cambridge University Press, 1994, 1991, 1989, 1987).

Recommended Periodical Supplements:

The Wall Street Journal — The New York Times
The Economist — Financial Times
Scientific American — Science
Worldwatch Institute

Readings on Reserve:

Acemoglu, Daron and Thierry Verdier (2000). "The Choice Between Market Failures and Corruption," *American Economic Review*, 90:1 (March), 194-211.

Ackerman, Frank and Elizabeth Stanton (2006). "Climate Change – the Costs of Inaction," (Medford, Mass.: Tufts University Global Development and Environment Institute).

Bator, Francis M. (1958), "Anatomy of Market Failure," *Journal of Political Economy*, 72:3 (August), 351-379.

Bojö, J., J. Mucknall, K. Hamilton, N. Kishor, C. Kraus, and P. Pillai (2001). "Environment", Draft Framework for Environmental Policy. (Washington, D.C.: The World Bank).

Borenstein, Severin, James Bushnell, and Frank Wolak (2001). "Measuring Market Inefficiencies in California's Restructured Wholesale Electricity Market," paper presented at the ASSA conference in Atlanta, Georgia (January).

Coase, Ronald H (1937), "The Nature of the Firm," Economica, New Series 4:16 (November), 386-405.

Coase, Ronald H. (1960), "The Problem of Social Cost", *Journal of Law and Economics* (October).

Dasgupta, Partha (2006). "Comments on the Stern Review's Economics of Climate Change", (London, U.K.: Royal Society Foundation for Science and Technology).

Easterbrook, Gregg (2007). "Global Warming: Who Loses-And Who Wins?", *The Atlantic Monthly* (April), 1-8.

Federal Trade Commission (1973). "The Petroleum Industry: Structure and Conduct", in Mansfield, *Microeconomics Readings*, (326-341).

Golan, Elise, Fred Kuchler, and Lorraine Mitchell (2000). "Economics of Food Labeling". (Washington, D.C.: Economic Research Service, U.S. Department of Agriculture, Agricultural Economic Report No. 793).

Goodland, Robert (1995). "The Concept of Environmental Sustainability," *Annual Review of Ecology and Systematics*, 26, 1-24.

Gylfason, Thorvaldur, and Martin L. Weitzman (2003). "Icelandic Fisheries Management: Fees vs. Quotas," Conference paper, Iceland and the World Economy: Small Island Economies in the Era of Globalization. (Cambridge, Mass.: Harvard University Center for International Development).

Krautkraemer, Jeffrey A. (1998). "Nonrenewable Resource Scarcity," *Journal of Economic Literature*, 36:4 (December), pp. 2065-2107.

Lareau, Thomas J. and Douglas A. Rae (1989), "Valuing WTP for Diesel Odor Reductions: An Application of Contingent Ranking Technique," *Southern Economic Journal* 55:3, 728-742.

LeBel, P. (2005). "Optimal Pricing of Biodiverse Natural Resources for Sustainable Economic Growth," *Journal of Development Alternatives,* 24:1-2 (March-June), 5-38.

LeBel, P. (1999), "Measuring Sustainable Economic Development in Africa," *Scandinavian Journal of Development Alternatives*, 18:2-3 (June-September), 265-282.

Lovins, Amory, L. Hunter Lovins, and Paul Hawken (1999). "A Road Map for Natural Capitalism," *Harvard Business Review*, (May-June), 146-158.

Newell, Richard G., James N. Sanchirico, and Suzi Kerr (2002). "Fishing Quota Markets," Discussion Paper 02-20. (Washington, D.C.: Resources for the Future).

Nordhaus, William (2006), "The *Stern Review* on the Economics of Climate Change," (November).

Porter, Robert H. (1995), "The Role of Information in U.S. Offshore Oil and Gas Lease Auctions". *Econometrica* 63:1 (January), pp. 1-28.

Stern, Nicholas (2006), Review of Climate Change Science, (London, U.K.: Royal Society Foundation for Science and Technology).

Stern Review Part 1 – Study Approach

Stern Review Part 2 – Impacts on Growth and Development

Stern Review Part 3 – Stabilization Economics

Stern Review Part 4 – Policy Mitigation Responses
Stern Review Part 5 – Policy Responses for Adaptation
Stern Review Part 6 – International Collective Action
Stern Review Charts - Stern Review Charts

Tietenberg, Tom (2003). "The Tradable-Permits Approach to Protecting the Commons: Lessons for Climate Change," *Oxford Review of Economic Policy,* 19:3, 400-420.

UNCTAD (1998). Greenhouse Gas Emissions Trading: Defining the Principles, Modalities, Rules and Guidelines for Verification, Reporting and Accountability, (Geneva, Switzerland: UNCTAD).

Varian, Hal R. (2006). "Recalculating the Costs of Global Climate Change," *The New York Times*, November 14, 2006.

_____. "Climate of Opinion," *The Wall Street Journal*, February 5, 2007.

World Meterological Organization, United Nations Environmental Programme, Intergovernmental Panel on Climate Change, "Climate Change 2007: Impacts, Adaptation and Vulnerability". (Brussels, Belgium: IPCC Working Group II).

Internet Sources:

Ecological Economics Resources:
http://www.ecoeco.org

Environmental Economics Resources:
http://www.aere.org/

Intergovernmental Panel on Climate Change (IPCC):
http://www.ipcc.ch/pub/online.htm

Japan Recycling Statistics:
http://web-japan.org/stat/stats/19EN51.html

Nature Conservancy:
http://nature.org/aboutus/

The Forest Stewardship Council:
http://www.fsc.org/fsc

U.S. Department of Energy Renewable Energy Annual Report (REA):
http://www.eia.doe.gov/cneaf/solar.renewables/page/pubs.html/

U.S. Department of the Interior Minerals Yearbook:
http://minerals.usgs.gov/minerals/pubs/

U.S. Energy Information Administration, Department of Energy
http://www.eia.doe.gov/

U.S. Energy Recycling Statistics:
http://www.epa.gov/epaoswer/non-hw/muncpl/facts.htm/

U.S. Environmental Protection Agency National Ambient Air-Quality Standards:
http://www.epa.gov/air/criteria.html

U.S. Environmental Protection Agency Air Quality Emissions Trends:
http://www.epa.gov/airtrends/sixpoll.html

U.S. Environmental Protection Agency Acid Rain Trends:
http://www.epa.gov/docs/acidrain/update3/allws.html

I. The Natural Science and Economics of Natural Resources and Global Warming

(03/09/09) **Class 1** – The Scope of Environmental Economics, text, chapter 1, (1-13), chapter 2, (14-22). **Key concepts**: Environmental economics, ecological economics, thermodynamics, entropy law, positive and negative feedback loops, carrying capacity, positive vs. normative economics, opportunity cost. **Reserve Readings**: WMO-UNEP IPCC Climate Change update: "Climate Change 2007: Impacts, Adaptation and Vulnerability"; Sir Nicholas Stern, Review of Climate Change Science (henceforth, Stern Review) – Study Approach. **Datasets**: World Grain Production. **Application Modules:** The Circular Flow Diagram ; The Measurement of Risk. **Classroom Case Studies:**

– Models and Methods in Environmental Economics, text, chapter 2, (22-32), chapter 3, (33-44). **Key concepts**: Basic supply and demand, Present and Future Values, Net Present Value (NPV) criterion, Pareto optimality, static vs. dynamic efficiency, willingness to pay criterion, Contingent Valuation, Hedonic Property Values-Conjoint Analysis, Hedonix Wage Values-Choice Experiments, Avoidance Expenditures-Contingent Ranking,. **Reserve Readings**: Thomas J. Lareau and Douglas A. Rae, "Valuing WTP for Diesel Odor Reductions: An Application of Contingent Ranking Technique," *Southern Economic Journal*, 55:3, 728-742; Stern Review – Impacts on Growth and Development. **Datasets**: **Application Modules:** Econometric Modeling **Classroom Case Studies:** Basic Supply and Demand Model

(03/11/09) **Class 2** – Markets and States in Environmental Choices, text chapter 3, (45-61), chapter 4, (62-67). **Key concepts**: Valuation of Human Life, tangible vs. intangible benefits, survey vs. engineering approaches, risk in expected NPV estimates, private vs. social rate of discount, ex ante vs. ex post estimates, cost-benefit vs. cost-effectiveness analysis, impact analysis. **Reserve Readings**: Bator, Francis M. (1958), "Anatomy of Market Failure," *Journal of Political Economy*, 72:3 (August), 351-379; Stern Review – Stabilization Economics. **Datasets**: **Application Modules: Classroom Case Studies:**

– Property Rights, Externalities, and Environmental Issues, text, chapter 4, (68-87). **Key concepts**: Efficient vs, inefficient property rights, negative vs. positive externalities, *res nullius* open-access regimes, common-property resource regimes, public goods, nonexcludability, indivisibility, biological biodiversity, genetic diversity, species diversity, free rider problem,

deadweight loss, risk premium and the risk-free cost of capital, market vs. government failure, rent seeking, moral hazard. **Reserve Readings**: Nordhaus, William (2006), "The *Stern Review* on the Economics of Climate Change," (November). **Datasets**: **Application Modules:** Capital Budgeting Fundamentals **Classroom Case Studies:**

(03/16/09) **Class 3** – Sustainable Development: Concept and Measures, text, chapter 5, (88-102), chapter 6, (103-113). **Key concepts**: Sustainable development, Rawlsian distributive justice criterion, Hartwick sustainability criterion, weak vs. strong sustainability criterion, environmental sustainability criterion, stationary population, fertility and replacement rates, youth vs. retirement effects, law of variable proportions (diminishing returns). **Reserve Readings**: Stern Review – Policy Mitigation Responses **Datasets**: **Application Modules: Classroom Case Studies:**

– Sustainable Development and Population Dynamics, text, chapter 6, (114-127), chapter 7, (128-136). **Key concepts**: Boserup induced innovation hypothesis, microeconomic theory of fertility, current (proven) reserves, potential reserves, resource endowment, indicated resources, inferred resources, undiscovered vs. hypothetical resources, speculative resources, recyclable resources, exhaustible vs. renewable resources choke price. **Reserve Readings**: Goodland, Robert (1995). "The Concept of Environmental Sustainability," *Annual Review of Ecology and Systematics*, 26, 1-24. **Datasets**: World Fossil Fuel Consumption; Energy Resources; Energy Efficiency
Application Modules: Classroom Case Studies:
Research Paper Topic Selection Deadline

II. Theory and Models of Exhaustible and Renewable Resources

(03/18/09) **Class 4** – Introduction to natural resource allocation models, text, chapter 7, (137-149), text chapter 8, (150-159). **Key concepts**: constant vs. increasing marginal extraction cost, marginal cost of exploration, backstop resource technology, Hubbert's peak, price controls, intra vs. interstate pricing rules, point vs. arc own-price elasticity of demand, OPEC, LNG, income elasticity of demand. **Reserve Readings**: Borenstein, Severin, James Bushnell, and Frank Wolak (2001). "Measuring Market Inefficiencies in California's Restructured Wholesale Electricity Market," paper presented at the ASSA conference in Atlanta, Georgia (January). **Datasets**: **Application Modules:** Exhaustible Resource Model **Classroom Case Studies:** Exhaustible Resources Case Study.

– Depletable and Nonrecyclable Energy Resources: Oil, Gas, Coal, and Uranium, text, chapter 8, (160-180). **Key concepts**: Models of cartel behavior and organization, national security pricing, SPR (strategic petroleum reserve) pricing and stockpiling choices, Price-Anderson Act of 1957, Three Mile Island GPU reactor accident, peak-load pricing, tradable energy certificates (TEC's), hydrogen fuel cell technologies. **Reserve Readings**: Federal Trade Commission (1973). "The Petroleum Industry: Structure and Conduct", in Mansfield, *Microeconomics Readings*, (326-341); Coase, Ronald H (1937), "The Nature of the Firm," Economica, New Series 4:16 (November), 386-405. **Datasets**: **Application Modules: Classroom Case Studies:**

Mid-Term break

(4/08/09) **Class 5** – Recyclable Resources: Minerals, Paper, Glass, and Other Materials, text, chapter 9, (181-205). **Key concepts**: extraction and disposal costs of recyclable resources, supply disruption pricing, scrap markets, the "take-back" principle of waste disposal pricing, fashion vs. durability obsolescence. **Reserve Readings**: **Datasets**: **Application Modules: Classroom Case Studies:**

– Replenishble but Depletable Resources: Water, text, chapter 10, (206-232). **Key concepts**: Hydrologic cycle, surface vs. groundwater resources, aquifer dynamics, riparian and prior appropriation doctrines, usufructory right, Federal reclamation projects and agricultural water pricing models, instream flows, common property problems, volumetric output, input per area, block-rate, two-part pricing, inverted black rate structure, seasonal rate structure. **Reserve Readings**: **Datasets**: **Application Modules: Classroom Case Studies:**

(4/13/09) **Class 6** – Reproducible Private-Property Resources: Agriculture, text, chapter 12, (233-257). **Key concepts**: agricultural resources, global scarcity hypothesis, agricultural productivity, recombinant DNA and genetically modified crops (GMO's – genetically modified organisms), organic certification, agricultural undervaluation biases in developing countries, cobweb model, agricultural stockpiling vs. commodity price stabilization models. **Reserve Readings**: Golan, Elise, Fred Kuchler, and Lorraine Mitchell (2000). "Economics of Food Labeling". (Washington, D.C.: Economic Research Service, U.S. Department of Agriculture, Agricultural Economic Report No. 793). **Datasets**: **Application Modules:** The Cobweb Model. **Classroom Case Studies:** Commodity Price Stabilization

– Storable, Renewable Resources: Forests, text, chapter 12, (258-285). **Key concepts**: Afforestation vs. deforestation, sustainable forestry, (MAI) mean annual increment forest growth index, optimal rotation rules, stumpage value, Forest Reserve Act of 1891, Multiple-Use Sustained Yield Act, Wildnerness Act, NGO's, Conservation eastements and land trusts, World Heritage Convention. **Reserve Readings**: LeBel, P. (2005). "Optimal Pricing of Biodiverse Natural Resources for Sustainable Economic Growth," *Journal of Development Alternatives,* 24:1-2 (March-June), 5-38. **Datasets**: **Application Modules:** Tree Species Growth Model; Tropical Timber Model Under Uncertainty. **Classroom Case Studies:**

Research Paper Preliminary Bibliography Submission Deadline

(4/15/09) **Class 7** – Renewable Common-Pool Resources: Fisheries, text, chapter 13, (286-297). **Key concepts**: Sylviculture, Garrett Hardin's tragedy of the commons, interactive resources, minimum viable population, sustainable yield, maximum sustainable yield, static efficient sustainable yield, dynamic efficient sustainable yield, **Reserve Readings**: Newell, Richard G., James N. Sanchirico, and Suzi Kerr (2002). "Fishing Quota Markets," Discussion Paper 02-20. (Washington, D.C.: Resources for the Future). **Datasets**: **Application Modules: Classroom Case Studies:**

– Renewable Common-Pool Resources: Other Species, text, chapter 13, (298-315). **Key concepts**: Aquaculture, transfer costs vs. real-resource costs, individual transferable quotas, bycatch, marine reserves, habitat conservation, ecosystem balance, ecotourism, catchability coefficient. **Reserve Readings**: Gylfason, Thorvaldur, and Martin L. Weitzman (2003). "Icelandic Fisheries Management: Fees vs. Quotas," Conference paper, Iceland and the World Economy: Small Island Economies in the Era of Globalization. (Cambridge, Mass.: Harvard University Center for International Development). **Datasets**: Chesapeake Bay Marine Harvests **Application Modules: Classroom Case Studies:**

(4/20/09) **Class 8** – Generalized Resource Scarcity, text, chapter 14, (316-337). **Key concepts**: technological progress, fixed vs. variable input substitution, scarcity rent, marginal extraction cost, physical indicators, marginal discovery cost, mineralogical threshhold, geochemically scarce metals. **Reserve Readings**: Krautkraemer, Jeffrey A. (1998). "Nonrenewable Resource Scarcity," *Journal of Economic Literature*, 36:4 (December), pp. 2065-2107; Porter,

Robert H. (1995), "The Role of Information in U.S. Offshore Oil and Gas Lease Auctions". *Econometrica* 63:1 (January), pp. 1-28. **Datasets**: **Application Modules: Classroom Case Studies:** Basic Economic Efficiency

(4/22/09) **Class 9** – Mid-term examination.

Text, chapters 1-13, key concepts, reserve readings, datasets, application modules, classroom case studies.

III. Theory and Models of Negative Externalities

(4/27/09) **Class 10** – An Overview of the Economics of Pollution Control, text, chapter 15, (338-368). **Key concepts**: absorptive capacity, stock pollutants, PCB's (polychlorinated biphenyls), fund pollutants, surface pollutant, global pollutant, mixed fund pollutants, emission standards, transferable emission permits, ambient standards, single vs. multiple receptors management, greenhouse gases (GHG's), bag levies. **Reserve Readings**: Tietenberg, Tom (2003). "The Tradable-Permits Approach to Protecting the Commons: Lessons for Climate Change," *Oxford Review of Economic Policy,* 19:3, 400-420. **Datasets**: U.S. Municipal Solid Waste **Application Modules: Classroom Case Studies:** The Leontief Input-Output Model.

– Stationary-Source Local Air Pollution, text, chapter 16, (370-394). **Key concepts**: command and control (CAC) policy, carbon monoxide (CO), carbon dioxide (CO-2), nitrogen dioxide (NO-2), ozone (O-3), Lead (Pb), Particulate density, sulfur dioxide (SO-2) , New Source Review amendments to the Clean Air Act (NSR), nonattainment regions, state implementation plan (SIP), Environmental Protection Agency (EPA), prevention of significant deterioration (PSD) of air in cleaner regions standard, best available control technology (BACT), new source performance standards (NSPS), emissions trading, emission reduction credits, offset policy, bubble policy, netting, banking, smog trading, California regional clean air incentives market (RECLAIM) **Reserve Readings**: UNCTAD (1998). Greenhouse Gas Emissions Trading: Defining the Principles, Modalities, Rules and Guidelines for Verification, Reporting and Accountability, (Geneva, Switzerland: UNCTAD). **Datasets**: U.S. Carbon Dioxide Emissions **Application Modules: Classroom Case Studies:**

Research Paper Preliminary Outline Submission Deadline

(4/29/09) **Class 11** – Regional and Global Air Pollutants: Acid Rain and Atmospheric Modification, text, chapter 17, (395-412). **Key concepts**: Acid rain, national acid rain precipitation assessment

program (NARPAP), transboundary problems, sulfur allowance program, ozone depletion. **Reserve Readings**: Coase, Ronald H. (1960), "The Problem of Social Cost", *Journal of Law and Economics* (October). **Datasets**: **Application Modules: Classroom Case Studies:**

– Other Sources of Air Pollution, text, chapter 17, (413-421), chapter 18, (422-436). **Key concepts**: United Nations Framework Convention on Climate Change (UNFCCC), Kyoto Protol, emissions trading (ET), joint implementation (JI), clean development mechanism (CDM), certified emission reductions (CER's), Prototype Carbon Fund (PCF), Global Environmental Facility (GEF), mobile source pollution, implicit subsidies, certification program, associated enforcement program, Clean Air Act Amendments of 1977, California Air Resources Board (CARB), Low Emission Vehicle (LEV), and Zero Emission Vehicle (ZEV) regulations, alternatives fuels, methyl tertiary butyl ether (MTBE). **Reserve Readings**: Dasgupta, Partha (2006). "Comments on the Stern Review's Economics of Climate Change", (London, U.K.: Royal Society Foundation for Science and Technology). **Datasets**: U.S.Carbon Dioxide Intensity **Application Modules:** Externalities. **Classroom Case Studies:**

(5/04/09) **Class 12** – Measures to Control Air Pollution, text, chapter 18, (436-445). **Key concepts**: fuel taxes, congestion pricing, Corporate Average Fuel Economy (CAFE) standards, fleet average, pay-as-you-drive insurance (PAYD) **Reserve Readings**: Easterbrook, Gregg (2007). "Global Warming: Who Loses-And Who Wins?", *The Atlantic Monthly* (April), 1-8. **Datasets**: U.S. Vehicle Sales. **Application Modules: Classroom Case Studies:** Optimal Externality Management

– Managing Water Quality and Pollution Dynamics, text, chapter 19, (446-474). **Key concepts**: groundwater pollution, ocean pollution, degradable vs. non-degradable pollutants, dissolved oxygen (DO), biochemical oxyden demand (BOD). oxygen, thermal pollution, eutrophication, Water Pollution Control Act of 1948, Water Quality Act of 1965, point sources, Safe Drinking Water Act of 1974, ocean dumping, ambient standards, national effluent standards, best practices technology (BPT), uniform treatment strategy (UT), uniform emissions charge (UEC), zoned effluence charge (ZEC), nonpoint pollution, pre-treatment standards, citizen suits. **Reserve Readings**: Varian, Hal R. (2006). "Recalculating the Costs of Global Climate Change," *The New York Times*, November 14, 2006. **Datasets**: U.S.

Superfund Sites **Application Modules:** Excise Taxation. **Classroom Case Studies:** Optimal Excise Taxation.

(5/06/09) **Class 13** – Economic, Environmental, and Legal Issues in Toxic Substance Management, text, chapter 20, (475-502). **Key concepts**: Love Canal case, dioxin, latency, uncertainty, occupational hazards, third party interests, common law, negligence, Learned Hand formula, strict liability, criminal law, statutory law, Federal Food, Drug, and cosmetic Act (FFDCA), Delaney Clause, National Institute for Occupational Safety and Health (NIOSH), Occupational Safe and Health Agency (OSHA), Federal Environmental Pesticide Control Act (FEPCA), Resource Conservation and Recovery Act (RCCRA), Toxic Substances Control Act (TSCA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA – The "Superfund Act"), Toxic Release Inventory Program (TRIP), 33/50 program, California Proposition 65, Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, judicial-legislative complementarity, joint and several liability doctrine, potentially responsible parties (PRP's), performance bonds. **Reserve Readings**: _____. "Climate of Opinion," *The Wall Street Journal*, February 5, 2007.**Datasets**: U.S. Low Level Nuclear Waste; U.S. High Level Nuclear Waste **Application Modules: Classroom Case Studies:**

IV. Social Welfare Considerations in the Context of Sustainable Development

(5/11/09) **Class 14** – Equity Issues in Environmental Management, text, chapter 21, (503-526). **Key concepts**: environmental justice, geographic information systems (GIS), Not-In-My-Backyard (NIMBY) response, new-source bias, stationary-source control, greenhouse gas control, point vs. nonpoint sources. **Reserve Readings**: Stern Review – Policy Responses for Adaption; Bojö, J., J. Mucknall, K. Hamilton, N. Kishor, C. Kraus, and P. Pillai (2001). "Environment", Draft Framework for Environmental Policy. (Washington, D.C.: The World Bank). **Datasets**: **Application Modules: Classroom Case Studies:**

(5/13/09) **Class 15** – Developmental and Poverty Aspects of Environmental Management, text, chapter 22, (527-551). **Key concepts**: steady-state growth model, natural resource curse hypothesis, information economy, welfare measures, genuine progress indicator (GPI), ecological footprint, human development index (HDI), **Reserve Readings**: Ackerman, Frank and Elizabeth Stanton (2006). "Climate Change – the Costs of Inaction," (Medford, Mass.: Tufts University Global Development and Environment Institute); P. LeBel (1999), "Measuring Sustainable Economic Development in

Africa," *Scandinavian Journal of Development Alternatives*, 18:2-3 (June-September), 265-282. **Datasets**: **Application Modules: Classroom Case Studies:** Income Distribution and Social Welfare

– Integrative Measures for Sustainable Development, text, chapter 23, (552-584). **Key concepts**: Rio Earth Summit, Brundtland Report, Hartwick rule revisited, Pezzey rule, pollution havens, Porter 'induced innovation" hypothesis (Toynbee revisisted), environmental Kuznets curve, NAFTA, WTO/GATT trade rules, transferable development rights (TDR's), full-cost vs. cost-effectiveness principles, property rights principle, sustainability principles, information principle, population stabilization (Boulding-Daly principle), profitable sustainability, public-private partnerships. **Reserve Readings**: World Meterological Organization, United Nations Environmental Programme, Intergovernmental Panel on Climate Change, "Climate Change 2007: Impacts, Adaptation and Vulnerability". (Brussels, Belgium: IPCC Working Group II); Acemoglu, Daron and Thierry Verdier (2000). "The Choice Between Market Failures and Corruption," *American Economic Review*, 90:1 (March), 194-211; Lovins, Amory, L. Hunter Lovins, and Paul Hawken (1999). "A Road Map for Natural Capitalism," *Harvard Business Review*, (May-June), 146-158; Stern Review – International Collective Action; Stern Review Synthesis. **Datasets**: **Application Modules: Classroom Case Studies:**

Research Paper submission deadline

(5/18/09) **Class 16** – Final examination.

Guidelines for Research Paper.

Students are to select a topic and prepare a research paper based on the indicated submission deadlines. Papers are to be double-spaced in Microsoft Word, using APA style. The body of the paper, which contains text, footnotes, tables, and charts only, and for which the body, exclusive of references, is to be a minimum of 20 pages. Sources used are to be reported as shown in the bibliography citations listed below. Failure to adhere to any of the deadlines will result in grading penalties, and only written submissions can be posted (i.e., no electronic submissions). Only topics that adhere to the instructor approval schedule may be submitted. Students should expect to apply theory and applications from the course to the analysis in the paper.

Texts on Natural Resource Economics

Faber, Malte, Reiner Manstetten, and John Proops (1996). *Ecological Economics: Concepts and Methods.* (Brookfield, Vermont: Edward Elgar Publishing Company).

Field, Barry C. (2001). *Natural Resource Economics: An Introduction.* (New York: McGraw-Hill).

Field, Barry C. (2006). *Environmental Economics: An Introduction*, fourth edition. (New York: McGraw-Hill).

Goodstein, Eban S. (2005). *Economics and the Environment*, 4th edition. (New York: John Wiley and Sons).

Hackett, Steven C. (2006). *Environmental and Natural Resource Economics,* 3rd edition. (Armonk, New York: M.E. Sharpe Publishing Company).

Harris, Jonathan (2006). *Environmental and Natural Resource Economics,* second edition. (Boston, Mass.: Houghton Mifflin Publishing Company).

Markandya, Anil, and Julie Richardson, editors (1992). *Environmental Economics: A Reader*. (New York: St. Martin's Press).

Oates, Wallace E., editor (1994). *The Economics of the Environment*. (Brookfield, Vermont: Edward Elgar Publishing Company).

Pearce, David W. and R. Kerry Turner (1990). *Economics of Natural Resources and the Environment*. (Baltimore, Maryland: The Johns Hopkins University Press).

Bibliography

Abalu and Hassan (1998). "Agricultural Productivity and Natural Resource Use in Southern Africa," *Food Policy*, 23:6 (477-490).

Abramowitz, Janet N. (1998). *Taking a Stand: Cultivating a New Relationship with the World's Forests*, Worldwatch Research Paper 140. (Washington, D.C.: The Worldwatch Institute).

Acheson, J.M. (2003). *Capturing the Commons: Devising Institutions to Manage the Maine Lobster Fishery*. (Hanover, N.H.: University Press of New England).

Amundsen, Eirik S., Trond Bjørndal, and Jon M. Conrad (1995). "Open Access Harvesting of the Northeast Atlantic Minke Whale," *Environmental and Resource Economics*, 6:2 (September), 167-185.

Anderson, Dennis (1987). *The Economics of Afforestation: A Case Study in Africa*, Occasional Paper Number 1/New Series.. (Baltimore, Maryland: The Johns Hopkins University Press for the World Bank).

Anderson, Lee G. (1986). *The Economics of Fisheries Management* revised and enlarged edition. (Baltimore: The Johns Hopkins University Press).

Anderson, S. and P. François (1997). "Environmental Cleanliness as a Public good: Welfare and Policy Implications of Nonconvex Preferences," *Journal of Environmental Economics and Management* 34(3): 256-274.

Anderson, Terry L. (1983). *Water Crisis: Ending the Policy Drought*. (Washington, D.C.: The Cato Institute).

Aoki, Masaki (1976). *Optimal Control and System Theory in Dynamic Economic Analysis*. (Amsterdam, Holland: North Holland Publishing).

Arrow, Kenneth J., and Anthony C. Fisher (1974). "Environmental Preservation, Uncertainty, and Irreversibility," *Quarterly Journal of Economics*, 88: 312-319.

Ashley, C. (1996). "Incentives Affecting Biodiversity Conservation and Sustainable Use: The Case of Land Use Options in Namibia", Research Discussion Paper 13, (Windhoek, South Africa: DEA).

Ashworth, William. (1995). *The Economy of Nature: Rethinking the Connections Between Ecology and Economics*. (Boston, Mass.: Houghton-Mifflin Publishing Company).

Babu, S., and R. Hassan (1995). "International Migration and Environmental Degradation: The Case of Mozambican Refugees and Forest Resources in Malawi", *Food Policy* (43): 233-247.

Baghwati, Jagdish (1993). "Does Free Trade Harm the Environment?" *Scientific American* 269:5 (November).

Balance, A., J. Turpie, and P. Ryan (2000). "The Recreational Demand for Clean Beaches and Economic Impacts of Pollution: A Case Study from the Cape Peninsula, SA" (Stockholm, Sweden: EDE 2nd International Conference).

Barbier, E.B. (1997). "Introduction to the Environmental Kuznets Curve" *Environment and Development Economics* 2(4): 369-382.

Barbier, Edward (1992), "Community Based Development in Africa," in Timothy Swanson and Edward Barbier, eds. *Economics for the Wilds: Wildlife, Diversity, and Development*. (Washington, D.C.: Island Press).

Bardhan, Pranab (2006). "Does Globalization Help the World's Poor?" *Scientific American* 294:4 (April).

Barde, Jean-Philippe and David W. Pearce (1991). *Valuing the Environment: Six Case Studies*. (London: Earthscan Publications).

Barnes, J., C. Schier, and G. van Rooy (1997). "Tourists' Willingness to Pay for Wildlife Viewing and wildlife Conservation in Namibia," DEA Research Discussion Paper No. 15 (Windhoek, South Africa: DEA).

Barrière, R. Pallu de la. (1980). *Optimal Control Theory*. (New York: Dover Publications, 1980 reprint of 1967 edition).

Batie, Sandra S. (2003). "The Environmental Impacts of Genetically Modified Plants: Challenges to Decision-Making," *American Journal of Agricultural Economics*, 85:5, 1107-1111.

Baumol, William J. and Wallace E. Oates (1988). *The Theory of Environmental Policy*. (Cambridge, U.K.: Cambridge University Press).

Baumol, William, and David Bradford (1972). "Detrimental Externalities and Non-Convexity of the Production Set" *Economica*, 39: 160-176;.

Beddington, John R., Watts, C.M., and Wright, W.D.C. (1975). "Optimal Cropping of Self-Reproducible Natural Resources." *Econometrica* 43:4 (July), 789-802.

Berck, Peter, and Jeffrey M. Perloff (1984). "An Open-Access Fishery with Rational Expectations," *Econometrica* 52:2 (March), 489-506.

Beverton, R.J.H., and Holt, S.L. (1957). *On the Dynamics of Exploited Fish Populations*. Ministry of Agriculture, Fisheries and Food, Fishery Investigations, Series II, Vol. 19 (London: Her Majesty's Stationery Office).

Berck, Peter (1979). "Open Access and Extinction." *Econometrica* 47:4 (July), 877-882.

Bohi, Douglas R., and Michael A. Toman (1984). *Analyzing Nonrenewable Resource Supply*. (Washington, D.C.: Resources for the Future).

Blinder, Alan S. And Philip Friedman, editors. (1977). *Natural Resources, Uncertainty, and General Equilibrium Systems*. (New York: Academic Press).

Boesen, J., and M. Rukuni (2000). "Land Tenure and Sustainable Development in Africa", in D. Turnam, ed. *African Perspectives: Practices and Policies Supporting Sustainable Development*. (Scandinavian Seminar College, Denmark).

Bojo, J. (1996). "The Economics of Wildlife: Case Studies from Ghana, Kenya, Namibia, and Zimbabwe," AFTES Working Paper No. 19. (Washington, D.C.: The World Bank).

Brander, James A. and M. Scott Taylor (1998), "The Simple Economics of Easter Island: A Ricardo-Malthus Model of Renewable Resource Use." *American Economic Review* 88:1 (March), 119-138.

Bromley, Daniel W. (1995). *The Handbook of Environmental Economics*. (Cambridge, Mass.: Basil Blackwell Publishers).

Bromley, Daniel W., editor (1992). *Making the Commons Work: Theory, Practice and Policy*. (San Francisco: ICS Press).

Bromley, Daniel W. (1991). *Environment and Economy: Property Rights and Public Policy*. (Oxford, U.K.: Basil Blackwell, Inc.).

Brooks, Daniel R. and E.O. Wiley (1988, 1986). *Evolution as Entropy: Toward a Unified Theory of Biology,* second edition. (Chicago, Illinois: University of Chicago Press).

Brown, Gardner M. (2000). "Renewable Natural Resource Management and Use without Markets." *Journal of Economic Literature* 38 (December), 875-914.

Brown, Kathryn (2001). "Genetically Modified Foods." *Scientific American* 284:4 (April).

Buchner, Barbara and Carlo Carraro (2005). "Modeling Climate Policy: Perspectives on Future Negotiations." *Journal of Policy Modeling* 27, 711-732.

Burtraw, Dallas (1996). "The SO-2 Emissions Trading Program: Cost Savings Without Allowance Trades." *Contemporary Economic Policy*, XIV-2, 79-94.

Calabre, Serge (1985). *Prix et Conjoncture sur les Marchés à terme de Produits*. (Abidjan, Côte d'Ivoire: Editions CEDA).

Caldwell, John C. (1990). "High Fertility in Sub-Saharan Africa." *Scientific American* 262:5 (May).

Carlson, Gerald R., David Zilberman, and John A. Miranowski, eds. (1993). *Agricultural and Environmental Resource Economics.* (New York: Oxford University Press).

Cartwright, Timothy J. (1993). *Modeling the World in a Spreadsheet: Environmental Simulation on a Microcomputer*. (Baltimore: The Johns Hopkins University Press).

Chamley, Christophe P. (2004). *Rational Herds: Economic Models of Social Learning*. (New York: Cambridge University Press).

Chapman, Duane (1987). "Computation Techniques for Intertemporal Allocation of Natural Resources," *American Journal of Agricultural Economics* 69 (February) 134-142.

Chiang, Alpha C. (1992). *Elements of Dynamic Optimization*. (New York: McGraw-Hill).

Christensen, P. (1995). Historical Roots for Ecological Economics: biophysical versus Allocative Approaches," in Krishnan, R, Harris, J, and R. Goodein, eds, A Survey of Ecological Economics. (Cabin John, Maryland: Island Press).

Claessens, Stijn, and Ronald C. Duncan, eds. (1993). *Managing Commodity Price Risk In Developing Countries*. (Baltimore, Maryland: The Johns Hopkins University Press for the World Bank).

Clark, Colin W. (1985). *Bioeconomic Modeling and Fisheries Management*. (New York: John Wiley and Sons).

Clark, Colin W. (1990). *Mathematical Bioeconomics: The Optimal Management of Renewable Resources*, second edition. (New York: John Wiley and Sons).

Clark, Colin W., Frank H. Clarke, and Gordon R. Munro (1979). "The Optimal Exploitation of Renewable Resource Stocks: Problems of Irreversible Investment." *Econometrica* 47:1 (January), 25-48.

Clarke, Bryan (1975). "The Causes of Biological Biodiversity." *Scientific American* 233:2 (August).

Cleaver, Kevin M. and Götz A. Schreiber (1998). *Inverser la spirale: Les interactions entre la population, l'agriculture et l'environnement en Afrique subsaharienne*. (Washington, D.C.: Document Technique de la Banque Mondiale numéro 372), série de la Région Afrique.

Cochran, Neal P. (1976). "Oil and Gas from Coal." *Scientific American* 234:5 (May).

Congress of the U.S. (1986). *Curbing Acid Rain: Cost, Budget, and Coal-Market Effects*. (Washington, D.C.: Congressional Budget Office, U.S. Government Printing Office).

Conrad, Jon M., and Colin W. Clark. (1991, 1987). *Natural Resource Economics: Notes and Problems*. (New York: Cambridge University Press).

Conrad, Jon M. (1999). *Resource Economics.* (New York: Cambridge University Press).

Cornes, R., and T. Sandler (1986). *The Theory of Externalities, Public Goods, and Club Goods*. (Cambridge, U.K.: Cambridge University Press).

Costanza, Robert, et.al (1998). "The Value of the World's Ecosystem Services and Natural Capital" *Ecological Economics* 25:1, 3-15.

Costanza, Robert, Olman Segura, and Juan Martinez-Alier, editors (1996). . *Getting Down to Earth: Practical Applications of Ecological Economics*. (Washington, D.C.: Island Press).

Costanza, Robert, ed. (1991). *Ecological Economics: The Science and Management of Sustainability*. (Washington, D.C.: Island Press).

Crosson, Pierre R., and Sterling Brubaker (1982). *Resource and Environmental Effects of U.S. Agriculture*. (Baltimore, Md.: Johns Hopkins University Press for Resources for the Future).

Daly, Herman E. (2005). "Economics in a Full World." *Scientific American* 293:3 (September).

Daley, Herman E. and Kenneth N. Townsend (1993). *Valuing the Earth: Economics, Ecology, Ethics*. (Cambridge, Mass.: MIT Press).

Daley, Herman E. (1977). *Steady-State Economics: The Economics of Biophysical Equilibrium and Moral Growth*. (San Francisco, California: W.H. Freeman and Company).

Dasgupta, Partha (1996). "The Economics of the Environment:" *Environment and Development Economics* 1(4): 387-428.

Dasgupta, Partha S. (1993). *An Inquiry into Well-Being and Destitution*. (New York: Oxford University Press).tt

Dasgupta, Partha, and Karl-Goran Mäler (1991). "The Environment and Emerging Development Issues", in *Proceedings of the World Bank Annual Conference on Development Economics 1990* (Washington, D.C.: The World Bank), 101-131.

Dasgupta, Partha S. and Geoffrey M. Heal (1979). *Economic Theory and Exhaustible Resources*. (New York: Cambridge University Press).

Deacon, R., et.al. (1998). "Research Trends and Opportunities in Environmental and Natural Resource Economics", *Environmental and Resource Economics* 11(3-4): 387-397.

Deacon, R.T. (1985). "The Simple Analytics of Forest Economics," in R.T. Deacon and M.B. Johnson, eds., *Forestlands: Public and Private*. (San Francisco: Pacific Institute for Public Policy Research).

Deffeyes, Kenneth S. (2005). *Beyond Oil: The View from Hubbert's Peak*. (New York: Hill and Wang Publishing Company).

Deffeyes, Kenneth S. (2001). *Hubbert's Peak: The Impending World Oil Shortage*. (Princeton, NJ: Princeton University Press).

Diamond, Peter A. and Jerry A. Hausman (1994). "Contingent Valuation: Is Some Number Better than No Number?" *Journal of Economic Perspectives*, 8:4 (Fall), 45-64.

Dieren, Wouter Van, editor (1995). *Taking Nature Into Account: A Report to the Club of Rome*. (New York: Springer-Verlag).

Dillon, John L. and Jock R. Anderson (1990, 1977, 1968). *The Analysis of Response in Crop and Livestock Production*, third edition. (New York: Pergamom Press).

Dinar, Ariel, and David Zilberman, eds. (1991). *The Economics and Management of Water and Drainage in Agriculture*. (Norwell, Mass.: Kluwer Academic Publishers).

Dixon, John A., and Maynard M. Hufschmidt (1986). *Economic Valuation Techniques for the Environment*. (Baltimore: The Johns Hopkins University Press.

Easter, K. William, M.W.Rosegrant, and Ariel Dinar, eds. (1998). *Markets for Water: Potential and Performance*. (Dordrecht, Netherlands: Kluwer Academic Publishers).

Faber, Malte, Reiner Manstetten, and John Proops (1996). *Ecological Economics: Concepts and Methods*. (Brookfield, Vermont: Edward Elgar Publishing Company).

Farrell, J., and E. Maskin (1989). "Renegotiation in Repeated Games", *Games and Economic Behavior* I: 327-360.

Ferguson, Brian S., and G.C. Lim (1998). *Introduction to Dynamic Economic Models*. (New York: Manchester University Press).

Fisher, Anthony C. (1981). *Resource and Environmental Economics*. (New York: Cambridge University Press.

Fischer, R.D. and Mirman, L.J. (1992). "Strategic Dynamic Interaction: Fish Wars." *Journal of Economic Dynamics and Control* 16(2), 267-287.

Ford, Andrew (1999). *Modeling the Environment*. (Washington, D.C.: Island Press).

Freeman, A. Myrick, III (1993). *The Measurement of Environmental and Resource Values*. (Washington, D.C.: Resources for the Future).

Freese, Curtis H. (1997). *Harvesting Wild Species: Implications for Biodiversity*. (Baltimore, Maryland: The Johns Hopkins University Press).

French, Hilary (2000). *Vanishing Borders: Protecting the Planet in the Age of Globalization*. (New York: W.W. Norton for the Worldwatch Institute).

Froot, Kenneth A., editor (1999). *The Financing of Catastrophe Risk*. (Chicago, Illinois: University of Chicago Press).

Gibbons, Diana (1986). *The Economic Value of Water*. (Washington, D.C.: Resources for the Future).

Gibbs, W. Wayt (2001). "The Termination of Species." *Scientific American* 285:5 (November).

Glickman, Theodore S. and Michael Gough, editors (1990). *Readings in Risk*. (Washington, D.C.: Resources for the Future).

Goeller, H. (1976). The Age of Substitutability." *Science*, vol. 191 (February 20, 1976), 683-689.

Golan, Elise, et.al. (2001). "Economics of Food Labeling," *Journal of Consumer Policy*, 24:2, 117-184.

Goldemberg, J. (1990). "Solving the Energy Problems in Developing Countries," *Energy Journal*, 11:1, 19-24.

Goldin, Ian and L. Alan Winters, editors (1995). *The Economics of Sustainable Development*. (New York: Cambridge University Press).

Goodland, R., H. Daly, and S. El Serafy (1991). "Environmentally Sustainable Economic Development – bulding on Brundtland", Environment Working Paper No. 46. (Washington, D.C.: The World Bank).

Gordon, H. (1954) "The Economic Theory of a Common Property Resource: The Fishery", *Journal of Political Economy* (1954).

Gordon, Robert B., Tjalling c. Koopmans, William D. Nordhaus, and Brian J. Sinner (1987). *Toward a New Iron Age? Quantitative Modeling of Resource Exhaustion*. (Cambridge, Mass.: Harvard University Press).

Greer, David and Brian Harvey (2004). *Blue Genes: Sharing and Conserving the World's Aquatic Biodiversity*. (Sterling, Virginia: Earthscan Publishing).

Griffin, James M. and Steven L. Puller (2005). *Electricity Deregulation: Choices and Challenges*. (Chicago, Illinois: University of Chicago Press).

Griffin, Ronald C. (1998). "The Fundamental Principles of Cost—Benefit Analysis", *Water Resources Research,* 34:8, 2063-2071.

Gwatkin, Davidson R. (1982). "Life Expectancy and Population Growth in the Third World." *Scientific American* 246:5 (May).

Gylfason, Thorvaldur, and Martin L. Weitzman (2002). "Icelandic Fisheries Management: Fees vs. Quotas", manuscript.

Hackett, Steven C. (2006). *Environmental and Natural Resource Economics*, 3rd edition. (Armonk, New York: W.E. Sharpe).

Hammack, Judd and Gardner Mallard Brown, Jr. (1974). *Waterfowl and Wetlands: Toward Bioeconomic Analysis*. (Baltimore, Maryland: The Johns Hopkins University Press for Resources for the Future).

Hanley, Nick, J.F.Shogren, and B. White (1997). *Environmental Economics: In Theory and Practice*. (London, U.K.: Macmillan).

Hanley, Nick, and Clive L. Spash (1994). *Cost-Benefit Analysis and the Environment*. (Brookfield, Vermont: Edward Elgar Publishing Company).

Harrington, Paul (1999). *Household Water Pricing in OECD Countries*. (Paris, France: OECD).

Harrington, Paul (1987). *Pricing of Water Services.* (Paris, France: OECD).

Harris, Jonathan M. (2006, 2002). *Environmental and Natural Resource Economics: A Contemporary Approach*. (Boston, Mass.: Houghton Mifflin Publishing Company).

Hausman, Jerry A., ed. (1993). *Continent Valuation: A Critical Assessment*. (Amsterdam, Netherlands: North-Holland Publishing).

Hazilla, Michael and Raymond J. Kopp (1984). "Assessing U.S. Vulnerability to Raw Material Supply Disruptions: An Application to Non-fuel Minerals," *Southern Economic Journal*, 52.

Heal, Geoffrey (1998). *Valuing the Future: Economic Theory and Sustainability*. (New York: Columbia University Press).

Hilborn, R.C. and C.J. Walters (1992). *Quantitative Fisheries Stock Assessment*. (New York: Chapman and Hall).

Hoel, Michael (1978). "Extermination of Self-Reproducible Natural Resources Under Competitive conditions." *Econometrica* 46, 219-224.

Horn, Henry (1975). "Forest Succession." *Scientific American* 232:5 (May).

Hotelling, Harold (1931). "The Economics of Exhaustible Resources." *Journal of Political Economy* 39, 137-175.

Hyde, William F. (1980). *Timber Supply, Land Allocation, and Economic Efficiency*. (Washington, D.C.: Resources for the Future).

International Energy Agency (2004). *Renewable Energy: Market and Policy Trends in IEA Countries*. (Paris, France: International Energy Agency).

International Energy Agency (2003). *Taxing Energy: Why and How?* (Paris, France: OECD).

IUCN, UNEP, WWF (1991). *Caring for the Earth: A Strategy for Sustainable Living*. (Gand, Switzerland, IUCN).

Jacobs, M. (1991). *The Green Economy – Environment, Sustainable Development and the Politics of the Future*. (London: Pluto Press).

Jepma, Atrinus, and Mohan Munasinghe (1998). *Climate Change Policy: Facts, Issues, and Analyses*. (New York: Cambridge University Press).

Jenkins, Robin R. (1993). *The Economics of Solid Waste Reduction: The Impact of User Fees*. (Cheltenham, U.K.: Edward Elgar).

Judson,D. (1995). "The Convergence of Neo-Ricardian and Embodied Energy Theories of Value and Price," in R.Krishnan, John Harris, and Robert Goodein, eds. *A survey of Ecological Economics*. (Washington, D.C.: Island Press).

Kakela, Peter J. (1981). "Iron Ore: From Depletion to Abundance," *Science*, 212 (April 10), 132-136.

Kammen, Daniel M. (1995). "Cookstoves for the DevelopingWorld." *Scientific American* 273:1 (July).

Kane, R., and D. Turnham (2000). "Sustainable Development and Community Mobilisation", in D. Turnham, ed. *African Perspectives: Practices and Policies Supporting Sustainable Development. (Scandinavian Seminar College, Denmark).*

Kapur, N.N. and H.K. Kewavan (1992). *Entropy Optimization Principles with Applications*. (New York: Academic Press).

Kaufman, R. and C. Cleveland (2001). "Oil Production in the Lower 48 States: Economic, Geological, and Institutional Determinants," *Energy Journal* 22:1, 27-49.

Kelley, Allen C., and Robert M.Schmidt (1994). *Population and Income Change: Recent Evidence*. (Washington, D.C.: The World Bank).

Kelley, Allen C. (1988). "Economic Consequences of Population Change in the Third World," *Journal of Economic Literature* 26 (December), 1685-1728.

Kete, Nancy (1992). "The U.S. Acid Rain Control Allowance Trading System," in T. Jones and J. Cofee-Morlot, eds. *Climate Change: Designing a Tradeable Permit System*. (Paris, France: OECD), 69-93.

Kneese, Allen V. and James L. Sweeney, eds. (1985). *Handbook of Natural Resource and Energy Economics*, vol. II. (Amsterdam, Netherlands: North-Holland Publishing Company).

Kneese, Allen V. (1984). *Measuring the Benefits of Clean Air and Water*. (Washington, D.C.: Resources for the Future).

Kopp, Raymond J. and V. Kerry Smith, eds. (1993). *Valuing Natural Assets: The Economics of Natural Resource Damage Assessment.* (Washington, D.C.: Resources for the Future).

Kosobud, Richard F., William A. Testa, and Donald A. Hanson, eds. (1993). *Cost-Effective Control of Urban Smog.* (Chicago: Federal Reserve Bank of Chicago).

Krautkramer, J.A. (1998). "Nonrenewable Resource Scarcity," *Journal of Economic Literature*, 36:4, 2065-2107.

Kremer, Michael and Charles Morcom (2000). "Elephants." *American Economic Review*, 90:1, pp. 212-234.

Krutilla, John V. and Anthony C. Fisher (1975). *The Economics of Natural Environments: Studies in the Valuation of Commodity and Amenity Resources*. (Baltimore, Maryland: The Johns Hopkins University Press).

Langniss, O., and R. Wiser (2003). "The Renewables Portfolio Standard in Texas: An Early Assessment," *Energy Policy*, 31, 527-535.

LeBel, Phillip (2005). "Optimal Pricing of Biodiverse Natural Resources for Sustainable Economic Growth," *Journal of Development Alternatives*, 24: 1-2, 5-38.

LeBel, Phillip G. (1999). "Measuring Sustainable Economic Development in Africa", *Scandinavian Journal of Development Alternatives and Area Studies* 18: 2-3 (June & September), 265-282.

LeBel, Phillip G. (1982). *Energy Economics and Technology*. (Baltimore: The Johns Hopkins University Press).

LeClair, Mark S. (2000). *International Commodity Markets and the Role of Cartels*. (Armonk, New York: M.E. Sharpe, Inc.).

Leigh, Daniel and Jan-Peter Olters (2006). "Natural Resource Depletion, Habit Formation, and Sustainable Fiscal Policy: Lessons from Gabon." (Washington, D.C.: IMF Working Paper WP/06/193).

Leung, Anthony and Ar-Young Wang (1976). "Analysis of Models for Commercial Fishing: Mathematical and Economical Aspects." *Econometrica* 44:2 (March), 295-303.

Levhari, David, and Leonard J. Mirman (1980). "The Great Fish War: An Example Using a Dynamic Cournot-Nash Solution." *Bell Journal of Economics* 11:1 (Spring), 322-334.

Lind, Robert C., et.al. (1982). *Discounting for Time and Risk in Energy Policy*. (Baltimore, Maryland: The Johns Hopkins University Press for Resources for the Future).

Lindenmayer, David B. and Jerry F. Franklin (2002). *Conserving Forest Biodiversity: A Comprehensive Multiscaled Approach*. (Washington, D.C.: Island Press).

Lotka, Alfred J. (1956). *Elements of Mathematical Biology*. (New York: Dover Publications reprint of 1925 edition of *Elements of Physical Biology*).

Lovins, Amory, L. Hunter Lovins, and Paul Hawken (1999). "A Road Map for Natural Capitalism," *Harvard Business Review* (May-June), 145-158.

Ljungqvist, Lars and Thomas J. Sargent. (2000). *Recursive Macroeconomic Theory*. (Cambridge, Mass.: MIT Press).

Lueck, Dean (2002). "The Extermination and Conservation of the American Bison," *Journal of Legal Studies,* 31, S609-S652.

Maestad, Ottar (2001). "Timber Trade Restrictions and Tropical Deforestation: A Forest Mining Approach." *Resource and Energy Economics* 23, 111-132.

Maizels, Alfred, Robert Bacon, and George Mavrotas (1997). *Commodity Supply Management by Producing Countries: A Case Study of the Tropical Beverage Crops*. (Oxford, U.K.: The Clarendon Press).

Mangel, Marc and Colin W. Clark (1988). *Dynamic Modeling in Behavioral Ecology*. (Princeton, N.J.: Princeton University Press).

Manin, William E., Helen M. Ingram, Nancy K. Laney, and Adrian H. Griffin (1984). *Saving Water in a Desert City*. (Washington, D.C.: Resources for the Future).

Markandya, Anil and Julie Richardson (1992). *Environmental Economics: A Reader*. (New York: St. Martin's Press).

Martin, William E., Helen M. Ingram, Nancy K. Laney, and Adrian H. Griffin (1984). *Saving Water in a Desert City*. (Washington, D.C.: Resources for the Future).

Mather, Alexander S. (1990). *Global Forest Resources*. (Portland, Oregon: Timber Press).

May, P., and R.S.D. Motta, eds. (1996). *Pricing the Planet: Economic Analysis from Sustainable Development*. (New York: Columbia University Press).

May, Robert M. (1992) "How Many Species Inhabit the Earth?" *Scientific American* 267:4 (October).

McNicol, David L. (1978). *Commodity Agreements and Price Stabilization: A Policy Analysis*. (Lexington, Mass.: D.C. Heath and Company).

Meadows, Donella, Jorgen Randers, and Dennis Meadows (2004). *The Limits to Growth: The 30 Year Global Update*. (White River Junction, Vermont: Chelsea Green Publishing).

Mikesell, Ramond F. (1992). *Economic Development and the Environment – A Comparison of Sustainable Development with Conventional Development Economics*. (London, U.K.: Mansel Publishing).

Mirowski, P. (1995). "Energy and Energetics in Economic Theory: A Review Essay", in R. Krishnan, John Harris, and Robert Doodein (eds), *A Survey of Ecological Economics*. (Washington, D.C.: Island Press).

Mitchell, Robert Cameron and Richard T. Carson (1989). *Using Surveys to Value Public Goods: The Contingent Valuation Method*. (Washington, D.C.: Resources for the Future).

Moore, Thomas Gale (1998). *Climate of Fear: Why We shouldn't Worry about Global Warming*. (Washington, D.C.: The Cato Institute).

Murray, J.D. (1993). *Mathematical Biology*, second corrected edition. (New York: Springer-Verlag).

National Center for Environmental Economics (2001). The United States Experience with Economic Incentives in Environmental Pollution Control Policy. (Washington, D.C.: U.S. Environmental Protection Agency). http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/homepage

Neher, P.A. (1990). *Natural Resource Economics: Conservation and Exploitation*. (Cambridge, U.K.: Cambridge University Press).

Neumayer, Ed. (2000). "Scarce or Abundant? The Economics of Natural Resource Availability," *Journal of Economic Surveys*, 14:3, 307-335.

Newell, Richard G., James N.Sanchirico, and Suzi Kerr (2002). "Fishing Quota Markets", Discussion Paper 02-20. (Washington, D.C.: Resources for the Future).

Nichols, Albert L. (1984). *Targeting Economic Incentives for Environmental Protection*. (Cambridge, Mass.: MIT Press).

Nitecki., M.H. (1984). *Extinctions*. (Chicago, Illinois: University of Chicago Press).

Nordhaus, William (1979). *The Efficient Use of Energy Resources*. (New Haven, Connecticut: Yale University Press Cowles Foundation monograph 26).

Norgard, Richard B. (1990). "Economic Indicators of Resource Scarcity: A Critical Essay," *Journal of Environmental Economics and Management,* 19 (July), 19-25.

Norgard,Richard B. (1989). "the Case for Methodological Pluralism", *Ecological Economics* 1:1 (37-57).

Norton, Bryan, and Ben A. Minteer (2002). "From Environmental Ethics to Environmental Public Philosophy: Ethicists and Economists: 1973-Future,.." in T. Tietenberg and H. Folmer, eds., *The International Yearbook of Environmental and Resource Economics: 2002/2003* (Cheltenham, U.K.: Edward Elgar Publishing Company), 373-407.

Noussair, Charles, Stéphane Robin, and Bernard Ruffieux (2004). "Do Consumers Really Refuse to Buy Genetically Modified Food?" *The Economic Journal* 114 (January), 102-120.

Oates, Wallace E., editor (1999). *The RFF Reader in Environmental and Resource Management*. (Washington, D.C.: Resources for the Future).

Oates, Wallace E., editor (1994, 1992). *The Economics of the Environment*. (Brookfield, Vermont: Edward Elgar Publishing Company).

O'Donnell, Christopher (1993). *Commodity Price Stabilisation*. (Brookfield, Vermont: Avebury Aldershot Publishing).

Opschoor, J.B., and Hans B. Vos (1989). *Economic Instruments for Environmental Protection*. (Paris, France: OECD).

O'Shea, Thomas J. (1994). "Manatees." *Scientific American* 271:1 (July).

Ostrom, Elinor (1992). *Crafting Institutions for Self-Governing Irrigation Systems*. (San Francisco: ICS Press).

Pagiola, Stefano, Joshua Bishop, and Natasha Landell-Mills (2002). *Selling Forest Environmental Services: Market-Based Mechanisms for Conservation and Development*. (London, U.K.: Earthscan).

Pauly, Daniel (2003). "Counting the Last Fish." *Scientific American* 289:3 (July).

Pearce, David, K, I. Hamilton, and Anthony G. Atkinson (1996). "Measuring Sustainable Development: Progress on Indicators," *Environment and Development Economics* (1): 85-101.

Pearce, David and Dominic Moran (1994). *The Economic Value of Biodiversity*. (New York: Earthscan Publications, IUCN).

Pearce, David and Anthony G. Atkinson (1993). "Capital Theory and the Measurement of Sustainable Development: An Indicator of Weak Sustainability," *Ecological Economics* (8): 103-108.

Pearce, David W. and J. Warford (1992). *World Without End: Economics, Environment and Sustainable Development*. (Oxford, U.K.: Oxford University Press).

Pearce,David W., E.B. Barbier, and A. Markandya (1990). *Sustainable Development: Economics and the Environment in the Third World.* (London, U.K.: Earthscan Publications).

Pearce, David W. and R. Kerry Turner (1990). *Economics of Natural Resources and the Environment*. (Baltimore: The Johns Hopkins University Press).

Penson, John B., Jr., Oral Capps, Jr., and C. Parr Rosson III. (1996). *Introduction to Agricultural Economics.* (Englewood Cliffs, New Jersey: Prentice-Hall).

Perman, R., Y Ma, J. Mcgilvray, and M. Common (1999). *Natural Resource and Environmental Economics*, 2nd edition. (Edinburgh, Scotland: Longmans).

Perrings, Charles, ed. (2000). *Biodiversity Conservation in Sub-Saharan Africa: Mending the Ark*. (Cheltenham, U.K.: Edward Elgar Publishing).

Perrings, Charles (1996). *Sustainable Development and Poverty Alleviation in Sub-Saharan Africa: The Case of Botswana*. (New York: Macmillan Publishing Company).

Perrings, Charles, Karl-Goran Maler, Carl Folke, C.S. Holling, and Beng-Owe Jansson (1995). *Biodiversity Loss: Economic and Ecological Issues*. (New York: Cambridge University Press).

Perry, Harry (1974). "The Gasification of Coal." *Scientific American* 230:3 (March).

Pesaran, M. and H. Samiei (1995). "Forecasting Ultimate Resource Recovery," *International Journal of Forecasting,* 11:4, 543-555.

Pierce, John R. (1975). "The Fuel Consumption of Automobiles." *Scientific American* 232:1 (January).

Pillai, K.M. 1984). *A Textbook of Plantation Crops*. (New Delhi, India: Vikas Publishing House, Ltd.)

Porter, Richard C. (2002). *The Economics of Waste.* (Washington, D.C.: Resources for the Future).

Portney, P. (1994). "The Contingent Valuation Debate – Why Economists Should Care." *Journal of Economic Perspectives*, 8(4, pp. 3-17.

Post, Richard F. (1973). "Flywheels." *Scientific American* 229:5 (December).

Pressman, Aaron (2006). "Fished Out." *Business Week* (September 4, 2006), Special Report.

Price, Colin (1993). *Time, Discounting, and Value*. (New York: Basil Blackwell Publishers).

Price, Colin (1989). *The Theory and Application of Forest Economics*. (Oxford, U.K.: Blackwell Publishers).

Putman, R.J. and S.D. Wratten (1984). *Principles of Ecology*. (Berkeley, California: University of California Press).

Rader, N. (2000). "The Hazards of Implementing Renewable Portfolio Standards," *Energy and Environment*, 11:4, 391-405.

Rambler, Mitchelll B., Lynn Maregulis, and René Foster, editors (1989). *Global Ecology: Towards a Science of the Biosphere.* (New York: Academic Press).

Rao, P.K. (2000). *Sustainable Development: Economics and Policy.* (Malden, Massachusetts: Blackwell Publishers).

Rasmussen, Wayne (1982). "The Mechanization of Agriculture," *Scientific American* 247:3 (September).

Reddy, Amulya K.N. (1990). "Energy for the Developing World." *Scientific American* 263:3 (September).

Renshaw, Ed. (1991). *Modeling Biological Populations in Space and Time*. (Cambridge, U.K.: Cambridge University Press).

Repetto, Robert (1988). *The Forest for the Trees? Government Policies and the Misuse of Forest Resources*. (Washington, D.C.: World Resources Institute).

Repetto, Robert (1983). "The Role of Population in Resource Depletion in Developing Countries", *Population and Development Review*, 9: 609-632.

Reschovsky, J.D., and S.E. Stone (1994). "Market Incentives to Encourage Household Waste Recycling: Paying for What You Throw Away," *Journal of Policy Analysis and Management*, 13, 120-139.

Rhodes, Olin E., Jr., Ronald K. Chesser, and Michael H. Smith (1996). *Population Dynamics in Ecological Space and Time.* (Chicago, Illinois: University of Chicago Press).

Rice, Richard E., Raymond E. Gullison, and John W. Reid (1997). "Can Sustainable Management Save Tropical Forests?" *Scientific American* (April), 44-49.

Rifkin, Jeremy (2002). *The Hydrogen Economy*. (New York: Penguin Putnam Books).

Robinson, Gregory G. (1987). *Resource Economics for Foresters*. (New York: John Wiley and Sons).

Rousso, A.S. and S.P. Shah (1994). "Packaging Taxes and Recycling Incentives: The German Green Dot Progeram," *National Tax Journal,* 47:3, 689-701.

Saeed, Khalid (1998). *Towards Sustainable Development*, 2nd edition. (Brookfield, Vermont: Ashgate Publishers).

Sagoff,Mark (1988). "Some Problems with Environmental Economics" *Environmental Ethics*, 10, (55-74).

Salanié, Bernard (2000). *Microeconomics of Market Failure.*, translation of *Microéconomie: Les défaillances du marché*, Economica (1998). (Cambridge, Mass.: MIT Press).

Salanié, Bernard (1997). *The Economics of Contracts*, translation of *Théorie des contrats*, Economica (1997). (Cambridge, Mass.: MIT Press).

Saliba, Bonnie Colby and David B. Bush (1987). *Water Markets in Theory and Practice: Market Transfers and Public Policy.* (Boulder, Colorado: Westview Press).

Sapsford, David , and Wyn Morgan, eds. (1994). *The Economics of Primary Commodities: Models, Analysis and Policy.* (Brookfield, Vermont: Edward Elgar Publishing Company).

Sathirathai, Suthawan and Edward B. Barbier (2001). "Valuing Mangrove Conservation in Southern Thailand," *Contemporary Economic Policy*, 19:2, 109-122.

Scheraga, Joel D., and Frances G. Sussman (1998), "Discounting and Environmental Management," in T. Tietenberg and H. Folmer, eds. (1998). The International Yearbook of Environmental and Resource Economics 1998-1999). (Cheltenham, U.K.: Edward Elgar Publishing Company), 1-32.

Schlager, Edella and Elinor Ostrom (1992). "Property Right Regimes and Natural Resources: A Conceptual Analysis," *Land Economics*, 68, 249-262.

Scott, Anthony D. (1955). "The Fishery: The Objectives of Sole Ownership." *Journal of Political Economy*, 63:2, pp. 116-124.

Shenk, Tanya M. and Alan B. Franklin, editors (2001). *Modeling in Natural Resource Environment: Development, Interpretation, and Application.* (Washington, D.C.: Island Press).

Shone, Ronald (1997). *Economic Dynamics: Phase Diagrams and Their Economic Application*. (New York: Cambridge University Press).

Shrivastava, M.B. (1997). *Introduction to Forestry*. (New Delhi: Vikas Publishing House, Ltd.).

Sigot, Asenath, Lori Ann Thrupp, and Jennifer Green, editors. (1995). *Towards Common Ground: Gender and Natural Resource Management in Africa*. (Washington, D.C.: World Resources Institute).

Simon, Julian L. (1992). *Population and Development in Poor Countries: Selected Essays*. (Princeton, N.J.: Princeton University Press).

Simon, Julian L. (1981). *The Ultimate Resource*. (Princeton, N.J.: Princeton University Press).

Singer, S. Fred (1997). *Hot Talk, Cold Science: Global Warming's Unfinished Debate.* (Oakland, California: The Independent Institute).

Smith, A. (1995). "the Teleological View of Wealth: An Historical Perspective," in R. Krishnan, J. Harris, and R. Goodein, eds (1995). *A Survey of Ecological Economics*. (Washington, D.C.: Island Press).

Smith, V. Kerry, editor (1979). *Scarcity and Growth Reconsidered*. (Baltimore, Maryland: The Johns Hopkins University Press for Resources for the Future).

Snyder, L.D., N.H. Miller, and R.N.Stavins (2003). "The Effects of Environmental Regulation on Technology Diffusion: The Case of Chlorine Manufacturing," *American Economic Review*, 93:2, 431-435.

Southey, C. (1972). "Policy Prescriptions in Economic Models: The Case of the Fishery," *Journal of Political Economy*, 80, pp. 769-775.

Spulber, Nicholas, and Asghar Sabbaghi (1993). *Economics of Water Resources: From Regulation to Privatization.* (Hingham, Mass.: Kluwer Academic Publishers).

Stavins, Robert, ed., (2000). *Economics of the Environment: Selected Readings*, 4th edition. (New York: W.W. Norton & Company).

Stavins, Robert N. (1989). "Harnessing Market Forces to Protect the Environment," *Environment,* 31, 4-7, 28-35.

Sterner, T. (2003). *Policy Instruments for Environmental and Natural Resource Management*. (Washington, D.C.: Resources for the Future).

Swaney, James A. (1987). "Elements of a New Institutional Environmental Economics" *Journal of Economic Issues* 21 (1739-1775).

Swanson, Timothy M., and Edward Barbier, eds. (1992). *Economics for the Wilds*. (Washington, D.C.: Island press).

Taylor, Robert E. (1990). *Ahead of the Curve: Shaping New Solutions to Environmental Problems*. (New York, New York: Environmental Defense Fund).

Thompson, D'Arcy Wentworth (1992, 1942). *On Growth and Form: The Complete Revised Edition*. (New York: Dover Publications, Inc.).

Tietenberg, Thomas H., ed. (1997). *The Economics of Global Warming*, The International Library of Critical Writings in Economics. . (Cheltenham, U.K.: Edward Elgar Publishing Company).

Tietenberg,Thomas H. (1992). *Environmental and Natural Resource Economics*, 3rd edition. (New York: HarperCollins Publishers).

Tietenberg, Thomas H. (1990). "Economic Instruments for Environmental Regulation," *Oxford Review of Economic Policy*, 6 (Spring), 17-33.

Tilton, John E. (2003). *On Borrowed Time? Assessing the Threat of Mineral Depletion*. (Washington, D.C.: Resources for the Future).

Tilton, John E., ed. (1992). *Mineral Wealth and Economic Development*. (Washington, D.C.: Resources for the Future).

Turner, Matthew A. (1999). "Optimal Quota Programs," Working Paper 98-01. (Toronto, Canada: University of Toronto).

Turner, R.K. (1993). *Sustainable Environmental Economics and Management: Principles and Practice*. (London, U.K.: Belhaven Press).

Turnham, D., ed. (2000). Annex 2: Annotated List of the Project Case Studies" in *African Perspectives: Practices and Policies Supporting Sustainable Development*. (Scandinavian Seminar College, Denmark).

Tuxill, John (1998). *Losing Strands in the Web of Life: Vertebrate Declines and the Conservation of Biological Diversity*, Worldwatch Institute Research Paper 141. (Washington, D.C.: The Worldwatch Institute).

United Nations (1991). *Population, Resources, and the Environment: The Critical Challenges*. (New York: The United Nations).

Uri, N.D. and R. Boyd (1995). "Scarcity and Growth Revisited." *Environment and Planning*, A27:11, 1815-1832.

van den Berg, Jeroen C.J.M., editor (1999). *Handbook of Environmental and Resource Economics*. (Cheltenham, U.K.: Edward Elgar Publishing Company).

Van Houtven, G.L. and G.E. Morris (1999). "Household Behavior Under alternative Pay-as-You-Throw Systems for Solid Waste Disposal," *Land Economics* 75:4 (November), 515-537.

Varangis, Panos, Takamasa Akiyama, and Donald Mitchell (1995). *Managing Commodity Booms and Busts*. (Washington, D.C.: The World Bank, Directions in Development series).

Veit, Peter, editor. (1998). *Africa's Valuable Assets: A Reader in Natural Resource Management.* (Washington, D.C.: World Resources Institute).

Verhulst, P.F. (1838). "Notice sur la loi que la population suit dans son accroissement." *Correspondance Mathématique et Physique*, 10, pp. 113-121.

Véron, René (2001). "The 'New' Kerala Model: Lessons for Sustainable Development," *World Development,* 29:4 (April), 601-617.

Viscusi, W. Kip (1998). *Rational Risk Policy*. (Oxford, U.K.: The Clarendon Press, the Arne Ryde Memorial Lecture Series).

Viscusi, W. Kip (1996). "Economic Foundations of the Current Regulatory Reform Efforts," *Journal of Economic Perspectives*, 10:3 (Summer), 119-134.

Wätzold, F. Frank (2004). "SO-2 Emissions in Germany, Regulations to Fight Waldsterben," in W. Harrington, R.D. Morgenstern, and T. Sterner, eds. (2004). *Choosing Environmental Po9licy: Comparing Instruments and Outcomes in the United States and Europe*. (Washington, D.C.: Resources for the Future).

Weber, Bruce H., David J. Depew, and James D. Smith, editors (1990). *Entropy, Information, and Evolution: New Perspectives on Physical and Biological Evolution*. (Cambridge, Mass.: MIT Press).

Wibe, Sören, and Tom Jones, eds. (1992). *Forests: Market and Intervention Failures*. (London, U.K.: Earthscan Publications, Ltd).

Williams, Jeffrey C., and Brian D.Wright (1991). *Storage and Commodity Markets*. (Cambridge, U.K.: Cambridge University Press).

Wilson, Edward O. (2002). *The Future of Life*. (New York: Alfred A. Knopf).

Wilson, Edward O. (1992). *The Diversity of Life.* (New York: W.W. Norton).

World Bank (1992). *World Development Report: Environment and Development*. (New York: Oxford University Press).

World Commission on Environment and Development (1987). *Our Common Future*. (Oxford, U.K.: Oxford University Press).

World Wildlife Fund (1993). "Sustainable Use of Natural Resources: Concepts, Issues, and Criteria", WWF Position Paper. (Washington, D.C.: World Wildlife Fund).

Wortman, Sterling (1976). "Food and Agriculture." *Scientific American* 235:3 (September).

Zellner, Arnold (1970). "Management of Marine Resources: Some Key Problems Requiring Additional Analysis.", in A.D. Scott, editor, *Economics of Fisheries Management: A Symposium.* (Vancouver, B.C.: Institute of Animal Resource Ecology).

_____ (1987). "La pêche dans le monde." (Dakar, Sénégal: BCEAO, l'économie ouest africaine), no. 361 (juin).