

Course Hours: MWF 4:00 – 4:50 PM**Classroom:** Center Hall 101**Instructor:** Dale Squiresdsquires@irpsmail.ucsd.edu**Office:** Econ 110A**Office Hours:** Immediately preceding class
or by appointment**Head Teaching Assistant:** Jake LaRiviere **Email:** jlariviere@ucsd.edu**Office:** Sequoyah 208**Office Hours:****Teaching Assistant:** Michael Futch**Email:** mfutch@ucsd.edu**Office:** Sequoyah 228**Office Hours:****Teaching Assistant:****Office:****Office Hours:****Class Web Page:****Course Dates:** Monday, January 8 - Friday, March 16**Final:** Friday, March 23, 3-6 pm**Spring Break for Students:** Sunday, March 26 – April 2**Holidays:** Martin Luther King, Jr., Monday, January 15
President's Day, Monday, February 19

Course Objectives

The Economics of Ocean Resources is designed to provide students with both the economic theory and management concepts of natural resource use as they apply to ocean resources, and the factual and institutional knowledge necessary for well-informed applications.

The course develops several basic themes and applies them to different resources. First, the common thread running throughout the course is the theme of optimal allocation of ocean resources. Second, property rights for ocean resources are often limited or incomplete, and many resource allocation decisions are intertemporal in nature. As a consequence, competitive markets for ocean resources often fail to form, or when they do form, they fail to optimally allocate ocean resources among the competing uses. The market failure and subsequent suboptimal use of ocean resources therefore calls into play explicit options of management and public regulation. Third, population dynamics of species forms the basis of bioeconomic models for renewable resources, which combines population dynamics, habitat, biodiversity, and economics. Fourth, the economic concepts of total economic value (use, existence, and option value) and mixed goods (a mixture of private and public goods or common resources) are applied to dolphins, whales, sea turtles, and coral reefs in which management requires attention to both private and public uses and total economic value.

This first section of the course covers issues related to the conservation and management of fisheries. After a review of environmental and resource economics concepts, the course first

develops simple population dynamics. The course subsequently integrates the population dynamics with economics to form a bioeconomic model. The basic static bioeconomic model then forms the basis for subsequent discussion of public management of fishing industries. The first section includes one video discussing the current plight of the world's fisheries and discussing various policy measures.

The second section of the course is more applied and broader in nature, covering environmental issues associated with living marine resources. The section first develops an overall economic analytical framework, focusing on management of mixed goods (a mixture of private and public goods or common resources) and accounting for total economic value. Mixed good management forms one of the current "hottest" environmental issues of the oceans, including dolphins, whales, sea turtles, and coral reefs. Specific analytic topics covered include common resources, public and mixed goods, total economic value, biodiversity, habitat, and wildlife management. Ecosystems management and sustainability are also touched upon. Videos and guest lectures will supplement the in-class treatment of several topics. Students are responsible for the readings on their own.

Course Requirements and Grading

1. Midterm examination in approximately week six -- 45% of course grade.
 - Covers the concepts but not the mathematics. Problem sets are designed to review and learn the mathematics of bioeconomic models.
2. Final examination is 50% of course grade
 - Covers all of the course material between the midterm and the class end, but not explicitly the material covered by midterm.
3. Two problem sets will be provided during the first part of the course and will be graded as pass / not pass. Their completion will count for 5% of the grade.
4. Weekly TA session to review and discuss topics and readings.

Reading Material

The two chapters of required reading material by Hartwick and Olewiler, Wilen, and Heal can be purchased in a packet from Cal Copy. The balance of the required reading is available as pdf files on the class website. The number of students wanting a reading packet will be determined on the second day of class and the order given to Cal Copy at that point.

THE ECONOMICS OF OCEAN RESOURCES

READING LIST

(* required material packet to be purchased from Cal Copy)
All readings required unless noted as optional under "Further
Reading (Optional)"

I. INTRODUCTION

1. Ocean Resources: An Overview

Note: The reference in this section should be skimmed to capture the main points.
The material is primarily for background.

"The Sea," Survey in *The Economist*, May 23, 1998, 18pp.
(pdf file available on class website)

2. Property Rights, Public Goods, Common Resources, Externalities, and Environmental and Resource Problems

Property Rights

Sections 3 and 4 of Scott, A. 2000. "Introducing Property in Fishery Management." In R. Schotten, ed., *Use of Property Rights in Fisheries Management*. FAO Fisheries Technical Paper 404/1. Rome: Food and Agriculture Organization of the United Nations.

Available online at: <http://www.fao.org/docrep/003/x7579e/x7579e00.htm> (pdf file is available on class web site)

Acheson J. 1975. "The Lobster Fiefs: Economic and Ecological Effects of Territoriality in the Marine Lobster Industry." *Human Ecology* 3:183-207.

Law of the Sea

Juda, Lawrence. *International Law and Ocean Use Management: The Evolution of Ocean Governance*. London: Routledge. 1996. Pp. 8-30 and 225-243.

Powerpoint Lectures (available on class website)

1. Environmental Externalities and Market Failure_1
2. Public Goods and Common Resources_2
3. Property Rights_3
4. Law of the Sea_4

Further Reading (Optional)

Chapter 2, "Property Rights," in R.Q. Grafton, W. Adamowicz, D. Dupont, H. Nelson, R. Hill, and S. Renzetti, *The Economics of the Environment and Natural Resources*. Blackwell Publishing (pdf file is available on class website)

II. THE ECONOMICS AND MANAGEMENT OF RENEWABLE MARINE RESOURCES

1. The Theory of Open Access and Bioeconomics

- * Wilen, J. "Life Histories of Organisms," Section 4.2.(pp. 91-93) in "Bioeconomics of Renewable Resource Use," Chapter 2 in A.V. Kneese and J.L. Sweeney, eds., *Handbook of Natural Resource and Energy Economics*, Vol. I. New York: Elsevier Science Publishers B.V., 1985.

Hardin, G. "Tragedy of the Commons." *Science*, Vol. 162, 13 December, 1968, http://www.economics.utoronto.ca/mturner/ec2908/readings/Hardin_Science1968.pdf (pdf file is available on class website)

Sections I and II (pp. 1-16) of Libecap, G. 2006. "Assigning Property Rights in the Common Pool. Implications of the Prevalence of First-Possession Rules." Prepared for "Sharing the Fish 06 Conference" February 26–March 2, 2006, Fremantle, Perth, Western Australia.

- * Hartwick, J. and N. Olewiler. *The Economics of Natural Resource Use*. New York: Addison-Wesley, 1997, Chapter 4.

Problem Set No. 1
Problem Set No. 2

Further Reading (Optional)

Case, T. 2000. "Density Dependent Population Growth," Chapter 5 and "Exploited Resources," Chapter 10 in T. Case, *An Illustrated Guide to Theoretical Ecology*. Oxford University Press. (Not required – read for further understanding of density-dependent population growth and logistic equation in particular.)
(Will be placed on reserves.)

Squires, D. 2005. "Introductory Lecture on Bioeconomics, Parts I, II, III."
(Word files available on class website.)

2. Regulation and Public Policy within a Bioeconomics and Property Rights Framework

- Hartwick and Olewiler. Chapter 5.
- Safina, Carl. "The World's Imperiled Fish." *Scientific American* 273, pp. 45-53. 1995.

Grafton, Q., D. Squires, and J. Kirkley. "Private Property Rights and the Crisis in World Fisheries: Turning the Tide?" *Contemporary Economic Policy* XIV (1996): 90-99. (pdf file is available on class website)

Section 5 of Scott, A. 2000. "Introducing Property in Fishery Management." In R. Schotten, ed., *Use of Property Rights in Fisheries Management*. FAO Fisheries Technical Paper 404/1. Rome: Food and Agriculture Organization of the United Nations. Section 5.

Available online at: <http://www.fao.org/docrep/003/x7579e/x7579e00.htm>

(pdf file is available on class website)

Sections V and VI (pp. 33-45) of Libecap, G. 2006. "Assigning Property Rights in the Common Pool. Implications of the Prevalence of First-Possession Rules." Prepared for "Sharing the Fish 06 Conference" February 26–March 2, 2006, Fremantle, Perth, Western Australia.

Powerpoint Lecture (available on class website)

ITQs_5

Possible guest lecture.

Video in class on fisheries issues and policy, *Empty Oceans, Empty Nets*

Further Reading (Optional)

- The Pew Commission's, "America's Living Oceans: Charting A Course for Sea Change," can be viewed at:
http://www.pewtrusts.org/pdf/env_pew_oceans_final_report.pdf
(pdf file is available on the class website)
- U.S. Commission on Ocean Policy's, "An Ocean Blueprint for the 21st Century" can be viewed at:
http://www.oceancommission.gov/documents/full_color_rpt/000_ocean_full_report.pdf
<http://www.nap.edu/books/0309063302/html/>
- The entire volume edited by Ross Schotten is an invaluable source of further readings on rights-based management (individual transferable quotas in particular).

Available online at: <http://www.fao.org/docrep/003/x7579e/x7579e00.htm>

- Another excellent source of information on property rights in fishing is the National Research Council's, *Sharing the Fish: Towards a National Policy on Individual Fishing Quotas*.

3. Marine Reserves

Palumbi, S.R. 2002. "Marine Reserves: A Tool for Ecosystem Management and Conservation. Pew Commission. General reference: focus on pp. 22-34.
(pdf file is available on the class website)

(pdf file is available on class website)

Further Reading (Optional)

Agardy, T. et al. 2003. Dangerous Targets? Unresolved Issues and Ideological Clashes around Marine Protected Areas. *Aquatic Conservation: Marine and Freshwater Ecosystems* 13(4): 353-367.

Hillborn, R. et al. 2004. When Can Marine Reserves Improve Fisheries Management? *Ocean and Coastal Management* 47: 197-205.

Jameson, S. C., M. H. Tupper, and J. M. Ridley. 2002. The Three Screen Doors: Can Marine "Protected" Areas be Effective? *Marine Pollution Bulletin* 44: 1177-1183.

4. Global Fisheries Issues

Garcia, S. and R. Grainger. 2005. "Gloom and Doom? The Future of Marine Capture Fisheries." *Philosophical Transactions of the Royal Society B*, Vol. 360:21-46.
(pdf file is available on class website)

Grafton et al. "Incentive-Based Approaches to Sustainable Fisheries," *Canadian Journal of Fisheries and Aquatic Sciences*, in press 2006.
(pdf file is available on class website)

Pauly et al. "Fishing Down Marine Food Webs," *Science* Vol. 279, pp. 860-863 (Feb 6, 1998)
<http://www.sciencemag.org/cgi/reprint/279/5352/860.pdf>
http://www.fisheries.ubc.ca/members/dpauly/Science_6_Feb_1998.htm
(pdf file is available on class web page)

Pikitch, E., et al. 2004. "Ecosystem-Based Fishery Management." *Science*, Vol. 305, 16 July, 2004, pp.346-347.
(pdf file is available on class webs page)

Zabel, R.W., C.J. Harvey, S.L. Katz, T.P. Good, O.S. Levin. "Ecologically Sustainable Yield." *American Scientist*, Vol. 91, pp.150-157 (March-April, 2003).
(pdf file is available on class webs page)

Conference report on governance issues for the high seas fisheries, 2005
(pdf file entitled, "International Fisheries Governance – Meeting 2005" available on class web page)

Powerpoint lecture (available on class web site)
Global Fishing Issues_6

Further Reading (Optional)

Garcia, S.M., Zerbi, A., Aliaume, C., Do Chi, T., and Lasserre, G. 2003. The Ecosystem Approach to Fisheries. *FAO Fisheries Technical Paper* 443, Rome, Italy.

Hilborn, R., J. Orensanz, and A. Parma. 2005. "Institutions, Incentives, and the Future of Fisheries." *Philosophical Transactions of the Royal Society B*, 360: 47-57
(pdf file available on class website)

Pauly et al. "Towards Sustainability In World Fisheries," *Nature*, Vol. 418 pp. 689-695 (August, 2002).

The paper is also downloadable direct from Daniel Pauly's website at University of British Columbia:
http://www.fisheries.ubc.ca/members/dpauly/Towards_Sustainability.pdf

(pdf file is available on class web page)

State of the World's Fisheries and Aquaculture by the FAO, 2004, which can be downloaded at:
http://www.fao.org/sof/sofia/index_en.htm

(pdf file available on class web site)

World Bank. 2004. *Saving Fish and Fishers: Toward Sustainable and Equitable Governance of the Global Fishing Sector*. Report No. 29090-GLB. Washington, D.C.:

The paper can be downloaded at:

[http://lnweb18.worldbank.org/ESSD/ardext.nsf/11ByDocName/SavingFishandFishersTowardSustainableandEquitableGovernanceoftheGlobalFishingSector/\\$FILE/SavingFishandFishers.pdf](http://lnweb18.worldbank.org/ESSD/ardext.nsf/11ByDocName/SavingFishandFishersTowardSustainableandEquitableGovernanceoftheGlobalFishingSector/$FILE/SavingFishandFishers.pdf)

(pdf file available on class web site)

Perrings, C., K. Dehnen-Schmutz, J. Touza, and M. Williamson. 2005. "How to Manage Biological Invasions Under Globalization." *Trends in Ecology and Evolution* 20(5): 212-215.

MIDTERM EXAMINATION

III. THE MANAGEMENT OF MIXED GOODS IN AN ECOSYSTEMS FRAMEWORK: DOLPHINS, WHALES, SEA TURTLES, AND CORAL REEFS

1. Common Resources, Public Bads, Mixed Goods, Total Economic Value, Biodiversity

* Heal, G. "Markets and Ecosystems (Chpt. 3)", "Biodiversity (Chpt. 6)", "Valuation (Chpt. 7)", "Sustainability (Chpt. 9)" in *Nature and the Marketplace*. Island Press (2000).

Worm et al. 2006. "Impact of Biodiversity Loss on Ocean Ecosystem Services." *Science* Vol. 313, 3 November 2006: 787-790.

Powerpoint Lectures (available on class website)

1. Conservation and Markets_7

(Reconciling Biodiversity Conservation with Markets and Resource Use)

2. Mixed Goods and Public Bads_8

3. Policies for Externalities_9

Further Reading (Optional)

"Total Economic Value," pp. 129-137 in D. W. Pearce and R.K. Turner, *Economics of Natural Resources and the Environment*. London: Harvester Wheatsheaf, (1990). (pdf file is available on the class website)

2. Sea Turtles

Dutton, P. and D. Squires. In press. "Reconciling Fishing with Biodiversity: A Holistic Recovery Strategy for Pacific Sea Turtles," *Ocean Development and International Law*.

(pdf file available on class web site)

Guest lecture

Powerpoint Lecture (in two parts) (available on class web site)

Sea Turtles Econ 145_I

Sea Turtles Econ 145_II

3. Dolphins

Hedley, C. 2001. "The 1998 Agreement on the International Dolphin Conservation Program: Recent Developments in the Tuna-Dolphin Controversy in the Eastern Pacific Ocean." *Ocean Development and International Law* 32 (2001): 71-92.

Available online at: <http://www.oceanlaw.net/hedley/pubs/32odil71.pdf>

(pdf file available on class website)

Possible guest lecture.

Further Reading (Optional)

Hall, Martin. 2003. "Solving the Tuna-Dolphin Problem." *Ocean Yearbook*.

(pdf file available on class website)

Hall, Martin. 1998. "An Ecological View of the Tuna-Dolphin Problem: Impacts and Trade-Offs," *Reviews in Fish Biology and Fisheries*, 8: 1-34.

(pdf file available on class website)

4. Whales

* Schneider, V. and D. Pearce. 2004. "What Saved the Whales? An Economic Analysis of the 20th Century Whaling." *Biodiversity and Conservation* 13(3): 543-562.

<http://www.oceanlaw.net/netpath/page5-com.htm>

(pdf file is available on class website.)

Possible guest lecture.

5. Coral Reefs