

Course Hours: MWF 4:00 – 4:50 PM**Classroom:** Center Hall 101**Instructor:** Dale Squiresdsquires@irpsmail.ucsd.edu**Office:** Econ 108**Office Hours:** Immediately preceding class
or by appointment**Head Teaching Assistant:** Jake LaRiviere

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Office: SH238**Class Web Page:****Course Dates:** Monday, March 31 - Friday, June 6**Final:** Thursday, June 12, 3pm-5:59 pm**Holidays:** Cesar Chavez Holiday, Friday, March 28

Memorial Day, Monday, May 26

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. A problem set is designed to review and learn the mathematics of bioeconomic models.

2. Final examination -- 45% 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 short assignments will be provided during the course and will be graded as pass / not pass, with 7 points for Assignment 1 (property rights essay) and 3 points for Assignment 2 (problem set) for each assignment (pass = full points, no pass = 0 points). Their completion will count for 10% of the grade.

4. Weekly TA session to discuss topics and readings

Reading Material

The two chapters of required reading material by Hartwick and Olewiler 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

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.

Optional: "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

Required: Squires, D. In press. "Property and Use Rights in Fisheries." In R. Allen, J. Joseph, and D. Squires, editors, *Conservation and Management of Transnational Fisheries*. Blackwell Publishing.
(pdf file available on class website)

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

II. THE ECONOMICS AND MANAGEMENT OF RENEWABLE MARINE RESOURCES

1. The Theory of Open Access and Bioeconomics

Required: 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.

(pdf file available on class website)

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

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.)

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

Required Assignment 1

For conceptual background read Hardin and either (1) Wade or (2) Seabright (more theoretical than Wade; Seabright uses theory of repeating cooperative and noncooperative games).

For application, read either (1) Acheson or (2) Cinner.

Assignment Reading: Hardin, G. 1968. "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) (required of all students)

Assignment Reading: Wade, R. 1987. "The Management of Common Property Resources: Finding a Cooperative Solution." *World Bank Research Observer* 2(2): 219-234.
(pdf file available on class website) (read either this or Seabright)

Assignment Reading: Seabright, P. "Managing Local Commons: Theoretical Issues in Incentive Design." *Journal of Economic Perspectives* 7(4): 113-134.
(pdf file available on class website) (read either this or Wade)

Assignment Reading: Acheson J. 1975. "The Lobster Fiefs: Economic and Ecological Effects of Territoriality in the Marine Lobster Industry." *Human Ecology* 3:183-207.
(pdf file available on class website) (read either this or Cinner)

Assignment Reading: Cinner, J. 2005. "Socio-Economic Factors Influencing Customary Marine Tenure in the Indo-Pacific." *Ecology and Society* 10(1): 1-36.
(pdf file available on class website) (read either this or Acheson)

Assignment: 4-page paper (typed, double spaced, 12 Arial font, 1" margins) discussing the possible use of common property to address the commons problem. Please develop your discussion within the context of either (1) Acheson and the lobster fiefs or (2) Cinner and customary marine tenure in the Indo-Pacific. Note: you don't have to read Acheson if you read Cinner and vice versa, but in either case you should show evidence of having read Hardin and either Wade or Seabright.

Required Assignment 2

Assignment: Problem Set No. 1

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

Required: Hartwick and Olewiler. Chapter 5.

Required: Squires, D., J. Kirkley, and C. Tisdell. 1995. "Individual Transferable Quotas as a Fishery Management Tool." *Reviews in Fisheries Science* 3(2): 141-169.
(pdf file available on class website)

Required: Grafton *et al.* "Incentive-Based Approaches to Sustainable Fisheries," *Canadian Journal of Fisheries and Aquatic Sciences* 63: 699-710.
(pdf file is available on class website)

Powerpoint Lecture (available on class website)
ITQs_5

Possible guest lecture.

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

3. Marine Reserves

Required: Hillborn, R. et al. 2004. When Can Marine Reserves Improve Fisheries Management? *Ocean and Coastal Management* 47: 197-205.
(pdf file is available on the class website)

4. Global Fisheries Issues

Note: These readings will be covered by the mid-term examination (i.e. there will be a question on them in the mid-term).

Required: Pauly et al. "Fishing Down Marine Food Webs," *Science* Vol. 279 pp. 860-863 (Feb 6, 1998)
(pdf file is available on class web page)

Required: Pauly *et al.* "Towards Sustainability In World Fisheries," *Nature* Vol. 418 pp. 689-695 (August, 2002).
(pdf file is available on class web page)

Required: Hilborn, R. 2007. "Moving to Sustainability by Learning from Successful Fisheries." *Ambio* 36(4): 296-303(pdf file available on class web page)

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

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

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

Required: "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)

Powerpoint Lectures (available on class website)
Conservation and Markets_7
(Reconciling Biodiversity Conservation with Markets and Resource Use)
Mixed Goods and Public Bads_8
Policies for Externalities_9

2. Sea Turtles

Dutton, P. and D. Squires. In press 2008. "Reconciling Fishing with Biodiversity: A

Holistic Recovery Strategy for Pacific Sea Turtles,” *Ocean Development and International Law*.

(pdf file available on class web site)

Segerson, K. In press. “Policies to Reduce Stochastic Sea Turtle Bycatch: An Economic Efficiency Analysis.” In P. Dutton, D. Squires, and M. Ahmed, editors, *Conservation of Pacific Sea Turtles*. Honolulu: University of Hawaii Press.

Guest lecture

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

Sea Turtles Econ 145_10A

Sea Turtles Econ 145_10B

3. Dolphins

Required: 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)

Possible guest lecture.

Powerpoint Lectures

Dolphin-Tunas_11A

Dolphin-Tunas_11B

Ecological Trade-Offs in the ETP_12

4. Whales

Required: 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.

(pdf file is available on class website.)

Powerpoint Lecture

Whales_12

Possible guest lecture.