

Environmental Markets (ESM 285)
Bren School of Environmental Science & Management
University of California, Santa Barbara
Spring 2017
Bren Hall1424
April 30, 2017

Professor: Gary Libecap
Office: 4412 Bren Hall
Phone: 805-893-8611
Email: glibecap@bren.ucsb.edu
Class meetings: MW 2:30-3:45 1520 Bren Hall
Office hours: M 1-2 or by appointment

Course Objective

This course presents rights-based or incentive-based arrangements for addressing environmental and natural resource losses associated with the “Tragedy of the Commons” whereby natural assets are under provided, under conserved, and depleted. Standard approaches are regulation and tax policies (Pigouvian Taxes), designed to constrain individual use to some optimum. Pigouvian taxes are rarely used and regulation (affectionately termed, “command and control”) often is not successful. The incentives of regulators and of actual users or other individuals do not coincide. Rights-based systems are an alternative that offer promise.

Topics include:

- The open access problem
- Traditional Pigouvian tax and regulatory solutions
- Ronald Coase, Nobel Prize 1991, and Coasean trading
- Environmental markets in habitat and ecosystem preservation, endangered species protection, conservation credits, surface and ground water reallocation and conservation, instream flows enhancement, fishery permits allocation and use, and possibly, cap and trade in emission permits.

Students will learn when rights-based systems are valuable solutions to open access losses and when they are unlikely to be and study the range of environmental markets. For **EACH CLASS** students will turn in a one-page summary/critique of the readings/topic by **8 am to me, glibecap@bren.ucsb.edu and BE PREPARED to LEAD DISCUSSION OF THE CLASS TOPIC.** I will randomly select 3-4 people to present their views and lead the class.

Course Materials

Course readings include journal articles, book chapters, cases, and reports. There will be guest lectures. All materials will be posted on Gauchospace. Class text book is Terry L. Anderson and Gary D. Libecap, 2014, *Environmental Markets: A Property Rights Approach*, New York: Cambridge University Press.

Course Requirements

Students are expected to complete all of the assigned reading before class.

1. For general discussion materials, students are required to turn in a **one** page written synopsis/criticism of key points in the **required readings by 8 am of the day of class to glibecap@bren.ucsb.edu** and be ready to lead discussion.

2. At the end of the term, students will submit a final, 5-page paper that outlines an area of environmental markets that seems particularly useful or that seems particularly problematic, relative to a baseline of standard regulation/tax policies. **Due June 9, 2017 8 am.**

Course Grades

Course grades will be based on daily class summaries/critiques (40%); discussion leadership (20%); and final research paper (40%).

4/03 Course Overview and the Problem of Open Access. This is the fundamental problem that leads to environmental degradation or loss and too rapid and wasteful natural resource extraction. All students will understand this problem and the reciprocal nature of environmental and resource problems.

Readings:

- Syllabus.
- Garrett Hardin, 1968, “The Tragedy of the Commons,” *Science* 162: 1243-8.
- H. Scott Gordon, 1954, “The Economic Theory of a Common Property Resource: The Fishery,” *Journal of Political Economy* 62(2): **pages 128-35 only.**
- Examples of environmental markets.
- Importance of Incentive Compatibility.

4/05 Standard Solutions: Regulation and Tax Policies and the Opportunity for Environmental Markets. What are the standard approaches for securing environmental quality, species and ecosystem conservation? When might they be effective and when not?

Readings:

- Terry L. Anderson and Gary D. Libecap, 2014 *Environmental Markets*, Preface Chapters 1, 2, “Who Owns the Environment?” “Is Government Regulation the Solution?”
- Pigouvian Tax, Regulation, and Comparison of Solutions.

4/10 Example: Groundwater: Regulation and Environmental Markets. Application of water rights and markets to groundwater overdraft, a classic open access problem. Guest presentation/discussion leader, Andrew Ayres.

Readings:

- Water in the West, Research Brief, November 2016, “Comparing Local Groundwater Withdrawal Permitting Laws in the Southwest and California”
- Yakima Herald, November 7, 2016, “Water Banking: Ruling means you could need to buy rights to drill a well.”
- Andrew Ayres-Sustainable Groundwater Management Act in California

4/12 Example: Groundwater: The Potential for Groundwater Rights and Local Solution to Overdraft.

- Andrew Ayres, continued.

4/17 Return to Theory: The Alternative to Standard Regulation: Rights-Based or Incentive-Based Approaches. Could parties bargain voluntarily to provide environmental quality and natural resource conservation? What might be the advantages relative to regulation? When would such approaches work and when might they not?

Readings:

- Terry L. Anderson and Gary D. Libecap, 2014 *Environmental Markets*, Chapter 3, “Property Rights for the Common Pool.”
- Ronald Coase, 1960, “The Problem of Social Cost,” *Journal of Law and Economics* 3: 1-44 **only**.
- What do you need for an environmental market? Property rights; an ability to bargain; and enforcement.

4/19 Local Solutions to Environmental and Resource Problems. There are examples of local solutions, whereby local groups restrict access and use. What are the characteristics of such settings and of the parties involved?

Readings:

- Terry L. Anderson and Gary D. Libecap, 2014 *Environmental Markets*, Chapter 4, “Local Property Rights to the Commons.”
- Michael Cox, Gwen Arnold, and Sergio Villamayor Tomás. 2010. A Review of Design Principles for Community-Based Natural Resource Management. *Ecology and Society* 15(4): 38-52, **especially Table 4**.

4/24 The Politics of Property Rights: Why Market Solutions are Often Difficult. Despite the benefits of assigning clear rights to environmental and natural resources when this is feasible to avoid the losses of open access, there often is resistance. Open access means too many parties use a resource and the assignment of property rights necessarily reduces the number of parties who have access. Those who expect to lose, might be better off under open access.

Readings:

- Terry L. Anderson and Gary D. Libecap, 2014 *Environmental Markets*, Chapter 5 “The Politics of Property Rights.”
- Bryan Leonard and Gary D. Libecap, 2015, “Endogenous First-Possession Property Rights in Open-Access Resources,” *Iowa Law Review* 100: 2457-78.
- Robert T. Deacon, Christopher Costello, and Dominic Parker. 2013. “Reforming Fisheries: Lessons from a Self-Elected Cooperative.” *Journal of Law and Economics* 56(1): **pages 83-89 only.**

4/26 Evidence of Benefits of Rights-Based Systems: Fisheries. Fisheries are not only iconic open-access resources, but examples of where regulation has failed and successfully been replaced in many cases by rights-based systems.

Readings:

- R. Quentin Grafton, Dale Squires, and Kevin Fox. “Private Property and Economic Efficiency: A Study of a Common-Pool Resource,” 2000 *Journal of Law and Economics*. 43(2): 679-713, **pages 679-90 only.**
- Christopher Costello, Steven Gaines, and John Lynham, 2008, “Can Catch Shares Prevent Fisheries Collapse?” *Science* 321, September 19: 1677-78.
- Ragnar Arnason, 2008, “Iceland’s ITQ System Creates New Wealth,” *The Electronic Journal of Sustainable Development* (2008) 1(2).

5/1 Coasean Trading (Environmental Markets) Approach to Conserving Big Eye Tuna in the Central and Western Pacific. Big Eye Tuna are a very valuable fish stock that are being overharvested for some time. Overharvest occurs from the by catch of juveniles in the massive skipjack tuna fishery. This is generally understood, but no workable response has been put into place. The costs of limiting skipjack fishing appear to be too high. In this paper, a possible solution is provided.

Reading:

- Dan Ovando, Gary Libecap, Lennon Thomas, Kat Millage, 2017, “A Bargain for Tuna: Market Based Solutions to Bigeye Tuna Bycatch.”

5/3 Water Markets: Surface and Groundwater. Water markets offer a solution to the growing problem of misallocation and waste. Why? And if so, how extensive are they? What could be the sources of resistance?

Readings:

- *Christian Science Monitor*, 3/8/2017 “How water swaps help the West manage a precious resource.”
- Westwater Research, “Water Market Outlook, 2016.”
- Westwater Research: “Water Market Outlook, 2017.”
- Bureau of Reclamation, 2016: *Water Marketing Activities within the Bureau of Reclamation*

- PPIC, “California’s Water,” October 2016.

5/8 Ecosystem Credit Markets, Transferable Development Rights, and Conservation Easements. There are a variety of instruments for protecting ecosystem quality.

Readings:

- Virginia McConnell and Margaret Walls, 2009, “Policy Monitor: U.S. Experience with Transferable Development Rights,” *Review of Environmental Economics and Policy*, Summer: 288-303.
- Dominic P. Parker and Wally N. Thurman 2013 “Conservation Easements: Tools for Conserving and Enhancing Ecosystem Services”. In: Shogren, J.F., (ed.) *Encyclopedia of Energy, Natural Resource and Environmental Economics*, 2: 133-143.
- Jessica Fox and Anamaria Nino-Murcia, 2005, “Status of Species Conservation Banking in the United States,” *Conservation Biology*, 19(4): 996-1007.
- Environmental Defense Fund: “Habitat Exchanges : How Do they Work?”
- EDF: Habitat Exchanges in General.
- EDF: Habitat Exchange Agreement.
- Lesser Prairie Chicken Habitat Quantification Tool.
- Central Valley Habitat Exchange EDF
- Central Valley Habitat Exchange Facts.

5/10 Example of Habitat Credits from a Bren Group Project: Feasibility of Establishing a Conservation Bank to Benefit Greater Sage Grouse in Montana.

- Guest discussion led by Bradley Bowers, Jeffrey Cedarbaum, Katherine Day, and Donald Macaskill.

5/15 Environmental Markets and Communities—why there can be opposition. Implementation of environmental markets or rights-based systems is often opposed by some parties even though there may be broad benefits from doing so.

- Guest lecture and discussion led by Eric Edwards, Utah State University.

5/17 Surface Water Trading Continued. This is an example of a specific objective achieved via the implementation and expansion of water markets.

- Guest lecture and discussion led by Eric Edwards, Utah State University.

5/22 Water Markets. More on water markets and their extent; the nature of property rights to water, critical for any water market.

- Bryan Leonard and Gary D. Libecap, 2017, “Prior Appropriation.”
- PPIC: Allocating California’s Water, 2016
- PPIC: State Water Market Needs Reform, 2016
- Peter Culp, Robert Glennon, and Gary D. Libecap: Shopping for Water, Island Press, 2014.
- EDF, 2016, “Better Access, Healthier Environment, Prosperous Communities: Recommended Reforms for the California Water Market”
- Leon Szeptyski and David Pilz (2017) “Colorado River Basin Environmental Water Transfers Scorecard,” Water in the West.

5/24 Water Markets. Water Quality Markets. There is a great deal of promise with water quality markets, but they face significant obstacles. We begin with their promise and their challenges.

Readings:

- Karen Fisher-Vanden and Sheila Olmstead, 2013. “Moving Pollution Trading from Air to Water: Potential, Problems, and Prognosis.” *Journal of Economic Perspectives* 27 (1): 147–172.
- USDA and Willamette Partners (2012), Part I, “A How-To Reference for Building Point-Nonpoint Water Quality Trading Programs Designing and Operating a Trading Program.”
- USDA and Willamette Partners (2012), Part II, “A How-To Reference for Building Point-Nonpoint Water Quality Trading Programs Designing and Operating a Trading Program.”
- Gwendolen Rees and Kurt Stephenson (2014), “Transaction costs of nonpoint source water quality credits: Implications for trading programs in the Chesapeake Bay watershed.”
- David A. Keiser and Joseph S. Shapiro (2017), “Consequences of the Clean Water Act and the Demand for Water Quality,” NBER Working Paper 23070, pp. 1-14, 21-35.

5/29 University Holiday

5/31 Air Emission Trading; Cap and Trade. For many of you, these are the most familiar environmental market and certainly the most prominent. But most do not perform well in terms of prices that equal something close to the social cost of carbon. Let’s see why and what we might learn.

Readings:

- Christoph Böhringer, 2014, “Two Decades of European Climate Policy: A Critical Appraisal,” *Review of Environmental Economics and Policy* 8(1): 1-17.
- Richard Schmalensee and Robert Stavins, 2013, “The SO₂ Allowance Trading System: The Ironic History of a Grand Policy Experiment,” *Journal of Economic Perspectives* 27 (1): 103-22.
- Graphs of price patterns for various Cap and Trade Emissions Markets.

RECLAIM

- US EPA. 2006. “An Overview of the Regional Clean Air Incentives Market.”

RGGI

- Regional Greenhouse Gas Initiative webpage: <http://rggi.org/>
- Skim just the overviews—introduction and conclusions: Paul M. Bernstein, W. David Montgomery, and Sugandha Tuladhar. 2004, “Economic Consequences of Northeastern State Proposals to Limit Greenhouse Gas Emissions from the Electricity Sector (RGGI).” Charles River Associates Incorporated.
- There are other assessments.

Canada

- BC, tax and trading? Quebec.

AB32

- Overview via CARB: <http://www.arb.ca.gov/cc/cc.htm>
- There are more recent assessments of AB 32.

EU ETS

China

6/5 Pros and Cons of use of Environmental Markets in Species Protec-

tion. There is significant controversy regarding how to protect species with regulation or markets. We begin with the problem of extinction and regulation under the ESA.

Reading:

- T.R. Halliday, 1980, “The Extinction of the Passenger Pigeon *Ectopistes Migratorius* and Its Relevance to Contemporary Conservation,” *Biological Conservation* 17: 157-62. Focus on the general arguments, not necessarily the biological modeling.
- Dean Lueck, 2002, “The Extermination and Conservation of the American Bison,” *Journal of Legal Studies* 31, S602-50. Focus on the general arguments, not necessarily the biological modeling.
- Jonathan Adler (2008), “Perverse Incentives and the Endangered Species Act,” RFF Public Commentary.
- Jeffrey Michael, Richard Howitt, Josué Medellín-Azuara, and Duncan MacEwan (2010) “A Retrospective Estimate of the Economic Impacts of Reduced Water Supplies to the San Joaquin Valley in 2009.”
- *The Hill* November 11, 2015, “Private investment holds key for species preservation”

6/7 International Trade in Endangered Species. Under the US ESA relatively few listed species are ever delisted and there is more movement to environmental markets for species preservation. In the international arena, this is not happening. Why and what are the possible consequences?

Reading:

- Doug Brandow 1/21/2013 “When You Ban the Sale of Ivory, You Ban Elephants,” *Forbes*
- cites.org: <http://www.cites.org/>
- Erwin H. Bulte and G. Cornelis van Kooten, 1999, “Economics of Antipoaching Enforcement and the Ivory Trade Ban,” *American Journal of Agricultural Economics*, 81, No. 2: 453-46. (skim the relevant pages).
- Michael `t Sas-Rolfes, 2013, “Does Destroying Ivory Really Save Elephants?” PERC Reports.
- “Elephants Get a Reprieve as Price of Ivory Falls,” *New York Times*, March 30, 2017.

6/9 Paper due, 8 am