

Course Information and Syllabus

Fall 2009

Water Policy

ESM 225

Bren School of Environmental Science and Management

Instructor: Robert Wilkinson, Ph.D. Phone: 569-2590
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Class Time: Tuesday/ Thursday 3:30pm-5:00pm

Class Location: Bren 1510

Office: Bren 4426

Office Hours: Tuesday/ Thursday 2:00pm-3:00pm and by appointment

Water is an immensely complex subject which requires the mastery of many disciplines from the practical sciences of hydrology, engineering, and chemistry to an understanding of history, social organization, and the law.

William L. Kahrl, *The California Water Atlas*

Course Description:

The topic of this course is water policy. We will explore key policy issues in the context of science, technology, and the practical management of water systems, and we'll examine the nexus between water policy, environmental issues, and economics. The course will provide students with an opportunity to focus on a policy issue of broad environmental, social, and economic significance. We will explore the following questions: What are the key policy issues? What roles do science, technology, economics, law, and social and political factors play in the policy process? We will examine the basics of water supply and use, the science of water systems and watersheds, key concepts in water policy and management, and we will cover the basics of water law as a fundamental element of the context for water policy.

Course Information and Requirements:

- Prerequisites for the course: second year standing or consent of the instructor
- 4 units

Grading Program:

The course grade will be based on the following point scale:

Class Participation	100
Presentations	200
Short Papers	400
Research Project	300
Total Points	1000

Please provide all class assignments to me by: 1) e-mail attachment (word, powerpoint, etc.) AND 2) written assignments on paper, due at the beginning of the class session on the day assigned.

Readings:

1. Course Reader, Water Policy, ESM 225 Grafikart, 6550 Pardall Rd, Isla Vista
2. Gaucho Space and web URLs identified for many specific readings below
3. Also, please sign up for the following free clipping service: "DWR's California Water News is distributed to California Department of Water Resources management and staff, for information purposes, by the DWR Public Affairs Office." For reader's services, including new subscriptions, please use the online page:
http://listhost2.water.ca.gov/mailman/listinfo/water_news

NOTE: *This course will place heavy emphasis on written and oral communication. You will be expected to stay on schedule with the readings, produce thoughtful and well-crafted written products and presentations, and contribute to class discussions. Full participation in this class is expected.*

Summary Course Calendar

September 29	Introduction to Water Policy: Course Overview
October 1	Historical Foundations for Water Policy
October 6	Current Challenges and Policy Developments
October 8	Legal Foundations of Water Policy Doctrines of Water Law
October 13	California's Water Plans and the Policy Planning Process
October 15	The Energy-Water Nexus: Integrating Policy Strategies
October 20	Systems Thinking and "Soft Path" Water Policy
October 22	The Potential Impacts of Climate Change on Water Systems
October 27	Water Policy Responses to Climate Change
October 29	Water Quality, Wastewater Treatment, and Water Recycling
November 3	Stormwater Management and Rainwater Harvesting
November 5	Desalination
November 10	Economics and Water Policy
November 12	Environmental Values and Water Policy
November 17	Watershed Logic as a Management Approach
November 19	Restoration as a Framework for Water Policy
November 24	Emerging Issues in Water Policy in the 21 st Century
November 26	THANKSGIVING
December 1	Student Presentations
December 3	Student Presentations

Syllabus

September 29

How, in the remaking of nature, do we remake ourselves?

Karl Wittfogel

Only through enlightened public understanding of these complex issues can we hope to integrate divergent viewpoints and contending interests into a wise policy of water management which will have sufficient resiliency to cope with climatic change and other developments in our society...

William L. Kahrl, *The California Water Atlas*

Topic: Introduction to Water Policy: Course Overview

We will begin with a review of the quarter calendar, course schedule and requirements, and other logistics. This will be followed by a discussion of the topic and purpose of the course. We will also do a round of introductions.

The subject of this course is Water Policy. We will begin with an examination of the topic: What issues are involved in water policy? What roles do science, economics, and social and political factors play in the policy process?

I will also review some of the hot button policy issues that we will be tracking this fall.

Brief class member introductions:

Please prepare and submit the following for the first class session:

- a full resume (don't worry about page length) include computer proficiency (graphics, GIS, modeling, etc.)
- statement of personal and professional *aspirations* (Please be a bit bold. I do not need exact plans or notions of what you are certain you will do. Think about what you *want* to do.) Be prepared to discuss it.

Readings:

- Reisner, Marc, 1993. *Cadillac Desert: The American West and its Disappearing Water*, Penguin, New York. (As I mentioned in my e-mail, I'd like you read this book on your own at some point before the end of the class. Sooner is better than later.)

Recommended Readings:

I'm providing below a few recommended sources for you. I do not expect you to read these works for this class. They are listed in order to give you guidance in case that you are looking to dig in further to learn about the history and context for water policy. I'd be delighted to discuss any of these works, and others, with you.

- Gleick, Peter et. Al: *The World's Water 2008-2009* (and previous years), <http://www.pacinst.org/publications/>
- Gottlieb, Robert, 1988. *A Life of Its Own: The Politics and Power of Water*, Harcourt Brace Jovanovich, New York
- Hundley, Norris Jr., 2001. *The Great Thirst*, University of California Press, Berkeley
- Kahrl, William, 1982. *Water and Power*, University of California Press, Berkeley
- Kelley, Robert. 1989. *Battling the Inland Sea, American Political Culture, Public Policy, and the Sacramento Valley, 1850-1986*, University of California Press, Berkeley.
- Stegner, Wallace, 1954. *Beyond the Hundredth Meridian: John Wesley Powell and the Second Opening of the American West*, Houghton Mifflin, Boston.
- Wilkinson, Charles, 1992. *Crossing the Next Meridian*, Island Press, Washington D.C.
- Worster, Donald, 1985. *Rivers of Empire*, Pantheon Books, New York
- Western Water Policy Review Advisory Commission, 1998, *Water in the West: Challenge for the Next Century*, National Technical Information Service.

October 1

My parents generation gloried in the construction of dams across America's rivers. My generation saw how those rivers were changed, deformed, killed by dams. Your generation must help decide if, how and where those dams stand or fall.

Bruce Babbitt, "Dams are Not Forever"

Topic: Historical Foundations for Water Policy

A key to understanding water policy issues is an understanding of the history behind present circumstances. We will explore the history of key water development strategies and we will discuss the environmental implications of several of the most interesting and important water projects including state and federal water systems and the projects built by the cities of Los Angeles and San Francisco.

Readings (reader/Gaicho):

- *California Water*, Water Education Foundation
- Postel, Sandra L., Gretchen C. Daily, Paul R. Ehrlich, 1996, "Human Appropriation of Renewable Fresh Water", *Science*, Vol. 271, 9 February 1996, p. 785.

Readings (web):

- LAO on California Water: <http://www.lao.ca.gov/laoapp/PubDetails.aspx?id=1889>

Resources:

- USGS <http://water.usgs.gov/> (A good web site for information on US water.)

October 6

... attitudes toward and methods for managing the State's natural resources have gone through many changes. Californians have become more environmentally sensitive, as reflected in statutes such as the California Environmental Policy Act, the Endangered Species Act, and the Wild and Scenic Rivers Act.

California Water Plan Update, 1993

Topic: Current Challenges and Policy Developments

California is in the midst of a major policy debate on water. We will discuss current policy questions with a focus on California decision-making processes.

Readings (web):

- Current bills: We will look at current legislative efforts as of this week. Look at the following web sites for progress on the following bills: (NOTE, things are moving quickly, so I'll give you an update in class. As I prepare this in late August, the proverbial compost is hitting the air handling device, so we will know more by the time we meet to discuss it.)
 - Senate Natural Resources & Water Committee, <http://www.assembly.ca.gov/acs/newcomframeset.asp?committee=26>
 - Assembly Water, Parks & Wildlife Committee, <http://www.assembly.ca.gov/acs/newcomframeset.asp?committee=26>
 - Senate Bill #1 (SB 12 content) author Simitian
 - Senate Bill #2 (SB 229 content) author Pavley
 - Senate Bill #3 (SB 458 content) author Wolk
 - Assembly Bill #1 (AB 39 content) author Huffman
 - Assembly Bill #2 (AB 49 content) authors Feuer-Huffman
- LAO on water rights (12 pages) <http://www.lao.ca.gov/laoapp/PubDetails.aspx?id=1959>
- New Global Public Opinion Survey Finds Water Issues are Top Environmental Concern Worldwide, Pacific Institute: http://www.pacinst.org/press_center/press_releases/water_survey_08_09.html
- 'Water buffaloes' got it all wrong <http://www.latimes.com/news/local/la-me-cap20-2009aug20.0.1463418.column>

Readings (reader/Gaicho):

- Wilkinson, Robert C., 2008. Invited Testimony to Congress, *Water Supply Challenges for the 21st Century*, Committee on Science and Technology, United States House of Representatives.

October 8

The development and use of water in California is governed by a complex system of State and federal laws... This system of law governing water is not fixed but evolves year by year as new issues are raised which require changes and new interpretations.

DWR, *California Water: Looking to the Future*, Bulletin 160-87

Topic: Legal Foundations of Water Policy and Doctrines of Water Law

Water law, and the ideas and circumstances that created it, are fundamental to the issues we are discussing in the context of water policy. We will look at the basis for water law and doctrine, the way it has been applied in the West, and the implications of our legal structure for water policy. The class will review the concepts, doctrines, key cases, and other aspects of water law.

Readings (reader/Gaicho):

- *Water Rights Law*, Water Education Foundation
- The “Audubon Case”, *National Audubon Society v. LADWP* [33 Cal. 3d 419 (1983)]
- California Constitution. Article 10, Section 2. http://www.leginfo.ca.gov/const/article_10
- Reclamation Projects Authorization and Adjustment Act of 1992 (CVPIA)

Resources:

- California State Water Resources Control Board, www.swrcb.ca.gov/ and
- SWRCB water rights: <http://www.waterboards.ca.gov/waterrights/>
- Environmental Protection Agency. <http://www.epa.gov/lawsregs/laws/index.html#cwa>
- California Environmental Quality Act (CEQA). (Pub. Resources Code, § 21000 et seq.) CEQA on line: <http://ceres.ca.gov/ceqa/>
- California River Law, <http://c2.com/kaweah/riverlaw.html>

Recommended Readings:

- Littleworth, Arthur L. and Eric L. Garner, 1995, *California Water*, Solano Press Books, Point Arena, CA
- California’s Rivers: A Public Trust Report. Prepared for the State Lands Commission. 1993. http://www.slc.ca.gov/Reports/CA_Rivers_Rpt.html

October 13

Before 1960, planning for future water allocation and use in California seemed to be a fairly straightforward process. With few exceptions, damming rivers ... was not regarded as having a serious detrimental impact on the environment.

DWR, *California Water: Looking to the Future*, Bulletin 160-87

Topic: California's Water Plans and the Policy Planning Process

California's official water plans have guided policy and infrastructure development for more than half a century. We will explore a variety of interesting issues that attend water planning and policy in California. We will consider questions such as: Why have we plumbed the state of California as we have? What is the relationship between the environmental problems we are facing and the way we have approached water policy in the past? What *is* the state water plan? How have the state's plans changed through the years? Why have we created the policy and norms that prevail today? What is driving important policy decisions we are currently making?

Readings (web):

- *The California State Water Plan*, Bulletin 160-09 Read the "Highlights" section (20 pages) and the Introduction: California Department of Water Resources, at: <http://www.waterplan.water.ca.gov>
- Los Angeles County Economic Development Corporation (LAEDC). 2008. *Where Will We Get the Water? Assessing Southern California's Future Water Strategies*. http://www.laedc.org/consulting/projects/2008_SoCalWaterStrategies.pdf.
- *Waste Not, Want Not: The Potential for Urban Water Conservation in California*, Pacific Institute. http://www.pacinst.org/reports/urban_usage/waste_not_want_not_full_report.pdf
- *California Water Solutions Now*, The Environmental Water Caucus: 2009. <http://ewccalifornia.org/home/index.php>

Readings (reader/Gaucha):

- McClurg, Sue. "Drought in the West: Changing Policies"
- Chung, Francis, et al. 2009. "Using Future Climate Projections to Support Water Resources Decision Making In California". California Climate Change Center
- Cohen, Ronnie, et al. 2009 "Increasing Water Efficiency in Commercial, Industrial, and Institutional (CII) Sector". Natural Resources Defense Council

Recommended Readings:

- *The California State Water Plans*, Bulletin 160-98 and Bulletin 160-05 <http://www.waterplan.water.ca.gov>
- Jay Lund, Ellen Hanak, William Fleenor, William Bennett, Richard Howitt, Jeffrey Mount, and Peter Moyle, 2008. Comparing Futures for the Sacramento-San Joaquin Delta. <http://www.ppic.org/main/home.asp>
- Dean Misczynski, 2009. Fixing the Delta: How Will We Pay for It? PPIC, <http://www.ppic.org/main/home.asp>

California's very existence is premised on epic liberties taken with water.

Marc Reisner, *Cadillac Desert*

Topic: The Energy-Water Nexus: Linking Policy Considerations

Water systems are major consumers of energy. In California, for example, the State Water Project is the largest single electricity consumer in the state, and its major pumping facility in the southern San Joaquin Valley is the largest single electricity user. In total, water systems consume about 19% of the state's electricity, the largest single sector. Water is also a source of energy, and hydroelectric power is a significant contributor to electricity grids in California and around the world. We will discuss the links between energy and water and various policy implications of this nexus.

Readings:

- Cohen, Ronnie, et. Al, *Energy Down the Drain*, 2004. NRDC and Pacific Institute. www.pacinst.org/reports/energy_and.../energy_down_the_drain.pdf
- California Energy Commission, *2005 Integrated Energy Policy Report*, (read the summary info at this web page, then read chapter 8 on water): http://www.energy.ca.gov/2005_energypolicy/index.html
- Park, Laurie, Bill Bennett, Stacy Tellinghuisen, Chris Smith, Robert Wilkinson, 2008. *The Role of Recycled Water In Energy Efficiency and Greenhouse Gas Reduction*, California Sustainability Alliance. http://sustainca.org/programs/water_energy/recycled_water_study

Readings (Reader/ Gaucho)

- Water/Energy Links in California

Recommended Readings:

- Wilkinson, Robert C., 2000. *Methodology For Analysis of The Energy Intensity of California's Water Systems, and an Assessment of Multiple Potential Benefits Through Integrated Water-Energy Efficiency Measures*, Exploratory Research Project, Ernest Orlando Lawrence Berkeley Laboratory, California Institute for Energy Efficiency. <http://www.es.ucsb.edu/faculty/wilkinson.php>

October 20

We must build now and ask questions later.

Harvey Banks, Former Director,
Department of Water Resources

Sustainable development should be the primary goal of environmental and economic policy.

National Commission on the Environment

It is increasingly obvious that the water policies that helped the state to become the agricultural and economic giant it is today are not up to the challenges of the 21st century.

Peter Gleick, et.al.,
California Water 2020: A Sustainable Vision

Topic: Systems Thinking and “Soft Path” Water Policy

We will use this class session to explore two related approaches to policy: systems thinking (e.g. systems dynamics) and “soft path” logic. In one of the most influential articles ever printed in the journal *Foreign Affairs*, Amory Lovins set forth the notion of “Soft Energy Paths” in 1976. The “soft path” is distinguished from a “hard path” in several important ways which we will discuss in class. The concept, originally applied to energy systems, has also been applied to water. We will explore the “soft water path” as an approach to water policy in the context of systems analysis.

Readings (reader/Gaucha):

- Meadows, Donella H., 1997. “Places to Intervene in a System”, *Whole Earth Magazine*, Winter 1997
- Soft Water Path Logic and Whole Systems Thinking
- Brooks, David B. 2003. *Another Path Not Taken: A Methodological Exploration of Water Soft Paths for Canada and Elsewhere*, Friends of the Earth Canada, Submitted to Environment Canada.

Readings (web):

- Best Management Practices, California Urban Water Conservation Council. <http://www.cuwcc.org>
- Sustaining California Agriculture in an Uncertain Future, Pacific Institute: http://www.pacinst.org/publications/online_update/aug_2009_online_update.html
- More with Less: Agricultural Water Conservation and Efficiency in California: A Special Focus on the Delta http://www.pacinst.org/reports/more_with_less_delta/index.htm

Recommended Readings:

- Meadows, Donella, H., Dennis L. Meadows, Jorgen Randers, 1992, *Beyond the Limits, Confronting Global Collapse, Envisioning a Sustainable Future*, Chelsea Green, Post Mills, Vermont.
- Hawken, Paul, Amory Lovins, and Hunter Lovins. 1999. *Natural Capitalism, Creating the Next Industrial Revolution*, Little, Brown, and Company.
- Ellen Hanak, 2009. California Water. PPIC, <http://www.ppic.org/main/home.asp>

Resources:

- Rocky Mountain Institute www.rmi.org

Climate change has the potential of affecting a wide variety of water resource elements. These range from water supply, hydroelectric power, sea level rise, more intense precipitation events, and water use.

Maurice Roos, California's State Hydrologist

Topic: The Potential Impacts of Climate Change on Water Systems

Water systems underpin both economies and ecosystems. Climate change and variability will impact these critical systems in a number of ways. All elements of water systems, from natural watersheds and water courses to reservoirs and conveyance systems to wastewater treatment systems, will be impacted by climate change and variability. In some cases, change may be beneficial. In others it may pose difficult challenges. We will examine the potential impacts of climate change with a specific focus on water resources. California will be used as a specific example.

Readings (web):

- United States Global Change Research Program (USGCRP), *Global Climate Change Impacts in the United States*, 2009. At: <http://www.globalchange.gov/> First read the background at: <http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts/full-report/about-this-report> Then review the relevant sections of the full report, found at: <http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts>
- Synthesis Report, Climate Change, Global Risks, Challenges & Decisions, Copenhagen 2009, 10-12 March <http://climatecongress.ku.dk/>

Recommended Readings:

- Wilkinson, Robert C., 2002. *The Potential Consequences of Climate Variability and Change for California, The California Regional Assessment*. Full report at: <http://www.ncgia.ucsb.edu/products.html>
- Intergovernmental Panel on Climate Change. <http://www.ipcc.ch/>
- National Assessment Synthesis Team. 2001. *Climate Change Impacts on the United States*. Report for the United States Global Change Research Program. Cambridge Univ. Press. <http://www.usgcrp.gov/usgcrp/nacc/> (See overview report and water sector report in particular)
- National Research Council, 2001. *Climate Change Science: An Analysis of Some Key Questions*, *Committee on the Science of Climate Change, Division on Earth and Life Studies*, National Academy Press, 2101 Constitution Avenue, N.W., Lockbox 285, Washington, D.C. 20055, (800) 624-6242, <http://www.nap.edu>

October 27

“In keeping with the Governor’s effort to fight climate change head on, re-examining the way we work and making adjustments accordingly is in many ways the most important thing we can do. Of all the difficult challenges that we’ve faced on this planet, environmental or otherwise, the greatest positive influence has happened when people acknowledge the problem, recognize their role in solving that problem and alter their behavior so that the change lasts. Adapting to climate change is a fundamental example of this principle”

Mike Chrisman, Secretary for Natural Resources

Topic: Water Policy Responses to Climate Change

Policy responses to climate change include efforts to reduce (GHG emissions), which are referred to in the climate dialogue as “mitigation” measures, and efforts to deal with impacts and changes already occurring and anticipated which are referred to as “adaptation” measures. There are important links between them. We will review the most current policies, plans, and strategies for both climate adaptation and mitigation at both the state and national/international levels.

Readings:

- Nelson, Barry, Monty Schmitt, Ronnie Cohen, Noushin Ketabi, Robert C. Wilkinson, 2007. *In Hot Water: Water Management Strategies to Weather the Effects of Global Warming*, Natural Resources Defense Council, <http://www.nrdc.org/globalWarming/hotwater/hotwater.pdf>
- AB 32 and Scoping Plan. Start here, these web sites provide links to an AB 32 fact sheet, the Scoping Plan, the timeline, and more: California Air Resources Board. <http://www.arb.ca.gov/cc/facts/facts.htm> and <http://www.arb.ca.gov/cc/ab32/ab32.htm>
- Global Warming Solutions Act of 2006 (AB 32): <http://www.arb.ca.gov/cc/docs/ab32text.pdf>
- *2009 California Climate Adaptation Strategy*, California Natural Resources Agency, (this site includes the plan as well as FAQs and other useful information) <http://climatechange.ca.gov/adaptation/index.html>

October 29

We are coming increasingly to appreciate the essential role of water in our total environment and also the importance of our environment to human well-being and to the maintenance of numerous delicately balanced life-support systems which sustain us.

William L. Kahrl, *The California Water Atlas*

Topic: Water Quality, Wastewater Treatment, and Water Recycling

Water quality is important to human health, ecosystem functions, and the viability species. Throughout the world, water quality is a significant and growing policy challenge. In many areas, water quality is declining. We will review the basics of water quality law and policy, and we will explore some of the state-of-the-art approaches to wastewater management.

Readings (reader/GaUCHO):

- TMDLs
- A Water Recycling Primer
- Wastewater Treatment Processes

Readings (web):

- *Water Recycling 2030, Recommendations of California's Recycled Water Task Force*, California Department of Water Resources, June 2003. <http://www.water.ca.gov/recycling/TaskForce/> (click on report image for download)

Resources:

- Biological Indicators of Watershed Health, <http://www.epa.gov/bioiweb1/>
- EPA's Offices of Water and Wastewater Management, <http://www.epa.gov/ow/> and <http://www.epa.gov/owm/>
- EPA. Economic Benefits of Runoff Controls. <http://www.epa.gov/OWOW/NPS/runoff.html>
- Environmental Protection Agency. 1999. Managing Non-point Source Pollution From Households: Pointer No. 10. <http://www.epa.gov/OWOW/NPS/facts/point10.htm>
- EPA. 1997. Managing Non-point Source Pollution From Agriculture: Pointer No. 6. <http://www.epa.gov/OWOW/NPS/facts/point6.htm>
- Environmental Protection Agency. 1997. The Non-point Source Management Program: Pointer No. 4. <http://www.epa.gov/OWOW/NPS/facts/point4.htm>

The success of environmentally sustained development depends on creative, environmentally sensitive engineering. It depends on engineering that looks beyond the immediate problem, the immediate gain, and considers the long term and wide ranging effects.

Lieutenant General Henry J. Hatch, Commander,
U.S. Army Corps of Engineers, Los Angeles, 1989

Topic: Stormwater Management and Rainwater Harvesting

As global warming threatens our water resources, communities are faced with a need to respond quickly and economically to water supply shortfalls. Both the snowpack and surface runoff that form a critical supply of potable water for western states are being affected by higher temperatures. Low impact development, or LID, is a land planning and engineering design approach to stormwater management that enables cities, states, and individuals to increase access to safe and reliable sources of water while reducing the amount of energy consumed and global warming pollution generated by supplying the water. New NRDC and UCSB analysis shows that implementing LID practices at new and redeveloped residential and commercial properties in parts of California can increase water supplies by billions of gallons each year, providing an effective and much-needed way to mitigate global warming's impact on California.

Readings (web):

- Garrison, Noah, Robert C. Wilkinson, Richard Horner, 2009. *A Clear Blue Future: How Greening California Cities Can Address Water Resources and Climate Challenges in the 21st Century*, Natural Resources Defense Council and Water Policy Program, Bren School of Environmental Science and Management, University of California, Santa Barbara, <http://www.nrdc.org/water/lid/default.asp>

Readings (reader/Gauche):

- Standard Urban Stormwater Mitigation Plans (SUSMPs)
- Stormwater Management, Urban Runoff, and Rainwater Catchment
- Laws and Regulations Governing Urban Runoff
- Otto, Besty, et al. 2002. "Paving Our Way to Water Shortages: How Sprawl Aggravates the Effects of Drought"

Resources:

- EPA. 1997. Economic Benefits of Runoff Controls. <http://www.epa.gov/OWOW/NPS/runoff.html>
- EPA. 1997. Managing Urban Runoff: Pointer No. 7. <http://www.epa.gov/OWOW/NPS/facts/point7.htm>

The moment we began settling California, we overran our water supply. We've never gotten to the point where you could just stop. And we never will.

William Warne, Former Director, Department of Water Resources

Topic: Desalination

Advances in technology have made it possible to treat salt water to high-quality water usable for any purpose. Applications of various technologies are proven, and they are being used successfully in a number of places around the world. They are not inexpensive, however, and there are environmental implications to their use. We will discuss the specific technologies currently being used, their costs, and other hurdles to their application.

Readings (web):

- *Desalination, With a Grain of Salt: A California Perspective*, <http://www.pacinst.org/reports/desalination/index.htm>
- Buross, O.K., 2000. *The ABCs of Desalting*, International Desalination Association, Topfield, Massachusetts, pp.20-23. <http://www.ida.bm/PDFS/Publications/ABCs.pdf>
- Draft Desalination Report to the Governor, DWR web site: <http://www.owue.water.ca.gov/recycle/desal/desal.cfm>
- California Desalination Planning Handbook <http://www.owue.water.ca.gov/recycle/desalination.cfm>

Resources:

- National Oceanic and Atmospheric Administration. 2001. Legislative Summaries: Coastal Zone Act Reauthorization Amendments Of 1990. <http://www.csc.noaa.gov/opis/html/summary/czra.htm>
- California Coastal Commission, *Seawater Desalination and the California Coastal Act*, <http://www.coastal.ca.gov/energy/Th3a-10-2003.pdf>
- Wangnick Consulting GMBH (<http://www.wangnick.com>) maintains a permanent desalting plants inventory and publishes the results biennially in co-operation with the International Desalination Association, as the IDA Worldwide Desalting Plants Inventory Report. Thus far, fifteen reports have been published, with the latest report having data through the end of 1997; and see Wangnick, Klaus. *1998 IDA Worldwide Desalting Plants Inventory Report No.15*. Produced by Wangnick Consulting for International Desalination Association. The data cited are as of December 31, 1997.

Unaware of the realities, Americans expect to receive water of the highest quality, at the lowest price, and in unlimited quality.

Federal Water Policy: Toward an Agenda for Action

It is increasingly obvious that the water policies that helped the state to become the agricultural and economic giant it is today are not up to the challenges of the 21st century.

Peter Gleick, et.al.,
California Water 2020: A Sustainable Vision

Topic: Economics and Water Policy

Economics has not figured prominently in water policy. Market signals (e.g. price signals) for water are commonly distorted. Water policy throughout the world has often systematically ignored market feedback. The result is predictable. Subsidies have seriously distorted “demand” for this scarce resource, many water supplies are seriously over-allocated, large “external” costs have been – and are being – paid by both the environment and society, and allocation of the resource is decidedly “sub-optimal” from an economic perspective. At the same time, many people are concerned that markets and market-oriented policies will harm both the poor and the environment. We will explore key issues related to the links between economics and water policy, and we will discuss the role, and the limits, of market tools and approaches – from pricing to water markets – as they are being employed as part of an emerging policy toolkit.

Readings (reader/Gaicho):

- “Priceless: A Survey of Water”, 2003. *Economist*, July, 19, 2003.
- Other readings

Readings (web):

- *The price of water: Market-based strategies are needed to cope with scarcity*, David Sunding, 2000. <http://californiaagriculture.ucanr.org/landingpage.cfm?article=ca.v054n02p56&fulltext=yes>
- Ravinder P.S. Malik, 2008. *Towards A Common Methodolgy For Measuring Irrigation Subsidies*, Global Subsidies Initiative (GSI) of the International Institute for Sustainable Development (IISD)Geneva, Switzerland <http://www.globalsubsidies.org/en/research/irrigation-subsidies>

Resources:

- Legislative Analyst's Office, 1999. *The Role of Water Transfers in Meeting California's Water Needs* September 8, 1999. <http://www.lao.ca.gov/>
- California State Water Resources Control Board, 1999. *A Guide to Water Transfers*, Division of Water Rights, California Environmental Protection Agency, Draft Document, July 1999. At <http://www.waterrights.ca.gov/watertransferguide.pdf>
- Public Citizen, <http://www.citizen.org/california/water/>
- Environmental Working Group, water subsidies, <http://www.ewg.org/reports/watersubsidies/execsumm.php>
- Lund, Jay R. and Richard Howitt, 2001. *Integrated Economic-Engineering Analysis of California's Future Water Supply*, Project Overview, October 2001. <http://cee.engr.ucdavis.edu/faculty/lund/CALVIN>

I loved building things. I wanted to build that goddamned water project. I was absolutely determined I was going to pass this California water project. I wanted this to be a monument to me.

Governor Pat Brown

Dams are not America's answer to the pyramids of Egypt. We did not build them for religious purposes and they do not consecrate our values (even if some are named after Presidents).

Bruce Babbitt, "Dams are not Forever"

Topic: Environmental Values and Water Policy

The modern environmental movement has shaped, and been shaped by, important water policy controversies. An early issue in California was the damming of Hetch Hetchy Valley in Yosemite National Park and the opposition to it by John Muir and others. The “movement” matured in the 1950s with David Brower and the Sierra Club battling dams on the Colorado River. American water policy was fundamentally altered in the process. We will examine and discuss the role of the environmental movement in the evolution of both the policy processes and outcomes.

Readings (reader/Gauche):

- *Overtapped Oasis*

Readings (web):

- Gleick, Peter, *et. al.*, 1995. *California Water 2020, A Sustainable Vision*, Pacific Institute, Oakland, CA.

Web Sites:

- NRDC, <http://www.nrdc.org/>
- Sierra Club, Restore Hetch Hetchy, <http://www.sierraclub.org/ca/hetchhetchy/>
- California Hydropower Reform Coalition, www.calhrc.org
- Environmental Working Group, www.ewg.org - Provides the public with locally relevant information on public health issues including drinking water.
- California Trout, www.caltrout.org
- Friends of the River, www.friendsoftheriver.org
- California Water Environment Association, www.cwea.org
- Surfrider Foundation USA <http://www.surfrider.org/>

Recommended Readings:

- Reisner, Marc and Sarah Bates, 1990. *Overtapped Oasis, Reform or Revolution For Western Water*, Island Press, Washington D.C.
- McPhee, John, 1971. *Encounters With the Archdruid*, Farrar, Straus and Gioux, New York

November 17

For too long, this water ran unused to the sea. For too long, surface water from one area was wasted, while there was a deficit nearby.

President John F. Kennedy, September, 1963

Topic: Watershed Logic as a Management Approach

Watersheds, and the idea of management and policy based on them, is a concept that is gaining ground in the United States and in other countries. New Zealand has recently restructured its entire national system of local land-use, resource, and environmental policy based on watersheds. Why are watersheds important in a political context? Why should, or should not, policy be based on watershed boundaries? Why do geographers and biologists find watersheds to be useful units of analysis? What are the political implications?

Readings (reader/Gaucha):

- *Watershed Management* in *Western Water*, Water Education Foundation
- "Finding Your Place in the Watershed"

Readings (web):

- CALFED Bay Delta Program: <http://calwater.ca.gov/index.aspx> (look at the pages on water supply, quality, and ecosystem restoration)
- Delta Vision: <http://deltavision.ca.gov/> (review final report and related strategic and implementation documents)
- LAO on Delta: <http://www.lao.ca.gov/laoapp/PubDetails.aspx?id=1931>

November 19

The 1940's dams were synonymous with progress, and the rivers were to be conquered with the fervor of a pioneer wielding an axe.

Tim Palmer, *Endangered Rivers and the Conservation Movement*

The clang of sledgehammer on concrete rings in a new era of watershed restoration.

Bruce Babbitt, "Dams are not Forever"

Topic: Restoration as a Framework for Water Policy

Legal mandates and policy processes are requiring restoration of habitats, species, and ecosystem functions. From a broader policy perspective, the restoration notion may also include restoration of community and business/jobs viability and profitability. In this class session we will discuss various examples of the restoration concept including dam removal and river restoration.

Readings:

- *Rivers Reborn: Removing Dams and Restoring Rivers in California*, Friends of the River
<http://www.friendsoftheriver.org/riversreborn/main3.html>

Resources:

- Society for Ecological Restoration, <http://www.ser.org/>
- Friends of the River. 2000. Restoring California Rivers: SB 1540 – The California Dam Decommission, River Restoration, and Public Safety Act of 2000. www.friendsoftheriver.org/html/a_damremove.html
- American Rivers, 1997. *Ten Reasons Why Dams Damage Rivers*. www.americanrivers.org/dam10ways.html

Recommended Readings:

- Postel, Sandra and Richter, Brian. 2003. *Rivers for Life*. Island Press.
- Gleick, Peter H., 2000. *The Changing Water Paradigm: A Look at Twenty-first Century Water Resources Development*, International Water Resources Association, Water International, Volume 25, Number 1, Pages 127-138, March 2000.

The History of the Colorado River contains a metaphor for our time. One could say that the age of great expectations was inaugurated at Hoover Dam -- a fifty-year flowering of hopes when all things seemed possible. And one could say that, amid the salt-encrusted sands of the river's dried up delta, we began to founder on the Era of Limits.

Marc Reisner, *Cadillac Desert*

Topic: Emerging Issues in Water Policy in the 21st Century

We will use this class session to discuss emerging water policy issues. From the global context to local issues, water policy considerations and strategies are changing rapidly. At this point in the course you will undoubtedly have a number of questions and ideas to discuss. This class session will be devoted to addressing those questions and ideas.

Readings (web):

- Water Scarcity and Climate Change: Growing Risks for Businesses and Investors, http://www.pacinst.org/reports/ungc_climate_water/index.htm
- Water conservation: "20 x 2020" Plan: http://www.swrcb.ca.gov/water_issues/hot_topics/20x2020/index.shtml