Course Information and Syllabus
Fall 2010

Water Policy
ESM 225
Bren School of Environmental Science and Management

Instructor: Robert Wilkinson, Ph.D.  Phone: 569-2590
E-mail: wilkinson@bren.ucsb.edu
Class Time: Tuesday/Thursday 3:45pm-5:15pm
Class Location: Bren 1510
Office: Bren 4426
Office Hours: Tuesday/Thursday 2:00pm-3:00pm and by appointment

Course Description:
The topic of this course is water policy. We will examine policy questions in the context of science, technology, law, politics, and the practical management of water systems, and we’ll explore the nexus between water policy, energy and climate policy, environmental issues, and economics. The course will provide an opportunity to focus on issues of broad environmental, social, and economic significance. We will examine the basics of water supply and use, 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:
The course grade will be based on the following point scale:

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<tr>
<th>Component</th>
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<tr>
<td>Class Participation</td>
<td>200</td>
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<tr>
<td>Presentations</td>
<td>100</td>
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<tr>
<td>Short Papers</td>
<td>450</td>
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<tr>
<td>Research Project</td>
<td>250</td>
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<tr>
<td>Total Points</td>
<td>1000</td>
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Please submit all class assignments in two forms: 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. I will use UCSB’s “Gaucho Space” for readings in addition to web-based readings identified below
4. Please sign up right away 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.
# Syllabus

## Summary Course Calendar

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<td>September 28</td>
<td>Water Policy: Toward an Integrated Approach</td>
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<td>September 30</td>
<td>Legal Foundations of Water Policy and Doctrines of Water Law</td>
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<td>October 5</td>
<td>Historical Context for Water Policy</td>
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<td>October 7</td>
<td>The Energy-Water-Climate Nexus: Integrating Policy Strategies</td>
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<td>October 12</td>
<td>Water Plans and the Policy Planning Process: Part 1 (State Level)</td>
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<td>Water Plans and the Policy Planning Process: Part 2 (Local and Regional)</td>
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<td>October 19</td>
<td>Water Plans and the Policy Planning Process: Part 3 (Federal and International)</td>
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<td>October 21</td>
<td>FIELD SESSION: Tour of Goleta Wastewater Plant</td>
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<td>October 26</td>
<td>The Potential Impacts of Climate Change on Water Systems</td>
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<td>Water Policy Responses to Climate Change</td>
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<td>November 2</td>
<td>Stormwater Management and Rainwater Harvesting</td>
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<td>November 4</td>
<td>Desalination</td>
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<td>November 9</td>
<td>Water Quality, Wastewater Treatment, and Water Recycling</td>
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<td>November 11</td>
<td>UCSB HOLIDAY</td>
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<td>November 16</td>
<td>Economics and Water Policy</td>
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<td>November 18</td>
<td>Watershed Logic as a Management Approach</td>
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<td>Restoration as a Framework for Water Policy</td>
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<td>Water Services, Water Use Efficiency, and Systems Thinking</td>
</tr>
<tr>
<td>December 2</td>
<td>Environmental Values and Water Policy</td>
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September 23

*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. Kahr, *The California Water Atlas*

**Topic:** Introduction and Course Overview

We will begin with an overview of the course including the quarter calendar, schedule and requirements, and other logistics. This will be followed by a discussion of the topic and purpose of the course.

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?

**Assignments:**
Please submit the following in class next Tuesday:
- a full resume (don’t worry about page length)
- 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.

**Recommended Reading:**

September 28

*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. Kahr, *The California Water Atlas*

*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

**Topic:** Water Policy: Towards an Integrated Approach

Water policy is evolving rapidly from an era of single-issue focus on decision-making for water or wastewater systems to an integrated approach that includes water supply, wastewater, stormwater, energy, climate, environment, and more. We will start with a discussion of this context for water policy and how it is advancing at the local, state, and federal levels.

**Readings:**
- Hundley, preface and chapters 1 & 2

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

**Recommended Reading:**
- Sustainable Water Resources Roundtable http://acwi.gov/swrr/swrr-sc.html and a good link to federal water programs is at http://acwi.gov/wicp_sitemap.html
September 30

*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, and the implications of legal structures for water policy. The class will review the concepts, doctrines, key cases, and other aspects of water law.

**Readings:**
- Hundley, Chapter 6
- *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](http://www.leginfo.ca.gov/const/article_10)
- Reclamation Projects Authorization and Adjustment Act of 1992 (CVPIA)

**Resources:**
- California Law [http://www.leginfo.ca.gov/calaw.html](http://www.leginfo.ca.gov/calaw.html)
- California State Water Resources Control Board, [www.swrcb.ca.gov/](http://www.swrcb.ca.gov/)
- Environmental Protection Agency. [http://www.epa.gov/lawsregs/laws/index.html#cwa](http://www.epa.gov/lawsregs/laws/index.html#cwa)

**Recommended Readings:**

October 5

*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 Context for Water Policy**

An essential aspect of understanding water policy issues is an understanding of the history behind present circumstances. We will explore the history of key water policy and development strategies.

**Readings:**
- Hundley, Chapter 3, 4, & 5
- *California Water*, Water Education Foundation

**Recommended Readings:**
October 7

California’s very existence is premised on epic liberties taken with water.
Marc Reisner, Cadillac Desert

Topic: The Energy-Water-Climate Nexus: Integrating Policy Strategies

Water systems are major consumers of energy. In California, for example, the State Water Project is the largest 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. Water is also a source of energy, and hydroelectric power is a significant contributor to electricity grids around the world. We will discuss the links between energy, water, and climate various policy implications of this nexus.

Readings:
• 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 Also see the full staff report (not required) and presentation materials.

Recommended Readings:

October 12

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


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:
• Hundley, Chapter 7 and “Reflections”
• 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

Recommended Readings:
October 14

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:** Water Plans and the Policy Planning Process: Part 2 (Local and Regional)**

Local and regional planning and management is a significant component of “local” water supply systems. These include the Los Angeles aqueduct, San Francisco’s Hetch Hetchy systems in Yosemite, and MWD’s Colorado River aqueduct along with many other significant local systems.

**Readings:**

- Metropolitan Water District of Southern California, Integrated Resources Plan (IRP) and Blue Ribbon Committee materials

**Recommended Readings:**


October 19

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

Karl Wittfogel

**Topic:** Water Plans and the Policy Planning Process: Part 3 (Federal, Global Levels)**

Federal efforts to develop an overarching water policy for the country have met with difficulty. The last major attempt to craft a federal water policy was in the late 1990s (see Western Water Policy Review Advisory Commission report). Recent discussions indicate a continuing interest in the development of an integrated federal policy on water. Individual agencies such as the Bureau of Reclamation are involved in water policy in certain regions. Other agencies deal with certain aspects of water management such as the Army Corps of Engineers with flood control and navigation, and the Environmental Protection agency with water quality and to some extent water use efficiency and stormwater management. At the international level, there are efforts to address water policy through multilateral programs like the Millennium Development goals. We will discuss these policy approaches.

**Readings:**

- Johnson Foundation Charting the Waters at [http://www.johnsonfdn.org/chartingnewwaters](http://www.johnsonfdn.org/chartingnewwaters)
October 26

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:


Recommended Readings:

- Synthesis Report, Climate Change, Global Risks, Challenges & Decisions, Copenhagen 2009, 10-12 March [http://climatecongress.ku.dk](http://climatecongress.ku.dk)
October 28

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:**

- 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](http://www.arb.ca.gov/cc/facts/facts.htm) and [http://www.arb.ca.gov/cc/ab32/ab32.htm](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](http://www.arb.ca.gov/cc/docs/ab32text.pdf) (this is the enabling legislation)
- 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](http://climatechange.ca.gov/adaptation/index.html)

November 2

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

Rainwater harvesting (capturing the rainwater and storing it in the ground or in tanks) and stormwater management (attenuating flows to avoid damages and pollution) are often labeled “low impact development, or LID” in the literature. 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. Implementing LID practices can increase water supplies, reduce pollution, save energy, and reduce greenhouse gas emissions. We will discuss this approach to water management and review quantification of multiple benefits.

**Readings (web):**


**Resources:**

November 4

The moment we began settling California, we overran out 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:

Resources:
- International Desalination Association: http://www.idadesal.org/

November 9

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 approaches to wastewater management.

Readings:

Resources:
- Biological Indicators of Watershed Health, http://www.epa.gov/bioiweb1/

November 11

UNIVERSITY HOLIDAY
November 16

_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:**

**Resources:**

November 18

_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 policy 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:**

**Recommended Readings:**
November 23

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 policies require 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

Recommended Readings:

Resources:
- Friends of the River [http://www.friendsoftheriver.org/site/PageServer](http://www.friendsoftheriver.org/site/PageServer)

November 25

THANKSGIVING
November 30

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: Water Services, Water Use Efficiency, and Systems Thinking

Increased water use efficiency is one of the largest “new” water supply options available. There is an emerging focus in water policy discussions on the provision of water services as opposed to ever-increasing volumes of water. We will discuss the role of water use efficiency and where it fits in the policy process in the context of systems approaches to policy.

Readings:
- CA Senate Bill x7-7 was enacted in November 2009, requiring all water suppliers to increase water use efficiency. http://www.water.ca.gov/wateruseefficiency/sb7/

Recommended Readings:

Resources:
... 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.

We must build now and ask questions later.
Harvey Banks, Former Director,
Department of Water Resources

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 – and the environmental movement – were both fundamentally altered in the process. We will examine and discuss the role of water and the environmental movement in the evolution of both the policy processes and outcomes.

Readings:
* TBA

Resources:
* Rocky Mountain Institute [www.rmi.org](http://www.rmi.org)
* Sierra Club, Restore Hetch Hetchy, [http://www.sierraclub.org/ca/hetchhetchy/](http://www.sierraclub.org/ca/hetchhetchy/)
* California Hydropower Reform Coalition, [www.callrc.org](http://www.callrc.org)
* Environmental Working Group, [www.ewg.org](http://www.ewg.org)
* California Trout, [www.caltrout.org](http://www.caltrout.org)
* Friends of the River, [www.friendsoftheriver.org](http://www.friendsoftheriver.org)
* California Water Environment Association , [www.cwea.org](http://www.cwea.org)
* Surfrider Foundation USA [http://www.surfrider.org/](http://www.surfrider.org/)

Recommended Readings: