

# Water Resources: Policy and Management

PuEnAf 351/551

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**Office Hours:** TTh: 11-12 or by appt.

**Class meets:** MWF 11-11:50

MAC 223

## **Course Objectives:**

Basic knowledge of the interdisciplinary nature of watershed management and linkages between natural science and social science in water policy, law, and planning.

Knowledge of the concepts, principles, and theories of water policy, law, and planning.

Knowledge of the traditions of geography – human-environmental interaction, earth science, and regional studies – and how they provide a framework to compare and contrast water issues from local to global scales.

An ability to engage in critical thinking about issues and concepts in water policy, management, and planning.

An ability to write clearly and effectively.

Introduce primary water policy, law, and planning literature.

An ability to analyze research and reports in the field of water policy, law, and planning.

An ability to qualify for graduate work in schools of environmental studies, public policy, public affairs, planning, or related fields, **or** to qualify for entry level professional employment in environmental policy and planning.

## **Introduction**

The world is facing unprecedented challenges as vital water is used and abused, managed and wasted. The world's limited water supply faces not only increasing populations to serve, but even more demand from newly-developing countries. Water quality is particularly vulnerable because air and soil pollution as well as certain land use practices can degrade water in addition to the pollutants introduced directly into waterways.

This course covers the past and present of how water has been shared and managed in various countries and divergent climates. How is it polluted, how is it purified, and how is it rationed in times of drought? What has mankind done to date to store, use, and reuse fresh water, and what are the possibilities for desalting briny groundwater and ocean water? Can

the various uses for water, municipal, industrial, agricultural, and instream uses be refined to "produce" more water? Are societies seriously planning for future water demand, or addressing the problems that may ensue from global climate change? Although governments have always played the leading role in supplying and allocating water, at what point does it become a commodity to be profited from by multinational corporations? More importantly, is the difference between available water and current demand creating winners and losers? One of the more arcane questions we will answer is: "How is Kansas like Libya?"

This course will cover the basics of water management and planning, covering local to global examples of such things as surface water pollution, mining of fossil aquifers, water wars at regional, interstate, and international levels, and current problems of perchlorate contamination, unprecedented drought in the West, threats to Great Lakes water, and more. Local, national, and international examples of water issues will weave the geographic themes of human-environmental interaction, earth science and regional studies to give a comprehensive analysis of the state of water issues now, and the implications for water in the future.

Weekly topics will be covered as follows:

**Jan 15: A Historical Perspective of Water Use and Development.**

Hydraulic Civilizations – Drinking water and irrigation

Water Transportation

Hydropower

Fertile Crescent, China, India, Andean regions, Iberian Peninsula, American Southwest

**Jan 22: Human Impacts on the Hydrologic Cycle, Climate, & Weather.**

Changing the hydrologic cycle at the local level

Potential regional effects of climate change

New needs for storage – floods and drought

Rivers no longer reach the sea

Great Salt Lake, Aral Sea, Yellow River, Colorado River, Rio Grande

**Jan 29: Surface and Ground Water Hydrology.**

Basics of water movement over and through different materials

Overpumping for water use: Mining, cities, agriculture

“Fossil” aquifers – Libya, Yemen, Saudi Arabia, Pakistan, Ogallala Aquifer, W. New Mexico

Overpumping for water waste: Natural gas mining – Northern Front Range of Rockies

**Feb 5: Water Quality.**

Characterizing water quality

Point and Nonpoint sources

Pollutant transport and fate – chemicals, metals, viruses and bacteria

When is a pollutant not a pollutant?

Science and politics behind regulations

Land use and water quality

Pollution effects on aquatic, riparian, and coastal environments

Relative differences in water quality problems between developed and developing countries

**Feb 12: Municipal and Irrigation Water Development.**

Early growing cities – Los Angeles, San Francisco, Denver, New York  
Shared and opposing interests of domestic, industrial, and irrigation uses  
Politics and economics of municipal competition for water and growth  
Irrigation – Trends and limitations

**Feb 19: Dams.**

Dam types, uses, and locations  
Positive and negative impacts- ecological, economic, health, political  
Colorado, Columbia, Mississippi and Tennessee Rivers  
Dams removal – Wisconsin and other key states  
Recently built dams in developing countries

**Feb 26, Mar 5: Water Allocation Law.**

Old world foundations  
Riparian  
Prior Appropriation  
Hybrid  
Groundwater law  
Federal Reserved rights  
Indian rights – Navajo-Gallup Water Project Legislation  
Interstate compacts

**Mar 9: Federal Agencies Influencing Water Use.**

USACE, USBR, USGS, USFWS, NPS, BLM, USEPA, NRCS, USFS, FERC, NMFS, FEMA.

**Mar. 10-18: Spring Recess**

**Mar 19: Local, Regional, State, and Multi-state Water Mgmt. Agencies in the U.S.**

Local – Municipal Water Depts, Water and Sewer Districts, Levee and Flood Control Districts, Ditch and Irrigation Companies, Acequias.  
Regional – Irrigation, Conservancy/Conservation, Natural Resources, and Groundwater Management Districts.  
State – Arizona Water Agencies, Rhode Island Water Agencies  
Multistate – Chesapeake Bay and Missouri River Basin Commissions  
Canadian and Mexican water management

**Mar 26: Drinking Water and Wastewater Treatment.**

Basics of treatment and distribution systems  
Effects of SDWA and CWA on treatment  
Wells and septic tanks – outside of which laws?  
Developed and developing country trends

**Apr 2: Infrastructure - National and Global.**

US - Age, maintenance, and regulatory costs for water and wastewater plants  
Canada – Cities without sewage treatment  
Developing countries – building treatment plants, determining user fees, social inequities

**Apr 9: Water in the Environment, Fish and Wildlife**

Wild and Scenic Rivers Act, National Environmental Policy Act, Endangered Species Act  
Whooping Cranes on the Platte River, Executive Branch decisions on Pacific Salmon, global  
caviar wars.

**Apr 16: Economics of Water**

Private or public funding  
Finding the “right” price  
Regional approaches  
International issues

**Apr 23: Conflicts and Compromise – Fighting over Water**

Alabama vs. Florida vs. Georgia  
Texas Panhandle  
Northern vs. Southern California  
Colorado River Compact – Northern vs. Southern states  
Missouri River – Upper vs. lower states  
International conflicts – Indus, Tigris, Euphrates, Nile, Jordan, Ganges, Mekong Rivers

**April 30: Global Water Trends**

Industrialization demand  
Population demand  
Water limits and distribution  
Water Harvesting  
Water Ranching  
Water Reuse

**May 7: Last Day of Class**

**Coursework and Grading**

There will be two midterms and a final. Half of the questions on these exams come from the lectures and half come from your readings. **Bring a printout of a water-related article every week. Make sure that each week your article is from a different source.** This is a writing emphasis course, giving the student an opportunity to write three papers on a current water problem. Undergraduate topics will be linked to three articles from the student articles. Graduate students will use three journal articles of their choice and write a discussion paper for each to meet this writing requirement.

Undergraduate Grading

Exam 1                    20  
Exam 2                    20  
Final                      20  
Three papers            25  
Participation/attend. 15  
                                  100

**Feb 16, Fri**  
**Mar 30, Fri**  
**May 14, Monday**  
**(10:30-12:30)**

Graduate Grading

Exam 1                    20  
Exam 2                    20  
Final                      20  
Essays - 3 journal articles   25  
Partic./Attendance        15  
                                  100

## **Readings**

Text - (2005) "*Principles of Water Resources: History, Development, Management, and Policy*, 2<sup>nd</sup> ed. by Thomas V. Cech Wiley Publ.

Articles – There will be some handouts in class or articles put on electronic reserve.

## **Important notes:**

- The final is only given at the allotted time in the campus schedule. **NO exceptions**
- Creating a distraction in class will result in your dismissal from class. Distractions include talking, passing notes, personal grooming, using electronic equipment of any kind, etc.

## **Students with Disabilities**

Note:

Consistent with the federal law and the policies of the University of Wisconsin, it is the policy of the University of Wisconsin-Green Bay to provide appropriate and necessary accommodations to students with documented physical and learning disabilities. If you anticipate requiring any auxiliary aids or services, you should contact me or the Coordinator of Services for Students with Disabilities at 465-2841 as soon as possible to discuss your needs and arrange for the provision of services.

## **Associated Literature**

Bates, Sarah F., David H. Getches, Lawrence J. MacDonnell, Charles F. Wilkinson. 1993. *Searching Out the Headwaters: Change and Rediscovery in Western Water Policy*. Washington D.C.: Island Press.

Brooks, Kenneth N., Peter F. Ffolliott, Hans M. Gregersen and Leonard F. DeBano. 1997. *Hydrology and the Management of Watersheds*, 2<sup>nd</sup> ed., Ames, IA: Iowa State University Press.

Catton, William R. Jr. 1980. *Overshoot: The Ecological Basis of Revolutionary Change*. Chicago, IL: University Of Illinois Press.

Feldman, David Lewis. 1991. *Water Resources Management: In Search of an Environmental Ethic*. Baltimore: The Johns Hopkins University Press.

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- Tarlock, Dan A., James N. Corbridge, Jr. and David H. Getches. 2002. *Water Resource Management: A Casebook in Law and Public Policy, 5 ed.*, New York: Foundation Press.
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- Wilkinson, Charles F. 1992. *Crossing the Next Meridian: Land, Water, and the Future of the West*. Washington, D.C.: Island Press.
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- (Jan. 21, 2003). *Colorado River's health is vital to West*. AZ Central [Online] [www.azcentral.com](http://www.azcentral.com).
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- (April 26, 2004). *Colorado thinks the unthinkable: Letting river water go*. AZ Central [Online] [www.azcentral.com](http://www.azcentral.com).
- (May 2004). *Lawmakers consider new Front Range water district*. US Water News Online.

(May 7, 2004). *USFilter RO system to desalinate riverside county water*. World-Wire [Online] [www.world-wire.com](http://www.world-wire.com).

Daley, R. M. (2003). *Chicago's Water Agenda 2003*. City of Chicago.

Ebbertand, S. & Massey, J. (April 29, 2004). *Lead levels in water high in 10 locales*. The Boston Globe [Online] [www.boston.com](http://www.boston.com).

Fleming, J. (May 3, 2004). *California thirsty for seawater: Desalination plant alarm opponents of development*. Chicago Tribune [Online] [www.chiagotribune.com](http://www.chiagotribune.com).

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