THE OHIO STATE UNIVERSITY

ENR 5451
Water Policy and Governance

Day and time of meetings: Monday/Wednesday from 12:45 to 2:05 PM
Location: 246 Agricultural Administration Building

Instructor: Ramiro Berardo, Ph.D.
Office hours: Monday 9 to 10:30 am and Wednesday 11:00 am to 12:00 pm, or by appointment
Email: berardo.3@osu.edu

Course Description

Freshwater is a necessary resource, but also a scarce one. It is this scarcity that produces the conditions for the emergence of conflict among potential users, hence requiring the design of institutions –or rules- that seek to accomplish an efficient and equitable utilization of water. This class examines such institutions a variety of levels –state, federal, and international- and analyzes how they affect water access and use in different areas (agriculture, energy, etc.). Students in the class will also engage in a careful examination of the sources of conflict and cooperation among water stakeholders on a regional and global scale. The main goal of the course is to foster the students' capacity to assess how water-related conflicts can be prevented through the design and implementation of relevant policies.

Course Objectives

- To expose students to the study of water topics from a policy perspective.
- To understand the role of national legislation in the regulation of behavior with potentially detrimental effects for water quality in the U.S.

- To learn about the potential and limitations of both free markets and governments in dealing with water management problems.
- To learn how to translate policy analysis into usable directives for water policy makers and stakeholders.
- To develop writing presentation skills.

Course Requirements

The Student:

Each student must accept responsibility for preparing for each class session by completing assigned readings and taking the time to reflect upon them. Assigned readings are posted in the course's Carmen site (or linked to from this syllabus).

Participation is graded in this class! Each student's contribution is helpful to increase our understanding of the topics we'll cover. **Only rule: <u>be courteous and tolerant with ideas that you don't agree with</u>**. In the course's Carmen site you can find a file called "Discussion questions.pdf" at the top of the "Readings" module. This file has some basic questions you should keep in mind as you read the material before coming to class. I plan to use those questions to guide the in-class discussions (at least initially but not always). There might be as many as 30 students in this class, which means that time to participate may be at a premium if a small group of students monopolizes discussions. To prevent this problem, I will both encourage students to participate, and randomly ask students for their opinions and ideas on the readings/ongoing conversations (i.e. we'll use the Socratic method). So be ready to be called on! But here is one simple rule to keep in mind: the more you raise your hand to participate, the less I will have to call out your name out of the blue.

Attendance is not mandatory.

There will be **one midterm examination**, but no final exam. The exam will be a mix of multiple choice, true/false and essay questions (there will be a few questions tailored specifically for graduate students). Make-up exams will be scheduled ONLY FOR MEDICAL REASONS THAT CAN BE PROPERLY DOCUMENTED.

Because this class is a 5000 level class, there will be both undergraduate and graduate students enrolled. **Undergraduate students will work in a group final project. This final project will result in two products: a policy brief, and a short documentary or podcast examining a water policy topic or problem.** The Policy Brief-Documentary/podcast Combo will be presented to the rest of the class at the end of the semester (see schedule below). More information about both components of the combo will be available online. Students will need to inform the instructor

about the topic no later than January 30th. **Graduate students can choose to work individually or in groups of no more than 3 students.** Graduate students working individually will produce a Policy Brief-Poster/Research Paper combo. Graduate students working in a group will produce a Policy Brief-Documentary Combo OR a Policy Brief-Research Paper Combo. The combos will be presented to the rest of the class at the end of the semester (see schedule below). More information about the combos will be available online. Students will need to inform the instructor about the type of combo (and topic) that they will be working on no later than January 30th.

In addition to presenting the combos to the class, students will submit them for grading on April 28th no later than 1:45 pm. Late submissions will be assessed a 20% grade reduction for the first 24 hours and 10% grade reduction for every 24 hours after that.

NO EXTRA CREDIT ASSIGNMENTS WILL BE GIVEN DURING THE SEMESTER.

Grading Policy

Participation: 25% of the final grade.

Exam: 35% of the final grade.

Policy Brief-Documentary/podcast/research paper/poster Combo: 40% of the final grade.

Grading Scale

A: 93 % or higher; A-: 90 to 92.9 %; B+: 87 to 89.9 %; B: 83 to 86.9 %; B-: 80 to 82.9 %; C+: 77 to 79.9 %; C: 73 to 76.9 %; C-: 70 to 72.9 %; D+: 67 to 69.9 %; D: 60 to 66.9 %; E: lower than 60%.

University Policies

Availability of Accommodations. If you have a documented disability, please register with the Office for Disability Services (ODS). After registration, make arrangements with me as soon as possible so that they can be implemented in a timely fashion. All discussions will remain confidential. If you have any questions about this process please contact ODS at (614) 292-3307.

Academic misconduct. Cheating on exams or plagiarism are violations of the

academic honor code and carry severe sanctions, including failing a course or even suspension or dismissal from the University. In addition to consulting the procedures created by the OSU Committee on Academic Misconduct (http://oaa.osu.edu/coam.html), here are some basic guidelines:

1. **Cheating on an exam**: Students who cheat on an exam will be reported to the Committee of Academic Misconduct for investigation and upon review will receive a failing grade for this class.

2. **Plagiarism**: Students who plagiarize (including engaging in self-plagiarism) will be reported to the Committee of Academic Misconduct for investigation and upon review will receive a failing grade. Plagiarism means using someone else's ideas or words (even in a short phrase) without indicating where you got them. If you use someone else's idea, in your own words, you must include a citation to indicate where you got the idea. If you use someone else's words, you must put quotes around them and include a citation to indicate where they came from. Plagiarism includes copying another student's paper or ideas. Self-plagiarism constitutes the reuse of one's own work, in its entirety or in part, submitted to satisfy other requirements at OSU or another institution.

Course Topics

January 6th
Introduction

No required reading. We will go over the syllabus, introduce ourselves, and discuss expectations for the semester. We will also form the groups for class projects.

January 8th
Water use at a planetary scale (I)

Required readings:

Hoekstra, A.Y. and Mekonnen, M.M. (2012). The water footprint of humanity. *Proceedings of the National Academy of Sciences*, 109(9): 3232– 3237.

Castilla-Rho, J. C., Rojas, R., Andersen, M. S., Holley, C., & Mariethoz, G. (2017). Social tipping points in global groundwater management. *Nature Human Behaviour*, *1*(9), 640.

January 13th
Water use at a planetary scale (II)

Required readings:

Dalin, C., Wada, Y., Kastner, T., & Puma, M. J. (2017). Groundwater depletion embedded in international food trade. *Nature*, *543*(7647), 700.

January 15th
Water Security

Required readings:

Gerlak, A. K., House-Peters, L., Varady, R. G., Albrecht, T., Zúñiga-Terán, A., de Grenade, R. R., ... & Scott, C. A. (2018). Water security: A review of place-based research. *Environmental Science & Policy*, *82*, 79-89.

Staddon, C., & Scott, C. A. (2018). Putting water security to work: addressing global challenges. *Water International* 43(8): 1017-1025.

January 20th
MLK day (No class)

January 22nd
Water and Conflict

Required reading:
CNA. 2017. The Role of Water Stress in Instability and Conflict. CRM-2017-U-016532.

January 27th
Water and Conflict (II)

No required reading

We'll watch and discuss parts of the movie "Blue Gold: Water Wars (2009)"

January 29th
Integrated Water Resources Management

Required readings:

Biswas, A. K. (2008). Integrated water resources management: is it working? *International Journal of Water Resources Development*, *24*(1), 5-22.

Petit, O. (2016). Paradise lost? The difficulties in defining and monitoring Integrated Water Resources Management indicators. *Current opinion in environmental sustainability*, *21*, 58-64.

February 3rd
Guest Speaker: Andrew McGuire
Watershed Management-Orange County (California)

Required readings:
Integrated Regional Water Management – Helping Create a Balanced Portfolio for our Water Future

February 5th
Water Doctrines

Required reading:

Tisdell, J. G. (2003). Equity and social justice in water doctrines. *Social justice research*, *16*(4), 401-416.

Suggested reading:

Smith, J.; Gleick, P.; Cooley, H.; Allen, L.; Vanderwarker, A.; Berry, K. 2012. *A Twenty-First Century U.S. Water Policy*. New York: Oxford University Press. Chapters 1 and 2 (available on Carmen)

Smith, J. C., & Ellsworth, S. M. (2016). Public Trust vs. Prior Appropriation A Western Water Showdown. *Natural Resources & Environment*, *31*(1), 18.

Smith Jr, M. D. (2016). A Blast from the Past: The Public Trust Doctrine and Its Growing Threat to Water Rights. *Envtl. L.*, *46*, 461.

February 10th
The Economics of Water

Required reading:

Garrick, D. E., Hanemann, M., & Hepburn, C. (2020). Rethinking the economics of water: an assessment. *Oxford Review of Economic Policy*, *36*(1), 1-23.

Suggested reading:

Olmstead, S. M. (2010). The economics of managing scarce water resources. *Review of Environmental Economics and Policy*, *4*(2), 179-198.

February 12th
In-class simulation (water rights market)

No required reading. In addition to the simulation, we'll devote about 15 minutes of this meeting to discuss topics for final combos.

February 17th
Clean Water Act (I)

Required reading:

Keiser, D. A., & Shapiro, J. S. (2018). *Consequences of the Clean Water Act and the demand for water quality*. *The Quarterly Journal of Economics*. DOI: 10.1093/qje/qjy019

February 19th
Clean Water Act (II)

Required reading:

We'll watch the following videos during class:
Why farmers are concerned about EPA's new rules on protected water. (NPR.)
Waters of the United States: interpreting the Clean Water Act. (Federalist Society.)
NY farmers ask EPA to "Ditch the Rule". (New York Farm Bureau.)

February 24th
Safe Drinking Water Act (I)

Required readings:

Tiemann, M. (2017). Safe Drinking Water Act (SDWA): A Summary of the Act and Its Major Requirements. Available at http://www.fas.org/sgp/crs/misc/RL31243.pdf

Allaire, M., Wu, H., & Lall, U. (2018). National trends in drinking water quality violations. *Proceedings of the National Academy of Sciences*, 201719805. Available on Carmen.

We'll visit the Contaminate Candidate List at
http://water.epa.gov/scitech/drinkingwater/dws/ccl/

February 26th
Safe Drinking Water Act (II)

Required readings:

McDonald, Y. J., & Jones, N. E. (2018). Drinking Water Violations and Environmental Justice in the United States, 2011–2015. *American journal of public Health 108*(10), 1401-1407

Switzer, D., & Teodoro, M. P. (2017). The Color of Drinking Water: Class, Race, Ethnicity, and Safe Drinking Water Act Compliance. *Journal-American Water Works Association*, *109*(9), 40-45.

March 2nd
Water Justice (I)

Required reading:

Neal, M. J., Lukasiewicz, A., & Syme, G. J. (2014). Why justice matters in water governance: some ideas for a 'water justice framework'. *Water Policy*, *16*(S2), 1-18.

March 4th
Water Justice (II)

Required reading:

Hanna-Attisha, M., LaChance, J., Sadler, R. C., & Champney Schnepp, A. (2016). Elevated blood lead levels in children associated with the Flint drinking water crisis: a spatial analysis of risk and public health response. *American journal of public health*, *106*(2), 283-290.

Movie: Poisoned Water.

Other (non required) reading:

Butler, L. J., Scammell, M. K., & Benson, E. B. (2016). The Flint, Michigan, water crisis: a case study in regulatory failure and environmental injustice. *Environmental Justice*, *9*(4), 93-97.

Clark, Anna. (2018). The Poisoned City: Flint's Water and the American Urban Tragedy

Hanna-Hatisha, Monna. (2018). What the eyes don't see. New York, NY: One world.

Pieper, K. J., Tang, M., & Edwards, M. A. (2017). Flint water crisis caused by interrupted corrosion control: Investigating "ground zero" home. *Environmental Science & Technology*, *51*(4), 2007-2014.

March 9th -13th
Spring Break

March 16th
Water Affordability

Required reading:

Teodoro, Manuel. 2019. Water & Sewer Service Affordability in Ohio Assessment & Opportunities for State Policy. Report to the Alliance for the Great Lakes & Ohio Environmental Council.

Teodoro, M. P. (2018). Measuring Household Affordability for Water and Sewer Utilities. *Journal-American Water Works Association*, *110*(1), 13-24.

March 18th
Harmful Algal Blooms in Lake Erie

Required readings:

Wilson, R. S., Beetstra, M. A., Reutter, J. M., Hesse, G., Fussell, K. M. D., Johnson, L. T., ... & Winslow, C. (2019). Commentary: Achieving phosphorus reduction targets for Lake Erie. *Journal of Great Lakes Research*.

Other (non-required) reading:

Berardo, R., Formica, F., Reutter, J., & Singh, A. (2017). Impact of land use activities in the Maumee River Watershed on harmful algal blooms in Lake Erie. *Case Studies in the Environment*. DOI: 10.1525/cse.2017.sc.450561.

Egan, D. (2017). *The Death and Life of the Great Lakes*. New York, NY: W.W. Norton & Company.

Vollmer-Sanders, C., Allman, A., Busdeker, D., Moody, L. B., & Stanley, W. G. (2016). Building partnerships to scale up conservation: 4R Nutrient Stewardship Certification Program in the Lake Erie watershed. *Journal of Great Lakes Research*, *42*(6), 1395-1402.

March 23rd
Harmful Algal Blooms in Lake Erie (II)

https://senr.osu.edu/No required reading. We'll use Mental Modeler to perform a stakeholder analysis in order to understand what are the main social-political obstacles to solving HABs in Lake Erie.

March 25th
Policy Briefs, videos, posters, and research papers.

No required reading. We will go over the requirements for policy briefs, videos, posters, and research papers.

March 30th
Exam Review OR pick up take-home exam

April 1st
In-class Exam

Note: Take home exams will be due on April 6th and you'll drop a copy in Carmen)

April 6th
Work on Policy Briefs, Videos, Posters (classroom)

April 8th -13th
Work on Policy Briefs, Videos, Posters
The instructor will hold office hours during the regularly scheduled time of the week PLUS during class time these two days. Students are encouraged to stop by to talk about their projects.

April 15th
Combo Presentations (I)

April 20th
Combo Presentations (II)

April 28th
Submit final combos by 1:45pm