

Water Resource Economics

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Class Meeting: M W 3:00 – 4:20
Class Location: Smith 311
Office hours: Thursday 4:00 – 5:00pm and
Friday 2:00 – 4:00pm
And by appointment
Website:
depts.washington.edu/pafwater/WatResEcon/

Description

This course will explore the economics of water resources. Students will gain familiarity with the basic economic insights into water resources problems, including static and dynamic efficiency for consumers and producers. We will discuss water pricing (including both municipal and irrigation), and cover techniques for measuring water demand. The course will primarily cover topics concerned with water *quantity*; students interested in topics of water *quality* and pollution control are encouraged to take PbAf 594 in the Winter quarter. Examples used in class will be drawn primarily from the Western US. We will also briefly explore how climate change is expected to alter the availability of water resources, and how economic approaches might be used to mitigate these effects.

The course is designed for students with backgrounds in public policy, engineering, hydrology, marine affairs or forestry who are interested in how economic tools can be applied to water resources policy. It is not meant as a doctoral-level field course in resource economics, but rather an introduction to the major tools and concepts. Although we will briefly cover water law (with special emphasis on western US water law and Washington state), it is not meant to be a comprehensive class on that topic (interested students are encouraged to take Law A525).

Course Objectives

By the end of the quarter, students will be able to:

- Define and apply to a water resource problem the following economic concepts: static efficiency, dynamic efficiency, Pareto optimality, discounting and the rate of time preference, benefit-cost analysis, opportunity costs, marginality, and public goods;
- Analyze optimal water use (from a consumer perspective), and optimal water supply (from a producer perspective) using simple optimization approaches;
- Use spreadsheets to illustrate demand and supply functions, and to solve basic problems of water allocation, pricing, and policy analysis;
- Describe different institutions and legal frameworks for the allocating surface and ground water;
- Apply several different techniques for measuring water demand;
- Discuss the economic logic behind the use of water markets, banks and leases for addressing scarcity, as well as the limitations and constraints to their use;
- Describe pricing practices currently being used in municipal and agricultural systems, and suggest ways in which these could be improved (using economic logic).

Pre-requisites

Graduate students only. Although the course does not assume any background in economics, it does assume a level of comfort with quantitative approaches. The class will be taught with a moderate amount of elementary calculus. Anyone with one college-level course in calculus should be more than prepared, and I will hold an

optional calculus tutorial session at the beginning of the term. Please contact me with questions about the calculus content.

Textbook

Water resource economics: The analysis of scarcity, policies and projects, Ronald C. Griffin. MIT Press, 2006.
Available on Amazon.com and in the University Bookstore on the Ave (the week of Oct 5).

Grading

Problem sets : 60% (15% each)

Final exam : 30%

Class participation : 10%

Problem Sets

There will be four problem sets. These are intended to help you apply the concepts in class and build practical skills (i.e. start making calculations, creating graphs, and solving problems on your own). You are free to work in groups on these problem sets, although you must turn in your own homework. They will be graded on a scale of 0 – 10 for completeness and accuracy, with more emphasis on the former. Show your work and try all problems. Points may be deducted for a lack of neatness or organization. Many problems will require use of a spreadsheet program like Excel.

Problem sets are due **before** class; I will deduct 1 point if it is handed in after I begin speaking. I will deduct 2 additional points for each day late (up to four days). Although I prefer hardcopies, you may also submit problems sets electronically through Catalyst's Drop Box (linked on website) if it is easier for you or if you are ill. They must be submitted before 3:00pm on the day they are due; the same policies above apply.

Final Exam

The final exam is meant to gauge your familiarity with the overall concepts covered in class. You will not be expected to make complicated calculations or derivations. As such, the exam will be closed-book. **The exam will be held during exam week: Thursday, December 17, 2:30 -4:20pm in Smith 311** (same room)

Schedule and readings *(subject to change as quarter progresses)*

Date	Topic	Readings	Other
9/30	Introduction	Griffin Ch 1, Ch 12	
10/5	Economic efficiency for a single agent	Griffin 2.1 -2.4	
10/7	Aggregate efficiency and opportunity costs	Griffin 2.4-2.6	
10/12	The economic idiosyncrasies of water	Griffin 2.7 – 2.10	
10/14	Dynamic efficiency – discounting, time preference, and net present value	Griffin 3.1 - 3.7	
10/19	NO CLASS		
10/21	Dynamic efficiency cont'd	Griffin 3.8-3.16	HW1 Due
10/26	Intro to welfare economics; market failures	Griffin 4.1 – 4.6	
10/28	Water law	Griffin 4.7 – 4.11	
11/2	Policy Analysis	Griffin Ch 5	HW 2 due
11/4	Policy Analysis (cont'd)		
11/9	Cost-benefit analysis	Griffin Ch 6	
11/11	NO CLASS – VETERAN'S DAY		
11/16	Water marketing	Griffin Ch 7	HW 3 due
11/18	Water marketing (cont'd)		
11/23	Water pricing	Griffin Ch 8	
11/25	Water pricing (cont'd)		
11/30	Measuring demand	Griffin Ch 9	
12/2	Measuring demand (cont'd)		
12/7	Supply analysis	Griffin Ch 10	HW 4 Due
12/9	The economics of virtual water	TBA	