

The Ecology and Economics of Salmon Recovery
Biology/Economics 140

Winter 2009

GENERAL INFORMATION

Times, Places: MW 1-1:50 pm, F 1-3:50 pm; AH225

Instructors:

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Office Hours: Hodges: M-F 9-10, and by appt. Hooper: M 2-3, F 10-11, and by appointment.

Texts: 1) Shared Strategy Development Committee (2007) Puget Sound Salmon Recovery Plan. Available online: <http://www.sharedsalmonstrategy.org/plan/toc.htm>. (Note: download the .zip file with the whole plan).

2) Montgomery, D.M. (2003) King of Fish: The Thousand Year Run of Salmon. Westview Press, Boulder, CO.

3) Barry Field (2008) Natural Resource Economics: An Introduction, 2nd ed., Waveland Press, Long Grove, IL.

Keeping up with the reading assignments is critical. Reading the assigned chapters *prior to* lecture will help greatly in your comprehension of the material and performance in this class. Additional reading may be required.

Web site: <http://fire.biol.wwu.edu/hooper/courses.html>

COURSE DESCRIPTION:

This course is organized around the 4 H's affecting salmon sustainability: harvest, habitat, hydropower, and hatcheries. We will use these topics to investigate the biology and economics underlying salmon decline and to better understand how ecology and economics might be harnessed to help with salmon recovery. We will investigate specific issues related to salmon, but we will also use salmon as a window to understand general concepts of ecology and economics, and how these two disciplines can inform each other for better natural resource management. The goals of this course are to

- 1) give you a firm understanding of the **concepts underlying both economic and ecological analyses;**
- 2) **illustrate how such analyses can be used** to better understand issues in sustainable management of natural resources – in this case, salmon;
- 3) improve your abilities to **participate in discussion** of scientific literature, including **developing skills in critical thinking;**
- 4) **actively engage you** in analyzing current issues in salmon and watershed management;
- 5) **enhance your understanding** of how human society is altering ecosystems, some of the problems that entails, and some of the solutions that might be possible.

COURSE GRADE:

1. Your grade will be based on a total of 320 possible points:

Discussion participation	30 points
2 midterms - 60 points each	120 points
Final exam (comprehensive)	100 points
Research Project and Poster	<u>100 points</u>
	350 points total

2. Exams: Midterm I - Fri, 1/30; Midterm II - Fri, 2/27; Final - Wed., 3/18, 10:30-12:30 p.m.

Exams will involve calculations, short answer and essay questions. Make-up exams are allowed only with a valid, *pre-approved* excuse. Regrades: If, after checking the answer key, you feel we have made an error in grading your test, please bring it to our attention. Regrades must be brought in within one week after the test is returned.

3. Poster - In groups of 2, you will do a research project presented as a scientific poster. See additional handouts for further description of this project.

4. Your final grade will be determined as a percentage of the point total. The following scheme will give you an idea of your performance, but we may adjust these grading criteria depending on the final distribution of scores.

A	93-100	B	83-86.9	C	73-76.9	D	63-66.9
A-	90-92.9	B-	80-82.9	C-	70-72.9	D-	60-62.9
B+	87-89.9	C+	77-79.9	D+	67-69.9	F	0-59.9

BIOL 140/ECON 140 - Class schedule

For readings: SRP = Puget Sound Salmon Recovery Plan, Field = Natural Resource Economics

Day	Questions	Econ Topics / Concepts	Ecol Topics / Concepts	Readings
1 1/7	What will the course cover? Why... and how? What is economics? What is ecology? Why together?		Overview of the salmon problem: the 4H's and how they relate to ecology and economics	SRP: Executive Summary
2 1/9	What does it mean to manage a fishery well? What do you need to know to (begin to) answer the question? What is a species? Which salmon are endangered?	The "economic way of thinking"	Overview of salmon life cycles and species concepts	SRP: Ch. 1, 2 Field: Ch. 1
Week 2				
3 1/12			Habitat: Human alteration – effects from physiology to ecosystem-scale	SRP: Ch. 3, Habitat
4 1/14			Habitat: Restoration and protection	SRP: Ch. 6, Habitat Strategies
5 1/16	Field Trip: Habitat assessment and restoration			SRP Ch. 5, Watershed Profile: Nooksack
Week 3				
6 1/19	<i>MLK Day – no class</i>			
7 1/21	Why do we have the problems we do?	Externalities, Public Goods, and the Tragedy of the Commons		Field: Ch. 2 – 4 and 6 (Note: skim chapter 2 for vocabulary; focus on pages 41-54, 57-60, 61-65, & 87-99)
8 1/23	How do you combine ecology and economics? Research topics due Discussion	Natural Resource Economics (focusing on renewable resources)		"Tragedy of the Commons" (Hardin) http://www.dieoff.org/page95.htm Montgomery Ch. 1-5
Week 4				
9 1/26	How many fish should you harvest (ecologically speaking)? Basics of population growth		Harvest: Population dynamics	SRP: Ch. 3 - Harvest;
10 1/28	How many fish should you harvest (ecologically speaking)? How do you determine what is the maximum sustainable yield? What happens if you harvest too many fish?		Harvest: Population dynamics	Ch. 6 – Harvest Strategies
11 1/30	Midterm #1			
Week 5				
12 2/2	How many fish should you harvest? (Is the maximum biological sustainable yield the right amount to harvest?)	- Introduction to efficiency - Static and dynamic efficiency - Highlight role of biology/ecology in the economic model		Field: Ch 5
13 2/4	How many fish should you harvest?	Policy issues (including property rights)		Field: Ch. 7
14 2/6	Discussion of research topics and critical thinking exercises			

	Week 6			
15 2/9	How do we incorporate concerns about the environment into economics?	Non-market valuation... and Cost Benefit Analysis		Field: Ch. 8
16 2/11	Dams and Salmon		Salmon and hydropower - ecology	TBA
17 2/13	Discussion			Montgomery Ch. 6-9 Handout (Herald article)
	Week 7			
18 2/16	<i>President's Day – no class</i>			
19 2/18	Using the tools of economics in fisheries management			Field Ch. 13
20 2/20	What is the role of farmed salmon? (Should hatchery fish count when measuring the health of salmon runs?) Discussion			Montgomery 10-11 Handouts (article from <i>The Economist</i> and Naylor 2004)
	Week 8			
21 2/23	Would you like a helping of sea lice with your salmon? Research outlines due		Hatcheries and fish farms: ecological issues	SRP Ch.3 - Hatchery
22 2/25	Hatcheries (continued)			SRP Ch. 6 – Hatchery strategies
23 2/27	Midterm #2			
	Week 9			
24 3/2	Are economics and ecology up to the task? (Are they part of the problem or the solution?)	WTP & WTA; CBA; and species extinction		Guest Lecture (Dan Hagen)
25 3/4	How do different cultures view the salmon problem?		Cultural issues in salmon decline and restoration	TBA (Upstream ch. 5, Reaching home, Atlas of PS)
26 3/6	Guest lecture or hatchery field trip: Ryan Vasak			
	Week 10			
27 3/9	Integration: H-integration strategies and adaptive management			SRP Ch. 3 – H-integration SRP Ch. 7
28 3/11	Integration: Financing and implementation			SRP Ch. 8 & 9
29 3/13	Research projects due – poster session			
3/18	Final exam, 10:30-12:30 p.m.			