

FISH 101
Water & Society
Winter 2016

Instructors:

Julian Olden

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Office Hours: After lecture or by appointment

Lead TA: Lukas DeFilippo (lukasdefilippo@gmail.com). Office hours: W 1-3 pm in FSH 358B.

Section TAs: Brady Grieve (bradyggrieve@hotmail.com), Mallory Llewellyn (millev@uw.edu), Michael Hickey (michickey594@gmail.com), Deni Murray (deni_murray@yahoo.com).

Lecture location: EXED 110

Lecture hours: MWF 9:30-10:20

Credits: 5

Course Canvas web page: <https://canvas.uw.edu/courses/1022755>

Daniel Schindler

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Office Hours: After lecture or by appointment

"Whiskey is for drinking; water is for fighting over" – attributed to Mark Twain

Water is an invaluable commodity that determines the wealth of nations, and the health of humans and the freshwater ecosystems upon which we depend. We all know too well the importance of clean, fresh water; but do you know the real reasons why water shortages have led to environmental degradation and intense social conflicts throughout the globe? Many of the most dangerous human diseases are water-borne; how are society's actions exacerbating these? Why is the biodiversity of freshwater ecosystems the most imperiled on the planet? Is Seattle really a 'wet' place or are we running out of sustainable water supplies? This course will examine these and many related questions to improve our understanding of human dependencies and effects on freshwater ecosystems.

COURSE IMPETUS

Water, the bloodstream of the biosphere, determines the sustainability of living systems. Despite the abundance of water on the Earth, the small proportion that is fresh is coming under increasing pressure as human populations increase and climate warms. These global changes are generating new conflicts between the needs of humans and the basic requirements of aquatic ecosystems. It is now abundantly clear that there are limits to the amount of water that can be withdrawn from the environment before natural functioning and productivity, native species, and the services and products the environment provides become severely degraded. Water managers and political leaders are becoming increasingly cognizant of these limits as they are being confronted with endangered species or water quality regulations, and changing societal values concerning ecological protection. In the face of prevailing management practices and growing demands for fresh water, will society be able to sustain healthy aquatic and riparian ecosystems capable of benefiting human populations?

COURSE OBJECTIVES

The objective of this course is to provide an understanding of the complex relationships between human societies, water resources, and aquatic ecosystems. We will accomplish this by exploring coupled human and natural systems and their dependence on fresh water. Topics of interest include global change, ecosystem services, fisheries, water pollution, urbanization, land use, climate change, watershed and river basin management, water technology, stakeholder processes, and water policy. Relevant examples will be drawn from the United States and from around the world.

INSTRUCTORS

The instructors endeavor to keep the course content timely and relevant to stimulate student discussion and

participation for the most enjoyable and effective learning. Julian Olden and Daniel Schindler are professors in the School of Aquatic and Fishery Sciences. Olden's research focuses on the ecology of freshwater ecosystems, in particular invasive species, climate change and water resource management. Schindler's research focuses on understanding issues such as climate change, fisheries exploitation, and watershed development.

LEARNING OUTCOMES

As a result of this course, students will have a strong understanding of the tight linkages between water, the environment, and human society. Course aims include to i) introduce students to contemporary issues and challenges in freshwater ecology and resource management; ii) develop student's writing skills to effectively communicate issues to a variety of audiences; iii) increase awareness that human existence depends on a supply of clean and abundant water; and iv) explore ways that society can reduce their impacts on water resources.

METHOD OF INSTRUCTION AND ASSIGNMENTS

Lectures: This course will consist of three 50-minute lectures per week.

Exams: Mid-term and final exams will consist of multiple choice and short answer questions.

Water Footprint Assignment: Did you know that it takes roughly 20 gallons of water to make a pint of beer and about 500 gallons, including water used to grow, dye and process the cotton, to make a pair of Levi's jeans? What's your water footprint? This assignment will involve the calculation and evaluation of your personal water footprint.

Article Review Assignment: You will write a review of a scientific article that addresses a current environmental or societal issue in the freshwater sciences. The goal of this assignment is for you to translate the article's key message into an interesting and accessible overview for the public. You will also be peer-reviewing a classmate's article.

Media Assignment: For this group assignment you must develop an advertisement for a product, corporation, or organization (existing or fictitious) that conveys some of the technical information about water sciences that has been covered in this course and is also compelling (i.e., it sells)!

Debate: You will actively participate in a scientific debate among your classmates regarding a current environmental issue. Drop the gloves and prepare for a friendly battle.

GRADING

Item	Points (% of final grade)
Mid-term exam #1	150 (15%)
Mid-term exam #2	150 (15%)
Water footprint assignment and discussion	100 (10%)
Article review assignment	150 (15%)
Media assignment	100 (10%)
Debate	50 (5%)
Final exam	300 (30%)
Total	1000 (100%)

HONORS SECTION

Please complete the Honors Program form and return to one of the Instructors at the beginning of the quarter (not the University Honors Program). Honors assignment will be distributed by the Instructors.

TEXTBOOK

None. Select readings will be provided by the instructors and TAs and will be tested on the exams when notified.

TOPICS

Date	Lecture	Discussion/Assignments
January		
Week 1		
4 Mo	Water: The bloodstream of the biosphere (S)	Introduction to FISH 101 (class expectations, exploring the Canvas web interface, assignment overview)
5 Tu		
6 We	Water demand: Human society (O)	
7 Th		
8 Fr	Water demand: Freshwater ecosystems (O)	
Week 2		
11 Mo	Freshwater ecosystem services (S)	Water footprint class discussion
12 Tu		
13 We	Water supply: The hydrologic cycle (S)	
14 Th		
15 Fr	The anatomy of the watershed (S)	
Week 3		
18 Mo	NO CLASS: Martin Luther King Day	Documentary: Last Call at the Oasis
19 Tu		Due: Water footprint assignment
20 We	Freshwater biodiversity (O)	
21 Th		
22 Fr	Water quality (S)	
Week 4		
25 Mo	Guest Lecture: Ulysses Hillard (Seattle Public Utilities)	Documentary: Alaska Gold (PBS Frontline)
26 Tu		Midterm Exam Review
27 We	Human land use (O)	
28 Th		
29 Fr	MID-TERM EXAM #1	
February		
Week 5		
1 Mo	Pollution (S)	Debate: Water wars on the Klamath River
2 Tu		Due: Debate assignment
3 We	Climate change (S)	
4 Th		
5 Fr	Dams: The good, the bad and the ugly (O)	
Week 6		
8 Mo	Conflicts between energy production and water quality: Hydrofracking and hydropower (S)	Documentary: Gasland
9 Tu		Overview of media assignment
10 We	Fisheries exploitation (S)	Due: Article review assignment (first draft)
11 Th		
12 Fr	Aquaculture (S)	
Week 7		
15 Mo	NO CLASS: Presidents Day	Group media assignments (work session)
16 Tu		Due: Article review assignment (peer review)
17 We	Guest lecture: Gordon Holtgrieve (UW)	
18 Th		
19 Fr	Invasive species (O)	
Week 8		

22 Mo	River restoration and conservation (O)	Midterm exam review Due: Article review assignment (final version)
23 Tu		
24 We	Guest lecture: Kari Vigerstol (The Nature Conservancy)	
25 Th		
26 Fr	MID-TERM EXAM #2	
March		
Week 9		
29 Mo	Water-borne diseases (S)	Presentation of media assignments
1 Tu		
2 We	Water in the era of global change (S)	
3 Th		
4 Fr	Guest lecture: TBA	
Week 10		
7 Mo	Technologies for water sustainability (O)	Final exam review
8 Tu		
9 We	Water conflicts and resolution (O)	
10 Th		
11 Fr	TBA	
16 We	FINAL EXAM (8:30-10:20 am)	

* This is a tentative list of lecture topics. Please consult the course Canvas website.

** Lectures by Olden (O) and Schindler (S)

ACADEMIC INTEGRITY

Plagiarism, cheating, and other misconduct are serious violations of your contract as a student. We expect that you will know and follow the University's policies on cheating and plagiarism. Any suspected cases of academic misconduct will be handled according to University regulations. More information can be found at: <http://depts.washington.edu/grading/issue1/honesty.htm>. Be advised, the instructors of this course have the right and responsibility to notify University Conduct committees about ANY suspected student misconduct. Exam cheating might come immediately to your mind when you hear this, but by FAR the most prominent form of cheating at UW is plagiarism.

It is YOUR responsibility to inform yourself of what plagiarism means. Students will receive NO credit for an assignment that contains plagiarized portions.

Typical plagiarism "oversights" are:

- (1) Copying an assignment from a friend with whom you study, OR working so closely with this friend that both your assignments LOOK copied (same words and ideas in the same order).
- (2) Copying whole sentences from a web site without restating in student's words or without quotation/citation.
- (3) Paraphrasing ideas of another author without attempting to write an "original" sentence.

EMAIL AND COMPUTER USE

All students are expected to have an email address and you will receive email relevant to this course on a regular basis.

LATE AND RE-GRADE POLICY

Discussion Section Assignments

You must turn-in all your assignments by the noted deadline. Assignments received after the deadline will receive a zero grade unless otherwise arranged with your TA.

Exams

We will only schedule a make-up exam if absolutely necessary. As soon as you foresee a conflict, please talk with us and provide a compelling, documented reason. If you miss an exam without contacting the instructors ahead of time, the instructor's will decide if you can re-schedule the exam.

Re-grades

If you feel that an exam or assignment has been graded unfairly or that a mistake has been made, you may submit a re-grade request WITHIN ONE WEEK of being handed back the assignment or exam. Requests must be submitted in writing and must be handed in at lecture. Requests should be stapled to the original assignment. E-mails and conversations cannot substitute for a written request.

DISABILITY ACCOMODATIONS

It is crucial that all students in this class have access to the full range of learning experiences. At the University of Washington, it is the policy and practice to create inclusive and accessible learning environments consistent with federal and state law.

Full participation in this course requires the following types of engagement:

Course component

Requirements

Lectures

The ability to attend all lectures each of 50-minute duration.

Discussion

The ability to participate in weekly group discussion for 110 minutes. The ability to collaborate in teams; includes leading discussions.

Assignments

The ability to work independently to interpret the primary literature; involves computer work, creating text, uploading assignments and writing a final report.

Exams

The ability to write a set of short-answer questions designed to be completed within the allotted time in a room with 100+ other students.

If you anticipate or experience barriers to your learning or full participation in this course based on a physical, learning, or mental health disability, please immediately contact the instructor to discuss possible accommodation(s). A more complete description of the disability policy of the College of the Environment can be found here. If you have, or think you have, a temporary or permanent disability that impacts your participation in any course, please also contact Disability Resources for Students (DRS) at: 206-543-8924 V; 206-543-8925 TDD; uwdss@uw.edu e-mail; <http://www.uw.edu/students/drs> web.

ASSIGNMENT DESCRIPTIONS

Debate

Due Date

Upload your assignment (Microsoft Word format) on Canvas by 5 pm the night BEFORE your Discussion section on the week of February 1, 2016.

Topics

Water Wars on the Klamath River

Objective

The purpose of the topic debate is to introduce you to new perspectives and broaden your thinking about water-related issues. During the discussion section we urge you to integrate concepts in the readings, lecture and documentary content to develop your point-of-view and craft a well-articulated argument.

Tasks

1. READ - For the debate topic you are required to read the overview papers and research multiple additional sources. Visit the course Canvas website for the papers and list of resources.
2. WRITE - Complete a 1.5 page fact finding assignment based on the questions below. Use 12-point font (Times New Roman), 1-inch (72 pt) margins and single line spacing.
3. DEBATE - Attend your discussion section (you must attend to receive any points) and prepare to debate. Debates will occur between groups of students, each sharing a different viewpoint. Be sure to bring your fact page and get ready to participate! Full details provided in Discussion class.

Grading

One-page fact assignment	2.5
Active participation in debate	2.5
Total Points	5

Fact Finding Assignment

Address the following questions in your 1.5 page assignment by using information from the collection of articles and your own research. Include each question in your assignment.

1. State your viewpoint. Are you for or against the action? Write down three well-developed reasons.
2. What is your opinion about the environmental risks associated with the action?
3. Which of the other interest groups might disagree with your position on the action? Why? How will you respond to their arguments?
4. Write down two open-ended questions (i.e., cannot be answered with a simple yes or no) that you think is essential to the debate.
5. Write down any other relevant information that you would like to use in the debate.

Water Footprint Assignment

Due Date

Upload your assignment (Microsoft Word format) on Canvas by 5:00pm on January 22, 2016.

Objective

The water footprint of an individual is defined as the total amount of freshwater that is used to produce the goods and services consumed. This assignment is designed to introduce you to the water footprint concept and enlighten you of your impact on water resources.

Tasks

1. Go to the "Water Footprint Assignment" page on the course Canvas site and download the **6** files (five Word documents - "Sizing Up Your Water Footprint Steps 1-5" and one Excel file "Water Footprint Calculator").
2. Go through the worksheets in order (Steps 1 through 4 – we will do step 5 in discussion section), completing the surveys about water usage, food consumption, where your drinking water comes from, etc., as you go. Answer all of the questions and make notes of your answers and your water footprint statistics. Print out your results and notes (or bring your computer with your notes) to discussion section during week 2.
3. In discussion section during week 2, we will gather in groups and discuss our water footprints ("Sizing Up Your Water Footprint Step 5" file). You are expected to actively participate in the discussion and share your ideas about why your water footprint is as high or as low as it is, and for ways in which to reduce your water footprint and those of people in your group.
4. Write an essay on your personal water footprint approximately 2 page (single-spaced) in length with 12-point font (Times New Roman) and 1-inch (72 pt) margins. Your essay should address the questions raised in each step of the assignment. You should include the results of your footprint, general information about the components of water footprints, and a review of how your lifestyle influences your water use. Assess how you might reduce your water footprint by 25% to 50%. This is a challenging task but try to think creatively and realistically about actions you could take to reduce your water use. You have flexibility with regards to the focus of this essay but it should be clearly written, edited, and display a synthesis of information sources. **Please edit your essay before submitting (writing clarity is worth 20% of this grade).**

Grading

Reporting personal water footprint statistics	1
Explanation of water footprint components and water involvement	2
Background on significant area of personal water use	2
Group participation and Discussion	3
Writing clarity	2
Total Points	10

Note

This assignment may (should!) change your life. Check out the website below (from another university) detailing how a college student changed her life after calculating her water footprint. It is inspiring!

<http://waterpaths.wordpress.com/category/assignments/my-water-footprint/>

Quiz how much you know: <http://kids.nationalgeographic.com/kids/games/puzzlesquizzes/water-wiz/>

Article Review Assignment

Due Date

February 5, 2016:	Topic/article approved by TA.
February 12, 2016:	Upload your draft essay (Microsoft Word format) on Canvas.
February 19, 2016:	Upload your peer-review of classmate's essay (Microsoft Word format) on Canvas.
February 26, 2016:	Upload your final essay (Microsoft Word format) on Canvas.

Objective

You are required to write a 2-page overview of a scientific article that addresses a current issue or recent discovery in the freshwater sciences. The goal of this assignment is for you to review a technical (peer-reviewed) 'water science' paper and translate its key message into an interesting and accessible article for the PUBLIC. You can decide what the outlet for your article might be (e.g., the local newspaper, a popular magazine, a website) but we expect that you will tailor your essay to appropriately and accurately convey the technical content of the original paper to a lay person. Alternatively, you can write a 2-page letter-to-the-editor for a major publication.

Tasks

From a scientific journal (e.g., *Science*, *Nature*, *Ecology*, *BioScience*, etc.) choose a recent research article that 1) you find interesting and 2) reports on a recent discovery or current issue in freshwater sciences. **This CANNOT include the debate topic.** Read the article and convince yourself that you can write a short essay for the public that conveys the central message of the technical paper. **By February 5th you must have your paper approved by your teaching assistant before you submit your essay for grading.**

Write a catchy, interesting, and technically accurate article summarizing the key message of the technical paper you have chosen. Your essay should be 2-pages long (single spaced, 12 point font, 1-inch page margins). Your essay should be written with appropriate paragraph structure and proper grammar. You do not need to list your references for this assignment. **However, you must submit a copy of the first page of your technical article (including the author list, the appropriate bibliographic information, and the Abstract) with your own essay.** Your instructors will show you how to extract specific pages from an electronic copy of a journal paper to include in your assignment.

You will also be responsible for peer-reviewing one of your classmate's essays. The essay will be assigned to you via Canvas on February 12th and you must submit a 0.5 page review (single spaced, 12 point font, 1-inch page margins) containing constructive comments and suggestions by February 19th.

Grading

Instructor Approval of Article by Feb 5th deadline	1
Submit draft essay by Feb 12th deadline	1
Peer review of classmate's essay	3
Scientific accuracy of article	3
Article was interesting, accessible, and connected to the broader themes examined in this course	4
Writing clarity, spelling and grammar	3
Total Points	15

Media Assignment

Due Date

Media assignments are due at Discussion during the week of February 29th, 2016.

Objective

Achieving the goals of sustainability and biodiversity conservation will require convincing the public and corporations to 'buy' (literally and figuratively) the argument that their own self-interests benefit from actions that minimize their impact on ecosystems. For this assignment you must develop an advertisement for a product, corporation, or organization (existing or fictitious) that conveys some of the technical information about water sciences that has been covered in this course and is also compelling (i.e., it sells)! Your grade will be based on a combination of the technical accuracy of your ad and your creative use of the media to convey a message. We have provided a few examples of previous year's media assignments in Canvas. You can use any media you wish to produce your ad (e.g., newspaper, TV, internet, radio, billboard, etc).

Tasks

This assignment should be done in groups of 2-3 students. You will each receive the same grade for the assignment. If you produce an advertisement for a newspaper, magazine or billboard, you should submit a hard copy of your assignment for grading. Attached to your advertisement should be a 1-page cover sheet that includes a title for your ad, the names and student ID number of all students who contributed to the assignment, and 2-3 sentence description of how each student contributed to the project. Your ad should be viewable on a single page.

If you produce an ad for radio or television, then your ad should be posted to YouTube and you should submit the link so that we can view or listen to your assignment. The link should be provided to the instructors on a 1-page document that also includes a title for your ad, the names and student ID number of all students who contributed to the assignment, and 2-3 sentence description of how each student contributed to the project. Your advertisement should be no longer than two minutes in duration!

Grading

A scientifically accurate message was conveyed by the advertisement	5
Advertisement was creative and compelling	5
Total Points	10



COMMON THREADS INITIATIVE

REDUCE
WE make useful gear that lasts a long time
YOU don't buy what you don't need

REPAIR
WE help you repair your Patagonia gear
YOU pledge to fix what's broken

REUSE
WE help find a home for Patagonia gear you no longer need
YOU sell or pass it on*

RECYCLE
WE will take back your Patagonia gear that is worn out
YOU pledge to keep your stuff out of the landfill and incinerator

REIMAGINE
TOGETHER we reimagine a world where we take only what nature can replace

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