Fish 428 Spring 2014
Stream and Watershed Restoration

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Meeting Times and Location
Mondays and Wednesdays 1:30 p.m. - 3:20 p.m.
Building FSH 108

Course Website: https://catalyst.uw.edu/workspace/grp/28675/188019

Course Objective
To teach students the principles of aquatic restoration through lectures, discussion, case studies, and field trips.

Course Description
The degradation of aquatic ecosystems has led to massive efforts to restore streams, rivers, lakes, and estuaries throughout the world. These efforts have met with varying levels of success often due to misunderstanding of ecological principles and watershed processes, poor design and implementation, and inadequately designed monitoring. In this course we will not only provide students with an overview of restoration principles and techniques, but with the knowledge and skills to assess ecosystem conditions, identify and prioritize restoration opportunities, and evaluate them from a scientific and economic perspective. We will do this through a combination of lectures, case studies, written assignments, class projects, and field trips.

Upon completing the course students will be able to:
- Assess current and historical watershed conditions
- Determine areas in need of restoration and protection
- Develop multiple approaches for prioritizing watershed restoration projects
- Assist in restoration project design and planning
- Develop rigorous restoration monitoring and evaluation programs
- Develop a watershed restoration plan

2014 Course Schedule and Readings

Week 1	Lecture	Required Reading	Assignment
March 31	Class overview, & expectations (Roni) Introduction to restoration (Roni)	Chapter 1.	
April 2	Salmon life history (Pess) Limiting factors (Pess)	Bjorn et al. 1991	
Week 2	**Lecture**	**Required Reading**	**Assignment**
April 7	Lab – Pivot tables/data normalization (Pess) Lab – Limiting Factors (Beechie)	Beechie et al. 1994	*Assignment 1 – Limiting Factors (problem set)*
April 9	Watershed scale processes (Beechie) Reach scale processes (Beechie)	Chapter 2.	
April 12	Stillaguamish and Sauk field trip (Beechie, Pess)	Beechie et al. 2001	
Week 3	**Lecture**	**Required Reading**	**Assignment**
April 14	Lab – Assessments – Sediment (Beechie, Computer Lab)	Chapter 3 (p. 50 - 78)	**Assignment 1 due** *Assignment 2 – Riparian & Sediment Assessments (problem set)*
April 16	Lab – Assessments – Riparian – (Beechie, Computer Lab)	Chapter 3 (p. 79 – 104)	
Week 4	**Lecture**	**Required Reading**	**Assignment**
April 21	Lab – Synthesis and identification of restoration actions (Beechie, Lab) Exercise: developing a restoration goal	Chapter 3. Beechie et al. 2008	**Assignment 2 due** *Assignment 3 – Watershed Synthesis (report)*
April 23	Lab – Restoration techniques and their effectiveness (Roni) Lab – additional work on synthesis	Chapter 5	
Week 5	**Lecture**	**Required Reading**	**Assignment**
April 28	Prioritizing restoration projects (Roni)	Chapter 6.	**Assignment 3 due**

	Prioritization group exercise (Roni)		*Assignment 4 – Prioritization (problem set)*
April 30	Economic considerations and regional examples of prioritization (Roni) Lacustrine restoration (Dr. Daniel Schindler)	Plummer 2005	
Sat May 3	Field Trip – Floodplain & Estuarine Restoration		
Week 6	**Lecture**	**Required Reading**	**Assignment**
May 5	Developing a restoration project proposal (Pess) Riparian Restoration – Susan Buis	Chapter 7.	**Assignment 4 due** *Assignment 5 – Restoration Proposal (report)*
May 7	Restoration Design using River Rat (Pess) Climate change (Beechie)	Chapters 7, 9 (section 9.3)	
Week 7	**Lecture**	**Required Reading**	**Assignment**
May 12	Stakeholder involvement (Dr. John Souder, Coos Bay Watershed)	Chapter 4.	
May 14	Lab – Monitoring restoration (Roni) Lab – Monitoring Analysis	Chapter 8.	**Assignment 5 due** *Assignment 6 – Monitoring Plan (report)*
Week 8	**Lecture**	**Required Reading**	**Assignment**
May 19	Lab – Monitoring parameters and sample size – (Roni/Pess, Computer Lab)	Liermann & Roni 2008	
May 21	Nearshore or Estuarine Monitoring (Dr. C. Rice) Elwha River (Pess)		
Week 9	**Lecture**	**Required Reading**	**Assignment**

May 26	Holiday		
May 28	Lecture – Giving effective scientific presentations (Roni) Group work on presentations	Required – Pickett et al. 1991; Chapter 9.	**Assignment 6 due** *Assignment 7 – Oral Presentation assigned*
Week 10	**Lecture**	**Reading**	**Assignment**
June 2	Oral presentation practice	Reardon 1999, Fraidenburg 2005	
June 4	**Oral Presentations**		**(Assignment 7 due)**

Required Text and Readings:
Roni P. and T. Beechie. 2013. Stream and watershed restoration: a guide to restoring riverine processes and habitats. Wiley Blackewell.

Supplemental Readings: posted on course website

Grading

Assignment	Points
Assignment 1 – Habitat assessment	100 points
Assignment 2 – Riparian & sediment	100 points
Assignment 3 – Watershed synthesis	100 points
Assignment 4 – Prioritizing actions	100 points
Assignment 5 – Restoration proposal	100 points
Assignment 6 – Monitoring plan	100 points
Group Oral presentation	100 points
Field trips/class participation	100 points
Total points possible	800 points

Problem Sets (Assignments 1, 2 & 4)
Each problem set will be worth 100 points and include three to five problems or questions that will require analysis, presentation of results, and interpretation of results. Problem sets will be graded upon whether you used the correct methodology (40 points), arrived at the correct answers (20 points) and interpretation of results (40 points).

Papers (Assignments 3, 5, & 6)
Each writing assignment will be worth 100 points and must be written in typical scientific format and include an introduction, methods, results, discussion, references, and tables and figures. We will provide detailed point breakdown and guidance for each assignment. Below is some general guidance on what to include in each section of your paper.

Introduction

The Introduction should cover: 1) what is known about the issue (show knowledge of the problem and previous work), 2) what is the data gap/problem we need to fill/solve and 3) describe what the paper will cover (i.e. In this paper we will…)

Methods

The Methods should describe 1) the study area (geology, topography, climate, species, and human impacts), 2) the methods of data collection and 3) methods of data analysis.

Results

This section should describe the results of the analysis and provide only facts. Interpretation of results is in the discussion and thus there should be no citations in the results.

Discussion

The Discussion is where one interprets the results, compares them with other related studies, and discusses their significance and management implications.

Tables and Figures
Tables and Figures should be used to enhance the understanding of the material presented. They should be used as a more efficient way to convey information than a verbal description.
Both Tables and Figures must be accompanied by explanatory captions that allow them to "stand alone" – which means the caption provides enough information that the figure can be understood by someone who has not read the whole report. Do not repeat in the text the information in Tables and Figures, but do cite them within, with a summary statement when that is appropriate. Tables and Figures are typically used in the Methods section to describe details of study location and methods and in the Results section to provide additional detail on results not provided in the text.

References
You must cite another researcher whenever you refer to his or her results, conclusions, or methods in your paper. For the purpose of this course, citations in text and in the References section must be formatted according to the standards of American Fisheries Society. http://www.fisheries.org/docs/pub_style9.pdf

Additional guidance for formatting scientific papers
The following sites provide additional detail on what to include in sections of a scientific paper:
http://www.bms.bc.ca/resources/library/pdf/GuidelinesScientificPapers.pdf
http://fisheries.org/docs/pub_tafs.pdf (see pages 318 to 320)

Late assignments – 5 points will be deducted from your grade for each day your assignment is late.

Group Oral Presentations
Each group of four or five students will have 25 minutes to give a group presentation of their comprehensive watershed restoration plan based on the four assignments. Each person must present a portion of the talk, but how much and what section will be determined by your group. The presentation will be worth 50 points and you will be graded by the performance of your group.

Grading for Oral Presentation

Overall presentation organization	30 points
Interpretation of data	30 points
Quality of graphics slides	20 points
Speaker delivery	20 points

Field Trips:
Field trips will be from 8:00 to 5:00 on Saturday April 12 and May 3. Students must be prepared for variable and inclement weather and bring the following:

- knee or hip boots or higher for walking in water or through wetted areas
- rain coat
- warm clothing (bring layers as it could be warm or cold this time of year)
- hat and/or sunscreen
- notebook
- small backpack
- lunch
- camera (optional)
- field trip insurance (optional but recommended see below)

School of Aquatic and Fishery Sciences Course Policies:

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, including definitions and examples of Academic Misconduct, can be found at:
http://depts.washington.edu/grading/conduct/index.html

Disability Accommodations:
To request academic accommodations due to a disability, please contact Disability Resources for Students (DRS), 011 Mary Gates Hall, Disabled Student Services, 448 Schmitz, (206) 543-8924, (TTY) 543-8925 or uwdrs@uw.edu.
http://depts.washington.edu/uwdrs/ If you have a letter from Disabled Student Services indicating that you have a disability that requires academic accommodations, please present the letter to the instructor so we can discuss the accommodations needed for this class.

Some Local Places to See Restoration

- Ravenna Creek - http://www.seattle.gov/Parks/proparks/Projects/RavennaCreekatRavenna.htm
- SEA Streets (Street Edge Alternative) http://www.seattle.gov/util/MyServices/DrainageSewer/Projects/GreenStormwaterInfrastructure/CompletedGSIProjects/StreetEdgeAlternatives/index.htm
- Thornton Creek - http://www.seattle.gov/util/MyServices/DrainageSewer/Projects/Meadowbrook&ThorntonCreek/index.htm
- Tolt River- http://www.kingcounty.gov/environment/animalsAndPlants/restoration-projects/tolt-restoration.aspx

- Snoqualmie River at Chinook Bend - http://www.kingcounty.gov/environment/waterandland/natural-lands/ecological/chinook-bend.aspx
- Sammamish River/Gold Creek- http://www.kingcounty.gov/environment/animalsAndPlants/restoration-projects/gold-creek.aspx
- Green/Duwamish River - http://www.govlink.org/watersheds/9/plan-implementation/ERP.aspx
- Elwha River - http://www.nps.gov/olym/naturescience/elwha-ecosystem-restoration.htm, http://videomonitoring.com/construction/olympic/js.htm