

**ESS /ENVIR / AIS 320**  
**CHANGING RIVERS OF PUGET SOUND**  
**SPRING 2011**

- Meetings: M & W, 11:30-12:50, Johnson Hall 127  
Required all-day Saturday field trips on April 16 and April 30
- Instructors: Brian Collins (329 Johnson Hall, bcollins@u.washington.edu)  
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- Text: Readings online: <http://gis.ess.washington.edu/grg/courses/ess320/index.html>

**Course description**

Rivers of Puget Sound have been changing since their origins following deglaciation more than 10,000 years ago. This course examines the physical and ecological evolution of Puget Sound rivers and the changing interactions of people, rivers, and ecosystems.

Topics include: (1) The geologic origins and processes that shape Puget Sound rivers and the ecosystems they support; (2) the changing relationship between people, rivers, and resources such as salmon; (3) the nature and extent of anthropogenic changes to rivers; (4) methods for detecting and evaluating environmental change; (5) historical context of resource management and restoration, including how Native American treaty rights influence resource management and restoration issues; and (6) the future of Puget Sound rivers, taking into account factors such as population growth, farmland preservation, river restoration, and climate change.

The class is framed by these broad questions: (1) How has the physical and ecological landscape changed through time? (2) How have humans changed and been changed by this landscape? (3) How does the history of landscape change caused by natural processes and by humans frame issues involving the use, management, and restoration of rivers and floodplains?

Twice-weekly classroom meetings include lectures and lab sessions. There are two all-day Saturday field trips to the Snohomish River and Duwamish River watersheds. These field trips are integral to the course and attendance is required. This class has no prerequisites.

**Course goals**

By the end of the course, students will: (1) Understand the geological and ecological dimensions of change to Puget Sound rivers. (2) Understand change through time in human interaction with rivers, including the contemporary role of American Indian tribes as co-managers of salmon and other resources. (3) Be able to apply this understanding to contemporary challenges associated with rivers in Puget Sound and elsewhere.

## Assignments

Assignment due dates are listed on the course schedule. Any changes to assignments or due dates will be announced in class and on the course website. There are no exams in this course.

### **(1) Journal** (30 points)

For each regular class meeting for which readings are assigned, create a journal entry following this format: (1) Identify a quote from the reading that seems representative of the meaning of the article. (2) Restate the quote in your own words. (3) Connect its meaning to other readings or to experiences or observations you have had during this class. Create a paragraph for each reading when there are multiple readings; remember to identify which reading you're writing about. Each week's entry should be 1-2 pages. For some class meetings a specific question will be given for you to respond to as an optional alternative to this format.

Grading: You will submit your journal, electronically, three times in the quarter. It will be graded credit/no credit. Credit will be given entries that reflect an appropriate level of thought and effort. Each of three electronic submissions will count toward 10 points (out of 100 for the course) of your grade.

### **(2) Field trips** (20 points)

Several questions will be handed out at the end of both field trips. Because this course includes students with a range of backgrounds and interests, you will have a choice of several questions. Questions will emphasize broad concepts and synthesis of the field trip with other course content. Short, written answers, along with your field trip worksheet, are due the following Wednesday. Worksheets for field trips will be posted on the website.

Grading: Your answers will be graded on whether you address the question and your statements are appropriately supported and clearly written.

### **(3) In-class lab exercises** (20 points)

There are five structured lab exercises to be turned in at the end of class. The first lab will be completed outside of class and handed in at a following class. Lab worksheets will be posted on the website.

Grading: Labs, mostly consisting of a series of short answers, will be graded on a scale of 1 to 4: 1: insufficient; 2: below average; 3: average; 4: above average.

### **(4) Final presentation** (30 points)

Working on your own or in a group of two, you will produce a poster on a topic of your choice. The last two class sessions will consist of a poster session, where you will be able to browse posters with poster authors stationed at their poster; this will be followed by a short (5 minute) presentation of your poster to the class. A summary and outline of your proposed topic is due by

May 9<sup>th</sup> at the latest—you are encouraged to start sooner. You will be able to change your topic after this; the objective of submitting a proposal is to provide you with feedback on defining a topic and how to structure a poster. A regular class period will include a session on the format you are expected to follow in your poster and tips and resources on poster-making.

Grading: Detailed guidelines on poster design and grading will be provided.

### Reading

Full citations for the reading are on the class webpage, and all readings can be downloaded from the class webpage. “Additional reading” on this syllabus and on the website are not required.

### Schedule

Date	Topic and activity	Reading	Assignments
<u>Week 1</u> M 3/28	Introductions		
W 3/30	Geology and co-evolution of rivers and salmon: Topography, salmon, and glaciers	<u>Assigned</u> : Booth et al., 2003; Nehlsen & Lichatowich 1997 <u>Additional</u> : Quinn 2005; Waples et al. 2008	
<u>Week 2</u> M 4/4	Geology and co-evolution of rivers and salmon: Sea level, volcanoes, earthquakes and forests in the shaping of modern rivers	<u>Assigned</u> : Collins and Montgomery 2011; Ludwin 2005 <u>Additional</u> : Beechie et al. 2001; Schindler et al. 2003	√ <u>Lab exercise #1</u> turned in (handed out on 3/28)
W 4/6	Geomorphology of rivers and watersheds (Guest: Dr. David Montgomery, Professor, ESS)	<u>Assigned</u> : Montgomery 2007	
<u>Week 3</u> M 4/11	The changing flora and human interactions with plants in the Puget Sound lowland	<u>Assigned</u> : Whitlock and Hebda 1997, Suttles and Ames 1997, Pojar and Mackinnon 1994	
W 4/13	The history of Puget Sound rivers: Rivers at the time of the treaties & changes in the second half of the 20 <sup>th</sup> century  Preview of Saturday field trip	<u>Assigned</u> : Collins et al. 2003	√ <u>Journal electronic submission #1</u> due 4/14
4/16 all-day field trip	All day field trip: From headwaters to saltwater along the Skykomish-Snohomish Rivers	<u>Assigned</u> : Executive summary, Snohomish River Basin salmon recovery plan	

	Meet outside north entrance to Johnson Hall, 8AM, back by 6PM	<u>Additional</u> : Tulalip Tribes 2010; Tanner et al. 2002; Bourgeois and Johnson 2001	
<u>Week 4</u> M 4/18	Post-glacial development of culture in relation to environmental change in the Puget Sound region (Guest: Dr. Julie Stein, Director of Burke Museum)	<u>Assigned</u> : Thrush ( <a href="#">online resource</a> )	
W 4/20	Methods to reconstruct the historical landscape in the Duwamish River valley	TBA (see website)	√ <u>Field trip report #1</u> due  √ <u>Lab exercise #2</u> handed in at end of class
<u>Week 5</u> M 4/25	The history of Puget Sound rivers: Reshaping the Duwamish River watershed	<u>Assigned</u> : Thrush 2006, Chrzastowski 1983, Klinge 2005	
W 4/27	Assessing post-glacial and historical environmental change at Union Bay Preview of Saturday field trip	TBA (see website)	√ <u>Lab exercise #3</u> handed in at end of class
Sat 4/30 9AM-5PM	Field trip: Following the historical path of a salmon: Green Lake, Ravenna Creek, Lake Washington, the Black and Duwamish Rivers  Meet at 9AM, Greenlake Community Center	<u>Assigned</u> : Thrush & Thompson 2007 <u>Additional</u> : Zehfuss et al. 2003	
<u>Week 6</u> M 5/2	Who has rights to salmon and to manage salmon habitat? Interpreting and reinterpreting the treaties (Guest: Dr. Alexandra Harmon, AIS)	<u>Assigned</u> : <a href="#">Treaty of Point Elliott</a> , Wilkinson 2000 chapters 2 & 3, <a href="#">Map of western Washington tribes and ceded areas</a>	
W 5/4	Treaty rights today (Guest: Alan Stay, Attorney, Muckleshoot Tribe)	<u>Assigned</u> : Morisset 2009 <u>Additional</u> : Uncommon Controversy Chapter 4; Blumm 2010	√ <u>Field trip report #2</u> due at start of class
<u>Week 7</u> M 5/9	Restoring and managing Puget Sound rivers	<u>Assigned</u> : Beechie et al. 2010, Cronin and Ostergren 2007, Jamestown S'Klallam Tribe <u>Additional</u> : Senos et al. 2006	√ Final project proposal due at start of class

		Roni et al 2008	
W 5/11	Restoring and managing Puget Sound rivers	<u>Assigned:</u> Climate Impacts Group 2009 <u>Additional:</u> Whitely Binder et al. 2010, Battin et al. 2007	
<u>Week 8</u> M 5/16	Salmon habitat restoration and farmland preservation in the Skagit River valley (Guest: Dr. Sara Breslow)	<u>Assigned:</u> Breslow 2011 Introduction, pp. 283-343 of Chapter 6 <u>Additional:</u> Breslow 2011 pp. 183-232 of Chapter 4	√ <u>Journal electronic submission #2</u> due May 17
W 5/18	Lab: Green River case study	<u>Assigned:</u> Brown 2008	√ <u>Lab exercise #4</u> handed in at end of class
<u>Week 9</u> M 5/23	Lab: Skokomish River case study	<u>Assigned:</u> Somerville 2009, Poff et al. 1997 <u>Additional:</u> Poff et al. 2003, Richter and Thomas 2007, FERC 2009	√ <u>Lab exercise #5</u> handed in at end of class
W 5/25	The Duwamish River Superfund site: Who is affected, and how? What's the best way to clean it up? (Guests: Shawn Blocker, Environmental Scientist EPA; Cari Simpson, Director Duwamish River Cleanup Coalition; James Rasmussen, Duwamish Tribe)	<u>Assigned:</u> Lower Duwamish Waterway Group 2010	
W 6/1	Student poster presentations (class held in JHN 026)		√ <u>Journal electronic submission #3</u>
W 6/8	Student poster presentations (final exam period, 2:30-4:20, JHN 011)		