Trophic Cascades—FOR/FW 547
2-3 credits
Instructors: William J. Ripple bill.ripple@oregonstate.edu
Anita Morzillo Morzillo.Anita@epa.gov

Prerequisite:
FOR/FW 547: Graduate or postbac standing, an ecology course

Course Content: The objective of this course is to examine carnivore effects on plants as mediated through herbivores. We will investigate the frequency and strength of trophic cascades in diverse ecosystems. Topics will range from theory, to the potential effects of carnivores in structuring ecosystems, to the implications for ecosystem function, management, and restoration. The course will consist of lectures, guest presentations, readings, class discussions, a field exercise, a short individual project, a term paper, and student presentations. Each student will write a term paper, and complete both an individual project and a field assignment. In addition, each student will lead at least one class discussion on assigned readings.

Objectives and measurable Student Learning Outcomes
Upon completion of the course, all students will be able to:

1. Conduct field projects analyzing top-down and bottom-up effects on forest structure.
2. Communicate scientifically with others in writing and orally regarding trophic cascades
3. Cite recent applications of trophic cascades theory in ecology, wildlife, forestry and other natural resource disciplines.
4. Synthesize, critique, and present journal articles on trophic cascades through leading class discussions.
5. Facilitate group discussions on trophic cascades.

Evaluation of Student Performance
Student performance in meeting learning outcomes in FOR/FW 547 will be evaluated as follows:
Grades will be based on 100 possible points and the following percentages: 10% short individual project, 40% term paper(s), 5% term paper(s) proposal, 10% lecture and reading discussion participation, 20% field project, 15% presenting and facilitating at least one discussion.

Class attendance is mandatory: an attendance sheet will be taken; three points (3% of total grade) will be deducted for each unexcused absence.

<table>
<thead>
<tr>
<th>Final Grade</th>
<th>Total Grade Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>95-100</td>
</tr>
<tr>
<td>A-</td>
<td>93-94</td>
</tr>
</tbody>
</table>
Discussions Leaders: When it is your turn to lead a discussion, please send an email to the class with a thought-provoking question(s) about the article by Monday before the Thursday class meeting.

Field Exercise: Students will evaluate top-down and bottom-up effects in an Oregon white oak stand on OSU property. Student teams will do a field project presentation on the last day of class.

Paper requirements

Students registered for 2 credits will write a paper (7-8 double spaced pages of text plus supplemental material, references, etc.). Potential topics for the paper include for example, investigating the developing theory, the history of thought, ideas, and work, or the frequency/strength of trophic cascades in various ecosystems. Those registered for 3 credits will write a second paper (10-12 double spaced pages of text plus supplemental material, references, etc.) that looks deeper into some specific aspect of the trophic cascades. A paper proposal is required and should be about 400-500 words for each proposed paper.

Individual Project
All students will complete this project. Please choose hypothesis A or B and write a very short paper (no more than 3 double spaced pages plus references) providing arguments, multiple lines of evidence if possible, and references to support your chosen hypothesis. Feel free to speculate as needed and/or use information from modern ecosystems to help frame your discussion. Think creatively and do not worry about getting it wrong for this project.

Hypothesis A The large mammalian herbivores of the North American Pleistocene were primarily food limited and before humans arrived in North America, ecosystems were structured more by “bottom up” forces with relatively high densities of large herbivores.

Hypothesis B The large mammalian herbivores of the North American Pleistocene were primarily predator limited and before humans arrived in North America, ecosystems were structured more by “top down” forces with relatively low densities of large herbivores.
Statement Regarding Students with Disabilities
OSU Policy on Students with Disabilities:
"Accommodations are collaborative efforts between students, faculty and Services for Students with Disabilities (SSD). Students with accommodations approved through SSD are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through SSD should contact SSD immediately at 737-4098."

Statement of Expectations for Student Conduct
Please see the OSU Student Conduct website:
http://oregonstate.edu/admin/stucon/achon.htm

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Topic (lecture)</th>
<th>Readings</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>April 2</td>
<td>Class overview, Introductions, Trophic Cascades Background Ripple</td>
<td>Laliberte and Ripple 2004 Ripple et al. in press</td>
<td></td>
</tr>
<tr>
<td>April 9</td>
<td>Trophic Cascades Background Ripple</td>
<td>Dalton 2008 Van Valkenburg and Hertel 1993 Kay 1998</td>
<td></td>
</tr>
<tr>
<td>April 16</td>
<td>Wolves-elk-plants-streams Beschta</td>
<td>Janzen 1983 Terborgh and Estes in press</td>
<td></td>
</tr>
<tr>
<td>April 23</td>
<td>Trophic Cascades Background</td>
<td>Polis et al. 2000 Springer et al. 2003 Hebblewhite et al. 2005</td>
<td></td>
</tr>
<tr>
<td>April 30</td>
<td>Density-mediated cascades (meta analysis) Ripple</td>
<td>Crête 1999 Peterson et al. 2003 Carpenter et al. in press</td>
<td></td>
</tr>
<tr>
<td>May 14</td>
<td>Field Trip/project</td>
<td>Myers et al. 2007 Roemer et al. 2009</td>
<td></td>
</tr>
<tr>
<td>May 21</td>
<td>Ecosystem dynamics (mesopredator release) Morzillo</td>
<td>Schmitz 2006 Berger et al 2001</td>
<td></td>
</tr>
<tr>
<td>May 28</td>
<td>Ecosystem dynamics (cougar cascades) Ripple</td>
<td>Myers et al. 2007 Roemer et al. 2009</td>
<td></td>
</tr>
<tr>
<td>June 4</td>
<td>Student Presentations on Field Projects course reaction survey</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1st paper due
2nd paper due
Required Readings


