

Amy E. Hessel
Assistant Professor, Geography
e-mail: Amy.Hessel@mail.wvu.edu
phone: 304-293-5603 ext. 4344
office: 420 White Hall

Geography 607: Geography of Fire

Semester: Fall 2006
Course Format and Hours: 3 hr Lecture, 3 hr credit
Prerequisites: Graduate Standing
Instructor: Dr. Amy Hessel, 420 White Hall, 293-5603 ext 4344,
Amy.Hessel@mail.wvu.edu
Time: Monday 1:30-4:20pm
Place: 112 White Hall
Office Hours: Monday 1:30-4:20pm or by appointment

Course Objectives:

1. Students will explore two key traditions in geography, spatial science and human environment relations through an intensive review of fire ecology literature.
2. Students learn to write a literature review or research paper for publication including: researching appropriate papers and texts, summarizing current research, identifying common themes and trends, and formalizing knowledge in written form.

Expected Learning Outcomes:

Upon successful completion of this course:

1. Students will understand the role of humans in affecting wildfire throughout the Holocene in North America.
2. Students will understand the role of different ignition sources in wildland fire.
3. Students will understand the fire triangle and other conceptual models of wildland fire.
4. Students will gain an understanding of different constraints on wildfire including: topography, fuels, climate and land use.
5. Students will be able to critically read articles in fire ecology.
6. Students will be able to lead an intellectual discussion of three articles of their choice.
7. Students will be able to review the work of their peers in a formal setting.
8. Students will gain experience in writing either a research paper or a literature review paper for publication.

Course Requirements:

Attendance:

Attendance is required. Students may miss **one class meeting**, however each additional unexcused absence will reduce the student's grade by one letter grade. Please be on time and ready to think hard.

Participation:

This is a hands-on course that requires active participation. 50% of your grade will be derived from participation including:

- a) **Reading.** Students must do assigned readings *before* class. It will be obvious to your classmates and to me whether you have read the material or not. Please do not embarrass yourself or the instructor by failing to do the readings.
- b) **Verbal participation.** This includes questions, suggestions, comments, and ideas. It also includes good communication skills, patience with your classmates and intellectual leadership.
- c) **Active participation.** This involves actually contributing to your final project including: identifying sources, reading and reviewing manuscripts, writing and possibly analysis.

Your participation grade will be assigned by your peers and your instructor. See table below.

Assignments:

The course is designed around a single final project authored by each student. Grading (including participation) will be determined as follows:

Student-lead discussion of 3 key articles: Each student will lead a discussion on 2-3 articles assigned for each week. Students will be graded on: knowledge of the material, questions posed to the class, and overall quality of the discussion (see attached grading score sheet).

Annotated bibliography (10-15 articles): These articles will make up the bulk of the literature each student will review for their manuscript. Each annotated bibliography will include a complete citation, 2-3 sentence summary of the article and 2-3 significant findings from the article that tie into the themes of the manuscript.

Paper Outline: This outline (2-3 pages) will provide the backbone of your paper. Your outline should be very detailed, including bulleted points for *each sentence* and appropriate citations and literature cited section.

1st draft: A completed draft of your manuscript (*in digital form; MS Word*).

Review of two 1st drafts: You will review two other students' drafts using the attached score sheet for evaluating manuscripts. You are also asked to provide written comments that will help improve their manuscript.

Final project: Each student will submit one paper (hard copy) before 4pm December 4. Papers can be left in my box outside room 425 White.

Task	Percent
Student lead discussion	20%
Annotated bibliography	5%
Outline of term paper	5%
First draft	5%
Review of two first drafts	5%
Final paper	40%
Participation grade	20%
Total Grade	100%

Required Readings:

Three readings a week assigned by one of your classmates or myself. All papers will be made available to students for copying or via electronic reserves as PDFs.

- Abrams, M. D. 1992. Fire and the development of oak forests. *BioScience* 42:346-353.
- Agee, J. K. 1993. *Fire Ecology of Pacific Northwest Forests*. Island Press, Washington D.C.
- Allen, C. D., M. Savage, D. Falk, K. Suckling, T. Swetnam, T. Schulke, P. Stacey, P. Morgan, M. Hoffman and J. Klingal. 2002. Ecological restoration of southwestern ponderosa pine ecosystems: a broad perspective. *Ecological Applications* 12:1418-1433.
- Arno, S. F. and S. Allison-Bunnell. 2002. *Flames in our forest: disaster or renewal?* Island Press, Washington D. C.
- Baker, W. 2002. Indians and fire in the Rocky Mountains: the wilderness hypothesis renewed Pgs. 41-76, In: *Fire, Native Peoples and the Natural Landscape*, T. Vale, ed. Island Press, Washington D.C.
- Baker, W. and K. F. Kipfmüller. 2001. Spatial ecology of Pre-Euro-American fires in a southern Rocky Mountain subalpine forest landscape. *Professional Geographer* 53:248-262.
- Boyd, R. 1999. *Indians, Fire and the Land in the Pacific Northwest*. Oregon State University Press, Corvallis, Oregon. P.1-30.
- Delcourt, H. and P. Delcourt. 1996. Pre-Columbian Native American fire on Southern Appalachian landscapes. *Conservation Biology* 11:1010-1014.
- Denevan, W. 1992. The pristine myth: the landscape of the Americas in 1492. *Annals of the Association of American Geographers* 82:369-385.
- Ehle and Baker. 2003. Disturbance and stand dynamics in ponderosa pine forests in Rocky Mountain National Park, USA. *Ecological Monographs* 73:543-566.
- Hessl, A. E., D. McKenzie, and R. Schellhaas. 2004. Drought and Pacific Decadal Oscillation linked to fire occurrence in the inland Pacific Northwest. *Ecological Applications* 14:425-442.
- Hobbs, R. and L. Huenneke. 1992. Disturbance, diversity, and invasion: implications for conservation. *Conservation Biology* 6:324-337.
- Hueberger, K. and F. Putz. 2003. Fire in the suburbs: ecological impacts of prescribed fire in small remnants of longleaf pine (*Pinus palustris*) sandhill. *Restoration Ecology* 11:72-81.

- James, F., C. Hess, and D. Kufrin. 1997. Species-centered environmental analysis: indirect effects of fire history on red-cockaded woodpeckers. *Ecological Applications* 7:118-129.
- Keeley, J. E. 2002. Native American impacts on fire regimes of the California coastal ranges. *Journal of Biogeography* 29:303-320.
- Keeley, J. E. 2004. Impact of antecedent climate on fire regimes in coastal California. *International Journal of Wildland Fire* 13:173-182.
- Keenshaw, K., J. Vaske, and A. Bright. 2004. Situational influences of acceptable wildland fire management actions. *Society and Natural Resources* 17:477-489.
- Keifer, M. 1998. Fuel load and tree density changes following prescribed fire in the giant sequoia-mixed conifer forest. In: L. Brennan and T. Pruden (eds), *Fire in ecosystem management: shifting paradigm from suppression to prescription*. Proceedings of the Tall Timbers Fire Ecology Conference, No. 20. Tall Timbers Research Station, Tallahassee, FL.
- Kilgore, B. and D. Taylor. 1979. Fire history of a sequoia-mixed conifer forest. *Ecology* 60:129-142.
- Minnich, R. A. 2001. An integrated model of two fire regimes. *Conservation Biology* 15:1549-1553.
- Moritz, M. A. 2003. Spatiotemporal analysis of controls on shrubland fire regimes: age dependency and fire hazard. *Ecology* 84:351-361.
- Pyne, S. 1982. *Fire in America: A Cultural History of Wildland and Rural Fire*. Princeton University Press.
- Running, S. 2006. Is global warming causing more, larger wildfires? *Science*.
- Sandberg, D., C. Hardy, R. Ottmar, J. Kendall Snell, A. Acheson, J. Peterson, P. Seamon, P. Lahm and D. Wade. 1999. National strategic plan: modeling and data systems for wildland fire and air quality. USDA Forest Service Pacific Northwest Research Station General Technical Report PNW-GTR-450.
- Sauer, C. 1950. Grassland climax, fire, and man. *Journal of Range Management* 3:16-21.
- Schuler, T. M. and W. R. McClain. 2003. Fire history of a ridge and valley oak forest. USDA Forest Service Northeastern Research Station Research Paper NE-724.
- Swetnam, T. 1993. Fire history and climate change in giant sequoia groves. *Science* 262:885-889.
- Taylor, A. H. 2000. Fire regimes and forest changes in mid and upper montane forests of the southern Cascades, Lassen Volcanic National Park, California, U.S.A. *Journal of Biogeography* 27:87-104.
- Turner, M. G., W. H. Romme, R. H. Gardner and W. W. Hargrove. 1997. Effects of fire size and pattern on early succession in Yellowstone National Park. *Ecological Monographs* 67:411-433.
- Vale, TR. 1998. The myth of the humanized landscape: an example from Yosemite National Park. *Natural Areas Journal* 18:231-236.
- Van Lear, D. 1984. Prescribed fire – its history, uses, and effects in southern forest ecosystems. Conference on Prescribed Fire and Smoke Management in the South. Atlanta, GA Sept 12-14, 1984.
- Walker, R., 1979. Review of The Environment as Hazard. *Geographical Review* 69: 113-14.
- Westerling, A.L., H.G. Hidalgo, D.R. Cayan, and T.W. Swetnam. 2006. Warming and earlier spring increases western U.S. forest wildfire activity. *Science*.

- White, G.F., 1942, Human Adjustment to Floods. Research Paper No. 29. Chicago: University of Chicago, Department of Geography.
- White, G.F., et al. 1997. Commentary on Human Adjustment to Floods. *Classics in Human Geography, Progress in Human Geography* 21: 423-429.
- Whitlock, C. and M. A. Knox. 2002. Prehistoric burning in the Pacific Northwest: human versus climatic influences. Pgs. 195-231, In: *Fire, Native Peoples and the Natural Landscape*, T. Vale, ed. Island Press, Washington D.C.
- Winter, G., C. Vogt, and S. McCaffrey. 2004. Examining social trust in fuels management strategies. *Journal of Forestry* 102:8-15.
- Winter, G. and J. Fried. 2000. Homeowner perspectives on fire hazard, responsibility, and management strategies at the wildland-urban interface. *Society and Natural Resources* 12:33-49.
- Wright, C. S. and J. K. Agee. 2004. Fire and vegetation history in the eastern Cascade Mountains, Washington. *Ecological Applications* 14:443-459.

Other Articles of Interest

- Kimmerer, R. W. and F. Kanawha Lake. 2001. The role of indigenous burning in land management. *Journal of Forestry* 99:36-41.
- Snow, D. 1995. Microchronology and demographic evidence relating to the size of pre-Columbian North American Indian populations. *Science* 268:1601-1604.
- Vale, TR. 2000. Pre-Columbian North America: pristine or humanized – or both? *Ecological Restoration* 18:2-3.
- Vale, TR. 2002. The pre-European landscape of the United States: pristine or humanized? Pgs. 1-40, In: *Fire, Native Peoples and the Natural Landscape*, T. Vale, ed. Island Press, Washington D.C.
- Zimmerer, K. 2000. The reworking of conservation geographies: nonequilibrium landscapes and nature-society hybrids. *Annals of the Association of American Geographers* 90:356-369.

Key Themes and Possible Research Topics:

Spatial Sciences: How has geography added to the study of fire ecology through the spatial sciences? How could geography contribute to fire ecology in the future? Is topography important? Is place important? What spatial statistics or analytical methods are/could be employed to study fire ecology (GIS, remote sensing, other)?

Human Environment Relations: Has the debate over native burning helped or hurt our understanding of fire ecology? Does current research on fire and climate make human influences irrelevant? What does current research in fire ecology say about the role of native peoples in affecting pre-Euro-American settlement vegetation? What can the study of human-environmental relations add to the study of fire ecology?

Schedule

Date	Topic	Readings	Discussant	Assignments/Due date
8/21	Role of Geography in Fire Ecology	Agee (p.3-19, 25-47) Sauer 1950	Hessl	
8/28	Humanized vs. Wild Debate	Denevan 1992, Vale 1998, Keeley 2002	Hessl	ID of 3 key articles, date
9/4	Labor Day			
9/11	Spatial Data in Fire Ecology	Ehle and Baker 2003, Taylor 2000, Wright and Agee 2004	George	
9/18	Spatial Analysis in Fire Ecology GeoDa Exercise	Baker and Kipfmuller, Baker 2002	Evan	ID your paper topic
9/25	Fire Effects on Succession	Turner et al. 1997; Keeley et al. 2006	James	
10/2	Case Study: Eastern Oak Forests	Abrams 1992, Schuler and McClain 2003, Delcourt and Delcourt 1997	Jon	Annotated bibliography
10/9	Case Study: Coastal California Fire	Minnich 2001, Keeley 2004, Moritz 2003	Carry	
10/16	Prescribed Fire	Van Lear 1984, Allen et al. 2002, James et al. 1997	Lisa	Outline
10/23	Fire as a natural hazard	White 1942, White et al. 1997; Walker 1979	James	
10/30	Case Study: Long leaf pine		George	
11/6	Climate Change and Fire	Westerling 2006; Running 2006; Flannigan 2005; Gillette 2006	Carry	1st draft (digital copy)
11/13	Urban Wildland Interface	Winter and Fried 2000; Heuberber and Putz 2003	Evan	Review of two 1st drafts
11/20	Rx Fire in Giant Sequoia NP	Keifer 2004, Kilgore and Taylor 1979, Swetnam 1993	Lisa	
11/27	Thanksgiving			
12/4	Fire and Invasive Species	Hobbs and Huenneke 1992?	Jon	Final Paper Due (hard copy)

This schedule is definitely subject to change!!! Students are responsible for changes announced in class.

Social Justice Statement

West Virginia University is committed to social justice. I concur with that commitment and expect to foster a nurturing learning environment based upon open communication, mutual respect, and non-discrimination. Our University does not discriminate on the basis of race, sex, age, disability, veteran status, religion, sexual orientation, color or national origin. Any suggestions as to how to further such a positive and open environment in this class will be appreciated and given serious consideration.

If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with Disability Services (293-6700).

Grading Rubric for Final Project:

Name: _____ Topic: _____

Ratings:

	Low				High
1. Geographic perspective/context	1	2	3	4	5
2. Statement of problem/thesis	1	2	3	4	5
3. Depth of analysis/argument	1	2	3	4	5
4. Balance of analysis/argument	1	2	3	4	5
5. Originality	1	2	3	4	5
6. Abstract	1	2	3	4	5
7. Introduction	1	2	3	4	5
8. Conclusion	1	2	3	4	5
9. Organization	1	2	3	4	5
10. Flow of ideas	1	2	3	4	5
11. Amount/use of authoritative literature/citations	1	2	3	4	5
12. Quality of data/evidence	1	2	3	4	5
13. Amount of data/evidence	1	2	3	4	5
14. Data interpretation	1	2	3	4	5
15. Maps, tables, figures (where appropriate)	1	2	3	4	5
16. Mechanics: spelling, punctuation, grammar etc.	1	2	3	4	5
17. Writing style, use of language	1	2	3	4	5
18. Presentation: title, subheads, pagination, appearance, assigned length	1	2	3	4	5
19. Crediting sources: in text references	1	2	3	4	5
20. List of references	1	2	3	4	5

Maximum Points = 100

Points: _____

Other Comments:

Grading Rubric for Student-Lead Discussion:

Name: _____ Topic: _____

Ratings:

	Low				High
Articles are well-chosen, focus on specific topic	1	2	3	4	5
Geographic perspective/context is made clear	1	2	3	4	5
Description of main topics/themes is clear	1	2	3	4	5
Depth of questions	1	2	3	4	5
Balance of questions vs. student discussion	1	2	3	4	5
Presentation: Leader speaks clearly, is easily understood	1	2	3	4	5

Maximum Points = 30

Points: _____

Other Comments: