

NRSM 170: International Environmental Change

Spring 2016
3 credits; grade

T & Th 2:10 – 3:30 PM
Location: Clapp 131

Course Description:

This course provides an introduction to natural and anthropogenic environmental change from ancient to contemporary times. Course objectives are to: 1) investigate the nature, role and importance of historic natural and anthropogenic ecological disturbances in the development and maintenance of terrestrial ecosystems, 2) consider how understanding historic disturbances can inform conservation and development efforts, and 3) evaluate implications of contemporary environmental change.

The issues we consider are multi-faceted and imprecisely known; there are rarely simple answers to complex problems and many things we do not know. I expect you to come to class having read the assigned readings and prepared to discuss them. We will discuss readings in class and I look forward to your informed participation. I would be happy to meet for additional review or discussion during office hours or by appointment.

Instructor:

Stephen Siebert, Professor
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Email: steve.siebert@umontana.edu;
Phone: 243-4661
Office hours: Tuesday & Thursday 11:30 – 1 PM or by appointment.

Required Readings:

All readings are available on disc in the Mansfield Library under NRSM170.

Learning Outcomes:

By completing this course students will be able to:

- articulate the meaning, role and importance of ecological disturbance in the development and maintenance of terrestrial ecosystems;
- identify and describe important attributes of ecological disturbances;
- describe the role of historic disturbance regimes, both natural and anthropogenic, in the development and maintenance of plant communities and biological diversity; and
- describe how contemporary anthropogenic disturbances differ from historic disturbance regimes and potential ecological and social effects of these differences.

Grading (+/- grading will be used):

- Two short writing assignment @ 15 pts each 30 %
- Two quizzes @ 15 pts each 30%
- In class assignments 15%
- Final exam 25%
- Total 100 %

Note: missed quizzes or late assignments will result in lost credit without prior approval. In class assignments (reflections or questions as assigned) are due in class that day; late assignments will not be accepted.

The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students (DSS). If you think you may have a disability that adversely affects your academic performance, and you have not already registered with DSS, please contact DSS in Lommasson 154 or 406-243-2243. I will work with you and DSS to provide appropriate accommodation.

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the [Student Conduct Code](#).

SYLLABUS

Week 1 Topics/Readings

- 1/26 Introduction to course & issues
- 1/28 Biocultural diversity & loss
[Video: Wade Davis on Endangered Cultures](#) (22 min)
Readings: Davis (2007) pp. 1-14

Week 2 Topics/Readings

- 2/2 Social & ecological change: disturbance & complexity
Readings: Pearce (2013), Uhl, et al. (1990)
- 2/4 The challenge of sustainable use and maintaining resilience
[Video: Building resilience – people with greener land](#) (6 min)
Readings: Berkes, et al. (2003), Ludwig, et al. (1993)

Week 3 Topics/Readings

- 2/9 Overview of historic land uses
Readings: Mann (2002), Willis et al. (2004)
- 2/11 Indigenous people: conservationists or despoilers?
Film: "Who's Destroying the Forest?" (DVD 03629; 47 min)
Readings: Diamond (2005), Dove (1993), Pearce (2012)

Week 4 Topics/Readings

- 2/16 Driving forces of forest conversion & degradation
Readings: Economist (2008), Geist & Lambin (2002), Revkin (2014)
- 2/18 Southeast Asia: Social & environmental transformation
Readings: Balch (2015)

Week 5 Topics/Readings

- 2/23 **Review, Quiz #1**

Historic land uses and social-ecological change examined

- 2/25 Hunting, gathering & change among the San in Southern Africa
Film: "The Great Dance" (80 min)
Readings: Bearak (2010)

Week 6 Topics/Readings

- 3/1 Historic agriculture & change in Crete
Readings: Grove & Rackham (2001), Marsh (1864)
- 3/3 Historic land use & change in Bhutan
Readings: Siebert & Belsky (2016)

Week 7 Topics/Readings

- 3/8 Agriculture in ancient Mexico
Film: "The Chinampas" (Video 02748; 30 min)
Readings: Chapin (1988)

3/10 Forest use and conservation in an Indonesian village
Readings: Ostrom (2001)

Week 8 Topics/Readings

3/15 Native American use of fire
Film: "Fires of Spring" (45 min)
Readings: Cronon (1983)

3/17 Kootenai land use & worldview
Readings: Kootenai Culture Committee (2015)

Week 9 Topics/Readings

3/22 Coffee & cacao: A global addiction & cultivation options
Readings: Jaffee (2007), Perfecto, et al. (1996)
3/24 Forestry in the future: agroforestry, biomass & land management
[Video: "For Greener Land and Bluer Water"](#) (10 min)
Readings: Miller & Nair (2006), USDA (2014)

Week 10 Topics/Readings

3/29 Development and change in Switzerland & Review
Readings: K uchli (1997)

3/31 **Quiz #2 and Writing assignment #1 due**

Spring Break

Week 11 Topics/Readings

4/12 Global Tourism; Film: "The Golf War" (DVD 10839; 40 min)
Readings: Rothman (1998)

4/14 Freshwater resources – a global crisis
Readings: Rodgers (2008)

Week 12 Topics/Readings

4/19 Invasive species & conservation
Readings: Crowl, et al. (2008), Epanchin-Niell (2014)

4/21 Community-based conservation in the Swan Valley, MT
Guest lecture: Northwest Connections
Readings: Parker (2014)

Week 13 Topics/Readings

4/26 Conventional and alternative agriculture
[Video: Principles of sustainable land management](#) (11 min)
Readings: Allen (2012), Altieri (2004), Rosenberg (2014)

4/28 A New/Old Land Ethic; Video: Green Fire (DVD 05758; 73 min)
Readings: Leopold (1949) pp.129-133 & 201-226

Week 14 Topics/Readings

5/3 Alternative paths & learning from others
[Video: E. Sirolli: Want to help someone? Shut up and listen!](#)(17 min)
Readings: Costanza, et al. (2007), Davidson (2000)

Writing assignment #2 due

5/5 Conclusion & Review

Readings: Davis (2007) pp. 183-202, Towe (1990), Wallace (1869)

Final Exam: Monday May 9, 1:10-3:10 PM in Clapp 131

Required Readings:

- Allen, T. 2012. The new land rush. *Utne Reader* Jan/Feb, pp. 50-53.
- Altieri, M. 2004. Linking ecologists and traditional farmers in the search for sustainable agriculture. *Front Ecol Env* 2:35-42.
- Balch, O. 2015. Indonesia's forest fires: everything you need to know. *The Guardian* Nov. 11.
- Bearak, B. 2010. For some bushmen, a homeland worth the fight. *NY Times* Nov. 4.
- Berkes, F., J. Colding, C. Folke (eds). 2003. Navigating Social-Ecological Systems. Cambridge Univ. Press, Cambridge. pp. 13-21.
- Chapin, M. 1988. The seduction of models. *Grassroots Development* 12(1):8-17.
- Costanza, R., et al. 2007. Sustainability or collapse: what can we learn from integrating the history of humans and the rest of nature? *Ambio* 36:522-527.
- Cronon, W. 1983. Changes in the Land. Hill & Wang, NY, pp. 159-170.
- Crowl, T. et al. 2008. The spread of invasive species and infectious disease as drivers of ecosystem change. *Front Ecol Env* 6:238-246.
- Davidson, C. 2000. Economic growth and the environment: alternatives to the limits paradigm. *BioScience* 50:433-440.
- Davis, W. 2007. Light at the Edge of the World. Douglas & McIntyre, Vancouver. (pp. 1-14 & 183-202).
- Diamond, J. 2005. Collapse. Viking Press, NY. (pp. 1-15).
- Dove, M. 1993. A revisionist view of tropical deforestation and development. *Environmental Conservation* 20:17-24.
- The Economist*. 2008. Malthus, the false prophet. May 17.
- Epanchin-Niell, R. 2014. Developing policies to combat invasive species. Resources 187, Resources for the Future, Washington, D.C.
- Geist, H. & E. Lambin. 2002. Proximate causes and underlying driving forces of tropical deforestation. *BioScience* 52:143-150.
- Grove, A. & O. Rackham. 2001. The Nature of Mediterranean Europe: An Ecological History. Yale Univ. Press, New Haven. pp. 8-10.
- Jaffee, D. 2007. Brewing Justice. Univ. CA Press, Berkeley. pp. 133-164.
- Kootenai Culture Committee. 2015. The traditional worldview of the Kootenai people. *Montana: The Magazine of Western History* 65(2):47-73.
- Küchli, C. 1997. Forests of Hope: Stories of Regeneration. New Society Publishers, Gabriola Island, BC, Canada. pp. 10-31.

- Leopold, A. 1949. Sand County Almanac. Oxford Univ. Press, NY. Thinking like a Mountain (pp. 129-133) & The land ethic (pp. 201-226).
- Ludwig, D., et al. 1993. Uncertainty, resource exploitation and conservation: lessons from history. *Science* 260:17-18.
- Mann, C. 2002. 1491. *The Atlantic Monthly* March, pp. 41-53.
- Marsh, G. 1864. Man and Nature: The Earth as Modified by Human Action. Charles Scribner & Sons, NY. pp. 1-7 & 33-34.
- Miller, R and P. nair. 2006. Indigenous agroforestry systems in Amazonia: from prehistory to today. *Agroforestry Systems* 66:151-164.
- Ostrom, E. 2009. A general framework for analyzing sustainability of social-ecological systems. *Science* 325:419-422.
- Parker, M. 2014. Swan Story. In: S. Charnley, T.E. Sheridan, G. P. Nabhan (eds). Stitching the West Back Together: Conservation of Working Landscapes. Univ. of Chicago Press, pp. 123-135.
- Pearce, F. 2013. True nature: Revising ideas on what is pristine and wild. *Yale Environment* 360.
- Pearce, F. 2012. Busting the forest myths: people as part of the solution. *Yale Environment* 360.
- Perfecto, I., et al. 1996. Shade coffee: a disappearing refuge for biodiversity. *BioScience* 46:598-608.
- Revkin, A. 2014. Can Peru control the murderous resource rush on its forest frontiers? *NY Times*, Oct. 10, 2014.
- Rogers, P. 2008. Facing the freshwater crisis. *Scientific American*, August, pp. 46-53.
- Rosenberg, T. 2014. A Green Revolution, this time for Africa. *NY Times* April 9, 2014.
- Rothman, H. 1998. Devil's Bargain. Univ. Press of Kansas. pp. 10-28.
- Siebert, S. & J. Belsky. 2016. Keeping ecological disturbance on the land: recreating swidden effects in Bhutan. In: M. Cairn (Ed). Shifting Cultivation Policy: Trying to Get it Right. (Vol II). Earthscan, London. (in press)
- Towe, T. 1990. It's time Montana stopped selling itself down the river. Editorial, *The Missoulian*, June 18, 1990.
- Uhl, C. et al. 1990. Studies of ecosystem response to natural and anthropogenic disturbances provide guidelines for designing sustainable land-use systems in Amazonia. In: A. Anderson (ed) Alternatives to Deforestation. Columbia Univ. Press, NY. pp. 24-27.
- USDA. 2014. Burgeoning biomass: creating efficient and sustainable forest biomass supply chains in the Rockies. *Science Bulletin* #13.

Wallace, A.R. 1869. The Malay Archipelago. Oxford Univ. Press, Oxford (reprint). pp. 596-598.

Willis, K.; L. Gillson; F. Brncic. 2004. How “virgin” is virgin rainforest? *Science* 304:402-403.