

LANDSCAPE ECOLOGY SYLLABUS

FRWS 6710-7710

John A. Bissonette

All materials and information for this class can be found on the class website, arranged as labeled modules, and accessed through the USU library class reserve site. **Reading assignments and all other information will be given on the web site Discussion Board.** Please do not post anything on the Discussion Board. That is reserved for Assignments. New information can be posted at any time so you must check this daily for updates on assignments. You can access the electronic reserves by bookmarking <http://eres.usu.edu>. The password is "Bis7710". If you are a MS student you should be enrolled for call number 23282 FRWS 6710, if you are a Ph.D student enroll for call number 23283 FRWS 7710. Starting on page 17 is information about student rights and responsibilities that you should read. The information can be found on the USU URL:

<http://www.usu.edu/aia/ACADEMIC/syllabusres.cfm>

GRADING:

Grading is based on total accumulation of points, and will depend upon three in-class tests, a final exam, the exercises and problem sets assigned, short spot quizzes, and participation in class during discussion.

Sentient participation in class discussion is required. You will be expected to come to class having read the assignments and prepared to discuss the issues. At the beginning of class I will often ask you to write a brief, 5 minute answer to a question that we either have discussed previously or that comes from the reading. What I am expecting here is that as you read you will come across questions or ideas that are not fully answered or are not clear. Make a note of these questions and bring to class. Questions that probe the concepts we are discussing and show that you are thinking of the material will be reflected in your grade. At times, you will also be expected to lead class discussion focusing on specific readings. Please prepare an outline for the class when you lead the

discussion. If you get to me the night before class, I will make copies for the class. If not, then please bring 16 copies to class. YOU WILL DO WELL IF YOU READ THE ASSIGNMENTS, THINK ABOUT THE ISSUES & ARE PREPARED TO DISCUSS THE ISSUES IN CLASS

COURSE SYNOPSIS:

This course will explore the concepts and precepts that underlie landscape ecology and are arranged into modules of different length and difficulty. The modules each include an introduction, usually in the form of a PowerPoint presentation, required readings that will give you the necessary background to understand the material, optional readings that will enhance your knowledge of the subject matter, a discussion period to clarify important points that you may have questions about, and usually one or two written exercises that illustrate specific concepts related to the material. Our focus will be on learning appropriate theory, making distinctions between important concepts, and trying to understand how the respective roles of equilibrium concepts, such as competition, predation, and parasitism vs. the stochastic forces of anthropogenic and 'natural' disturbance regimes structure landscapes and animal communities. We will try to do this in a spatially and temporally sensitive way.

Required reading for this class will include chapters from two books. Only one is required. A good basic text, but not required, is Landscape Ecology in Theory and Practice: Pattern and Process. The second book is required and is called Learning Landscape Ecology. It contains most of the exercises that we will do in the course. Both are available in the University bookstore. There are other books that address aspects of the subject; see the end of the syllabus for a partial list of other relevant books. I have also put manuscripts in PDF format on electronic course reserve for you. Not all will be assigned reading. Many are for additional information on subjects specific to the class that you may wish to look at.

REQUIRED CLASS TEXTS (you will use them as background and for take home exercises)

- a) Gergel, S. E., and M. G. Turner. 2001. Learning Landscape Ecology. Springer, New York, 316 pp. (with CD-ROM) ISBN 0-387-95254-3

NOT REQUIRED, BUT EXCELLENT READING SOURCE

- a) Turner, M. G., R. H. Gardner, and R. V. O'Neill. 2001. *Landscape Ecology in theory and Practice: Pattern and Process*. Springer-Verlag, New York, N.Y. (with CD-Rom) ISBN 0-387-95123-7

MODULES

A note on these modules: These modules reflect my **best guess** at what we will cover. The readings will vary. The Landscape Ecology class is always a diverse group with very different backgrounds. My objective is to proceed at a reasonably fast pace, but with enough short reviews to cover baseline material that some of you have had but forgotten and that some of you may never have had formally. I have found that if I do not do some review of concepts that students need as background, your ability to grasp the concepts and put them into a workable framework is much more difficult. The basic concepts come from the reading. If you do not know something, look it up. I will often ask in class if you understand various concepts. If no one knows, then I know that I need to do a brief review. Your job is to be prepared; my job is to see that you understand. If we both work at it, the class should be worth your time.

- 1) Why Landscape Ecology? Module: Objectives are to learn about the status of knowledge of students, to provide a context for what landscape ecology is, and to establish a conceptual basis for understanding 'causality' in ecology.
 - a. Introductions, Questionnaire
 - b. 5 minute written exercise: what is landscape ecology and why has it developed as a distinct discipline.
 - c. PowerPoint presentation: Context for Landscape Ecology
 - d. Reading:
 - i. Wiens, J. A. 1999. The science and practice of landscape ecology Pages 371-383 in Klopateck, J. M. and R. H. Gardner (eds.) *Landscape Ecological Applications: Issues and Applications in Landscape Ecology*. Springer, New York, N. Y.
 - ii. Baskerville, G. L. 1994. Gaelic poetry for deaf seagulls-encore. *The Forestry Chronicle* 70(5):562-564.

- iii. Wiens, J. A. 1992. What is landscape ecology, really? *Landscape Ecology* 7(3):149-150.
 - iv. Risser, P. G. 1999. Landscape ecology: does the science only need to change at the margin. Pages 3-10 in Klopateck, J. M. and R. H. Gardner (eds.) *Landscape Ecological Applications: Issues and Applications in Landscape Ecology*. Springer, New York, N. Y.
 - e. Discussion
 - f. Important Landscape Ecology Definitions
 - g. PowerPoint presentation: *Causality in Ecology*
 - h. Handout: *Causality in Ecology*
 - i. Reading:
 - i. Wright, B. E. 1979. Causality in biological systems. *Trends in Biochemical Sciences*. May: N 110-111.
 - ii. Williams, B. K. 1997. Logic and science in wildlife biology. *Journal of Wildlife Management* 61(4):1007-1015.
 - j. Discussion
 - k. Optional Reading
 - i. Wu, J. and R. Hobbs. 2002. Key issues and research priorities in landscape ecology: an idiosyncratic synthesis. *Landscape Ecology* 17:355-365.
- 2) Context for Ecology module: Objectives are to explain the human tendencies that influence how scientists do science, and to address the issue of how scientific 'rigor' is defined for smaller scale studies and what problems arise when one tries to do larger, landscape scale studies.
- a. Exercise /class participation on sharpening and leveling using the 4 sentences from Mowat's "Lost in the Barrens" (attached)
 - b. PowerPoint presentation: Things are not what they seem
 - c. Discussion of implications of "sharpening and leveling"
 - d. Discussion of the concept of 'Observation Set'
 - e. Discussion: What is rigor in ecology?
 - f. Readings:
 - i. Chamberlin, T. C. 1897. The method of multiple working hypotheses. Reprinted in *Science* 1965 148:754-759
 - ii. Platt, J. R. 1964. Strong inference. *Science* 146(3642): 347-352.

- iii. Wiens, J. A., N. C. Stenseth, G. Van Horne, and R. A. Ims. 1993. Ecological mechanisms and landscape ecology. *Oikos* 66:369-380
 - iv. S. Sullivan. 1996. Towards a non-equilibrium ecology: perspectives from an arid land. *Journal of Biogeography* 23:1-5
 - g. Discussion
 - h. Optional Readings:
 - i. Romesburg, H. C. Wildlife science: gaining reliable knowledge. *Journal of Wildlife Management* 45:293-313.
 - ii. Matter, W. J., and R. W. Mannan. 1989. More on gaining reliable knowledge: a comment. *Journal of Wildlife Management* 53:1172-1176.
 - iii. W. Roush: When Rigor meets Reality (*Science* 1995(269):313-315
 - iv. Murphy, D. D, and B. D. Noon. 1991. Coping with uncertainty in wildlife biology. *Journal of Wildlife Management* 55:773-582.
- 3) Hierarchy module: Objectives are to explain the underlying basis for ecological organization
- a. PowerPoint presentation: Why are the doomsday predictions wrong?
 - b. DiscussionReadings:
 - i. King, A. W. 1997. Hierarchy theory: a guide to system structure for wildlife biologists. Pages 185-212 in J. A. Bissonette, (ed), *Wildlife and Landscape Ecology: Effects of pattern and Scale*. Springer-Verlag, New York, N. Y.
 - ii. Urban, D. L., R. V. O'Neill, and H. H. Shugart, Jr. *Landscape Ecology*. *Bioscience* 37:119-127
 - c. Discussion
 - d. Exercise: Learning Landscape Ecology Chapter 1: Scale and Hierarchy Theory, R. V. O'Neill and M. A. Smith
 - e. Take-home exercise instructions
 - f. Powerpoint for Exercise 1 (after completion)
 - g. Optional Reading:
 - i. Kotliar, N. B., and J. A. Wiens. 1990. Multiple scales of patchiness and patch structure: a hierarchical

framework for the study of heterogeneity. *Oikos* 59:253-260.

- ii. Moon, D. C., and P. Stiling. 2002. Top-down, bottom-up, or side to side? Within-trophic-level interactions modify trophic dynamics or a salt marsh herbivore. *Oikos* 98(3) 479-489.

- 4) Scaling Concepts module: Objectives are to explain the critical concept of scale, present pertinent definitions and terminology, illustrate scale problems, and relate to hierarchy theory.
- a. PowerPoint presentation: Critical Concept of Scale
 - b. Reading:
 - i. Forum: comment and reply (Norton & Lord 1990, Wiens 1990, *Functional Ecology* 4:719-720)
 - c. Discussion
 - d. Reading:
 - i. Bissonette, J. A. 1997. Scale sensitive ecological properties: historical context, current meaning. Pages 3-30 in J. A. Bissonette (ed.), *Wildlife and Landscape Ecology: Effects of Pattern and Scale*, Springer-Verlag, New York, N.Y.
 - ii. I. Storch, and J. A. Bissonette. 2002. The problem with linking scales in the use of indicator species in conservation biology. Pages 73-92 in J. A. Bissonette and I. Storch (eds.), *Landscape Ecology and Resource Management: Linking Theory with Practice*. Island Press, Covelo CA, and Washington, D. C.
 - e. Discussion
 - f. Exercise: Learning Landscape Ecology Chapter 13: Interpreting landscape patterns from organism-based perspectives, S. M Pearson.
 - g. Optional Reading:
 - i. M. G. Turner, S. M. Pearson, W. H. Romme, and L. L. Wallace. 1997. Landscape heterogeneity and ungulate dynamics: what spatial scales are important. Pages 331-348 in J. A. Bissonette (ed), *Wildlife and Landscape*

Ecology: Effects of Pattern and Scale, Springer-Verlag, New York, N.Y.

- ii. Kawata, M. 1995. Emergent and effective properties in ecology and evolution. *Researches in Population Ecology* 37(1):93-96.

- 5) Fractal Dimensions module: Objectives are to introduce the idea of dimensions (especially fractal dimensions) as power scaling laws that allow one to understand the concept of scaling organisms to their environment, and as a new way of viewing the natural world.
- a. "kangaroo in Denmark' word game
 - b. PowerPoint presentation: Dimensions and Fractals
 - c. Hand outs: Dimensions Review, Fractal Calculations & Fractal Chronology, Fractal Generation, Cantor Dust, Underlying Characteristics of Chaos and Fractals
 - d. Discussion
 - e. Readings:
 - i. Milne, B. T. 1997. Applications of fractal geometry in wildlife biology, Pages 32-69 in J. A. Bissonette, (ed), *Wildlife and Landscape Ecology: Effects of pattern and Scale*. Springer-Verlag, New York, N. Y.
 - ii. Avnir, D., O. Biham, D. Lidar, O. Malcai. 1998 Is the Geometry of Nature Fractal? *Science* 279:39-40
 - iii. Sugihara, G., and R. M. May. 1990. Applications of fractals in ecology. *Trends in Ecology and Evolution* 5(3):79-86
 - f. Discussion
 - g. Readings:
 - i. Loehle, C. 1990. Home range: a fractal approach. *Landscape Ecology* 5:39-52.
 - ii. Gautestad, A. O., and I. Mysterud. 1994. Are home ranges fractals? *Landscape Ecology* 9:143-146.
 - iii. Loehle, C. 1994. Home ranges reconsidered. *Landscape Ecology* 9:147-149.
 - h. Problem set: Calculating the coastline (fn:coast-prob-set#1-03)
 - i. Coastline explanation (fn:coastline-explan-03)
 - j. Discussion

- 6) Understanding Fragmentation Metrics module: Objectives are to introduce the students to methods of quantifying properties of fragmented landscapes.
- a. PowerPoint presentation: Introduction to Metrics (from FRAGTSTATS)
 - b. Handouts: Fragmentation Metrics Table
 - c. Exercise: LE-book chapter 7, chapter 8
 - d. Reading:
 - i. Gustafson Quantifying landscape spatial pattern: what is the state of the art (1998) *Ecosystems* (1998) 1:143-156
 - ii. Tishendorf, L. 2001. Can landscape indices predict ecological processes consistently? *Landscape Ecology* 16:235-254.
 - e. Discussion
 - f. Optional readings:
 - i. Hargis et al. 1997. Understanding measures of landscape Pattern (pages 231-261 Chapter 9) in J. A. Bissonette (ed.) *Wildlife and Landscape Ecology: Effects of pattern and Scale*. Springer-Verlag, New York, N. Y.
 - ii. Tishendorf, L., and L. Fahrig. 2000. How should we measure landscape connectivity? *Landscape Ecology* 15:633-641.
 - iii. Tishendorf, L. and L. Fahrig. 2000. On the usage and measurement of landscape connectivity. *Oikos* 90:7-19.
 - g. Optional problem set with FRAGTSTATS and computer generated maps
- 7) Landscape Elements and Pattern module: Objectives are to illustrate the fundamental elements in a landscape, to address the idea of landscape pattern, and to encourage students to think about when and whether landscape heterogeneity has effects on animal populations.
- a. PowerPoint presentation: Landscape Elements
 - b. Discussion
 - c. PowerPoint presentation: Are Patterns Real?
 - d. Reading:

- i. Bissonette, J. A. 2002. Linking landscape patterns to biological reality. Pages 15-34 in J. A. Bissonette and I. Storch (eds.), *Landscape Ecology and Resource Management: Linking Theory with Practice*. Island Press, Covelo CA, and Washington, D. C.
 - ii. Mitchell, M. S., and R. A. Powell. 2002. Linking fitness landscapes with the behavior and distribution of animals. Pages 93-124 in J. A. Bissonette and I. Storch (eds.), *Landscape Ecology and Resource Management: Linking Theory with Practice*. Island Press, Covelo CA, and Washington, D. C.
 - e. Discussion
 - f. Handouts: *Geologic Time Scale*
 - g. Readings:
 - v. Fausch, K. D., C. E. Torgersen. C. V. Baxter, and H. W. Li. 2002. Landscapes to riverscapesk: bridging the gap between research and conservation of stream fishes. *Bioscience* 52(6):483-499.
 - h. Exercise: *Learning Landscape Ecology Chapter 6. Creating Landscape Pattern*, H. R. Delcourt
 - i. Optional reading:
 - i. Johnson, L. B. and S. H. Gage 1997. Landscape approaches to the analysis of aquatic ecosystems.
 - ii. Harrison, S. and L. Fahrig 1995. Landscape pattern and population conservation
 - iii. Dunning, J. B., B. J. Danielson, and H. R. Pulliam. 1992. Ecological proesseses that affect populations in complex landscapes. *Oikos* 65(1):169-175
- 8) Habitat Fragmentation module: Objectives are to illustrate that the concept of habitat fragmentation is broader than originally conceived, to put into perspective the question of what aspect of pattern (habitat area or spatial configuration) is most important in structuring animal populations, and to illustrate the idea of 'landscape connectivity' from an organism standpoint.
- a. PowerPoint presentation: Definition of Fragmentation

- b. Readings: Lord, J. M., and D. A. Norton. 1990. Scale and the spatial concept of fragmentation. *Conservation Biology* 4(2):197-202.
 - c. PowerPoint presentation: Mismatched Philosophy and Fragmentation Studies.
 - d. Discussion
 - e. Readings:
 - i. Merriam, G. 1995. Movement in spatially divided populations: responses to landscape structure. Pages 64-77 in W. Z. Lidicker, Jr. (ed). *Landscape approaches in mammalian ecology and conservation*. University of Minnesota Press, Minneapolis MN USA.
 - ii. Storch, I. 2002. Linking a multiscale habitat concept to species conservation. Pages 303-320 in J. A. Bissonette and I. Storch (eds.), *Landscape Ecology and Resource Management: Linking Theory with Practice*. Island Press, Covelo CA, and Washington, D.C.
 - f. PowerPoint presentation: Contribution of spatial configuration vs. habitat amount.
 - g. Readings:
 - i. Schmiegelow, F. K. and M. Mönkkönen 2002. Habitat loss and fragmentation in dynamic landscapes: avian perspectives from the boreal forest. *Ecological Applications* 12(2):375-389.
 - h. Exercise: Learning Landscape Ecology Chapter 5: Simulating changes in Landscape Pattern. Eric Gustafson
 - i. Optional readings:
 - ii. Garshelis, D. L. 2000. Delusions in habitat evaluation: meaningful use, selection, and importance. Pages 111-164.
 - iii. Pringle, C. M., R. J. Naiman, G. Bretschko, J. R. Karr, M. W. Oswood, J. R. Webster, R. L. Welsomme, and M. J. Winterbourn. 1988. Patch dynamics in lotic systems: the stream as a mosaic. *Journal North American Benthological Society* 7(4):503-524.
- 9) Disturbance Regimes module: Objectives are to place into perspective the small and large scale causes that structure populations and

influence vital statistics, such as birth and death rates, and survivorship.

- a. Powerpoint presentation: Multiple causes structure animal populations and Communities
- b. Discussion
- c. Readings:
 - i. Connell, J. H., 1978. Diversity in tropical rain forests and coral reefs. *Science* 199:1302-1310
 - ii. Wilkinson, D. M. 1999. The disturbing history of intermediate disturbance, *Oikos* 41:145-147
 - iii. Houston, M. Houston 1979. A general hypothesis of species diversity. *American Naturalist* 113(1):81-101
 - iv. Turner, M. G., W. H. Romme, R. J. Gardner, R. V. O'Neill, and T. K. Kratz. 1992. A revised concept of landscape equilibrium: disturbance and stability on scaled landscapes. *Landscape Ecology*.
- d. Exercise: Learning Landscape Ecology Chapter 11: Landscape disturbance: Location, pattern, and dynamics, Turner, M. F., D. S. E. Gergel, and F. S. Chapin III.
- e. Optional Readings:
 - i. White, P. S., and J. Harrod. 1997. Disturbance and diversity in a landscape context. Pages 128-159 in J. A. Bissonette (ed.) *Wildlife and Landscape Ecology: Effects of Pattern and Scale*. Springer-Verlag, New York, N. Y.
 - vi. Reeves, G. H., L. E. Benda, K. M. Burnett, P. A. Bisson, and J. H. Sedell. 1995. A disturbance-based ecosystems approach to maintaining and restoring freshwater habitats of evolutionary significant units of anadromous salmonids in the Pacific Northwest. *American Fisheries Society Symposium* 17:334-349.
 - vii. Sturtevant, B. R., R. H. Gardner, and R. E. Plotnick. Disturbance-mediated coexistence: the importance of spatial pattern. (Abstract from ESA meeting)
 - viii. Richards, C., L. B. Johnson, and G. E. Host. 1996. Landscape-scale influences on stream habitats and biota. *Canadian Journal of Fisheries and Aquatic Sciences*. 53 (Suppl. 1):295-311.

- 10) Landscape Pattern and Metapopulations module: Objectives are to illustrate and probe the relationship between landscape pattern and metapopulation dynamics.
- a. PowerPoint presentation: Patterned landscapes and Complicated Population Dynamics
 - b. Discussion
 - c. Reading:
 - d. Reading:
 - i. Edwards, T. C., Jr., G. G. Moisen, T. S. Frescino, and J. J. Lawler. Modeling multiple ecological scales to link landscape theory to wildlife conservation. Pages 153-172 in J. A. Bissonette and I. Storch (eds.), *Landscape Ecology and Resource Management: Linking Theory with Practice*. Island Press, Covelo CA, and Washington, D.C.
 - e. Discussion
 - f. Exercise: Learning Landscape Ecology Chapter 15: Landscape Connectivity and Metapopulation Dynamics, K. A. With.
 - g. Optional readings:
 - i. Hanski, I. 1991. Metapopulation dynamics: brief history and conceptual domain. *Biological Journal of the Linnean Society* 42:3-16.
 - ii. Lewin, R. 1986. Supply-side ecology. *Science* 234:25-27.
 - iii. Wiens, J. A. 1996. Wildlife in patchy environments: metapopulations, mosaics, and management. Pages 53-84.
 - iv. Harrison, S. 1994. Metapopulations and conservation. Pages 111-128 in Edwards, P. J., R. M. May, and N. R. Webb (eds.), *Large-scale Ecology and Conservation Biology*. Blackwell Scientific Publications, London.
 - iv. Ritchie, M. E. 1997. Populations in a landscape context" sources, sinks, and metapopulations. Pages 160-174 in J. A. Bissonette, (ed), *Wildlife and Landscape Ecology: Effects of pattern and Scale*. Springer-Verlag, New York, N. Y.

11) Biodiversity module

- a. PowerPoint presentation: to do
- b. Discussion
- c. Reading:
 - i. Rosenfeld, J. S. 2002. Functional redundancy in ecology and conservation. *Oikos* 98(1):156-162.
 - ii. Ritchie, M. E., and H. Olff. 1999. Spatial scaling laws yield a synthetic theory of biodiversity. *Nature* 400:557-560
 - iii. White, D., E. M. Preston, K. E. Freemark, and A. R. Kiestler. 1999. A hierarchical framework for conserving biodiversity. Pages 127-153 in Klopateck, J. M. and R. H. Gardner (eds.) *Landscape Ecological Applications: Issues and Applications in Landscape Ecology*. Springer, New York, N. Y.
 - iv. Peterson, G., C. R. Allen, and C. S. Holling. 1998. Ecological resilience, biodiversity, and scale. *Ecosystems* 1:6-18.
 - v. Polasky, E. and A. R. Solow. 1999. Conserving biological diversity with scarce resources. Pages 154-174 in Klopateck, J. M. and R. H. Gardner (eds.) *Landscape Ecological Applications: Issues and Applications in Landscape Ecology*. Springer, New York, N. Y.
 - vi. Pacific Northwest Research Station Science Findings 9:November 1998. Biodiversity and intentional management: a renaissance pathway Lawton, J. H. 1999. Are there general laws in ecology? *Oikos* 84:177-192.
- d. Exercise: Learning Landscape Ecology Chapter 14. *Landscape Context*, S. M. Pearson.
- e. Discussion

ADDITIONAL READING

There is a "must-read" book that I believe every serious graduate student should have on her/his shelf. HOW TO READ A BOOK by M. J. Adler & C. Van Doren (1972 Simon & Shuster - ISBN 0-671-21209-5 Pbk.) details the levels of reading (elementary, inspectional, analytical, and

syntopical) and the characteristics of each. Graduate students should be reading at least at the third level, and striving for the fourth. This is not required but most highly recommended.

Class material will be taken from many sources including the following. You may wish to search for these in the Library and consult them for background material.

- 1 Pickett, S. T. A., J. Kolasa, and C. G. Jones. 1994. *Ecological understanding: the nature of theory and the theory of nature*. Academic Press, San Diego, CA. 206pp.
- 2 Gilovich, T. 1991. *How we know what isn't so: the fallibility of human reason in everyday life*. The Free Press (div. of Macmillan, Inc. New York. 216 pp. (a very nice assessment of how we fall from objectivity—highly recommended. You will recognize yourself in these pages!!)
- 3 Bodkin, D. B. 1990. *Discordant Harmonies*. Oxford Univ. Press, New York. 241pp. (we read this in 1994. This is a nice discourse on the discordant nature of nature)
- 4 Gleick, J. 1988. *Chaos: making a new science*. Penguin Books. 352 pp. (this is one of the easiest books to understand the elements of chaos and fractals)
- 5 Forman, R.T.T., and M. Godron. 1986. *Landscape Ecology*. John Wiley & Sons, New York. 619 pp. (this is the first "textbook" on landscape ecology and is of historical interest)
- 6 O'Neill, R.V., D.L. De Angelis, J.B. Waide, and T.F.H. Allen. 1986. A hierarchical concept of ecosystems. *Monogr. in Pop. Biol.* #23. Princeton Univ. Press. 253 pp. (presents a fundamental view that unifies the nutrient cycling and energy flow view of ecology with the population dynamics approach; emphasizes rate-structured hierarchies as the framework; must read this one)
- 7 Cronon, W. 1983. *Changes in the land: Indians, colonists, and the ecology of New England*. Hill and Wang, New York. 241 pp. (one of the

nicest works emphasizing the temporal dynamics and their importance in understanding landscape dynamics; written by an historian)

- 8 Kuhn, T. S. 1962 (1970 ed) *The structure of scientific revolutions*. Univ. Chicago Press, Chicago, IL. 210 pp. (*several zerox copies of this will be available* (provides a nice explanation of how paradigms change in science))
- 9 Pickett, S.T.A., and P.S. White (eds. . 1985. *The ecology of natural disturbance and patch dynamics*. Academic Press, Inc. 472 pp. (One of the earlier works that tries to assemble conceptual papers on the topic)
- 10 Walters, C. 1986. *Adaptive management of renewable resources*. Macmillan Publ. Co., New York. 374 pp. (an approach increasingly being used by management agencies, albeit perhaps imperfectly)
- 11 Harris, L. D. 1984. *The fragmented forest: island biogeography theory and the preservation of biotic diversity*. Univ. Chicago Press, Chicago, IL. 211 pp. (an earlier work on fragmentation effects)
- 12 *Quantitative methods in landscape ecology*. 1991. M. G. Turner and R. H. Gardner (eds.) *Ecological Studies* 82. Springer-Verlag, New York. 536 pp. (a nice compendium of methods in this fast evolving field!)
- 13 *Forest island dynamics in man-dominated landscapes*. 1981. R. L. Burgess and D. M. Sharpe (eds. . *Ecological studies* 41. Springer-Verlag, New York. 310 pp.
- 14 *Changing landscapes: an ecological perspective*. 1989. I.S. Zonneveld and R. T. T. Forman (eds). Springer-Verlag, New York. 286 pp.
- 15 T. F. H. Allen, and T. W. Hoekstra. 1992. *Towards a unified ecology*. Columbia University Press, New York. 384pp. (this is perhaps one of the most innovative and difficult to grasp [at first] concepts. A real thought-provoker)
- 16 Peak, D., and M. Frame. 1994. *Chaos under control: the art and science of complexity*. W. H. Freeman & Co., N. Y. 408pp. (one of the

best written books on the topic; highly recommended for every serious ecology graduate student)

- 17 Brown, J. H. 1995. *Macroecology*. Univ. Chicago Press, Chicago. 269pp.
- 18 Edwards, P. J., R. M. May, and N. R. Webb. eds. 1994. *Large-scale ecology and conservation biology. The 35th Symposium of the British Ecological Society for Conservation Biology*. Blackwell Scientific Publications, London. 375pp.
- 19 Szaro, R. C., and D. W. Johnson. 1966. *Biodiversity in managed landscapes*. Oxford University Press, Oxford. 778pp
- 20 Farina, A. 1998. *Principles and methods in landscape ecology*. Chapman and Hall, New York. 235.
- 21 Turner, M. G., R. H. Gardner, and R. V. O'Neill. 2001. *Landscape Ecology in Theory and practice*. Springer, New York. 401pp.
- 22 Klopatek, J. M. And R. H. Gardner. eds. 1999. *Landscape Ecological Analysis*. Springer, New York. 400pp.
- 23 Boitani, L. and T. K. Fuller. 2000. eds. *Research Techniques in Animal Ecology: Controversies and consequences*. Columbia University Press, New York. 442pp.
- 24 Gaddis, J. L. 2002. *The Landscape of History*. Oxford University Press, New York, N.Y. 192 pp.

ACADEMIC RESPONSIBILITIES

For more information, please contact:

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Academic Freedom and Professional Responsibilities (Faculty Code)

Academic freedom is the right to teach, study, discuss, investigate, discover, create, and publish freely. Academic freedom protects the rights of faculty members in teaching and of students in learning. Freedom in research is fundamental to the advancement of truth.

Faculty members are entitled to full freedom in teaching, research, and creative activities, subject to the limitations imposed by professional responsibility. Faculty Code Policy #403 further defines academic freedom and professional responsibilities:

<http://personnel.usu.edu/policies/403.htm>. [Top](#)

Academic Integrity - "The Honor System"

Each student has the right and duty to pursue his or her academic experience free of dishonesty. The Honor System is designed to establish the higher level of conduct expected and required of all Utah State University students.

The Honor Pledge: To enhance the learning environment at Utah State University and to develop student academic integrity, each student agrees to the following Honor Pledge:

"I pledge, on my honor, to conduct myself with the foremost level of academic integrity." A student who lives by the Honor Pledge is a student who does more than not cheat, falsify, or plagiarize. A student who lives by the Honor Pledge:

- Espouses academic integrity as an underlying and essential principle of the Utah State University community;
- Understands that each act of academic dishonesty devalues every degree that is awarded by this institution; and
- Is a welcomed and valued member of Utah State University. [Top](#)

Course Fees

Courses that utilize course fees are required to identify the amount of the course fee and explain the purpose of the course fee on the syllabus given to students. Course fee information not included on the syllabus will result in the course fee automatically being deleted. [Top](#)

Grievance Process (Student Code)

Students who feel they have been unfairly treated [in matters other than (i) discipline or (ii) admission, residency, employment, traffic, and parking - which are addressed by procedures separate and independent from the Student Code] may file a grievance through the channels and procedures described in the Student Code: http://studentlife.tsc.usu.edu/stuserv/pdf/student_code.pdf (Article VII. Grievances, pages 25-30). [Top](#)

Plagiarism

Plagiarism includes knowingly "representing, by paraphrase or direct quotation, the published or unpublished work of another person as one's own in any academic exercise or activity without full and clear acknowledgment. It also includes the unacknowledged used of materials prepared by another person or agency engaged in the selling of term papers or other academic materials." The penalties for plagiarism are severe. They include warning or reprimand, grade adjustment, probation, suspension, expulsion, withholding of transcripts, denial or revocation of degrees, and referral to psychological counseling. [Top](#)

Sexual Harassment

Sexual harassment is defined by the Affirmative Action/Equal Employment Opportunity Commission as any "unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature." If you feel you are a victim of sexual harassment, you may talk to or file a complaint with the Affirmative Action/Equal Employment Opportunity Office located in Old Main, Room 161, or call the AA/EEO Office at 797-1266. [Top](#)

Students with Disabilities

The Americans with Disabilities Act states: "Reasonable accommodation will be provided for all persons with disabilities in order to ensure equal participation within the program. If a student has a disability that will likely require some accommodation by the instructor, the student must contact the instructor and document the disability through the Disability Resource Center (797-2444), preferably during the first week of the course.

Any request for special consideration relating to attendance, pedagogy, taking of examinations, etc., must be discussed with and approved by the instructor. In cooperation with the Disability Resource Center, course materials can be provided in alternative format, large print, audio, diskette, or Braille." [Top](#)

University Grading Scale

- A 100-93%
- A- 92-90%
- B+ 89-87%
- B 86-83%
- B- 82-80%
- C+ 79-77%
- C 76-73%
- C- 72-70%
- D 69-60%
- F Below 60%

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Withdrawal Policy and "I" Grade Policy

Students are required to complete all courses for which they are registered by the end of the semester. In some cases, a student may be unable to complete all of the coursework because of extenuating circumstances, but not due to poor performance or to retain financial aid. The term 'extenuating' circumstances includes: (1) incapacitating illness which prevents a student from attending classes for a minimum period of two weeks, (2) a death in the immediate family, (3) financial responsibilities requiring a student to alter a work schedule to secure employment, (4) change in work schedule as required by an employer, or (5) other emergencies deemed appropriate by the instructor. [Top](#)