

## ESM 215

- 1/7-11 Introduction to Landscape Ecology

### Required readings

McGarigal, K. Introduction to landscape ecology. Duke University misc. report.

Lindenmayer et al. 2008. A checklist for ecological management of landscapes for conservation. *Ecology Letters* 11:78-91.

### Further reading

Turner, M. G. 2006. Landscape Ecology: What is the state of the science? *Ann. Rev. Ecol. Evol. Syst.* 2005. 36:319–44.

- Exercise 1. A cursory look at selected landscapes via Google Earth Assignment

This purpose of this exercise is to get you thinking about how to identify, describe and analyze landscapes from an ecological perspective. You will also begin to familiarize yourself with the Burton Mesa of western Santa Barbara County, which will serve as our case study landscape for the class.

- Week 1 slides File
- Lab\_notes File
- 1/14-18 The biophysical template

### Required Readings

Beier, P. and B. Brost. 2010. Use of Land Facets to Plan for Climate Change: Conserving the Arenas, Not the Actors. *Conservation Biology* 24: 701–710.

Reiners, W.A. and K.L. Driese. 2001. The propagation of ecological influences through heterogeneous environmental space. *Bioscience* 51: 939-950.

### Further Readings

Delcourt, H. and P. Delcourt. 1990. Quaternary landscape ecology: Relevant scales in space and time. *Landscape Ecology* 1: 23-44.

- Exercise 2. Physical environmental controls on land cover pattern Assignment
- Field trip, 1/26/19 - Burton Mesa Folder
- Readings for Exercise 2 Folder
- Week 2 Class Notes File
- 1/22-1/26 Disturbance Regimes

### Required Reading

Turner, M.G. Disturbance and landscape dynamics in a changing world. *Ecology*, 91(10), 2010, pp. 2833–2849.

Thom, D. and R. Seidl. 2016. Natural disturbance impacts on ecosystem services and biodiversity in temperate and boreal forests. *Biological Reviews* 19:760-781.

### Further reading

Perry, G.L.W. and J. Milington. 2008. Spatial modelling of succession-disturbance dynamics in forest ecosystems: Concepts and examples. *Perspectives in Plant Ecology, Evolution and Systematics* 9 (2008) 191–210.

- Exercise 3: Quantifying Landscape Pattern Assignment
- Readings for Exercise 3 Folder
- Week 3 Notes File
- 1/28-2/1 Ecological edge effects

### Required Reading

Ries, L. R. J. Fletcher, J. Battin and T. D. Sisk. 2004. Ecological responses to habitat edges: Mechanisms, Models, and Variability Explained. *Annu. Rev. Ecol. Evol. Syst.* 2004. 35:491–522.

### Further Reading

Pfeifer., M. et al. 2017. Creation of forest edges has a global impact on forest vertebrates. *Nature* 551: 187 - 191.

- Exercise 4: Edge and road effects in the landscape Assignment
- Readings for Exercise 4 Folder
- 2/5-2/10 Road network ecology

### Required Reading

Coffin, A.W. 2007. From roadkill to road ecology: A review of the ecological effects of roads. *Journal of Transport Geography* 15:396–406.

### Further Reading

Brady, S.P.O. and J.L. Richardson. 2017. Road ecology: shifting gears toward evolutionary perspectives. *Frontiers in Ecology and Environment* 15: 91–98.

- Exercise 5: Modeling species habitat connectivity across the landscape Assignment
- Readings for Exercise 5 Folder

- 2/11-17 Populations, metapopulations and metacommunities

Required reading

Haddad, et al. 2017. Connecting models, data, and concepts to understand fragmentation ' s ecosystem-wide effects. *Ecography* 40:1-8.

Tscharntke et al. 2012. Landscape moderation of biodiversity patterns and processes - eight hypotheses. *Biological Reviews* 87:661-685.

Supplementary Reading

Singleton and McRae. 2013. Assessing habitat connectivity. Chapter 13 in, Craighead, L. and C. Convis, eds., *Conservation Planning: Shaping the Future*. ESRI Press, Redlands CA.

- Exercise 6: Designing wildlife corridors in human-dominated landscapes Assignment
- 2/18- 24 Ecosystem processes and services

Required Reading

Verhagen, W. et al. 2016. Effects of landscape configuration on mapping ecosystem service capacity: a review of evidence and a case study in Scotland. *Landscape Ecology* 31:1457–1479

Wu, J. 2013 Landscape sustainability science: ecosystem services and human well-being in changing landscapes. *Landscape Ecology* 28: 999-1023.

- 2/25-3/3 Urbanizing landscapes

Required reading

Norton, B.A. et al. 2015. Planning for cooler cities: A framework to prioritise green infrastructure to mitigate high temperatures in urban landscapes. *Landscape and Urban Planning* 134: 127–138.

Groffman, P. et al. 2014. Ecological homogenization of urban USA. *Frontiers in Ecology and Environment* 12: 74–81,

- 3/4 - 3/10 Landscapes in a changing climate

Required Reading

Klausmeyer et al. 2011. Landscape-scale indicators of biodiversity's vulnerability to climate change. *Ecosphere* 2(8):art88. doi:10.1890/ES11-00044.1

Keane, R. et al. 2015. Representing climate, disturbance, and vegetation interactions in landscape models. *Ecological Modelling* 309–310: 33–47.

- 3/11-3/17 Landscape restoration

#### Required Reading

Metzger J.P., Brancalion P.H.S.. 2016. Landscape Ecology and Restoration Processes. In: Palmer M.A., Zedler J.B., Falk D.A. (eds) *Foundations of Restoration Ecology*. Island Press, Washington, DC.

Beller, E. et al. 2018. Building ecological resilience in highly modified landscapes. *Bioscience* (early online). doi:10.1093/biosci/biy117

- 3/18 - 3/22 Exam week

ESM 215 has no final exam.

- March 25 - March 31