

E555 UE Course Calendar, 2020 – working version

E555 Urban Ecology – Topics/Readings, Sp 2020

All papers are located in Canvas Assignments Weekly Folders (1-15)

**Week #1 January 14 – Welcome to the Workshop and Urban Ecology; Course introduction and all that stuff
Topics – What is Urban; Urban Ecology Themes hdout – discussion; Review “The Anthropocene” as needed;
Fischer prepared introductory handout and PPT on urban ecosystems**

[Check out and register to receive The Nature of Cities blog at http://www.thenatureofcities.com/.](http://www.thenatureofcities.com/)

**Assigned Readings: Before class – See Reading Assignments & Themes (see Themes & Defining UE) Folders
From Atlantic Cities “The Rise of Urban Ecology” (see Citations from Rise of UE folder, this is really the good
stuff) <http://www.citylab.com/weather/2012/11/rise-urban-ecology/4032/>**

Fischer BC. 2017. Defining Urban Ecology & the Connection to Urban Forestry. IAA Newsletter (Winter), p 14-15.

See Folder – Anthropocene Readings - Browse as necessary to be sure you are up to speed on this concept per UE.

Pickett et al. 2016. Evolution and future of urban ecological science: ecology in, of, and for the city. *Ecosystem Health and Sustainability* 2(7):e01229. doi:10.1002/ehs2.1229

Book introduction - Baltimore School of Urban Ecology: Scale, Space and Time for the Study of Cities. Yale Press

**Week #2 January 21 – Clean up lingering course format questions; Intro Book Review & Research Paper.
Topics this week - Finalizing class understanding of urban, urban ecology, etc.; Discuss Assignments of
topics/teams (4/team) for Wks 4-7 and beyond including possible guest discussants.**

Assigned Readings: Week 2 Reading Assignments Folder

From The Nature of Cities (TNoC) (2018) “What should every ecologist know about urban ecology?”

<https://www.thenatureofcities.com/2018/01/29/one-thing-every-ecologist-know-urban-ecology/>

Pickett, STA., JM Grove. 2009. Urban Ecosystems: What would Tansley Do? *Urban Ecosystems* 12: 1-8.

Strauss et al. 2015. Cities and the Environment: Eight Years of Urban Ecology Research and Practice. *Cities and the Environment (CATE)*: Vol. 8: Iss. 2, Article 23. Available at: <http://digitalcommons.lmu.edu/cate/vol8/iss2/23>

Tanner C, et al. 2014. Urban ecology: advancing science and society. *Front Ecol & Environ* 12(10): 574-581

Week #3 January 29 – Urban Patch Dynamics, a key theme in Urban Ecology

**Statement: Urban patches are an important way to view a city’s ecology and its connections to social
structure (past and present) as well as a clear methodology to view urban ecology “in’, ‘of’ and ‘for’ the city.**

Reading Assignments:

From TNoC (2013) Marshall V. 2013. “Patch Reflection.” *The Nature of Cities*.

www.thenatureofcities.com/2013/04/14/aerial-reflection-for-urban-ecology/. Accessed 19 Jan. 2017.

Grove JM et al. 2015. *The Baltimore School of Urban Ecology: Space, Scale and Time for the Study of Cities*.
Yale Press, Chap 3, 38-76.

Avins M. 2013. Baltimore’s Forest Patches: Emerald Assets for Ecosystem Services. 34p. Baltimore Green Space
<http://baltimoregreenspace.org/downloads/ForestPatchesWeb.pdf>

Redlining of 1930’s, a lens for urban patch dynamics: see Mapping Inequality - Relining at

<https://dsl.richmond.edu/panorama/redlining>

Two examples – Durham NC (Cooper) and Indianapolis IN. Possible Zoom interview with Donovan Moxley,
former UE Student (2017)?

Week #4 February 4 – Urban Wildlife: Conservation and Coexistence

Topic Statement: Coexistence with wildlife is not always as straightforward as we would like. Conflict is often amplified in urban settings because humans are the dominant force on the landscape, and suitable habitat is limited. This week's topics will explore strategies for conserving wild species in urban landscapes while considering human needs and perspectives.

Reading Assignments:

Conservation in Urban Areas. (n.d.). Retrieved from

<https://www.oregonconservationstrategy.org/conservation-toolbox/conservation-in-urban-areas/>

Soulsbury, C. D., & White, P. C. (2016). Human–wildlife interactions in urban areas: a review of conflicts, benefits and opportunities. *Wildlife research*, 42(7), 541-553.

Christopher A. et.al. 2017. Biodiversity in the City: Fundamental Questions for Understanding the Ecology of Urban Spaces for Biodiversity Conservation. *BioScience* 67(9):799 – 807.

City Critters: Unpacking the rise of urban coyotes. *Economist*, Jan 16, 2020.

Elliot, E. E., Vallance, S., & Molles, L. E. (2016). Coexisting with coyotes (*Canis latrans*) in an urban environment. *Urban ecosystems*, 19(3), 1335-1350.

Week #5 February 11 – Green Infrastructure

Topic Statement: As cities continue to expand in population and land usage, the amount of green infrastructure in an urban area is vital for the sustainability of the city. This includes green space (i.e., urban forests, parks and open green space, etc.) and the integration of green into gray infrastructure (i.e., green roofs and green walls). This week's articles will examine how cities use green infrastructure to mitigate climate change effects, how they promote ecologically and socially healthy and sustainable communities, and how cities will need dedicated and strong leadership to achieve their goals.

Climate-Smart Cities Program. Urban Climate Lab at the Georgia Institute of Technology. 2016. The Benefits of Green Infrastructure for Heat Mitigation and Emissions Reductions in Cities: A Review of the Literature. 34 p. The Trust for Public Land. <https://www.tpl.org/benefits-green-infrastructure-heat-mitigation-and-emissions-reductions-cities>.

Kowarik, I., Hiller, A., Planchuelo, G., Seitz, B., et.al (2019). Emerging Urban Forests: Opportunities for Promoting the Wild Side of the Urban Green Infrastructure. *Sustainability* 11, 1-27.

Reynolds, H.L., Brandt, L., Fischer, B.C. et al. Implications of climate change for managing urban green infrastructure: an Indiana, US case study. *Climatic Change*(2019). <https://doi.org/10.1007/s10584-019-02617-0>

Artmann, Martina, Kohler, Manon, Meinel, Gotthard, Gan, Jing and Ioja, Ioan-Cristian. (2019). How smart growth and green infrastructure can mutually support each other – A conceptual framework for compact and green cities. *Ecological Indicators* 96, 10-22.

Week #6 February 18 – International Urban Ecology – Asia and South America

Topic Statement: This week we will geographically focus on China, India, and Amazonia, and emphasize and discuss the fundamental differences in the ecology of their urban environments. Developing nations experience unique pressures such as rapid urban population growth, rapid environmental change, urban sprawl, and a dynamic socioeconomic environment. These pressures shift the path of environmental modification within cities, and in turn shape the feedback between the environment and society.

Xia J, Zhang Y Y, Xiong L H, He S, Wang L F, Yu Z B. 2017. Opportunities and challenges of the Sponge City construction related to urban water issues in China. *Science China Earth Sciences*, 60: 652–658, doi: 10.1007/s11430-016-0111-8

Padoch, C., E. Brondizio, S. Costa, M. Pinedo-Vasquez, R. R. Sears, and A. Siqueira. (2008). Urban Forest and Rural Cities: Multi-sited Households, Consumption Patterns, and Forest Resources in Amazonia. *Ecology and Society*, 13(2): 2.

Chaturvedi, Arun, Rahul Kamble, N.G. Patil, and Alka Chaturvedi. 2013. "City–Forest Relationship in Nagpur: One of the Greenest Cities of India." *Urban Forestry & Urban Greening* 12 (1): 79–87. <https://doi.org/10.1016/j.ufug.2012.09.003>.

Supplemental reading includes this slideshow/website with different green projects in Asia: <https://www.adb.org/green-cities/#intro>, also attached reading "A new urban landscape in East-Southeast Asia 2000-2010". A Schneider, C M Mertes, A J Tatem, et. al. (2015) [Environmental Research Letters](#), Vol 10,3

Week #7 February 25 – Urban Aquatic Systems

Topic Statement: Water has the ability to devastate cities and to provide critical habitat for endangered species; the decisions we make determine how water affects us. Governments at local, state and federal levels have attempted to control aquatic systems through gray infrastructure and more recently green infrastructure. When managing these aquatic systems one must assess the detrimental effects (pollution, flooding, sedimentation, etc.) of urbanized water while maximizing the potential ecosystem benefits that they can provide.

Teurlinx, Sven, Kuiper, Jan J., Hoevenaar, Ellen CM, Lurling, Miquel, Brederveld, Robert J., Veraart, Annelies J., Janssen, Annette BG, Mooij, Wolf M. and de Senerpont Domis, Lisette N. (2019). "Towards restoring urban waters: understanding the main pressures." *Current Opinion in Environmental Sustainability* 36, 49-58.

DOI (2016, August 24). Case Studies. Retrieved February 21, 2020 from https://evergladesrestoration.gov/content/documents/strategic_plan_biennial_report/2014_tables/Case_Studies.pdf

Palta, M. M., Grimm, N. B., & Groffman, P. M. (2017). "Accidental" urban wetlands: ecosystem functions in unexpected places. *Frontiers in Ecology and the Environment*, 15(5), 248–256. doi: 10.1002/fee.1494

Allinson, G., Zhang, P., Bui, A. et al. Pesticide and trace metal occurrence and aquatic benchmark exceedances in surface waters and sediments of urban wetlands and retention ponds in Melbourne, Australia. *Environmental Science Pollution Research* 22, 10214–10226 (2015). <https://doi.org/10.1007/s11356-015-4206-3>

Week #8 March 3 – Urban Wildlife 2 – The Bird and The Bees

Topic Statement: As the world becomes increasingly urbanized, evaluating how wildlife fits into urban systems will be crucial, especially with those forms that are relatively ubiquitous, like birds and bees. As our understanding of these complex relationships improves, cities must balance wildlife needs with those of the people living in these urban areas. In balancing these needs, managers need to understand and address ways that the urbanized environment affects wildlife habitat suitability, the potential benefits of green spaces, and the extent of anthropogenic stressors.

Lerman, S. B., Nislow, K. H., Nowak, D. J., DeStefano, S., King, D. I., & Jones-Farrand, D. T. (2014). Using urban forest assessment tools to model bird habitat potential. *Landscape and urban planning*, 122, 29-40

Phillips, J. N., K. E. Gentry, D. A. Luther, and E. P. Derryberry. 2018. Surviving in the city: higher apparent survival for urban birds but worse condition on noisy territories. *Ecosphere* 9(9):e02440. 10.1002/ecs2.2440

Sivakoff, Frances S., Prajzner, Scott P. and Gardiner, Mary M. (2018). "Unique bee communities within vacant lots and urban farms result from variation in surrounding urbanization intensity." *Sustainability* 10, (1926) 1-17. doi:10.3390/su10061926

Turo, K. J., & Gardiner, M. M. (2019). From potential to practical: conserving bees in urban public green spaces. *Frontiers in Ecology and the Environment*, 17(3), 167-175. doi: 10.1002/fee.2015.

Week #9 March 10 – Book Review presentations

March 16-27 Spring Break & Course converts to Online for semester – see Syllabus/Announcements for format, all subject to change – content remains the same except no Research Paper Presentations

Week #10 March 24 – Jess Vogt, DePaul University Interview – NH Tree Planting & UE – SES Framework

Vogt, J. (2020b). Urban Forests as Social-Ecological Systems. In *Encyclopedia of the World's Biomes*. (pp. 1-13). <https://doi.org/10.1016/b978-0-12-409548-9.12405-4>

Vogt J.M, S.L. Watkins, S.K. Mincey, M. Patterson, and B.C. Fischer. 2015. “Explaining planted-tree survival and growth in urban neighborhoods: A study of recently-planted trees in Indianapolis.” *Landscape & Urban Planning*, 136: 130-143. DOI: 10.1016/j.landurbplan.2014.11.021.

Widney S, Fischer BC, Vogt J. (2016). Tree mortality undercuts ability of tree-planting programs to provide benefits. *Forests* 7(3)(65), 21p (Special Issue - Urban and Peri-urban Forest Diversity and Ecosystem Services) doi: 10.3390/f7030065.

Vogt J, Abood M. (2020 submission). A transdisciplinary, mixed methods research agenda for evaluating collective impact for tree planting: The CommuniTree initiative in northwest Indiana, U.S. UF&UG

Week #11 March 31 – Urban Farming/Gardening (vacant lots, pollinator impacts) & UE

Topic Statement: Urban agriculture is vital in providing local food for a growing urban landscape and residential population. This includes multiple ecosystem and social benefits provided with new innovative methods in different city landscapes. This week's articles will discuss the growth of urban agriculture in the United States and its innovative development, a comparison between three US cities community gardens and socio-ecological services implications, the support urban agriculture provides to ecosystem services, biodiversity patterns, challenges faced for promotion, and the multiple values urban farming can provide.

Plumer, B. (2016, October 12) *The Real Value of Urban Farming* Retrieved April 5, 2020 from <https://www.vox.com/2016/5/15/11660304/urban-farming-benefits>

Palmer, L. Urban agriculture growth in US cities. *Nat. Sustain.* **1**, 5–7 (2018).

Anderson, E. C., Egerer, M. H., Fouch, N., Clarke, M., & Davidson, M. J. (2019). Comparing community garden typologies of Baltimore, Chicago, and New York City (USA) to understand potential implications for socio-ecological services. *Urban Ecosystems*, 22(4), 671-681.

Lin, Philpott, & Jha. *The Future of Urban Agriculture and Biodiversity-Ecosystem Services: Challenges and Next Steps*. (2015). Retrieved from https://www.researchgate.net/profile/Brenda_Lin/publication/273309331_The_future_of_urban_agriculture_and_biodiversity-ecosystem_services_Challenges_and_next_steps/links/5aefba13aca2727bc00653ca/The-future-of-urban-agriculture-and-biodiversity-ecosystem-services-Challenges-and-next-steps.pdf

Week #12 April 7 – Urban Diseases, Pathogens, etc., & Urban Connections

Topic Statement: As made apparent by the current pandemic, pathogenic disease can have major impacts on human society and the environment. Our discussion will focus on the following questions: How do aspects of an urban environment shape the emergence and spread of pathogenic diseases? What management strategies can be taken to limit transmission or lessen the severity of an outbreak?

Bradley, C. A., & Altizer, S. (2007). Urbanization and the ecology of wildlife diseases. *Trends in ecology & evolution*, 22(2), 95-102.

Yang, L., Turo, K.J., Riley, C.B. *et al.* (2019) Can urban greening increase vector abundance in cities? The impact of mowing, local vegetation, and landscape composition on adult mosquito populations. *Urban Ecosyst.* **22**, 827–839 (2019).

Afshinnekoo, E., Meydan, C., Chowdhury, S., Jaroudi, D., Boyer, C., Bernstein, N., ... & Ahsanuddin, S. (2015). Geospatial resolution of human and bacterial diversity with city-scale metagenomics. *Cell systems*, 1(1), 72-87.

Carney, Richard L. (03/2020). "Highly heterogeneous temporal dynamics in the abundance and diversity of the emerging pathogens *Arcobacter* at an urban beach". *Water research (Oxford)* (0043-1354), 17, p. 115405.

Week #13 April 14 – UE & People – Eco-psychology (Doses of Nature) & Human Health

Topic Statement: Humans both shape and are shaped by the environment around us, and our interactions with nature in urban areas are increasingly becoming a research focus as urbanization trends continue. Exploring these complex human-nature interactions is difficult due to logistical challenges, issues with isolating the effects of a single variable, cultural differences, and other factors. This week we will explore some findings on how humans are psychologically impacted by green spaces in urban areas, as well as how human-nature interactions are studied and the impacts and/or challenges presented by those approaches.

Vierikko et al (2016). Considering the ways biocultural diversity helps enforce the urban green infrastructure in times of urban transformation. *Current Opinion in Environmental Sustainability*, 22:7-12.

Nutsford, D., Pearson, A. L., & Kingham, S. (2013). An ecological study investigating the association between access to urban green space and mental health. *Public health*, 127(11), 1005-1011.

Franco, L. S., Shanahan, D. F., & Fuller, R. A. (2017). A Review of the Benefits of Nature Experiences: More Than Meets the Eye. *International Journal of Environmental Research and Public Health*, 14(8).

Case Study. 2010. Retrieved from *Environ. Sci. Technol.* 2010, 44, 3947–3955
<https://pubs.acs.org/doi/10.1021/es903183r>

Week #14 April 23 – Environmental Change > Urban Change & UE: the Future

Topic: While interest in climate change has been growing over the last couple of decades, effective strategies to address vulnerabilities and strengthen resilience still need more research focus. Urban areas have unique climate risks (e.g., urban heat island, grey infrastructure, large areas of impervious surfaces contributing to water management issues, etc.), and less is known about their impact on urban ecology and how to mitigate and adapt for the future, especially as cities continue to rapidly grow. This week, we examine barriers to climate change adaptation in urban areas, integrative approaches cities can take, and governance obstacles to overcome.

Brink, E., Aalders, T., Ádám, D., Feller, R., Henselek, Y., Hoffmann, A., ... Wamsler, C. (2016). Cascades of green: A review of ecosystem-based adaptation in urban areas. *Global Environmental Change*, 36, 111–123. doi: 10.1016/j.gloenvcha.2015.11.003

Doherty, M., Klima, K., & Hellmann, J. J. (2016). Climate change in the urban environment: Advancing, measuring and achieving resiliency. *Environmental Science & Policy*, 66, 310–313.
<https://doi.org/10.1016/j.envsci.2016.09.001>

Alexandra, J. (2017). The City as Nature and the Nature of the City-Climate Adaptation Using Living Infrastructure: Governance and Integration Challenges. *Australasian Journal of Water Resources*. 21(2): 63-76.

Environmental Change and Urban Forests discussion led by B.C. Fischer using preliminary results of the Indiana Municipal Urban Forests research project (Freeman-Day S, Fischer BC, DeVoe CB, Moxley DJ. 2019. Active Indiana municipal urban forestry programs: How are they addressing sustainability/environmental change? IAS 134th Proc pp 88-89.) and City of Goshen Urban Forestry Climate Adaptation Planning – March 2018, Adapted from Goshen City Website by BC Fischer, April 2020 for E555 Urban Ecology course)

Week 15 – Research Paper Presentations by Students