

Dean L. Urban

Curriculum Vitae

Nicholas School of the Environment
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Professional Experience

Current: Professor of Landscape Ecology, Emeritus, Nicholas School of the Environment, Duke University (Assistant Professor 1994-2000, Associate Professor 2000-2006, Professor 2007-2024)

Senior Associate Dean for Academic Initiatives (2015-2019)

Chair, Division of Environmental Science and Policy (2010-2015)

Previous: Associate Professor in Forest Science, and faculty affiliate, Graduate Program for Ecological Studies, Colorado State University (1991-1994)

Research Assistant Professor (1989-1990) and Research Associate (1986-1989), Environmental Sciences Department, University of Virginia

Predocctoral Research Fellow, Oak Ridge National Laboratory (1985-1986)

Research Focus: Landscape Ecology (spatial pattern, scaling issues); Forest Communities and Ecosystems (gradient analysis in montane forests, climate change); Biodiversity and Conservation Practice (metapopulation theory, nature reserve system design)

Research Activities and Tools: Simulation modeling of plant and animal communities; Univariate, multivariate, and spatial statistics; Geographic information systems and remote sensing technologies; Vegetation analysis (ordination and classification); Field methods including vegetation sampling and animal census techniques

Teaching: Landscape Ecology (fall); Landscape Analysis and Management (spring); Land Conservation in Practice (spring seminar)

Honors: Distinguished Landscape Ecologist (life-time achievement award by US Chapter of the International Association for Landscape Ecology, 2014)

Education

Ph.D., Ecology, The University of Tennessee, 1986;
Awarded Chancellor's Citation for Outstanding Professional Promise.
Dissertation: *Forest bird demography in a landscape mosaic*
Advisor: Herman (Hank) Shugart

M.A., Zoology (Wildlife Ecology), Southern Illinois University at Carbondale, 1981;
University honors.
Thesis: *Habitat relationships of forest birds and small mammals*

B.A., Botany and Zoology (double major; chemistry minor), Southern Illinois University, 1978; University honors

Professional Activities

Memberships: Ecological Society of America, International Association of Landscape Ecology (President-elect, 2009; President, 2010-2011)

Board Service: Triangle Land Conservancy, Durham (2013-2018); Pacific Forest Trust, San Francisco (2013-2022); NC Chapter, The Nature Conservancy (2018-present)

Associate Editor: Ecology and Ecological Monographs (2002-2005), Landscape Ecology (2002-2007)

Invited member of the Design Consortium for the National Ecological Observatory Network (NEON): Land Use and Habitat Science Committee, and National Network Design Committee (2005-2006).

Participation in NSF's LTER network (three forested sites) and the USGS/Biological Resource Division's Global Change Research Program (Sierran project). Research coordinated with Global Change and Terrestrial Ecosystems, IGBP; invited participant in GCTE workshops on patch dynamics models, scaling issues, and the role of spatiotemporal heterogeneity in global change research.

Recovery Team member for the federally threatened Mexican spotted owl (1993-2003)

Publications (alphabetical by year)

Book Project:

1. Urban, D.L. 2024. *Landscape ecology: a task-oriented perspective*. Springer Nature AG, Cham, Switzerland.
2. Urban, D.L. 2023. *Agents and implications of landscape pattern: working models for landscape ecology*. Springer Nature AG, Cham, Switzerland.

Refereed Journal Articles

1. Thorne, J.T., R.M. Boynton, A.D. Hollander, L.E. Flint, and D. Urban. 2023. The contribution of microregugia to landscape thermal inertia for climate-adaptive conservation strategies. *Earth's Future* 11(6):e2022EF003338.
2. Delesantro, J.M., J.M. Duncan, D. Riveros-Iregut, J.R. Blaszczak, E.S. Bernhardt, D.L. Urban, and L.E. Band. 2022. The nonpoint sources and transport of baseflow nitrogen loading across a developed rural-urban gradient. *Water Resources Research* 58:e2021WR031533.
3. Delesantro, J.M., J.M. Duncan, D. Riveros-Iregui, J.R. Blaszczak, E.S. Bernhardt, D.L. Urban, and L.E. Band. 2021. Characterizing and classifying urban watersheds with compositional and structural attributes. *Hydrol. Processes* 35(9):e14339.
4. Blaszczak, J.R., J.M. Delesantro, D.L. Urban, M.W. Doyle, and E.S. Bernhardt. 2019. Scoured or suffocated: urban stream ecosystems oscillate between hydrologic and dissolved oxygen extremes. *Limnol. Oceanogr.* 64:877-894.
5. Blaszczak, J.R., J.M. Delesantro, Y. Zhong, D.L. Urban, and E.S. Bernhardt. 2019. Watershed urban development controls on urban streamwater chemistry variability. *Biogeochemistry* 144:61-84.

6. Walker, N.J., D. Schaffer-Smith, J.J. Swenson, and D.L. Urban. 2019. Improved connectivity analysis using multiple low-cost paths to evaluate habitat for the endangered San Martin titi monkey (*Plecturocebus oenanthe*) in north-central Peru. *Landscape Ecology* 34:1859-1875.
7. Xi, W., R.K. Peet, M.T. Lee, and D.L. Urban. 2019. Hurricane disturbances, tree diversity, and succession in North Carolina Piedmont forests, USA. *J. For. Res.* 30:219-231.
8. Baruch, E.M., K.A. Voss, J.P. Blaszczyk, J. Delesantro, D.L. Urban, and E.S. Bernhardt. 2018. Not all pavements lead to streams: variation in impervious surface connectivity affects urban stream ecosystems. *Freshwater Science* 37: 673-684.
9. Forester, B.R., J.R. Lasky, H.H. Wagner, and D.L. Urban. 2018. Comparing methods for detecting multivariate genotype-environment associations. *Molec. Ecol.* 27:2215-2233.
10. Hakkenberg, C.R., R.K. Peet, D.L. Urban, and C. Song. 2018. Modeling plant composition in a forest landscape using LiDAR and hyperspectral remote sensing. *Ecol. Applic.* 28:177-190.
11. Hassett, B.A., E.B. Sudduth, K.A. Somers, D.L. Urban, C.R. Violin, S. Wang, J.P. Wright, R.M. Cory, and E.S. Bernhardt. 2018. Pulling apart the urbanization axis: patterns of biophysical degradation and biological response across urban streams. *Freshwater Science* 37:653-672.
12. Lopez, B.E., D. Urban, and P.S. White. 2018. Testing the effects of four urbanization “filters” on forest plant taxonomic, functional, and phylogenetic diversity. *Ecol. Applic.* 28:2197-2205.
13. Lopez, B.E., D. Urban, and P.S. White. 2018. Nativity and seed dispersal mode influence species’ responses to habitat connectivity and urban environments. *Global Ecol. Biogeogr.* 27:1017-1030.
14. Lovette, J.P., Duncan, J.M., Smart, L.S., J.P. Fay, L.P. Olander, D. Urban, N.Daly, J. Blackwell, A.B. Hoose, A.M. Farcia, and L.E. Band. 2018. Leveraging big data towards functionally based, catchment-scale restoration prioritization. *Environmental Management* 62:1007-1024.
15. Olander, L.P., R.J. Johnston, H. Tallis, J. Kagan, L.A. Maguire, S. Polasky, D. Urban, J. Boyd, L. Wainger, and M. Palmer. 2018. Benefit-relevant indicators: ecosystem services measures that link ecological and social outcomes. *Ecol. Indicators* 85:1262-1272.
16. Qiu, J., E.T. Game, H. Tallis, L.P. Olander, L. Glew, J. Kagan, E.L. Kalies, D. Michanowicz, J. Phelan, S. Polasky, J. Reed, E.O. Sills, D. Urban, and S.K. Weaver. 2018. Evidence-based causal chains for linking health, development, and conservation actions. *BioScience* 68:182-193.
17. Xi, W., R.K. Peet, M.T. Lee, and D.L. Urban. 2018. Hurricane disturbances, tree diversity, and succession in North Carolina Piedmont forests, USA. *J. For. Res.* <https://doi.org/10.1007/s11676-018-0813-4>.

18. Belote, T., M.S. Dietz, P.S. McKinley, A.A. Carlson, C. Carroll, C.N. Jenkins, D.L. Urban, T.J. Fullman, J.C. Leppi, and G.H. Aplet. 2017. Mapping conservation strategies under a changing climate. *BioScience* 67:494-497.
19. Austin, K., M. Lee, C. Clark, B. Forester, D. Urban, L. White, P. Kasibhatla, and J. Poulsen. 2017. An assessment of high carbon stock and high conservation value approaches to sustainable oil palm cultivation in Gabon. *Env. Research Letters* 12:014005.
20. Somers, K.A., E.S. Bernhardt, B.L. McGlynn, and D.L. Urban. 2016. Downstream dissipation of storm flow heat pulses: a case study and its landscape-level implications. *J. American Water Res. Assoc.* 52:281-297.
21. Austin, K.G., P.S. Kasibhatla, D.L. Urban, F. Stolle, and J. Vincent. 2015. Reconciling oil palm expansion and climate change mitigation in Kalimantan, Indonesia. *PLoS One* 10(5):e0127963.
22. Wilson, R., D. Hardisty, R. Epanchin-Niell, M. Runge, K. Cottingham, D. Urban, L. Maguire, A. Hastings, P. Mumby, and D. Peters. 2015. A typology of timescale mismatches and behavioral interventions to diagnose and solve conservation problems. *Cons. Biol.* 30:42-49.
23. Urban, D. 2014. On scale and pattern. *The Paper Trail: Bulletin of the Ecological Society of America* 95:124-125.
24. Sexton, J.O., D.L. Urban, M.J. Donohue, and C. Song. 2013. Long-term land cover dynamics by multi-temporal classification across the Landsat-5 record. *Remote Sensing of Environment* 128:246-258.
25. Somers, K.A., E.S. Bernhardt, J.B. Grace, B.A. Hassett, E.B. Sudduth, S. Wang, and D.L. Urban. 2013. Streams in the urban island: spatial and temporal variability in temperature. *Freshwater Science* 32:309-326.
26. Trainor, A.M., J.R. Walters, D.L. Urban, and A. Moody. 2013. Evaluating the effectiveness of a Safe Harbor Program for connecting wildlife populations. *Animal Conservation* 16:610-620.
27. Poor, E.E., C. Loucks, A. Jakes, and D.L. Urban. 2012. Comparing habitat suitability and connectivity modeling methods for conserving pronghorn migrations. *PLoS ONE* 7(11):e49390.
28. Thorne, L.H., D.W. Johnston, D.L. Urban, J. Tyne, L. Bejder, R.W. Baird, S. Yin, S.H. Rickards, M.H. Deakes, J.R. Mobley, A.A. Pack, and M.C. Hall. 2012. Predictive modeling of spinner dolphin (*Stenella longirostris*) resting habitat in the main Hawaiian Islands. *PLoS ONE* 7(8): e43167.
29. Xi, W., R.K. Peet, and D.L. Urban. 2012. The impacts of a large, infrequent hurricane on understory sapling dynamics and diversity in North Carolina Piedmont forests, USA. *Tree and Forestry Science and Biotechnology* 6:51-59.
30. Schick R.S., P.N. Halpin, A.J. Read, D.L. Urban, B.D. Best, C.P. Good, J.J. Roberts, E.A. LaBrecque, C. Dunn, L.P. Garrison, K.D. Hyrenbach, W.A. McLellan, D.A. Pabst, and S. Stevick. 2011. Community structure in pelagic marine mammals at large spatial scales. *Mar Ecol Prog Ser* 434:165-181.

31. Stephenson, N.L., P.J. van Mantgem, A.G. Bunn, H. Bruner, M.E. Harmon, K.B. O'Connell, D.L. Urban, and J.F. Franklin. 2011. Causes and implications of the correlation between forest productivity and tree mortality rates. *Ecol. Monogr.* 81:527-555.
32. Minor, E.S., and D.L. Urban. 2010. Forest bird communities across a gradient of urban development. *Urban Ecosystems* 13:51-71.
33. Urban, D., E. Minor, E. Treml, and R. Schick. 2009. Graph models of habitat mosaics. *Ecology Letters* 12:260-273.
34. Minor, E.S., R.I. McDonald, E.A. Treml, and D.L. Urban. 2008. Uncertainty in spatially explicit population models. *Biol. Cons.* 141:956-970.
35. Minor, E.S., and D.L. Urban. 2008. A graph-theory framework for evaluating landscape connectivity and conservation planning. *Cons. Biol.* 22:297-307.
36. Treml, E.A., P.N. Halpin, D.L. Urban, and L.F. Pratson. 2008. Modeling population connectivity by ocean currents: a graph-theoretic approach for marine conservation. *Landscape Ecology* 23:19-36.
37. Xi, Weimin, R.K. Peet and D.L. Urban. 2008a. Changes in forest structure, species diversity, and spatial pattern following hurricane disturbance in a Piedmont North Carolina forest, USA. *Journal of Plant Ecology* 1:43-57.
38. Xi, Weimin, R.K. Peet, J.K. DeCoster, and D.L. Urban. 2008b. Tree damage risk factors associated with large, infrequent wind disturbances of Carolina forests. *Forestry* 81:317-334.
39. Gardner, R.H., and D.L. Urban. 2007. Neutral models for testing landscape hypotheses. *Landscape Ecology* 22:15-29.
40. Goslee, S.C., and D.L. Urban. 2007. The *ecodist* package for dissimilarity-based analyses of ecological data. *J. Statistical Software* 22:7.
41. Hierl, L.A., C.S. Loftin, J.R. Longcore, D.G. McAuley, and D.L. Urban. 2007. A multivariate assessment of changes in wetland habitat for waterfowl in Moosehorn National Wildlife Refuge, Maine, USA. *Wetlands* 27:141-152.
42. McDonald, R.I., P.N. Halpin, and D.L. Urban. 2007. Monitoring succession from space: a case study from the North Carolina Piedmont. *Applied Vegetation Science* 10:193-203.
43. Minor, E.S., and D.L. Urban. 2007. Graph theory as a proxy for spatially explicit population models in conservation planning. *Ecological Applications* 17:1771-1782.
44. McDonald, R.I., and D.L. Urban. 2006. Edge effects on species composition and exotic species abundance in the North Carolina Piedmont. *Biological Invasions* 8:1049-1060.
45. McDonald, R.I., and D.L. Urban. 2006. Spatially varying rules of landscape change: lessons from a case study. *Landscape and Urban Planning B* 74:7-20.

46. Bunn, A.G., L.J. Graumlich, and D.L. Urban. 2005. Climatically significant trends in 20th-century tree growth at high elevations. *The Holocene* 15:481-488.
47. Goslee, S.C., W.A. Niering, D.L. Urban, and N.L. Christensen. 2005. Dynamics of a Connecticut forest: environment, history, and vegetation. *J. Torrey Botanical Club* 132:471-482.
48. Keitt, T.H., and D.L. Urban. 2005. Scale-specific inferences on vegetation-environment relationships using wavelet regression. *Ecology* 86:2497-2504.
49. Lookingbill, T., and D. Urban. 2005. Gradient analysis, the next generation: towards more plant-relevant explanatory variables. *Canadian J. For. Res.* 35:1744-1753.
50. Pierce, K.B., T.R. Lookingbill, and D.L. Urban. 2005. A simple method for estimating potential relative radiation for landscape-scale vegetation analysis. *Landscape Ecology* 20:137-147.
51. Taverna, K., D.L. Urban, and R.I. McDonald. 2005. Modeling landscape vegetation pattern in response to historic land use: a hypothesis-driven approach for the North Carolina Piedmont. *Landscape Ecology* 20:689-702.
52. Urban, D.L. 2005. Modeling ecological processes across scales. *Ecology* 86:1996-2006.
53. Wiersma, Y.F., and D.L. Urban. 2005. Beta-diversity and nature reserve system design: a case study from the Yukon, Canada. *Conservation Biology* 19:1262-1272.
54. King, R.S., C.J. Richardson, D.L. Urban, and E.A. Romanowicz. 2004. Spatial dependency of vegetation-environment linkages in an anthropogenically influenced wetland ecosystem. *Ecosystems* 7:75-97.
55. Lookingbill, T.R., and D. Urban. 2004. An empirical approach towards improved spatial estimates of soil moisture for vegetation analysis. *Landscape Ecology* 19:417-433.
56. McDonald, R.I., and D.L. Urban. 2004. Forest edges and tree growth rates in the North Carolina Piedmont. *Ecology* 85:2258-2266.
57. Peters, D.P., J.E. Herrick, D.L. Urban, R.H. Gardner, and D.D. Breshears. 2004. Strategies for ecological extrapolation. *Oikos* 106:627-636.
58. Arge, L., J.S. Chase, P. Halpin, L. Toma, J.S. Vitter, D. Urban, and R. Wickremesinghe. 2003. Efficient flow computation on massive grid terrain datasets. *GeoInformatica* 7:283-313.
59. Lookingbill, T.R., and D.L. Urban. 2003. Spatial estimation of air temperature differences for landscape-scale studies in montane environments. *Agric. and Forest Meteorology* 114:141-151.
60. McDonald, R., R.K. Peet, and D.L. Urban. 2003. Spatial pattern of *Quercus* regeneration limitation and *Acer rubrum* invasion in a Piedmont forest. *J. Vegetation Science* 14:441-450.

61. Kintsch, J.A., and D.L. Urban. 2002. Focal species, community representation, and physical proxies as conservation strategies: a case study in the Amphibolite Mountains, North Carolina, USA. *Conservation Biology* 16:936-947.
62. McDonald, R., R.K. Peet, and D.L. Urban. 2002. Environmental correlates of oak decline and red maple increase in the North Carolina Piedmont. *Castanea* 67:84-95.
63. Urban, D.L., S. Goslee, K.B. Pierce, and T.R. Lookingbill. 2002. Extending community ecology to landscapes. *Ecoscience* 9:200-212.
64. Acevedo, M.F., M. Ablan, D.L. Urban, and S. Pamarti. 2001. Estimating parameters of forest patch transition models from gap models. *Environmental Modelling and Software* 16:649-658.
65. Urban, D.L., and T.H. Keitt. 2001. Landscape connectivity: a graph-theoretic perspective. *Ecology* 82:1205-1218.
66. Bunn, A.G., D.L. Urban, and T.H. Keitt. 2000. Landscape connectivity: a focal-species analysis using graph theory. *J. Environ. Manage.* 59:265-278.
67. Miller, C., and D.L. Urban. 2000a. Connectivity of forest fuels and surface fire regimes. *Landscape Ecol.* 15:145-154.
68. Miller, C., and D.L. Urban. 2000b. Modeling the effects of fire management alternatives in Sierra Nevada mixed-conifer forests. *Ecol. Applic.* 10: 85-94.
69. Schick, R.S., and D.L. Urban. 2000. Spatial components of bowhead whale (*Balaena mysticetus*) distribution in the Alaskan Beaufort sea. *Can. J. Fish. and Aquatic Sci.* 57:2193-2200.
70. Urban, D.L. 2000. Using model analysis to design monitoring programs for landscape management and impact assessment. *Ecol. Applic.* 10:1820-1832.
71. Urban, D.L., C. Miller, N.L. Stephenson, and P.N. Halpin. 2000. Forest pattern in Sierran landscapes: the physical template. *Landscape Ecol.* 15:603-620.
72. Miller, C., and D.L. Urban. 1999a. A model of surface fire, climate, and forest pattern in the Sierra Nevada, California. *Ecol. Modelling* 114:113-135.
73. Miller, C., and D.L. Urban. 1999b. Forest pattern, fire, and climatic change in the Sierra Nevada. *Ecosystems* 2:76-87.
74. Miller, C., and D.L. Urban. 1999c. Interactions between forest heterogeneity and surface fire regimes in the southern Sierra Nevada. *Canadian J. For. Res.* 29:202-212.
75. Keitt, T., D. Urban, and B. Milne. 1997. Managing fragmented landscapes: a macroscopic approach. *Conservation Ecology* 1:4. (on-line at <http://www.consecol.org/Journal/vol1/iss1/art4>).
76. Acevedo, M.F., D.L. Urban, and H.H. Shugart. 1996. Models of forest dynamics based on roles of tree species. *Ecol. Modelling* 87:267-284.

77. Weishampel, J.F., and D.L. Urban. 1996. Coupling a spatially explicit forest gap model with a 3-D solar routine to simulate latitudinal effects. *Ecol. Modelling* 86:101-111.
78. Acevedo, M., D.L. Urban, and M. Ablan. 1995. Transition and gap models of forest dynamics. *Ecol. Applic.* 5:1040-1055.
79. Hansen, A.J., S.L. Garman, J.F. Weigand, D.L. Urban, W.C. McComb, and M.G. Raphael. 1995. Ecological and economic effects of alternative silvicultural regimes in the Pacific Northwest: a simulation experiment. *Ecol. Applic.* 5:535-554.
80. Turchi, G.M., P.L. Kennedy, D.L. Urban, and D. Hein. 1995. Bird species richness in relation to isolation of aspen habitat. *Wilson Bulletin* 107:463-474.
81. Urban, D.L. 1994. Global change and everything. (Review of Kareiva, Kingsolver, and Huey, 1993, *Biotic interactions and global change*, Sinauer.) *Ecology* 75:1521-1522.
82. Coffin, D.P., and D.L. Urban. 1993. Implications of natural-history traits to ecosystem dynamics: comparison of a grassland and forest. *Ecol. Modelling* 67:147-178.
83. Hansen, A.J., S.L. Garman, B.Marks, and D.L. Urban. 1993. An approach for managing vertebrate diversity across multiple-use landscapes. *Ecol. Applic.* 3:481-496.
84. Lauenroth, W.K., D.L. Urban, D.P. Coffin, W.J. Parton, H.H. Shugart, T.B. Kirchner, and T.M. Smith. 1993. Modeling vegetation structure-ecosystem process interactions across sites and biomes. *Ecol. Modelling* 67:49-80.
85. Levine, E.R., K.J. Ranson, J.A. Smith, D.L. Williams, R.G. Knox, H.H. Shugart, D.L. Urban, and W.T. Lawrence. 1993. Forest ecosystem models: linking forest succession, soil process, and radiation models. *Ecol. Modelling* 65:199-220.
86. Urban, D.L., M.E. Harmon, and C.B. Halpern. 1993. Potential response of Pacific Northwestern forests to climatic change: effects of stand age and initial composition. *Climatic Change* 23:247-266.
87. VanVorhis, P., W.D. Millard, J. Thomas, and D. Urban. 1993. TERRA-Vision —the integration of scientific analysis into the decision-making process. *Int. J. Geogr. Infor. Systems* 7:143-164.
88. Hansen, A.J., and D.L. Urban. 1992. Avian response to landscape pattern: the role of species life histories. *Landscape Ecology* 7:163-180.
89. Weishampel, J.F., D.L. Urban, H.H. Shugart, and J.B. Smith, Jr. 1992. Semi-variograms from a forest transect gap model compared with remotely sensed data. *J. Veg. Science* 3:521-526.
90. Urban, D.L., G. Bonan, T.M. Smith, and H.H. Shugart. 1991. Spatial applications of gap models. *Forest Ecology and Management* 42:95-110.
91. Bonan, G.B., H.H. Shugart, and D.L. Urban. 1990. The sensitivity of some high-latitude boreal forests to climatic parameters. *Climatic Change* 16:9-29.

92. Urban, D.L., and T.M. Smith. 1989. Microhabitat pattern and the structure of forest bird communities. *American Naturalist* 133:811-829.
93. Smith, T.M., and D.L. Urban. 1988. Scale and resolution of forest structural pattern. *Vegetatio* 74:143-150.
94. Urban, D.L., R.V. O'Neill, and H.H. Shugart. 1987. Landscape ecology. *BioScience* 37:119-127.

Book Chapters

(I no longer—or very rarely—accept invitations to author book chapters.)

1. Pitman, S.J., J.A. Wiens, J. Wu, and D.L. Urban. 2017. Landscape ecologists' perspectives on seascape ecology. Chapt 16 in S.J. Pitman, *Seascape ecology*. John Wiley and Sons, Ltd.
2. Lookingbill, T.R., M.E. Rocca, and D.L. Urban. 2010. Focused assessment of scale-dependent vegetation pattern. Pages 111-138 in C.A. Drew, Y.F. Wiersma and F. Huettmann (eds.), *Predictive Species and habitat modeling in landscape ecology: concepts and applications*. Springer, New York.
3. Urban, D.L. 2006. A modeling framework for ecological restoration. Pages 238-256 in D. Falk, M. Palmer, and J. Zedler (eds.), *Foundations of restoration ecology*, Island Press, Washington.
4. Urban, D.L., R.I. McDonald, E.S. Minor, and E.A. Treml. 2006. Causes and consequences of land use change in the North Carolina Piedmont: the scope of uncertainty. Pages 239-257 in J. Wu, K.B. Jones, and H. Li (eds.), *Scaling and uncertainty in regional ecological studies: methods and applications*. Springer, New York.
5. Urban, D.L., R.V. O'Neill, and H.H. Shugart. 2006. Landscape ecology. Reprint of 1987 article as pages 265-273 in J.A. Wiens, M.B. Moss, D.J. Mladenoff, and M.G. Turner (eds.), *Foundation papers in landscape ecology*. Columbia, New York.
6. Gardner, R.H., and D.L. Urban. 2003. Model testing and validation: past lessons and present challenges. Pages 184-203 in C.D. Canham, J.J. Cole, and W.K. Lauenroth (eds.), *Models in ecosystem science*. Princeton University Press, Princeton.
7. Urban, D.L. 2003. A community-wide investment in modeling. Pages 466-470 in C.D. Canham, J.J. Cole, and W.K. Lauenroth (eds.), *Models in ecosystem science*. Princeton University Press, Princeton.
8. Urban, D.L. 2002a. Tactical monitoring of landscapes. Pages 294-311 in J.L. Liu and W.W. Taylor (eds.), *Integrating landscape ecology into natural resource management*. Cambridge Univ. Press, Cambridge.
9. Urban, D.L. 2002b. Classification and regression trees. Pages 222-232 in B. McCune and J.B. Grace, *Analysis of ecological communities*. MjM Software Design, Glenden Beach, Oregon.

10. Urban, D.L. 2002c. Prioritizing reserves for acquisition. Pages 293-305 in S.E. Gergel and M.G. Turner (eds.), *Learning landscape ecology: a practical guide to concepts and techniques*. Springer-Verlag, New York.
11. Urban, D.L., and D.O. Wallin. 2002. Introduction to Markov models. Pages 35-48 in S.E. Gergel and M.G. Turner (eds.), *Learning landscape ecology: a practical guide to concepts and techniques*. Springer-Verlag, New York.
12. Pearson, S.M., M.G. Turner, and D.L. Urban. 1999. Effective exercises in teaching landscape ecology. Pages 335-368 in J.M. Klopatek and R.H. Gardner (eds.), *Landscape ecological analysis*. Springer, New York.
13. Urban, D.L., M.F. Acevedo, and S.L. Garman. 1999. Scaling fine-scale processes to large-scale patterns using models derived from models: meta-models. Pages 70-98 in D. Mladenoff and W. Baker (eds.), *Spatial modeling of forest landscape change: approaches and applications*. Cambridge University Press, Cambridge, UK.
14. Acevedo, M., D.L. Urban, and M. Ablan. 1995. Landscape scale forest dynamics: GIS, gap, and transition models. Pages 181-186 in M.F. Goodchild, L.T. Steyaert, B.O. Parks, et al. (eds.), *GIS and environmental modeling: progress and research issues*. GIS World Books, Fort Collins, Colorado.
15. Urban, D.L. 1994. Landscape ecology and ecosystem management. (Invited paper presented at the Conference on Sustainable Ecological Systems, Flagstaff, AZ, July 1993.) Pages 127-136 in W. Covington and L. DeBano (eds.), *Sustainable ecological systems: implementing an ecological approach to land management*. USDA Gen. Tech. Report RM-247. Rocky Mountain Expt. Station, Fort Collins.
16. Urban, D.L., and H.H. Shugart. 1992. Individual-based models of forest succession. Pages 249-292 in D.C. Glenn-Lewin, R.K. Peet, and T.T. Veblen (eds.), *Plant succession: theory and prediction*. Chapman and Hall, London.
17. Urban, D.L., A.J. Hansen, D.O. Wallin, and P.N. Halpin. 1992. Life-history attributes and biodiversity: scaling implications for global change. Pages 173-195 in O.T. Solbrig, H.M. van Emden, and P.G.W.J. van Oordt (eds.), *Biodiversity and global change*. Monograph No. 8, International Union of Biological Sciences, Paris.
18. Hansen, A.J., D.L. Urban, and B. Marks. 1991. Avian community dynamics: the interplay of landscape trajectories and species life histories. Pages 170-195 in A.J. Hansen and F. DiCatri (eds.), *Landscape boundaries: consequences for biotic diversity and ecological flows*. Springer-Verlag, New York.
19. Horn, H.H., Shugart, H.H., and D.L. Urban. 1989. Simulators as models of forest dynamics. Pages 256-267 in J. Roughgarden, R.M. May, and S.A. Levin (eds.), *Perspectives in ecological theory*. Princeton Univ. Press, Princeton.
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21. Shugart, H.H., and D.L. Urban. 1988. Scale, synthesis, and ecosystem dynamics. Pages 279-290 in L.R. Pomeroy and J.J. Alberts (ed.), *Concepts of ecosystem ecology*. Springer-Verlag, New York.

22. Shugart, H.H., and D.L. Urban. 1986. Overall summary: a researcher's perspective. Pages 425-429 in J. Verner, M.L. Morrison, and C.J. Ralph (eds.), *Modeling habitat relationships of terrestrial vertebrates*. Univ. Wisconsin Press, Madison.
23. Urban, D.L., and H.H. Shugart. 1986. Avian demography in mosaic landscapes: modeling paradigm and preliminary results. Pages 273-279 in J. Verner, M.L. Morrison, and C.J. Ralph (eds.), *Modeling habitat relationships of terrestrial vertebrates*. Univ. Wisconsin Press, Madison.
24. Urban, D.L., R.V. O'Neill, and H.H. Shugart. 1986. Linkages in hierarchical models. Pages 116-124 in M.I. Dyer and D.A. Crossley (eds.), *Coupling of ecological studies with remote sensing*. U.S. MAB, Washington.

Public Reports

1. National Ecosystems Services Partnership. 2014. *Federal Resource Management and Ecosystems Services Guidebook*. National Ecosystems Services Partnership, Duke University. <https://nespguidebook.com>.

Working Papers

1. Olander, L., D. Urban, R.J. Johnston, G. van Houtven, and J. Kagan. 2016. Proposal for increasing consistency when incorporating ecosystem services into decision-making. NESP Policy Brief 16-01. Nicholas Institute for Environmental Policy Solutions, Duke University.
2. Olander, L. G.W. Charackis, P. Comer, M. Effron, J. Gunn, T. Holmes, R. Johnston, J. Kagan, W. Lehman, J. Loomis, T. McPhearson, A. Neale, L. Patterson, L. Richardson, M. Ross, D. Saah, S. Sifleet, K. Stockmann, D. Urban, L. Wainger, R. Winthrop, and D. Yoskowitz. 2016. Data and modeling infrastructure for national integration of ecosystem services into decision-making: expert summaries. NESP Working Paper 16-02. Nicholas Institute for Environmental Policy Solutions, Duke University.

Apocryphal Reports

1. USDI Fish and Wildlife Service (with 14 primary authors). 1995. Recovery Plan for the Mexican Spotted Owl (*Strix occidentalis lucida*). U.S. Fish and Wildlife Service, Albuquerque, New Mexico.
2. Urban, D.L. 1990. A versatile model to simulate forest pattern: a user's guide to ZELIG. Special publication, Environmental Sciences Department, Univ. Virginia, Charlottesville. 108 pages.
3. Urban, D.L., and H.H. Shugart. 1989. Forest response to climatic change: a simulation study for southeastern forests. In J.B. Smith and D.A. Tirpak (eds.), *The potential effects of global climate change on the United States*. EPA-230-05-89-054. U.S. EPA, Washington, D.C.
4. Urban, D.L., H.H. Shugart, D.L. DeAngelis, and R.V. O'Neill. 1988. Forest bird demography in a landscape mosaic. ORNL/TM-10332, ESD Publ. No. 2853.

Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Other Research and Teaching Products

1. PORTFOLIO: a flexible decision-support tool for nature reserve site selection and conservation planning (developed in collaboration with The Nature Conservancy, 2000, now at version 2.4 for DOS; version 3.0 for Windows released 2005).
2. ECODIST: an R library of programs for analyses based on ecological distance (mostly written and maintained by Sarah Goslee) (<http://www.r-project.org>).
3. LANDGRAPHS: programs for graph-theoretic analysis of landscape connectivity (developed with T.H. Keitt, see Urban and Keitt 2001).
4. METAFOR: a landscape-scale meta-model of forest dynamics for research and teaching (a statistical model that captures the essential behaviors of the gap model ZELIG; version 1.0 is documented by Urban et al. 1999).
5. MORAN and VARIOGRAM: programs for spatial autocorrelation and semivariance analysis (tools for spatial analysis; 1999).
6. RIPLEY: a versatile program for point-pattern analysis (tools for spatial analysis; 2001)
7. ZELIG: a versatile model to simulate forest pattern. (began as version 1, 1990; now as FACET version 3.5, FM 97.5, 1997).

Some of these programs are available with documentation via my website.

Student Advising and Mentoring

Ph.D. students:

Joanna Blaszczak (co-advised with Emily Bernhardt) — *Development configuration and water quality in urban streams* (2018)

Brenna Forester — *Population capacity for local adaptation versus directed dispersal in response to climatic warming: a landscape genomics approach* (2017)

Kayleigh Somers (co-advised with Emily Bernhardt) — *Thermal regimes of urban stream ecosystems* (2013)

Joseph Sexton — *Spatiotemporal patterns of land use/land cover change in the North Carolina Piedmont* (2009)

Nicolette Cagle (co-advised with Norm Christensen and John Terborgh) — *Multiscale habitat relationships of snakes in the Prairie Peninsula of Illinois* (2008)

Emily Minor — *Integrating forest bird behavior to the landscape scale* (2006)

Monique Rocca (co-advisor with Norm Christensen) — *Fine-scale heterogeneity in fire regimes in Sierran Nevada forests* (2004)

Robert McDonald — *Landscape history, land use pattern and forest dynamics in the North Carolina Piedmont* (2004)

Todd Lookingbill — *The Tsuga-Abies ecotone in Pacific Northwestern conifer forests:*

demographic mechanisms and environmental constraints (2003)

Kenneth Pierce — *Reconciling forest demography with gradient analysis in montane landscapes* (2002)

Chiru Chang — *Understanding fire regimes: a general model* (1999)

C. Miller, Graduate Degree Program in Ecology, Colorado State University — *Forest pattern, surface fire regimes, and climatic change in the Sierra Nevada, California* (1998)

Service on >40 doctoral committees in Duke's University Program in Ecology and in the Departments of Environment, Biology, Computer Science, and the Institute of Statistics and Decision Support at Duke; the Departments of Biology, Geography, and City and Regional Planning at UNC-Chapel Hill; and at NC State University.

Master's in Environmental Management (MEM) advisees:

Awarded the inaugural Dean's Award for Outstanding Mentorship (1998)

Advising ~ 5–10 per year in a 2-year program, including Master's projects (>200 total)

Program Chair for Ecosystem Science and Conservation (MEM degree) and/or Forest Resource Management (Master of Forestry degree), 2002-2007, 2010-2015, 2018-2019, 2021-2024.

Faculty Advisor and Mentor, Doris Duke Conservation Fellows Program (sponsored by the Doris Duke Charitable Foundation), 2002-2012