JAKE F. WELTZIN

Ecologist, US Geological Survey
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Education

1993-1998 Ph.D., Renewable Natural Resource Studies (major) and Global Change (minor), 1998
University of Arizona, Tucson, AZ
Dissertation: Biotic and abiotic constraints on shifts in temperate savanna ecotones at lower treeline.

1988-1990 M.S., Range Science, 1990
Texas A & M University, College Station, TX
Thesis: The potential role of prairie dogs in regulating honey mesquite population dynamics.

1983-1987 B.S., *cum laude*, Range and Forest Management, 1987
Colorado State University, Fort Collins, CO
Honors Thesis: Kaufman ranch plan - a plan for a ranch in northcentral Colorado.

1986 University of Aberdeen, Scotland.
Independent Project: Forestry policy in Great Britain - past, present, and a plan for the future.

Experience

Program Manager, Status and Trends Program. Ecosystems Mission Area, US Geological Survey, Reston, VA, 20192. 2015-Present.

Executive Director, USA National Phenology Network, National Coordinating Office, Tucson, AZ 85721. 2007-Present.

Ecologist, Ecosystems Mission Area, US Geological Survey, Reston, VA, 20192. 2007-Present.

Adjunct Associate Professor. School of Natural Resources and Environment, University of Arizona, Tucson, AZ, 85721. 2007-Present.

Program Coordinator, Status and Trends Program, Acting. Ecosystems Mission Area, US Geological Survey, Reston, VA, 20192. 2014-2015.

Senior Science Advisor for Environments, Acting. Ecosystems Mission Area, US Geological Survey, Reston, VA, 20192. 2012, 2015.

Program Director. Ecological Biology, Division of Environmental Biology, National Science Foundation, Arlington, VA, 22230. 2006-2007.

Associate Professor. Department of Ecology and Evolutionary Biology, University of Tennessee, Knoxville, TN, 37996. 2005-2007.

Assistant Professor. Department of Ecology and Evolutionary Biology, University of Tennessee, Knoxville, TN, 37996. 1999-2005.

Post-doctoral Research Associate. Department of Biological Sciences, University of Notre Dame, Notre Dame, IN, 46556. 1998-1999.

Graduate Research Assistant. School of Renewable Natural Resources, University of Arizona, Tucson, AZ, 85721. 1993-1998.

Project Manager/Plant Ecologist. Raedeke Associates, Inc., 5711 NE 63rd St., Seattle, WA, 98115. 1990-1993.

Graduate Research Assistant. Department of Range Science, Texas A & M University, College Station, TX, 77843-2616. 1988-1990.

Undergraduate Research. National Science Foundation - Research Experiences for Undergraduates. Supplement to: Southern Turkana Ecosystem Project, Natural Resources Ecology Laboratory, Colorado State University, Fort Collins, CO, 80523-1499. 1987.

Natural Resource Management Consultant. Self-employed. Client: William G. Kaufman, Attorney-at-Law, Glenwood Springs, CO, 81601. 1987.

Forestry Aid/Technician and Squad Boss. U.S. Forest Service, Mt. Hood National Forest, OR. Summers 1983-1986.

Research, Development, and Teaching Grants

Geocaching Natural Features – Applying Game Mechanics to Citizen Science Data Collection. US Geological Survey Community for Data Integration. 2015-2016. $48,805. Co-PI.

Climate-smart phenology monitoring using *Nature's Notebook* -- the USA National Phenology Network's ground-based, national-scale multi-taxa monitoring program. US Geological Survey Technology Enable Learning Course Development. 2014-2105. $14,493. PD/PI.

Integrating Phenological, Trait and Environmental Data For Continental Scale Analysis: A Community Approach. NSF-NEON (National Science Foundation - National Ecological Observatory Network). First Articles Science Workshop. 2015. $18,690. Co-PI.

DataONE. (Data Observation Network for Earth; A DataNet Project.) National Science Foundation. 2009-2014. $19,247,742. Co-I.

California Phenology Project: Technical Assistance. NPS Cooperative Ecosystems Studies Unit. 2011-2014. $103,923. Co-PI.

Integrated phenological monitoring, analysis, and synthesis to track ecosystem responses to climate change. USGS Status and Trends National Park Monitoring Program. 2010-2013. $180,000. PD/PI.

Facilitation of a phenology network to assess climate change response in California parks. NPS Cooperative Ecosystems Studies Unit. 2010. $27,715. Co-PI.

RCN (Research Coordination Network) - USA National Phenology Network. National Science Foundation. 2007-2014. $406,951. Co-PI.

Community and ecosystem response to global change: interactive effects of atmospheric carbon dioxide, surface temperatures, and soil moisture. Department of Energy, Program for Ecosystem Research. 2002-2007. $1,061,653. PD/PI.

Collaborative Research: Vulnerability of semi-arid grasslands to encroachment by woody plants: the role of grass invasions, seasonal precipitation, and soil type. National Science Foundation. 2004-2008. $72,651. PD/PI.

Combined and relative effects of resource availability, propagule pressure, and insect herbivores on invasion in an old-field system. University of Tennessee. Professional Development Fund. 2004. $4,752. PD/PI.

A CHN autoanalyzer for program strengthening and building ecology and evolutionary biology and environmental sciences at UT. University of Tennessee Scholarly Activities Research Incentive Fund (SARIF) Equipment and Infrastructure Fund. 2004. $18,050. Co-PI.

Plant energetic processes: response to environmental change and implications for plant communities. National Park Foundation. 2003-2005. $84,024. PD/PI.

Improving teaching skills: The Teaching Professor Conference. University of Tennessee. Professional Development Fund. 2003. $1,310. PD/PI.

Climate change, grass invasions, and woody plant dynamics in semi-arid savannas. US Department of Agriculture Cooperative State Research, Education, and Extension Service. 2000-2005. $300,000. PD/PI.

Genomic characterization of belowground ecosystem responses to climate change. Department of Energy, Oak Ridge National Laboratory, Laboratory Directed Research and Development Program. 2002-2005. $645,000. Co-PI.

Understory plant community response to elevated carbon dioxide: pattern and process. University of Tennessee-Battelle, LLC, Oak Ridge National Laboratory. 2002-2003. $29,500. PD/PI.

Instructional equipment for teaching field-oriented ecology. College of Arts and Sciences, University of Tennessee. 2002. $9,950. PD/PI.

Plant community response to elevated concentrations of atmospheric carbon dioxide. University of Tennessee-Battelle, LLC, Oak Ridge National Laboratory. 2001-2002. $29,500. PD/PI.

Incubation activity: Biocomplexity in peatlands. National Science Foundation. 2000-2002. $99,540. Co-PI.

Plant species diversity in restored pastures, Great Smoky Mountains National Park. National Park Service. 2001. $1,000. PD/PI.

Plant invasions and climate change: the role of increasing carbon dioxide concentration. University of Tennessee-Battelle, LLC, Oak Ridge National Laboratory. 2000-2001. $20,000. PD/PI.

A cryogenic vacuum distillation line for University of Tennessee Science Alliance Stable Isotope Laboratory. University of Tennessee Scholarly Activities Research Incentive Fund. 2000. $6,000. PD/PI.

A cryogenic vacuum distillation line for University of Tennessee Science Alliance Stable Isotope Laboratory. University of Tennessee Threshold Honors Program and Howard Hughes Medical Institute. 2000. $2,400. PD/PI.

Northern peatlands and their potential feedbacks on global warming. University of Tennessee. Professional Development Fund. 2000. $4,255. PD/PI.

Teaching research skills in field-oriented plant ecology. College of Arts and Sciences, University of Tennessee. 2000. $3,000. PD/PI.

Changing precipitation regimes and functional rooting depths in temperate deciduous forest. Lockheed Martin Energy Research Corporation, Oak Ridge National Laboratory. 2000. $24,153. PD/PI.

Cades Cove Prairie Restoration: Five-year response to herbicide and fire treatments. National Park Service. 2000. $1,900. PD/PI.

Microenvironmental constraints on shifts in woodland/grassland ecotones. Sigma Xi, The Scientific Research Society. 1996. $475. PD/PI.

Alteration of seasonal precipitation regimes: Effects on coexisting grass and tree seedling water relations and gas exchange. University of Arizona Graduate Student Research Fund. 1996. $1,950. Co-PI.

Investigations of seasonal plant water use: applications of stable-isotope analysis. University of Arizona Foundation. 1995. $5,000. Co-PI.

Books

Weltzin, J.F. and G.R. McPherson. 2003. Changing Precipitation Regimes and Terrestrial Ecosystems: A North American Perspective. University of Arizona Press. 237 pp.

Refereed Publications (authored with graduate* or undergraduate student)**

McKinley, D.C., A.J. Miller-Rushing, H.L. Ballard, R.E. Bonney, H. Brown, S. Cook-Patton, D.M. Evans, R.A. French, J.K. Parrish, T.B. Phillips, S.F. Ryan, L.A. Shanley, J.L. Shirk, K.F. Stepenuck, J.F. Weltzin, A.Wiggins, O.D. Boyle, R.D. Briggs, S.F. Chapin III, D.A. Hewitt, P.W. Preuss, and M.A. Soukup. *In review.* Citizen science can improve conservation science, natural resource management, and environmental protection. Biological Conservation.

Elmendorf, S.C, K.D. Jones, BI Cook, JM Diez, CAF Enquist, RA Hufft, MO Jones, SJ Mazer, AJ Miller-Rushing, D Moore, MD Schwartz, JF Weltzin. *In review*. The Plant Phenology Sampling Design for the National Ecological Observatory Network. Ecosphere.

Crimmins, T.M., L.A. Barnett, E.G. Denny, A.H. Rosemartin, S. Schaffer, and J.F. Weltzin. *In review*. From tiny acorns grow mighty oaks: What we've learned from nurturing *Nature's Notebook*. Chapter X *in* Lepczyk, C., T. Vargo and O. Boyle. Handbook of Citizen Science in Ecology and Conservation, University of California Press.

Mehdipoor, H., R. Zurita-Milla, A. Rosemartin, K.L. Gerst, and J.F. Weltzin. 2015. Developing a workflow to identify inconsistencies in volunteered geographic information: A phenological case study. PLoS ONE 10(10): e0140811. DOI: 10.1371/journal.pone.0140811

Ault, T.R., M.D. Schwartz, R. Zurita-Milla, J.F. Weltzin and J.L. Betancourt. 2015. Trends and natural variability of spring onset in the coterminous United States as evaluated by a new gridded dataset of spring indices. Journal of Climate 28:8363-8378. DOI: 10.1175/JCLI-D-14-00736.1

McKinley, D.C., A.J. Miller-Rushing, H.L. Ballard, R.E. Bonney, H. Brown, D.M. Evans, R.A. French, J.K. Parrish, T.B. Phillips, S.F. Ryan, L.A. Shanley, J.L. Shirk, K.F. Stepenuck, J.F. Weltzin, A.Wiggins, O.D. Boyle, R.D. Briggs, S.F. Chapin III, D.A. Hewitt, P.W. Preuss, and M.A. Soukup. 2015. Investing in Citizen Science Can Improve Natural Resource Management and Environmental Protection. Issues in Ecology. Issue 19. http://www.esa.org/esa/wp-content/uploads/2015/09/Issue19.pdf

Rosemartin, A.H., E.G. Denny, J.F. Weltzin, R.L. Marsh, B.E. Wilson, H. Mehdipoor, R. Zurita-Milla, and M.D. Schwartz. 2015. Lilac and honeysuckle phenology data 1956-2014. Scientific Data 2:150038. DOI: 10.1038/sdata.2015.38

Thomas, K.A., M.D. Fornwall, J.F. Weltzin and R.B. Griffis. 2014. Organization of marine phenology data in support of planning and conservation in ocean and coastal ecosystems. Ecological Informatics. DOI: dx.doi.org/10.1016/j.ecoinf.2014.08.007

Resco de Dios, V., J.F. Weltzin, W. Sun, T.E. Huxman and D.G. Williams. 2014. Transitions from grassland to savanna under drought via passive facilitation by grasses. Journal of Vegetation Science 25:937–946. DOI: 10.1111/jvs.12164 [Commentary by Wilson, S.D. 2014. Help from the dead: facilitation during succession can start when neighbours die. Journal of Vegetation Science 25:917–918. DOI: 10.1111/jvs.12192]

Crimmins, T.M., J.F. Weltzin, A.H. Rosemartin, E.M. Surina, L. Marsh, and E.G. Denny. 2014. Focused campaign increases activity among participants in *Nature's Notebook*, a citizen science project. Natural Sciences Education 43:64-72. DOI: 10.4195/nse2013.06.0019

Denny, E.G., K.L. Gerst, A.J. Miller-Rushing, G.L. Tierney, T.M. Crimmins, C.A.F. Enquist, P. Guertin, A.H. Rosemartin, M.D. Schwartz, K.A. Thomas and J.F. Weltzin. 2014. Standardized phenology monitoring methods to track plant and animal activity for science and resource management applications. International Journal of Biometeorology 58:591-601. DOI: 10.1007/s00484-014-0789-5

Schwartz, M.D., E. Beaubien, T.M Crimmins and J.F. Weltzin. 2013. North America. Chapter 5 *in* Schwartz, M.D. (ed). Phenology: An Integrative Environmental Science, 2nd Ed. Springer Science+Business Media B.V. DOI: 10.1007/978-94-007-6925-0_5

Rosemartin, A.H., T.M. Crimmins, C.A.F. Enquist, K.L. Gerst, J.L. Kellermann, E.E. Posthumus, E.G. Denny, P. Guertin, L. Marsh and J.F. Weltzin. 2013. Organizing phenological data resources to inform natural resource conservation. Biological Conservation 173:90-97. DOI: 10.1016/j.biocon.2013.07.003

Schwartz, M.D., J.L. Betancourt, and J.F. Weltzin. 2012. From Caprio's Lilacs to the USA National Phenology Network. Frontiers in Ecology and the Environment 10:324-327. DOI: 10.1890/110281

*Resco de Dios, V., J.F. Weltzin, W. Sun, T.E. Huxman, and D.G. Williams. 2012. Windows of opportunity for *Prosopis velutina* seedling establishment and encroachment in a semiarid grassland. Perspectives in Plant Ecology, Evolution and Systematics 14:275-282. DOI: 10.1016/j.ppees.2012.03.002

*Souza, L. J.F. Weltzin, and N.J. Sanders. 2011. Differential effects of two dominant plant species on community structure and invasibility in an old-field ecosystem. Journal of Plant Ecology 4:123-131. DOI: 10.1093/jpe/rtq027

*Souza, L., W.A. Bunn, J.F. Weltzin, and N.J. Sanders. 2011. Similar biotic factors affect early establishment and abundance of an invasive plant species across spatial scales. Biological Invasions 13:255-267. DOI: 10.1007/s10530-010-9805-9

*Kardol, P., C.E. Campany, L. Souza, R.J. Norby, J.F. Weltzin and A.T. Classen. 2010. Climate change effects on plant biomass alter dominance patterns and community evenness in an experimental old-field ecosystem. Global Change Biology 16:2676–2687. DOI: 10.1111/j.1365-2486.2010.02162.x

*Souza, L., R.T. Belote, P. Kardol, J.F. Weltzin and R.J. Norby. 2010. CO_2 enrichment accelerates successional development of an understory plant community. Journal of Plant Ecology 3:33-39. DOI: 10.1093/jpe/rtp032

Classen, A.T., R.J. Norby, C.E. Campany, K.E. Sides, and J.F. Weltzin. 2010. Climate change alters seedling emergence and establishment in an old-field ecosystem. PLoS ONE 5(10): e13476. doi:10.1371/journal.pone.0013476

Jones, K.B., H. Bogena, H. Vereecken, and J.F. Weltzin. 2010. Design and Importance of Multi-tiered Ecological Monitoring Networks. Pages 355-374 in F. Müller et al. (eds.), Long-Term Ecological Research, Springer Science+Business Media B.V. DOI: 10.1007/978-90-481-8782-9_25

*Engel, E.C., J.F. Weltzin, R.J. Norby, and A.T. Classen. 2009. Responses of an old-field plant community to interacting factors of elevated [CO_2], warming, and soil moisture. Journal of Plant Ecology 2:1-11. DOI: 10.1093/jpe/rtn026

*Resco de Dios, V., B.E. Ewers, W. Sun, T.E. Huxman, J.F. Weltzin and D.G. Williams. 2009. Drought-induced hydraulic limitations constrain leaf gas exchange recovery after precipitation pulses in the C_3 woody legume, *Prosopis velutina*. New Phytologist 181: 672–682. DOI: 10.1111/j.1469-8137.2008.02687.x

Bridgham, S.D., J. Pastor, B. Dewey, J.F. Weltzin, and K. Updegraff. 2008. Rapid carbon response of peatlands to climate change. Ecology 89:3041-3048. DOI: 10.1890/08-0279.1

*Cable, J.M., K. Ogle, D.G. Williams, J.F. Weltzin and T.E. Huxman. 2008. Soil texture drives responses of soil respiration to precipitation pulses in the Sonoran desert: implications for climate change. Ecosystems 11:961-979. DOI: 10.1007/s10021-008-9172-x

White, J. R., R. D. Shannon, S.D. Bridgham, J. F. Weltzin, and J. Pastor. 2008. Effects of soil warming and drying on methane cycling in a northern peatland mesocosm study. Journal of Geophysical Research 113: G00A06. DOI: 10.1029/2007JG000609

Chen, J.Q., S.D. Bridgham, J. Pastor, A. Noormets, J. Keller, and J.F. Weltzin. 2008. Temperature responses to infrared-loading and water table manipulations in peatland mesocosms. Journal of Integrative Plant Biology 50:1484-1496. DOI: 10.1111/j.1744-7909.2008.00757.x

McPherson, G.R. and J.F. Weltzin. 2008. Implications of peak oil for industrialized societies. Bulletin of Science, Technology & Society 28:187-191. DOI: 10.1177/0270467608316098

Garten, Jr., C.T., A.T. Classen, R.J. Norby, D.J Brice, J.F.Weltzin and L. Souza. 2008. Role of N_2-fixation in constructed old-field communities under different regimes of [CO_2], temperature, and water availability. Ecosystems 11:125-137. DOI: 10.1007/s10021-007-9112-1

**Dermody, O, J.F. Weltzin, E.C. Engel, P. Allen, and R.J. Norby. 2008. How do elevated [CO_2], warming, and reduced precipitation interact to affect soil moisture and LAI in an old field ecosystem? Plant and Soil 295:217- 227. DOI: 10.1007/s11104-007-9443-x

*Resco de Dios, V., D.D. Ignace, W. Sun, T.E. Huxman, J.F. Weltzin and D.G. Williams. 2008. Chlorophyll fluorescence, predawn water potential and photosynthesis in precipitation pulse-driven ecosystems – implications for ecological studies. Functional Ecology 22:479-483. DOI: 10.1111/j.1365-2435.2008.01396.x

*Engel, E.C. and J.F. Weltzin. 2008. Can community composition be predicted from pairwise species interactions? Plant Ecology 195:77-85. DOI: 10.1007/s11258-007-9300-2

Wan, S., R.J. Norby, J. Ledford, and J.F. Weltzin. 2007. Responses of soil respiration to elevated CO_2, air warming, and soil water availability in a model old-field grassland. Global Change Biology 13:2411–2424. DOI: 10.1111/j.1365-2486.2007.01433.x

**Perkins, T.A., W.R. Holmes, and J.F. Weltzin. 2007. Multi-species interactions in competitive hierarchies: New methods and empirical test. Journal of Vegetation Science 18:685-692. Runner-up, 2007 Editors' Award; J. Veg. Sci. (2008) 19:1-2. DOI: 10.3170/2008-8-18468

*Sanders, N.J., J.F. Weltzin, G.M. Crutsinger, M.C. Fitzpatrick, M.A. Nuñez, C.M. Oswalt, and K.E. Lane. 2007. Insects mediate the effects of propagule supply and resource availability on a plant invasion. Ecology 88:2383-2391. DOI: 10.1890/06-1449.1

**Fortner, A.M. and J.F. Weltzin. 2007. Competitive hierarchy for four common old-field plant species depends on resource identity and availability. Journal of the Torrey Botanical Society 134:166-176. DOI: 10.3159/1095-5674(2007)134[166:CHFFCO]2.0.CO;2

*Ignace, D.D., T.E. Huxman, J.F. Weltzin and D.G. Williams. 2007. Leaf gas exchange and water status responses of a native and non-native grass to precipitation across contrasting soil surfaces in the Sonoran Desert. Oecologia. DOI: 10.1007/s00442-007-0670-x

*Fitzpatrick, M.C., J.F. Weltzin, N.J. Sanders, and R.R. Dunn. 2007. The biogeography of prediction error: Why does the introduced range of the fire ant over-predict its native range? Global Ecology and Biogeography 16:24-33. DOI: 10.1111/j.1466-822x.2006.00258.x

*Belote, R.T. and J.F. Weltzin. 2006. Interactions between two co-dominant, invasive plants in the understory of a temperate deciduous forest. Biological Invasions 8:1629-1641. DOI: 10.1007/s10530-005-3932-8

**Potts, D.L., T.E. Huxman, J.M. Cable, N.B. English, D.D. Ignace, J.A. Eilts, M.J. Mason, J.F. Weltzin and D.G. Williams. 2006. Antecedent moisture and seasonal precipitation influence

response of canopy-scale carbon and water exchange to rainfall pulses in semi-arid grassland. New Phytologist. DOI: 10.1111/j.1469-8137.2006.01732.x

*Weltzin, J.F., R. T. Belote, L.T. Williams, J.K. Keller, and E.C. Engel. 2006. Authorship in ecology: attribution, accountability, and responsibility. Frontiers in Ecology and the Environment 4:435-441. DOI: 10.1890/1540-9295(2006)4[435:AIEAAA]2.0.CO;2 [Reply to comments: Weltzin, J.F., R. T. Belote, L.T. Williams, J.K. Keller, and E.C. Engel. 2007. Ensuring that "authors" write - the authors reply. Frontiers in Ecology and the Environment 5:11].

*Heisler, J.L. and J.F. Weltzin. 2006. Variability matters: towards a perspective on the influence of precipitation on terrestrial ecosystems. New Phytologist 172:189-192. DOI: 10.1111/j.1469-8137.2006.01876.x

*Potts, D.L., T.E. Huxman, B.J. Enquist, J.F. Weltzin, and D.G. Williams. 2006. Resilience and resistance of ecosystem functional response to a precipitation pulse in a semi-arid grassland. Journal of Ecology 94:23-30. DOI: 10.1111/j.1365-2745.2005.01060.x.

*Yepez, E.A., T.E. Huxman, D.D. Ignace, N.B. English, J.F. Weltzin, A.E. Castellanos, and D.G. Williams. 2005. Dynamics of transpiration and evaporation following a moisture pulse in semiarid grassland: a chamber-based isotope method for partitioning flux components. Agricultural and Forest Meteorology 132:359-376. DOI: 10.1016/j.agrformet.2005.09.006

*English, N.B., J.F. Weltzin, A. Fravolini, L.M. Thomas and D.G. Williams. 2005. The influence of soil texture and vegetation on soil moisture under rainout shelters in a semi-desert grassland. Journal of Arid Environments 63:324-343. DOI: 10.1016/j.jaridenv.2005.03.013

**Weltzin[1], J.F., J.K. Keller[1], S.D. Bridgham, J. Pastor, P.B. Allen, and J. Chen. 2005. Litter as a control on fen plant community composition and production. Oikos 110:537-546. [1]Authors contributed equally.

*Fitzpatrick, M.C. and J.F. Weltzin. 2005. Ecological niche models and the geography of biological invasions: a review and a novel application. Pages 45-60 *in* Inderjit, editor. Ecological and Agricultural Aspects of Invasive Plants. Birkhauser- Verlag/Switzerland.

*Cole, P.G. and J.F. Weltzin. 2005. Light limitation creates patchy distribution of a non-native grass in eastern deciduous forests. Biological Invasions 7:477-488.

*Sanders, N.J., R.T. Belote and J.F. Weltzin. 2004. Multi-trophic effects of elevated CO_2 on understory plant and arthropod communities. Environmental Entomology 33:1609-1616.

*Noormets, A., J. Chen, S.D. Bridgham, J. Pastor, J.F. Weltzin, B. Dewey, and J. LeMoine. 2004. The effects of infrared loading and water table on soil energy fluxes in northern peatlands. Ecosystems 7:573-582.

*Cole, P.G. and J.F. Weltzin. 2004. Environmental correlates of the distribution and abundance of *Microstegium vimineum* in East Tennessee, USA. Southeastern Naturalist 3:545-562.

Chesson, P., R.L.E. Gebauer, S. Schwinning, N. Huntly, K. Wiegand, M.S.K. Ernest, A. Sher, A. Novoplansky, and J.F. Weltzin. 2004. Resource pulses, species interactions, and diversity maintenance in arid and semi-arid environments. Oecologia 141:236-253.

Huxman[1], T.E., M.D. Smith[1], P.A. Fay, A.K. Knapp, M.R. Shaw, M.E. Loik, S.D. Smith, D.T. Tissue, J.C. Zak, J.F. Weltzin, W.T. Pockman, O.E. Sala, B. Haddad, J. Harte, G.W. Koch, S. Schwinning, E.E. Small, and D.G. Williams. [1]Authors contributed equally. 2004. Convergence across biomes to a common rain-use efficiency. Nature 429:651-654.

*Belote, R.T., J.F. Weltzin, and R.J. Norby. 2004. Response of an understory plant community to elevated [CO_2] depends on differential responses of dominant invasive species and is mediated by soil water availability. New Phytologist 161:827-835.

*Huxman, T.E., J.M. Cable, D. D. Ignace, J.A. Eilts, N.B. English, J.F. Weltzin, and D.G. Williams. 2004. Response of net ecosystem gas exchange to a simulated precipitation pulse in a semi-arid grassland: the role of native versus non-native grasses and soil texture. Oecologia 141:295-305.

English, N.B., D.G. Williams, and J.F. Weltzin. 2003. Soil temperature and moisture dynamics after experimental irrigation on two contrasting soils on the Santa Rita Experimental Range: implications for mesquite establishment. Pages 188-192 *in* McClaran, M.P., P.F. Ffolliott, and C.B. Edminster, tech coords. Santa Rita Experimental Range: 100 Years (1903-2003) of Accomplishments and Contributions. USDA Forest Service Proceedings RMRS-P-30.

Weltzin, J.F., M.E. Loik, S. Schwinning, D.G. Williams, P. Fay, B. Haddad, J. Harte, T.E. Huxman, A.K. Knapp, G. Lin, W.T. Pockman, M.R. Shaw, E. Small, M.D. Smith, S.D. Smith, D.T. Tissue, and J.C. Zak. 2003. Assessing the response of terrestrial ecosystems to potential changes in precipitation. BioScience 53:941-952.

*Weltzin, J.F., N.Z. Muth, B. VonHolle, and P.G. Cole. 2003. Genetic diversity and invasibility: a test using a model system with a novel experimental design. Oikos 103:505-518.

**Price, C.A. and J.F. Weltzin. 2003. Managing non-native plant populations through intensive plant community restoration in Cades Cove, Great Smoky Mountains National Park, USA. Restoration Ecology 11:351-358.

**Weltzin, J.F. and P.B. Allen. 2003. Tree seedling recruitment in temperate deciduous forest: interactive effects of soil moisture, light, and slope position. Pages 217 - 226 *in* Hanson, P.J. and S.D. Wullschleger, eds. North American temperate deciduous forest responses to changing precipitation regimes. Ecological Studies, Volume 166. Springer Verlag, New York.

**Drake, S.J., J.F. Weltzin, and P.D. Parr. 2003. Assessment of non-native invasive plants on the National Environmental Research Park at Oak Ridge National Laboratory. Castanea 68:15-30.

*Weltzin, J.F., R.T. Belote, and N.J. Sanders. 2003. Biological invaders in a greenhouse world: will elevated CO_2 fuel plant invasions? Frontiers in Ecology and the Environment 1:146-153.

Weltzin, J.F., S.D. Bridgham, J. Pastor, J. Chen, and C. Harth. 2003. Potential effects of warming and drying on peatland plant community composition. Global Change Biology 9:141-151.

Weltzin, J.F. and D.T. Tissue. 2003. Resource pulses in arid environments - patterns of rain, patterns of life. New Phytologist 157:171-173.

Weltzin, J.F. and G.R. McPherson. 2003. Predicting the response of terrestrial ecosystems to potential changes in precipitation regimes. Pages 3-8 *in* Weltzin, J.F. and G.R. McPherson, eds. Changing Precipitation Regimes and Terrestrial Ecosystems: A North American Perspective. University of Arizona Press, Tucson.

Weltzin, J.F. and G.R. McPherson. 2003. Assessing response of terrestrial populations, communities, and ecosystems to changes in precipitation regimes: progress to date and future directions. Pages 180-188 *in* Weltzin, J.F. and G.R. McPherson, eds. Changing Precipitation Regimes and Terrestrial Ecosystems: A North American Perspective. University of Arizona Press, Tucson.

Weltzin, J.F. and G.R. McPherson. 2003. Response of southwestern oak savannas to potential future precipitation regimes. Pages 127-146 *in* Weltzin, J.F. and G.R. McPherson, eds. Changing Precipitation Regimes and Terrestrial Ecosystems: A North American Perspective. University of Arizona Press, Tucson.

R.J. Norby, P.J. Hanson, E.G. O'Neill, T.J. Tschaplinski, J.F. Weltzin, R.T. Hansen, W. Cheng, S.D. Wullschleger, C.A. Gunderson, N.T. Edwards, and D.W. Johnson. 2002. Net primary productivity of a CO_2-enriched deciduous forest and the implications for carbon storage. Ecological Applications 12:1261-1266.

Pastor, J., B. Peckman, S.D. Bridgham, J.F. Weltzin, and J. Chen. 2002. Plant community dynamics, nutrient cycling, and alternative stable equilibria in peatlands. American Naturalist 160:553-568.

*Weltzin, J.F., K.A. Snyder, and D.G. Williams. 2001. Experimental manipulations of precipitation seasonality: effects on oak (*Quercus*) seedling demography and physiology. Western North American Naturalist 61:463-472.

**Weltzin, J.F., C. Harth, S.D. Bridgham, J. Pastor, and M. Vonderharr. 2001. Production and microtopography of bog bryophytes: response to warming and water-table manipulations. Oecologia 128:557-565.

*Weltzin, J.F., J. Pastor, C. Harth, S.D. Bridgham, K. Updegraff, and C.T. Chapin. 2000. Response of bog and fen plant communities to warming and water-table manipulations. Ecology 81:3464-3478.

Hanson, P.J. and J.F. Weltzin. 2000. Drought and climate change as vectors of disturbance in temperate forest communities. Science of the Total Environment 262:205-220.

Weltzin, J.F. and G.R. McPherson. 2000. Implications of precipitation redistribution for shifts in temperate savanna ecotones. Ecology 81:1902-1913.

McPherson, G.R. and J.F. Weltzin. 2000. Disturbance and climate change in United States/Mexico borderland plant communities: A state-of-the-knowledge review. USDA Forest Service Rocky Mountain Research Station General Technical Report RMRS-GTR-50. 20 pp.

Weltzin, J.F. and G.R. McPherson. 1999. Facilitation of conspecific seedling recruitment and shifts in temperate savanna ecotones. Ecological Monographs 69:513-534.

Williams, D.G., G.R. McPherson, and J.F. Weltzin. 1999. Stress in wildland plants: implications for ecosystem structure and function. Pages 907-929 *in* M. Pessarakli, ed. Handbook of plant and crop stress, second edition. Marcel Dekker, New York, NY.

Weltzin, J.F., S.R. Archer, and R.K. Heitschmidt. 1998. Defoliation and woody plant (*Prosopis glandulosa*) seedling establishment: potential vs. realized herbivory tolerance. Plant Ecology 138:127-135.

McPherson, G.R. and J.F. Weltzin. 1998. Herbaceous response to canopy removal in southwestern oak woodlands. Journal of Range Management 51:674-678.

Weltzin, J.F., S.R. Archer, and R.K. Heitschmidt. 1997. Small mammal regulation of vegetation structure in a temperate savanna. Ecology 78:751-763.

Weltzin, J.F., S.L. Dowhower, and R.K. Heitschmidt. 1997. Prairie dog effects on plant community structure in southern mixed-grass prairie. Southwestern Naturalist 42:251-258.

Weltzin, J.F. and G.R. McPherson. 1997. Spatial and temporal soil moisture resource partitioning by trees and savannas in a temperate savanna, Arizona, USA. Oecologia 112:156-164.

**Germaine, H.L., G.R. McPherson, K. Rojahn, A. Nicholas, and J.F. Weltzin. 1997. Constraints on germination and emergence of Emory oak. Pages 225-230 *in* R.B. Standiford, technical coordinator. Proceedings of a Symposium on Oak Woodlands: Ecology, Management, and Urban Interface Issues. USDA Forest Service Pacific Southwest Experiment Station General Technical Report PSW-160, Berkeley, California.

Weltzin, J.F. and G.R. McPherson. 1995. Potential effects of climate change on lower treelines in the southwestern United States. Pages 180-193 *in* DeBano, L.F., G.J. Gottfried, R.H. Hamre, C.B. Edminster, P.F. Ffolliott, and A. Ortega-Rubio, technical coordinators. Biodiversity and Management of the Madrean Archipelago: The Sky Islands of Southwestern United States and Northwestern Mexico. USDA Forest Service Rocky Mountain Experiment Station General Technical Report RM-264, Fort Collins, Colorado.

Weltzin, J. F. and M.B. Coughenour. 1990. Savanna tree influence on understory vegetation and soil nutrients in northwestern Kenya. Journal of Vegetation Science 1:325-334.

Other publications

Weltzin, J.F. 2015. National Coordinating Office Perspective of USA-NPN Accomplishments since 2007. Appendix 4 (pp. 19-23) *in* Glynn, P.D. and T.W. Owen, eds. Review of the USA National Phenology Network. USGS Circular 1411. 27 pp. http://dx.doi.org/10.3133/cir1411. Accessed 23 October 2015. [USGS Internal Peer Reviewed.]

Griswold, T., J. Strange, J. F. Weltzin, J. Freilich, R. Rochefort, W. Meikle, J. Evans, P. Manley, D. Kerestes, G. Krupnick, S. Droege. 2015. Section I: Status and Trends. Pages 6-11 in Vilsack, T. and G. McCarthy. Pollinator Research Action Plan - Report of the Pollinator Health Task Force. https://www.whitehouse.gov/sites/default/files/microsites/ostp/Pollinator%20Research%20Action%20Plan%202015.pdf. Accessed 19 May 2015. [USGS Internal Peer Reviewed.]

Gerst, K.A., A.H. Rosemartin, E.G. Denny, C.A.F. Enquist, R.L. Marsh, D.J.P. Moore, T.M. Crimmins, J.F. Weltzin. 2015. USA National Phenology Network data product development framework and data product catalog, v 1.0. USA-NPN Technical Series 2015-001. https://www.usanpn.org/files/shared/USANPN_DataProductCatalog_4-15.pdf. Accessed 22 May 2015.

Denny, E.G. and J.F. Weltzin. 2015. Leafing and flowering data for lilacs and honeysuckles 1956-2014. USGS ScienceBase Catalog. https://www.sciencebase.gov/catalog/item/5499b905e4b093dfafda3575. Accessed 20 January 2015.

Rosemartin, A.H.R., E.G. Denny and J.F. Weltzin. 2014. Plant and Animal Phenology Data for the United States. https://www.sciencebase.gov/catalog/item/52fe35a8e4b02a2ea84aa9f7. Accessed 20 January 2015.

Kenney, M.A, A.C. Janetos et al. 2014. National Climate Indicators System Report. National Climate Assessment and Development Advisory Committee. http://tinyurl.com/IndicatorPilotReport. Accessed 7 October 2014. 157 pp.

USA-NPN National Coordinating Office. 2014. USA National Phenology Network Five-Year Strategic Plan (FY14-FY18). USA-NPN Programmatic Series 2014-001. www.usanpn.org. Accessed 19 March 2014. 26 pp.

Thorpe, A., S. Elmendorf, K. Jones, B. Cook, J. Diez, C. Enquist, M. Jones, R. Kao, S. Mazer, A. Miller-Rushing, D. Moore, M. Schwartz, and J.F. Weltzin. 2013. Terrestrial Observing System Science Design, Plant Phenology. National Ecological Observatory Network (NEON), Document #: NEON.DOC.000917, Revision: A_DRAFT, 28 February 2013. 36 pp.

Weltzin, J.F., J.L. Betancourt, B. Cook, C. Enquist, J. Gross, G. Henebry, R. Kao, J. Kimball, B. Reed, and S. Running. 2013. Phenology and Seasonality in Physical and Biological Systems as Indicators of Climate Variation and Change. A report from the US Global Change Research

Program, National Climate Assessment, Indicator Work Group, Phenology Indicator Technical Team. 21 August 2013. 106 pp.

Kellermann, J.L., T.M. Crimmins, E.G. Denny, C.A.F. Enquist, K.L. Gerst, A.H. Rosemartin, and J.F. Weltzin. 2013. *Nature's Notebook*: 2012 State of the Data. USA-NPN Technical Series 2013-001. www.usanpn.org. Accessed 26 July 2013. [USGS internal reviewed]

Tierney, G., B. Mitchell, A. Miller-Rushing, J. Katz, E.G. Denny, C. Brauer, T. Donovan, A.D. Richardson, M. Toomey, A. Kozlowski, J. Weltzin, K. Gerst, E. Sharron, O. Sonnentag and F. Dieffenbach. 2013. Phenology Monitoring Protocol: Northeast Temperate Network. Natural Resource Report NPS/NETN/NRR—2013/681. National Park Service, Fort Collins, Colorado. [NPS and USGS internal reviewed]

Wiggins, A., R. Bonney, E. Graham, S. Henderson, S. Kelling, G. LeBuhn, R. Littauer, K. Lotts, W. Michener, G. Newman, E. Russell, R. Stevenson and J.F. Weltzin. 2013. Data Management Guide for Public Participation in Scientific Research. DataONE: Albuquerque, NM. 15 pp.

Leicht-Young, S.A., C.A.F. Enquist, J.F. Weltzin. 2013. Observed changes in phenology across the USA: A regional review for the 2013 National Climate Assessment. [A series of eight information sheets for each of 8 U.S. Global Change Research Program NCA regions. USGS internal reviewed]

Janetos, A.C., R.S. Chen, D. Arndt, M. Kenney (Coordinating Lead Authors with 25 Contributing Authors including J. F. Weltzin). 2012. National Climate Assessment Indicators: Background, Development, & Examples. Technical Input Report for the US Global Change Research Program 2013 National Climate Assessment 2013. Accessed 25 September 2012.

Enquist, C.A.F., S.L. Young, J.F. Weltzin, M.D. Schwartz, T. Ault, and J.L. Betancourt. 2012. Phenology as a bio-indicator of climate change impacts on people and ecosystems: towards an integrated national assessment approach. Technical Input Report 2011-043 for the US Global Change Research Program 2013 National Climate Assessment 2013 (cross-listed as USA-NPN Technical Series 2012-003). [USGS internal reviewed]

Kellermann, J.L., T.M. Crimmins, E.G. Denny, C.A.F. Enquist, R.L. Marsh, A.H. Rosemartin, and J.F. Weltzin. 2012. USA National Phenology Network 2011 Data & Participant Summary. USA-NPN Technical Series 2012-001. www.usanpn.org. Accessed 25 September 2012. [USGS internal reviewed]

Weltzin, J.F. 2012. Citizen science: Tracking global change with public participation in scientific research. Pages 25-26 in Sagarin, R. and A. Pauchard. Observation and Ecology: Broadening the Scope of Science to Understand a Complex World. Island Press, Washington, DC [USGS internal reviewed]

Crimmins, T.M., A.H. Rosemartin, R.L. Marsh, E.G. Denny, C.A.F. Enquist, J.F. Weltzin. 2011. USA National Phenology Network 2010 Data & Participant Summary. USA-NPN Technical Series 2011-001. www.usanpn.org. Accessed 1 March 2012. [USGS internal reviewed]

Crimmins, T.M., A.H. Rosemartin, A. Lincicome, J.F. Weltzin. 2010. USA National Phenology Network 2009 Observer Survey Report. USA-NPN Technical Series 2010-003. www.usanpn.org. Accessed 1 March 2012. [USGS internal reviewed]

Crimmins, T.M., A.H. Rosemartin, K.A. Thomas, R.L. Marsh, E.G. Denny, J.F. Weltzin. 2010. USA National Phenology Network 2009 Data Summary. USA- NPN Technical Series 2010-002. Accessed 1 March 2012. [USGS internal reviewed]

Thomas, K.A., E.G. Denny, A.J. Miller-Rushing, T.M. Crimmins, and J.F. Weltzin. 2010. The National Phenology Monitoring System v0.1. USA-NPN Technical Series 2010-001. www.usanpn.org. Accessed 1 March 2012. [USGS internal reviewed]

Weltzin, J.F. and colleagues. 2011. The USA National Phenology Network – Taking the Pulse of Our Planet. USGS Fact Sheet 2011-3023. [USGS internal reviewed]

Nolan, V.P. and J.F. Weltzin. 2011. Phenology for Science, Resource Management, Decision Making, and Education (meeting report). Eos 92:15.

Weltzin, J.F. 2010. Phenology and ecosystem processes (book review). Ecology 91:1874-1875.

Miller-Rushing, A.J. and J.F. Weltzin. 2009. Phenology as a tool to link ecology and sustainable decision making in a dynamic environment (expanded meeting report). New Phytologist: 184:743-745.

*Fitzpatrick, M. and J.F. Weltzin. 2005. Characterizing ecosystem response to climate variability (book review). Greenland, D., D.G. Goodin and R.C. Smith, eds. (2003) *Climate variability and ecosystem response at long-term ecological research sites*. The Long-Term Ecological Research Network Series. Oxford University Press, Oxford, UK. Global Ecology and Biogeography 14:600-601. DOI: 10.1111/j.1466-822x.2005.00208.x

*Engel, E.C. and J.F. Weltzin. 2003. Ecology in a nutshell (book review). Cotgreave, P. and I. Forseth. (2002) *Introductory ecology*. Blackwell Science Ltd., Oxford, UK. Global Ecology & Biogeography 12:525-526.

Weltzin, J.F. and D.G. Williams. 2003. Isotopes for ecosystems (editorial). BioScience 53:795.

**Drake, S.J., J.F. Weltzin, and P.D. Parr. 2002. Assessment of non-native invasive plants on the National Environmental Research Park at Oak Ridge National Laboratory. Oak Ridge National Laboratory Technical Memorandum. ORNL/TM-2001/113.

**Price, C. and J.F. Weltzin. 2001. The efficacy of prairie restoration in Cades Cove, Great Smoky Mountains National Park. Research report to Great Smoky Mountains National Park Vegetation Management Division, Gatlinberg, Tennessee.

Teaching experience

Instructor; University Honors Seminar - Global Change Biology (Honors undergraduates; UH 348). Develop and teach original course. University Honors Program, University of Tennessee, Knoxville, TN. Spring 2005.

Co-Instructor; Grantwriting 101 (Graduate majors; EEB 606). Develop and teach original course. Department of Ecology and Evolutionary Biology, University of Tennessee, Knoxville, TN. Spring 2005.

Co-coordinator and mentor; Interdisciplinary Training for Undergraduates in Biological and Mathematical Sciences (UBM): Spatial Models for Invasion Biology (NSF Supplement to L. Gross and S. Lenhart, Univ. Tenn.). An interdisciplinary, long-term immersive and integrative primary research experience for undergraduate students from math and biology, designed to build on and reinforce disciplinary academic studies, with joint mentorship by senior researchers from both disciplines. (Undergraduate majors; EEB 400, EEB 493, Math 490). Department of Ecology and Evolutionary Biology and Department of Math, University of Tennessee, Knoxville, TN. 2003-2005.

Instructor; Introduction to Faculty Research (Graduate majors; EEB 508). Coordinate discussion of EEB Faculty research with graduate students. Department of Ecology and Evolutionary Biology, University of Tennessee, Knoxville, TN. Fall 2004.

Instructor; Community Ecology (Graduate and undergraduate majors; EEB 461). Develop and teach original course with field laboratory. Department of Ecology and Evolutionary Biology, University of Tennessee, Knoxville, TN. Fall 2004.

Instructor; General Ecology (Undergraduate majors; BIOL 250). Develop and teach original course with field laboratory. Division of Biology and Department of Ecology and Evolutionary Biology, University of Tennessee, Knoxville, TN. Fall 2001, Fall 2003.

Instructor; Biological Diversity and Ecosystem Function (Graduate seminar; EEB 601). Coordinate seminar and discussion. Department of Ecology and Evolutionary Biology, University of Tennessee, Knoxville, TN. Spring 2003.

Instructor; Independent Study: Plant Ecology (Graduate course; EEB 593). Develop and teach original course. Department of Ecology and Evolutionary Biology, University of Tennessee, Knoxville, TN. Fall 2002.

Instructor; Plant Invasions: Pattern and Process (Graduate seminar; EEB 601). Coordinate seminar and discussion. Department of Ecology and Evolutionary Biology, University of Tennessee, Knoxville, TN. Spring 2001.

Instructor; Plant Ecology (Undergraduate/graduate course; EEB/BOT 431). Develop and teach original course with field laboratory. Department of Ecology and Evolutionary Biology, University of Tennessee, Knoxville, TN. Fall 2000.

Instructor; Applied Plant Ecology: An Experimental Approach from A to Z (Graduate course; EEB 593). Develop and teach original course. Department of Ecology and Evolutionary Biology, University of Tennessee, Knoxville, TN. Spring 2000.

Instructor; Ecology and Environmental Issues (Undergraduate core curriculum course for non-science majors). Develop and teach original course and laboratories. Department of Biological Sciences, University of Notre Dame, Notre Dame, IN. Spring 1999.

Graduate Teaching Assistant; Introduction to Global Change (Undergraduate core curriculum course for non-science majors). Laboratory and some lectures. Laboratory of Tree Ring Research, University of Arizona, Tucson, AZ. Fall 1997.

Graduate Teaching Assistant; Fundamentals of Ecology Laboratory (Undergraduate core curriculum course for science and non-science majors). Laboratory and field trip activities. Department of Range Science, Texas A & M University, College Station, TX. Spring 1989.

Formal and informal classroom and field presentations on science and global change. Elementary through high school, Fort Huachuca School District, Sunnyside School District, Arizona.

Supervision of post-doctoral scholars and students

Postdoctoral

Walker, Jessica 2014-present. USGS Mendenhall Postdoctoral Fellow (with C. Wallace, J. Sankey, and J. Brown)
Sankey, Joel 2011-2012. USGS Mendenhall Postdoctoral Fellow (with C. Wallace)
Dermody, Orla 2006-2007. University of Tennessee
Nagel, Jennifer M. 2003-2005. University of Tennessee

PhD and MS

Engel, E. Cayenne. MS, 2005. University of Tennessee
Cole, Patrice G. PhD, 2003. University of Tennessee
Belote, R. Travis. MS, 2003. University of Tennessee

Undergraduate Theses/Projects

Wisneski, Kristin. 2011. Biosphere II Science and Society Fellow; U Arizona
Jantz, Samuel. 2005. UT Undergraduate Summer Research Internship; U Tennessee
DeVan, Caroline M. 2004. Honors thesis; U Tennessee
Faulkner, A. 2004. Honors thesis; U Tennessee
Fortner, Allison M. 2003. UT/ORNL Honors Undergraduate Summer Research Internship; U Tennessee
Holmes, Frederick B. 2001. Ronald McNair Post-Baccalaureate Achievement Program; U Tennessee

Price, Charles A. 2001. Honors thesis; U Tennessee

Membership on graduate committees:

Benton, Lisa; MS, SNR, Univ. Arizona (UA)
Burhenn, Karen; MS, EEB, Univ. Tennessee (UT)
Fitzpatrick, Matthew; PhD, EEB (UT)
Goodman, Rachel; MS, EEB (UT)
Hagen, Jonathan; MS, FWF (UT)
Hallman, Christine; PhD, LTRR (UA)
Iversen, Colleen; PhD, EEB (UT)
Marshall, Jordon; PhD, FWF (UT)
Moss, Joe; MS, Botany (UT)
Muth, Norris; PhD, EEB (UT)
Nuñez, Martin; PhD, EEB (UT)
Pierce, Aaron; PhD, FWF (UT)
Rose, Anita; MS, EEB (UT)
Samuel, Corey; PhD, EEB (UT)
Sheehan, Carolyn Reilly; MS, EEB (UT)
Souza, Lara; PhD, EEB (UT)
Tanner, Benjamin; PhD, Geology (UT)
Thomas, Leigh; MS, EEB (UT)
Vázquez, Diego; PhD, EEB (UT)
Von Holle, Elizabeth; PhD, EEB (UT)

Invited Presentations

About 20 invited presentation each year from 2008-present on activities related to the USA National Phenology Network, at academic institutions, state and federal agencies, non-governmental organizations, networks, and naturalist groups. List available upon request.

An update on the emerging USA National Phenology Network Status, goals and objectives, and collaborative opportunities. Session on Observing, Analyzing, and Modeling Phenologies at Multiple Scales. American Geophysical Union Annual Meeting, San Francisco, CA. December 2007.

Implementation of the USA National Phenology Network. Northeast Regional Phenology Network (NE-RPN) Workshop, Durham, NH. November 2007.

Global change in my back yard: Phenology as a tool for engaging citizen scientists in local assessment of global change. Pardee Symposium on "Creating Citizen Scientists: Needs and Opportunities to Engage Students and the Public in the Process of Science." Geological Society of America Annual Meeting, Denver, CO. October 2007. With T. Crimmins.

Opportunities for collaborations between Ameriflux and NPN: A discussion document. Ameriflux Annual Meeting, Boulder, CO. October 2007. Poster, with M. Losleben.

Towards a science-based USA National Phenology Network. USGS Headquarters, Reston, VA. October 2007.

Phenological monitoring and the Natural Reserve System. University of California Natural Reserve System Annual Meeting, Hastings Reserve, Carmel Valley, CA. October 2007.

The USA National Phenology Network: Towards an Integrative Assessment of Global Change Impacts at the National Scale. USGS Fort Collins Science Center, Ft. Collins, CO. October 2007.

The USA National Phenology Network: Towards an Integrative Assessment of Global Change Impacts at the National Scale. National Park Service, Ft. Collins, CO. October 2007.

Phenology as an integrative science for assessment of global change impacts: The USA National Phenology Network. The Nature Conservancy Climate Change Science Workshop. Portland, OR. September 2007.

The USA National Phenology Network: Phenology as an integrative science for monitoring and predicting global change. 1st USA National Phenology Network (USA-NPN) Research Coordination Network (RCN) Annual Meeting, Milwaukee, WI. August 2007.

The USA National Phenology Network: Assessment of global change impacts at national and regional scales. Towards a Southwest Phenology Network workshop, American Society of Photogrammetry & Remote Sensing (ASPRS), Southwest US Region, October 2007.

Ecoinformatics and Climate Change: Addressing phenological data and information needs - Implementing the US National Phenological Network. Ecoinformatics: Sharing complex multidisciplinary information for addressing global challenges, a symposium. EcoSummit 2007 – Ecological Complexity and Sustainability: Challenges and Opportunities for 21st-Century's Ecology, Beijing, China. 2007.

Implementation of a science-based US National Phenology Network. US Geological Survey and University of Arizona. 2007.

View from the peak: A primer on peak oil. National Science Foundation. 2007.

Challenge talk: Research on precipitation change and terrestrial ecosystems: status, observations, needs, and challenges. Effects of Precipitation Change on Terrestrial Ecosystems (EPRECOT) workshop. Lo Skolen, Elsinore, Denmark. 2006.

From facilitative to competitive interactions: controls on mesquite invasions in semi-arid grasslands. National Science Foundation. 2006.

From facilitative to competitive interactions: controls on mesquite invasions in shrub grasslands. University of Arizona. 2006.

Woody plant recruitment in temperate, semi-arid savannas: grass invasions, soil type, and precipitation regime. Peking University, Beijing, P.R. China. 2005.

Climate change, grass invasions, and woody plant dynamics in semi-arid savannas. Research Center of Plant Ecology and Biodiversity Conservation, Institute of Botany, Chinese Academy of Sciences, Beijing, P.R. China. 2005.

Effects of invasive versus native grasses on soil moisture and woody plant seedling recruitment across contrasting soils and summer precipitation regimes in a temperate semi-arid savanna. Ecological Society of America Annual Meeting, 7-12 August 2005, Montréal, Canada. Organized Oral Session.

Establishing meaning in education: student involvement in research. The Teaching Professor Conference, 20-22 May 2005, Schaumburg, IL. Workshop.

Plant communities, global change, and biological invasions: an empirical approach. North Carolina State University. 2005.

Climate change and biological invasions: from global scales to local processes. Middle Tennessee State University. 2004.

Climate change: fueling the fire of biological invasions? University of Tennessee Science Forum, University of Tennessee. 2004.

Plant community response to global change: the role of experimental field research with case studies from grasslands to deciduous forests. Department of Forestry, Wildlife and Fisheries, University of Tennessee. 2004.

Biological invasions in a greenhouse world. Association of Southeastern Biologists Annual Meeting, 14 - 17 April 2004, Memphis, TN. Symposium.

Changing climates, invasive species, and encroachment of woody plants in arid and semi-arid ecosystems. Ecological Society of America Annual Meeting, 3-8 August 2003, Savannah, GA. Symposium.

Structure and function of temperate savannas: interactive effects of geomorphology and plant invasions. Department of Biology, Humboldt State University. 2003.

Grass invasions alter soil moisture and woody plant dynamics on different geomorphic surfaces, Arizona. Analysis and Synthesis of Precipitation and Ecosystem Change workshop, National Center for Ecological Analysis and Synthesis, Santa Barbara, California. 2003.

Assessing interactive effects of climate change and plant invasion in temperate savannas. Department of Botany, University of Tennessee. 2002.

Recruitment of woody plants in semi-arid savannas -- the role of spatial and temporal variability of soil moisture. Resource Pulse Use in Arid Ecosystems workshop, Ecological Society of America Annual Meeting, 2-4 August 2002, Tucson, AZ.

Global climate change and plant invasions. Ecological Society of America Annual Meeting, August 4-9, 2002, Tucson, Arizona. Symposium. R.T. Belote and N. Sanders co-authors.

Climate change, grass invasions, and woody plant dynamics in semi-arid savannas. Analysis and Synthesis of Precipitation and Ecosystem Change workshop, National Center for Ecological Analysis and Synthesis, Santa Barbara, California. 2002.

Assessing response of plant communities and ecosystems to global climate change. Section of Integrative Biology, School of Biological Sciences, University of Texas. 2001.

Response of understory plant communities to elevated carbon dioxide concentrations: first year results and future directions. Oak Ridge National Laboratory, Oak Ridge, Tennessee. 2001.

Global Warming: Is the Jury Still Out? University of Tennessee Science Forum, University of Tennessee. 2001.

Peatland plant communities and global climate change. Department of Biology, Appalachian State University. 2000.

Experimental approaches to assessment of ecosystem response to global climate change. Department of Geography. University of Tennessee. 2000.

Plant organismal biology: current research in ecology, evolution and systematics. Departments of Biological Sciences and Health Sciences, East Tennessee State University. 2000.

Assessing the response of plant communities to changing climates. Department of Ecology and Evolutionary Biology, University of Tennessee. 1999.

Northern peatlands and changing climates. Department of Botany, University of Tennessee. 1999.

Predicting response of ecosystems to changing climates -- from southwestern savannas to northern peatlands. Oak Ridge National Laboratory, Oak Ridge, Tennessee. 1999.

The role of experiments in global change science: an example from northern peatlands. W.K. Kellogg Biological Station, Michigan State University. 1999.

Constraints on shifts in temperate savanna ecotones. Department of Ecology and Evolutionary Biology, University of Tennessee. 1999.

Biotic and abiotic constraints on shifts in temperate savanna ecotones at lower treeline. Department of Biological Sciences, University of Notre Dame. 1998.

Rodent herbivores constrain vegetation structure in temperate shrub savannas. Department of Biological Sciences, University of Notre Dame. 1998.

Global change and precipitation redistribution: implications for woody plant recruitment and shifts in lower treeline. Ecological Society of America Annual Meeting, Baltimore, MD, 1998. Symposium. G.R. McPherson co-author.

Rodent herbivores constrain vegetation structure in temperate shrub savannas. VII International Congress of Ecology, Florence, Italy, 1998. Symposium. S. Archer co-author.

Changes in southwestern savanna structure: is the past the key to the future? Ecological Society of America Annual Meeting, Albuquerque, NM, 1997. Symposium. G.R. McPherson co-author.

Climate change in the sky islands: whither from here? School of Renewable Natural Resources, University of Arizona. 1995.

Abiotic constraints on shifts in lower treeline. School of Renewable Natural Resources, University of Arizona. 1995.

Abstracts

About 20 presentations at local, state, national and international meetings, conferences and workshops each year from 2008-present on activities related to the USA National Phenology Network. List available upon request.

J.F. Weltzin and M.L. Losleben. Phenology as an integrative science for assessment of global change impacts. American Geophysical Union Annual Meeting, San Francisco, CA. December 2007.

Losleben, M.L. and J.F. Weltzin. Phenology as an integrative science for assessment of global change impacts: The USA National Phenology Network. 4th RISE Symposium (Research Insights in Semiarid Ecosystems), 6 October 2007, Tucson, AZ. Poster.

Losleben, M.L. and J.F. Weltzin. Phenology as an integrative science for assessment of global change impacts: The USA National Phenology Network. Ecological Society of America Annual Meeting, 5-10 August 2007, San Jose, CA. Poster.

Dermody, O., J.F. Weltzin, J., A. Classen, and R.J. Norby. Do changes in CO_2, temperature, and precipitation interact to affect net ecosystem exchange in an old-field ecosystem? Ecological Society of America Annual Meeting, 5-10 August 2007, San Jose, CA. Presentation.

Souza, L., J.F. Weltzin, and N.J. Sanders. Dominant plant species affect community structure and control the establishment of an exotic species in an old-field system. Ecological Society of America Annual Meeting, 5-10 August 2007, San Jose, CA. Presentation.

Campany, C.E., J.F. Weltzin, R.J. Norby, A.T. Classen, E.C. Engel, and O.C. Dermody. Interactive effects of atmospheric and climate change on aboveground production in a constructed old-field ecosystem. Ecological Society of America Annual Meeting, 5-10 August 2007, San Jose, CA. Presentation.

Classen, A.T., C.T. Garten Jr., R.J. Norby, and J.F. Weltzin. Understanding belowground processes in a multifactor world: Interactive effects of atmospheric carbon dioxide, temperature, and soil moisture. Ecological Society of America Annual Meeting, 5-10 August 2007, San Jose, CA. Presentation.

Resco de Dios, V., J.F. Weltzin, T.E. Huxman, N. Pierce, W. Sun, and D.G. Williams. Windows of opportunity for woody plant encroachment in a Sonoran Desert grassland. Ecological Society of America Annual Meeting, 5-10 August 2007, San Jose, CA. Presentation.

Weltzin, J.F. Phenology as an Integrative Science for Assessment of Global Change Impacts: The USA National Phenology Network. EcoSummit 2007 – Ecological Complexity and Sustainability: Challenges and Opportunities for 21st-Century's Ecology, 22-27 May 2007, Beijing, China. Presentation.

Weltzin, J.F. View from the peak: environmental and societal implications of peak oil. EcoSummit 2007 – Ecological Complexity and Sustainability: Challenges and Opportunities for 21st-Century's Ecology, 22-27 May 2007, Beijing, China. Presentation.

Weltzin, J.F., C. Campany, O. Dermody, A.T. Classen, and R.J. Norby. Main versus interactive effects of global change on a constructed old-field ecosystem. Ecological Society of America Annual Meeting, 5-10 August 2007, San Jose, CA. Presented.

Weltzin, J.F. Peak oil: The challenge to global sustainability. International Union of Biological Sciences Scientific Symposium: Biological Sciences for the 21st Century: Meeting the Challenges of Sustainable Development in an Era of Global Change, 9-13 May 2007, Washington, DC. Poster.

Dermody, O., J.F. Weltzin, J., A. Classen, and R.J. Norby. How do changes in [CO_2], temperature, and precipitation affect net ecosystem exchange in an old field ecosystem? American Geophysical Union Annual Meeting, 11-15 December 2006, San Francisco, California. Presentation.

Classen, A.T., R.J. Norby and J.F. Weltzin. Linking above- and belowground processes in a multifactor world: effects of atmospheric carbon dioxide, warming, and soil moisture. Soil Science Society of America Annual Meeting, 12-16 November 2006, Indianapolis, Indiana. Presentation. *Best Paper award.*

Resco de Dios, V., W. Sun, N. Pierce, T.E. Huxman, J.F. Weltzin and D.G. Williams. Stomatal and

non-stomatal limitations to carbon assimilation in response to rainfall pulses in woody plant seedlings. The Biology of Transpiration: From Guard Cells to the Globe, American Society of Plant Biologists, 10-14 October 2006, Snowbird Mountain Resort, UT. Poster.

Classen, A.T., R.J. Norby, and J.F. Weltzin. Linking above- and belowground processes in a multifactor world: analyzing and interpreting a multifactor climate change experiment. Ecological Society of America Annual Meeting, 6-11 August 2006, Memphis, TN. Symposium.

Engel, E.C., J.F. Weltzin, and R.J. Norby. Community NDVI is driven by species-specific responses to global change. Ecological Society of America Annual Meeting, 6-11 August 2006, Memphis, TN. Poster.

Evans, J., J.F. Weltzin, and N.J. Sanders. Community-level responses to nutrients, herbivory, and invasion in an east Tennessee old-field. Ecological Society of America Annual Meeting, 6-11 August 2006, Memphis, TN. Symposium. Poster.

Souza, L., J.F. Weltzin, and N.J. Sanders. Increases in nitrogen availability have indirect negative effects on *Lespedeza cuneata* seedling abundance via decreases in light and soil moisture availability. Ecological Society of America Annual Meeting, 6-11 August 2006, Memphis, TN. Symposium. Presentation.

Dermody, O., R.J. Norby, E.C. Engel, and J.F. Weltzin. How do changes in [CO_2], temperature, and precipitation affect the spatial and temporal dynamics of soil moisture in an old field ecosystem? Ecological Society of America Annual Meeting, 6-11 August 2006, Memphis, TN. Symposium. Presentation.

Ignace, D., T. Huxman, J.F. Weltzin, and D.G. Williams. Leaf photosynthetic responses of native and non-native C_4 grasses to precipitation pulses in a desert grassland. Ecological Society of America Annual Meeting, 6-11 August 2006, Memphis, TN. Symposium. Presentation.

Reilly Sheehan, C.D., E.C. Engel, J.F. Weltzin. Moisture drives species diversity in a multi-factor global change experiment. Ecological Society of America Annual Meeting, 6-11 August 2006, Memphis, TN. Symposium. Poster.

Dermody, O., J.F. Weltzin, and R.J. Norby. Elevated [CO_2], warming, and precipitation interact to alter the spatial and temporal availability of soil moisture in an old field ecosystem. Workshop: Effects of Precipitation Change on Terrestrial Ecosystems (EPRECOT); Terrestrial Ecosystem Responses to Atmospheric and Climatic Change (TERACC), 22-25 May 2006, Elsinore, Denmark. Poster.

Reilly Sheehan, C.D., J.F. Weltzin, E.C. Engel, and R.J. Norby. Moisture drives species diversity in a multi-factor global change experiment. Workshop: Effects of Precipitation Change on Terrestrial Ecosystems (EPRECOT); Terrestrial Ecosystem Responses to Atmospheric and Climatic Change (TERACC), 22-25 May 2006, Elsinore, Denmark. Poster.

Engel, E.C., J.F. Weltzin, O. Dermody, and R.J. Norby. Responses of canopy greenness, green-up, and senescence to elevated [CO_2], warming, and soil moisture availability. Workshop: Effects of Precipitation Change on Terrestrial Ecosystems (EPRECOT); Terrestrial Ecosystem Responses to Atmospheric and Climatic Change (TERACC), 22-25 May 2006, Elsinore, Denmark. Poster.

Engel, E.C, J.F. Weltzin, and R.J. Norby. Interactive effects of warming and water availability on NDVI in an old-field community global change experiment. Association of Southeastern Biologists Annual Meeting, 29 March – 1 April 2006, Gatlinberg, TN. Presented.

Reilly, C.D., J.F. Weltzin, and E.C. Engel. Effects of *Lespedeza cuneata* on species-level dynamics, community composition and structure, and ecosystem processes under global climate change. Association of Southeastern Biologists Annual Meeting, 29 March – 1 April 2006, Gatlinberg, TN. Presented.

Classen, A., R.J. Norby, J. Ledford, and J.F. Weltzin. Belowground response to global change: effects of atmospheric carbon dioxide, surface temperature, and soil moisture. Ecological Society of America Annual Meeting, 7-12 August 2005, Montréal, Canada. Poster.

Wan, S., R.J. Norby, J.F. Weltzin, and P.B. Allen. No responses of belowground C and N pools and dynamics to elevated [CO_2], rising temperature and changing soil moisture in old-field grassland. Ecological Society of America Annual Meeting, 7-12 August 2005, Montréal, Canada. Presented.

Mason, M.J., J.F. Weltzin, D.L. Potts, N.B. English, T.E. Huxman and D.G. Williams. Survivorship of woody plant seedlings under altered precipitation regimes is facilitated by a non-native, invasive grass. Ecological Society of America Annual Meeting, 7-12 August 2005, Montréal, Canada. Poster.

Eilts, J.A., T.E. Huxman, D.G. Williams, and J.F. Weltzin. Differences in physiological response to water availability due to dissimilar root characteristics in two co-occurring grass species. Ecological Society of America Annual Meeting, 7-12 August 2005, Montréal, Canada. Presented.

Ignace, D.D., D.L. Potts, E.A. Yepez-Gonzalez, T.E. Huxman, D.G. Williams, J.F. Weltzin. Response of evapotranspiration in a semi-arid ecosystem applied with a simulated precipitation pulse: the role of a native and non-native grass species across geomorphic surfaces. Ecological Society of America Annual Meeting, 7-12 August 2005, Montréal, Canada. Presented.

Souza, L., J.M. Nagel, E.C. Engel, J.F. Weltzin, and R.J. Norby. Do mid-day carbon and water exchange differ from integrated values in four old-field species under global climate change? Ecological Society of America Annual Meeting, 7-12 August 2005, Montréal, Canada. Presented.

Potts, D.L, T.E. Huxman, N.B. English, J.F. Weltzin and D.G. Williams. Precipitation pulses in a simulated desert grassland: the role of pulse seasonality and bunchgrass species on canopy-scale carbon exchange. Ecological Society of America Annual Meeting, 7-12 August 2005, Montréal, Canada. Presented.

Engel, E.C., J.F. Weltzin, and R.J. Norby. Species-specific and community responses of an old-field plant community to the interacting factors of elevated [CO_2], warming, and soil moisture content. Ecological Society of America Annual Meeting, 7-12 August 2005, Montréal, Canada. Presented.

Sanders, N.J. and J.F. Weltzin. Insects mediate the interactive effects of propagule pressure and resource availability on a plant invasion. Ecological Society of America Annual Meeting, 7-12 August 2005, Montréal, Canada. Presented.

Weltzin, J.F., G.M. Crutsinger, M.C. Fitzpatrick, M.A. Nuñez, C.M. Oswalt, J.M. Stephens, P.B. Allen and N.J. Sanders. Combined and relative effects of resource availability, propagule pressure, and insect herbivores on invasion in an old-field system. Association of Southeastern Biologists Annual Meeting, 13-15 April 2005, Florence, AL. Presented.

Fitzpatrick, M.C. and J.F. Weltzin. Niche modeling in reverse: Evaluating the use of ecological niche models to predict biological invasions. Annual Symposium of the U.S. Regional Association of the International Association for Landscape Ecology (US-IALE2005), 12-16 March 2005, Syracuse, NY. Presented.

Engel, E.C., J.F. Weltzin, and R.J. Norby. Effects of elevated [CO_2], warming, and soil moisture on community composition of old-field plant communities. Southeastern Ecology and Evolution Conference, 11-13 March 2005, Athens, GA. Presented.

Souza, L., J.M. Nagel, E.C. Engel, J.F. Weltzin, and R.J. Norby. Can daily carbon gain of four old-field species explain their performance in a community under global climate change? Southeastern Ecology and Evolution Conference, 11-13 March 2005, Athens, GA. Presented.

DeVan, C.M., J.F. Weltzin, R.T. Belote and R.J. Norby. Elevated [CO_2] facilitates development of understory vegetation within a closed-canopy deciduous forest. Southeastern Ecology and Evolution Conference, 11-13 March 2005, Athens, GA. Presented.

Weltzin, J.F., P.B. Allen, R.J. Norby, and L.A.G. Souza. Soil moisture response to multiple, interacting factors of global change in an old-field ecosystem. Workshop: Modeling Ecosystem Responses to Global Change: Techniques and Recent Advances; Terrestrial Ecosystem Responses to Atmospheric and Climatic Change (TERACC), 9-12 January 2005, Fort Myers, FL. Poster.

Yepez, E.A., T.E. Huxman, D. Ignace, N. English, J.F. Weltzin, and D.G. Williams. Short-term dynamics of soil evaporation and transpiration following a moisture pulse in semiarid grassland: a chamber-based method using stable isotope tracers. Symposium: Research Insights in Semiarid Ecosystems, 13 November 2004, Tucson, AZ. Presented.

Engel, E.C., J.F. Weltzin, and R.J. Norby. CO_2, temperature, and soil moisture interactions affect NDVI and reproductive phenology in old-field plant communities. American Geophysical Union Annual Meeting, 13-17 December 2004, San Francisco, CA. Poster.

Engel, E.C., J.F. Weltzin, and R.J. Norby. Response of an old-field plant community to elevated, temperature, CO_2, and soil moisture availability: What is the role of biotic interactions? Ecological Society of America Annual Meeting, 1-6 August 2004, Portland, OR. Poster.

Weltzin, J.F., P.B. Allen, R.J. Norby, E.C. Engel, L. Souza, and S. Wan. Old-field communities and global change: interactive effects of carbon dioxide, temperature, and soil moisture. Ecological Society of America Annual Meeting, 1-6 August 2004, Portland, OR. Poster.

Wan, S. R.J. Norby, J.F. Weltzin, C. Reilly, P.B. Allen. Global change and soil respiration: Complex responses to multiple interacting factors in old-field grassland. Ecological Society of America Annual Meeting, 1-6 August 2004, Portland, OR. Presented.

Cable, J, T. Huxman, J.F. Weltzin, D.G. Williams, D. Potts, D. Ignace, N. English, M. Mason. Controls on respiration in a semi-arid grassland in southeastern Arizona. Ecological Society of America Annual Meeting, 1-6 August 2004, Portland, OR. Presented.

Ignace, D., T. Huxman, D. Potts, J. Cable, M. Mason, N. English, J.F. Weltzin, D.G. Williams. Functional response of native and non-native grasses to simulated precipitation in the Sonoran Desert. Ecological Society of America Annual Meeting, 1-6 August 2004, Portland, OR. Presented.

Fortner, A.M. and J.F. Weltzin. Interspecific and intraspecific competition among four common old-field plant species. Southeastern Ecology and Evolution Conference, 5-7 March 2004, Atlanta, GA. Poster.

Allen, P.B, J.F. Weltzin, R.J. Norby, and J.E. Buckner. Simulating multifactor climate change in an old-field grass community: design, setup, and first year monitoring of the Old-field Community Climate and Atmosphere Manipulation project (OCCAM). Association of Southeastern Biologists Annual Meeting, 14-17 April 2004, Memphis, TN. Poster.

Allen, P.B, J.F. Weltzin, and P.J. Hanson. A 3-year cohort study of the recruitment and survival of deciduous forest tree species in response to altered precipitation regimes. Association of Southeastern Biologists Annual Meeting, 14-17 April 2004, Memphis, TN. Presented.

Weltzin, J.F., P.B. Allen, R.J. Norby, E. Buckner, E.C. Engel, L. Souza, and S. Wan. Community and ecosystem response to global change: the Old-field Community Climate and Atmospheric Manipulation (OCCAM) project. Association of Southeastern Biologists Annual Meeting, 14-17 April 2004, Memphis, TN. Presented.

Engel, E.C. and J.F. Weltzin. What factors drive the response of an old-field plant community to the interactive effects of CO_2, temperature, and soil water availability? Association of Southeastern Biologists Annual Meeting, 14-17 April 2004, Memphis, TN. Presented.

Souza, L., P.B. Allen, J.F. Weltzin, R.J. Norby, S. Wan. Leaf and ecosystem-level gas exchange responses to global change: the Old-field Community Climate and Atmospheric Manipulation

(OCCAM) project. Association of Southeastern Biologists Annual Meeting, 14-17 April 2004, Memphis, TN. Presented.

English, N.B., D.G. Williams and J.F. Weltzin. Soil temperature and moisture dynamics after experimental irrigation on two contrasting soils on the Santa Rita experimental range: Implications for mesquite establishment. Santa Rita Experimental Range: One-hundred years (1903-2003) of accomplishments and contributions, 30 October - 1 November 2003, Tucson, AZ. Poster.

Engel, E.C. and J. F. Weltzin. What factors drive the response of an old-field community to the interactive effects of CO2, temperature, and soil water availability? South-east Ecology, Population Genetics, and Evolution (SEEPAGE) annual meeting; September 19-21 2003, South Holston Lake, VA. Poster.

Chen, J., D.L. Potts, T.E. Huxman, J.F. Weltzin, D.G. Williams, N.B. English. Trace gas fluxes in a semi-arid grassland: the role of C_4 bunchgrass species, simulated precipitation and season. Ecological Society of America Annual Meeting, 3-8 August 2003, Savannah, GA. Poster.

Potts, D.L., T.E. Huxman, B.J. Enquist, J.F. Weltzin, and D.G. Williams. Multivariate analysis of ecosystem response to precipitation pulses. Ecological Society of America Annual Meeting, 3-8 August 2003, Savannah, GA. Presented.

Cole, P.G. and J.F. Weltzin. Demonstration of a light/water tradeoff in the non-native, invasive grass, *Microstegium vimineum*. Ecological Society of America Annual Meeting, 3-8 August 2003, Savannah, GA. Presented.

Fortner, A.M. and J.F. Weltzin. Interspecific and intraspecific competition in old-field plant communities. Ecological Society of America Annual Meeting, 3-8 August 2003, Savannah, GA. Poster.

Engel, E.C. and J.F. Weltzin. How does plant competition mediate the interactive effects of CO_2, temperature, and soil water availability? Ecological Society of America Annual Meeting, 3-8 August 2003, Savannah, GA. Poster.

Belote, R.T. and J.F. Weltzin. Forest understory community responses to elevated CO_2. Ecological Society of America Annual Meeting, 3-9 August 2003, Savannah, GA. Poster.

Engel, E.C., J.F. Weltzin, R.J. Norby, R.M. Miller, and P.B. Allen. Old-field Community Climate and Atmospheric Manipulation facility (OCCAM) - Community and ecosystem response to global change: interactive effects of atmospheric carbon dioxide, surface temperatures, and soil moisture. Terrestrial Ecosystem Responses to Atmospheric and Climatic Change (TERACC) Workshop; 27-30 April 2003, Lake Tahoe, CA. Poster.

Belote, R.T., J.F. Weltzin, and R.J. Norby. Will rising CO_2 levels affect Southern Appalachian invasive species? Southern Appalachian Man and the Biosphere Annual Meeting, 5-7 November 2002, Gatlinberg, TN. Poster.

Thomas, L.T. and J.F. Weltzin. Biotic and abiotic constraints on woody plant seedling establishment in semi-arid savannas. American Geophysical Union Chapman Conference. Eco-hydrology of semiarid landscapes: interactions and processes. 9-13 September 2002, Taos, NM. Poster.

Huxman, T.E., J.M. Cable, D.D. Ignace, A.J. Eilts, J.F. Weltzin, D.G. Williams, and N.B. English.. Geomorphic influence on ecosystem precipitation pulse response in a semi-arid grassland. American Geophysical Union Chapman Conference. Eco-hydrology of semiarid landscapes: interactions and processes. 9-13 September 2002, Taos, NM. Poster.

Noormets, A., J. Chen, S.D. Bridgham, J. Pastor, J.F. Weltzin, B. Dewey, and J. LeMoine. The effects of infrared loading and water table on soil energy fluxes in northern peatlands. Ecological Society of America Annual Meeting, 4-9 August 2002, Tucson, AZ. Poster.

English, N.B., D.G. Williams, J.F. Weltzin, A. Fravolini, L. Thomas, and M. Andregg. Implementation and monitoring of large-scale precipitation shelters on semi-arid grasslands, Santa Rita Experimental Range, Arizona. Ecological Society of America Annual Meeting, 4-9 August 2002, Tucson, AZ. Poster.

Belote, R.T., J.F. Weltzin, R.J. Norby. Plant communities, exotic invaders, and the role of elevated CO_2. Ecological Society of America Annual Meeting, 4-9 August 2002, Tucson, AZ. Presented.

Cole, P.G. and J.F. Weltzin. Demonstration of a light/water trade-off in the non-native, invasive grass, *Microstegium vimineum*. Ecological Society of America Annual Meeting, 4-9 August 2002, Tucson, AZ. Presented.

Thomas, L.M., J.F. Weltzin, and L. Sturdivant. Biotic and abiotic constraints on woody plant seedling establishment in semi-arid savannas. Ecological Society of America Annual Meeting, 4-9 August 2002, Tucson, AZ. Presented.

Allen, P.B., J.F. Weltzin, and P.J. Hanson. Effects of changing precipitation regimes on native tree recruitment, survival, and composition in an upland oak forest in east Tennessee, U.S.A. Association of Southeastern Biologists Annual Meeting, 10-13 April 2002, Boone, NC. Presented.

Belote, R.T., J.F. Weltzin, and R.J. Norby. What are the effects of elevated CO_2 on a plant community dominated by two invasive plants? Association of Southeastern Biologists Annual Meeting, 10-13 April 2002, Boone, NC. Presented.

Cole, P.G. and J.F. Weltzin. Demonstration of a light/water trade-off in the non-native, invasive grass, *Microstegium vimineum*. Association of Southeastern Biologists Annual Meeting, 10-13 April 2002, Boone, NC. Presented.

Thomas, L.M. and J.F. Weltzin. Proximate and ultimate constraints on biological invasions. Association of Southeastern Biologists Annual Meeting, 10-13 April 2002, Boone, NC. Presented.

Weltzin, J.F., C.A. Price, and K. Johnson. Community-level response of pasture communities to restoration using native plant species. Association of Southeastern Biologists Annual Meeting, 10-13 April 2002, Boone, NC. Presented.

Weltzin, J.F., C.A. Price, and K. Johnson. Managing non-native plant populations through intensive plant community restoration in Cades Cove, Great Smoky Mountains National Park: sixth-year response. Southern Appalachian Man and the Biosphere Annual Meeting, 6-8 November 2001, Gatlinberg, TN. Presented.

Bridgham, S. D., J. Pastor, J. Weltzin, J. Chen, B. Dewey, and J. Keller. 2001. Climate effects of carbon storage in peatlands. Soil Science Society of America Annual Meeting, 21-25 October 2001, Charlotte, NC. Presented.

R.J. Norby, E.G. O'Neill, C.A. Gunderson, P.J. Hanson, T.J. Tschaplinski, J.F. Weltzin, R.T. Hansen, W. Cheng, C.A. Gunderson, N.T. Edwards, and D.W. Johnson. CO_2 enrichment increases net primary productivity but not biomass increment in a closed-canopy forest stand. Ecological Society of America Annual Meeting, August 6-10, 2001, Madison, WI. Presented.

N.J. Sanders, J.F. Weltzin, R.T. Belote, and R.J. Norby. What are the combined effects of global climate change and biological invasions on insect community structure? Ecological Society of America Annual Meeting, August 6-10, 2001, Madison, WI. Presented.

Weltzin, J.F., R.J. Norby, and L.M. Thomas. Production of invasive plants in response to elevated CO_2 in a closed-canopy, deciduous forest. Ecological Society of America Annual Meeting, August 6-10, 2001, Madison, WI. Presented.

Pastor, J., J. Chen, S.D. Bridgham, B. Dewey, T. Marshall, J. Weltzin, C. Harth, J.K. Keller. Long-term energy flows in peatlands and their responses to heat and water loading. Ecological Society of America Annual Meeting, August 6-10, 2001, Madison, WI. Presented.

Cole, P.G., J.F. Weltzin, and M.A. Huston. Identifying the habitat characteristics of the non-native, invasive grass, *Microstegium vimineum*. Ecological Society of America Annual Meeting, August 6-10, 2001, Madison, WI. Presented.

Thomas, L.M. and J.F. Weltzin. Effect of perennial bunchgrass density and soil rock fragment content on *Prosopis velutina* size and production. Ecological Society of America Annual Meeting, August 6-10, 2001, Madison, WI. Presented.

Pastor, J., B. Peckham, S. Bridgham, J. Weltzin, and J. Chen._ 2001._ Plant community dynamics, nutrient cycling, and multiple stable equilibria in peatlands._ Seventh International Symposium on the Biogeochemistry of Wetlands, Duke University, Durham, NC, June 17-20, 2001. Presented.

S.D. Bridgham, J.K. Keller, J.F. Weltzin, J. Pastor, K. Updegraff, B. Dewey, C. Harth and J. Chen. The carbon balance of bogs and fens in a manipulative climate change experiment. Seventh Symposium on Biogeochemistry of Wetlands, Duke University, Durham, NC, June 17-20, 2001. Presented.

Weltzin, J.F., R.J. Norby, and L.M. Thomas. Global change and biological invasions: response of understory invasive plants to elevated CO_2. Association of Southeastern Biologists Annual Meeting, April 4-7, 2001, New Orleans, LA. Presented.

Cole, P.G., J.F. Weltzin, and M.A. Huston. Identifying the habitat characteristics of the non-native, invasive grass, *Microstegium vimineum*. Association of Southeastern Biologists Annual Meeting, April 4-7, 2001, New Orleans, LA. Presented.

Price, C. and J.F. Weltzin. The efficacy of prairie restoration in Cades Cove, Smoky Mountain National Park. Association of Southeastern Biologists Annual Meeting, April 4-7, 2001, New Orleans, LA. Poster.

Drake, S.J., J.F. Weltzin, and P.D. Parr. Assessment of non-native invasive plants on the National Environmental Research Park at Oak Ridge National Laboratory. Association of Southeastern Biologists Annual Meeting, April 4-7, 2001, New Orleans, LA. Presented.

Kuppinger, D. and J.F. Weltzin. The state of alien invasive plant knowledge and control on managed lands of the southern Appalachians. Association of Southeastern Biologists Annual Meeting, April 4-7, 2001, New Orleans, LA. Presented.

Cole, P.G., J.F. Weltzin, and M.A. Huston. Identifying the habitat characteristics of the non-native, invasive grass, *Microstegium vimineum*. Southeast Exotic Pest Plant Council Annual Symposium, March 21-23, 2001. Athens, GA. Presented.

Drake, S.J., J.F. Weltzin, and P.D. Parr. Assessment of non-native invasive plants on the National Environmental Research Park at Oak Ridge National Laboratory. Southeast Exotic Pest Plant Council Annual Symposium, March 21-23, 2001. Athens, GA. Presented.

Cole, P.A. and J.F. Weltzin. Focusing on invasive pests. Southern Appalachian Man and the Biosphere Annual Meeting, November 14-16, 2000, Gatlinberg, Tennessee. Presented.

Price, C., J.F. Weltzin, and C. Fleming. The efficacy of prairie restoration in Cades Cove, Smoky Mountain National Park. Southern Appalachian Man and the Biosphere Annual Meeting, November 14-16, 2000, Gatlinberg, TN. Poster.

Kuppinger, D., J.F. Weltzin, H. Vinson, J. Ranney, and R. Turner. The state of invasive plant knowledge and control on managed lands of the Southern Appalachians. Southern Appalachian Man and the Biosphere Annual Meeting, November 14-16, 2000, Gatlinberg, TN. Presented.

Chen, J., S.D. Bridgham, J. Pastor, X. Wang, J. Weltzin, C. Harth, B. Dewey, T. Marshall, J. Keller, K. Updegraff, and E. Euskirchen. Energy flows in peatlands and their responses to heat and water loading. Ecological Society of America Annual Meeting, Snowbird, UT, 2000. Presented.

Bridgham, S.D., J. Pastor, J. Chen, J. Weltzin, K. Updegraff, C. Harth, J. Keller, B. Dewey, and P. Weishampel. Peatland response to climate change—a manipulative approach. Wetlands, Carbon

Cycling, and Future Climate Change. Sponsored by the U.S. Geologic Survey, Patuxent Research Refuge, U.S. Fish and Wildlife Service, Laurel, MD, April 25-27, 2000. Presented.

Chen, J., S.D. Bridgham, J. Pastor, J.F. Weltzin, X. Wang, C. Harth, B. Dewey, J. Keller, and K. Updegraff. Energy flows in peatlands and temperature responses to heat and water loading: a mesocosm approach. The 11th Annual Harvard Forest Ecology Symposium, Harvard University, Petersham, MA, April 3, 2000. Presented.

Bridgham, S. D., J. Pastor, J. Chen, J. Weltzin, X. Wang, K. Updegraff, C. Harth, P. Weishampel, and J. Keller. Climate change impacts on northern peatlands: a manipulative approach. Joint Science Team Meeting TCP, PER, & NIGEC, Indianapolis, IN, June 3-4, 1999. Poster.

Bridgham, S. D., J. Pastor, J. Chen, J. Weltzin, X. Wang, K. Updegraff, C. Harth, P. Weishampel, and J. Keller. Climate change impacts on northern peatlands: a manipulative approach. GCTE (Global Change and Terrestrial Ecosystems) core project of the IGBP (International Geosphere Biosphere Programme) conference, How Nutrients Cycles Constrain Carbon Balances in Boreal Forests and Arctic Tundra, Abisko, Sweden, June 15-18, 1999. Poster.

Weltzin, J.F., J. Pastor, C. Harth, S.D. Bridgham, and K. Updegraff. Response of bog and fen plant communities to warming and water table manipulations. Ecological Society of America Annual Meeting, Spokane, WA, 1999. Presented.

Weltzin, J.F., S. Archer, and R.K. Heitschmidt. Honey mesquite (*Prosopis glandulosa*) seedlings tolerate frequent defoliation. Society for Range Management Annual Meeting, Wichita, KS, 1996. Presented.

Weltzin, J.F. and G.R. McPherson. Effects of tree canopy removal on herbaceous community structure in southwestern oak woodlands. Ecological Society of America Annual Meeting, Providence, RI, 1996. Presented.

Weltzin, J.F. and G.R. McPherson. Global change and precipitation redistribution: effects on tree-grass ratios. Ecological Society of America Annual Meeting, Snowbird, UT, 1995. Presented.

Weltzin, J.F. and G.R. McPherson. Distribution of Emory oak (*Quercus emoryi*) seedlings at lower treeline. International Association of Landscape Ecology, US Section, Tucson, AZ, 1994. Poster.

Weltzin, J.F., S. Archer, and R.K. Heitschmidt. The historical role of prairie dogs in regulating *Prosopis glandulosa* (honey mesquite) abundance. Ecological Society of America Annual Meeting, San Antonio, TX, 1991. Presented.

Weltzin, J.F. and M.B. Coughenour. Overstory-understory interactions in a Kenyan savanna ecosystem. Society for Range Management Annual Meeting, Billings, MT, 1989. Presented.

Professional Activities and Service

Member: Indicators Interagency Working Group, US Global Change Research Program, 2015.
Team Co-Lead: Biodiversity Societal Benefit Area, 2016 National Earth Observation Assessment (EOA 2016), US Group on Earth Observation (USGEO) Assessment Working Group, 2014-present.
Co-Lead, and author: Status and Trends of Pollinators Chapter, Pollinator Research Action Plan, Pollinators Research Plan Interagency Working Group. 2014.
Subgroup Member: National Fish, Wildlife and Plants Climate Adaptation Joint Implementation Working Group. 2014.
Steering Committee Member, and Panelist: Tracking a Changing Climate: Citizen Science Contributions to the National Climate Assessment, co-sponsored by USGCRP, Commons Lab of the Woodrow Wilson International Center for Scholars, and the Federal Community of Practice on Crowdsourcing and Citizen Science, Washington, DC, 2014.
Co-organizer: "Phenology and seasonality in climate change and ecology" organized session, European Geosciences Union General Assembly, 2012, 2013, 2014.
Panelist: Open Innovation and Science: Spotlight on Citizen Science, sponsored by Commons Lab of the Woodrow Wilson International Center for Scholars, Washington, DC, 2013.
Participant: Plant Phenology Working Group, National Ecological Observatory Network, 2012-present
Team Lead: Phenology Indicator Technical Team, Indicator Work Group, National Climate Assessment, US Global Change Research Program, 2013-present
Team Lead: Biodiversity Societal Benefit Area, National Earth Observation Program Assessment (EOA 2012), OSTP, 2012-2013.
Member: USGS Community for Data Integration Citizen Science Working Group, 2011-present
Guest Editor: Ecological Applications, 2012
Co-organizer: National Workshop On Public Participation In Scientific Research, Portland, OR, 2012
Co-organizer: Phenology 2012 – An International Phenology Conference, Milwaukee, WI, 2012
Associate Editor, Ecosphere, 2011-present
Member: USGCRP National Climate Assessment Indicators Work Group, 2011-present
Session co-organizer: Tracking Global Change at Local Scales: Phenology for Science, Conservation, Management, Education, and Outreach. George Wright Society Conference, New Orleans, LA, 2011.
Member: USGCRP National Climate Assessment Ecological Indicators Work Group, 2010-2012
Co-lead and member: DataONE Public Participation in Scientific Research (previously "Citizen Science") Working Group, 2009-2012
Guest Editor: Southeast Naturalist, 2010
Special Session co-organizer: Phenology as a tool to enhance ecological understanding through integration of research and education. Annual Meeting of ESA, Milwaukee, WI, 3-8 August 2008
Member: Ecological Society of America WS Cooper Award Selection Committee, 2008-2010
Associate Editor: Journal of Plant Ecology, 2007-2010
Member: William G. McGinnis Scholarship in Arid Lands Studies Committee, 2008-2010
Program Director, Ecological Biology, Division of Environmental Biology, NSF, 2006-2007
Human and Social Dynamics Program Management Team
NSF Invasive Species Working Group
NSF Cyberinfrastructure in Biological Sciences Working Group
NSF Microbial Biology Working Group
DEB Translating Science for Society Working Group
NSF Proposal Review Panel, Evolutionary and Population Ecology. November 2005

USDA-NSF Interagency PI Meeting: Role of applied and basic research in the management of biological invasions. USDA-CSREES, October 2005

Program co-chair: 2006 Association of Southeastern Biologists Annual Meeting

Workshop co-organizer: SAPOZEO 2nd organizational meeting; May 2005, Knoxville, TN

Co-Organizer: Southern Appalachians to Ozarks Ecological Observatory (SAPOZEO), part of the National Ecological Observatory Network (NEON), 2004-2005

Member: Conference Programming Committee, Magna Publications Teaching Professor Conference, 2005

Board of Advisors, *New Phytologist*, 2004-2007

Session chair: 2004 Association of Southeastern Biologists Annual Meeting.

USDA-NRI-CSREES Proposal Review Panel, Biology of Weedy and Invasive Plants. April 2003

Symposium co-organizer: Biological invasions in a time of global change. 2003 Ecological Society of America Annual Meeting

Advisor: Southern Appalachian Man and Biosphere Program Invasive Species Initiative 2001

Symposium co-organizer: Importance of precipitation amount and seasonality for ecosystem structure and function. 1998 Ecological Society of America Annual Meeting

Reviewer: First-Order Draft of the IPCC Working Group II Fourth Assessment

Proposal reviews: National Science Foundation (NSF) Ecology Panel, Ecosystems Panel, Biocomplexity in the Environment Panel, Global Scientists and Engineers DDIG Panel, Hydrologic Sciences Panel; Department of Energy (DOE) National Institute for Global Environmental Change; DOE National Institute for Climatic Change Research; Swiss National Science Foundation; USDA-NRI-CSREES Plants and Environmental Adaptation Panel; Israel Science Foundation

Manuscript reviews: American Journal of Botany, American Midland Naturalist, Applied Vegetation Science, BioScience, Canadian Journal of Botany, Castanea, Climatic Change, Diversity and Distributions, Ecology, Ecography, Ecological Applications, Ecosphere, Ecosystems, Environmental Management, Frontiers in Ecology and the Environment, Great Basin Naturalist, Biological Invasions, Journal of Ecology, Journal of Applied Ecology, Journal of Biogeography, Journal of Range Management, Journal of the Torrey Botanical Society, Journal of Tropical Forest Science, Journal of Vegetation Science, Nature, New Phytologist, Oecologia, Oikos, Plant Cell and Environment, Plant Ecology, Rangeland Ecology and Management, Science, Southwestern Naturalist, USDA-Agricultural Research Service, USGS-Biological Research Division, USGS

Textbook reviews: Blackwell Publishing (*Essentials of Ecology 2e, Begon et al.*); McGraw-Hill Higher Education (*Ecology - Concepts and Applications 3e, Molles; The Global Environment, Cleveland and Kaufmann*); Benjamin Cummings (*Elements of Ecology 6e, Smith and Smith*)

Odum Award Committee, Southeast Chapter of the Ecological Society of America, Association of Southeastern Biologists annual meetings (2003-2005; Chair in 2005)

University of Tennessee Department, College and University Activities (1999-2007)

Chancellor's Scholars Selection Committee 2005

College of Arts and Sciences Faculty Speakers Bureau 2005-2006

Division of Biology Greenhouse Facilities Committee 2005-2007

EEB Undergraduate Committee 2003-2007

EEB Executive Committee 2002-2005

EEB Graduate Committee 1999-2003

Student Progress Subcommittee

Recruiting Subcommittee

Graduate Curriculum Revision Subcommittee
EEB Departmental Seminar Spring 2000
EEB Faculty Position Search Subcommittee 2001, 2002, 2003, 2004, 2005
Scholars in the Schools - National Merit Scholars University Visitation Program 2003
Teacher training - Knox County Schools Science Teachers In-Service Day 2005

Workshops

Participant, Open Science and Innovation: Of the People, By the People, For the People *and* Open Science and Innovation: All Hands on Deck!, Office of Science Technology and Policy Event and Workshop, Washington, DC, 2015.
Participant, USGS Powell Center Monarch Restoration Workshops, Fort Collins, CO, 2014, 2015.
Participant, Sustaining Biological Infrastructure: Strategies for Success – A Short Course for Project Directors, Linthicum Heights, MD, 2014.
USGCRP National Climate Assessment Indicators Working Group, January 2012, Washington DC
EPA Climate Change Indicators Workshop, March 2011, Arlington, VA.
USGCRP National Climate Assessment Ecological Indicators Working Group, November 2010, Washington, DC
California Phenology Project Science Advisory Workshop, November 2010, Berkeley, CA
Land-product validation for remote sensing phenology; 2010, Dublin, Ireland
Phenology as a tool for science, management and education in the face of global change; workshops at Ecological Society of America Annual Meetings 2009, 2010, 2011, and The Wildlife Society Annual Meeting, 2010, and the George Wright Society Conference, 2011; and the Rocky Mountain Science and Sustainability Network Academy, 2010 and 2011; organizer or co-organizer
USA National Phenology Network, Research Coordination Network 1st, 2nd, 3rd, 4th, and 5th Annual Meetings/Workshops, Autumn 2007-2010 and 2012, Milwaukee, WI; organizer or co-organizer
National Climate Change and Wildlife Science Center; national and regional workshops, 2008-2009; VA, MD, and CO
Effects of Precipitation Change on Terrestrial Ecosystems (EPRECOT). Terrestrial Ecosystem Responses to Atmospheric and Climatic Change (TERACC). May 2006, Helsinore, Denmark.
Consortium of Regional Ecological Observatories – COREO; 2005, Kalamazoo, MI and Tucson, AZ
Modeling Ecosystem Responses to Global Change: Techniques and Recent Advances. Terrestrial Ecosystem Responses to Atmospheric and Climatic Change (TERACC). January 2005, Fort Myers, FL
Regional NEON Congress (Consortium of Regional Ecological Observatories - COREO); October 2004, North Bonneville, WA
Interactions Between Increasing CO_2 and Temperature in Terrestrial Ecosystems. Terrestrial Ecosystem Responses to Atmospheric and Climatic Change (TERACC), Global Change and Terrestrial Ecosystems Focus 1; April 2003, Lake Tahoe, CA
Resource Pulse Use in Arid Ecosystems, University of Arizona; August 2002, Tucson, AZ.
From Transient to Steady State Response of Ecosystems to CO_2-Enrichment and Global Warming; Terrestrial Ecosystem Responses to Atmospheric and Climatic Change (TERACC), Global Change and Terrestrial Ecosystems Focus 1; May 2002, Durham, NH
Analysis and Synthesis of Precipitation and Ecosystem Change workshop, National Center for Ecological Analysis and Synthesis; March 2002, September 2002, March 2003; Santa Barbara, CA

Terrestrial Ecosystems Research Facilities (TERF) workshop, Department of Energy; November 2000, Chantilly, VA

Awards, Honors, and Honor Societies

Eugene M. Shoemaker Communications Award, External Communications, Internet Product Category, 2014: Connecting People with Nature to Benefit Our Changing Planet: The *Nature's Notebook* website. 2015
College of Arts and Sciences Junior Research/Creative Achievement Award, 2001-2002
Science Alliance Faculty Award, University of Tennessee/Oak Ridge National Laboratory Science Alliance Program, 2001
Outstanding Dissertation, School of Renewable Natural Resources, University of Arizona, 1999

Fellowships/Stipends/Scholarships

University of Arizona Graduate College Fellowship, 1997
UA/NASA Space Grant Graduate Research Fellowship, 1995-1997
Flinn Foundation Biology.21 Graduate Fellowship, UA, 1996
William G. McGinnies Scholarship in Arid Lands Studies, UA, 1996
Regents Fellowship, College of Agriculture, TAMU, 1988
Society for Range Management Scholarships, CSU, 1986, 1987
Thomas C. Evans Scholarship, CSU, 1986
Delano F. Scott Scholarship, CSU, 1986

Professional Memberships

American Geophysical Union
Ecological Society of America
The Wildlife Society