

## STEVEN L. VOELKER, PH.D.

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### Professional preparation

B.S. Forest Management, University of Wisconsin-Stevens Point, 2001

M.S. Forestry, University of Missouri, 2004

Ph.D. Forest Science & Wood Science, Oregon State University, 2009

### Appointments

*Present: Assistant Professor of Dendroclimatology, Department of Plants Soils & Climate and The Ecology Center, Utah State University*

*2014-2016: Post-Doctoral Researcher, Oregon State University*

For this post I work with a collaborative group of scientists at the USDA Forest Service, OSU and other academic institutions. I oversee research on tree-ring  $^{13}\text{C}$  from forests in Central Oregon that span the past 100+ years (inter-annual resolution). This project aims to understand the drought-sensitivity and resilience of conifer forests following the advent of modern fire suppression in the mid-20<sup>th</sup> century.

*Summer 2014: Instructor for "Introduction to Environmental Science", Oregon State University*

See below for Teaching and Mentoring Experience.

*2011-2014: Post-Doctoral Researcher, University of California, Berkeley & Southern Oregon University*

I implemented NSF-funded research to establish sub-annual resolution, millennial length climate reconstructions from California redwoods using tree ring-widths and stable isotopes  $^{13}\text{C}$  and  $^{18}\text{O}$ . Initial results show that climate variability, as indicated by multi-proxy estimates of wet or dry years, were most abundant during the most recent century of anthropogenic climate change as well as during the Medieval Climate Anomaly and lowest during the Little Ice Age. Our multi-proxy results also indicate that we can provide both a drought reconstruction for Northern California and a robust reconstruction of the Pacific Decadal Oscillation over the past 1100 years.

*2009-2011: Post-Doctoral Researcher, Oregon State University*

Co-PI of a full collaborative NSF proposal "Testing tree carbon capture from paleo to present" that I was the lead writer of as a PhD student. I implemented research on tree growth, stable isotopes and wood anatomy of modern and  $^{14}\text{C}$ -dated deglacial-aged oaks [6 published papers]. This funding also supported two M.S. students investigating stable isotopes, tree growth and non-structural carbon dynamics of trees in Oregon and Washington [3 published papers].

*2004-2009: PhD Student, Oregon State University*

I conducted collaborative research on the tree physiology and growth performance of transgenic poplars with down-regulated lignin synthesis (collaboration between OSU, Washington State University, PNW Forest Service Research station, DOE National Renewable Energy Laboratory, and Oak Ridge National Laboratory) [4 published papers]. I also conducted NSF-funded research at the Smithsonian Tropical Research Institution in Panama on the physiology of tropical and temperate trees with my research group at OSU [5 published papers].

*2002-2004: MS Student, University of Missouri*

I used forest inventory and dendrochronology data to study tree mortality and forest stand dynamics in the Missouri Ozarks [4 published papers].

*2001:* Forester for the USDA Forest Service FIA program, PNW Research Station, Anchorage, AK  
I established initial data collection points and forest inventory and ground flora data across Southeastern Alaska.

*2000:* Michigan Department of Natural Resources  
I worked as a plant ecologist to collect data for a habitat type classification system.

*1999-2001:* Robert Freckmann Herbarium, University of Wisconsin Stevens-Point  
I worked part-time as an undergraduate student to organize specimens and do data entry for a plant mapping project.

#### Invited Presentations (since 2010)

Voelker SL. Drought interactions with forest pests: a review of physiological mechanisms leading to tree death. Western Forest Insect Work Conference, Jackson, WY, May 2017

Voelker SL, 2000 years of past climate events in Utah and the West -- and potential for gaining new climate knowledge from tree-rings. USU Spring Runoff Conference, March 2017

Voelker SL. Applications of dendrochronology to understand recent and long past effects of climate change. USU Geology Dept. Seminar, February 2017.

Baguskas SA. SL Voelker, CJ Still et al., Impact of historic drought on the size and age structure of a Bishop pine (*Pinus muricata*) forest on Santa Cruz Island, California. Northern California Botanist Meeting, January 2017.

Voelker SL and FC Meinzer. An overview of drought impacts on whole tree physiology, morbidity and death. California Forest Pest Council Meeting, Davis, CA, November 2016

Voelker SL. Forest health and drought stress in the Great Basin and across the West: Potential for insights and education on the roles of changing climate and fire regimes. NSF-funded Spring Valley Field Station Workshop on Great Basin Environments, Hidden Canyon Retreat, Nevada, August 2016

Voelker SL. CO<sub>2</sub>-effects on leaf gas exchange as inferred from tree-ring stable isotopes. Ameridendro Conference, Mendoza, Argentina, April 2016.

Dawson TE, JS Roden, SL Voelker, JA Johnstone, and AR Ambrose. Using redwood tree ring chronologies to obtain the long-view on California's coastal climate. December 2014.

Voelker SL. Oh what a tree can tell! A history in rings. Friday Science Seminar Series, Southern Oregon University, May 2012.

Voelker SL. Unraveling a mystery of Earth history: linking tree physiology and paleoecology, OSU EcoEvo Seminar, April 2012.

Voelker SL. Tree-ring insights on paleoclimate and past forest productivity, Max-Planck Institute for Biogeochemistry, Jena, Germany, April 2011.

Voelker SL. A meta-analysis and review of paired  $\delta^2\text{H}$  and  $\delta^{18}\text{O}$  for the interpretation of paleo-climate and paleo-ecohydrology, BASIN conference on stable isotopes in water cycle research, Keystone, CO, March 2011.

Voelker SL. Controls on tree growth, wood density and photosynthesis on annual to millennial scales, Dept. of Wood Science & Engineering, OSU, May 2010.

Voelker SL. Progress towards understanding late Pleistocene to Holocene climates in central North America using tree physiology, growth and stable isotopes Dept. of Marine Geology and Geophysics, OSU, April 2010.

Voelker SL. Progress towards understanding changes in tree growth rates over the past millennium and during the Pleistocene-Holocene transition, University of Arizona Tree-Ring Laboratory, March 2010.

Volunteered Presentations (since 2010)

Voelker SL, AG Merschell, FC Meinzer, TA Spies and CJ Still. Fire suppression has led to greater drought-sensitivity in dry conifer forests: tree-ring carbon isotope evidence from Central Oregon. AGU, San Francisco, CA, December 2016.

Belmecheri S, R Guerrieri and SL Voelker Regulation of leaf-gas exchange strategies of woody plants under elevated CO<sub>2</sub>. AGU, San Francisco, CA, December 2016.

Ambrose AR, W. Baxter, C. Wong, TE Dawson, A Carroll and SL Voelker. Climate and physiological effects on leaf and tree-ring stable isotopes in California redwoods. AGU, San Francisco, CA, December 2016.

Voelker SL, JS Roden and TE Dawson. Millennial-length stable isotope chronologies of coastal California redwoods: a new perspective on the interaction of temperature and hydroclimate variability for Pacific coastal ecosystems. PNW Climate Conference, Coeur d'Alene, ID, November 2015.

Bakuskas, SA, SL Voelker, B Rastogi, BT Greer, L Gao, RA Miller, RC Arce and CJ Still. Impact of historic drought on size and age structure and function of a Bishop pine (*Pinus muricata*) forest on Santa Cruz Island, California, ESA, Baltimore, MD, August 2015.

Voelker SL, JA Johnstone, JS Roden and TE Dawson. Multi-proxy approaches to isolating low-frequency climate signals from tree-ring  $\delta^{13}\text{C}$ ,  $\delta^{18}\text{O}$  and ring-widths, AGU, San Francisco, CA, December 2013.

Voelker SL, FC Meinzer, B Lachenbruch, JR Brooks, MC Stambaugh and RP Guyette. Colder springs and warmer, wetter summers during the late glacial climate of central North America: inferences from stable isotopes  $\delta\text{D}$  and  $\delta^{13}\text{C}$  and wood anatomy of sub-fossil oak wood, ESA, Portland, OR, August 2012.

Marias DE, FC Meinzer, DC Shaw, DR Woodruff, SL Voelker, B Lachenbruch. Effect of hemlock dwarf mistletoe on the physiology of host western hemlock using tree rings and C and O stable isotopes, ESA, Portland, OR, August 2012.

Saffell BJ, FC Meinzer, B Lachenbruch, SL Voelker and DC Shaw. Use of tree-ring stable isotopes to quantify Swiss Needle Cast disease severity in Douglas-fir, ESA, Portland, OR, August 2012.

Voelker SL, FC Meinzer, B Lachenbruch, JR Brooks, MC Stambaugh and RP Guyette. Development and application of a paleoclimate proxy for spring temperatures in central North America: did low temperatures limit tree physiological function during the Younger-Dryas? EGU, Vienna, Austria, April 2011.

Meinzer FC, KA McCulloh, J Sperry, B Lachenbruch, SL Voelker, DR Woodruff, J-C Domec. Comparative hydraulic architecture of early and late successional tropical species. ESA, Austin, TX, August 2011.

Teaching and Mentoring Experience:

Co-advisor / committee member for Jessika Carlstrom, M.S. Student, USU, Start date: September 2016

Primary Advisor for Rachel Keen, M.S. Student., USU, Start date: January 2017

Primary Advisor for (Arthur) His-Wu Hsu, Ph.D. Student, Start date: June 2017

Primary Advisor for Thiet Van Nguyen, Ph.D. Student, Start date: September 2017

Instructor: Dendrochronology and Dendroclimatology, USU Graduate course, Spring 2017 (odd years thereafter)

Instructor: *Introduction to Environmental Science*, OSU, Summer 2014

I taught this on-line course to 32 students across the United States. It was a great experience but also a tremendous amount of work to prepare all of the on-line materials, interact regularly with students in on-line discussions and grade the quizzes and laboratory assignments each week in addition to grading three lengthy exams that included short answer and essay components.

I have trained and/or mentored seventeen interns and/or technicians in field and laboratory skills while some were also trained in data analyses and scientific writing. This includes three undergraduate students at the University of Missouri, one post-bac technician, three undergraduate students, two undergraduate research interns, and two high school students at Oregon State University and two post-MS technicians, two undergraduate students and one undergraduate research intern at Southern Oregon University.

Assisted in training and mentoring five graduate students (3 M.S., 2 Ph.D.)

Guest lecturer: *Tree Physiology*, OSU, 2006-2015.

I contributed lectures and laboratories on Dendrochronology as well as Tree and Forest Mortality.

Guest lecturer: *Stable Isotope Integration to 3-PG Forest Growth Model*, OSU, 2014.

I contributed a lecture on tree-ring isotope variability and opportunities for research

Guest speaker: *Isotopics*, OSU, 2008-2013.

I contributed lectures/discussion based on my own research.

Teaching assistant: *Wood Anatomy*, OSU, 2005.

I prepared laboratory materials, helped students during laboratories, graded assignments and gave lectures when my major advisor was absent.

Teaching assistant for *Forest Ecology*, University of Missouri, 2003.

I prepared laboratory materials, lead students in weekly outdoor laboratory assignments at separate locations within a half-hour driving distance of campus and graded assignments and exams.

Teaching assistant for *Forest Health and Protection*, University of Missouri, 2004.

I prepared laboratory materials, helped students during laboratories and graded assignments.

Teaching assistant for the following one credit classes: Field Experience in Forest Mensuration, Field Experience in Wildlife Management Techniques, Field Experience in Plant Identification, University of Wisconsin-Stevens Point, Summer 1999. For these courses I prepared laboratory materials, collected plants for identification, set up laboratory exercises in various forest settings and helped students during those laboratory exercises.

Volunteer teacher at College of Forestry outreach programs, 2004-2010.

Each year I taught "Wood-Magic" to 2<sup>nd</sup> through 4<sup>th</sup> graders for three days at OSU in the Fall and for two days at the World Forestry Center in Portland, OR in the Spring.

Served as an instructor at the 16<sup>th</sup> Annual North American Dendroecological Fieldweek, June 2006.

I was an assistant instructor to Dr. Richard Guyette, and helped lead the Climate Reconstruction Group during this event. We produced a 750-year chronology from a lava-flow in the Oregon Cascade Mountains which included the oldest known Douglas-fir in Oregon (1000+ years old).

#### Awards and Professional Development:

Co-organizer of AGU session entitled Forests in the Anthropocene: trading water for carbon from the leaf to ecosystem, 2016.

Awarded visiting scholar fellowship to train at the University of Arizona Tree-Ring Laboratory, 2010.

Received the Mary McDonald Fellowship from the OSU College of Forestry, 2006-07.

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Received the Univ. of Missouri Dept. of Forestry Outstanding Graduate Student Achievement Award, 2004.

Received Kurtz Memorial Scholarship from the UWSP College of Natural Resources, 2000.

Served on the Forestry Graduate Student Council for the Wood Science Department, 2007-2009.

Served as a Graduate Representative for the Forest Science Department at OSU College of Forestry, 2006.

Served as president of the UWSP student chapter of the Society of American Foresters, 2000-2001.

### Peer-reviewer for >20 journals (alphabetical order)

*American Midland Naturalist, Biomass & Bioenergy, Canadian Journal of Forest Research, Dendrochronologia, Ecological Monographs, Ecology, Environmental Research Letters, Geophysical Research Letters, Global Change Biology, Global Ecology and Biogeography, Hydrological Processes, Journal of Ecology, Journal of Geophysical Research: Atmospheres, Journal of Geophysical Research: Biogeosciences, Journal of Snow and Landscape Research, Natural Areas Journal, Nature Communications, New Phytologist, Northern Journal of Applied Forestry, Oecologia, Plant Cell, Proceedings of the National Academy of Sciences USA, Scientific Reports, Tree Physiology, Trees-Structure & Function*

### Funded grant proposals

Sub-award from NSF Macrosystems Grant to Jim Ehleringer and Gabe Bowen for ITCE: Inter-university Training for Continental-scale Ecology. Awarded to Co-PIs TE Dawson, CJ Still and SL Voelker for project entitled: Drought, Isotopes & Ecosystem Resilience in the West: DrIER-W. Award: \$60,000, 2016.

Grant funded from the USDA Forest Service, Forest Health Monitoring Program, "*Investigating Causes of Bishop Pine (Pinus muricata D. Don) Mortality on California's North Coast.*" PI: Chris Lee, Senior Personnel: R. Muzika, R. Pasquinelli, D. Rizzo, T. Scholars, J. Stone, SL Voelker. 2-year budget: Award of \$115,724 (\$56,556 from USFS and \$59,168 matching funds from California Department of Forestry and Fire Protection).

Grant funded by the Huron Mountain Wildlife Foundation for travel and tree core collection. *Do tree growth responses to climate change differ among boreal forest species within the lake effect zone of Lake Superior.* Award: \$2,000, 2015, PI: SL Voelker.

Grant funded by the University of Wisconsin Department of Botany for data collection supporting preliminary data collection that will be used to justify funding from larger agency (i.e. NSF). This award will be used for stable isotope analyses of tree-rings collected during the summer of 2015 associated with the pending Lake Superior pre-proposal and full proposal in prep listed below. Award: \$5,000, 2015, Co-PIs: KA McCulloh and SL Voelker.

Grant funded by the Swiss Needle Cast (SNC) Cooperative, *Test for the effect of Swiss Needle Cast on tree carbohydrate reserves.* Award: \$10,000, 2012-2013. Co-PI's: BJ Saffell, FC Meinzer, DR Woodruff and SL Voelker.

Grant funded by the Swiss Needle Cast (SNC) Cooperative, *Use of tree-ring stable isotopes to test for the effect of fog on Swiss Needle Cast infection severity.* Award: \$10,000, 2012-2013. Co-PI's: BJ Saffell, SL Voelker and FC Meinzer.

Grant funded by NSF, Division of Environmental Biology, Ecosystems Cluster, *Collaborative Research: Testing tree carbon capture from paleo to present.* Award: \$560,000 to OSU and the U. of Missouri, 2009-2012. Co-PI's: SL Voelker, B Lachenbruch, FC Meinzer, JR Brooks, RP Guyette.

### Proposals pending:

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Pending full proposal to NSF, (RFP: Paleo Perspectives on Climate Change), *Collaborative Research: Reconstructing Late Holocene Temperature Variability Using Tree-Ring Isotopes*. Co-PI's SL Voelker, S-Y Wang and MC Stambaugh. 3-year budget: \$552,248 to USU.

Pending Early Career proposal to NSF, (RFP: Macrosystems Biology and early NEON Science). *MSB-ECA: Cross-Biome Forest Responses to Climate and CO<sub>2</sub>*. 2-year budget: \$243,729.

Peer-Reviewed Publications: (reverse chronological order)

- Voelker** SL and FC Meinzer. Where and when does stem cellulose  $\delta^{18}\text{O}$  reflect a leaf water enrichment signal? *Tree Physiology*. In Press.
- Voelker SL, MC Stambaugh, JR Brooks, FC Meinzer, B Lachenbruch and RP Guyette. Evidence that greater  $\text{CO}_2$  has increased the temperature-sensitivity of tree growth: a comparison of modern and paleo oaks. *Oecologia*. In Press.
- Cornejo-Oviedo E, SL Voelker, DB Mainwaring, DA Maguire, FC Meinzer, JR Brooks. 2017. Basal area growth, carbon isotope discrimination, and intrinsic water use efficiency after fertilization of Douglas-fir in the Oregon Coast Range. *Forest Ecology and Management* 398: 285-295.
- Voelker SL, JR Brooks, FC Meinzer, R Anderson, M K-F Bader, G Battipaglia, KM Becklin, D Beerling, D Bert, JL Betancourt, TE Dawson, JC Domec, RP Guyette, C Körner, SW Leavitt, S Linder, JD Marshall, M Mildner, J Ogée, I Panyushkina, HJ Plumpton, KS Pregitzer, M Saurer, AR Smith, RTW Siegwolf, MC Stambaugh, AF Talhelm, JC Tardif, PK Van de Water, JK Ward and L Wingate. 2016. A dynamic leaf gas-exchange strategy is conserved in woody plants under changing ambient  $\text{CO}_2$ : evidence from carbon isotope discrimination in paleo and  $\text{CO}_2$  enrichment studies. *Global Change Biology* 22: 889-902.
- Voelker SL, X Feng, SW Leavitt, IP Panyushkina, DA Grimley, D Grimm, JP Marsicek, B Shuman and BB Curry. 2015. Hydroclimate of the North American mid-continent during the last deglaciation. *Quaternary Research* 83: 336-344.
- Lee C, SL Voelker, RM Holdo and RM Muzika. 2014. Tree architecture predicts growth and mortality rates in Midwestern oaks. *Canadian Journal of Forest Research* 44: 1005-1012.
- Marias DE, FC Meinzer, DC Shaw, DR Woodruff, SL Voelker and B Lachenbruch. 2014. Effect of hemlock dwarf mistletoe on the physiology of host western hemlock using tree ring  $^{13}\text{C}$  and  $^{18}\text{O}$ . *Tree Physiology* 34: 595-607.
- Voelker SL, JR Brooks, FC Meinzer, JS Roden, A Pazdur, S Pawelczyk, P Hartsough, K Snyder, L Plavcová, J Šantrůček. 2014b. Isolating relative humidity: dual isotopes  $\delta^{18}\text{O}$  and  $\delta\text{D}$  as deuterium deviations from the global meteoric water line. *Ecological Applications* 24: 960-975.
- Saffell BJ, FC Meinzer, SL Voelker, D Shaw, JR Brooks, B Lachenbruch, J McKay. 2014b. Tree-ring isotopes record the impact of a foliar fungal pathogen on  $\text{CO}_2$  assimilation and growth in Douglas-fir. *Plant, Cell & Environment* 37: 1536-1547.
- Saffell BJ, FC Meinzer, DR Woodruff, DC Shaw, SL Voelker and B Lachenbruch. 2014a. Seasonal carbohydrate dynamics and growth in Douglas-fir trees experiencing chronic, fungal-mediated reduction in leaf area. *Tree Physiology* 34: 218-208.
- Voelker SL, FC Meinzer, B Lachenbruch, JR Brooks and RP Guyette. 2014a. Drivers of radial growth and carbon isotope discrimination of bur oak (*Quercus macrocarpa* Michx.) across continental gradients in precipitation, vapor pressure deficit and irradiance. *Plant, Cell & Environment* 37: 766-779.
- Voelker SL, P-E Noirot-Cosson, MC Stambaugh, ER McMurry, FC Meinzer, B Lachenbruch and RP Guyette. 2012. Spring temperature responses of oaks are synchronous with North Atlantic conditions during the last deglaciation. *Ecological Monographs* 82: 169-187.
- McCulloh K, DM Johnson, FC Meinzer, SL Voelker, B Lachenbruch and J-C Domec. 2012. Hydraulic architecture of two species differing in wood density: opposing strategies in co-occurring tropical pioneer trees. *Plant, Cell & Environment* 35: 116-125.

- McCulloh K, FC Meinzer, JS Sperry, B Lachenbruch, SL Voelker, DR Woodruff and J-C Domec. 2011. Comparative hydraulic architecture of tropical tree species representing a range of successional status and wood density. *Oecologia* 167: 27-37.
- Voelker SL, B Lachenbruch, FC Meinzer and SH Strauss. 2011b. Reduced wood stiffness and strength, and altered stem form, in young antisense *4CL* transgenic poplar with reduced lignin contents. *New Phytologist* 189: 1096-1109.
- Voelker SL, B Lachenbruch, FC Meinzer, P. Kitin and SH Strauss. 2011a. Transgenic poplars with reduced lignin show impaired xylem conductivity, growth efficiency and survival. *Plant, Cell & Environment* 34: 655-668.
- Voelker SL, B Lachenbruch, FC Meinzer, M Jourdes, C Ki, AM Patten, LB Davin, NG Lewis, GA Tuskan, L Gunter, SR Decker, MJ Selig, R Sykes, ME Himmel, P Kitin, O Shevchenko and SH Strauss. 2010. Antisense down-regulation of *4CL* expression alters lignification, tree growth and saccharification potential of field-grown poplar. *Plant Physiology* 154: 874-886.
- Kitin P, SL Voelker B Lachenbruch, FC Meinzer and SH Strauss. 2010. Tyloses and phenolic deposits in xylem vessels impede water transport in low-lignin transgenic poplars: a study by cryo-fluorescence microscopy. *Plant Physiology* 154: 887-898.
- McCulloh K, JS Sperry, B Lachenbruch, FC Meinzer, PB Reich and SL Voelker. 2010. Moving water well: comparing hydraulic efficiency in twigs and trunks of coniferous, ring-porous, and diffuse-porous saplings from temperate and tropical forests. *New Phytologist* 186: 439-450.
- Voelker SL, RM Muzika and RP Guyette. 2008. Individual tree and stand level influences on the growth, vigor and decline of red oaks in the Ozarks. *Forest Science* 54: 8-20.
- Taylor AM, JR Brooks, JJ Morell and SL Voelker. 2008. Correlation of carbon isotope ratios in the cellulose and wood extractives of Douglas-fir. *Dendrochronologia* 26: 125-131.
- Parke JL, E Oh, SL Voelker, EM Hansen, G Buckles, and B Lachenbruch. 2007. *Phytophthora ramorum* colonizes tanoak xylem and is associated with reduced stem water transport. *Phytopathology* 97: 1558-1567.
- Voelker SL, RM Muzika, RP Guyette and MC Stambaugh. 2006. Historical CO<sub>2</sub> growth enhancement declines with age in *Quercus* and *Pinus*. *Ecological Monographs* 76: 549-564.

Other Publications and Scientific Contributions:

- Voelker SL, *et al.* I have submitted 37 tree-ring data collections to the International Tree-Ring Data Bank managed by NOAA, <https://www.ncdc.noaa.gov/data-access/paleoclimatology-data/datasets/tree-ring>. More data collections are scheduled to be submitted in the next year from my recent research on redwoods and near Lake Superior.
- Voelker SL. 2011. Age-dependent changes in environmental influences on tree growth and their implications for forest responses to climate change. *In* Size- and age-related changes in tree structure and function, FC Meinzer, T Dawson and B Lachenbruch (*eds.*). pp. 455-479, DOI: 10.1007/978-94-007-1242-3\_17.
- Lachenbruch B, SL Voelker, FC Meinzer and SH Strauss. 2010. Structural and functional differences among transgenic hybrid poplar lines with varying lignin contents. Proceedings of the 6<sup>th</sup> Plant Biomechanics Conference, Cayenne, French Guiana, Nov. 16-21, 2009
- Guyette RP, RM Muzika, and SL Voelker. 2007. The historical ecology of fire, climate, and the decline of



shortleaf pine in the Ozarks. *In* JM Kabrick, DC Dey, D Gwaze (*eds.*). Shortleaf pine restoration and ecology in the Ozarks: proceedings of a symposium, USDA For. Serv. GTR-NRS-P-15, pp. 8-18.

Manuscripts in review or in preparation

Ratcliff CJ, Voelker SL and Nolin AW. In Prep. Tree-ring carbon isotopes primarily record summer evaporative demand in the western Cascade Mountains, Oregon. *In Prep.*

Baguskas, SA, SL Voelker, B. Rastogi, BT Greer, L Gao, RA Miller, RC Arce and CJ Still. August 2015. Impact of historic drought on size and age structure and function of a Bishop pine (*Pinus muricata*) forest on Santa Cruz Island, California. *In Prep.*

Voelker SL, et al. Lake Superior temperatures are recorded by tree-ring isotopes. *In Prep.*

Voelker SL, et al. Site-specific tree-ring isotope responses in sugar maple and white spruce at the north and south edges of their range. *In Prep.*

Voelker SL, JS Roden, JA Johnstone and TE Dawson. Tree-ring stable isotopes of California redwoods show peaks in coastal hydroclimate variability during the Medieval Climate Anomaly and 20th century. *In Prep.*

Voelker SL, FC Meinzer, B Lachenbruch, JR Brooks, CJ Still, JI Burton. Carbon availability impacts the growth of coarse roots more than stems in conifers from wet and dry ecosystems: implications for forest carbon allocation responses to climate change. *In Prep.*

Voelker SL, Merschell AG, FC Meinzer, TA Spies, CJ Still. Fire suppression has led to greater drought-sensitivity in dry conifer forests: tree-ring carbon isotope evidence from Central Oregon. *In Prep.*