

CURRICULUM VITAE

John J. Battles

University of California, Berkeley
Department of Environmental Science, Policy, and Management
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EDUCATION

Cornell University:
Ph.D. in forest science, May 1994.

Yale University:
B.S. in biology, May 1985.
Graduated summa cum laude with distinction in the major.

PROFESSIONAL EXPERIENCE

Professor of forest ecology, Department of Environmental Science, Policy, and Management,
UC Berkeley, July 2009 to present.

Chair, Ecosystem Science Division, Department of Environmental Science, Policy, and
Management, UC Berkeley, July 2010 to June 2014.

Co-Director, Center for Forestry, College of Natural Resources, UC Berkeley,
December 2000 to June 2010.

Associate/Assistant professor of forest ecology, Department of Environmental Science, Policy,
and Management, UC Berkeley, January 1995 to June 2009.

Postdoctoral research associate, Department of Natural Resources, Cornell University,
January 1994 to December 1994.

Research staff scientist, University of Pennsylvania, May 1986 to August 1988.

HONORS AND AWARDS

Departmental Award for Student Mentoring (voted by students) -- 2013
Departmental Award for Undergraduate Teaching Excellence -- 2004
Hellman Faculty Fellow -- 1998

SERVICE TO SCHOLARLY, PUBLIC, AND GOVERNMENTAL ORGANIZATIONS

Co-chair, Science Advisory Panel, California Wildfire and Forest Resilience Task Force ([CA Task Force](#)).

Vice president and founding board member, the Climate and Wildfire Institute ([CWI](#))

Faculty coordinator, Bonnie Reiss Climate Action Student Fellowship Program, UC Division of Agriculture and Natural Resources ([Climate Action Fellowship](#))

PEER-REVIEWED PUBLICATIONS

(ORCID: <http://orcid.org/0000-0001-7124-7893>; [Google Scholar Profile](#))

In progress

Contosta, A.R., **J.J. Battles**, J. L. Campbell, C.T. Driscoll, S.R. Garlick, M.B. Green, R T. Holmes, G.E. Likens, N.L. Rodenhouse, S. Rogers, P.H. Templer, M.A. Vadeboncoeur, and P. M. Groffman. In Review. Early warning signals of changing resilience in the biogeochemistry and biology of a northern hardwood forest. *Environmental Research Letters*.

Stephens, S., D. Foster, **J. Battles**, A. Bernal, B. Collins, R. Hedges, J. Moghaddas, A. Thomson-Roughton, and R. York. In revision. Forest restoration and fuels reduction work: Different pathways for achieving success in the Sierra Nevada. *Ecological Applications*.

Last ten years

Low, K.E., **J. J. Battles**, R. E. Tompkins, C. P. Dillingham, S. L. Stephens, and B. M. Collins. 2023. Shaded fuel breaks create wildfire-resilient forest stands: Lessons from a long-term study in the Sierra Nevada. *Fire Ecology* 19:29.

Martinez, D.J., B.R. Middleton, and **J.J. Battles**. 2023. Environmental justice in forest management decision-making: Challenges and opportunities in California. *Society and Natural Resources*. DOI: [10.1080/08941920.2023.2203103](https://doi.org/10.1080/08941920.2023.2203103)

Vilanova, E., L.A. Mortenson, L. E. Cox, B. M. Bulaon, J. M. Lydersen, C. J. Fettig, **J. J. Battles**, and J.N. Axelson. 2023. Characterizing ground and surface fuels across Sierra Nevada forests shortly after the 2012–2016 drought. *Forest Ecology and Management*. 537, p.120945.

Knight, C.A., **J.J. Battles**, M. J. Bunting, M. Champagne, J. A. Wanket, and D. B. Wahl. 2022. Guidelines for robust estimates of tree biomass from pollen accumulation rates: Quantifying reconstruction uncertainty. *Frontiers in Ecology and Evolution* 10.

Cox, L., R.A. York, and **J.J. Battles**. 2022. Informing silvicultural strategies for a climate-resilient species: Initial insights from an incense-cedar spacing trial. *Canadian Journal of Forest Research* 52:1254–1265.

Cleavitt, N.L., M. Montague, **J. J. Battles**, O.F. Box, J.H. Matthes, and T.J. Fahey. 2022. Enemy release from beech bark disease coincides with upslope shift of American beech. *Canadian Journal of Forest Research* 52: 1224–1233.

- Wang, J.A., J.T. Randerson, M.L. Goulden, C.A.Knight and **J.J. Battles**. 2022. Losses of tree cover in California driven by increasing fire disturbance and climate stress. *AGU Advances*, 3(4), p.e2021AV000654.
- Bernal, A.A., S.L. Stephens, B.M. Collins, and **J.J. Battles**. 2022. Biomass stocks in California's fire-prone forests: Mismatch in ecology and policy. *Environmental Research Letters* (4), p.044047.
- Knight, C.A., L. Anderson, M. J. Bunting, M. Champagne, R. M. Clayburn, J. N. Crawford, A. Klimaszewski-Patterson, E. E. Knapp, F. K. Lake, S.A. Mensing, D. Wahl, J. Wanket, A. Watts-Tobin, M. D. Potts, and **J. J. Battles**. 2022. Land management explains major trends in forest structure and composition over the past 3000 years in California's Klamath Mountains. *Proceedings of the National Academy of Science* 119: e2116264119
- Knight, C.A., R. E. Tompkins, J. A. Wang, R.A. York, M.L. Goulden, and **J.J. Battles**. 2021. Accurate tracking of forest activity key to multi-jurisdictional management goals: A case study in California. *Journal of Environmental Management* 301: 114083.
- Dudney, J., C. Willing, A. Das, A. Latimer, and J. Nesmith, and **J. J. Battles**. 2021. Climate change asymmetrically shifts infectious tree disease. *Nature Communications* 12(1): 1-13.
- Cleavitt, N.L., **J.J. Battles**, T.J. Fahey, and N.S. van Doorn. 2021. Disruption of the competitive balance between foundational tree species by interacting stressors in a temperate deciduous forest. *Journal of Ecology*.
- Tubbesing, C. L., D. J. N. Young, R. A. York, S. L. Stephens, and **J. J. Battles**. 2021. Incorporating shrub neighborhood dynamics to predict forest succession trajectories in an altered fire regime. *Ecosystems*: <https://doi.org/10.1007/s10021-021-00645-5>.
- York, R.A., H. Noble, L. Quinn-Davidson, and **J.J. Battles**. 2021. Pyrosilviculture: Combining prescribed fire with gap-based silviculture in mixed conifer forests of the Sierra Nevada. *Canadian Journal of Forest Research* 51: 1-11.
- Wason, J., **J. Battles**, M. B. Berdugo, P. Casson, J. Tourville, and M. Dovciak. 2021. Sentinel research sites in global change research: Whiteface Mountain, New York. *Northeastern Naturalist* 28:47-63.
- *Cowles, J. et al. 2021. Ecosystem trajectories, resilience, and the state of our future earth: Insight from the U.S. LTER Network. *Ecosphere*: Article e03434 (Note: 1 of 6 leads; total 21 co-authors).
- Dudney, J., R. York, C. Tubbesing, A. T. Roughton, D. Foster, S. L. Stephens, and **J. J. Battles**. 2021. Overstory removal and biological legacies influence long-term forest management outcomes on introduced species and native shrubs. *Forest Ecology and Management* 491: 119149.

- Cox, L.E., R.A. York, and **J.J. Battles**. 2021. Growth and form of giant sequoia (*Sequoiadendron giganteum*) in a plantation spacing trial after 28 years. *Forest Ecology and Management* 488:119033
- Valipour, M., C.E. Johnson, **J.J. Battles**, J.L. Campbell, T.J. Fahey, H. Fakhraei, and C.T. Driscoll. 2021. Simulation of the effects of forest harvesting under changing climate to inform long-term sustainable forest management using a biogeochemical model. *Science of the Total Environment* 767:144881.
- Levine, J. P. de Valpine and **J.J. Battles**. 2021. Generalized additive models reveal stand-level heterogeneity in live tree biomass equations. *Canadian Journal of Forest Research* 51:546-564.
- Knight, C.A. M. Baskaran, M. J. Bunting, M. Champagne, M. D. Potts, D. Wahl, J. Wanket, and **J. J. Battles**. 2021. Linking modern pollen accumulation rates to biomass: Quantitative vegetation reconstruction in the western Klamath Mountains. *The Holocene*: <https://doi.org/10.1177/095968362098803>
- Dudney, J.C., J.C.B. Nesmith, M.C. Cahill, J.E. Cribbs, D.M. Duriscoe, A.J. Das, N.L. Stephenson, and **J.J. Battles**. 2020. Interacting effects of white pine blister rust, mountain pine beetle, and fire threaten four white pine species. *Ecosphere*: Article e03263.
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- Foster, D. E., **J.J. Battles**, B.M. Collins, R.A. York, and S.L. Stephens. 2020. Potential wildfire and carbon stability in frequent-fire forests in the Sierra Nevada: Tradeoffs from a long-term study. *Ecosphere*: Article e03198.
- Knight, C.A, C.V. Cogbill, M. D. Potts, J. A. Wanket, and **J. J. Battles**. 2020. Settlement-era forest structure and composition in the Klamath Mountains: Reconstructing a historical baseline. *Ecosphere*: Article e03250.
- Tubbesing, C., R.A. York, S.L. Stephens, and **J.J. Battles**. 2020. Rethinking fire-adapted species in an altered fire regime. *Ecosphere*: Article e03091.
- O'Hara, K.O. and **J. J. Battles**. 2020. Variation in leaf area index in complex mixed-conifer forests in California's Sierra Nevada: implications for stocking control. *Forests*.
- Tubbesing, C.L., J.D. Lara, **J. J. Battles**, P. W. Tittman, and D. M. Kammen. 2019. Characterization of the woody biomass feedstock potential resulting from California's drought. *Scientific Reports* 10: 1096.
- Levine, C.R., C.V. Cogbill, B.M. Collins, A.J. Larson, J.A. Lutz, M.P. North, C.M. Restaino, H.D. Safford, S.L. Stephens, and **J.J. Battles**. 2019. Estimating historical forest density from land-survey data: a response to Baker and Williams (2018). *Ecological Applications*: e0196.
- Saska, P. C., R. C. Bales, C. L. Tague, **J. J. Battles**, B.W. Tobin and M. H. Conklin. 2019. Fuels

treatment and wildfire effects on runoff from Sierra Nevada mixed-conifer forests. *Ecohydrology*; p.e2151.

Wason, J.W., C.M. Beier, **J.J. Battles** and M. Dovciak. 2019. Acidic deposition and climate warming as drivers of tree growth in high-elevation spruce-fir forests of the Northeastern US. *Frontiers in Forests and Global Change* 2:63.

Hu, T., Q. Ma, Y. Su, **J. J. Battles**, B. M. Collins, S.L. Stephens, M. Kelly, and Q. Guo. 2019. A simple and integrated approach for fire severity assessment using bi-temporal airborne LiDAR data. *International Journal of Applied Earth Observations and Geoinformation* 78: 25-38.

Battles, J.J., N.L. Cleavitt, C.E. Johnson and T.J. Fahey. 2019. Reply to the comment by Bailey et al. on “Long-term decline of sugar maple following forest harvest, Hubbard Brook Experimental Forest, New Hampshire”. *Canadian Journal of Forest Research* 49: 1-2.

Tubbesing, C., D.L. Fry, G.B. Roller, B.M. Collins, V.A. Fedorova, S.L. Stephens, and **J. J. Battles**. 2019. Strategically placed landscape fuel treatments decrease fire severity and promote recovery in the northern Sierra Nevada. *Forest Ecology and Management* 436:45-55.

Dudney, J., R.J. Hobbs, R. Heilmayr, **J.J. Battles**, and K.N.Suding. 2018. Navigating novelty and risk in resilience management. *Trends in Ecology & Evolution* 33: 863-873.

Jen, C., Y. Liang, Yutong. L. Hatch, N. Kreisberg, C. Stamatis, K. Kristensen, Kasper, **J. Battles**, S. Stephens, R. York, K. Barsanti, and A. Goldstein. 2018. High hydroquinone emissions from burning manzanita. *Environmental Science and Technology Letters* 5: 309-314.

Valipour. M., C.T. Driscoll, C. E Johnson, **J. J Battles**, J. L Campbell, and T. J Fahey. 2018. The application of an integrated biogeochemical model to simulate dynamics of vegetation, hydrology and nutrients in soil and streamwater following a whole-tree harvest of a northern hardwood forest. *Science of the Total Environment* 645: 244-256.

Roman, L., H. Pearsall, T. Eisenman, T. Conway, R. Fahey, S. Landry, J. Vogt, N. van Doorn, J. M. Grove, D. Locke, A. Bardekjian, **J. Battles**, M. Cadenasso, C. Konijnendijk van den Bosch, M. L. Avolio, A. Berland, D. Jenerette, S. Mincey, D. Pataki, and C. Staudhammer. 2018. Human and biophysical legacies shape contemporary urban forests: A literature synthesis. *Urban Forestry & Urban Greening* 31: 157-168.

Cleavitt, N.L. **J.J. Battles**, C.E. Johnson, and T.J. Fahey. 2018. Long-term decline of sugar maple following whole-tree harvest, Hubbard Brook Experimental Forest, New Hampshire. *Canadian Journal of Forest Research*: 48: 23-31.

Battles, J.J., N.L. Cleavitt, D.S. Saah, Benjamin T. Poling, and T.J. Fahey. 2017. Ecological impact of a microburst windstorm in a northern hardwood forest. *Canadian Journal of Forest Research* 47:

- Saska, P. C, M. H. Conklin, **J. J. Battles**, C. L. Tague, and R. C. Bales. 2017. Forest thinning impacts on the water balance of Sierra Nevada mixed conifer headwater basins. *Water Resources Research*: 53: 5364-5381.
- McLauchlan, K., L. Gerhart, **J. Battles**, J. Craine, A. Elmore, P. Higuera, M. Mack, B. McNeil, D. Nelson, N. Pederson, and S. Perakis. 2017. Centennial-scale reductions in nitrogen availability in temperate forests of the United States. *Scientific Reports* 7.
- Levine, C.R., C. V. Cogbill, B. M. Collins, A. J. Larson, J.A. Lutz, M. P. North, C. M. Restaino, H. D. Safford, S. L. Stephens and **J. J. Battles**. 2017. Evaluating a new method for reconstructing forest conditions from General Land Office survey records. *Ecological Applications* 27:1498–1513.
- Wason J.W., M. Dovciak, C.M. Beier, and **J.J. Battles**. 2017. Lack of range shifts despite tree growth responses to recent changes in climate and acidic deposition. *Journal of Applied Ecology*. doi:10.1111/1365-2664.12899
- Levine, C. R., F. Krivak-Tetley, N. S. van Doorn, J. S. Ansley, and **J.J. Battles**. 2016. Long-term demographic trends in a fire-suppressed mixed-conifer forest. *Canadian Journal of Forest Research* 46: 745-752.
- Su, Y, Q. Guo, D. L. Fry, B. M. Collins, N.M. Kelly, J. P. Flanagan, and **J.J. Battles**. 2016. A vegetation mapping strategy for conifer forests by combining airborne lidar data and aerial imagery. *Canadian Journal of Remote Sensing* 42:1-15, DOI: 10.1080/07038992.2016.1131114.
- Fahey, T.J., A. K. Heinz, **J.J. Battles**, M. C. Fisk, C.T. Driscoll, J. D. Blum, and C. Johnson. 2015. Root biomass declined in response to restoration of soil calcium in a northern hardwood forest. *Canadian Journal of Forest Research* 46:738-744.
- Shao, S., C.T. Driscoll, C.E. Johnson, T.J. Fahey, **J.J. Battles** and J.D. Blum. 2015. Long-term responses in soil solution and streamwater chemistry at Hubbard Brook after experimental addition of wollastonite. *Environmental Chemistry*, <http://dx.doi.org/10.1071/EN15113>.
- Glassman, S.I., C. R. Levine, A.M. DiRocco, **J. J. Battles** and T. D. Bruns. 2015. Ectomycorrhizal fungal spore bank recovery after a severe forest fire: Some like it hot. *The ISME Journal*: doi: 10.1038.
- Tempel, D.J., R. J. Gutiérrez, **J. J. Battles**, D. L. Fry, Yanjun Su, Qinghua Guo, M. J. Reetz, S. A. Whitmore, G. M. Jones, B. M. Collins, S. L. Stephens, M. Kelly, W. J. Berigan, and M. Z. Peery. 2015. Modeling short- and long-term impacts of fuels treatments and wildfire on an old-forest species. *Ecosphere* 6:1-18.
- Eitzel, M., **J.J. Battles**, R.A. York, and P. de Valpine. 2015. Can't see the trees for the forest: complex factors influence survival in a temperate second-growth forest. *Ecosphere* 6:1-

17.

- Jones, D., K.O. O'Hara, **J.J. Battles**, and R. Gersonde. 2015. Alternative procedures for leaf area estimation in Sierra Nevada conifer trees. *Forests* 6: 2631-2654.
- Cousins, Stella, J.M., **J.J. Battles**, J.E. Sanders, and R.A. York. 2015. Decay patterns and carbon density of standing dead trees in California Mixed Conifer Forests. *Forest Ecology and Management* 353: 136-147.
- Gonzalez, P., **J.J. Battles**, B.M. Collins, T. Robards, and D.S. Saah. 2015. Aboveground live carbon stock changes of California wildland ecosystems, 2001-2010. *Forest Ecology and Management* 348: 68-77.
- Fahey, T.J., K. S. Kassam, P.H. Templer, B. T. Anderson, A. R. Fusco, **J. J. Battles**, J. L. Campbell, L. Rustad, C. T. Driscoll Jr., M. B. Green, N. L. Rodenhouse, P. G. Schaberg, M. A. Vadeboncoeur. 2015. The promise and peril of intensive-site-based ecological research: Insights from the Hubbard Brook Ecosystem Study. *Ecology*: 96:885-901.
- Dufour, S., M.K. Hayden, J. C. Stella, H. Piégay and **J. J. Battles**. 2014. Maintaining channel abandonment processes increases riparian plant diversity within fluvial corridors. *Ecohydrology* 8:780–791.
- Collins, B.M., A.J. Das, **J. J. Battles**, D. L. Fry, K. D. Krasnow, and S. L. Stephens. 2014. Beyond reducing fire hazard: fuel treatment impacts on overstory tree survival. *Ecological Applications* 24: 1870-1886.
- Cleavitt, N.L., **J.J. Battles** T.J. Fahey, and J.L. Blum. 2014. Determinants of survival over seven years for a natural cohort of sugar maple seedlings in a northern hardwood forest. *Canadian Journal of Forest Research* 44:1112-1121.
- Johnson, C.E., C.T. Driscoll, J.D. Blum, T.J. Fahey and **J.J. Battles**. 2014. Soil chemical dynamics after calcium silicate addition to a northern hardwood forest. *Soil Science Society of America Journal* 78:1458-1468.
- Eschtruth, A.K. and **J.J. Battles**. 2014. Ephemeral disturbances have long lasting impacts on forest invasion dynamics. *Ecology* 95:1770-1779.
- Roman, L.A., **J.J. Battles**, and J.R. McBride. 2014. Determinants of establishment survival for residential trees in Sacramento County, CA. *Landscape & Urban Planning* 129: 22-31.
- Lydersen, J.M., B. M. Collins, C.B. Dow, P. Gonzalez, C. M. Ewell, D. S. Saah, A.L. Reiner, J. Fites and **J.J. Battles**. 2014. Using field data to assess model predictions of surface and ground fuel consumption by wildfire in coniferous forests of California. *Journal of Geophysical Research: Biogeosciences* 119:223-235.
- McLauchlan, K.K., P. E. Higuera, D. G. Gavin, S. S. Perakis, M. C. Mack, H. Alexander, **J. Battles**, F. Biondi, B. Buma, D. Colombaroli, S. Enders, D. R. Engstrom, F. S. Hu, J. R.

Marlon, J. Marshall, M. McGlone, J. L. Morris, L. E. Nave, B. N. Shuman, E. Smithwick, D. H. Urrego, D. A. Wardle, C. J. Williams, J. J. Williams. 2014. Reconstructing disturbances and their biogeochemical consequences over multiple timescales. *BioScience* 64:105-116.

Battles, J.J., T.J. Fahey, C.T. Driscoll, J.D. Blum, and C. E. Johnson. 2014. Restoring soil calcium reverses forest decline. *Environmental Science and Technology Letters* 1: 15-19.

Roman, L.A., **J.J. Battles**, and J.R. McBride. 2013. The balance of planting and mortality in a street tree population. *Urban Ecosystems*. DOI 10.1007/s11252-013-0320-5.

Eitzel, M., **J.J. Battles**, R.A. York, J. Knape, and P. de Valpine. 2013. Estimating tree growth models from complex forest monitoring data. *Ecological Applications* 23: 1288-1296.
ERRATUM. 2016. Estimating tree growth from complex forest monitoring data (vol 23, pg 1288, 2013). *Ecological Applications* 26: 1943-1945.

Eschtruth, A. K., R.A. Evans, and **J.J. Battles**. 2013. Patterns and predictors of survival in *Tsuga canadensis* populations infested by the exotic pest *Adelges tsugae*: 20 years of monitoring. *Forest Ecology and Management* 305: 195-203.

Green, M.B., A.S. Bailey, S.W. Bailey, **J. J. Battles**, J. L. Campbell, C. T. Driscoll, T.J. Fahey, L. Lepine, G.E. Likens, S.V. Ollinger, and P.G. Schaberg. 2013. Decreased water flowing from a forest amended with calcium silicate. *Proceedings of the National Academy of Science* 110: 5999–6003.

York, R.A., O'Hara, K.L. & **Battles, J.J.** 2013. Density effects on giant sequoia (*Sequoiadendron giganteum*) growth through 22 years: Implications for restoration and plantation management. *Western Journal of Applied Forestry* 28:483-495.

PEER-REVIEWED CONTRIBUTIONS TO SHARED DATABASES

(co-author recognition for input on database construction and data contribution)

Jucker, T. et al. 2022. Tallo – a global tree allometry and crown architecture database. *Global Change Biology* 28: 5254-5268.

Kattge, J, G. Bönisch, S. Díaz et al. 2020. TRY plant trait database – enhanced coverage and open access. *Global Change Biology* 26: 119– 188. <https://doi.org/10.1111/gcb.14904>.

Falster, D.S. et al. 2015. BAAD: a biomass and allometry database for woody plants. *Ecology* 96: 1445.

REPORTS, BOOK CHAPTERS AND PUBLIC OUTREACH (last five years)

Andreozzi, C.L., J.B. Smith, S.M. Ostoja, N. Enstice, L. Weissberg, C. Clark, P.A. Stine, and **J.J. Battles**. 2023. Central Coast Regional Profile. Report prepared for the California Wildfire and Forest Resilience Task Force by the Science Advisory Panel.

Andreozzi, C.L., J.B. Smith, S.M. Ostoja, N. Enstice, L. Weissberg, C. Clark, P.A. Stine, and **J.J. Battles**. 2023. South Coast Regional Profile. Report prepared for the California Wildfire and Forest Resilience Task Force by the Science Advisory Panel.

Andreozzi, C.L., J.B. Smith, S.M. Ostoja, N. Enstice, L. Weissberg, C. Clark, P.A. Stine, and **J.J. Battles**. 2022. Sierra Nevada Regional Profile. Report prepared for the California Wildfire and Forest Resilience Task Force by the Science Advisory Panel.

Battles, J.J. and A. Hall. 2021. Do We Have the Science, Tools, and Policies Needed to Predict Wildfire and Its Impacts in California? UC Center Sacramento Policy Brief. Volume 04, Issue 02, April 21, 2021.

van Doorn, N.S., L.A. Roman, et al. 2020. Urban tree monitoring: a resource guide. General Technical Report PSW-GTR-266. UDA Forest Service. (1 of 19 co-authors).

Roman, L.A, van Doorn N.S., et al. 2020. Urban tree monitoring: a field guide. General Technical Report NRS-GTR-194. UDA Forest Service. (1 of 17 co-authors).

McCann, H., V. Butsic, **J. Battles**, R. Cisneros, Y. Jin, S. Kocher, M. Potts, and S. Stephens. 2020. The Benefits of Headwater Forest Management. Public Policy Institute of California ([Link to report](#)).

Axelson, J., **J.J. Battles**, and 23 others. 2019. The California Tree Mortality Data Collection Network—Enhanced communication and collaboration among scientists and stakeholders. California Agriculture 73:55-62.

Axelson, J., **J.J. Battles**, A. Das, and P. van Mantgem. 2019. Coming to terms with the new normal: Forest resilience and mortality in the Sierra Nevada. Fremontia 46: 50-56.

Ackerly, David, **John Battles**, Van Butsic, Patrick Gonzalez, Maggi Kelly, Whendee Silver, David Saah, Stefania Di Tommaso, Allegra Mayer, Diana Moanga, Isabel Schroeter, Bruce Riordan. (University of California, Berkeley). 2018. Land Acquisition and Ecosystem Carbon in Coastal California. California's Fourth Climate Change Assessment. Publication number: CCCA4-EXT-2018-003.

Dettinger, Michael, Holly Alpert, **John Battles**, Jonathan Kusel, Hugh Safford, Dorian Fougères, Clarke Knight, Lauren Miller, Sarah Sawyer. (United States Geological Survey). 2018. Sierra Nevada Summary Report. California's Fourth Climate Change Assessment. Publication number: SUM-CCCA4-2018-004.

Battles, John, David Bell, Robert Kennedy, David Saah, Brandon Collins, Robert York, John Sanders. (University of California, Berkeley). 2018. Innovations in Measuring and Managing Forest Carbon Stocks in California. California's Fourth Climate Change Assessment, California Natural Resources Agency. Publication number: CCCA4-CNRA2018-014.

RESEARCH MEDIA LINKS (recent)

White pine blister rust

<https://www.plantsciences.ucdavis.edu/news/drought-and-climate-change-shift-tree-disease-sierra-nevada>

Measuring treatments

<https://www.cafiresci.org/search?q=knight>