

# Zachary L. Steel

✉ [zlsteel@berkeley.edu](mailto:zlsteel@berkeley.edu) 🌐 [zack-steel.com](https://zack-steel.com) | Updated: April 13, 2022

## EDUCATION

University of California, Davis, Ph.D. Ecology	2014–2018
University of California, Davis, M.S. Ecology	2008–2011
Whitman College, B.A. Biology	2002–2006

## EMPLOYMENT

University of California, Berkeley:	
Post-doctoral Researcher	2019–Present
University of California, Davis:	
Graduate Student Researcher	2014–2018
Jr. Specialist Researcher	2012–2014
Fire Science Consortium Coordinator	2012–2013
US Fulbright Program, Santiago, Chile:	
Research Fellow	2011
University of California, Davis:	
Graduate Student Researcher	2008–2011
University of California, Santa Cruz:	
Assistant Biologist	2007–2008
PRBO Conservation Sciences:	
Biology Technician	2007–2008

## PUBLICATIONS

### Journal Articles

Accepted – Viljur, M. and 46 others including **Steel, Z. L.**. “The effect of natural disturbances on forest biodiversity: An ecological synthesis”, *Biological Reviews*.

Accepted – Safford, H., A. Paulson, **Z. Steel**, D. Young, and R. Wayman. “The 2020 California fire season: A year like no other, a return to the past, or a harbinger of the future?”. *Global Ecology and Biogeography*.

In Press – Levine, J., B. Collins, **Z. L. Steel**, P. de Valpine, and S. Stephens. “High-severity fire risk heightened both on and near industrially managed forests”. *Frontiers in Ecology and the Environment*.

2022 – **Steel, Z. L.**, A. Fogg, R. Burnett, L. J. Roberts, H. D. Safford. 2022. “When bigger isn’t better – implications of large high-severity wildfire patches for avian diversity and community composition”. *Diversity and Distributions* 23(3):439-453.

2021 – **Steel, Z. L.**, B. M. Collins, D. B. Sapsis, and S. L. Stephens. “Quantifying pyrodiversity and its drivers”. *Proc. R. Soc. B* 288(1948).

- 2021 – **Steel, Z. L.**, M.J. Goodwin, M.D. Meyer, G.A. Fricker, H.S.J. Zald, M.D. Hurteau, and M.P. North. Do forest fuel reduction treatments confer resistance to beetle infestation and drought mortality? *Ecosphere* 12(1):e03344.
- 2021 – Jager, H., J. Long, R. Malison, B. Murphy, A. Rust, L. Silva, R. Sollman, **Z. Steel**, M. Bowen, J. Dunham, J. Ebersole, and R. Flitcroft. “Resilience of terrestrial and aquatic fauna to historical and future wildfire regimes in western North America”. *Ecology and Evolution* 11(18):12259-12284.
- 2021 – Stephens, S., S. Thompson, G. Boisrame, B. Collins, L. Ponisio, K. Rakhmatulina, **Z. Steel**, J. Stevens, K. Wilken, and J. van Wagtendonk. “Fire, water, and biodiversity in the Sierra Nevada: A possible triple win”. *Environmental Research Communications* 3(08):1004.
- 2021 – **Steel, Z. L.**, D. Foster, M. Coppoletta, J. M. Lydersen, B. Wing, S. L. Stephens, and B. M. Collins. “Ecological resilience and vegetation transition in the face of multiple large wildfires”. *Journal of Ecology* 109(9):3340-3355.
- 2019 – **Steel, Z. L.**, B. Campos, W. Frick, R. Burnett, and H. D. Safford. “The effects of wildfire severity and pyrodiversity on bat occupancy and diversity in fire-suppressed forests”. *Scientific Reports* 9, 16300.
- 2019 – Wilkins, L. G. E., K. R. Matthew, **Z. L. Steel**, S. C. Nussle, and S. M. Carlson. “Population dynamics of *Rana sierrae* at Dusy Basin: Influence of non-native predators, drought, and restoration potential”. *Ecosphere* 10(11):e02951.
- 2018 – **Steel, Z. L.**, M. Koontz, and H. Safford. “The changing landscape of wildfire: Burn pattern trends and implications for California’s yellow pine and mixed conifer forests”. *Landscape Ecology* 33(7): 1159-1176.
- 2017 – **Steel, Z. L.**, A. E. Steel, J. Williams, J. H. Viers, P. Marquet, and O. Barbosa. “Patterns of bird diversity and habitat use in mixed vineyard-matorral landscapes of Central Chile”. *Ecological Indicators* 73:345-357.
- 2017 – Grof-Tisza, P., **Z. L. Steel**, E. Cole, M. Holyoak, and R. Karban. “Testing predictions of movement behavior in a hilltopping moth”. *Animal Behavioral* 133:161-168.
- 2017 – Grof-Tisza, P., **Z. L. Steel**, and R. Karban. “The spatial distribution and oviposition preference of the Ranchman’s tiger moth, *Platypreria virginalis* (Lepidoptera: Arctiidae)”. *Journal of the Lepidopterists’ Society* 71(1):16-19.
- 2015 – **Steel, Z. L.**, H. D. Safford, and J. H. Viers. “The fire frequency-severity relationship and the legacy of fire suppression in California forests”. *Ecosphere* 6(1):1-23.
- 2013 – Schwartz, M.W., L. B. Smith, and **Z. L. Steel**. “Conservation investment for rare plants in urban environments”. *PLOS ONE* 8(12):e83809.
- 2012 – **Steel, Z. L.**, M. L. Bond, R. B. Siegel, and P. Pyle. “Avifauna of Sierra Nevada Network parks: Assessing distribution, abundance, stressors, and conservation opportunities for 145 bird species”. National Park Service, Fort Collins, Colorado. [Natural Resource Report NPS/SIEN/NRR—2012/506](#).
- 2011 – Siegel, R. B., R. L. Wilkerson, J. F. Saracco, and **Z. L. Steel**. “Elevational distribution of common bird species on the Sierra Nevada’s west slope”. *Western Birds* 42:2-26.

#### *In Review or Revision*

- Steel, Z. L.**, G. M. Jones, B. M. Collins, R. Green, A. Koltunov, K. L. Purcell, S. C. Sawyer, M. R. Slaton, S. L. Stephens, P. Stine, and C. Thompson. “Mega-disturbances cause rapid decline of mature conifer forest habitat in California”, *Ecological Applications*.
- Weeks, J. M., H. Safford, J. Miller, **Z. Steel**, and E. Batzer. “High Severity Fire Drives Floristic Homogenization in Human-Altered Forests”, *Ecosphere*.

Williams, J., H. Safford, N. Enstice, J. Tangenberg, **Z. Steel**, and A. Paulson. "High severity burn area and proportion exceed historic conditions in forests of Sierra Nevada and adjacent ranges (USA)". *Ecosphere*.

### **Outreach Documents & Software**

2021 – USFS Region 5 Climate Change Trend Assessments (8 reports). E.g.:

Wuenschel, A., S. Gross, B. Estes, K. Merriam, H. Safford, S. Sawyer, **Z. Steel**, L. Wolf. Sierra National Forest Climate Change Trend Summary. Unpublished report. USFS Pacific Southwest Region, Vallejo CA.

2020 – **Steel, Z. L.**, M. Meyer, A. Wuenschel, S. Ostojka, and M. North. "Climate-wise reforestation toolkit". Rshiny web application prepared for the US Forest Service, and the California Climate Hub. [Available online](#)

2018 – **Steel, Z. L.**, B. R. Campos, and H. D. Safford. "Bat occupancy in Sierra Nevada wildfire areas and implications for post-fire management". Prepared for US Forest Service, Region 5. [PDF](#)

2018 – Campos, B. R., **Z. L. Steel**. FIRE-BAT spatial predictive tool. ArcGIS toolbox prepared for US Forest Service, Region 5. [Users Manual](#)

2017 – Campos, B. R., R. D. Burnett, and **Z. L. Steel**. "Bird and bat inventories in the Storrie and Chips fire areas 2015-2016: Final report to the Lassen National Forest". Point Blue Conservation Science, Petaluma, CA. Point Blue Contribution No. 2142. [PDF](#)

2017 – Fogg, A. M., **Z. L. Steel** and R. D. Burnett. "Avian Monitoring in Freds and Power fires: Final Report". Point Blue Conservation Science, Petaluma, CA. Point Blue Contribution No. 2138. [PDF](#)

2013 – Schwartz, M. W., et al. "Sensitive Animals - Appendix 15 to SEKI Natural Resources Condition Assessment". Natural Resource Report NPS/SEKI/NRCA—2013/665. National Park Service. Fort Collins, Colorado. Assessments within:

**Steel, Z. L.**, E. Reddy and R. Green. The American Pika - *Ochotona princeps*

**Steel, Z. L.**, J. Shields. Sierra Nevada Bighorn Sheep - *Ovis canadensis sierrae*

Copeland, S., K. Dybala, **Z. L. Steel**. California Condor - *Gymnogyps californianus*

**Steel, Z. L.**, Sierra Nevada Chipmunks - *Tamias spp.*

2012 – **Steel, Z. L.**, O. Barbosa, and P. Marquet. "Biodiversidad de Aves y Carbono en el Paisaje Vinedo". Three reports prepared for landowner partners in the Colchagua Valley, Chile.

2011 – **Steel, Z. L.**, M. Wilderson, P. Grof-Tisza, and K. Sulzner. "Assessing species and area vulnerability to climate change for the Oregon Conservation Strategy: Willamette Valley Ecoregion". Prepared for the Oregon Department of Fish and Wildlife and the Defenders of Wildlife.

## **TEACHING**

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### *Graduate & Post-graduate Teaching:*

Guest Lecturer – UCD, Fire Ecology	Winter 2020-2022
Guest Lecturer – UCB, Fire Ecology Seminar	Spring 2020
Co-Instructor – UCD, Fire Ecology	Winter 2018
Guest Lecturer – UCD, Ecogeomorphology	Springs 2014–2018
Certificate of Completion – UCD Foundations of Teaching workshop series	Fall 2017
Guest Lecturer – American River College, Experimental Design	Spring 2017
Teaching Assistant – UCD, Trees and Forests; PLS 144	Fall 2015

Teaching Assistant – UCD, Trees and Forests; PLS 144 Fall 2014

*Mentoring:*

Undergraduate Mentor – Student research experience Spring 2019-Present

Undergraduate Mentor – Association for Women in Science Mentoring program 2019

High School Mentor – Student & Landowner Education Stewardship program 2015–2016

Undergraduate Mentor – Student research experience Summer 2009

*Outdoor Education:*

Naturalist/Raft Guide – UCD, Outdoor & Watershed Sciences programs 2013-2018

Teacher/Scientist – Earthwatch citizen science programs 2013

Naturalist/Kayak Guide – San Juan Islands, WA Summers 2006-2007

*Undergraduate Teaching:*

Teaching Assistant – Whitman College, Genetics; BIO 205 Fall 2005

Teaching Assistant – Whitman College, Ecology; BIO 277 Spring 2005

## **AWARDS**

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***Grants written & funded:***

2020-2023 – *Implications of increasing the scale of managed wildfire on forest carbon stocks and pyrodiversity.*  
Funded by California Department of Forestry and Fire Protection (CALFIRE). \$422,000

2017-2018 – *Ecological implications of wildfire and forest restoration on birds and bats (phase II).* Funded by US Forest Service. \$122,000

2014-2017 – *Ecological implications of wildfire and forest restoration on birds and bats (phase I).* Funded by US Forest Service. \$127,000

2011 – *Quantifying avian habitat use and carbon stocks in Chilean vineyards.* Funded by US Fulbright Program. \$17,000

***Fellowships received:***

2014-2018 (7 quarters) – *Graduate Group of Ecology Fellowship.* Funded by UC Davis. \$79,000

2017 – *Ecology Student Endowment.* Funded by UC Davis. \$1500

2010 – *Graduate Group of Ecology Fellowship.* Funded by UC Davis. \$11,000

2002-2006 – *Walter Brattain Merit scholarship.* Funded by Whitman College. \$32,000

2001-2002 (2 awards) – *Governor's college scholarship.* Funded by State of California. \$2000

## **SELECT PRESENTATIONS**

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***Invited talks***

2021 – International Fire Ecology and Management Congress, *Forest resilience and transition in the face of successive large wildfires in California's Sierra Nevada Mountains*

2021 – Berkeley EcoLunch Seminar, *Wildlife and wildfire: a love-hate relationship*

2021 – Yosemite National Park Forum, *Restoring pyrodiversity to benefit Sierra Nevada wildlife communities*

2021 – Western Section of the Wildlife Society Annual Meeting (**Plenary**), *Implications of changing fire patterns on habitats and wildlife*

- 2020 – Natural Areas Association Annual Meeting, *Implications of changing fire regimes for Sierra Nevada bat and bird communities*
- 2017 – Instituto Politécnico Nacional, CIIDIR-Unidad Oaxaca, Mexico, *Murcielagos en un paisaje caracterizado por incendios: Impactos en diversidad y uso de habitat*
- 2017 – Northwest Science Conference, *The influence of burn severity on bat species occurrence in post-fire landscapes*
- 2011 – Universidad Mayor, Santiago, Chile, *Mercados de carbono: una oportunidad potencial para biodiversidad en agroecosistemas*

### **Contributed talks**

- 2022 – International Association of Landscape Ecology, *Megadisturbances Cause Rapid Decline of Mature Forest Habitat in California*
- 2021 – International Association of Landscape Ecology, *Quantifying pyrodiversity and its drivers*
- 2020 – Ecological Society of America Annual Meeting, *What doesn't kill you makes you stronger - or not: Conifer mortality following forest treatments and drought*
- 2019 – The Wildlife Society Annual Conference, *The Influence of Burn Severity and Pyrodiversity on Bat Communities in Sierra Nevada Forests*
- 2018 – Mediterranean Forest Ecosystems International Conference (MedPine6), *Changing patterns of severe wildfire lead to bird diversity declines & community transitions in conifer forests of California, USA*
- 2018 – Ecological Society of America Annual Meeting, *Bat species occupancy varies across a disturbance gradient; implications for a future of extreme wildfire events*
- 2017 – Ecological Society of America Annual Meeting, *The influence of spatial context and successional pathways on bird communities following high-severity wildfire*
- 2017 – Mediterranean Ecosystems Conference (MEDECOS), *Shifting patterns of California fire and forest landscapes in an era of global change*
- 2016 – Natural Areas Conference, *The Changing Landscape of California Fire: Trends in Burn Patterns and Post-Fire Forest Heterogeneity*
- 2011 – Buenos Aires Fulbright Regional Enhancement Seminar, *Carbon Sequestration: Risk or tool for biodiversity?*
- 2011 – Bay Area Conservation Biology Symposium, *Assessing species vulnerability to climate change in the Willamette Valley Ecoregion*

## **SERVICE**

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**Professional Society Memberships:** Ecological Society of America, The Wildlife Society, Natural Areas Association, International Association of Landscape Ecology, Association for Fire Ecology

**Journal Referee:** *Global Change Biology, Environmental Research Letters, Landscape Ecology, Current Landscape Ecology Reports, PLOS One, Ecosphere, Ecography, Diversity and Distributions, Ecology and Society, Forest Ecology and Management, Biological Conservation*

**Special Symposium co-organizer:** “Toward a comprehensive understanding of pyrodiversity: How landscape- scale heterogeneity in fire history influences biodiversity across taxa, fire regimes, and spatial scales.” International Association of Landscape Ecology 2021 meeting, Reno, NV

**Dissertation Committee Member:** For a student of the Autonomous University of Baja California