

# Cate B. Quinn

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## EDUCATION

- 2018      **PhD Ecology**, University of California at Davis, Davis, CA  
Advisor: Ben Sacks
- 2005      **BA Geology-Biology**, Brown University, Providence, RI  
Senior project on Pliocene paleoclimate

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## RESEARCH EXPERIENCE

- 2018–present      **Postdoctoral Research**, Mammalian Conservation and Ecology Unit,  
Veterinary Genetics Laboratory, University of California, Davis.  
Projects included:

- Whole genome sequencing of historical museum specimens to investigate evolutionary history of North American *Canis* species (2021–present)
- Whole genome sequencing to quantify inbreeding in montane red foxes (2019–present)
- Development of a genomic tool to monitor hybridization of the Sierra Nevada Red Fox (*final report in preparation*)
- Genetic management planning analysis for the Sierra Nevada red fox (*completed 2021*), including genetically explicit simulations of unmanaged genetic rescue
- Genetic monitoring of the Sierra Nevada DPS of Sierra Nevada red fox (2018–present)

- 2012–2018      **Graduate Research**, Ecology Graduate Group, University of California, Davis, Davis, CA.  
  
Dissertation: Noninvasive conservation genetics of the Sierra Nevada red fox (*Vulpes vulpes necator*) in California and Oregon.

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## PUBLICATIONS

- 2022      **CB Quinn**, S Preckler-Quisquater, JR Akins, PR Cross, PB Alden, SL Vanderzwan, JA Stephenson, PJ Figura, GA Green, TL Hiller, BN Sacks. Contrasting genetic trajectories of endangered and expanding red fox populations in the western U.S.
- 2022      EC Bolas\*, **CB Quinn**\*, DH Van Vuren, SL Vanderzwan, CH Floyd, KL Jones, L Shaskey, BN Sacks. Pattern and timing of mitochondrial divergence of island spotted skunks on the California Channel Islands. *Journal of Mammalogy*. \*equal authorship

- 2021 BN Sacks, KJ Mitchell, **CB Quinn**, LM Hennelly, MHS Sinding, MJ Statham, S Preckler-Quisquater, SR Fain, L Kistler, SL Vanderzwan, JA Meachen, EO Ostrander, LA Frantz. Pleistocene origins, western ghost lineages, and the emerging phylogeographic history of the red wolf and coyote. *Molecular Ecology* 30(17):4292–4304.
- 2021 BE Hatfield, JM Runcie, EA Siernion, **CB Quinn**, TR Stephenson. New detections extend the known range of the state-threatened Sierra Nevada red fox. *California Fish and Game*, 107:438–443.
- 2020 MK Schwartz, AD Walters, KL Pilgrim, KM Moriarty, KM Slauson, WJ Zielinski, KB Aubry, BN Sacks, KE Zarn, **CB Quinn**, MK Young. Pliocene-early Pleistocene geological events structure Pacific Martens (*Martes caurina*). *Journal of Heredity*, 111(2):169–181.
- 2019 **CB Quinn**, PB Alden, BN Sacks. Noninvasive sampling reveals short-term genetic rescue in an insular red fox population. *Journal of Heredity*, 110(5):556–576.
- 2018 **CB Quinn**, JR Akins, TL Hiller, BN Sacks. Predicting the potential distribution of the Sierra Nevada red fox in the Oregon Cascades. *Journal of Fish and Wildlife Management* 9(2):351–366.
- 2017 Lounsberry, ZT, **CB Quinn**, C Angulo, T Kalani, E Tiller, BN Sacks. 2017. Investigating genetic introgression from farmed red foxes into the wild population in Newfoundland, Canada. *Conservation Genetics* 18.
- 2009 Lawrence, KT, TD Herbert, **CM Brown**, ME Raymo, and AM Haywood. 2009. High-amplitude variations in North Atlantic sea surface temperature during the early Pliocene warm period, *Paleoceanography* 24.

#### Manuscripts in review, revision, or preparation

- In revision DS Green, ME Martin, SM Matthews, JR Akin, J Carlson, P Figura, BE Hatfield, JD Perrine, **CB Quinn**, BN Sacks, SL Stock, JM Tucker. Distribution and density of Sierra Nevada red fox predicted by hierarchical modeling. *Journal of Mammalogy*.
- In Preparation **CB Quinn**, BN Sacks. Demographic feedbacks between inbreeding and outbreeding depression increase risk of extirpation for small populations. *Animal Conservation*.
- In Preparation S Preckler-Quisquater, **CB Quinn**, BN Sacks. (In Prep) Maintenance of a narrow hybrid zone between native and introduced red foxes despite conspecificity and high dispersal capabilities. *Molecular Ecology*.
- In Preparation **CB Quinn**, S Preckler-Quisquater, J Carlson, P Figura, BN Sacks. Whole genomes reveal recent inbreeding in montane populations of red fox.

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#### TECHNICAL REPORTS

- In Preparation **CB Quinn** and BN Sacks. Development of a genomic tool to monitor for hybridization of the Sierra Nevada DPS of Sierra Nevada Red Fox.

- Report to U.S. Fish and Wildlife Service, Sacramento, California.
- 2022 Sierra Nevada Red Fox Conservation Advisory Team. A Conservation Strategy for the Sierra Nevada Red Fox. California Department of Fish and Wildlife, Sacramento, USA. 173 pp.
- 2022 **CB Quinn** and BN Sacks. 2022. Noninvasive genetic monitoring of the Sierra Nevada DPS of the Sierra Nevada red fox: 2018–2020. Final Report to U.S. Fish and Wildlife Service, Sacramento, California, April 30, 2022. 37 pp.
- 2022 **CB Quinn** and BN Sacks. 2022. Extension of noninvasive genetic survey for the Sierra Nevada red fox DPS. Final Report to U.S. Fish and Wildlife Service, Reno, Nevada, April 30, 2022, 18 pp.
- 2021 **CB Quinn** and BN Sacks. 2021. Genetic analysis of red foxes in Grand Teton National Park. Report to Teton National Park, Jackson, WY, December 7, 2021, 15pp.
- 2021 **Quinn CB** and BN Sacks. 2021. Genetic management planning analysis for the Sierra Nevada red fox. Final Report to U.S. Fish and Wildlife Service, Sacramento, California, March 31, 2021, 135 pp.
- 2017 **Quinn, CB**, TL Hiller, BN Sacks 2017. Distribution and genetic structure of Sierra Nevada red fox in Oregon. Report to Oregon Department of Fish and Wildlife, Salem Oregon, 53 pp.
- 2016 BN Sacks, **CB Quinn**, PB Alden. 2015. Sierra Nevada red fox monitoring: phase I. Report to United State Forest Service, Pacific Southwest Region. 37 pp.
- 2014 **CB Quinn** and BN Sacks. 2014. Ecology, distribution, and genetics of Sierra Nevada Red Fox. Report to California Department of Fish and Wildlife. 38 pp.

## PRESENTATIONS

### Professional Meetings

- 2022 “Genomic consequences of population declines in the Sierra Nevada and Cascade red fox subspecies” **CB Quinn**, S Preckler-Quisquater, J Carlson, P Figura, JR Akins, TL Hiller, BN Sacks. *Poster*. 2022 Western Section of the Wildlife Society, Reno, NV.
- 2022 “Estimating the population size and habitat associations of cougars in Yosemite National Park by combining detection dog team surveys and trail camera data” DS Green, SM Matthews, BN Sacks, **CB Quinn**, S Vanderzwan, M Buchalski, H Smith, J Hartman, BK Jackson, M McDonald, H Mackey, S Stock. *Talk*. 2022 Western Section of the Wildlife Society, Reno, NV.
- 2020 “Genomic consequences of inbreeding and admixture in the Sierra Nevada red fox” **CB Quinn**, J Carlson, P.Figura, BN Sacks. *Contributed talk*. Western Section of the Wildlife Society, Redding, CA.
- 2019 “Noninvasive sampling reveals short-term genetic rescue in an isolated red fox population” **CB Quinn**, PB Alden, BN Sacks. *Contributed talk*. Joint Wildlife Society and American Fisheries Annual Conference Reno,

NV.

- 2019 “New detection of the threatened Sierra Nevada red fox” L Siemion, B Hatfield, **CB Quinn**, J Runcie, T Stephenson. *Poster*. Joint Wildlife Society and American Fisheries Annual Conference, Reno, NV.
- 2019 “Contractions and expansions: investigating the trajectory of the Sierra Nevada red fox and its associates” **CB Quinn**, G Green, T Hiller, J Bowles, K Moriarty, B Hatfield, S Stock, BN Sacks. *Contributed talk*. Western Section of the Wildlife Society, Fish Camp, CA.
- 2019 “Outfoxed no more: Sierra Nevada red fox captures reveal new insights into habitat use and reproduction” J Carlson, P Figura, D Clifford, **CB Quinn**, BN Sacks. *Contributed talk*. Western Section of the Wildlife Society, Fish Camp, CA
- 2018 “The status and trajectory of a remnant native red fox population in the Central Sierra Nevada” **CB Quinn**, BN Sacks. *Contributed talk*. Western Section of the Wildlife Society, Santa Rosa, CA.
- 2018 “Use of noninvasive DNA to determine genetic subdivisions among ecoregional coyote populations in the Sierra Nevada” JD Owen, **CB Quinn**, BN Sacks. *Poster*. Western Section of the Wildlife Society, Santa Rosa, CA
- 2017 “Distribution and Connectivity of Sierra Nevada red fox in the Oregon Cascades” **CB Quinn**, TL Hiller, J Mcfadden-Hiller, JR Akins, BN Sacks. *Poster*. Western Section of the Wildlife Society, Reno, NV.
- 2016 “Noninvasive genetic characterization of a high-Sierra coyote population potentially impacting the endangered Sierra Nevada red fox during 4 years of drought” **CB Quinn**, BN Sacks. *Contributed talk*. Western Section of the Wildlife Society, Pomona, CA.
- 2015 “The role of inbreeding depression in limiting reproductive output of Sierra Nevada red fox” **CB Quinn**, BN Sacks. *Contributed talk*. 16th Bay Area Conservation Biology Symposium, Berkeley, CA.
- 2015 “A report on occupancy estimates, range extent, and habitat use for the Sierra Nevada red fox (*Vulpes vulpes necator*), coyote (*Canis latrans*), and the American marten (*Martes americana*) in the eastern Sierra Nevada.” CJ Stermer, **CB Quinn**, K Fien, B Furnas, BN Sacks. *Contributed talk*. Western Section of the Wildlife Society, Santa Rosa, CA.
- 2014 “A natural experiment in inbreeding depression in an isolated population of montane red fox.” **CB Quinn**, D Wolfson, BN Sacks. *Poster*. Ecological Society of America, Sacramento, CA.
- 2014 “Three years of noninvasive research on the Sonora Pass Sierra Nevada red fox population.” **CB Quinn**, C Stermer, PB Alden, D Wolfson, K Fien, JM Statham, A Rich, R Mazur, E Burkett, BN Sacks. *Contributed talk*. Western Section of the Wildlife Society, Reno, NV.
- 2013 “Conservation of the Sierra Nevada Red Fox in the Real World: Challenges, Gaps, and Management Tools.” **CB Quinn**, BN Sacks. *Invited talk and panelist*. Perspectives on Endangered Species Management Symposium in the 94<sup>th</sup> American Association for the Advancement of Science, Pacific Division, Las Vegas, NV.

**Invited  
lectures and  
seminars**  
2022

Department of Wildlife  
California, Davis, CA

- 2020 Teton National Park, Jackson, WY, presentation to agency biologists and academic collaborators. 29 September 2020
- 2017 Oregon Forest Resources Institute, Albany, OR, forest carnivore symposium. 9 October 2017.
- 2016 Yosemite Forum, Yosemite Valley, CA, public lecture series. 6 November 2016.
- 2015 Tahoe Biological Interagency Group, S. Lake Tahoe, CA. 17 November 2015.
- 2014 USFS Pacific Northwest Annual Threatened and Endangered Species and Regional Wildlife Program Managers Meeting, Ashland, OR. 21 October 2014.

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**FELLOWSHIPS**

- 2012–2015 NSF Graduate Research Fellowship, \$130,000
- 2016 Ecology Graduate Group Fellowship, \$10,500

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**SERVICE**

- 2022–present Translocation team for the Lassen population of Sierra Nevada red fox
- 2015–present Sierra Nevada red fox working group (annual presenter)
- 2019–2022 Sierra Nevada red fox conservation advisory team
- 2018 Participated in 2-day workshop for the Sierra Nevada red fox working group, Lassen National Park, CA, 23–24 April 2018.
- 2016 Led workshop on collecting mesocarnivore scats for DNA analysis (field training for 20+ state and federal biologists), Humboldt-Toiyabe and Stanislaus National forests, CA, 31 August–1 September 2016.
- 2014 Co-led workshop for Yosemite National Park biologists on approaches for studying Sierra Nevada red fox, El Portal, California, 15 October 2014.
- Peer reviewer for Biological Conservation, Animal Conservation, Ecology and Evolution

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**TEACHING AND MENTORING**

***Invited Guest Lectures***

- 2021 Conservation Biology, American River College, 20 October 2021.
- 2021 Ecology, American River College, 27 April 2021

- 2019 Wildlife Biology, American River College, 11 March 2019.
- 2015 Mammalogy, Sacramento State University. 23 October 2015.
- 2013 Conservation Biology, American River College, 23 October 2013.

***Teaching Assistantships – University of California, Davis***

- 2018 Introductory ecology and evolution, (BIS 2B, winter quarter)
- 2016 Introduction to wildlife ecology and conservation (WFC 10, fall quarter)
- 2016 Wildlife field methods (WFC 100, spring quarter)

***Mentorships***

- 2022–present *MS*: G. Rosburg-Francot, Dietary assessment of Sierra Nevada red fox and sympatric mesocarnivores using DNA metabarcoding.
- 2021–present *Undergraduate*: M. Sadyrova (Animal Biology, senior practicum), Computer simulations to test how donor attributes influence the efficacy of genetic rescue in small populations
- 2016–2018 *Undergraduate*: J. Owens (Animal Biology, senior practicum), Genetic substructure of coyotes along ecotypes in California.
- 2015–2016 *Undergraduate*: R. Kuffel (Animal Biology, senior practicum), Stable isotopes of subalpine carnivores in the Sierra Nevada.
- 2013–2014 *Undergraduate*: N. Barney (Animal Biology), Phylogeography of Pacific Crest martens

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**PRIOR FIELD AND LABORATORY EXPERIENCE**

- 2011–2012 **Sierra Nevada, CA**, Department of California Fish and Wildlife, red fox occupancy surveys: junior specialist.
- 2009–2011 (summers) **Lake Tahoe Basin, CA**, US Forest Service, project monitoring for goshawk, spotted owl, butterflies, and bats: crew leader (2011) and field technician (2009–2010)
- 2010–2011 (winters) **Tetons, WY**, US Fish and Wildlife Service/Teton National Park, wolf predation: field technician.
- 2010 (fall), 2009 (winter) **San Juans, CO**, Colorado Parks and Wildlife, snowshoe hare demograph and lynx occupancy: field technician.
- 2008 **Haines Junction, Yukon, Canada**, red squirrel demography and life history: field technician.
- 2006–2008 **Petaluma, CA**. Sonoma Mountain Institute, soils microbiology restoration: laboratory manager.
- 2006 **Point Reyes, CA**. Point Blue Conservation Science, songbird banding: field technician.
- 2004–2006 **Providence, RI**, Brown University Geological Sciences, paleoclimate reconstruction: undergraduate laboratory assistant.
- 2003 **Providence, RI**, Brown University Environmental Sciences, oceanographic surveying: undergraduate laboratory assistant.