

Qing L. Cao

Conservation Biologist | Behavioral Ecologist | Conservation Genomics Researcher

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PROFILE

Conservation biologist with long-term research experience across Asia, North America, and Africa, focusing on equid conservation, species coexistence, conservation in human-dominated landscapes, and conservation genomics. Uses field ecology, remote sensing, GIS, camera trapping, molecular tools, and pedigree-based approaches to study habitat selection, behavior, resource use, population history, and conservation management in endangered wildlife.

RESEARCH AREAS

- Species coexistence and niche differentiation in arid and steppe ecosystems
- Conservation on human-dominated landscapes
- Conservation genomics, pedigree analysis, and population management
- Equid conservation biology, including Przewalski's horse and Asiatic wild ass

CURRENT APPOINTMENTS

Postdoctoral Researcher, Smithsonian Conservation Biology Institute 2018-present
Smithsonian Institution

- Research on conservation genetics, evolutionary history, and population management of endangered equids.
- Collaborative work linking genomic evidence with ex situ and in situ conservation practice.

Lecturer / Instructor, Princeton University 2018-present
Teaching in biology, conservation biology, and global environmental change

- Contributed to teaching across multiple undergraduate courses in environmental and biological sciences.

Scientific Head, Linne Conservation, China 2022-present

- Leads conservation monitoring and research programs focused on Przewalski's horse and other dryland species in Xinjiang.

EDUCATION

PhD in Ecology and Evolutionary Biology 2011-2018
Princeton University | Advisor: Dan I. Rubenstein

- Dissertation research on niche differentiation, resource use, and coexistence between Przewalski's horse and Asiatic wild ass in arid ecosystems.

MA in Ecology and Evolutionary Biology 2009-2011
Princeton University

MS in Wildlife Conservation and Utilization 2004-2007
Beijing Forestry University | Advisor: Defu Hu

BS in Biological Sciences 2000-2004
Beijing Forestry University

SELECTED RESEARCH AND PROFESSIONAL EXPERIENCE

Przewalski's horse and Asiatic wild ass research, Kalamaili, Xinjiang *2009-present*

- Long-term field research on coexistence, habitat use, and conservation genomics.

South China tiger research and habitat assessment *2005-2009*

- Behavioral monitoring, habitat evaluation, and GIS-based assessment for tiger conservation in China.

GIS and remote sensing training and applied conservation analytics *2007-present*

- Applied spatial analysis, telemetry, and habitat modeling in wildlife research and training contexts.

SELECTED PROJECTS

- Equid behavioral ecology and conservation research supported by National Science Foundation-linked work.
- Przewalski's horse conservation and satellite monitoring supported by American Zoos & Aquarium.
- Przewalski's horse monitoring and associated dryland wildlife surveys in Kalamaili, Xinjiang.
- Genetic resource survey and molecular pedigree development for Przewalski's horse in Xinjiang.

AWARDS AND RECOGNITION

- **Southwood Prize**, British Ecological Society, for the Journal of Applied Ecology paper on coexistence between Przewalski's horse and Asiatic wild ass.
- Research grants and project support from zoological, academic, and conservation funding sources in the United States and China.

PROFESSIONAL SERVICE AND COORDINATION

- Co-coordinator for Przewalski's horse, IUCN SSC Equid Specialist Group.
- Coordinator, Przewalski's horse Conservation Alliance (PHCA) Genetic Working Group.

PROFESSIONAL AFFILIATIONS

- Sigma Xi, The Scientific Research Honor Society, Member.
- British Ecological Society, Member.

SELECTED PUBLICATIONS

2026 Cao QL, Kartzinel TR, Zhang YJ, Songer M, Liu G, Lyu HY, Hu DF, Li JC, Leimgruber P, Rubenstein DI. Return to historical range can mask niche compression in a reintroduced large mammal. *Submitted*.

2026 Cao QL, Zhang YJ, Kartzinel TR, Songer M, Shao CL, Li JC, Hu DF, Leimgruber P, Rubenstein DI. Livestock exclusion restores winter coexistence between native and reintroduced wild equids. *Submitted*.

2026 Cao QL, Zhang YJ, Zhang YB, Luo Y, Chen L, Wang ZS, Simek J, et al. Forty years of captive breeding in Przewalski's horse: pedigree-based insights into population growth, sex ratio, and inbreeding. *Wildlife Biology*, e01634. (**Cover article**)

2025 Cao QL, Zhang Y, Songer M, Leimgruber P, Hu D, Li J, Wang C, et al. Coexistence between Przewalski's horse and Asiatic wild ass in the desert: The importance of people. *Journal of Applied Ecology* 62(5): 1078-1090. (**Winner of the British Ecological Society Southwood Prize**)

2023 Cao QL, Pukazhenthil BS, Bapodra P, Lowe S, Bhatnagar YV. Equid Adaptations to Cold Environments. In Prins HHT, Gordon IJ, editors. *The Equids: A Suite of Splendid Species*, 209-246. Springer International Publishing.

2017 Sen Z, Cao QL, Keremu A, Shanhui L, Yongjun Z, Defu H. Food patch particularity and forging strategy of reintroduced Przewalski's horse in North Xinjiang, China. *Turkish Journal of Zoology* 41(5): 924-930.

2016 Rubenstein DI, **Cao QL**, Chiu J. Equids and ecological niches: behavioral and life history variations on a common theme. In Ransom JI, Kaczensky P, editors. *Wild Equids: Ecology, Management, and Conservation*, 58-68. Johns Hopkins University Press.

2016 Schoenecker KA, King SRB, Nordquist MK, Nandintsetseg D, **Cao QL**. Habitat and diet of equids. In Ransom JI, Kaczensky P, editors. *Wild Equids: Ecology, Management, and Conservation*, 41-57. Johns Hopkins University Press.

2015 Zhang Y, **Cao QL**, Rubenstein DI, Zang S, Songer M, Leimgruber P, et al. Water use patterns of sympatric Przewalski's horse and khulan: interspecific comparison reveals niche differences. *PLoS One* 10(7): e0132094.

2014 Liu G, Xu CQ, **Cao QL**, Zimmermann W, Songer M, Zhao SS, Li K, Hu DF. Mitochondrial and pedigree analysis in Przewalski's horse populations: implications for genetic management and reintroductions. *Mitochondrial DNA* 25(4): 313-318.

2009 **Cao QL**, Hu DF, Lu J, Huang ZF, Fu WY. A comparison on behavioral rhythm of South China Tiger (*Panthera tigris amoyensis*) in different age groups. *Acta Ecologica Sinica* 29: 2767-2774.

SELECTED TEACHING

- Biology and environmental science teaching at Princeton University, including conservation biology and global environmental change, with Princeton teaching diploma.
- Earlier teaching and training contributions in conservation biology, savanna ecology, GIS, remote sensing, and habitat analysis workshops at Smithsonian National Zoo and Princeton Library.

METHODS AND TECHNICAL STRENGTHS

- Field ecology, wildlife monitoring, camera trapping, and behavioral observation
- Remote sensing, GIS, Google Earth Engine, telemetry, and spatial habitat analysis
- Conservation genetics, molecular ecology, DNA barcoding, and pedigree analysis
- R, Python, and quantitative analysis for ecological research

LANGUAGES

Chinese (native), English (professional).