

Xiaoxiao Li

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Research Interests

My research explores how multiple environmental stressors—including chemical pollution, nutrient enrichment, temperature and habitat heterogeneity—affect biodiversity, species interactions, ecosystem functioning, and the stability of ecological communities. I combine empirical data with theoretical and simulation-based approaches to understand the mechanisms underlying these responses.

Employment

2025–present **University of Sheffield** — Postdoctoral Research Associate, School of Biosciences, Ecology and Evolutionary Biology.

UKRI-NERC project on the impacts of chemical mixtures on UK freshwater biodiversity in a changing world.

Collaborating supervisor: Prof. Andrew P. Beckerman.

2022–2024 **Guangdong University of Technology** — Postdoctoral Research Associate, School of Ecology, Environment and Resources.

Research on hydrology-driven trophic dynamics and keystone species in coastal food webs.

Collaborating supervisor: Prof. Zhifeng Yang.

Education

2015–2022 **Beijing Normal University** — PhD in Ecology, School of Environment.

Thesis: *Food web trophic structure and stability in the Yellow River Delta wetlands.*

Supervisor: Prof. Wei Yang.

2019–2020 **University of Potsdam** — Visiting PhD Researcher, Institute of Biochemistry and Biology, Ecology and Ecosystem Modelling.

Supervisors: Prof. Ursula Gaedke and Prof. Peter C. de Ruiter.

2011–2015 **Henan University** — BSc in Environmental Science, College of Geography and Environmental Science.

Thesis: *Heavy metal enrichment risk and its spatial distribution in soils around thermal power plants.*

Supervisor: Prof. Xinling Ruan.

Research Funding

Principal Investigator

2024–2026 **National Natural Science Foundation of China** — *Food web dynamics and stability under nutrient enrichment in the Pearl River Estuary.* ¥300,000.

- 2022–2025 **Guangdong Basic and Applied Basic Research Foundation** — *Food web rewiring under hydrological regulation in the Pearl River Estuary*. ¥100,000.
- 2022–2023 **China Postdoctoral Science Foundation** — *Impact of invasive *Spartina alterniflora* on the stability of native seagrass food webs*. ¥80,000.

Contributed Projects

- 2025–present **UKRI-NERC** — *Assessing and managing the impacts of mixtures of chemicals on UK freshwater biodiversity in a changing world*.
- 2022–2024 **Program for Guangdong Introducing Innovative and Entrepreneurial Teams** — Water quality improvement and ecological restoration in aquatic ecosystems.
- 2019–2020 **DFG Priority Program, Germany** — *Flexibility matters: interplay between trait diversity and ecological dynamics using aquatic communities as model systems*.
- 2015–2018 **National Program on Key Basic Research Project of China** — Mechanisms and simulation of land-reclamation impacts on ecological processes in coastal wetlands.

Manuscripts in Preparation

- 35 **Li X.**, Maltby L., Beckerman A.P. Food web structure and species sensitivity distributions additively shape community tolerance and extinction coherence under chemical stress.
- 34 **Li X.**, Johnson T.F., Liang R., Childs D.Z., Maltby L., Beckerman A.P. Phylogenetic, allometric, and functional structure of species chemical sensitivity across aquatic taxa.
- 33 **Li X.**, Forgoston E., Beckerman A.P., Gaedke U., de Ruiter P.C. Structural dependencies in trophic interaction strength promote stability in natural food webs.
- 32 Strydom T., **Li X.**, Blake L.S.L., Beckerman A.P., Childs D.Z. Is everything a Niche model?
- 31 Danet A., **Li X.**, Hanfling R., Beckerman A.P. Effects of trophic and resource couplings on community stability.

Peer-reviewed Publications

- 2026** 30. Liu X., Yang W., **Li X.**, & Sun T. (2026). Food web structure and energy flux can enhance multifunctionality: Evidence from a river-lake ecosystem. *Water Biology and Security*, 100634.
- 2025** 29. **Li X.**, Yang W., Novak M., Zhao L., de Ruiter P.C., Yang Z., & Guill C. (2025). Body mass–biomass scaling modulates species keystone-ness to press perturbations. *Ecology Letters*, 28(2), e70086.
28. Gaedke U., **Li X.**, Guill C., Hemerik L., & de Ruiter P.C. (2025). Seasonal shifts in trophic interaction strength drive stability of natural food webs. *Ecology Letters*, 28(1), e70075.
27. **Li X.**, Gaedke U., Wacker A., Schulze B., Yang Z., Moorthi S., ... & Klauschies T. (2025). Coadaptation shapes ecological interactions in mixotroph-resource systems. *Oikos*, e11054.
26. **Li X.**, Xu Z., Zhang S., Gao W., Dong Q., Guo F., ... & Yang Z. (2025). Eutrophication-driven changes in plankton trophic interactions: insights from trade-offs in functional traits. *Environmental Science & Technology*, 59, 744–755.

25. Yao W., Yang W., Fu X., **Li X.**, & Sun T. (2025). Quantifying energy fluxes and trophic dynamics to assess artificial reef restoration success: Evidence from Bohai Bay, China. *Estuarine, Coastal and Shelf Science*, 109467.
24. Yang W., Zhang Z., **Li X.**, Zhao J., & Sun T. (2025). Comparing food web structure and trophic diversity between natural and artificial habitats: a case study in the Bohai Sea, China. *Marine Biology*, 172(6), 85.
23. Jiao L., Zhang P., **Li X.**, Yang W., & Sun T. (2025). Escalating climatic and anthropogenic disturbances drive a fragmented and squeezed vegetation pattern: a case study in the Yellow River Delta from 1990 to 2020. *Environmental and Sustainability Indicators*, 100734.
22. Liu X., Yang W., **Li X.**, Ding J., Sun T., & Liu H. (2025). Water regulation weakens the relationship between biodiversity and ecosystem multifunctionality: Insights from a highly managed Chinese lake. *Journal of Environmental Management*, 373, 124003.
21. Dong Q., Xu Z., Chen Y., **Li X.**, Fan W., Xue J., ... & Yang Z. (2025). Heterogeneous saltwater intrusion patterns and drivers among multiple outlets in a complex estuary. *Journal of Environmental Management*, 393, 126896.
20. Wu Y., Yang W., Liu J., **Li X.**, & Cui B. (2025). Eutrophication drives resource use efficiency variations in freshwater plankton communities across river–lake continuum in China's Poyang Lake Basin. *Hydrobiologia*, 1–17.
- 2024** 19. **Li X.**, Yang W., Jiao L., Sun T., & Yang Z. (2024). Sediment water content drives movement of intertidal crab *Helice tientsinensis* more strongly than salinity variations. *Marine Environmental Research*, 201, 106711.
18. Liu X., Yang W., Fu X., & **Li X.** (2024). Determination of the ecological water levels in shallow lakes based on regime shifts: A case study of China's Baiyangdian Lake. *Ecohydrology & Hydrobiology*, 24(4), 931–943.
17. Xu C., Xu Z., **Li X.**, & Yang Z. (2024). Integrated simulation-surrogate-optimization modeling framework for multiple tradeoffs among socioeconomic and ecological targets in reservoir operations. *Journal of Environmental Management*, 368, 122092.
16. Liu X., Sun T., Yang W., **Li X.**, Ding J., & Fu X. (2024). Meta-analysis to identify inhibition mechanisms for the effects of submerged plants on algae. *Journal of Environmental Management*, 355, 120480.
- 2023** 15. **Li X.**, Yang W., Ma X., Zhu Z., Sun T., Cui B., & Yang Z. (2023). Invasive *Spartina alterniflora* habitat forms high energy fluxes but low food web stability compared to adjacent native vegetated habitats. *Journal of Environmental Management*, 334, 117487.
14. **Li X.**, Klauschies T., Yang W., Yang Z., & Gaedke U. (2023). Trait adaptation enhances species coexistence and reduces bistability in an intraguild predation module. *Ecology and Evolution*, 13, e9749.
13. Feng J., Li S., **Li X.**, Jiang Y., Wang R., Meng X., ... & Stenseth N.C. (2023). Coupling strength between omnivory loops and their one-species-delete subloops drives real food web stability. *Theoretical Ecology*, 16(4), 327–338.
- 2022** 12. **Li X.**, Yang W., Sun T., & Yang Z. (2022). Trophic diversity and food web structure of vegetated habitats along a coastal topographic gradient. *Frontiers in Marine Science*, 9, 920745.

11. Yang W., Fu X., **Li X.**, & Yang Y. (2022). Temporal changes of the food web structure and function driven by changes in hydrological regimes and water quality in a large shallow lake. *Frontiers in Environmental Science*, 10, 987600.
10. Fu X., Yang W., Zheng L., Liu D., & **Li X.** (2022). Spatial patterns of macrobenthos taxonomic and functional diversity throughout the ecotones from river to lake: A case study in Northern China. *Frontiers in Ecology and Evolution*, 10, 922539.
- 2021** 9. **Li X.**, Yang W., Gaedke U., & de Ruiter P.C. (2021). Energetic constraints imposed on trophic interaction strengths enhance resilience in empirical and model food webs. *Journal of Animal Ecology*, 90(9), 2065–2076.
8. **Li X.**, Yang W., Sun T., & Gaedke U. (2021). Quantitative food web structure and ecosystem functions in a warm-temperate seagrass bed. *Marine Biology*, 168(5), 74.
- 2020** 7. **Li X.**, Yang W., Li S., Sun T., Bai J., Pei J., ... & Cui B. (2020). Asymmetric responses of spatial variation of different communities to a salinity gradient in coastal wetlands. *Marine Environmental Research*, 158, 105008.
- 2019** 6. **Li X.**, Yang W., Sun T., & Su L. (2019). Framework of multidimensional macrobenthos biodiversity to evaluate ecological restoration in wetlands. *Environmental Research Letters*, 14(5), 054003.
- 2018** 5. Yang W., **Li X.**, Jin Y., & Sun T. (2018). The impact of multiple seashore reclamation activities on vegetation cover in the Yellow River Delta, China: implications based on structural equation modeling. *Journal of Coastal Conservation*, 22, 283–292.
4. Pei J., Yang W., Cai Y., Yi Y., & **Li X.** (2018). Relationship between vegetation and environment in an arid-hot valley in southwestern China. *Sustainability*, 10(12), 4774.
- 2017** 3. Yang W., **Li X.**, Pei J., Sun T., Shao D., Bai J., & Li Y. (2017). Bioavailability of trace metals in sediments of a recovering freshwater coastal wetland in China's Yellow River Delta, and risk assessment for the macrobenthic community. *Chemosphere*, 189, 661–671.
2. Yang W., **Li X.**, Sun T., Pei J., & Li M. (2017). Macrobenthos functional groups as indicators of ecological restoration in the northern part of China's Yellow River Delta wetlands. *Ecological Indicators*, 82, 381–391.
1. Yang W., **Li X.**, Sun T., Yang Z., & Li M. (2017). Habitat heterogeneity affects the efficacy of ecological restoration by freshwater releases in a recovering freshwater coastal wetland in China's Yellow River Delta. *Ecological Engineering*, 104, 1–12.

Preprint

- 2023** Forgoston E., Day S., de Ruiter P.C., Doelman A., Hartemink N., Hastings A., Hemerik L., Hening A., Hofbauer J., Kefi S., Kessler D.A., Klauschies T., Kuehn C., **Li X.**, Moore J.C., Morrien E., Neutel A.M., Pantel J., Schreiber S.J., Shaw L.B., Shnerb N., Siero E., Storch L.S., Thorne M.A.S., van de Leemput I., van Velzen E., Weinans E. (2023). Stability and fluctuations in complex ecological systems. *arXiv:2306.07447*.

Awards & Honors

- 2021 Academic Scholarship of Beijing Normal University, ¥18,000.
 2019–2020 Chinese Scholarship Council Abroad Visiting Scholarship, €20,000.
 2019 Academic Scholarship of Beijing Normal University, ¥18,000.

- 2018 Chinese National Scholarship for Doctoral Students, ¥30,000.
- 2017 Academic Scholarship of Beijing Normal University, ¥15,000.
- 2016 Academic Scholarship of Beijing Normal University, ¥10,000.
- 2015 Outstanding Graduate of Henan University.

Conference Organization

- 2023 **The 4th International Symposium of Coastal Resources and Environment (CORE)**, Guangzhou, China — Organizing Committee Member.
- 2020 **DynaTrait Project Annual Meeting**, Potsdam, Germany — Session Chair.

Conference & Seminar

- 2026 Seminar at INRAE, Rennes, France — Talk.
- 2026 SETAC Europe 36th Annual Meeting, Maastricht, The Netherlands — Poster.
- 2025 BES Annual meeting 2025, Edinburgh, UK — Poster.
- 2025 Seminar at University of Potsdam, Ecology and Ecosystem Modelling, Potsdam, Germany — Talk.
- 2024 Symposium on Mathematical Ecology, Yunnan, China — Talk.
- 2024 Frontier Forum on Global Change Ecology, Beijing, China — Talk.
- 2023 The 22nd China Conference on Ecology, Guizhou, China — Talk.
- 2022 Lorentz Workshop: Stability and Fluctuations in Complex Ecological Systems, Leiden, the Netherlands — Talk and poster.
- 2021 Ecological Society of America Annual Meeting — Poster.
- 2019 Production Ecology & Resource Conservation, the Netherlands — Group talk.
- 2018 Conference of the International Society of Limnology, Nanjing, China — Talk.
- 2017 Conference of the International Society for River Science, New Zealand — Talk.

Teaching & Mentoring

Teaching

- 2024 Guest lecture, *Watershed Ecosystem Health Assessment* (Master's), 2 hours.
- 2016–2017 Teaching Assistant, *Environmental Statistics* (Bachelor's), 32 hours.

Co-mentoring

- Xianting Fu PhD student — Food-web energy fluxes and local stability in lakes.
- Weiping Dong Master's student — Species distribution models for plankton.
- Ziyue Zhang Master's student — Food-web structure and dynamic modelling.

Outreach & Engagement

- 2026 Freshwater Quality Programme [Webinar](#) (22 June 2026)
- 2023 Stakeholder engagement with managers of the Yellow River Delta National Nature Reserve on project progress and conservation strategies for *Spartina alterniflora*.
- 2022 Conservation outreach supporting preparation of UNESCO application materials for the Minjiang Estuary Nature Reserve.

Academic Service

Journal Editor *River* (Youth Editor).

Reviewer *Nature Communications; Communications Biology; Ecology; Journal of Ecology; Journal of Animal Ecology; Journal of Applied Ecology; Limnology & Oceanography; Water Research; Ecology and Evolution; Theoretical Ecology; Ecological Indicators; Frontiers in Ecology and Evolution; Journal of Environmental Management; Progress in Oceanography.*

Memberships British Ecological Society (BES); Ecological Society of China (ESC); Association for the Science of Limnology and Oceanography (ASLO).