# How Biodiversity Impacts Businesses and Societies

Wall Street Journal coverage

* <https://www.wsj.com/articles/companies-pledge-action-to-stop-biodiversity-loss-in-new-initiative-aa3d4489>
* <https://www.wsj.com/articles/half-a-year-after-the-cop-agreement-on-nature-companies-are-increasingly-looking-at-their-biodiversity-impact-d0b53fb3>
* <https://www.wsj.com/articles/gucci-owner-kering-drugmaker-gsk-and-others-are-developing-a-global-standard-on-nature-loss-4c2a7f3b>
* <https://www.wsj.com/articles/quantifying-companies-impact-on-forests-oceans-is-a-challenge-11647349201>

1. This chapter describes what we know and don’t know about business and biodiversity.

## What Is Biodiversity?

1. Biodiversity is the variety of living organisms and ecosystems. Formally, it is “the variability among living organisms from all sources, including…the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems” (Secretariat of the Convention on Biological Diversity, 1992, p. 4).
2. In 2022, more than 200 nations established the Kunming-Montreal Global Biodiversity Framework laying out a plan for the world to live in harmony with nature. Target 15 directly notes the roles and responsibilities of businesses in achieving societies compatible with biodiversity conservation and restoration. “Take legal, administrative or policy measures to encourage and enable business, and in particular to ensure that large and transnational companies and financial institutions: (a) Regularly monitor, assess, and transparently disclose their risks, dependencies and impacts on biodiversity, including with requirements for all large as well as transnational companies and financial institutions along their operations, supply and value chains, and portfolios; (b) Provide information needed to consumers to promote sustainable consumption patterns; (c) Report on compliance with access and benefit-sharing regulations and measures, as applicable; in order to progressively reduce negative impacts on biodiversity, increase positive impacts, reduce biodiversity-related risks to business and financial institutions, and promote actions to ensure sustainable patterns of production” (CBD, 2022, p. 11).
3. Biodiversity is important for both utilitarian and cultural reasons. The sustainable use of biodiversity allows us to meet present human needs while preserving options for future people to meet their own needs, in line with the concept of sustainable development (UNWCED, 1987). The most basic need met by biodiversity is the need for natural resources produced by ecosystems. An ecosystem is "a dynamic complex of plant, animal, and micro-organism communities and their nonliving environment interacting as a functional unit" (United Nations, 1992, p. 3). Common ecosystem units include forests, wetlands, and estuaries. Materials produced by ecosystems and useful for people are natural resources. Natural resources include both living and nonliving materials. Biodiversity is relevant to living materials, such as timber, edible plants and animals, and fibers. Meeting present shelter, food, and clothing needs requires sustainable sources of such natural resources. Ecosystem produce natural resources, and meeting present and future needs requires sustaining ecosystem function to produce and reproduce resources. The same argument applies to immaterial benefits derived from ecosystems, which have been named ecosystem services to distinguish them from material natural resources. Some ecosystem services derived from biodiversity include waste disposal, water purification, climate regulation, recreation, cultural value, religious meaning, inspiration, flood mitigation, and protection from natural disasters (Hanson et al., 2012). Companies depend on ecosystem services that maintain stable business environments (Hanson et al., 2012). Biodiversity decline can create business risks at the level of individual businesses and at the higher level of systemic risks across economies (Evison & Knight, 2010; Kedward et al., 2020, 2022; TEEB, 2010). Maintaining and restoring biodiversity is necessary to ensure the sustainability of natural resources and ecosystem services used by businesses and needed by people, in both the present and future.
4. Biodiversity is conceptualized in three types that can be nested: ecosystem diversity, species diversity, and genetic diversity (Berrisford, 2021). Ecosystem diversity is the variety of ecological systems or “ecosystems.” The second type of biodiversity is species diversity, the variety of organisms within an ecosystem. Genetic diversityis the third type of biodiversity and is the variety of genes within a species.

## The State of Biodiversity

* 1. Alberts, E. C. (2022, April 11). *Global biodiversity is in crisis, but how bad is it? It’s complicated*. Mongabay Environmental News. <https://news.mongabay.com/2022/04/global-biodiversity-is-in-crisis-but-how-bad-is-it-its-complicated/>
  2. Pennisi, E. (2021). Getting the big picture of biodiversity. *Science*, *374*(6570), 926–931. <https://doi.org/10.1126/science.acx9637>

## The Desired State of Biodiversity

* + 1. Mace, G. M., Reyers, B., Alkemade, R., Biggs, R., Chapin III, F. S., Cornell, S. E., Díaz, S., Jennings, S., Leadley, P., Mumby, P. J., Purvis, A., Scholes, R. J., Seddon, A. W. R., Solan, M., Steffen, W., & Woodward, G. (2014). Approaches to defining a planetary boundary for biodiversity. *Global Environmental Change*, *28*(1), 289–297. <https://doi.org/10.1016/j.gloenvcha.2014.07.009>

1. Recognizing that business activity reduces or eliminates biodiversity, sustainability goals increasingly seek to preserve and restore biodiversity. Businesspeople are now exploring how their companies can impact ecosystems and species “in a way and at a rate that does not lead to the long-term decline of biodiversity” (Secretariat of the Convention on Biological Diversity, 1992, p. 5).

## The Interdependence of Business and Biodiversity

*This section explains “the need for businesses to integrate biodiversity conservation into their operations to mitigate risks, enhance resilience, and contribute positively to global sustainability goals.”*

# What Biodiversity Topics Has Business and Society Scholarship Addressed?

Key terms from chapter solicitation

* Biodiversity
* Physical environment
* Ability of corporations to respond to challenges in their physical environment
  + Scopes framework
  + Competitive restrictions
* Ecosystem stability
* Human well-being
* Economic prosperity
* Business activities / operations
* Ecosystem services
* Biodiversity conservation
* Risk mitigation
* Resilience
* Global sustainability goals
* Field of business in society
* Past and present relevance of biodiversity for the field of business in society
* Destroying an ecosystem if another ecosystem is created (offset)
* Ratio versus absolute outcomes
  + Carbon/water intensity versus carbon emissions or water withdrawal

## Biodiversity Crisis

1. “Biodiversity crisis” appeared in the academic literature as early as 1992, in an article about how biologists and members of the Royal Swedish Academy of Sciences could help end the crisis by conserving and rehabilitating biodiversity (Western, 1992). Swaney and Olson (Swaney & Olson, 1992) is one of the earliest academic journal articles indexed with both biodiversity and business as subject terms.

## Managing Biodiversity

1. Management scholars began studying the organizational, network, leadership, and psychological characteristics of the response by biologists and others working in conservation (Westley, 1997).

## Measuring Biodiversity

### Measuring Baseline Biodiversity

1. Baseline biodiversity is the current state of biodiversity in an ecosystem or species. It is measured in the present and is a static rather than dynamic.
2. Measuring genetic biodiversity
3. Measuring species biodiversity
   1. eDNA measurement <https://www.naturemetrics.com/species-detection>
4. Measuring ecosystem biodiversity

### Measuring Biodiversity Change

1. Unlike measuring baseline biodiversity, measuring biodiversity change requires choosing a reference condition to compare against a point-in-time biodiversity measurement. The choice of reference condition often determines if change has been loss or gain, making the choice of reference condition a critical decision point in the measurement of biodiversity change. Imagine a company engaged in soybean farming wants to measure biodiversity change over 200 acres of soil ecosystem it owns and has used for 35 years to grow soybeans. The choice of reference condition will determine the biodiversity change measurement. If the reference condition is the ecosystem 3 years ago when the soil was under the same cultivation conditions as the present point-in-time biodiversity measurement, then the biodiversity change measure will likely show no change in biodiversity. However, if the reference condition is the soil ecosystem 80 years ago, when it was a prairie ecosystem rather than a soybean field, then the same point-in-time measure that showed no change in biodiversity compared to a reference condition from 3 years prior could show a biodiversity loss compared to a reference condition from 80 years prior.
2. Scientists have developed several methods to define a reference condition for measuring biodiversity change.
   1. (Gann et al., 2019)
3. Broadly, the choice of reference condition involves normative judgments about the desired ecosystem and/or biodiversity state. Scholars have called conservation biology—the field of study most associated with biodiversity conservation and restoration—an “explicitly normative science” (Galusky, 2000).
4. Strange, N., Ermgassen, S. zu, Marshall, E., Bull, J. W., & Jacobsen, J. B. (2024). Why it matters how biodiversity is measured in environmental valuation studies compared to conservation science. Biological Conservation, 292, 110546. <https://doi.org/10.1016/j.biocon.2024.110546>
5. (Ben Rejeb-Mzah et al., 2024) review indices used to measure biodiversity
6. CDC Biodiversité. (2021). *Global Biodiversity Score – 2021 Update—Establishing an Ecosystem of Stakeholders to Measure the Biodiversity Performance of Human Activities*. <https://www.cdc-biodiversite.fr/publications/global-biodiversity-score-update2021-cahier18/>
7. IFRS Foundation. (2023a). *IFRS S1 General Requirements for Disclosure of Sustainability-related Financial Information*.
8. IFRS Foundation. (2023b). *IFRS S2 Climate-related Disclosures*.
9. S&P Global Sustainable1. (2023). *Sustainability Quarterly*.
10. TEEB. (2010). *TEEB - The Economics of Ecosystems and Biodiversity for Business—Executive Summary 2010*. <http://www.teebweb.org/LinkClick.aspx?fileticket=bYhDohL_TuM=&tabid=1278&mid=2357>
11. WWF France & AXA. (2019). *Into the Wild: Integrating Nature into Investment Strategies*.

## Sthe Problems of B Loss

# Outstanding Research Needs

## Business or industry level impacts

1. See p. 1377 in White et al. (White et al., 2024)
2. Irvine-Broque, A., & Dempsey, J. (2023). Risky business: Protecting nature, protecting wealth? *Conservation Letters*, *n/a*(n/a), e12969. <https://doi.org/10.1111/conl.12969>
3. (Roome, 1998): Sustainability strategies for industry

## Ecosystem-level thinking

1. (WCMC, 2023)

# References

Ben Rejeb-Mzah, I., Jaubert, N., Mrabet, H., & Vincent, A. (2024). *Quantifying Biodiversity Loss Risk: Biodiversity intactness indices* (SSRN Scholarly Paper No. 4888492). https://papers.ssrn.com/abstract=4888492

Berrisford, K. (2021, December 21). *A Simple and Visual Definition of Biodiversity*. Network for Business Sustainability. https://www.nbs.net/articles/a-simple-and-visual-definition-of-biodiversity

CBD. (2022, December 19). *15/4. Kunming-Montreal Global Biodiversity Framework*. https://www.cbd.int/doc/decisions/cop-15/cop-15-dec-04-en.pdf

Evison, W., & Knight, C. (2010). *Biodiversity and business risk*. PricewaterhouseCoopers and the World Economic Forum.

Galusky, W. J. (2000). The Promise of Conservation Biology: The Professional and Political Challenges of an Explicitly Normative Science. *Organization & Environment*, *13*(2), 226–232. https://doi.org/10.1177/1086026600132008

Gann, G. D., McDonald, T., Walder, B., Aronson, J., Nelson, C. R., Jonson, J., Hallett, J. G., Eisenberg, C., Guariguata, M. R., Liu, J., Hua, F., Echeverría, C., Gonzales, E., Shaw, N., Decleer, K., & Dixon, K. W. (2019). International principles and standards for the practice of ecological restoration. Second edition. *Restoration Ecology*, *27*(S1). https://doi.org/10.1111/rec.13035

Hanson, C., Ranganathan, J., Iceland, C., & Finisdore, J. (2012). *The corporate ecosystem services review: Guidelines for identifying business risks and opportunities arising from ecosystem change. Version 2.0* (p. 48). World Resources Institute. https://www.wri.org/research/corporate-ecosystem-services-review

Kedward, K., Ryan-Collins, J., & Chenet, H. (2020). *Managing nature-related financial risks: A precautionary policy approach for central banks and financial supervisors* [Working Paper]. https://www.ucl.ac.uk/bartlett/public-purpose/publications/2020/aug/managing-nature-related-financial-risks

Kedward, K., Ryan-Collins, J., & Chenet, H. (2022). Biodiversity loss and climate change interactions: Financial stability implications for central banks and financial supervisors. *Climate Policy*, 1–19. https://doi.org/10.1080/14693062.2022.2107475

Panwar, R., Ober, H., & Pinkse, J. (2023). The uncomfortable relationship between business and biodiversity: Advancing research on business strategies for biodiversity protection. *Business Strategy and the Environment*, *32*(5), 2541–2647. https://doi.org/10.1002/bse.3139

Roome, N. (1998). *Sustainability Strategies for Industry: The Future of Corporate Practice* (N. Roome, Ed.). Island Press.

Roome, N. (2011). Looking Back, Thinking Forward: Distinguishing Between Weak and Strong Sustainability. In *The Oxford Handbook of Business and the Natural Environment*. Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199584451.003.0034

Secretariat of the Convention on Biological Diversity. (1992, May 22). *Convention on Biological Diversity: Text and Annexes*.

Swaney, J. A., & Olson, P. I. (1992). The Economics of Biodiversity: Lives and Lifestyles. *Journal of Economic Issues*, *XXVI*(1), 1–25.

TEEB. (2010). *The Economics of Ecosystems and Biodiversity in Business and Enterprise.* https://teebweb.org/publications/teeb-for/business-and-enterprise/

United Nations. (1992). *Convention on Biological Diversity*. https://www.cbd.int/convention/text/

UNWCED. (1987). *Our Common Future*. Oxford University Press.

WBCSD. (2024). *One Planet Business for Biodiversity (OP2B) – WBCSD*. https://www.wbcsd.org/actions/one-planet-business-for-biodiversity-op2b/

WCMC. (2023, November). *Towards ecosystem-level thinking by the private sector*. UNEP-WCMC. http://production-wordpress.unep-wcmc.org/towards-ecosystem-level-thinking-by-the-private-sector/

Western, D. (1992). The Biodiversity Crisis: A Challenge for Biology. *Oikos*, *63*(1), 29–38. https://doi.org/10.2307/3545513

Westley, F. (1997). “Not on Our Watch”: The Biodiversity Crisis and Global Collaboration Response. *Organization & Environment*, *10*(4), 342–360. https://doi.org/10.1177/192181069701000402

White, T. B., Bromwich, T., Bang, A., Bennun, L., Bull, J., Clark, M., Milner-Gulland, E. J., Prescott, G. W., & Starkey, M. (2024). The “Nature-Positive” Journey for Business: A Conceptual Research Agenda to Guide Contributions to Societal Biodiversity Goals. *One Earth*, *7*(8), 1373–1386. https://doi.org/10.1016/j.oneear.2024.07.003