



The trashing of treasure: global biodiversity needs intensive care

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ASBTRACT: Continuing population declines and extinctions across the earth's biodiversity spectrum further undermine global ecological functioning and the security of human society. A comprehensive summary of the soon to be released Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) Nexus Assessment report was published in December 2024. It stated that the current environmental, social and economic crises, reflected in mounting biodiversity loss, global climate change, growing water and food insecurity and risks to human health, are inseparable. It also warned that biodiversity levels have fallen between 2% and 6% per decade for the last 30 to 50 years. The level of harm being inflicted on nature is chilling for human society given that the report also stated that ~\$58 trillion of global economic activity in 2023 was in sectors moderately to highly nature dependent. Setting aside the strong moral arguments for biodiversity conservation, this situation points to a mounting economic disaster. On a positive note, the report summary did list a suite of proposals for slowing this alarming level of biodiversity loss. However, separate from the IPBES Nexus report, factors that need to be addressed include the expectation of continuous economic growth, extreme concentration of global wealth and power; economic materialism; corporate tax avoidance; public and private sector corruption; the non-incorporation of environmental costs in generating Gross Domestic Product; and the flooding of the internet with misinformation, including climate change denial.

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Numerous reports have highlighted the loss of biodiversity globally (Carson, 1962; Wilson, 1985; Diamond, 1989; Stork and Lyal, 1993; Pimm and Raven, 2000; Thomas et al., 2004; Dickman et al., 2007; Dunn et al., 2009; Ripple et al., 2017; Kehoe et al. 2021; Raven and Wagner, 2021; Harvey et al. 2023; Boyle et al. 2024; Woinarski et al. 2024; Carluccio et al. 2025), including mites (Winchester and Ring, 1996; Carlson et al., 2017; Napierala et al., 2018; Elo and Sorvari, 2019; Sullivan and Ozman-Sullivan, 2021, 2022; Seeman, 2022; Ozman-Sullivan and Sullivan, 2023; Ozman-Sullivan et al., 2024).

The mounting environmental, social and economic costs of biodiversity loss across the world (Ehrlich and Ehrlich, 1981; Cardinale et al., 2012; Ripple et al., 2017; Carrington, 2018; OECD, 2019; Bradshaw et al., 2021; Sullivan and Ozman-Sullivan, 2022, 2023) were put in a holistic context in a comprehensive summary of the most recent Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) Nexus Assessment report released in December 2024 in Windhoek, Namibia (the full report is to be issued in 2025). The IPBES Plenary, composed of representatives of the 147 governments that are members of IPBES, endorsed the full report, which was the product of three years of collaborative, interdisciplinary work by 165 experts from 57 countries from all regions of the world (Anonymous, 2024).

In brief, the IPBES Nexus report summary (Anonymous, 2024) stated that the current environmental, social and economic crises, reflected in mounting biodiversity loss,

growing water and food insecurity, health risks and climate change, are intimately interconnected. Furthermore, they compound each other in ways that can make separate efforts to address them both ineffective and counterproductive.

The year 2024 was the first in which the average global temperature was clearly 1.5 °C above the pre-industrial average, a threshold established by the Paris Agreement to restrict the risks and impacts associated with climate change (Anonymous, 2025a). Arrival at this tragic milestone has sharpened the focus on the growing environmental crisis because climate change is also a key contributor to biodiversity loss (Thomas et al., 2004). In response to this dire situation, McGuire and Hallam (2025) challenged scientists to act urgently in an article titled "Scientists prize neutrality – that doesn't cut it anymore. In 2025, they must fully back the climate movement".

According to the IPBES Nexus report summary (Anonymous, 2024), biodiversity, the richness and variety of all life on Earth, continues to decline globally, regionally and locally. More specifically, biodiversity levels have dropped by 2% to 6% every 10 years across multiple indicators for the last 30 to 50 years. Setting aside any moral arguments for biodiversity conservation, this continuing tragic loss of biodiversity could be described politely as economic suicide since the report stated that ~\$58 trillion of global economic activity in 2023 was in sectors moderately to highly dependent on what nature provides. Furthermore, the re-

port summary stated that up to \$25 trillion of negative impacts on biodiversity, climate, water resources and public health were not considered in decision-making in the fossil fuel, agriculture and fisheries sectors.

Urgently arresting the continuing biodiversity, climate and poverty/social justice crises is an enormously complex but not impossible challenge. Many government agencies, indigenous groups, NGOs, academic institutions, businesses, local groups and journalists across the world are making valuable contributions to public education and biodiversity conservation and the halting of climate change.

The summary of the IPBES Nexus Report (Anonymous, 2024) lists 70 political and community level responses, including some low cost responses that can reduce the intensity of the current crisis. Furthermore, some of the response options can have broad, positive impacts. They include the restoration of carbon-rich ecosystems such as forests, including mangroves, and degraded soils; better integration of landscape and seascape management; urban nature-based solutions; sustainable, healthy diets; and supporting indigenous food systems.

Earlier, Ripple et al. (2017), in the landmark publication, "World Scientists' Warning to Humanity; A Second Notice", documented the dimensions of the growing global environmental crisis and outlined numerous measures that need to be urgently adopted in response.

Bradshaw et al. (2021) asserted that the global environmental emergency requires fundamental changes to global capitalism, education programs and society, including the abandonment of the focus on perpetual economic growth; social equality; a rapid transition from fossil-fuel use to renewable energy sources; and the empowerment of minority and disadvantaged groups in all societies.

Stehfest et al. (2009) stated that the livestock sector accounts for 18% of greenhouse gas emissions and 80% of human land use. They argued that a global shift to a less meat-based diet, or even a complete transition to a plant-based diet, would free up 2.7 billion hectares of pastureland and 100 million hectares of cropland for revegetation and greatly reduce the production of methane and nitrous oxide, both potent greenhouse gases. They concluded that this dietary change would substantially improve global land use and human health and play a major role in climate change mitigation.

Other actions that would substantially contribute to saving the great majority of the world's remaining biodiversity include: the protection of natural and semi-natural habitats, especially the subtropical and tropical forests; habitat restoration with local species; management of soils as a vast carbon sink; minimization of air, water and soil pollution; a reduced human population; and the sustainable use of global resources (Sullivan and Ozman-Sullivan, 2022).

Achieving urgent biodiversity and climate change goals is also being slowed by factors such as the growth of populism, nationalism and authoritarianism; an identity crisis in 'democracies'; public and private sector corruption; widespread ignorance of the extreme consequences of the

current 'business as usual' approach; lack of environmental education in schools; hundreds of thousands of academics not taking enough responsibility for social change; corporate tax avoidance; vast and increasing military expenditure; regional wars; growing disrespect for the United Nations and its institutions; increasing disregard for facts as a basis for decision making; gender discrimination; enormous wealth and resource use differences between the global rich elite and the huge masses of humanity in grinding poverty; the non-incorporation of environmental costs in generating Gross Domestic Product; non-enforcement of national and international laws to protect biodiversity; suppression of environmental activism through violence and oppressive laws; increasing concentration of media ownership; and flooding of the Internet with misinformation by vested interests seeking to sow fear and disharmony. As one example of the horrifically distorted global economy, Anonymous (2025b) reported that the wealth of the world's billionaires grew by two trillion dollars in 2024, amounting to 5.7 billion dollars per day, which was three times faster than in the previous year.

The enormous and complex social, political and economic challenges to biodiversity conservation, climate stabilisation, sustainability and social justice can only be overcome by a huge, brave, collective, on-going effort worldwide. We can all contribute by consciously minimizing our ecological footprints in all aspects of our daily lives and through active support of biodiversity conservation, renewable energy and social justice initiatives.

Authors' contributions

Gregory T. Sullivan: Conceptualisation (equal), writing - original draft (lead), writing - editing after review (equal). **Sebahat K. Ozman-Sullivan:** Conceptualisation (equal), writing - original draft (support), writing - editing after review (equal).

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Conflict of interest

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REFERENCES

Anonymous. 2024. Media release: IPBES Nexus Assessment. Available from <https://www.ipbes.net/node/85582> (Last accessed: 20 December 2024).

- Anonymous. 2025a. Global climate highlights 2024. Available from <https://climate.copernicus.eu/global-climate-highlights-2024> (Last accessed: 18 January 2025).
- Anonymous. 2025b. Billionaire wealth surges by \$2 trillion in 2024, three times faster than the year before, while the number of people living in poverty has barely changed since 1990. Available from <https://www.oxfam.org/en/press-releases/billionaire-wealth-surges-2-trillion-2024-three-times-faster-year-while-number> (Last accessed: 21 January 2025).
- Boyle, M.J.W., Sharp, A.C., Barclay, M.V., Chung, A.Y.C., Ewers, R.M., de Rougemont, G., Bonebrake, T.C., Kitching, R.L., Stork, N.E. and Ashton, L.A. 2024. Tropical beetles more sensitive to impacts are less likely to be known to science. *Current Biology*, 34 (16): 770-771.
doi: 10.1016/j.cub.2024.06.059
- Bradshaw, C.J.A., Ehrlich, P.R., Beattie, A., Ceballos, G., Crist, E. et al. 2021. Underestimating the challenges of avoiding a ghastly future. *Frontiers in Conservation Science*, 1: 615419.
doi: 10.3389/fcsc.2020.615419
- Cardinale, B.J., Duffy, J.E., Gonzalez, A., Hooper, D.U., Perrings, C. et al. 2012. Biodiversity loss and its impact on humanity. *Nature*, 486: 59-67.
doi: 10.1038/nature11148
- Carlson, C.J., Burgio, K.R., Dougherty, E.R., Phillips, A.J., Bueno, V.M. et al. 2017. Parasite biodiversity faces extinction and redistribution in a changing climate. *Science Advances*, 3(9): e1602422.
doi: 10.1126/sciadv.1602422
- Carluccio, A., Capezzuto, F., Maiorano, P., Sion L. and D'Onghia, G. 2025. Cold-water coral ecosystems along the Apulian coasts: Biodiversity and urgency of conservation measures in the Anthropocene. *Journal for Nature Conservation*, 84: 126785.
doi: 10.1016/j.jnc.2024.126785
- Carrington, D. 2018. What is biodiversity and why does it matter to us? Available from <https://www.theguardian.com/news/2018/mar/12/what-is-biodiversity-and-why-does-it-matter-to-us> (Last accessed: 11 December 2024).
- Carson, R. 1962. *Silent spring*. Houghton Mifflin, New York, USA, 368 pp.
- Diamond, J.M. 1989. Overview of recent extinctions. In: *Conservation for the Twenty-First Century*. Western, D. and Pearl, M.C. (Eds). Oxford University Press, Oxford, UK, 37-41.
- Dickman, C.R., Pimm, S.L. and Cardillo, M. 2007. The pathology of biodiversity loss: the practice of conservation. In: *Key topics in conservation biology*. MacDonald, D. and Service, K. (Eds). Wiley-Blackwell Publishing, Oxford, UK, 1-16.
- Dunn, R.R., Harris, N.C., Colwell, R.K., Koh, L.P. and Sodhi, N.S. 2009. The sixth mass coextinction: are most endangered species parasites and mutualists? *Proceedings of the Royal Society B*, 276: 3037-3045.
doi: 10.1098/rspb.2009.0413
- Ehrlich, P.R. and Ehrlich, A.H. 1981. *Extinction: The causes and consequences of the disappearance of species*. Random House, New York, USA, 305 pp.
- Elo, R.A. and Sorvari, J. 2019. The impact of forest clear felling on the oribatid mite fauna inhabiting *Formica aquilonia* nest mounds. *European Journal of Soil Biology*, 94: 103101.
doi: 10.1016/j.ejsobi.2019.103101
- Harvey, J.A., Tougeron, K., Gols, R., Heinen, R., Abarca, M., Abram, P.K., Basset, Y. et al. 2023. Scientists' warning on climate change and insects. *Ecological Monographs*, 93 (1): e1553.
doi: 10.1002/ecm.1553
- Kehoe, R., Frago, E. and Sanders, D. 2021. Cascading extinctions as a hidden driver of insect decline. *Ecological Entomology*, 46 (4): 743-756.
doi: 10.1111/een.12985
- McGuire, B. and Hallam, R. 2025. Scientists prize neutrality – that doesn't cut it anymore. In 2025, they must fully back the climate movement. Available from <https://www.theguardian.com/commentis-free/2025/jan/09/planet-dying-climate-crisis-emergency-scientists> (Last accessed: 12 January 2025).
- Napierała, A., Książkiewicz-Parulska, Z. and Błoszyk, J. 2018. A Red List of mites from the suborder Uropodina (Acari: Parasitiformes) in Poland. *Experimental and Applied Acarology*, 75: 467-490.
doi: 10.1007/s10493-018-0284-5
- OECD. 2019. *Biodiversity: Finance and the economic and business case for action*. OECD Publishing, Paris, France, 121 pp.
doi: 10.1787/a3147942-en
- Ozman-Sullivan, S.K. and Sullivan, G.T. 2023. Coextinction is magnifying the current extinction crisis, as illustrated by the eriophyoid mites and their host plants. *Acarologia*, 63 (1): 169-179.
doi: 10.24349/vktn-dk8m
- Ozman-Sullivan, S.K., Sullivan, G.T., Cakir, S., Bas, H., Saglam, D., Doker, I. and Tixier, M.-S. 2024. Phytoseiid mites: trees, ecology and conservation. *Diversity*, 16: 542.
doi: 10.3390/d16090542
- Pimm, S.L. and Raven, P. 2000. Extinction by numbers. *Nature*, 40: 843-845.
doi: 10.1038/35002708
- Raven, P.H. and Wagner, D.L. 2021. Agricultural intensification and climate change are rapidly decreasing insect biodiversity. *Proceedings of the National Academy of*

- Sciences of the United States of America, 118 (2): e2002548117.
doi: [10.1073/pnas.2002548117](https://doi.org/10.1073/pnas.2002548117)
- Ripple, W.J., Wolf, C., Newsome, T.M., Galetti, M., Alamgir, M. et al. 2017. World scientists' warning to humanity: a second notice. *BioScience*, 67 (12): 1026-1028.
doi: [10.1093/biosci/bix125](https://doi.org/10.1093/biosci/bix125)
- Seeman, O.D. 2022. Mite conservation: which species should we care about – and should we care at all? In: *Acarological frontiers: Proceedings of the XVI International Congress of Acarology (1-5 December 2022, Auckland, New Zealand)*. Zhang, Z.-Q., Fan, Q.-H., Heath, A.C.G. and Minor, M.A. (Eds). Magnolia Press, Auckland, New Zealand, 328 pp. *Zoosymposia*, 22: 094-094.
doi: [10.11646/zoosymposia.22.1.52](https://doi.org/10.11646/zoosymposia.22.1.52)
- Stehfest, E., Bouwman, L., van Vuuren, D. P., den Elzen, M.G.J., Eickhout, B. and Kabat, P. 2009. Climate benefits of changing diet. *Climate Change*, 95: 83-102.
doi: [10.1007/s10584-008-9534-6](https://doi.org/10.1007/s10584-008-9534-6)
- Stork, N.E. and Lyal, C.H.C. 1993. Extinction or 'co-extinction' rates? *Nature*, 366: 307.
doi: [10.1038/366307a0](https://doi.org/10.1038/366307a0)
- Sullivan, G.T. and Ozman-Sullivan, S.K. 2021. Alarming evidence of widespread mite extinctions in the shadows of plant, insect and vertebrate extinctions. *Austral Ecology*, 46 (1): 163-176.
doi: [10.1111/aec.12932](https://doi.org/10.1111/aec.12932)
- Sullivan, G.T. and Ozman-Sullivan, S.K. 2022. Global mite diversity is in crisis: what can we do about it? In: *Acarological frontiers: Proceedings of the XVI International Congress of Acarology (1-5 December 2022, Auckland, New Zealand)*. Zhang, Z.-Q., Fan, Q.-H., Heath, A.C.G. and Minor, M.A. (Eds). Magnolia Press, Auckland, New Zealand, 328 pp. *Zoosymposia*, 22: 89-93.
doi: [10.11646/zoosymposia.22.1.51](https://doi.org/10.11646/zoosymposia.22.1.51)
- Sullivan, G.T. and Ozman-Sullivan, S.K. 2023. Biyolojik çeşitliliğin korunması ve akarlar. In: *Genel akaroloji*. Doğan, S. and Ozman-Sullivan, S.K. (Eds). Nobel Akademik Yayıncılık, Ankara, Türkiye, 607-625. [In Turkish]
- Thomas, C.D., Cameron, A., Green, R.E., Bakkenes, M., Beaumont, L.J. et al. 2004. Extinction risk from climate change. *Nature*, 427: 145-148.
doi: [10.1038/nature02121](https://doi.org/10.1038/nature02121)
- Wilson, E.O. 1985. The biological diversity crisis: Despite unprecedented extinction rates, the extent of biological diversity remains unmeasured. *BioScience*, 35 (11): 700-706.
doi: [10.2307/1310051](https://doi.org/10.2307/1310051)
- Winchester, N.N. and Ring, R.A. 1996. Centinellan extinction: extirpation of northern temperate old-growth rainforest arthropod communities. *Selbyana*, 17 (1): 50-57.
- Woinarski, J.C.Z., Braby, M.F., Gibb, H., Harvey, M.S., Legge, S.M., Marsh, J.R., Moir, M.L., New, T.R., Rix, M.G. and Murphy, B.P. 2024. This is the way the world ends; not with a bang but a whimper: Estimating the number and ongoing rate of extinctions of Australian non-marine invertebrates. *Cambridge Prisms: Extinction*, 2: e23, 1-11.
doi: [10.1017/ext.2024.26](https://doi.org/10.1017/ext.2024.26)
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