

Post-2020 Global Biodiversity Framework

Population Abundance: An essential measure of ecosystem integrity

Technical Briefing for CBD negotiators

Key messages

In order to know whether we are on track to achieving the goals of the post-2020 Global Biodiversity Framework (GBF), we need to measure what matters. For ecosystem integrity (goal A of the 1st draft GBF), the essential components are: the extent of good quality habitat, species diversity and the abundance of species. However, the set of headline indicators proposed for the GBF¹ does not include an indicator specifically for species population abundance. This is a significant gap.

The Living Planet Index (LPI) can fill this gap: it is an established indicator which measures population abundance and is compiled using national data.

Background and Rationale

- Three variables must be measured to assess the integrity of ecosystems: 1) the extent of good quality habitat, 2) the diversity of species, and 3) the abundance of species. All three indicators are needed to give a full picture of the integrity of ecosystems and the extent to which ecosystem recovery is taking place.²
- Abundance of wild species is an essential biodiversity variable. Unless we increase the average abundance of wild species populations, it will not be possible to halt and reverse biodiversity loss.
- The relevance of population abundance is recognised in the first draft of the post-2020 GBF, in milestone A.2 (... and **the abundance and distribution of populations of species is enhanced or at least maintained**) and implicitly in goal A.
- The IUCN World Conservation Congress in 2021 recognised the importance of monitoring trends in species abundance. In [Resolution 116](#), adopted by more than 98% of the votes, made up of both state and non-state members³, the IUCN Congress called for:
 - A GBF that aims for (...) *the recovery of the population abundance of species*
 - A (...) *monitoring framework that ensures that key dimensions of biodiversity, including trends of species populations at global level (...) are (...) monitored.*

¹ Non-paper: *Proposed monitoring framework for the post-2020 global biodiversity framework* [SBSTTA-24 - Documents](#)

² Pereira et al (2013) Essential Biodiversity Variables. Science. DOI: 10.1126/science.1229931.

³ State members of IUCN voted with 98.06% in favour of adoption of the motion.

- The draft set of headline indicators⁴ currently does not include a headline indicator to monitor changes in population abundance, creating a significant gap in the monitoring framework. Instead, the Species Habitat Index (SHI) is proposed at the Headline level. The SHI is a modelled indicator that measures habitat change, but does not specifically measure abundance trends.
- The LPI is uniquely placed to provide a robust and reliable measure of changes in wild-species abundance. It is an established indicator (unlike many other proposed Headline Indicators), that contains data on nearly 28,000 populations of nearly 5,000 species spanning five decades, and can be disaggregated regionally, nationally, and for particular habitat and species groups. It was [an indicator for several Aichi Biodiversity Targets](#)⁵ of the Strategic Plan for Biodiversity 2011-2020.
- The LPI complements other indicators such as the Red List Index (which tracks extinction risk) and also provides trend data on some species that are not currently included in the Red List Index. The LPI can also capture changes in biodiversity more rapidly.
- Over 40 countries have data for at least 50 species (and many countries have data sets for several hundred species) already providing a solid basis for the widespread use of the LPI at national level.
- A predictive map is currently being developed to give an expected trend of the LPI at national level.
- In a [survey](#) developed by the CBD Secretariat during SBSTTA 24 (May 2021), 81% of Parties that responded agreed that the LPI is relevant to measure overall progress of goal A. This scored higher than for some of the other proposed indicators.

Details about the Living Planet Index

What is the Living Planet Index?

- The [LPI](#) is an established indicator of biodiversity change. It tracks changes in the relative abundance of wild species populations over time.
- The LPI meets the various criteria previously established (publicly available, peer-reviewed⁶, regularly updated, existing mechanism for updating the indicator by a Biodiversity Indicators Partnership (BIP) member).
- A decrease in the LPI represents an average decline in the size of populations of wild species. As a result, the LPI provides crucial information of pressures on habitats and the consequent loss of biodiversity even if species have not yet been assessed as threatened with extinction.
- The building blocks of the index are time-series of vertebrate population sizes (or a proxy measure) from terrestrial, freshwater, and marine habitats around the world. The data sources are listed for each data set and come primarily from scientific papers and national species monitoring schemes.
- The data is gathered from almost 4,000 sources which use increasingly sophisticated technology to estimate population sizes, such as remote sensing to monitor populations, and processing big data from citizen science initiatives. The number of populations, geographical coverage and coverage of different species groups continues to increase, thereby improving the reliability and scope of the Index.

⁴ Non-paper Proposed monitoring framework for the post-2020 global biodiversity framework [SBSTTA-24 - Documents](#)

⁵ Tittensor et al (2014) A mid-term analysis of progress toward international biodiversity targets. Science. DOI: 10.1126/science.1257484.

⁶ See: Loh et al. (2005) The Living Planet Index: using species population time series to track trends in biodiversity. Phil. Trans. R. Soc. B360:289–295. <http://doi.org/10.1098/rstb.2004.1584>, and McRae et al. (2017) The Diversity-Weighted Living Planet Index: Controlling for Taxonomic Bias in a Global Biodiversity Indicator. PLoS ONE 12(1): e0169156. <https://doi.org/10.1371/journal.pone.0169156>.

- The LPI is highlighted in the [IPBES Global Assessment on Biodiversity and Ecosystem Services Report](#), and is used in other global assessments ([GEO-6](#), [Global Wetlands Outlook](#), [Global Biodiversity Outlook-5](#)).
- The method that underpins the LPI has also been used in other established indicators such as the [Wetland Extent Index](#), and the [Wild Bird Index](#))⁷.

The LPI at regional and national level

- The LPI can provide regional and national trends. It is open-source and its data are freely available: Data are currently available for 195 countries (161 are Parties to the CBD) and these datasets continue to grow. [Guidelines](#) and support to develop a national level LPI are available.
- The methodology that is used for the LPI has been adopted at a regional (Arctic Species Trend Index⁸, Mediterranean wetlands⁹) and national (Canada – part of the Canadian Environmental Sustainability Indicators, Australia¹⁰, the Netherlands¹¹, Uganda¹², China¹³, Belgium¹⁴) level, as well as for selected groups of species and habitats (Arctic migratory birds¹⁵, migratory fish¹⁶, forest species¹⁷).
- The indicator has also recently been used to explore how biodiversity trends in developing countries vary with other SDG indicator trends. As the amount of data varies for each country, where insufficient data are available to calculate a LPI at the national level, techniques have been developed to calculate extrapolated values.
- In addition to the tools for analysis and a guidance document, experts from the [LPI partnership](#) regularly provide advice and support for the development of national LPIs. The key partners of the LPI are the Zoological Society of London and World Wide Fund for Nature (WWF).

⁷ The Wetland Extent Index is also a [BIP indicators](#). For the Wild Bird Index, see also: [IPBES global/regional indicator factsheet](#)

⁸ McRae L, Gill M, Bohm M, Deinet S, & Collen B. (2012) The Arctic Species Trend Index: using vertebrate population trends to monitor the health of this rapidly changing ecosystem. *Circumpolar Biodiversity*, 13: 144-156.

⁹ Galewski T, Collen B, McRae L, et al (2011). Long term trends in the abundance of Mediterranean wetland vertebrates: from global recovery to localized declines. *Biological Conservation*, 144, 1392-1399.

¹⁰ Bayraktarov, Elisa, et al. "Variable effects of protected areas on long-term multispecies trends for Australia's imperiled birds." *Conservation Science and Practice* (2021): e443.

¹¹ van Strien, Arco J., et al. "Modest recovery of biodiversity in a western European country: The Living Planet Index for the Netherlands." *Biological Conservation* 200 (2016): 44-50.

¹² Pomeroy, D., Tushabe, H., and Loh, J. (2017). *The State of Uganda's Biodiversity 2017*. National Biodiversity Data Bank. Makerere University, Kampala.

¹³ WWF China. (2015). *Living planet report China 2015: Development, species and ecological civilization*. WWF China in partnership with China Council for International Cooperation on Environment and Development (CCICED), Institute of Geographic Sciences and Natural Resources Research (IGSNRR) and Institute of Zoology of Chinese Academy of Sciences (CAS), and the Global Footprint Network.

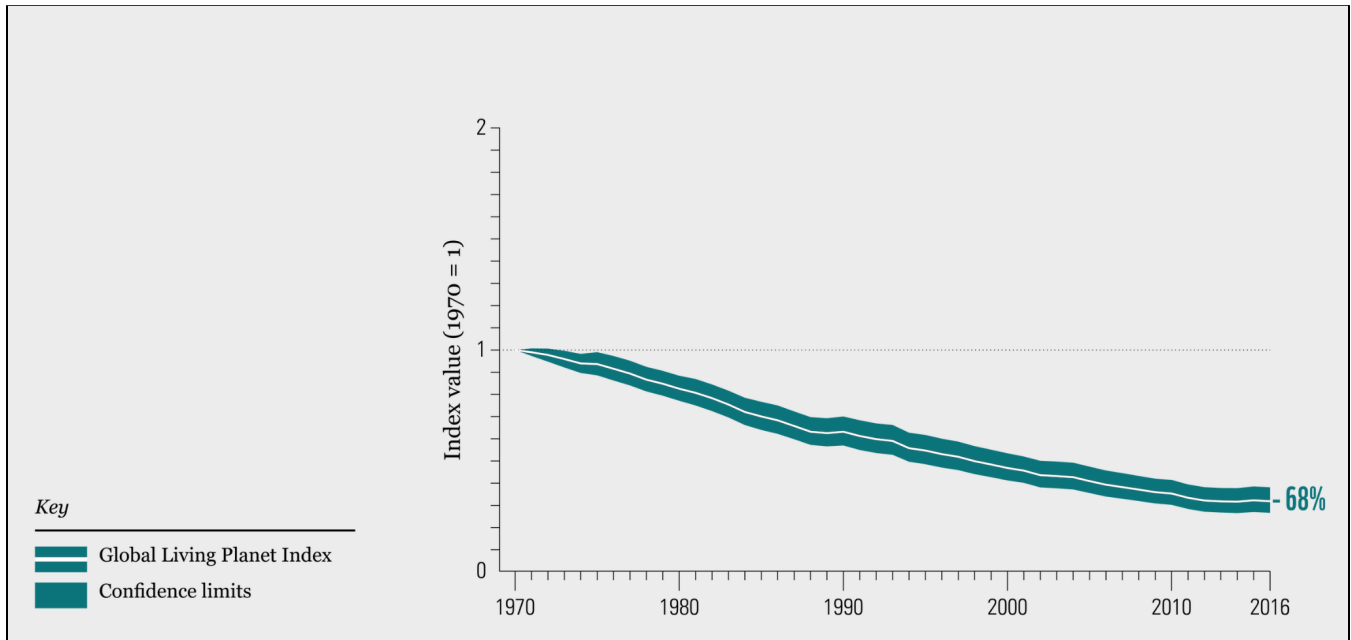
¹⁴ WWF. (2020). *Rapport Planète Vivante - La Nature en Belgique*. Szczodry, O., Eggermont, H., Paquet, J.-Y., Herremans, M., and Luyten, S. editors. WWF, Brussels, Belgium.

¹⁵ Deinet, S., Zöckler, C., Jacoby, D., Tresize, E., Marconi, V., McRae, L., Svobods, M., & Barry, T. (2015). *The Arctic Species Trend Index: Migratory Birds Index*. Conservation of Arctic Flora and Fauna, Akureyri, Iceland.

¹⁶ Deinet, S., Scott-Gatty, K., Rotton, H., Twardek, W. M., Marconi, V., et al. (2020). *The Living Planet Index (LPI) for migratory freshwater fish - Technical Report*. World Fish Migration Foundation, The Netherlands.

¹⁷ Green, E. J., McRae, L., Freeman, R., Harfoot, M. B. J., Hill, S. L. L., et al. (2020). Below the canopy: global trends in forest vertebrate populations and their drivers. *Proc Biol Sci* 287:20200533. doi: 10.1098/rspb.2020.0533.

Figure 1: The 2020 Living Planet Index suggests that by 2016 populations had declined on average by 68% since 1970. ZSL/WWF, 2020.



Further rationale for including the LPI in the monitoring framework of the post-2020 Global Biodiversity Framework

- Understanding the status and trends of wildlife populations (abundance) is critical in monitoring the integrity of the ecosystems on which we rely. It is also important in identifying those animals and places that are most in need of conservation action.
- The LPI is currently the most comprehensive indicator of trends in relative abundance of populations .
- The LPI was previously adopted by the CBD to measure progress towards the CBD’s 2010 biodiversity target¹⁸ and then used as [an indicator for several Aichi Biodiversity Targets](#)¹⁹.
- The LPI was proposed as a headline indicator in previous drafts of the monitoring framework.
- In addition to being an essential headline indicator for Goal A and Milestone A.2, the LPI can be used as a component or complementary indicator for other targets of the GBF, including as a complementary indicator to measuring trends for the following proposed targets:
 - Ensure that the harvesting, trade and use of wild species is sustainable, legal, and safe for human health (Target 5)
 - Populations of different habitat specialist species (e.g. for forest specialists), and
 - Genetic variation within populations (relevant for Goal A)

¹⁸ Butchart et al. (2010) Global Biodiversity: Indicators of Recent Declines. Science. DOI: 10.1126/science.1187512.

¹⁹ Tittensor et al (2014) A mid-term analysis of progress toward international biodiversity targets. Science. DOI: 10.1126/science.1257484.

- The LPI could potentially also be used as one of the indicators to measure the 2030 Mission. Species population abundance is an essential biodiversity variable, and the LPI could be used to measure whether biodiversity is on a path to recovery by 2030 (the current draft text for the Mission), and whether biodiversity loss is being reversed to achieve a nature-positive world - WWF's proposal for the Mission).

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