





# Application of the Living Planet Index to France (Metropolitan territory and Overseas)

Postdoctoral or Research engineer position 2 years - Paris (France)

## Context and general objective

The Living Planet Index (LPI, Loh et al. 2005) is an indicator of the variation of species abundance over time, which aggregates the time series of vertebrate populations of terrestrial, freshwater and marine systems at the global level into a relative index with the population level in 1970 as reference. The LPI is published every two years as part of the Living Planet Report (Almond et al. 2020) and its application is an important contribution to the diagnosis, communication and political management of the biodiversity crisis. Its use in numerous scientific articles, its media echo and its mobilization by organizations such as the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES, 2019) make it a relevant tool to shed light on many issues. The proposed project is at the interface between expertise and research and aims to decline the Living Planet Index at the scale of French territories.

## Main steps of the project

Three main steps, with distinct objectives, will be investigated:

(1) Evaluating, collecting and collating necessary data to build the LPI on a French scale. The first step will be to identify the data already available for calculating the LPI within the framework of the *Système d'Information de l'Inventaire du Patrimoine naturel (SINP)*, and beyond if necessary. This step will also allow for the identification of geographical areas (for example, for which data are more accessible) on which preliminary analyses can be carried out to address objectives (2) and (3).

(2) Meaning of the index obtained and determination of the limitations of its interpretation. This work can build on recent works that have improved our understanding of the roles of various methodological choices in the behavior of the LPI and its interpretation, such as the method of weighting abundances (Collen et al. 2009; Jasper 2020) and population/species trends (Leung et al. 2020), accounting for imperfect sampling, or the role of random fluctuations in abundance time series (Buschke et al. 2021). In addition to the application of data identified and compiled under objective (1), this step may also rely on the use of simulated data using simple population dynamics models. This work will be based, for example, on a comparison of different species weighting methods (equal weighting, initial abundance, body mass, etc.), and of their issues, notably on the conceptual (ecological significance of the index according to its weighting) and technical (sensitivity, reliability, robustness) levels.

(3) Application of the LPI index to the diagnosis of biodiversity dynamics on a French scale. The implementation of the LPI in France will be based on work already done on local variations of the index (PACA region, Mediterranean wetlands, etc.), and will include the exploration of taxonomic and spatio-temporal specificities (covariates). The index can be adapted geographically, for example to sub-national territories (such as eco-regions). Metropolitan France could be targeted initially, before an application to the Overseas Territories. The possibility of extending the national LPI to other taxonomic groups than vertebrates will be studied.

## Skills and profile of the candidate:

- The candidate should have a PhD in ecology or biostatistics, with a good knowledge of biodiversity conservation issues, preferably in population ecology or macroecology.

- Essential qualifications include strong skills in the analysis of large datasets and associated computational methodologies, including programming for data management and statistical processing (R or other).

- The candidate should have excellent listening and dialogue skills, possibly through experience in facilitating/leading collaborative projects.

- Excellent English skills (written and spoken); although not required, French will be appreciated.

## Missions associated with the position:

In addition to carrying out the steps described above, the candidate will be required to:

- Write a report related to each of the research axes and a scientific publication related to axes (2) and (3)

- Ensure regular and transparent communication on the progress of the project between WWF and the MNHN staff

- Participate in the scientific animation of the host laboratory at MNHN
- Participate in the supervision of a Master 2 student
- Participate in the dissemination of results in connection with WWF France

## Working conditions:

The person recruited will be co-hosted by MNHN and WWF. At MNHN, he/she will be hosted at the CESCO laboratory (UMR 7204 - Centre d'Ecologie et des Sciences de la Conservation), Paris (France) where he/she will join the population ecology team. He/she will work 1-2 days per week at the WWF office.

The candidate commits to publish the results of his/her research in high-level international scientific journals with the other people involved in the project, as well as to communicate them at international conferences or through other activities.

#### Appointment:

The contract is funded by WWF France and will be established with the MNHN administration for a period of 24 months (2 years), starting as soon as possible from January 2024 (depending on the availability of the applicant). The <u>net salary</u> will be approximately  $2 \ 200 \in$  (after taxes), including social security benefits and basic health care.

#### Application:

- The application must be written in French or English, including a cover letter, a full CV, letters of recommendation or names/contacts of at least two references, as well as any useful information such as university degree grades.

- Deadline and submission: Applications should ideally be sent before December 15, 2023 to J.B. Mihoub (mihoub@mnhn.fr), Alexandre Robert (alexandre.robert@mnhn.fr), Florian Barnier (florian.barnier@mnhn.fr) and Yann Laurans (ylaurans@wwf.fr). Incomplete applications will not be considered.

- After a first selection based on the applications received, individual interviews will be offered to the pre-selected candidates from December 15, 2023.

#### References

- Almond, R.E.A., Grooten M. & Petersen, T. (2020) Living Planet Report 2020—Bending the Curve of Biodiversity Loss.
- Buschke, F. T., Hagan, J. G., Santini, L., & Coetzee, B. W. (2021). Random population fluctuations bias the Living Planet Index. Nature Ecology & Evolution, 5(8), 1145-1152.
- Collen, B. et al. (2009). Monitoring change in vertebrate abundance: the Living Planet Index. Conserv. Biol. 23, 317–327.
- IPBES (2019).Summary for Policymakers of the Global Assessment Report on Biodiversity and Ecosystem Services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.
- Jaspers, A. (2020). Can a single index track the state of global biodiversity? Biol. Conserv. 246, 108524.
- Leung, B. et al. (2020). Clustered versus catastrophic global vertebrate declines. Nature 588, 267–271.
- Loh, J. et al. (2005) The Living Planet Index: using species population time series to track trends in biodiversity. Philos. Trans. R. Soc. B 360, 289–295.