

BioSpace25 - Biodiversity insight from Space
10 - 14 February 2025 | ESA-ESRIN | Frascati - Italy

Monitoring biodiversity with ecological niche models and time series of remote sensing products

Neftalí Sillero, João Alírio, Nuno Garcia, Inês Freitas, João Campos, A. Márcia Barbosa, Salvador Arenas-Castro, Isabel Pôças, Lia Duarte, Ana Cláudia Teodoro

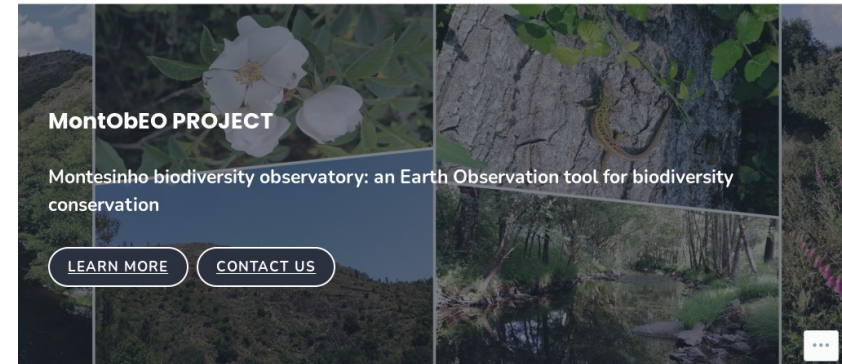
- MontObEO research project
- Funded by FCT (Portugal)
- Biodiversity monitoring framework



FCT Fundação
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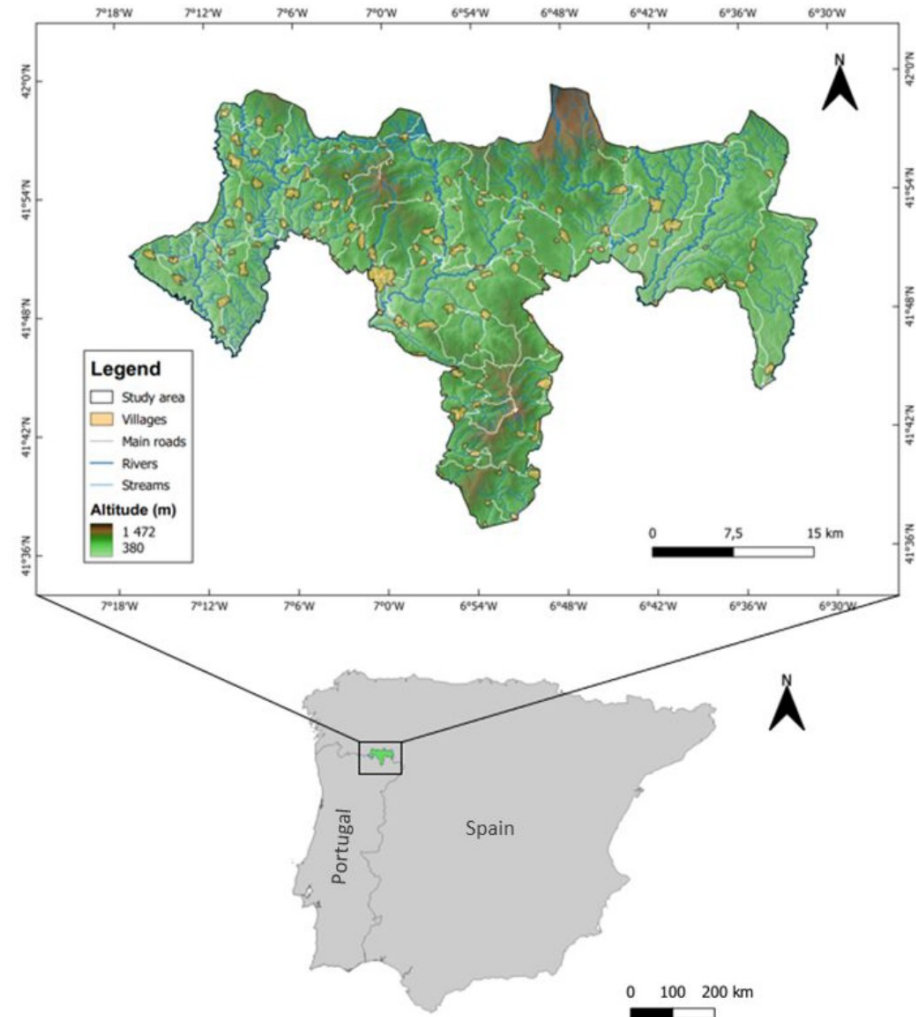


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<https://montobeo.wordpress.com/>

- MontObEO research project
- Funded by FCT (Portugal)
- Biodiversity monitoring framework
- Natural Park of Montesinho (Portugal)



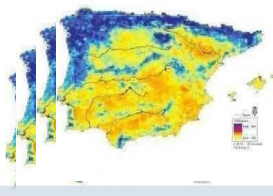
- Estimation of species vulnerability
- Trends of habitat suitability index
- 2001-2023
- Periodicity: one year
- Time series of remote sensing variables: MODIS
- Ecological niche models: Maxent
- Trend analyses: Mann-Kendall test
- Five taxonomical groups



Species records



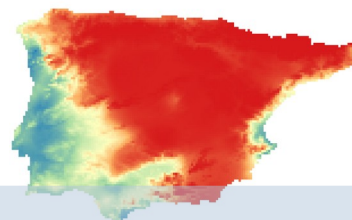
MODIS variables



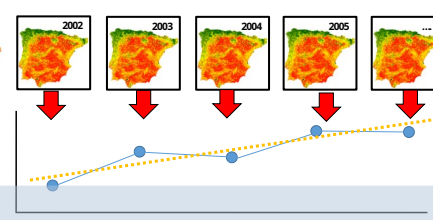
Maxent



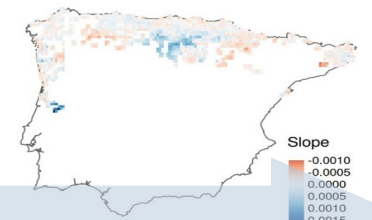
Ecological niche model



Habitat suitability trends



Mann-Kendall test



- Estimation of species vulnerability
- Trends of habitat suitability index
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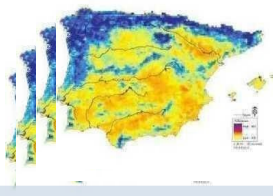


Google Earth Engine

Species records



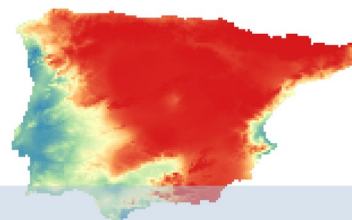
MODIS variables



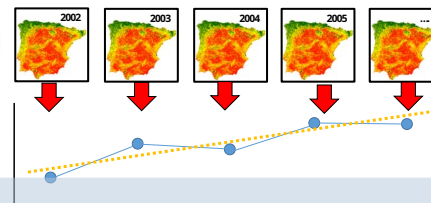
Maxent



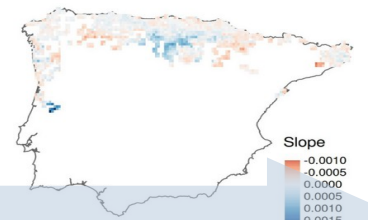
Ecological niche model

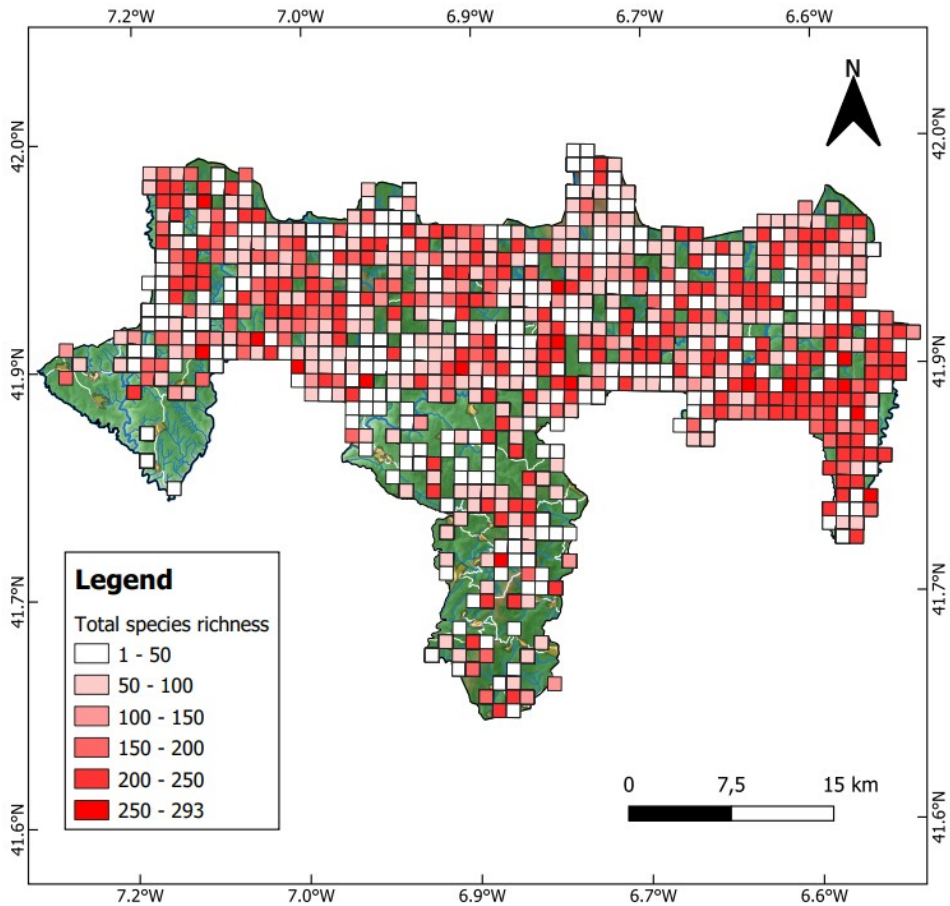


Habitat suitability trends



Mann-Kendall test





Taxonomical group: 32587 records

Vascular plants	Amphibians	Reptiles	Birds	Mammals
11452	2456	1055	28950	3973

Taxonomical groups: 1311 species


Vascular plants	Amphibians	Reptiles	Birds	Mammals
1058	13	20	153	42

Menu
☰






WebGIS

Biodiversity data

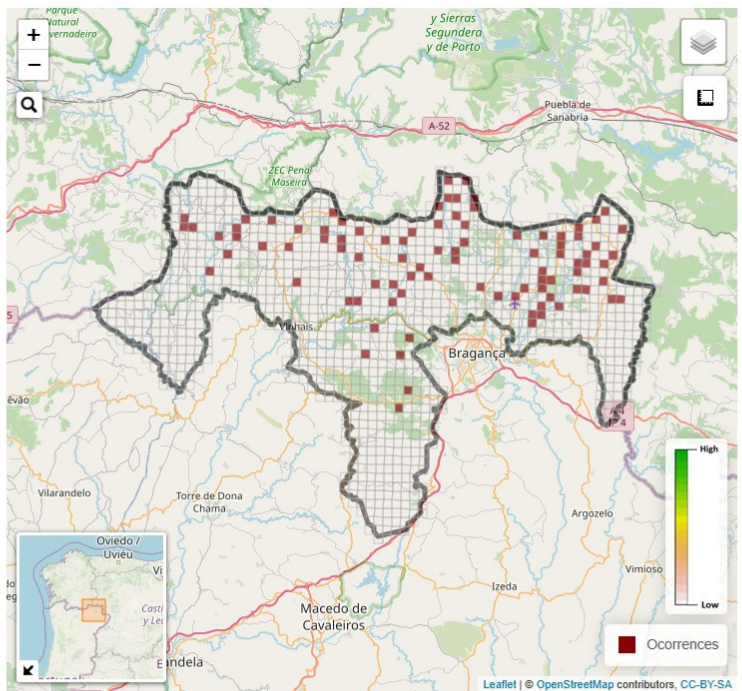
Biodiversity curiosities



MontObEO logo

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Select the taxonomic group:

Mammals

Select the genus (scientific name):

Vulpes

Select the species (scientific name):

Vulpes vulpes

Enviromental Variables (EVs):

EVI

Opacity of EVs:

0 1

Description

Species

Enviromental Variables

Authors and Citation

MontObEO Web Geographic Information System (WebGIS), designed for Montesinho/Nogueira special protection area (MN-SPA) which integrates the Natura 2000 network (<https://natura2000.eea.europa.eu/Natura2000/SDF.aspx?site=PTCON002>). Biodiversity data is represented on 1km spatial resolution and environmental variables (EVs) presented were used in ecological niche models (ENMs) on MontObEO project.

Support

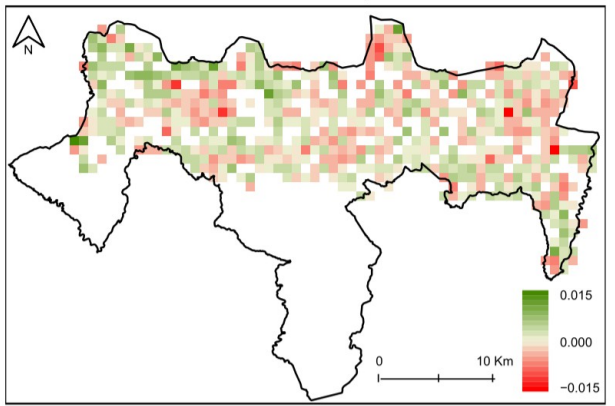
If you have founded a problem about WebGIS, please contact immediately the authors.

Questions

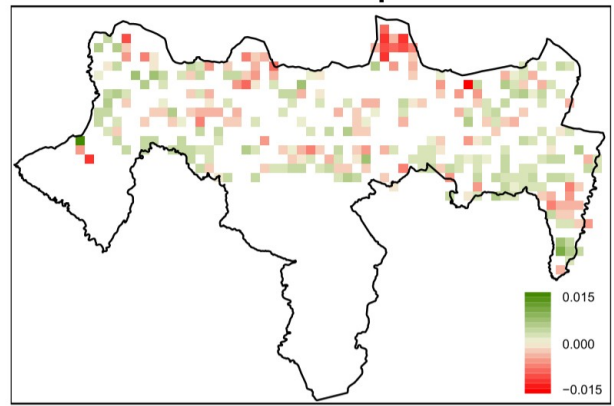
If you have any questions about the WebGIS, send us an e-mail: montobeo.project@gmail.com

https://montobeo.shinyapps.io/MN-SPA_WebGIS/

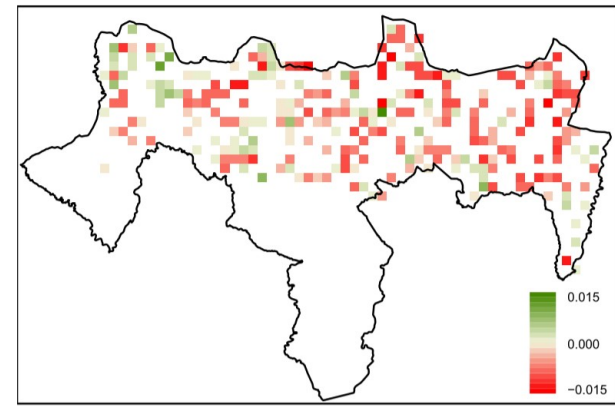
HSI trends: All species



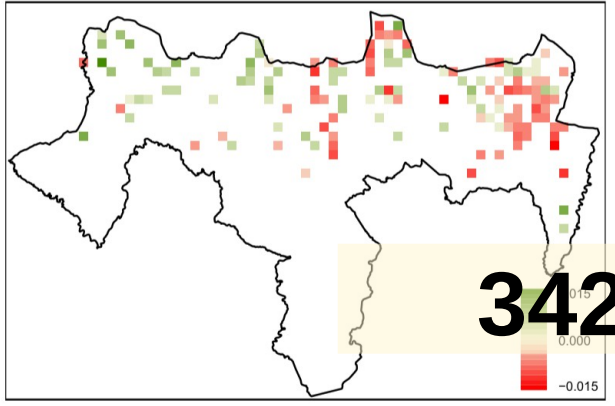
HSI trends: Amphibians



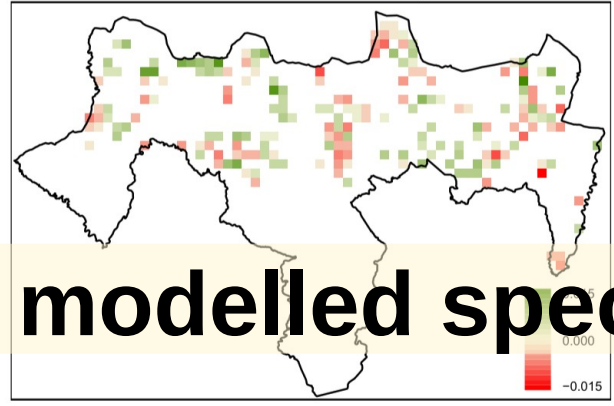
HSI trends: Birds



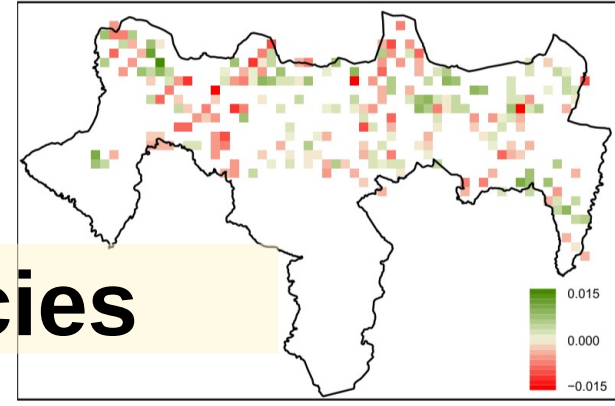
HSI trends: Mammals



HSI trends: Vascular plants

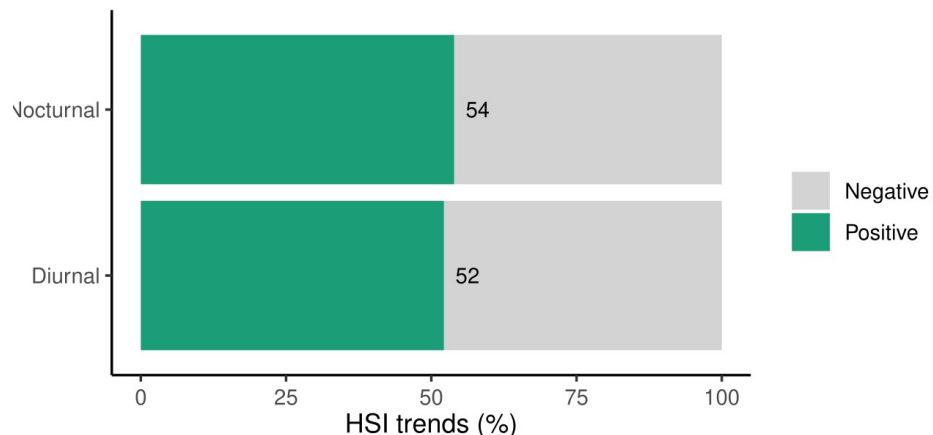


HSI trends: Reptiles

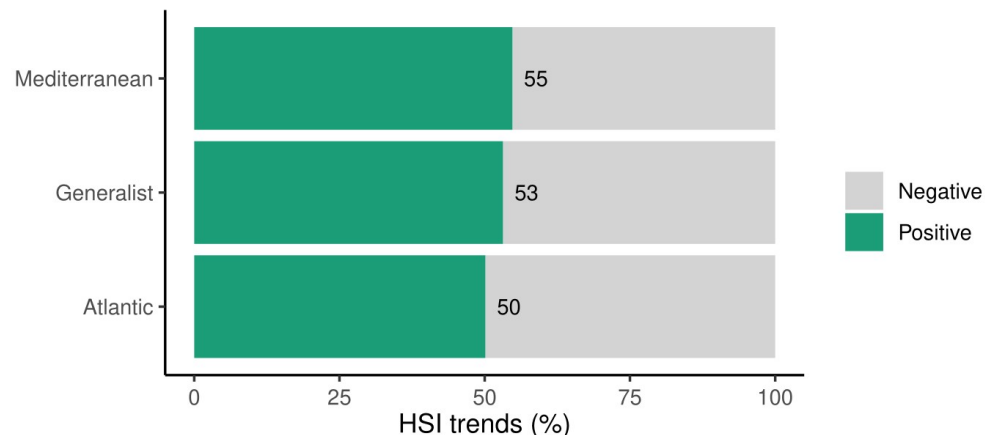


342 modelled species

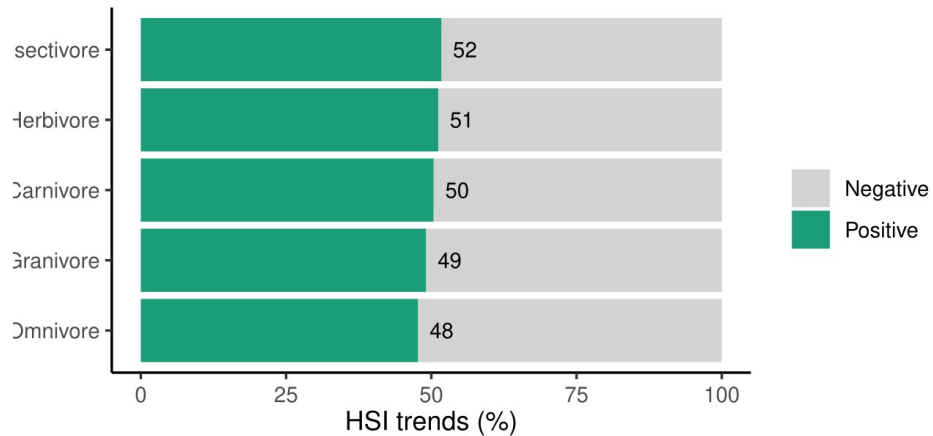
Activity



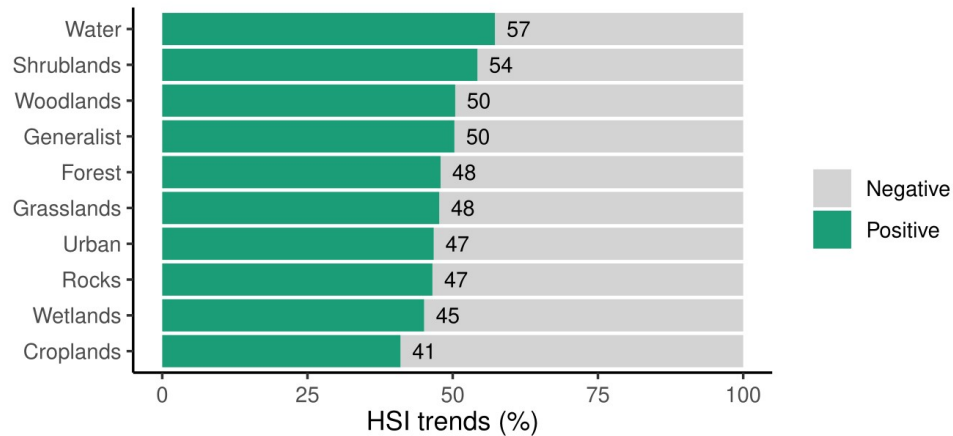
Climate



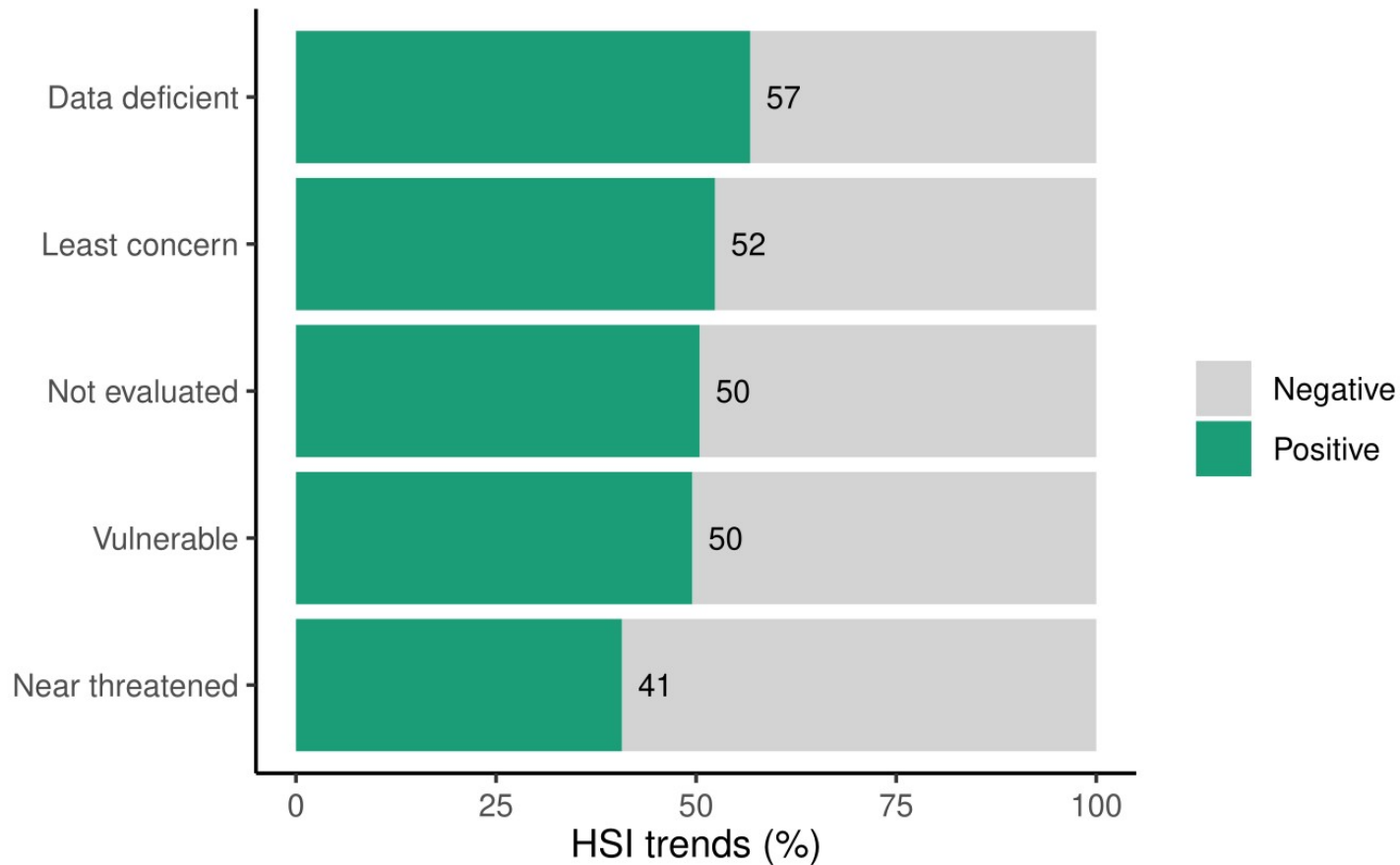
Diet



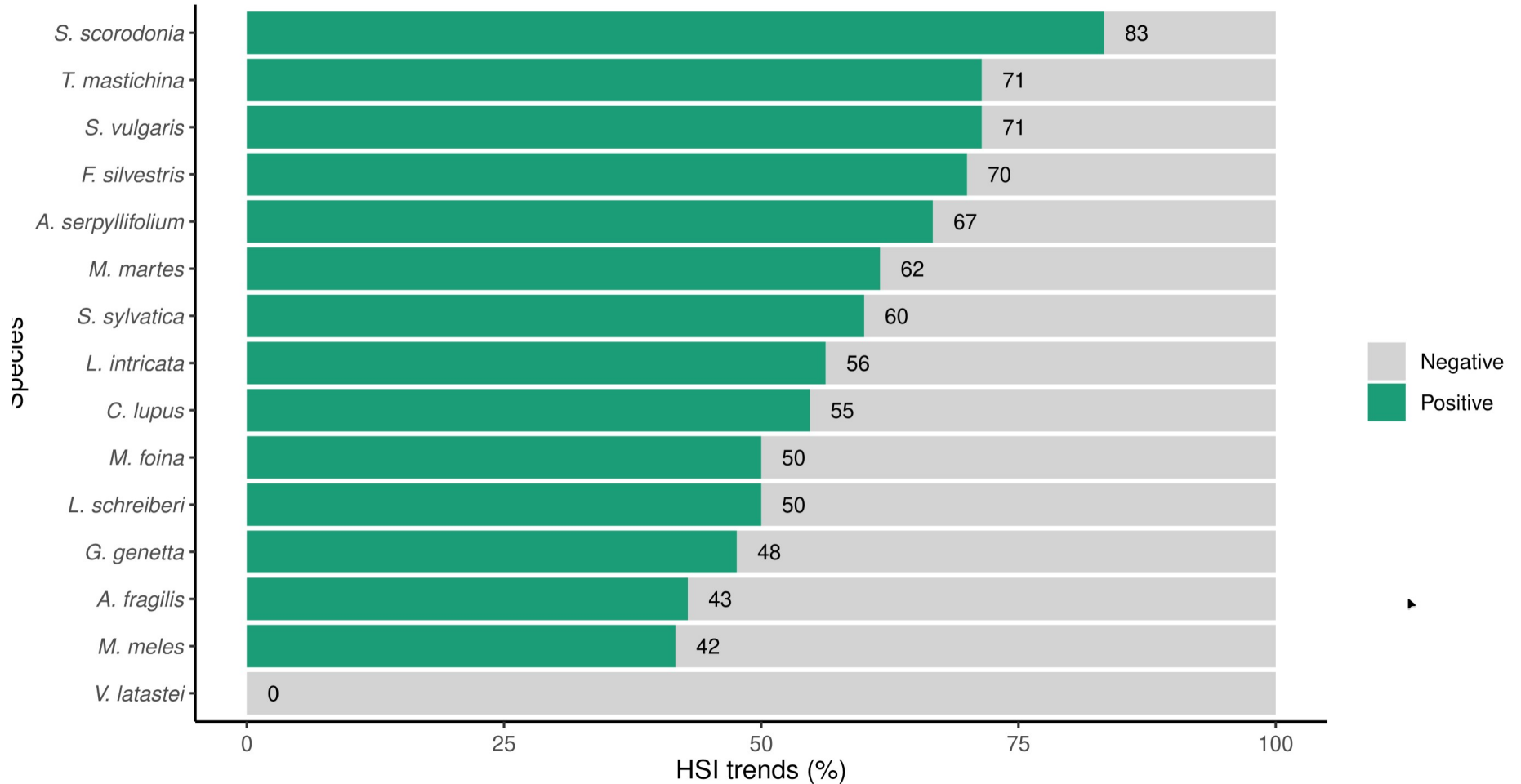
Habitat

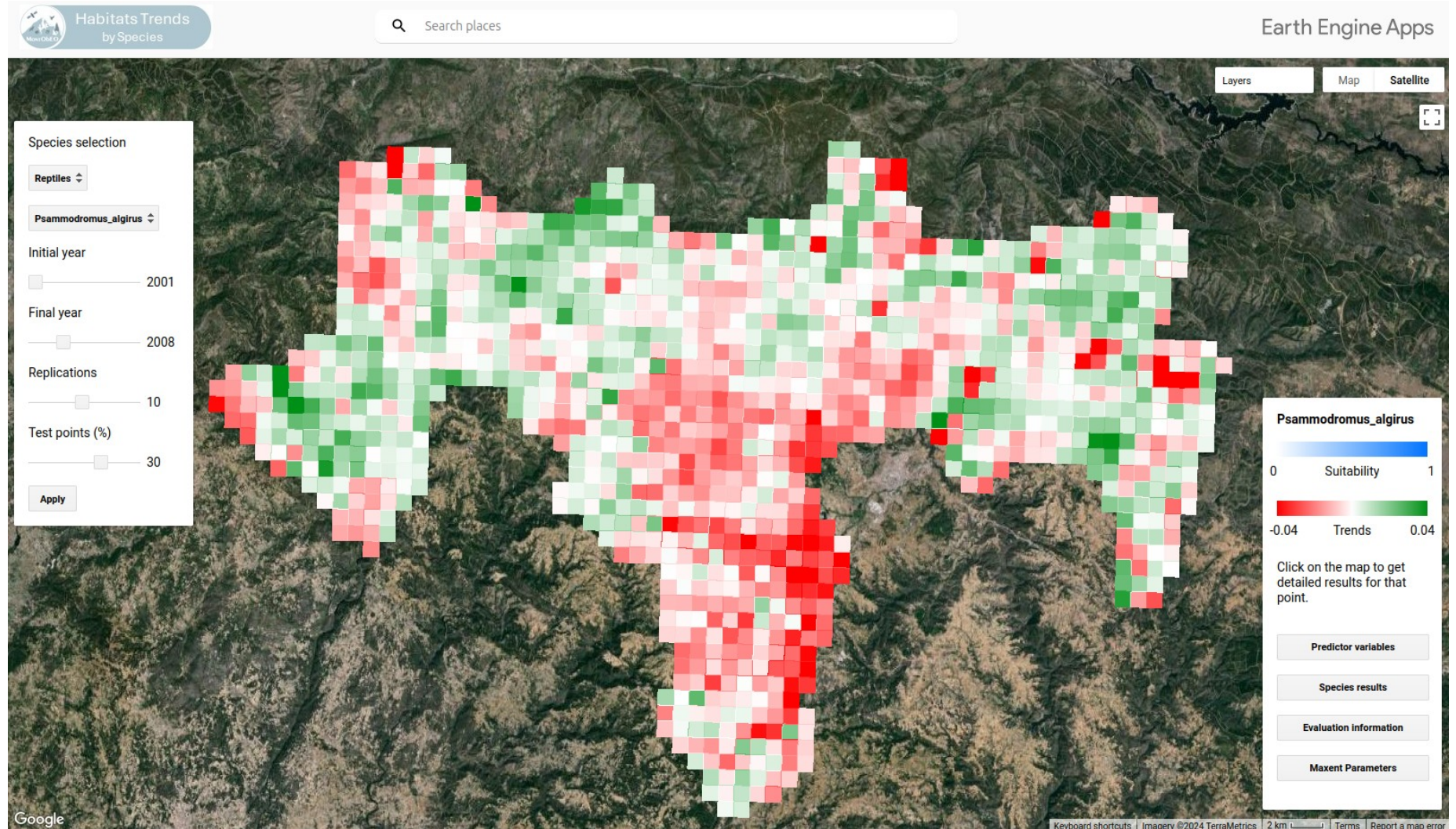


IUCN (EU)



Key species





ecotrends

The goal of `ecotrends` is to **compute a time series of ecological niche models**, using species occurrence data and environmental variables, and then map the existence and direction of **linear temporal trends in environmental suitability**, as in [Arenas-Castro & Sillero \(2021\)](#).

This package is part of the [MontObEO project](#).

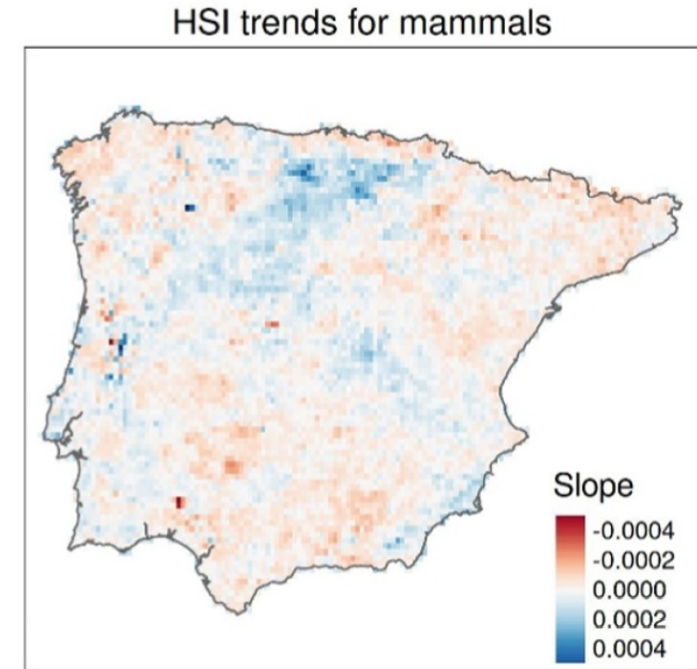
Installation

You can install `ecotrends` from GitHub with:

```
devtools::install_github("AMBarbosa/ecotrends")
```



- Effective monitoring methodology can be applied to any group of organisms, in any location, and at any scale.
- Environmental data like remote sensing and climate information to assess the status of species, groups of species, or entire communities.
- Provide decision-makers with valuable information to manage and protect the environment.



THANK YOU!



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