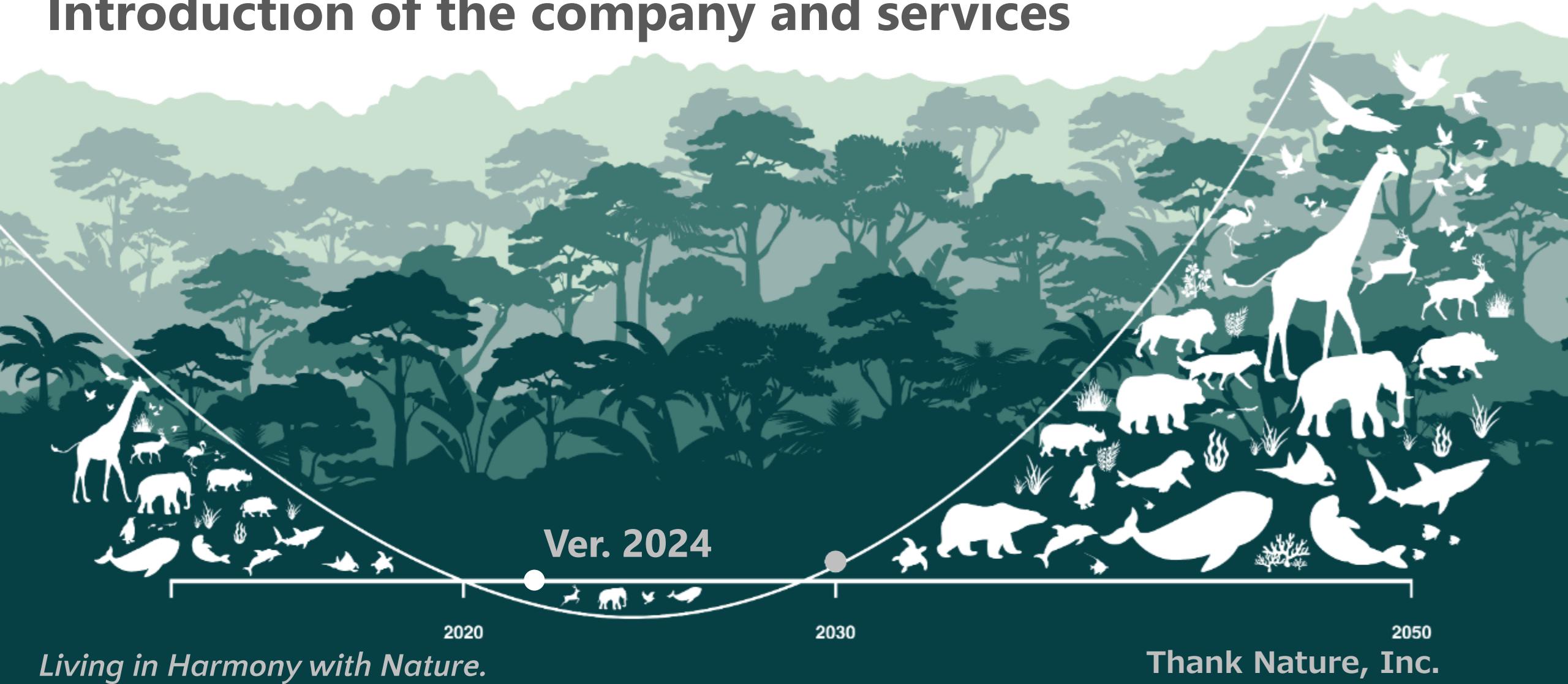


# Think Nature Inc.

## Introduction of the company and services



# CONTENTS

1. Company profile
2. Our specialties: data & technology
3. Services
4. Furthermore!
5. Appendix

# CONTENTS

- 1. Company profile**
2. Our specialties: data & technology
3. Services
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# Company Profile

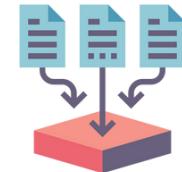
Think Nature is a university-launched start-up with a mission to underpin the nature economy with a sophisticated spatio-temporal exploration of nature and biodiversity big data. We provide analytical consulting and assessment tools to our clients.

Company name	Think Nature, Inc.
Main services	<ul style="list-style-type: none"><li>• Analysis/Evaluation for TNFD</li><li>• Evaluation of nature positive impact/effect</li><li>• Various kinds of analysis base on big data of natural resources/biodiversity</li></ul>
CEO	Dr. Yasuhiro Kubota (Prof. of the University of Ryukyus)
Foundation	2019
Number of staff	20 (including 7 Ph.D holders)
Address	305 Regional Innovation General Research Bldg, 1, Sembaru, Nakagami Gun, Nishihara Cho, Okinawa, 903-0213, Japan

# Our Special Characteristics and Advantages

01

## Global No.1 quality/quantity big data and AI



Data mutual  
complementation

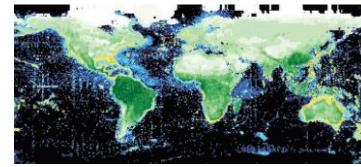


Over 150 data sources  
( Updated and expanding  
regularly )

Original AI

Biodiversity  
BigData

Whole  
World



Biodiversity MAP

Various

Accuracy  
Over 90%

03

## Reliability / Achievements



3 University members  
7 Dr. degree holders

Member of TNFD's  
Nature-related Data  
Catalyst

Over 15  
Over 5  
Over 8

Major Enterprise  
Ministries/local governments  
Partnerships

# CONTENTS

1. Company profile
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# Key technology (Biodiversity BigData × AI)

We offer the world's largest biodiversity big data using scientifically reliable data and approaches and develop a variety of analyses and services based on them.

## Building BigData with Diverse Data

Collecting scientifically credible data and aggregating extensive species distribution data



Papers



Sampling data



Open data base



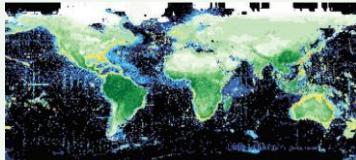
Biologging data



Data collected by specialists



Environmental DNA



Building big data of species distributions

## Species Distribution Map Creation using AI

Linking environmental information to species distribution data and using AI learning to simulate species distribution



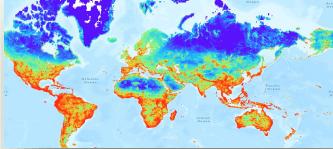
+  
Linking various environmental data & AI learning

temperature  
Land use

precipitation  
elevation

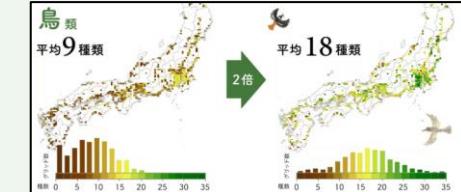
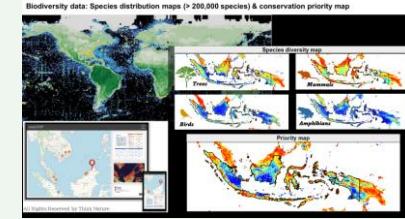
ocean current

Developing a global species distribution map



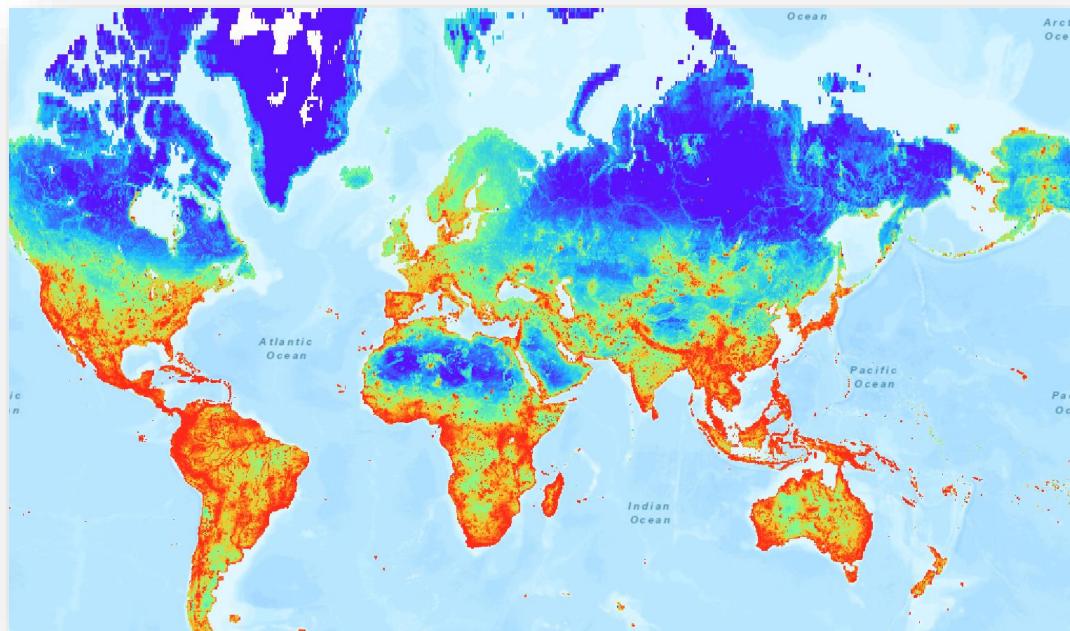
## Providing Various Nature Services

Various assessment analyses based on the species distribution map and model

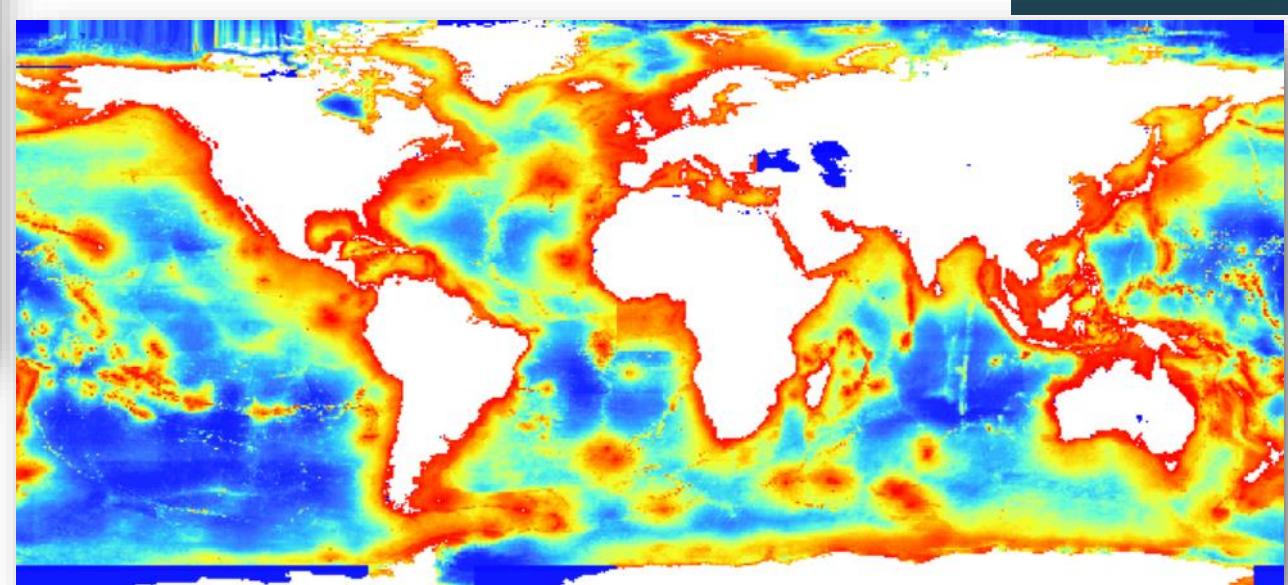


# Global datasets of species distribution in 10 arcmin (~15km) grid

Our dataset covers 350,000 species on a global scale. We develop data not only terrestrial but also marine.



Terrestrial



Marine

# Scientific basis of our distribution datasets

Science Advances

Current Issue First release papers Archive About  Su

HOME > SCIENCE ADVANCES > VOL. 9, NO. 40 > OCCURRENCE-BASED DIVERSITY ESTIMATION REVEALS MACROECOLOGICAL AND CONSERVATION KNOWL-...

 | RESEARCH ARTICLE | ECOLOGY 

## Occurrence-based diversity estimation reveals macroecological and conservation knowledge gaps for global woody plants

BUNtarou Kusumoto , Anne Chao , Wolf L. Eiserhardt , Jens-Christian Svenning , Takayuki Shiono , and Yasuhiro Kubota  [Authors](#)

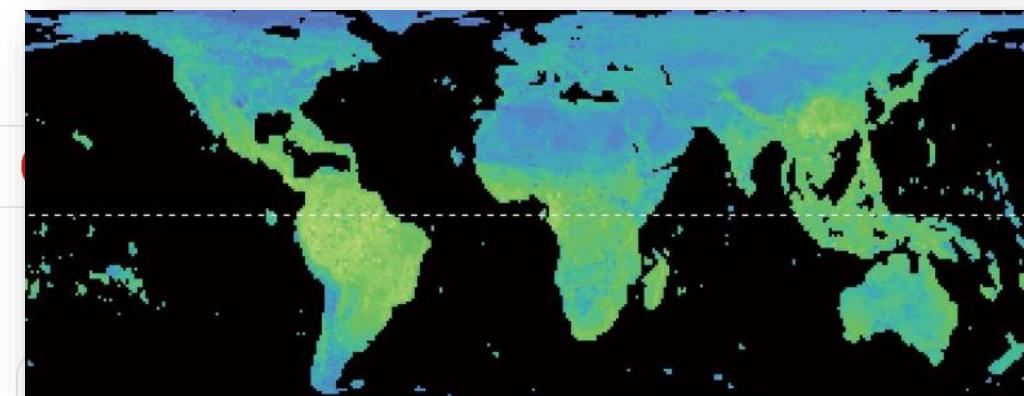
[Info & Affiliations](#)

SCIENCE ADVANCES • 6 Oct 2023 • Vol 9, Issue 40 • DOI: 10.1126/sciadv.adh9719

 3,872   

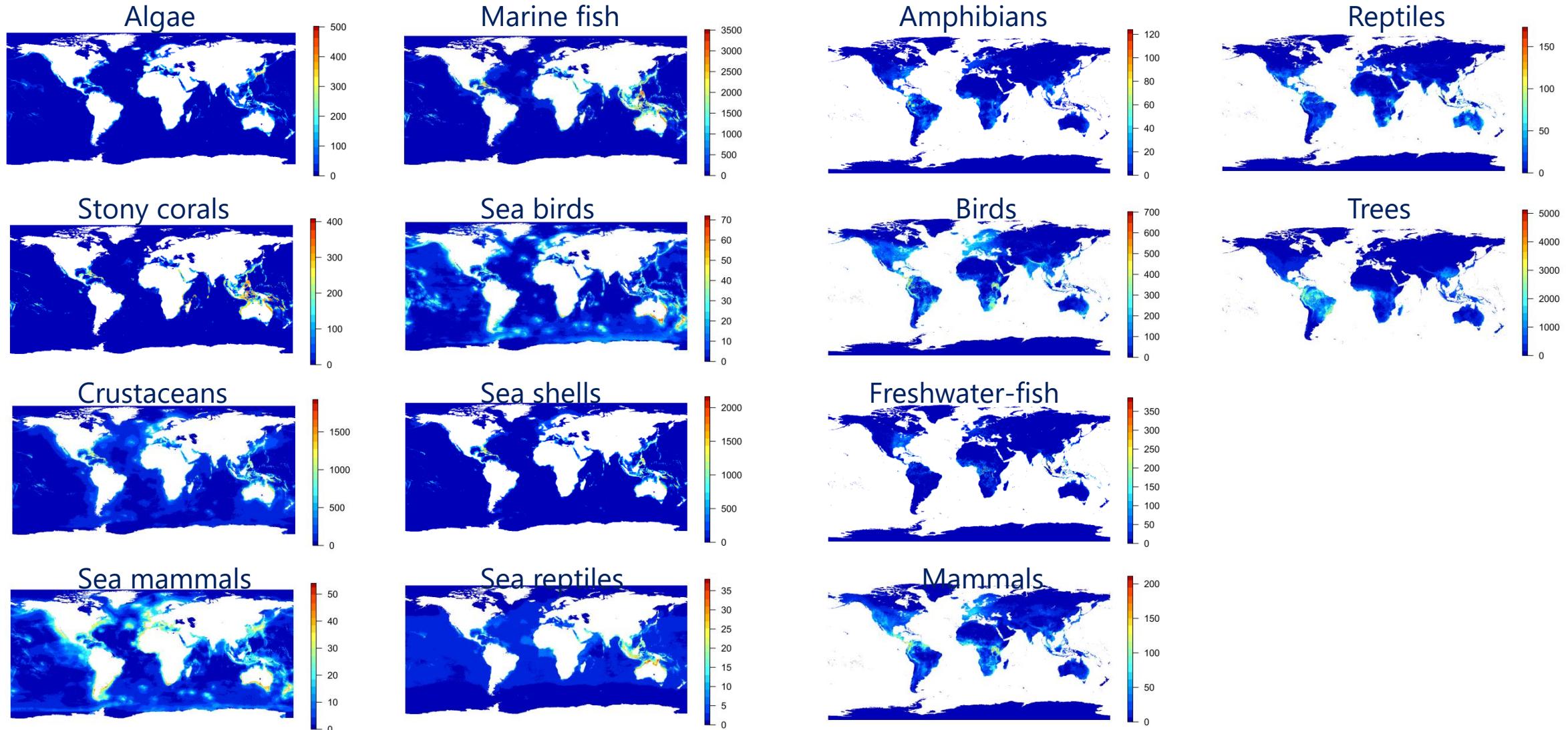
### Abstract

Incomplete sampling of species' geographic distributions has challenged biogeographers for many years to precisely quantify global-scale biodiversity patterns. After correcting for the spatial inequality of sample completeness, we generated a global species diversity map for woody angiosperms (82,974 species, 13,959,780 occurrence records). The standardized diversity estimated more pronounced latitu-



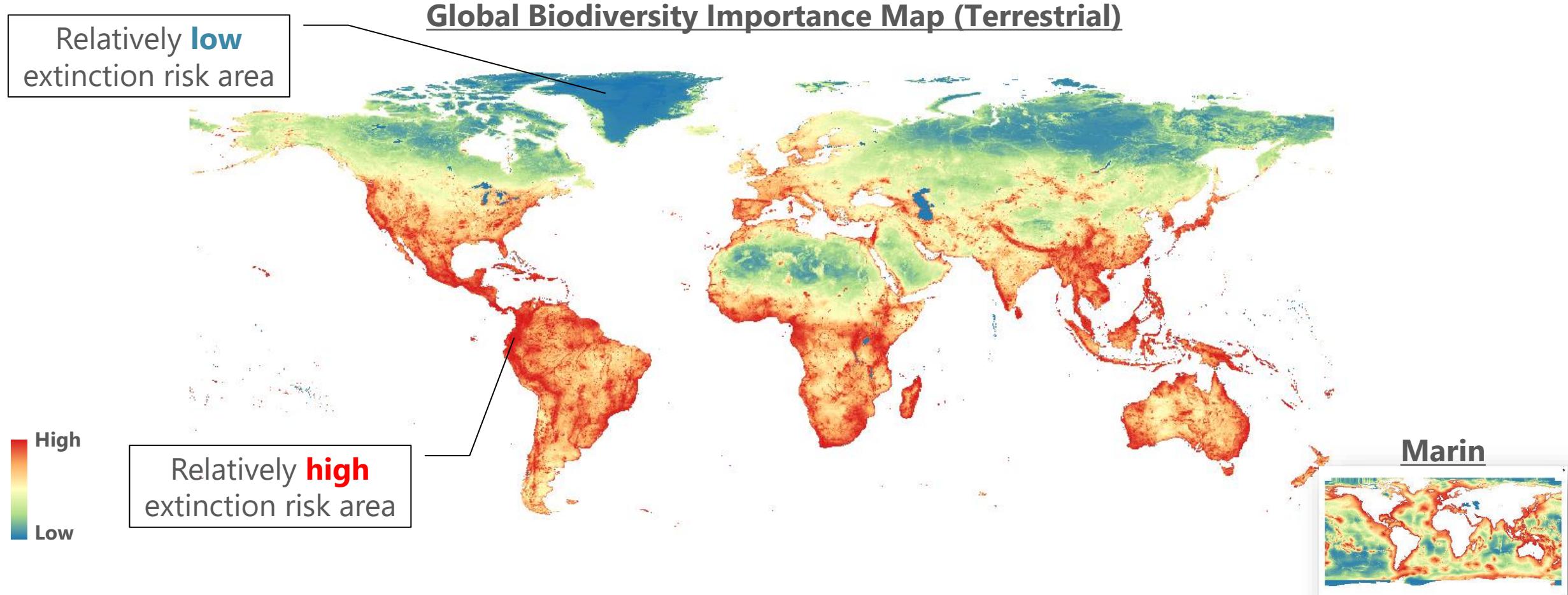
©Think Nature, Inc. 2024, All Rights reserved.

# Covering many taxa in terrestrial and marine realms



# Biodiversity Importance Map

Biodiversity importance map visualizes the extinction risk of organisms due to land development. It is given the highest weight in many cases when selecting priority areas. The higher the number of species of living organisms and the higher the number of threatened species, the higher the area.



# Available spatial data about nature

Covering approximately 180 types of indices including not only biodiversity indices, but also other states of nature, ecosystem services, & impact drivers.

Locate	Evaluate	Assess
<b>BIM</b> Number of species in each taxon <ul style="list-style-type: none"><li>  woody species</li><li>  Birds</li><li>  Mammals</li><li>  Amphibians</li><li>  Freshwater fishes</li><li>  Marine fishes</li><li>  Corals, etc.</li></ul> <b>Alpha/beta diversity</b> <ul style="list-style-type: none"><li>  Fungi</li><li>  Protists</li><li>  Invertebrates</li><li>  Bacteria etc.</li></ul> <b>Diversity of pollinators</b> <b>Conservation priority</b> <ul style="list-style-type: none"><li>  Consolidation, woody,,</li></ul> <b>Area of each species</b> <ul style="list-style-type: none"><li>  Forest</li><li>  Wetlands</li><li>  Urban</li><li>  Bare land,,etc.</li></ul> <b>Distance from the coast</b> <b>River flow rate</b> <b>etc.</b>	<b>Various emissions</b> <ul style="list-style-type: none"><li>  Carbon</li><li>  PCDD</li><li>  etc.</li></ul> <b>Aboveground/underground carbon</b> <b>Groundwater Supply</b> <b>Forest Habitat Integrity</b> <b>Root water retention, depth of reach</b> <b>Soil</b> <ul style="list-style-type: none"><li>  Fertile soil</li><li>  Disease suppression function</li><li>  etc.</li></ul> <b>Night light intensity</b> <b>Water use</b> <ul style="list-style-type: none"><li>  Manufacturing</li><li>  Mining and refining</li></ul> <b>Livestock</b> <ul style="list-style-type: none"><li>  etc.</li></ul> <b>Footprint</b> <ul style="list-style-type: none"><li>  Density of grazing for fiber</li><li>  Density of grazing for labor</li><li>  Open-pit area</li><li>  Temporary production</li><li>  etc.</li></ul>	<b>BIM Potential</b> <b>Increase in emissions of various types</b> <b>STAR Indicators (overall/endangered limit)</b> <ul style="list-style-type: none"><li>  Integrated, woody,,</li><li>  Agricultural sustainability</li></ul> <b>By 2100</b> <ul style="list-style-type: none"><li>  Temperature change</li><li>  Precipitation change</li><li>  etc.</li></ul> <b>Freshwater stress</b> <b>Freshwater vulnerability</b> <b>Landslide frequency</b> <b>Area of lost area</b> <b>Water Pollution Degree</b> <b>Flood frequency</b> <b>Earthquake disaster frequency</b> <b>Storm disaster frequency</b> <b>Drought frequency</b> <b>Urban expansion potential</b> <b>Plant biomass loss</b> <b>Footprint Increase</b> <b>Forest Area Change</b> <b>Over 40 threats from human activity</b> <b>etc.</b>

# CONTENTS

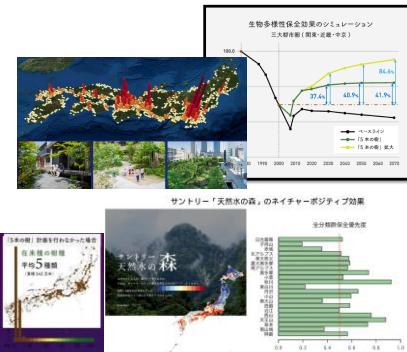
1. Company profile
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# (A part of) Our Services lineup

## TN GAIN

### Natural Regeneration and Conservation Effectives Assessment

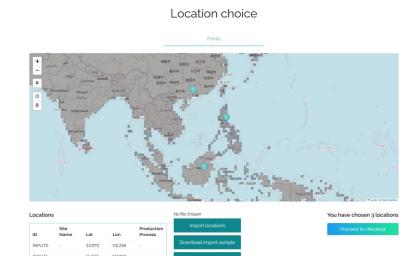
We quantitatively visualize the nature-positive effects of environmental conservation activities; Utilizing native species, afforestation, forest conservation, and natural regeneration.



## GBNAT

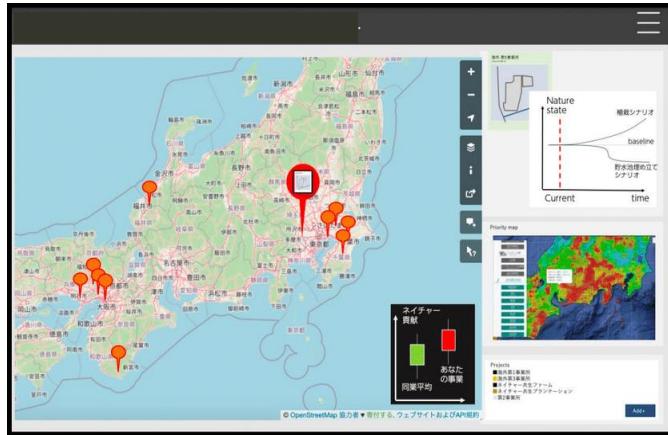
### Automated-reporting system of biodiversity and ecosystem status around corporates locations

Immediate evaluation of priority location for both terrestrial and marine realms.



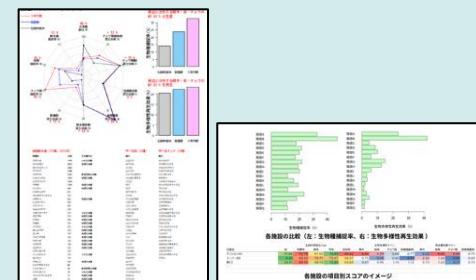
# Visualizing the Effectiveness of Natural Regeneration: TN GAIN

Quantifying the nature-positive effects of environmental conservation activities, including the use of native species, afforestation, forest conservation, and natural regeneration.



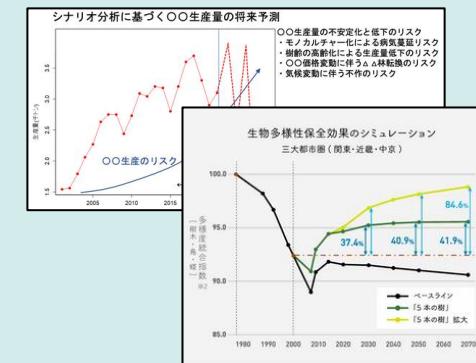
## ① Visualization of Nature-positive Effects

- Quantifying and visualizing nature-positive effect of forest conservation and utilizing the native species
- Project before/after, comparative analysis, Industry Peer Comparison, baselines comparison



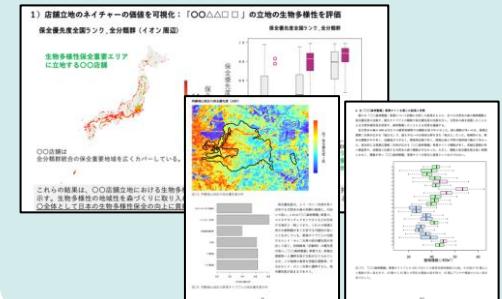
## ② Identification of Conservation Effects with Scenario-based Analysis

- Conducting future forecasts based on various scenarios
- Utilizing scenario effects for goal setting



## ③ Utilization of PR for Nature Conservation Activities

- Quantification using multiple indicators such as area, species count, and conservation priority
- Enhancing appeal with visualization and quantification of effects



**Visualize the nature-positive effects and support your PR efforts and nature-related projects.**

# Case study: TN GAIN (Measuring the effectiveness of organic farming)

We evaluated the nature-positive action of a Japanese brewery



"Effect of land-use changing from the artificial turf to organic wheat farming filed"



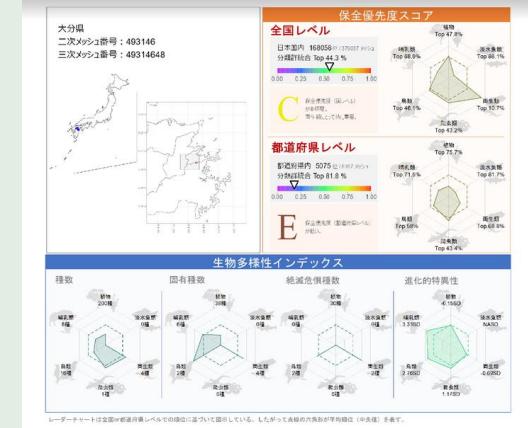
## ① Visualizing current biodiversity status in the target area

Analysis of the conservation importance of the target area with revealing the species information.

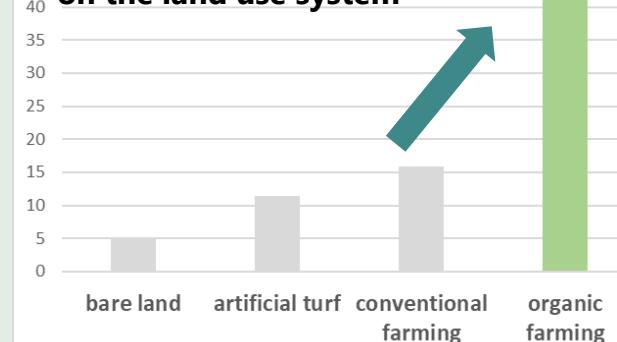
## ② Evaluating the Effects of organic farming

Quantify the effect of organic farming by comparing the number of species of each Taxonomic group. Our PoC revealed that

- ✓ Organic farming contributes the species richness dramatically.
- ✓ Farmland improves the climate and water ecosystem services than bare land.



Differences in the bird species depend on the land use system



# Case study: TN GAIN (Measuring the effectiveness of forest conservation activities)

水と生きる  
**SUNTORY**

サントリー 天然水の森

Registered as OECM (Other Effective area-based Conservation Measure)

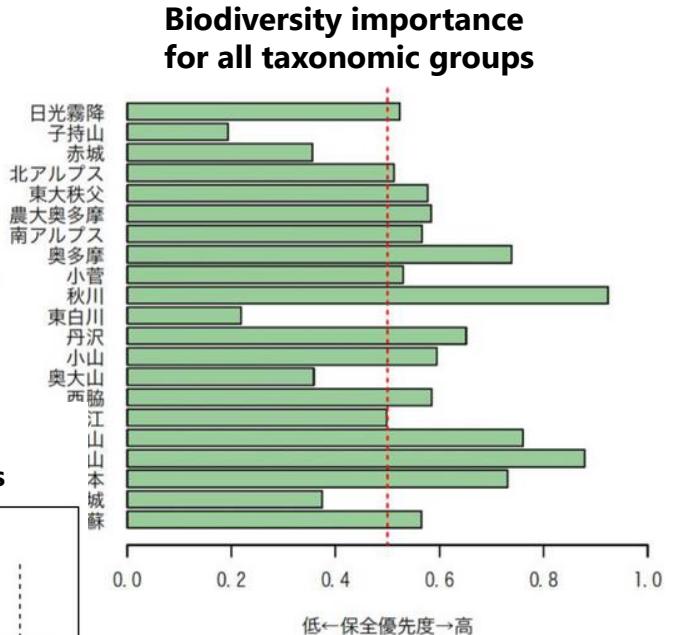
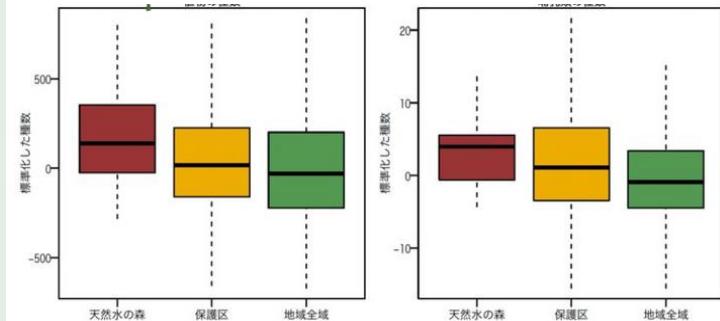


## Quantifying and visualizing the conservation benefits

Nature-positive effect of "Suntory Forest of Natural Water"



Biodiversity in 'natural water forests': comparison with officially protected areas



Source: our document 'Quantitative evaluation of the biodiversity conservation benefits of Suntory natural water forests'.

# Case study: TN GAIN ( Evaluation of nature-positive effects of using native species in housing)

We evaluate the positive impact on biodiversity through the promotion of native species planting in residential areas.

## Visualization of nature-positive effect by "Gohon no ki" Project



- the 30th Grand Prize for the Global Environment Award
- "EcoPro Awards" Minister's Award

Received several awards related to the environment



- the 30th Grand Prize for the Global Environment Award
- "EcoPro Awards" Minister's Award

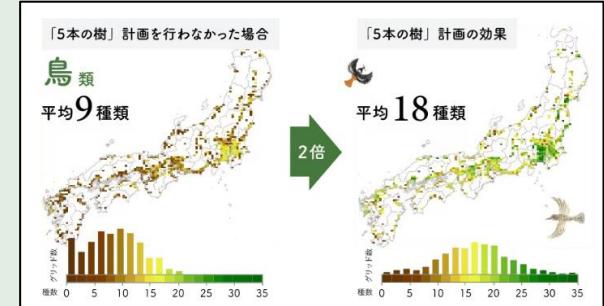
Received several awards related to the environment

## ① Quantifying and Visualizing the Effectiveness

Comparative analysis of the impact on trees, birds, and butterflies resulting from the planting or non-planting of five trees.

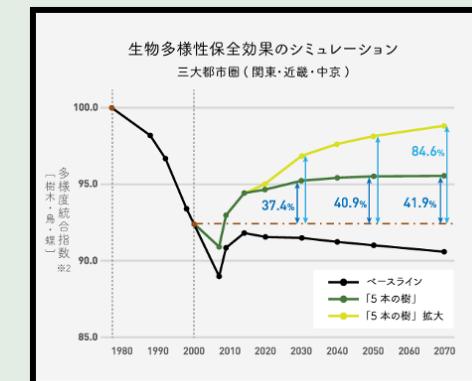
# of species of Birds  $\times 2$

# of species of Butterflies  $\times 5$



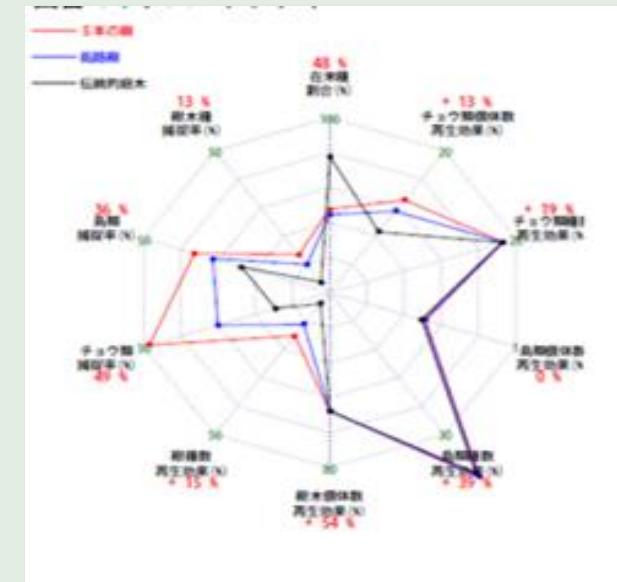
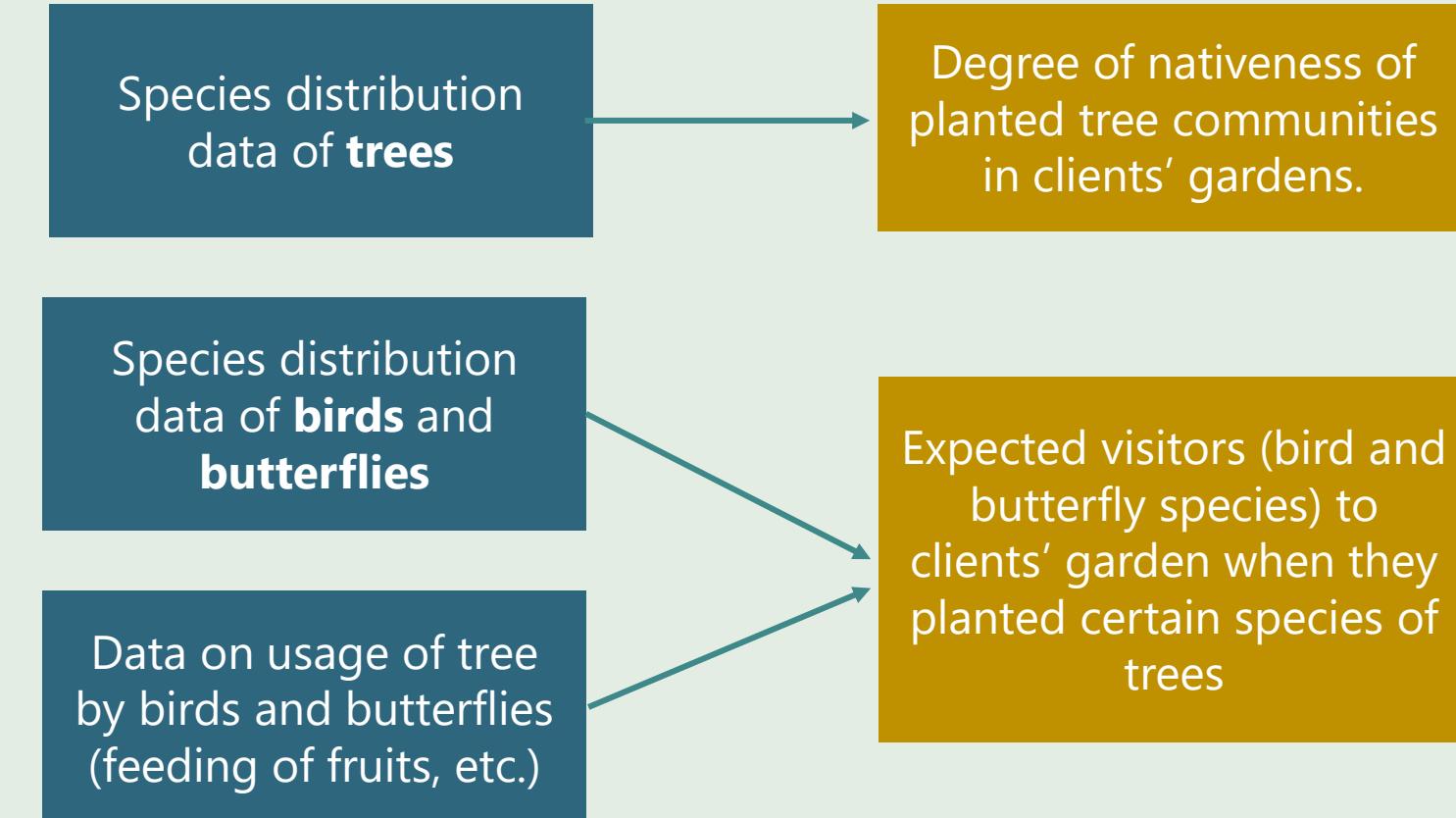
## ② Evaluating the Effects for Each Scenario

Forecast and evaluate the effects until 2070 in the event of project continuation, expansion, or non-implementation.



Sources : Sekisui House,Ltd. "Gohon no ki" Project [https://www.sekisuihouse.co.jp/gohon\\_sp/method/](https://www.sekisuihouse.co.jp/gohon_sp/method/)

# Algorithm for softscape nature-positive evaluation

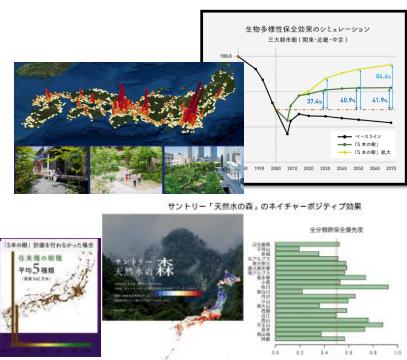


# (A part of) Our Services lineup

## TN GAIN

### Natural Regeneration and Conservation Effectives Assessment

We quantitatively visualize the nature-positive effects of environmental conservation activities; Utilizing native species, afforestation, forest conservation, and natural regeneration.



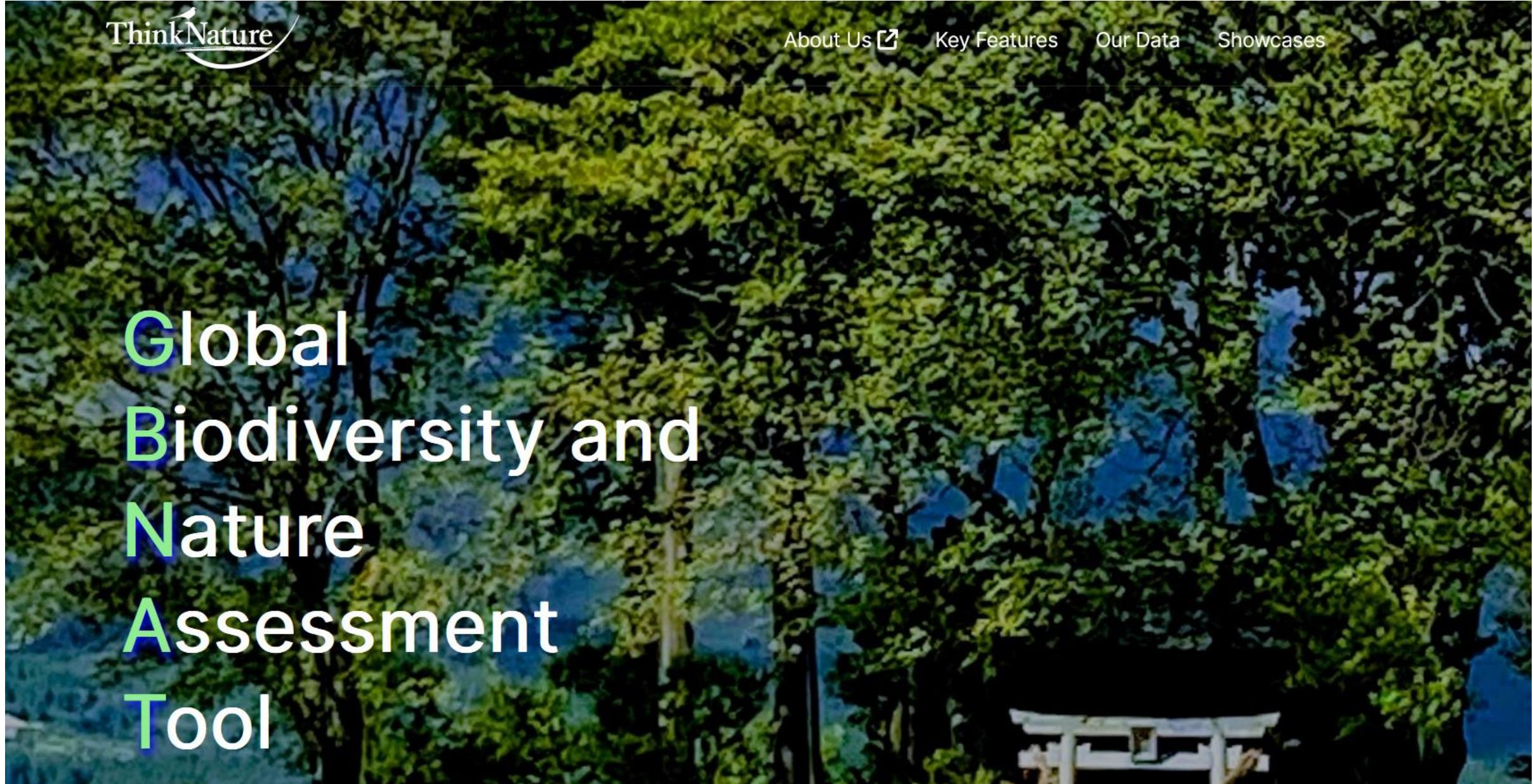
## GBNAT

### Automated-reporting system of biodiversity and ecosystem status around corporates locations

Immediate evaluation of priority location for both terrestrial and marine realms.



# GBNAT: Global Biodiversity and Nature Assessment Tool

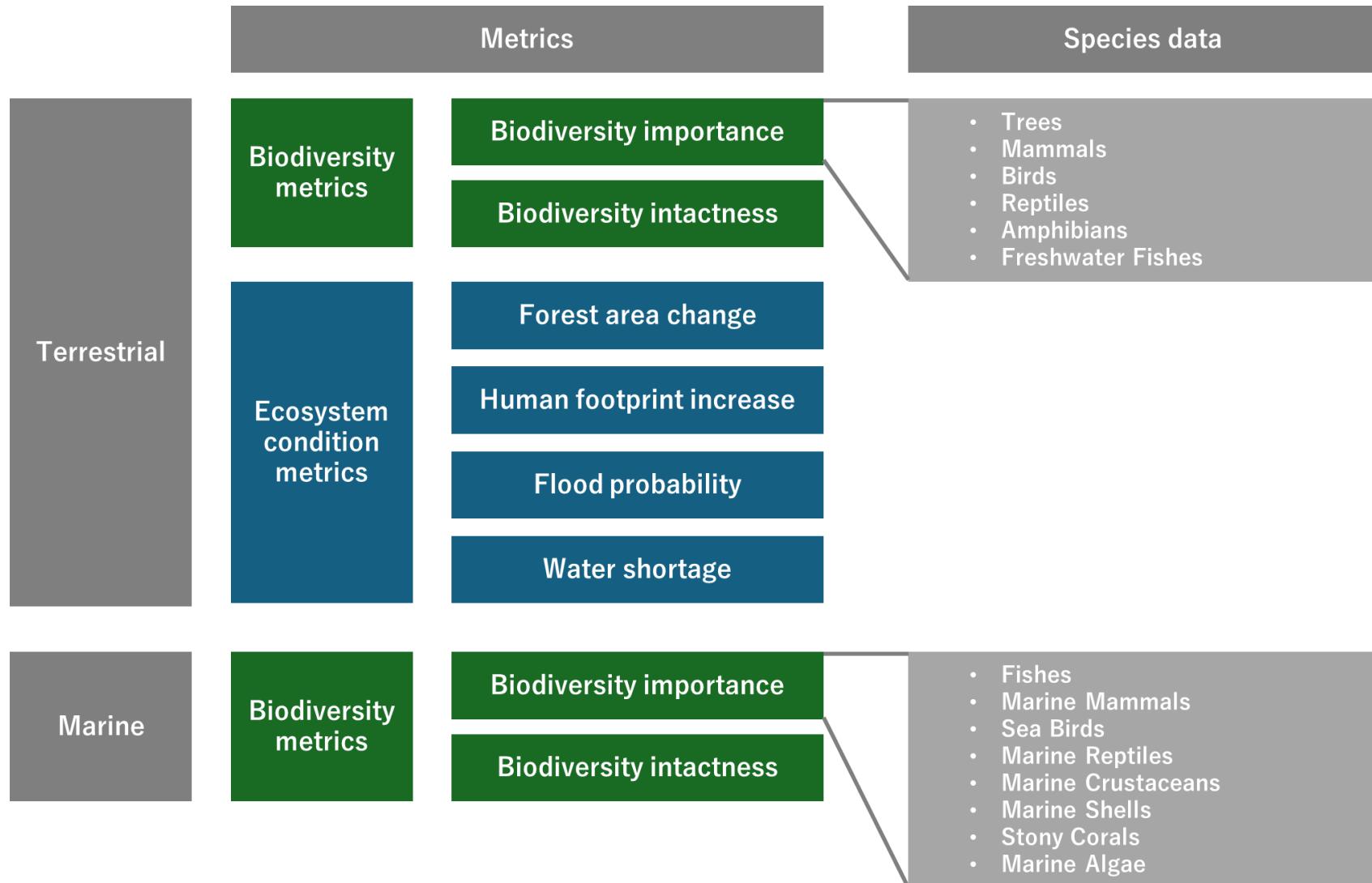
The background of the page is a photograph of a lush green forest. In the bottom right corner, a traditional Japanese torii gate is partially visible, standing near a body of water. The overall atmosphere is natural and serene.

ThinkNature

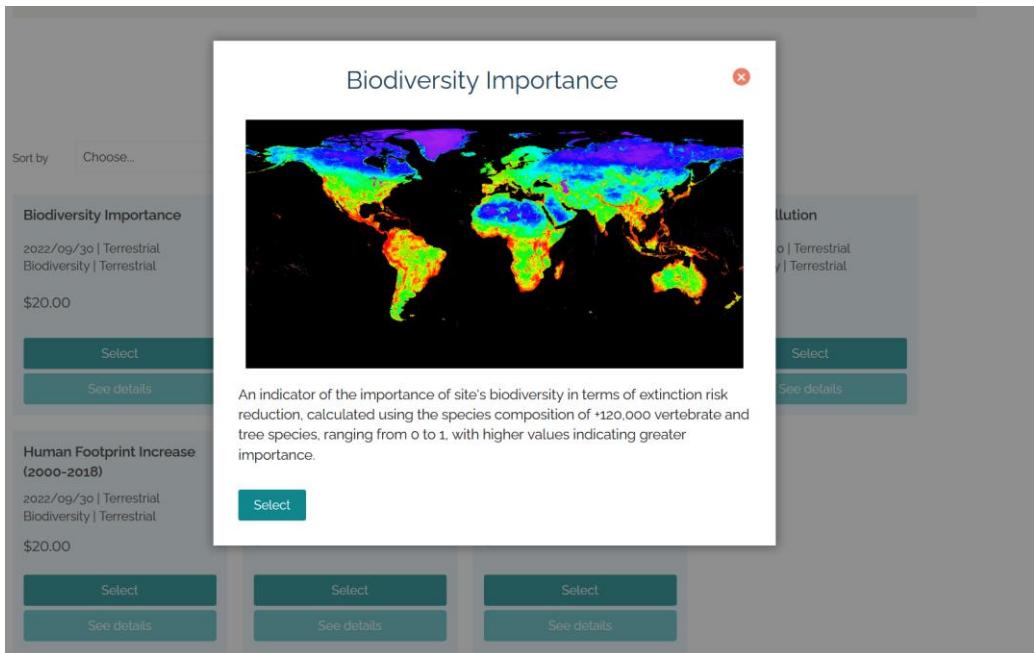
About Us  Key Features Our Data Showcases

# Global Biodiversity and Nature Assessment Tool

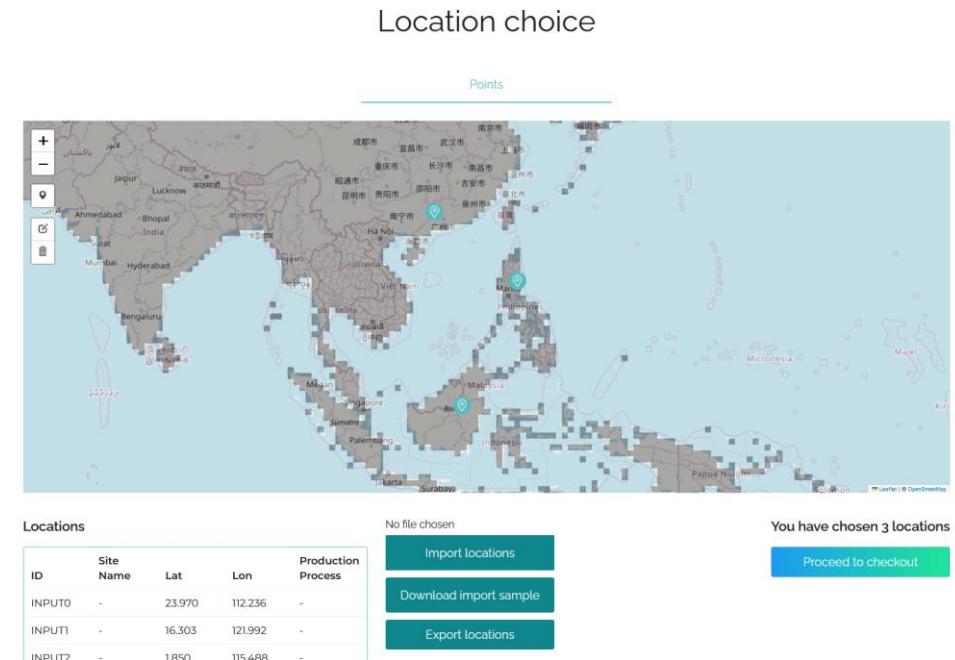
# Data layers currently available on GBNAT



## Data Explanation



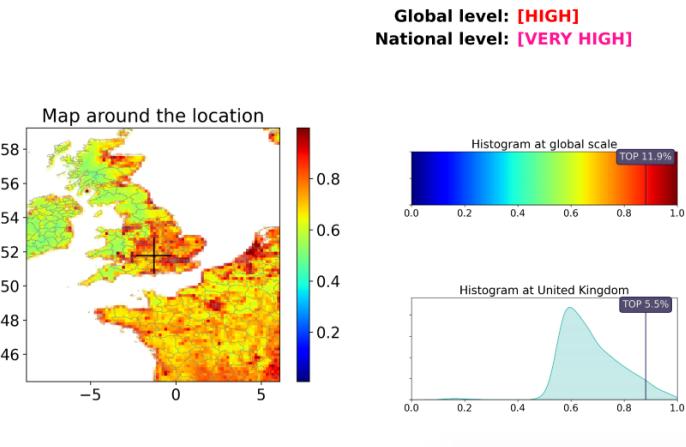
## Interactive Locating



# Report samples

Sitename: 5  
Lat: 51.77  
Lon: -1.285  
Country: United Kingdom

## 1. Terrestrial Biodiversity Importance

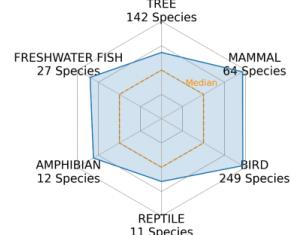


The site here has #TOP 11.9% rank at the global scale, meaning [HIGH] importance of terrestrial biodiversity. Among United Kingdom, the site here has # level, meaning [VERY HIGH] importance of

Sitename: 5  
Lat: 51.77  
Lon: -1.285  
Country: United Kingdom

### SPECIES RICHNESS BY TAXONOMIC GROUPS - DETAILED OPTION

This site has a remarkable species richness for:  
[MAMMAL]  
[BIRD]  
[AMPHIBIAN]  
[FRESHWATER\_FISH]

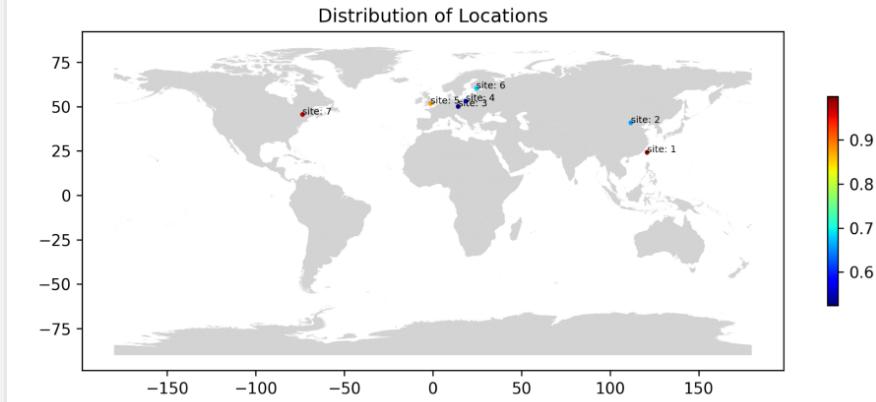


Location-wise results highlights each locality's significance in terms of biodiversity and ecosystem integrity

Summary reports provides global distributions of priority areas

## Summary Report by Data Layers

### 1. Terrestrial Biodiversity Importance



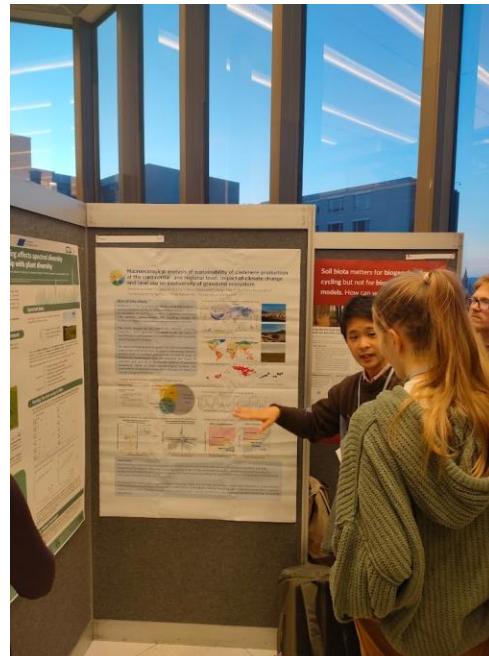
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# International Biogeography Society, Conference 2023

We studied the relationship between cashmere production which is generally considered to be the cause of desertification and biodiversity, in collaboration with a globally operating apparel company. This study was presented in the IBS 2023 which is an academic conference of the International Biogeography Society.

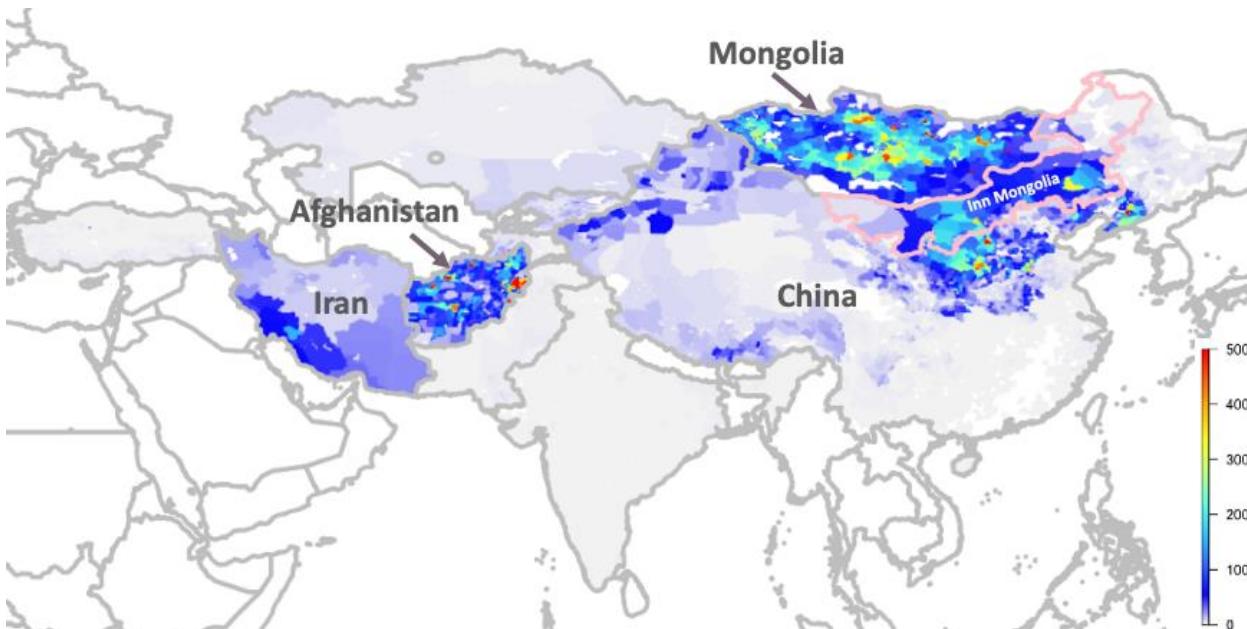
The International Biogeography Society website homepage features a prominent banner at the top with the text "IBS 2023" and "CONFERENCE". Below the banner, there are navigation links for "HOME", "ABOUT US", "WHAT WE OFFER", "MEETINGS", "NEWS", and "GET INVOLVED". On the right side of the header, there is a "MEMBERS LOGIN" button and social media icons for Twitter and Facebook. A large green button in the center of the page says "Become a Member" and "SEE THE BENEFITS HERE".



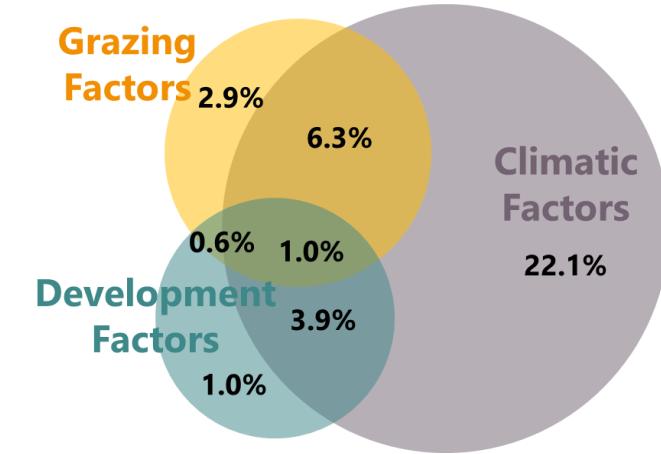
# International Biogeography Society, Conference 2023

We calculated relative importance of grazing, climate change, and development on recent vegetation changes. Plus, our analysis revealed that an impact of grazing on biodiversity is context-dependent, where drier area will experience a severer decrease in plant species richness and biomass while wetter area could benefit from inhibition of forest expansion maintaining grassland habitat under increased precipitation by climate change.

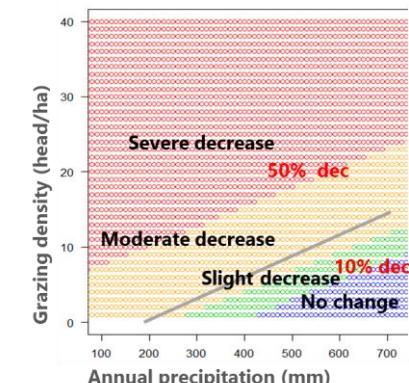
## Grazing density of cashmere goats at a continental scale



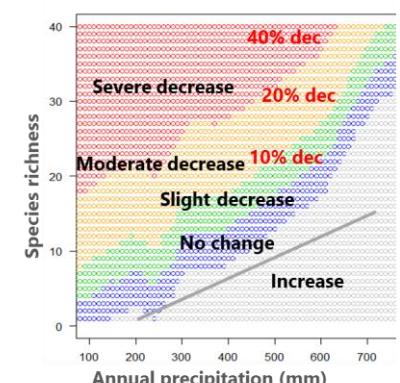
## Impact drivers of vegetation changes in a grazing area



## Above-ground biomass



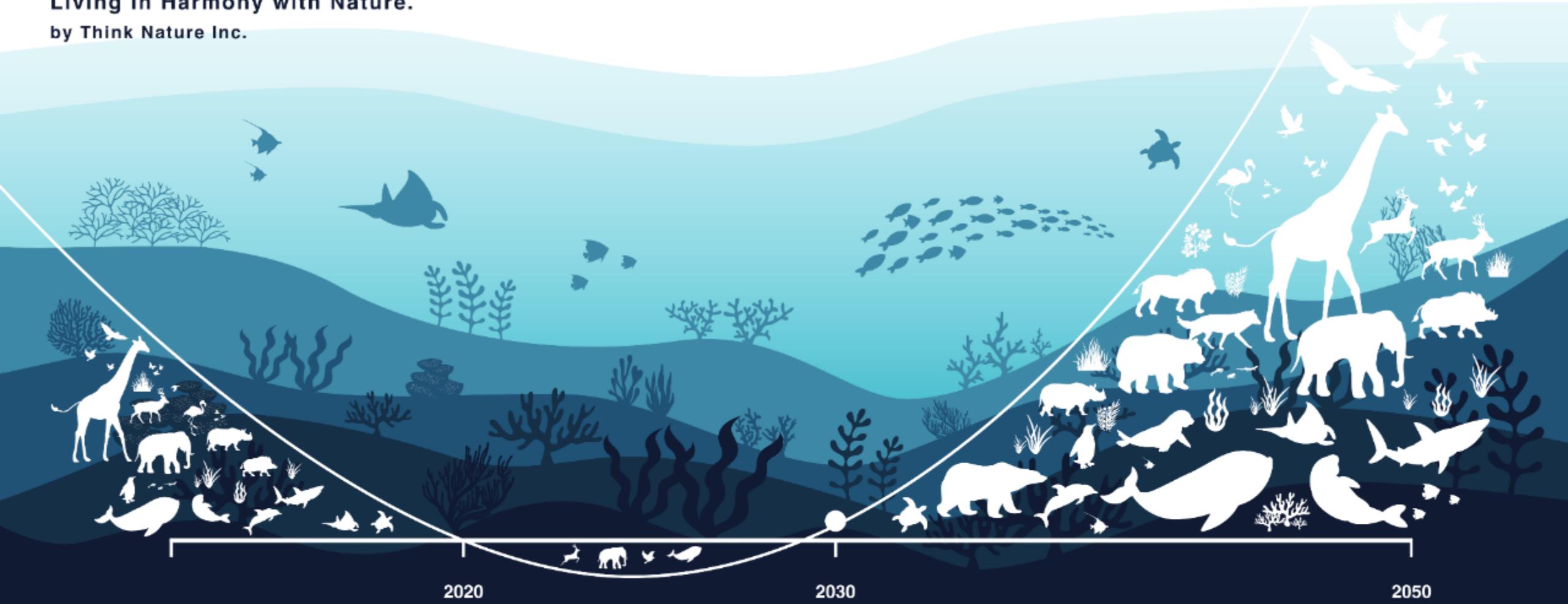
## Species richness of plant



# THANK YOU

**Living in Harmony with Nature.**

by Think Nature Inc.



Contact:

Email: [@think-nature.jp](mailto:@think-nature.jp)

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# Appendix

# Other services lineup

Based on big data and AI in biodiversity, we offer a variety of services related to biodiversity and natural capital.

## TN LEAD

### Value Chain Natural Risk Assessment

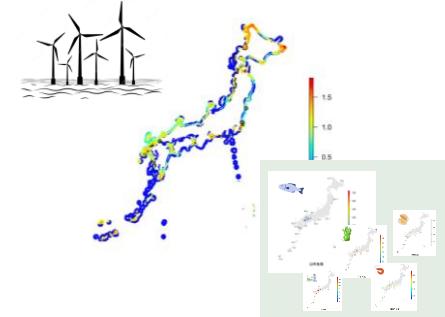
With global big data, evaluate the impact, dependency, and related risks of your company's value chain on biodiversity.



## TN IMPACT

### Impact and Risk Assessment on Biodiversity

Evaluate the impact and risks to biodiversity of various business activities; Renewable energy, real estate, and marine development.



## DugongsAI

### Promotion and Awareness-raising: Biodiversity Observation App

For the promotion and awareness-raising of biodiversity, we developed and provide biodiversity observation application for all

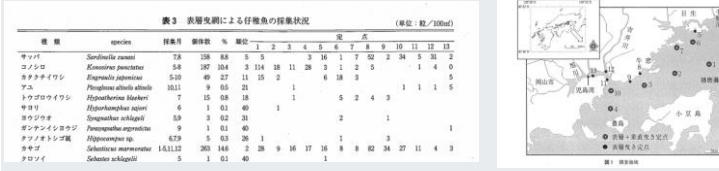


# How was the biodiversity importance map developed?

We derive species richness and biodiversity importance from overlaying maps of individual species distributions.

## Data curation from observation (occurrence) information

Utilizing geocoding, over **40 million data** were collected and organized at the level of **species, location, and time**.



草加・亀井・小見山(2013)のケース

Extract information

本番号	学名	学名	学名	調査方法	調査
1	サバ	サバ	サバ	調査	226
2	岡山県	小笠原島	東京	調査	226
3	岡山県	アカウニ	東京	調査	226
4	岡山県	沈水魚	東京	調査	226
5	岡山県	フマキ	東京	調査	226
6	岡山県	カサゴ	東京	調査	226
7	岡山県	アカウニ	東京	調査	226
8	岡山県	アカウニ	東京	調査	226
9	岡山県	アカウニ	東京	調査	226
10	岡山県	アカウニ	東京	調査	226
11	岡山県	アカウニ	東京	調査	226
12	岡山県	アカウニ	東京	調査	226
13	岡山県	アカウニ	東京	調査	226

Extraction & summarization of literature from around the world

species	location	time
Dicentrarchus labrax	japanicae, name	order, mesh3, latitude, longitude, pre-1949, 1950-1959, 1960-1969, 1970-1979, 1980-1989, 1990-1999, 2000-2010, unknown
Paraliparis setifer	イギリスザメ, イギリスザメ, イギリス	51330345, 34.2875, 125.0688
Paraliparis setifer	イギリスザメ, イギリスザメ, イギリス	51330345, 34.20417, 130.0813
Ocyurus maculatus	イギリスカツオ, カツオ	51330346, 34.20417, 130.0813
Tetronarce kuroshio	コヒビ	51330347, 34.20417, 130.0813
Dicentrarchus buri	ダツナギザメ, ダツナギザメ, タラヌギザメ	51330347, 34.2875, 125.0688
Hypogymnophia nigrimaculata	ハココロサメ	51330345, 34.2875, 125.0688
Chimaera annularis	アフロザメ, ハクジラ	51330345, 34.2875, 125.0688
Chimaera annularis	アフロザメ, ハクジラ	51330345, 34.20417, 130.0813
Cyphotrematoides insignis	ハマジクラ	51330345, 34.2875, 125.0688
Erythrinus pungitius	イソコゼ	51330345, 34.2875, 125.0688
Glossogobius bicoloratus	ヒラコゼ	51330345, 34.2875, 125.0688
Ophichthus laticaudatus	ハココロサメ	51330345, 34.2875, 125.0688
Lutjanus argenteoauratus	コフダダイ	51330345, 34.2875, 125.0688
Lutjanus fulvus	オフダダイ	51330345, 34.2875, 125.0688
Enoplopterus ethiomeatus	ヘビゴリザメ	51330345, 34.2875, 125.0688
Girella punctata	メリラ	51330345, 34.2875, 125.0688
Girella punctata	メリラ	52395512, 35.1379, 130.6438

## Modeling (species -> species richness)

Creation of **species richness distribution** based on species distribution **for five vertebrate groups and nearly 300,000 species of trees**.

species	location	time
Dicentrarchus labrax	japanicae, name	order, mesh3, latitude, longitude, pre-1949, 1950-1959, 1960-1969, 1970-1979, 1980-1989, 1990-1999, 2000-2010, unknown
Paraliparis setifer	イギリスザメ, イギリスザメ, イギリス	51330345, 34.2875, 125.0688
Paraliparis setifer	イギリスザメ, イギリスザメ, イギリス	51330345, 34.20417, 130.0813
Ocyurus maculatus	イギリスカツオ, カツオ	51330346, 34.20417, 130.0813
Tetronarce kuroshio	コヒビ	51330347, 34.20417, 130.0813
Dicentrarchus buri	ダツナギザメ, ダツナギザメ, タラヌギザメ	51330347, 34.2875, 125.0688
Hypogymnophia nigrimaculata	ハココロサメ	51330345, 34.2875, 125.0688
Chimaera annularis	アフロザメ, ハクジラ	51330345, 34.2875, 125.0688
Chimaera annularis	アフロザメ, ハクジラ	51330345, 34.20417, 130.0813
Cyphotrematoides insignis	ハマジクラ	51330345, 34.2875, 125.0688
Erythrinus pungitius	イソコゼ	51330345, 34.2875, 125.0688
Glossogobius bicoloratus	ヒラコゼ	51330345, 34.2875, 125.0688
Ophichthus laticaudatus	ハココロサメ	51330345, 34.2875, 125.0688
Lutjanus argenteoauratus	コフダダイ	51330345, 34.2875, 125.0688
Lutjanus fulvus	オフダダイ	51330345, 34.2875, 125.0688
Enoplopterus ethiomeatus	ヘビゴリザメ	51330345, 34.2875, 125.0688
Girella punctata	メリラ	51330345, 34.2875, 125.0688
Girella punctata	メリラ	52395512, 35.1379, 130.6438

Modeling and species distribution data creation

Mammals Birds ... Reptiles Trees



Global data scale: 10 arcmin (~15km)/ domestic data scale: 1km

Creation of species number distributions by overlaying



## Calculate the biodiversity importance

Creation of the regional biodiversity importance based on **species distribution and species conservation urgency**

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Creation of biodiversity importance for each taxon

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Creation of the integrated biodiversity importance

Integrated biodiversity importance

