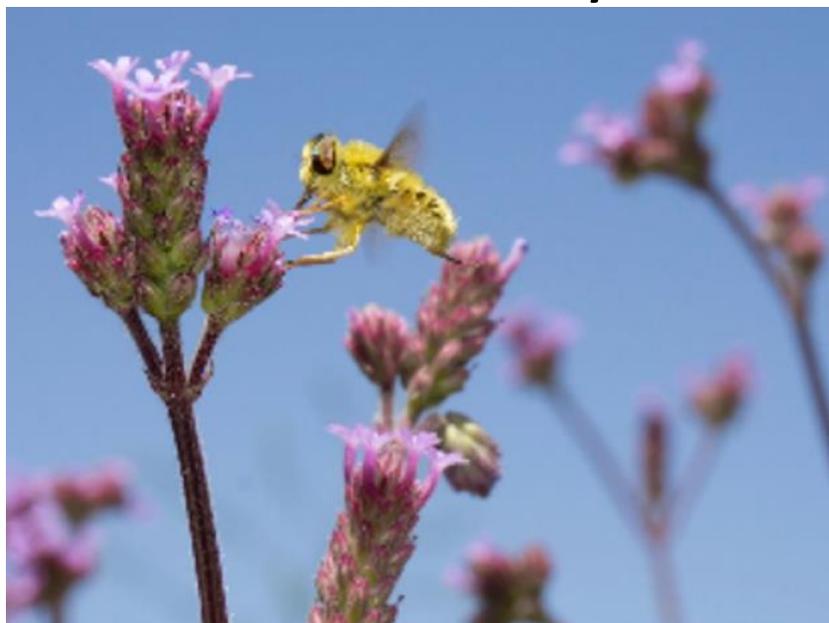


## Carbon4 Finance biodiversity footprint database using the Global Biodiversity Score



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### GENERAL INFORMATION

<b>Name of biodiversity measurement tool</b>	<b>Biodiversity Impact Analytics (BIA) database (application of the Global Biodiversity Score)</b>
<b>Name of company</b>	<b>Carbon4 Finance</b>
<b>Sector</b>	All sectors
<b>Turnover</b>	Not applicable
<b>Date/Period of measurement (year(s))</b>	BIA database released in year n is based on company data for year n-1

### Business application(s)

<b>BA1: Assessment of current biodiversity performance</b>	
<b>BA 3: Tracking progress to targets</b>	BIA can be used to track progress relatively to international targets (bending the curve, no net loss...). The MSA.km2 is indeed a metric relative to ecosystem integrity, which is being considered within the Science-Based Target Network (SBTN). The GBS can be used to Measure, set & disclose (step 3 of the SBTN Interim Guidance): measure impacts and express them in MSA.km2, set a target of impact reduction in MSA.km2 or in % of the footprint in a specific year (e.g. -30% compared to 2019 by 2030). It can also be used to disclose impacts regularly. On top of that, preliminary assessment of the planetary boundary for terrestrial biodiversity have been conducted and expressed in MSA (Lucas & Wilting 2018): even though these works require significant additional research, they provide the foundations to set scientifically meaningful targets.
<b>BA 4: Comparing options</b>	BIA analysis is available at portfolio level to compare the portfolio's impact with its benchmark and at company level to compare the company's impact with its sectoral peers.
<b>BA 5: Assessment / rating of biodiversity performance by third parties, using external data</b>	Core application
<b>BA 7: Screening and assessment of biodiversity risks and opportunities</b>	Screening of the ecological integrity risks at a portfolio level, i.e. the risks of impacting ecosystem integrity (as measured by the MSA.km <sup>2</sup> unit). In turn, risks of impacts on biodiversity translate into business risks (e.g. reputational, regulatory, financial) or possibly legal.
<b>BA 8: Biodiversity accounting for internal reporting and/or external disclosure</b>	Users can track and report biodiversity impact of their investments for listed assets (equities, corporate bond and sovereign bonds).

### Organisational Focus Area (site, product, supply chain, ...)

<b>OFA 5: Corporate level</b>	
<b>OFA 6: Sector level</b>	Portfolio level

## DESCRIPTION OF THE CASE

See summary description of Global Biodiversity Score [here](#)

### Context and specifics of Biodiversity Impact Analytics (BIA)

Launched in 2016 and based in Paris, Carbon4 Finance offers a complete set of climate data solutions covering both physical risk (CRIS Methodology: Climate Risk Impact Screening) and transition risk (CIA Methodology: Carbon Impact Analytics). These proprietary methodologies allow financial organisations to measure the carbon footprint of their portfolio, assess the alignment with a 2°C-compatible scenario and measure the level of risks that arise from events related to climate change. Carbon4 Finance applies a rigorous “bottom-up” research-based approach, which means that each asset is analysed individually and in a discriminating manner.

For climate data, they cover main equities and fixed income market indices (MSCI World, S&P 500, STOXX 600, BB EURO aggregate IG Index). Together with CDC Biodiversité, Carbon4 Finance leverages on their climate expertise and data to build a dataset of biodiversity footprints for investors using the Global Biodiversity Score (GBS).

More precisely Carbon4 Finance provides company specific data of two types: turnover amount and split by economic sector (based on the CRIS existing database) and countries and GHG emissions (all scopes, based on the CIA existing database). This data is then plugged in the GBS model. In this case, for all pressures except climate change, pressure amounts are estimated based on a combination of EEMRIO model (Exioabse) and CDC Biodiversité’s commodity impact factors. Pressure amounts are then translated into potential impacts using GLOBIO pressure-impact relationship.

So, BIA is a database built from a combination of company data provided by Carbon4Finance and GBS methodology provided by CDC Biodiversité.

### Boundaries

The perimeter of the biodiversity footprints is the whole value chain (from cradle to grave). However, downstream impacts are limited to those caused by climate change (when material), due to data and methodological limitations. As in carbon accounting, impacts of direct operations are included in Scope 1. Impacts of energy purchases are included in Scope 2. Impacts of other purchases are included in upstream Scope 3, while impacts of product life and end of life are included in downstream Scope 3.

To account for impacts lasting beyond the period assessed, impacts are split into dynamic – periodic gains/losses occurring within the period assessed – and static – persistent impacts or stock of accumulated losses.

Three overarching types of biodiversity are usually distinguished: terrestrial, aquatic (lakes, rivers, wetlands) and marine (oceans and seas). Marine biodiversity is not covered by the GBS (due to lack of scientific data) and is therefore not included in the dataset. This limitation will be highlighted for sectors where marine biodiversity impact is significant such as fishery or seafood related businesses.

### Location and scale

The assessment is not made at the site level but at the company level, over the whole value chain. Impacts are broken down at the country level.

### Types of pressures

Pressures	Terrestrial	Freshwater	Marine
<b>Land use change</b>	Land Use, Fragmentation, Encroachment	Wetland conversion	
<b>Climate change</b>	Climate Change	Hydrological disturbance due to Climate Change	
<b>Pollution</b>	Atmospheric nitrogen deposition, Ecotoxicity (assessed but not displayed in results).	Freshwater eutrophication, Land use in catchment of rivers and wetlands, Ecotoxicity (assessed but not displayed in results)	
<b>Direct exploitation</b>		Hydrological disturbance due to water use	
<b>Invasive species</b>			
<b>Other</b>			

### Collected data on economic activities, pressures, state and impacts

Primary data	Secondary data	Modelled data
<b>Economic data</b>		
For each company assessed: turnover breakdown by industry and country (EUR) from Carbon4 Finance (CRIS database)		
<b>Challenges</b>		
<b>Pressures</b>		
For each company assessed: GHG emissions (Scope 1,2,3) from Carbone4 Finance (CIA database)		
<b>Challenges</b>		
<b>State</b>		
<b>Challenges</b>		
<b>Impacts</b>		
<b>Challenges</b>		

#### What was the role of qualitative information?

No qualitative information is used to complement the quantitative data used to assess the biodiversity footprint at this stage.

#### Baseline/reference situation

The reference state against which 100% MSA is defined, is the undisturbed state (by definition of the MSA metric). This is a totally different concept from the baseline situation. At this stage, since it is the first dataset release, there is no historical reference. For next releases, the baseline will be 2019's dataset.

#### Required efforts for the measurement

The development of the dataset requires time and resources from Carbon4 Finance and CDC Biodiversité. However, the use of the dataset is effortless for end users in a sense that biodiversity footprint is directly accessible without any extra data needed other than company identification number (such as ISIN Code, LEI or Ticker).

The web interface will allow users to explore results at company and portfolio levels. Even though accessing biodiversity footprint figures is straightforward, fully understanding results, underlying concepts and assumptions requires some time and possibly training. An annual fee will be required to access the database.

#### Required skills to complete this exercise

We recommend dataset users to study GBS methodology fundamentals in order to better understand the biodiversity footprint figures. Numerous options are available: CDC Biodiversité's publicly available reports and videos, commercial webinars or trainings.

## Results and application

Figure 1 is a visual of the user interface which will be available for BIA users on C4F web platform. Users can set up a portfolio composed of various listed equities, then results can be explored at the portfolio or the company level. An example of the exploration interface is given with McDonalds (Figure 1). Underlying raw data can be downloaded in an Excel form.

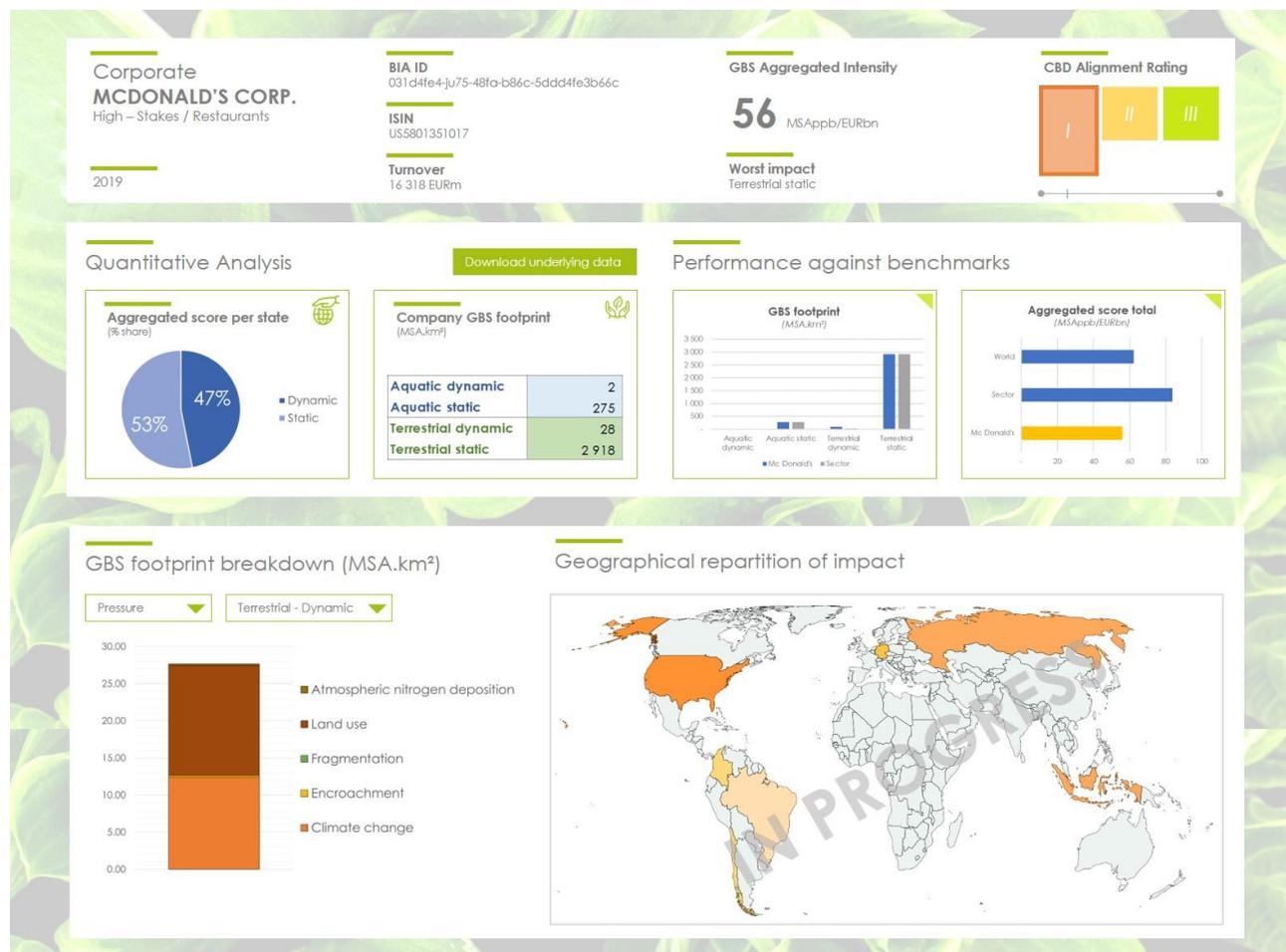


Figure 1 Example of exploration interface

Figure 1: Example of exploration interface

**GBS Aggregated intensity:** Results are expressed using MSA parts per billion (MSAAppb) in order to combine terrestrial and aquatic impacts. The graphs showing the aggregated score for dynamic and static seem not to be in line with the absolute figures in the second image (GBS footprint) as these show a much lower percentage of dynamic impact than the pie chart on the left suggests. However, this is due to the fact that for combining a dynamic and static impact, a 50 years recovery time is assumed for static impacts which is reflected in the formula for GBS aggregated intensity below:

### ***GBS aggregated intensity***

$$\begin{aligned}
 &= \frac{1}{\text{Enterprise value}} \\
 &\times \left( \frac{1}{\text{Terrestrial global surface}} \left[ \text{Dynamic}_{\text{MSA.km}^2}^{\text{terrestrial}} + \frac{1}{50} \text{Static}_{\text{MSA.km}^2}^{\text{terrestrial}} \right] \right. \\
 &\left. + \frac{1}{\text{Aquatic (freshwater) global surface}} \left[ \text{Dynamic}_{\text{MSA.km}^2}^{\text{aquatic}} + \frac{1}{50} \text{Static}_{\text{MSA.km}^2}^{\text{aquatic}} \right] \right)
 \end{aligned}$$

**CBD Alignment rating:** this visual is not stabilized yet as CBD target has still to be defined. In this version we suggest a red-light type visual where green is “compatible with the target”, yellow “close to the target” and red “incompatible with the target”

### **Interpretation of results and impact on decision-making**

As BIA is still under development, we cannot yet give a feedback on how it is used. BIA, in its first version, is relevant to identify biodiversity risks at a portfolio level. It is an interesting first step in mainstreaming biodiversity for investors in a quantified way:

- they can understand the concepts and key drivers by applying a footprint methodology on their portfolio,
- they can prioritize their analysis effort and engagement process starting with companies where potential impacts are the highest relatively to their portfolio exposure,
- they can also understand the limitations in terms of granularity and hopefully call (and invest) for a more sophisticated database feed by more granular data in order to extend the potential applications.

BIA database and interface are still under development and several improvements could be included in the final version. The interface will allow users to explore the results either at the portfolio and at the company level. An example of this exploration tool is given for McDonalds. Main functionalities, for both companies and portfolios, are:

- global aggregated score in MSAppb\*/b€ combining the 4 combination of terrestrial/aquatic and dynamic/static,
- a rating relative to the alignment to international target (to be defined),
- a breakdown of the score between static and dynamic impacts,
- a breakdown of absolute impacts in MSA.km<sup>2</sup> for the 4 combination of terrestrial/aquatic and dynamic/static,
- performance relatively to sectoral and global benchmarks,
- absolute impacts breakdown per scopes or pressures,
- Country location of impacts (estimated),
- link to download associated raw data.

This information will help users to understand biodiversity impacts of their investments, where they come from (sector, company, pressure, scope, location), how they perform relatively to benchmarks and if they are aligned with international targets, in order to report their biodiversity impact or to integrate it into their investment decision process.

## STRENGTHS AND LIMITATIONS OF THE APPLIED MEASUREMENT APPROACH IN THIS SPECIFIC CASE

### Self-assessment

Relevance	
Strengths	<ul style="list-style-type: none"> <li>The large coverage of the dataset allows investors to get a full picture of their portfolios' footprint, allowing them to identify risks and track performance</li> </ul>
Limitations	<ul style="list-style-type: none"> <li>The footprints are computed based on sectoral financial data and carbon data. Therefore, company footprints are at this stage estimates and not fit for one-on-one comparisons, especially within the same sector.</li> </ul>
Opportunities for improvement	<ul style="list-style-type: none"> <li>Dataset will be improved in the future leveraging on Carbon4 Finance expertise on bottom-up approach (collecting company-specific data at the site or company level). More and more physical data on pressures and raw materials will be collected and integrated in the footprint results, making them more precise and more granular.</li> </ul>
Completeness	
Strengths	<ul style="list-style-type: none"> <li>BIA currently covers cradle to grave impacts for climate change pressure, it only covers direct operations and upstream impacts (cradle to gate) on terrestrial and aquatic (freshwater) biodiversity for all other pressures.</li> </ul>
Limitations	<ul style="list-style-type: none"> <li>The MSA does not cover the risk of extinction of species, nor the degradation of the diversity of genes. The GBS also does not cover marine biodiversity, or some pollution types such as plastic waste</li> </ul>
Opportunities for improvement	<ul style="list-style-type: none"> <li>As metrics and approaches to cover impacts on species extinction and genes mature, BIA dataset could integrate that data. Also, a line by line qualitative analysis will be provided to identify high risks for those topics. Furthermore, as the GBS evolves, future evaluations will be more complete and might involve spatial data.</li> </ul>
Rigor	
Strengths	<ul style="list-style-type: none"> <li>The robustness and transparency of the tool are reinforced by a GBS independent critical review committee. Two panels were set up to conduct "critical review" of the GBS in 2020 (the review was completed in early 2020). Their goals were complementary. The expert panel verified the consistency and quality of the tool (assumptions, data, uncertainty, etc.), suggested improvements and assisted in the testing of the software component of the GBS. The stakeholder panel assessed the consistency of the GBS tool with existing public policies related to corporate biodiversity and with existing tools. The experts panel includes half a dozen international scientific experts.</li> </ul>
Limitations	<ul style="list-style-type: none"> <li>Uncertainties in the assessment of impacts are higher for freshwater (or aquatic) biodiversity than for terrestrial biodiversity and the freshwater impact assessment should thus be considered more as a compass, pointing at the direction to follow to reduce impacts.</li> </ul>
Opportunities for improvement	

<b>Replicability</b>	
Strengths	<ul style="list-style-type: none"> <li>Users have access to global level as well as intermediary levels to facilitate interpretation. For each company impacts can be broken down by region, pressure, scope or raw material.</li> </ul>
Limitations	<ul style="list-style-type: none"> <li>BIA does not display GBS impact factors used to calculate impacts.</li> </ul>
Opportunities for improvement	<ul style="list-style-type: none"> <li>GBS impact factors for financial data (at the sector and region level) will be available soon as CDC Biodiversité is working on sectoral benchmarks guides including them</li> </ul>
<b>Aggregation</b>	
Strengths	<ul style="list-style-type: none"> <li>Data are available at the company level and can be aggregated at the portfolio level. Even aquatic and terrestrial data are aggregated using MSAppb, see complementary information</li> </ul>
Limitations	<ul style="list-style-type: none"> <li></li> </ul>
Opportunities for improvement	<ul style="list-style-type: none"> <li>In the future, with the integration of bottom-up collected data, it will be possible to compare the biodiversity impact of one company amongst its sectoral peers (namely qualitative information like the strategy and governance of the company regarding biodiversity impact).</li> </ul>
<b>Communication</b>	
Strengths	<ul style="list-style-type: none"> <li>The MSA measures biodiversity intactness relative to its abundance in undisturbed ecosystems. A 100% ratio indicates an intact ecosystem while damages caused by an increase of pressures bring the MSA progressively to 0% when all originally occurring species are extinct in the ecosystem. The gradual deterioration from a pristine ecosystem to a completely artificialized space is easily understandable for non experts.</li> </ul>
Limitations	<ul style="list-style-type: none"> <li>MSA.km2 is not yet widespread</li> </ul>
Opportunities for improvement	<ul style="list-style-type: none"> <li>GBS allows to address targets expressed in CBD Zero draft. The dynamic impacts for instance equate the changes in the “Bending the curve” or the +20% ecosystem integrity in the CBD Zero Draft</li> </ul>
<b>User friendliness</b>	
Strengths	<ul style="list-style-type: none"> <li>C4F will integrate BIA dataset to all its analysing tools so that end users will benefit from the same experience as for climate data. On CDC Biodiversité’s side, there is a clear framework and support system. Training are available for a fee to better understand GBS methodology concepts, strengths and limitations.</li> </ul>
Limitations	<ul style="list-style-type: none"> <li>Methodology can be seen as complex even though trainings are available. An annual fee is required to access the database.</li> </ul>
Opportunities for improvement	<ul style="list-style-type: none"> <li>The user interface can be refined to integrate biodiversity specificities relatively to climate change.</li> </ul>
<b>Investment</b>	
Strengths	<ul style="list-style-type: none"> <li>Dataset is ready to use, no additional data collection effort is required.</li> </ul>
Limitations	<ul style="list-style-type: none"> <li>Time might be needed to get familiar with GBS methodology and correctly interpret the results. An annual fee is required to access the database.</li> </ul>
Opportunities for improvement	

### Overall assessment

This dataset is a first version of the large scale application of the GBS for investors. A testing phase is planned before the official launch in Q2 2021.

Overall, BIA has achieved what it promised to do: quantify the global and end-to-end biodiversity footprint with a global coverage. By providing relevant quantitative footprint estimations, BIA dataset will greatly improve the biodiversity mainstreaming for finance where aggregated quantitative data need had been clearly identified.

### Case study description and self-assessment carried out by

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Antoine Vallier (CDC Biodiversité)

### More information on the measurement approach can be found here:

C4F CIA: [http://www.carbone4.com/wp-content/uploads/2019/09/CarbonImpactAnalytics\\_November18.pdf](http://www.carbone4.com/wp-content/uploads/2019/09/CarbonImpactAnalytics_November18.pdf)

C4F CRIS:

<http://crisforfinance.com/en/cris-finance-climate-risk-impact-screening/>

CDC B/GBS 2019 technical update: <http://www.mission-economie-biodiversite.com/wp-content/uploads/2020/09/N15-TRAVAUX-DU-CLUB-B4B-GBS-UK-MD-WEB.pdf>

CDC B/GBS 2018 technical update: <http://www.mission-economie-biodiversite.com/wp-content/uploads/2019/05/N14-TRAVAUX-DU-CLUB-B4B-GBS-UK-WEB.pdf>

CDC B/GBS GBS technical update 2017: <http://www.mission-economie-biodiversite.com/downloads/biodiv2050-outlook-no-11/>