

THE GLOBAL BIODIVERSITY SCORE

Report for the review committee: Quality Assurance

May 2020 - Final version

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42 Note to the reader

43 Global Biodiversity Score (GBS) review reports are not completely independent from each other. Readers
 44 of this report are advised to read the reports dedicated to **Core concepts of the GBS** (CDC Biodiversité
 45 2020a), **Terrestrial pressures on biodiversity** (CDC Biodiversité 2020e) and **Aquatic pressures on**
 46 **biodiversity** (CDC Biodiversité 2020c) to ensure a good overall comprehension of the tool and the present
 47 report. The sections describing default assessment as well as the limitation sections are especially
 48 recommended.

49 The following colour code is used in the report to highlight:

50 - **Assumptions**

51 - **Important sections**

52 - **Developments of the GBS planned in the future**

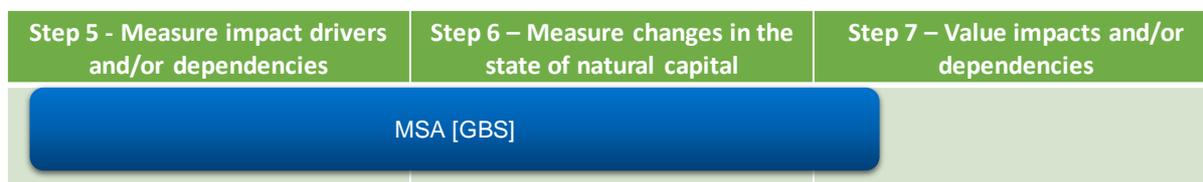
53 The GBS review reports are aimed at technical experts looking for an in-depth understanding of the tool
 54 and contribute to the transparency that CDC Biodiversité considers key in the development of such a tool.
 55 They focus on technical assumptions and principles. Readers looking for a short and easy-to-understand
 56 explanation of the GBS or for an overview of existing metrics and tools should instead read the general
 57 audience reports published by CDC Biodiversité (CDC Biodiversité 2017; CDC Biodiversité, ASN Bank, and
 58 ACTIAM 2018; CDC Biodiversité 2019b).

59

Introduction

60 The documents of the critical review detail the technical hypotheses, methodologies, and choices of data
 61 sources that compose the first version of the GBS. Due to the GBS' intrinsic uncertainties, we consider
 62 primordial to establish clear guidelines that will limit errors caused by its misuse or misunderstanding. In this
 63 document, we explicit how a Biodiversity Footprint Assessment (BFA) made using the GBS should be
 64 conducted and audited. More specifically, we seek to explicit the key principles that GBS users must follow
 65 and explore what to be vigilant about when auditing a GBS BFA.

66 This document aligns with other initiatives' framework as much as possible. In particular, the *Biological*
 67 *Diversity Protocol* (BD Protocol) v1.1 draft document, and the *NatCap Checker Guidance v1.0* have widely
 68 inspired this document. The **BD Protocol** is an output of the Biological Disclosure Project (BDP) which aims
 69 at providing a common **accounting framework** for the private sector "to identify, measure, manage and
 70 report on their impacts on biodiversity in a standardised, comparable, credible and unbiased manner"(EWT
 71 - NBBN 2019). The **NatCap Checker** is a self-assessment tool of the Natural Capital Coalition, which aims
 72 at enabling "users to assess, communicate and improve the level of confidence in their natural capital
 73 assessment" (Natural Capital Coalition 2019). Figure 1 illustrates how the MSA, and thus the GBS, connect
 74 with the Natural Capital Protocol and natural capital assessments.



75

76 *Figure 1: BFAs with the GBS deal with steps 5 and 6 (and partly 7) of the Natural Capital Protocol (for biodiversity)*
 77 *(Lammerant 2019)*

78 As noted in the Core concepts review document (CDC Biodiversité 2020a), the GBS 1.0 should be primarily
 79 seen as a compass indicating to companies in which direction to go rather than as a weighting scale, *i.e.*
 80 providing insights on which strategic actions to take to reduce their impacts rather than measuring
 81 accurately the changes in the state of biodiversity (*i.e.* biodiversity impacts). Future updates of the GBS
 82 should however bring it closer to a "weighting scale" role. This document prepares for the time when BFAs
 83 will provide a reasonably accurate measurement of biodiversity impacts. Its sections play different roles:
 84 section 1 explains CDC Biodiversité's vision related to BFAs, section 2 provides the skeleton of a future
 85 "reporting framework" which assessors would have to follow to conduct BFAs and auditors could use to
 86 verify BFAs, section B provides additional guidance for auditors and section 4 assesses how well the GBS
 87 currently covers pressures and the impacts of all kinds of commodities and industries. The maturity of the
 88 topic is limited, so that this document contains only preliminary thoughts on BFAs audits. Additional work in
 89 the coming months and years will formalize a comprehensive reporting framework for assessors and
 90 auditors.

91 1 Context: our vision for the 92 GBS Biodiversity Footprint 93 Assessment ecosystem

94 First and foremost, it is key to detail in what context BFAs using the GBS will be conducted, and to whom
95 the key principles defined thereafter are aimed at.

96 1.1 Who will use the GBS?

97 **Our vision for Biodiversity Footprint Assessments (BFAs) involves the same types of actors as those involved**
98 **today in Carbon Footprint Assessments.** That is: 1) companies willing to assess their environmental footprint
99 by themselves; 2) specialized external assessor consultants who will conduct assessments for companies;
100 3) investors aiming to invest in companies based on their biodiversity performance; 4) data providers and
101 rating agencies providing biodiversity scoring for a wide range of companies and financial assets; 5) external
102 auditors whose role it is to make sure that non-financial disclosures based on BFAs results are trustworthy.
103 For the last category, voluntary and mandatory auditing can be distinguished. In the first case, companies
104 may voluntarily seek auditors to double-check their assessments. CDC Biodiversité may establish a “*GBS*
105 *verified*” service in partnership with auditors to provide such voluntary assurance. In the second case, the
106 non-financial reglementary reporting – like the Non-Financial Performance Statement (DPEF in French) –
107 should be audited by non-financial auditors. The relationships between those actors and CDC Biodiversité’s
108 role in the emerging GBS BFA ecosystem are summarized by Figure 2.

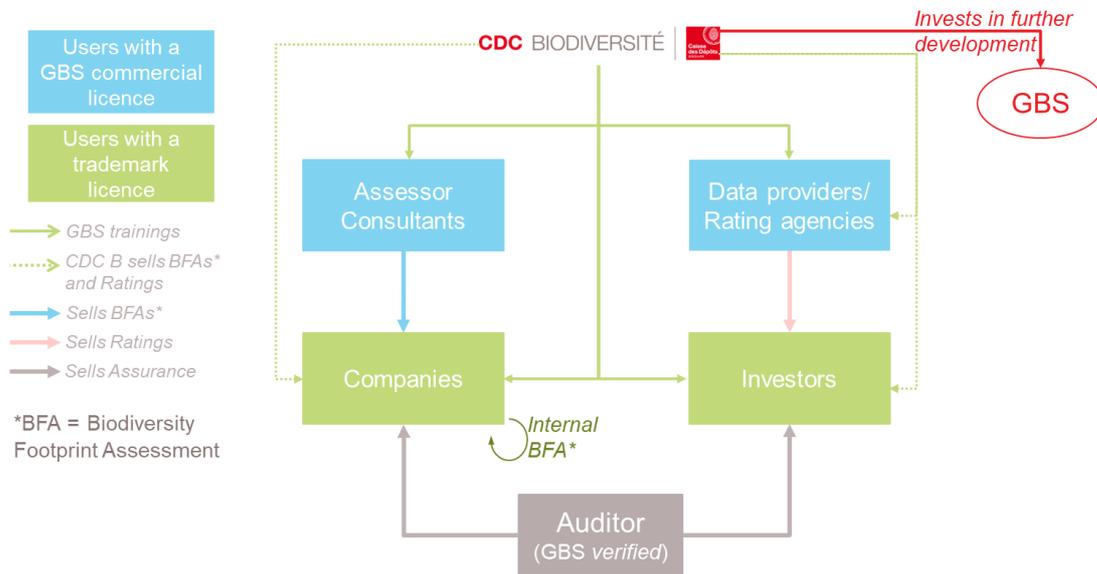


Figure 2: The GBS ecosystem

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Depending on the use they will make of the GBS, users will be required to purchase different types of licences. Licences' price will be low, since CDC Biodiversité's financial goal is solely to reimburse its development expenditures and ensure that the GBS can keep being improved in the future.

1.2 What are the applications of the GBS?

The GBS is a tool aiming at assessing the biodiversity footprint of large companies at the scale of their value chain, as well as financial institutions' portfolios (Lammerant 2019). What's more, it is fitted for three types of businesses applications:

- "Assessment of current biodiversity performance"
- "Tracking progress towards targets"
- "Assessment / rating of biodiversity performance by third parties, using external data"

Finally, to ensure reasonable accuracy, results should be reported only for entities with a cumulated surface area of at least 100-1000 ha, related to GLOBIO's cause-effect relationships, or with a turnover of more than 10-100 million euros, which more or less translates into impacts over areas of 100-1000 ha.

1.3 GBS mandatory trainings

CDC Biodiversité will host GBS trainings, tailored for each type of actors likely to use the GBS. Trainings will make sure that rating agencies and GBS assessors use our tool in the right way. Therefore, the trainees

128 will have to take a test at the end of their training and the GBS will hold a list of certified GBS assessors.
129 More specifically, different levels of training are planned:

- 130 • Level 1 trainings will target anyone willing to understand how to draw a link between biodiversity
131 erosion and economic activities using a GBS BFA. The trainings will focus primarily on defining the
132 perimeter of a BFA, getting a good command of the data collection process and interpreting GBS
133 results.
- 134 • Level 2 trainings will enable participants to lead the comprehensive GBS BFA of any organization
135 autonomously and manage the tool in its complexity. It should last two days and is open only to
136 people who followed the level 1 training.
137

138 1.4 Audits

139 External auditors will be responsible for ensuring the completeness and the veracity of the GBS BFAs
140 incorporated to companies' non-financial disclosures. More specifically, as with carbon non-financial
141 disclosures, they can verify three types of information (cf. section B for more details):

- 142 - The veracity of the **input data**. For instance, if a company calculates the impacts of its wheat
143 procurements, it should be able to give a proof of the transaction, such as an invoice;
- 144 - The tools' **calculations**, and the impact factors. In our case, the review committee will hold that
145 responsibility since the external auditors do not have the knowledge required;
- 146 - **Misinterpretations of the results**.

147
148 For this reason, the creation of a specific level 2 training for external auditors is currently under consideration
149 by CDC Biodiversité.

150 2 Preliminary reporting 151 framework

152 This section provides a preliminary reporting framework for assessors and auditors. Still, the GBS and the
153 BFA ecosystem are not yet mature enough to conduct routine audits of BFAs. More thoughts will be put
154 into the rules delining assessors' and auditors' roles in the coming months. A "How to conduct a GBS-based
155 BFA" guide will also be released by CDC Biodiversité. We acknowledge that the current preliminary
156 framework still leaves some room for interpretation. As such, it should not be considered as a proper
157 "reporting protocol" dedicated to auditors, which will also be released later on.

158 2.1 Key Principles that a BFA should adhere to

159 The following seven principles are extracted from the *Biological Diversity Protocol* (BD Protocol) v1.1 draft
 160 document (EWT - NBBN 2019) and the NatCap Checker Guidance v1.0 (Natural Capital Coalition 2019),
 161 completed with our experience. Having worked closely with about 25 large companies and 10 financial
 162 institutions through the B4B+ Club (Business for Positive Biodiversity Club), these principles appeared
 163 crucial for future GBS-based BFAs.

164 A RELEVANCE

165 “Ensure the biodiversity impact inventory appropriately reflects the biodiversity impacts of the company and
 166 its value chain. It shall serve the decision-making needs of users, both internal and external to the company.”
 167 (EWT - NBBN 2019).

168 Ensuring that all “relevant” information is included in the assessment (Natural Capital Coalition 2019) first
 169 requires to correctly set the boundaries of the assessment, and then to properly assess the most material
 170 impacts. Assessing impacts is time-consuming, so that assessing all impacts with maximum accuracy is not
 171 realistic. Assessors should focus in priority on the most material impacts. For instance, applying the
 172 relevance principle ensures that assessors avoid spending 80% of their time assessing impacts
 173 representing less than 1% of the overall impacts.

174 Appropriately setting the assessment boundaries requires the consideration of:

175 - **Organisational structure boundaries:** define clearly which company’ entities will be included in
 176 the assessment, and to what extent their impacts should be attributed to parent company.
 177 More specifically, impact attribution must be in line with financial disclosures following either
 178 financial control, operational control or equity control (% of the asset owned) impact allocation
 179 system (CDC Biodiversité, ASN Bank, and ACTIAM 2018; CDC Biodiversité 2020a).

180 - **Value chain boundaries:** not only direct operations, but also upstream (suppliers) and
 181 downstream (clients) impacts should be included in the assessments. As noted in our work
 182 with Dutch and German partners (CDC Biodiversité, ASN Bank, and ACTIAM 2018), in
 183 principle Scope 1, 2 and relevant categories of Scope 3 should be included. When deviating
 184 from this (*e.g.* when Scope 3 is not relevant), it should be made clear why.

185 - **Business context:** to some extent, the nature of the activities/sector and geographic locations
 186 can influence the needs of stakeholders and information users, and thus the assessment
 187 boundaries.

188 Regarding the issue of materiality, CDC Biodiversité will publish sectoral guidelines highlighting the most
 189 material impacts by industry to facilitate their identification.

190 B EQUIVALENCY

191 The BD Protocol initial draft requires to “Ensure that the notion of equity in the type of biodiversity (*i.e.*
192 ecological equivalency or like-for-like principle) is integral to biodiversity impact inventory development and
193 accounting. Undertake net impact accounting only for equivalent biodiversity losses (negative impacts) and
194 gains (positive impacts).” (EWT - NBBN 2019).

195 The latest stakeholder feedback report on the protocol’s consultation notes that flexibility and leniency will
196 be increased regarding this principle. Aggregated metrics such as the MSA should thus be compatible with
197 the protocol. Indeed, the MSA can be considered as a habitat rating method under the BD Protocol.
198 Furthermore, recording impacts by habitats is very difficult for impacts occurring upstream or downstream
199 in the value chain as large companies can have thousands of direct and indirect suppliers, and do not
200 necessarily know their exact location. This issue is even greater when it comes to financial institutions.
201 Section 2.4.A.2 provides additional guidance on how impacts should be reported to abide by the principle
202 of ecological equivalency.

203 C COMPLETENESS

204 “Account for and report on all biodiversity impacts within the chosen organizational and value chain
205 boundaries. Disclose and justify any exclusion. [...] In practice, a lack of data, or the cost of gathering data,
206 may be limiting factors.” (EWT - NBBN 2019). This principle has always been key to the GBS, which is why
207 default assessments were designed as a way to compensate for any missing refined data on the company’s
208 side.

209 Complying with this principle requires that, within the assessment boundaries, the assessment include
210 impacts across all the Scopes covered by the GBS, *i.e.* Scopes 1, 2 and 3 upstream, and across all the
211 pressures covered by the GBS, *i.e.* land use, fragmentation, encroachment, atmospheric nitrogen
212 deposition, climate change, hydrological disturbance, wetland conversion, nutrient emissions and land use
213 in catchment of rivers and wetlands. Any exclusion must be disclosed and justified. In line with the Relevance
214 principle, it might be justified to exclude impacts representing very small fractions of the total impact (*e.g.*
215 less than 1%) whose assessment would require considerable efforts, but such exclusion must be explained.

216 As noted in other review documents, some impacts are however currently not covered by the GBS (*e.g.*
217 impacts on marine biodiversity). This should be clearly stated in BFAs using the GBS and BFA reports should
218 include a section on environmental safeguards (*cf.* 2.2) to deal qualitatively with these gaps.

219 D CONSISTENCY

220 “Use consistent methodologies to allow for meaningful comparisons of biodiversity impacts over time.
221 Transparently document any changes to the data, inventory boundary, methods or any other relevant
222 factors in the time series.” (EWT - NBBN 2019). The NatCap Checker also contains a Consistency principle,

223 which details to “ensure the data and methods used for an assessment are compatible with each other
 224 and with the scope of analysis, which depends on the overall objective and expected application”
 225 (Natural Capital Coalition 2019). **In our case, the section 1.2 of this document details which companies**
 226 **fall within the scope of analysis of the GBS, and what its business applications are.**
 227

228 E TRANSPARENCY

229 “Address all relevant issues in a factual and coherent manner, based on a clear audit trail. Disclose any
 230 relevant assumptions and make appropriate references to the data collection and estimation methodologies
 231 used.” (EWT - NBBN 2019).

232 *Transparency* here is similar to *Replicability* in the NatCap Checker, which details that “all assumptions,
 233 data, caveats, and methods used are transparent, traceable, fully documented, and repeatable.”

234 It is essential for these two principles that **GBS users are aware that they should keep track of each of**
 235 **their hypotheses, choices of methods and data sources.** These principles will be part of the GBS
 236 trainings. Furthermore, **future developments of the GBS allowing users to track all the impact factors used**
 237 **in the computation from data entry to results** will be key to help them cope with the *Replicability* principle.

238 F ACCURACY

239 “Ensure that the measurement of biodiversity impacts is systematically accurate, as far as can be
 240 judged, notably by **reducing uncertainties as far as is practicable.** Achieve suitable accuracy to enable
 241 users to make decisions with reasonable assurance as to the integrity of the reported information.
 242 When no direct observation is possible, estimate impacts on the basis that they are reasonably likely
 243 to occur, **recording all methodological limitations.**” (EWT - NBBN 2019).
 244

245 It should be first noted that in all but rare exceptions, the GBS has no access to direct measurements of
 246 biodiversity state. Instead, it relies at some stages on cause-effect relationships to assess biodiversity
 247 impacts based on pressure data. The underlying uncertainties of those relationships inherently put a ceiling
 248 to the accuracy of assessments. However, when comprehensive ecological survey data is available, it can
 249 be included to verify (and correct) the impacts assessed based on pressure data.

250 It goes without saying that “reducing uncertainties as far as is practicable” is one of the main challenges
 251 that the GBS must face, whether uncertainties are intrinsic to the tools’ methodology (*e.g.* uncertainty of
 252 the impact factors), or extrinsic (*e.g.* quality of the inventory data, uncertainty of underlying models). **More**
 253 **work on handling uncertainties is planned in the upcoming updates of the GBS.** For now, a qualitative
 254 assessment of the data accuracy is conducted thanks to the data quality tiers (see the report dedicated to
 255 GBS Core concepts (CDC Biodiversité 2020a)). Moreover, a conservative, an optimist and a central value
 256 can be filled in the input documents, allowing to account for users’ doubts on pressures’ measurements and

257 commodities purchases. Future developments of the GBS will aim at handling the uncertainties of the data
258 included in the model, the model assumptions and the impact factors in a similar way.

259 **All unassessed materials due to a lack of impact factors will be specified in the GBS output to clarify its**
260 **methodological limitations.**

261 Finally, one necessary aspect in abiding by the *Accuracy* principle is respecting the **eligibility** of a company
262 to the GBS BFA (10-100 million in turnover and a cumulated land surface area of 100-1000ha), and the
263 **business applications** of the GBS – see section 1.2.

264 G TIME-PERIOD ASSUMPTION

265 “Account for biodiversity impacts consistently across business reporting periods.” (EWT - NBBN 2019).
266 Ideally, companies should measure the dynamic impacts that occurred in the time periods separating two
267 BFA measurements. For example, if a company first measures its impact in 2019, and then again in 2022,
268 the 2020 and 2021 dynamic impacts originating from punctual sources (*e.g.* buying raw materials) should
269 be included in the analysis and allocated to their respective year of consumption.

270 2.2 Data inputs

271 Data inputs should follow the key principles listed above and the latest data collection guidelines provided
272 by CDC Biodiversité (CDC Biodiversité 2019a) which state the hierarchy of data inputs (which type of data
273 is preferred, what are other options if ideal data is not available, etc.).

274 As explained in the various GBS review documents and particularly in the Core concepts (CDC Biodiversité
275 2020a), three values (central, optimist, conservative) of the impact factors and calculation intermediaries
276 will be provided to cover the associated uncertainty¹. Data inputs should similarly be provided with three
277 values.

278 2.3 Calculations

279 Calculations should use a version of the GBS officially provided and supported by CDC Biodiversité, ideally
280 the latest release of the GBS. A clear audit trail should be provided so that the data sources, the GBS input
281 files and the results can easily be linked and calculations can easily be reproduced if necessary.

¹ In the GBS 1.0, for most items, the central, optimist and conservative values are unfortunately the same. Updates of the tool will increase the number of items for which uncertainty is properly taken into account.

282 2.4 Results

283 A QUANTITATIVE ASSESSMENT

284 Quantitative footprint results should state the version of the GBS used, the date of the calculation and the
285 author of the calculation.

286 It should be made clear in the results which Scopes, pressures and commodities were included in the
287 assessment. The quantities of materials and emissions which were not assessed due to a lack of impact
288 factors in the version of the GBS used should be reported in addition to the quantitative footprint results, to
289 disclose the extent of the impacts not included in the footprint figures.

290 2.4.A.1 Overall uncertainty

291 In GBS 1.0, calculations are conducted only based on the “central” value of each figure involved in the
292 calculation (data input such as surface area under intensive agriculture, impact factors such as the impact
293 per km² of intensive agriculture).

294 In future updates of the GBS, several “calculation scenarios” will be implemented to provide a range of
295 values for the impacts assessed:

- 296 - a "**central**" scenario using all the central values
- 297 - a "**lower bound**" scenario which include optimist values when the likelihood of the actual value being
298 near its conservative value is high, and central values otherwise
- 299 - an "**upper bound**" scenario which is the mirror of the lower bound with conservative values
- 300 - an "**extremely optimist**" scenario using all the optimist values
- 301 - an "**extremely conservative**" scenario using all the conservative values

302

303 On top of results calculated with the “central” scenario, assessors should provide a range of uncertainty
304 using the “lower bound” and “upper bound” scenarios.

305

306 For instance, the Core concept document (CDC Biodiversité 2020a) suggests that the standard error of the
307 impact factors can be used to build the conservative and optimistic values. In the case of intensive agriculture,
308 the standard error is 0.08 and the average is 0.1 (Alkemade et al. 2009), leading to a central value of 0.1, a
309 conservative value of 0.02 and an optimistic value of 0.18. Depending on the “calculation scenario”
310 considered, one of these three values would be used in calculations when reporting results. For instance,
311 the static land use impact of an intensive agriculture farmland of 100 ha (central value) comprised between
312 90 ha (optimistic value) and 110 ha (conservative value), would be (prior to rounding):

- 313 - central scenario: $100 \times (1 - 0.1) = 90$ MSA.ha

- 314 - extremely optimist: $90 \times (1-0.18) = 73.8$ MSA.ha
 315 - extremely conservative: $110 \times (1-0.02) = 107.8$ MSA.ha

316 2.4.A.2 Break down of results

317 Results of BFAs should be broken down based on several splits:

- 318 - climate change impacts on biodiversity should be reported separately. This allows to
 319 distinguish between impacts already tackled through the assessed entity's climate policy
 320 and the non-climate impacts it needs to tackle through additional actions;
- 321 - terrestrial and aquatic (freshwater) impacts should be reported separately to avoid
 322 minimizing aquatic impacts. Aquatic ecosystems cover a much smaller surface area of the
 323 Earth. It means that an impact of 100 MSA.km² is a much larger share of aquatic biodiversity
 324 than it is of terrestrial biodiversity. It also means that aquatic impacts are usually
 325 quantitatively much smaller than terrestrial impacts, although they can be equally significant;
- 326 - dynamic and static impacts must be reported separately. In particular, static impacts cannot
 327 be summed up over reporting periods (CDC Biodiversité 2020a).

328 Ideally, and in line with the equivalency principle of the BD Protocol, impacts should be reported by
 329 ecoregion (as defined by the WWF²). However, reporting at the global level is also possible.

330 B QUALITATIVE ASSESSMENT

331 To paraphrase the common work with other financial institutions which provided a very good overview of
 332 the aim and principle of a qualitative assessment in the context of a BFA (CDC Biodiversité, ASN Bank, and
 333 ACTIAM 2018), any BFA has its own limitations, especially regarding the available data and the cause-effect
 334 relationships used to calculate the impact on biodiversity. These limitations should be recognised, reported
 335 and taken into consideration in the interpretation and use of the footprint results. A qualitative analysis
 336 serves to put the quantitative results into perspective, identify perimeter/methodological limitations and
 337 provide an assessment (quantitative and/or qualitative) of uncertainty. This analysis can consist of three
 338 parts:

- 339 • A description of the context in which the footprint results should be interpreted, including, among
 340 others, the objective of the BFA;
- 341 • An identification of the general limitations of the quantitative analysis, relevant to all economic
 342 activities assessed;
- 343 • A sector-specific qualitative analysis focusing on sector specific issues regarding biodiversity
 344 impacts which may not be (fully) covered by the quantitative analysis.

345 Sectoral guidance and principles can support the qualitative sectoral analysis, and can also provide
 346 additional context to assessors on how to apply the BFA's principles. For instance, in the livestock

² <https://www.worldwildlife.org/biome-categories/terrestrial-ecoregions>

347 husbandry industry, the LEAP principles³ insists on the need to assess both negative and positive impact
 348 and states that feed production, including off-farm (*i.e.* Scope 3 upstream) should be included in
 349 assessments (Relevance and Completeness principles).

350 **C ENVIRONMENTAL SAFEGUARDS**

351 The qualitative assessment should be completed with a specific focus on making sure that factors and
 352 pressures which may influence the biodiversity impact of economic activities are not overlooked (CDC
 353 Biodiversité, ASN Bank, and ACTIAM 2018). To ensure such factors and pressures are not overlooked in
 354 the decisions taken following a BFA, companies should address them by implementing environmental
 355 safeguards, as listed in Table 1 **Erreur ! Source du renvoi introuvable.** These environmental safeguards are
 356 similar to the “Do no significant harm” criteria of the European Union Green Taxonomy.

357 Table 1 should be seen as a checklist: for each “issues not (fully) covered by the GBS”, the assessor should
 358 check whether the company meets the criteria listed, and if it does, he should advise the company to
 359 implement the actions listed as “addressing the issue”. For instance, if the company operates in or near
 360 protected areas (criteria for the second issue listed in the table), it should establish and implement a
 361 Biodiversity Management Plan or a Biodiversity Action Plan. Compliance with the environmental safeguards
 362 do not influence the quantitative assessment expressed in MSA.km².

363 *Table 1: Environmental Safeguards to implement to complete the quantitative assessment of a BFA*

Issues not (fully) covered by the GBS approach	Criteria to apply to direct operations and the value chain (especially suppliers) to assess if actions should be taken	Actions addressing the issue
Location specific impact characteristics		
Water scarcity	• If some activities in water-scarce areas	Establish and implement a water management system
Proximity of HCVA's (High Conservation Value Areas) / protected areas	• If operating in or near these areas	Establish and implement a Biodiversity Management Plan or Biodiversity Action Plan for the entities concerned

³ <http://www.fao.org/3/a-i6492e.pdf>

<p>Presence of threatened or protected species</p>	<ul style="list-style-type: none"> • If endangered or threatened species are suspected to be locally affected by the activities • If activities must comply with the mitigation hierarchy 	<p>Establish or workin within Verified Conservation Areas (VCA)</p> <p>Respect legal requirements related to the mitigation hierarchy</p>
<p>Impact on soil fertility/soil quality</p>		
<p>Impacts on soil fertility/soil quality</p>	<ul style="list-style-type: none"> • If activities impact soil fertility or quality 	<p>Switch to production or sourcing only from organic or low impact agriculture</p>
<p>Drivers of biodiversity loss</p>		
<p>Introduction of invasive alien species</p>	<ul style="list-style-type: none"> • If activites can introduce invasive alien species to new areas (<i>e.g.</i> through transport) 	<p><i>Specific certification initiatives may be used/required to guarantee compliance</i></p> <p>Require the implementation of a management system to prevent the introduction of invasive species</p> <p>Ban the use of GMOs</p>
<p>Overexploitation</p>	<ul style="list-style-type: none"> • If activities are contributing to over-harvesting or over-use of living species, pushing their populations to decline 	<ul style="list-style-type: none"> • In case of 'high risk' sectors: companies should assess a sustainable level of exploitation <p><i>Specific certification initiatives may be used/required to guarantee compliance</i></p> <ul style="list-style-type: none"> • Comply with CITES • Ban the use of IUCN red list species
<p>Disturbance</p>	<ul style="list-style-type: none"> • If activities are expected to significant (<i>e.g.</i> based on an environmental impact assessment)? 	<ul style="list-style-type: none"> • Carry out an EIA (Environmental Impact Assessment) and implement its recommendations <p>If fisheries, no salting-out.</p>

364 **3** How to audit a GBS 365 Biodiversity Footprint 366 Assessment

367 One of the roles of the GBS will be to feed non-financial disclosures with quantitative biodiversity-related
368 information. When this reporting is provided to shareholders or regulators, it will have to be reviewed by
369 independent external auditors (see Figure 2), just as any material likely to influence external view on the
370 company's performance. Therefore, we distinguish the assessor (person carrying the assessment) from the
371 auditor (external reviewer), and detail concretely what constitutes the audit of a GBS assessment.
372 Compliance with the key principles should be verified, as well as the company data / entry files, the
373 calculations and the results .

374 Two assurance levels are usually distinguished: **limited assurance** where the auditor seeks to obtain a
375 meaningful assurance level as a basis for a negative conclusion on the results reported, and **reasonable**
376 **assurance** where a higher assurance level is sought. Depending on the objective of the BFA (*e.g.* for internal
377 use only), the desired level of quality assurance might be lower and self-verification by the company may be
378 sufficient. Still, these guidelines provide a basis to work on.

379 **3.1** Verification of the compliance with the key 380 principles

381 **A** RELEVANCE

382 The most important part in designing a BFA may be the **definition of the perimeter of the analysis, as part of**
383 **the *Relevance* principle above.** The following questions must be answered by auditors:

- 384 •
- 385 • ***Do the chosen value chain boundaries cover the most material impacts?*** If Scope 3
386 upstream and/or downstream are excluded of the analysis, it should be made clear why by the
387 assessor. The GBS 1.0 currently gives little to no information about the Scope 3 downstream
388 impacts but this will change in future versions. However, Scope 3 upstream impacts are well
389 documented and are often found to be a major source of biodiversity loss. Depending on the
390 economic sector, auditors should judge whether the choice of reported Scopes is justified.

391 • **Are the most material pressures included in the analysis?** The GBS can evaluate the
 392 following pressures on biodiversity: land use, fragmentation, encroachment, atmospheric
 393 nitrogen deposition, climate change, hydrological disturbance, wetland conversion, nutrient
 394 emissions and land use in catchment of rivers and wetlands. Some of these pressures may be
 395 particularly material for the economic sector assessed. Those pressures have to be included in
 396 the assessment. CDC Biodiversité will develop guidelines to list such material pressures for
 397 each industry.

398 • **Are the organizational structure boundaries of the company coherent and justified?**
 399 Auditors should verify that it is consistent with the financial disclosure breakdown, meaning that
 400 there is no entity missing in the BFA. Furthermore, the impact allocation system chosen,
 401 between operational control, financial control, and equity share, should be justified and verified
 402 for each entity.

403 **B EQUIVALENCY**

404 Auditors should verify that the guidelines provided in section 2.4.A.2 are followed and that impacts are
 405 reported separately for terrestrial and aquatic biodiversity, and for dynamic and static impacts.

406 **C COMPLETENESS**

407 Auditors should verify that all the pressures and Scopes covered by the GBS are included in the assessment
 408 and that when they are not, appropriate justifications have been provided.

409 **D CONSISTENCY**

410 Auditors should verify that the GBS has been used for a business application for which it is built (as listed in
 411 section 1.2).

412 **E TRANSPARENCY**

413 Auditors should verify that a clear audit trail is available to document the data and assumptions used.

414 **F ACCURACY**

415 Auditors should check that:

416 - Whenever input data is uncertain, this uncertainty has been reflected through the use of a central,
 417 conservative and optimist value;

- 418 - Known uncertainties are properly reported, *i.e.* the data quality tiers associated to the results;
- 419 - Unassessed materials are reported;
- 420 - Results are reported only at levels where the GBS can be accurate, *i.e.* more than 10-100 million in
421 turnover and 100-1000ha of cumulated land surface area.

422 G TIME-PERIOD ASSUMPTION

423 Auditors should verify that the year considered for the assessment matches with the “*time period*
424 *assumption*” principle mentioned above. In particular, **auditors must be vigilant to prevent companies from**
425 **opportunistically cherry-picking the time periods of their assessments**, choosing periods when impacts are
426 lower than usual.

427 3.2 Verification of data inputs

428 The auditor should verify that data inputs are correct and follow the key principles listed above and the
429 principles listed in the data collection guidelines (CDC Biodiversité 2019a). **In future versions of the**
430 **reporting framework and the data collection guidelines, special attention will be paid to making clear**
431 **what is the hierarchy of preferred data inputs, and what should be the minimal perimeter and coverage**
432 **of data inputs to ensure compliance with the key BFA principles.**

➤ Veracity of the data:

The auditor should ensure that the analysis does not contain any misleading data. For instance, the auditor could ask for the invoices of reported commodities purchases.

➤ Nomenclature verification:

The data collection process of a refined GBS assessment contains up to 10 input files. Inputted data should fit the nomenclature specific to each pressure or commodity concerned. For instance, the land-use pressure is evaluated using GLOBIO pressure-impact relationships, therefore binding the GBS users to build correspondence between the company data and the GLOBIO nomenclature. Each of these correspondences should be justified in the “Comments” column of the input files or in a separate document to ensure that it can be reviewed. The same applies to the input files on commodities purchased, as the GBS 1.0 contains impact factors for the major ones only (*e.g.* all types of coals will not be covered, and the purchase of different types of coal should be aggregated in a single line).

➤ Methodology verification:

Often, companies do not have directly available refined data and have to make assumptions and/or generalizations. For example, in a case study with a member of the B4B+ Club, the company would deduce the average surface area of its industrial plants in a country based on the surface area of a few industrial factories. **This type of assumption is very useful to fill data gaps. It needs to be specified and justified by the assessor and reviewed by the auditor to ensure the quality of the analysis.**

433 3.3 Verification of calculations

434 The audit of the tool itself is not part of this audit: verifying the robustness and validity of the GBS itself is the
435 task of the review committee.

436 Instead, the auditor should check whether the footprints have indeed been calculated through the GBS. To
437 facilitate this verification, the assessor should provide a clear audit trail including the input files, input data
438 and the raw outputs of the GBS.

439 3.4 Verification of results

440 A QUANTITATIVE AND QUALITATIVE ASSESSMENTS

441 Results verification includes two components. First, the auditor should check that the reported results are
442 indeed the ones which were calculated by the tool. This verification is very similar to the calculation
443 verification and require a clear audit trail from the assessor. Second, the auditor should check that the
444 interpretation and description of the results are correct and appropriate. **CDC Biodiversité will release
445 sectoral benchmarks listing the most material pressures, and orders of magnitude of the values
446 expected for the different pressure and the average “impact intensity” of each industry (in MSA.m² per
447 thousand euros of turnover).** These benchmarks will facilitate the verification of interpretation of results.

448 B ENVIRONMENTAL SAFEGUARDS

449 As explained in section 2.4C, Table 1 should be seen as a checklist of Environmental safeguards a company
450 should implement to deal with risks of biodiversity impacts not fully covered by the quantitative assessment
451 conducted with the GBS. Auditors should thus verify that the checklist has been followed and that the
452 application of the criteria for each issue is appropriate and properly documented. Auditors should further
453 verify that the company has taken the measures listed as “Actions addressing the issue” and that those
454 measures are properly document (*e.g.* Biodiversity Management Plans easily accessible).

455 Auditors are conversely not expected to verify the quality of the measures taken. For instance, they are not
456 expected to assess the quality of Biodiversity Management Plans.

4 Assessment of the current coverage of the GBS

4.1 Confidence on the GBS modules

CDC Biodiversité assessed the degree of confidence of the GBS modules regarding 1) the biodiversity impacts assessed and 2) whether the decisions favoured are indeed beneficial to biodiversity. The assessment is presented in Table 2 and

Table 3. It is based on a qualitative self-evaluation of the quantity and quality of the evidence used to build each module, and on the robustness of the assumptions taken. **The table is thus meant as an acknowledgment of limitations, not as a proof of robustness.** The review process itself provides another, independent, assessment of the degree of confidence of each module.

The degree of confidence is represented by colours: green for good, yellow for intermediate, red for poor and gray when the item is not covered. In Table 2, a link is made between the five main drivers of biodiversity loss identified by the IPBES (Díaz et al. 2019) (in italics) and the pressures used in the GBS based on GLOBIO and GLOBIO-Aquatic models. See the dedicated reports for more details (CDC Biodiversité 2020c; 2019b).

473
474

475 Table 2: Assessment of the degree of confidence of the GBS modules by CDC Biodiversité. Pressures

Module	Pressure	Self-assessment
Aquatic biodiversity	<i>IPBES: Changes in land and sea use</i>	
	Hydrological disturbance (HD _{water})	
	Wetland conversion (WC)	
	Other types of changes	Not covered
	<i>IPBES: Direct exploitation of organisms</i>	Not covered
	<i>IPBES: Pollution</i>	
	Land use in catchment (LUR and LUW)	
	Nutrient emissions (FE)	
	Chemical pollution (Ecotoxicity)	
	Other types of pollution	Not covered
	<i>IPBES: Invasion of alien species</i>	Not covered
	<i>IPBES: Climate change</i>	
	Hydrological disturbance (HD _{CC})	
	Other impacts of climate change	Not covered
Terrestrial biodiversity	<i>IPBES: Changes in land and sea use</i>	
	Land use (LU)	
	Encroachment (E)	
	Fragmentation (F)	
	<i>IPBES: Direct exploitation of organisms</i>	Partly covered by LU and E
	<i>IPBES: Pollution</i>	
	Atmospheric Nitrogen Deposition (N)	
	Chemical pollution (Ecotoxicity)	
	Other types of pollution	Not covered
	<i>IPBES: Invasion of alien species</i>	Not covered
<i>IPBES: Climate change</i>		
Climate change (CC)		
Marine biodiversity		Not covered

476

477 Table 3: Assessment of the degree of confidence of the GBS modules by CDC Biodiversité. CommoTools

Module	Assessment
Crops CommoTool	
Livestock husbandry CommoTool and Grass CommoTool	
Mining CommoTool	

Oil & Gas CommoTool

Not reviewed

Wood logs CommoTool

478

479

4.2 Materials and emissions

480 The GBS currently does not cover all the emissions or all the commodities causing biodiversity loss. Part of
481 the extent of the “unassessed impacts” can be estimated. EXIOBASE’s environmental extensions document
482 some emissions and materials which are not currently covered by the GBS. The materials⁴ are:

- 483 - Domestic Extraction Used - Forestry - Kapok Fruit
- 484 - Domestic Extraction Used - Forestry - Natural Gums
- 485 - Domestic Extraction Used - Forestry - Raw materials other than wood
- 486 - Domestic Extraction Used - Metal Ores - PGM ores
- 487 - Domestic Extraction Used - Metal Ores - Uranium and thorium ores

488 The emissions, already listed in the ecotoxicity document (CDC Biodiversité 2020b), are: B(b)F, B(k)F,
489 Benzo(b)fluoranthene, Benzo(k)fluoranthene, CO, Indeno, Indeno(1,2,3-cd)pyrene, N , NH₃, NMVOC,
490 NO_x, NOX, P, PM₁₀, PM_{2.5}, P_{xx}, TSP, Emissions nec.

491 The total tonnage of materials not assessed is approximately 70 million tonnes, broadly split between PGM
492 ores and Uranium and thorium ores (the other three representing only a small fraction). Considering an
493 impact factor of between $3 \cdot 10^{-6}$ and $1 \cdot 10^{-3}$ MSA.km²/t (first and third quartile of the distribution of impact
494 factors for mining), that leads to an estimation of between 210 and 70 000 MSA.km², with the value more
495 likely to be around 2 800 MSA.km² (median of the distribution). At the upper edge, this would represent a
496 significant unassessed impact, but it is more likely to represent a relatively small contribution to biodiversity
497 loss (up to 1% of total dynamic impact).

498 Regarding emissions, about 98% of the total tonnage of emissions are currently covered by the GBS.

499

4.3 Industries

500 The GBS currently relies on 5 CommoTools which focus exclusively on raw material extraction and
501 production (including agriculture and logging). For industries lower in the value chain, such as processing,
502 manufacturing or retail, the GBS currently lacks assessments of the average Scope 1 land occupation or
503 transformation, water consumption, nitrogen and phosphorous emissions. Conversely, as explained in the
504 Input output modelling document (CDC Biodiversité 2020d), the emissions reported in EXIOBASE are

⁴ Fishery-related materials are not listed here since impacts on marine biodiversity are not covered at all by the GBS.

505 directly used to assess Scope 1 GHG emissions. This means that for these industries, if companies do not
 506 provide data on their land occupation, etc. the average Scope 1 assessment based on financial data alone
 507 will be limited to the CC impact. However, these limitations do not apply to the Scope 3 upstream impacts
 508 related to raw material extractions. For instance, based on financial data alone, the Scope 1 of Processing
 509 of meat cattle will be limited to CC but its Scope 3 impacts related to the breeding of cattle will be properly
 510 accounted for. **Since most of the impacts occur during raw material extraction, the GBS still accounts**
 511 **for most of the impacts occurring globally.** In other words, in many cases, it is likely that the Scope 1
 512 impacts currently not covered for some industries are not the most material impacts of those industries.
 513 However, companies operating within downstream industries should keep in mind that their Scope 1
 514 impacts will be under-estimated when only financial data (and not inventory or pressure data) is fed into the
 515 GBS.

516 *Table 4: Assessment by CDC Biodiversité of the coverage of Scope 1 pressures by industry in the GBS (green: good;*
 517 *yellow: intermediate; red: currently not covered)*

EXIOBASE 3 industry	LU, E, F, WC, LUR, LUW	CC HD _{CC}	HD _{water}	N FE
Cultivation of paddy rice	Green	Green	Yellow	Yellow
Cultivation of wheat	Green	Green	Yellow	Yellow
Cultivation of cereal grains nec	Green	Green	Yellow	Yellow
Cultivation of vegetables, fruit, nuts	Green	Green	Yellow	Yellow
Cultivation of oil seeds	Green	Green	Yellow	Yellow
Cultivation of sugar cane, sugar beet	Green	Green	Yellow	Yellow
Cultivation of plant-based fibers	Green	Green	Yellow	Yellow
Cultivation of crops nec	Green	Green	Yellow	Yellow
Cattle farming	Yellow	Green	Yellow	Yellow
Pigs farming	Yellow	Green	Yellow	Yellow
Poultry farming	Yellow	Green	Yellow	Yellow
Meat animals nec	Yellow	Green	Yellow	Yellow
Animal products nec	Yellow	Green	Yellow	Yellow
Raw milk	Yellow	Green	Yellow	Yellow
Wool, silk-worm cocoons	Red	Green	Red	Red
Manure treatment (conventional), storage and land application	Red	Green	Red	Red
Manure treatment (biogas), storage and land application	Red	Green	Red	Red
Forestry, logging and related service activities (02)	Green	Green	Red	Red
Fishing, operating of fish hatcheries and fish farms; service activities incidental to fishing (05)	No coverage of marine biodiversity but CC and HD _{CC} impacts can be included in the assessments			
Mining of coal and lignite; extraction of peat (10)	Yellow	Green	Yellow	Yellow

Extraction of crude petroleum and services related to crude oil extraction, excluding surveying	Yellow	Green	Yellow	Yellow
Extraction of natural gas and services related to natural gas extraction, excluding surveying	Yellow	Green	Yellow	Yellow
Extraction, liquefaction, and regasification of other petroleum and gaseous materials	Yellow	Green	Yellow	Yellow
Mining of uranium and thorium ores (12)	Yellow	Green	Yellow	Yellow
Mining of iron ores	Yellow	Green	Yellow	Yellow
Mining of copper ores and concentrates	Yellow	Green	Yellow	Yellow
Mining of nickel ores and concentrates	Yellow	Green	Yellow	Yellow
Mining of aluminium ores and concentrates	Yellow	Green	Yellow	Yellow
Mining of precious metal ores and concentrates	Yellow	Green	Yellow	Yellow
Mining of lead, zinc and tin ores and concentrates	Yellow	Green	Yellow	Yellow
Mining of other non-ferrous metal ores and concentrates	Yellow	Green	Yellow	Yellow
Quarrying of stone	Yellow	Green	Yellow	Yellow
Quarrying of sand and clay	Yellow	Green	Yellow	Yellow
Mining of chemical and fertilizer minerals, production of salt, other mining and quarrying n.e.c.	Red	Green	Red	Red
Processing of meat cattle	Red	Green	Red	Red
Processing of meat pigs	Red	Green	Red	Red
Processing of meat poultry	Red	Green	Red	Red
Production of meat products nec	Red	Green	Red	Red
Processing vegetable oils and fats	Red	Green	Red	Red
Processing of dairy products	Red	Green	Red	Red
Processed rice	Red	Green	Red	Red
Sugar refining	Red	Green	Red	Red
Processing of Food products nec	Red	Green	Red	Red
Manufacture of beverages	Red	Green	Red	Red
Manufacture of fish products	Red	Green	Red	Red
Manufacture of tobacco products (16)	Red	Green	Red	Red
Manufacture of textiles (17)	Red	Green	Red	Red
Manufacture of wearing apparel; dressing and dyeing of fur (18)	Red	Green	Red	Red
Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear (19)	Red	Green	Red	Red

Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials (20)				
Re-processing of secondary wood material into new wood material				
Pulp				
Re-processing of secondary paper into new pulp				
Paper				
Publishing, printing and reproduction of recorded media (22)				
Manufacture of coke oven products				
Petroleum Refinery				
Processing of nuclear fuel				
Plastics, basic				
Re-processing of secondary plastic into new plastic				
N-fertiliser				
P- and other fertiliser				
Chemicals nec				
Manufacture of rubber and plastic products (25)				
Manufacture of glass and glass products				
Re-processing of secondary glass into new glass				
Manufacture of ceramic goods				
Manufacture of bricks, tiles and construction products, in baked clay				
Manufacture of cement, lime and plaster				
Re-processing of ash into clinker				
Manufacture of other non-metallic mineral products n.e.c.				
Manufacture of basic iron and steel and of ferro-alloys and first products thereof				
Re-processing of secondary steel into new steel				
Precious metals production				
Re-processing of secondary precious metals into new precious metals				
Aluminium production				
Re-processing of secondary aluminium into new aluminium				
Lead, zinc and tin production				

Re-processing of secondary lead into new lead, zinc and tin				
Copper production				
Re-processing of secondary copper into new copper				
Other non-ferrous metal production				
Re-processing of secondary other non-ferrous metals into new other non-ferrous metals				
Casting of metals				
Manufacture of fabricated metal products, except machinery and equipment (28)				
Manufacture of machinery and equipment n.e.c. (29)				
Manufacture of office machinery and computers (30)				
Manufacture of electrical machinery and apparatus n.e.c. (31)				
Manufacture of radio, television and communication equipment and apparatus (32)				
Manufacture of medical, precision and optical instruments, watches and clocks (33)				
Manufacture of motor vehicles, trailers and semi-trailers (34)				
Manufacture of other transport equipment (35)				
Manufacture of furniture; manufacturing n.e.c. (36)				
Recycling of waste and scrap				
Recycling of bottles by direct reuse				
Production of electricity by coal				
Production of electricity by gas				
Production of electricity by nuclear				
Production of electricity by hydro				
Production of electricity by wind				
Production of electricity by petroleum and other oil derivatives				
Production of electricity by biomass and waste				
Production of electricity by solar photovoltaic				
Production of electricity by solar thermal				
Production of electricity by tide, wave, ocean				

Production of electricity by Geothermal				
Production of electricity nec				
Transmission of electricity				
Distribution and trade of electricity				
Manufacture of gas; distribution of gaseous fuels through mains				
Steam and hot water supply				
Collection, purification and distribution of water (41)				
Construction (45)				
Re-processing of secondary construction material into aggregates				
Sale, maintenance, repair of motor vehicles, motor vehicles parts, motorcycles, motor cycles parts and accessoires				
Retail sale of automotive fuel				
Wholesale trade and commission trade, except of motor vehicles and motorcycles (51)				
Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods (52)				
Hotels and restaurants (55)				
Transport via railways				
Other land transport				
Transport via pipelines				
Sea and coastal water transport				
Inland water transport				
Air transport (62)				
Supporting and auxiliary transport activities; activities of travel agencies (63)				
Post and telecommunications (64)				
Financial intermediation, except insurance and pension funding (65)				
Insurance and pension funding, except compulsory social security (66)				
Activities auxiliary to financial intermediation (67)				
Real estate activities (70)				

Renting of machinery and equipment without operator and of personal and household goods (71)				
Computer and related activities (72)				
Research and development (73)				
Other business activities (74)				
Public administration and defence; compulsory social security (75)				
Education (80)				
Health and social work (85)				
Incineration of waste: Food				
Incineration of waste: Paper				
Incineration of waste: Plastic				
Incineration of waste: Metals and Inert materials				
Incineration of waste: Textiles				
Incineration of waste: Wood				
Incineration of waste: Oil/Hazardous waste				
Biogasification of food waste, incl. land application				
Biogasification of paper, incl. land application				
Biogasification of sewage sludge, incl. land application				
Composting of food waste, incl. land application				
Composting of paper and wood, incl. land application				
Waste water treatment, food				
Waste water treatment, other				
Landfill of waste: Food				
Landfill of waste: Paper				
Landfill of waste: Plastic				
Landfill of waste: Inert/metal/hazardous				
Landfill of waste: Textiles				
Landfill of waste: Wood				
Activities of membership organisation n.e.c. (91)				
Recreational, cultural and sporting activities (92)				
Other service activities (93)				
Private households with employed persons (95)				
Extra-territorial organizations and bodies				

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SAS au capital de 17 475 000 euros
RCS Paris 501 639 587
Siret 501 639 587 00028 - APE 6420Z
N° TVA Intracom. FR51501639587