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# The emancipatory potential of biodiversity reporting: evidence from the United Kingdom and South Africa

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## ABSTRACT

The current paper explores the emancipatory potential of biodiversity accounting and reporting by analysing interpretively how listed companies in the United Kingdom and South Africa engaged with biodiversity-related information in their corporate reports. Drawing on the seminal academic research and recent international policy developments, five interrelated elements pointing to transformative accounting and reporting practice are identified: (1) the organisation's rationale for managing biodiversity; (2) the identification and measurement of material stocks of biodiversity; (3) biodiversity-related performance management; (4) governance and assurance practices; and (5) reporting considerations. The elements are applied to a sample of the largest companies in each jurisdiction using a qualitative content analysis with complementary techniques to gauge the level of biodiversity reporting in total and for each element. The analysis highlights disclosures ranging from a weak-form of emancipatory accounting characterised by policy-level reporting and compliance to stronger forms of emancipatory accounting which, owing to action-oriented, context-specific substantiated reporting, point to an underlying change potential at work. By articulating a continuum of biodiversity accounting and reporting practice, the paper extends the emancipatory accounting literature, provides a principles-based framework for assessing the change potential of biodiversity reporting in different contexts and informs ongoing environmental reporting policy development.

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Biodiversity; extra-financial reporting; sustainable development; South Africa; United Kingdom

## ACCEPTED BY

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## 1. Introduction

This paper explores the emancipatory potential of biodiversity accounting and reporting by examining how listed companies in the United Kingdom and South Africa engage with biodiversity-related information in their corporate reports.<sup>1</sup> The proposed

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<sup>1</sup>Appendix A includes the definition of key terms and acronyms used in the study.

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accounting and reporting framework entails more than expanded disclosure; it requires context-specific, action-oriented and substantiated engagement with ecological impacts, risks and responsibilities.

Developing such accounting and reporting practices is challenging. Biodiversity is complex, context-dependent and difficult to measure, and there is a risk that corporate reporting degenerates into symbolic compliance or impression management. Nevertheless, recent academic research and international policy initiatives suggest that existing accounting, management and governance systems can be adapted to address biodiversity meaningfully without requiring radical institutional change (Da Mata et al., 2025; Maroun & Ecim, 2024; Roberts & Elamer, 2025). Initiatives relating to biodiversity reporting, extinction accounting and ecosystem accounting illustrate how organisations can integrate ecological considerations into mainstream accounting and accountability practices (Atkins & Maroun, 2018; Jones, 2003).

Against this background, the paper develops a principles-based framework for assessing the emancipatory potential of biodiversity accounting and reporting. Synthesising insights from prior academic research and recent international reporting developments, five interrelated elements are identified: (1) the organisation's rationale for managing biodiversity; (2) the identification and measurement of material stocks of biodiversity; (3) biodiversity-related performance management; (4) governance and assurance practices; and (5) reporting considerations. The framework is deliberately not a disclosure checklist. Instead, it is designed to capture how organisations understand biodiversity and whether this understanding is reflected in accounting and reporting practices, with the potential to support material organisational change.

The framework is applied to a qualitative content analysis of corporate reports issued by the largest listed companies in the United Kingdom and South Africa over the period 2018–2022. These jurisdictions provide a meaningful basis for comparison. Neither has mandated biodiversity-specific disclosure requirements, yet both encourage expanded social and environmental reporting through corporate governance codes and listing requirements. At the same time, the countries differ materially in their ecological contexts and economic structures. South Africa is a biodiversity-rich developing economy with significant agricultural, mining and industrial activity, while the UK is a developed, service-oriented economy with comparatively limited biodiversity (see Section 3). Examining reporting practices across these settings allows the study to explore how biodiversity accounting develops under different institutional and ecological conditions. Disclosures are analysed qualitatively using the proposed framework and complemented by quantitative techniques to gauge changes in reporting intensity and emphasis over time. This mixed-method approach enables the identification of variations in practice while retaining sensitivity to context and meaning.

The paper makes three main contributions. Firstly, it consolidates the work on biodiversity reporting (Jones & Solomon, 2010), extinction accounting (Atkins & Maroun, 2018) and ecosystem accounting (Russell et al., 2017). The details are integrated with recent international policy developments to articulate a contemporary framework for emancipatory biodiversity accounting and reporting.

Secondly, it provides one of the first longitudinal, cross-jurisdictional analyses of biodiversity reporting using an explicitly emancipatory lens, responding to calls for research

that examines how emerging forms of extra-financial reporting<sup>2</sup> are developing internationally (Roberts et al., 2021). This complements earlier studies, which have examined select developing (e.g. Lanka et al., 2017; Mansoor & Maroun, 2016; Sun & Lange, 2023) and developed economies (e.g. Hossain, 2017; Rimmel & Jonäll, 2013; Schneider et al., 2014), but without the benefit of a current and consolidated schematic to evaluate how companies account for and report on biodiversity. South African research is sector-specific (e.g. Usher & Maroun, 2018), while UK-based studies prioritise reporting by local governments and other public sector entities (e.g. Gaia & Jones Michael, 2019). The current paper focuses on prominent listed companies and covers a larger sample than earlier work over an extended period (Da Mata et al., 2025).

Thirdly, this paper challenges the view that extra-financial reporting is usually more symbolic than substantive (e.g. Boiral, 2016; Milne et al., 2009). Practices range along a continuum from weak, compliance-oriented forms to stronger, more transformative approaches. The results complement the largely philosophical assessments of the emancipatory accounting project (e.g. Gallhofer & Haslam, 1996, 2005) while clarifying that this type of accounting is not limited to niche applications like nature diaries, artwork or counter-accounts (e.g. Atkins & McBride, 2022; Dey, 2010). Profit-oriented entities can adapt existing methods of accounting and accountability to achieve economic objectives while also ensuring positive environmental outcomes.

The framework will be especially useful for preparers grappling with the application of multiple reporting standards because it provides a principles-based approach to implementing accounting and reporting systems to achieve positive change. The framework can also be applied by academics to evaluate the state and development of extra-financial reporting based on an emancipatory framing rather than prioritising the frequency of disclosures or their select semantic properties (e.g. Beretta & Bozzolan, 2004; Michelon et al., 2015).

## 2. The emancipatory potential of biodiversity reporting

Accounting is a socially constructed process that can draw on multiple perspectives to problematise social and environmental issues, challenge hegemonic positions and explore alternatives to the status quo (Gallhofer et al., 2015; Gallhofer & Haslam, 1996). Realising this emancipatory potential does not require radical social or economic reorganisation. Existing methods of record-keeping, analysis and reporting can be adopted according to the context, allowing expanded accounting systems to operate within capital markets while widening accountability (Maroun & Atkins, 2018). Initiatives to incorporate biodiversity into accounting (Jones & Solomon, 2013), including ecosystem (Russell et al., 2017) and extinction accounting (Atkins & Maroun, 2018), are examples.

### 2.1. Operationalising emancipatory accounting

Emancipatory accounting should not be conflated with research focusing solely on the extent or quality of extra-financial disclosure. Prior studies identify multiple practices

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<sup>2</sup>Organisations prepare different types of annual, integrated or sustainability reports. Reviewing the differences among these reporting types is beyond the scope of this study. For brevity, the paper refers to “corporate” or “extra-financial reports”.

for operationalising emancipatory accounting. In the context of biodiversity loss, this includes scene-setting and the provision of species- and ecosystem-related information to establish shared understanding among non-experts (Jones, 1996). Organisations define “biodiversity” and articulate the case for its conservation on economic, ecological and moral grounds (Jones & Solomon, 2013; Samkin et al., 2014), avoiding oversimplification of complex human–nature relationships or anthropocentric framings which imply nature’s dependence on humanity (Gray & Milne, 2018).

Mission statements and biodiversity-related policies are developed accordingly (Hassan et al., 2020; Rimmel & Jonäll, 2013). To ensure a nexus between policy and action, organisations engage extensively with stakeholders to problematise biodiversity risks and impacts beyond narrow financial considerations (Gallhofer & Haslam, 1996). Such engagement can be used to refine policies, identify mitigation strategies and develop partnerships to support the implementation of biodiversity action plans (Jones & Solomon, 2013; Maroun & Atkins, 2018; Sobkowiak, 2023; van Liempd & Busch, 2013).

Effective implementation requires appropriate management systems, internal controls and lines of accountability to track progress against biodiversity objectives (Rimmel & Jonäll, 2013; van Liempd & Busch, 2013). Performance is assessed using financial and extra-financial measures (Ecim et al., 2025) consistent with emancipatory accounting’s capacity to operate within existing economic paradigms. Organisations evaluate the costs and benefits of biodiversity initiatives while also considering changes in the social and environmental capitals on which they depend and which they affect (Atkins & Maroun, 2018, 2020).

Internal performance management culminates in reporting to investors and other stakeholders. Emancipatory reporting explicates the links between biodiversity loss, business models and risk, and explains how financial and extra-financial resources are deployed to mitigate adverse impacts and pursue opportunities (Atkins & Maroun, 2018, 2020). While financial perspectives remain relevant, they are complemented by narrative, visual and other communicative elements, which convey the ecological and socio-cultural value of biodiversity beyond monetary terms (Gallhofer & Haslam, 1996; Russell et al., 2017; Sullivan & Hannis, 2017). To avoid impression management, reports should present favourable and unfavourable outcomes with equal prominence.<sup>3</sup>

Overall, emancipatory accounting is expected to yield substantive rather than symbolic reporting. External reports should demonstrate a context-specific and holistic understanding of biodiversity as a material component of the organisation’s business model and social licence to operate. This provides the basis for clearly articulated strategies, concrete actions, post-implementation reviews and iterative system refinements (Atkins & Maroun, 2018; Corvellec, 2016). Beyond meeting conventional disclosure quality indicators, emancipatory reporting offers a performative account of how biodiversity is actively understood and managed.

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<sup>3</sup>The practices used to operationalise an emancipatory form of accounting, developed in the context of addressing biodiversity loss, are summarised in Appendix B. These provide the foundation for an expanded emancipatory accounting model which is outlined in Section 2.2.

## ***2.2. Interrelated dimensions of an emancipatory framework for biodiversity accounting and reporting***

The performative reporting envisioned by emancipatory accounting requires robust accounting, management and governance systems capable of collecting, processing and integrating biodiversity-related data into decision-making and reporting (Alrazi et al., 2015; Atkins & Maroun, 2018; De Villiers et al., 2017). While site visits would be ideal (e.g. Junior et al., 2014), insights into these systems can be inferred from corporate reports, including disclosures about their preparation and underlying processes (e.g. Afolabi et al., 2023; Michelon et al., 2015). The position is iterated by recent standards/guidelines issued by the Financial Stability Board (FSB, 2023b), the Global Reporting Initiative (GRI, 2024) and the International Sustainability Standards Board (ISSB, 2023). Drawing on these sources and the earlier emancipatory accounting literature, four interrelated dimensions are examined below: (a) identification and measurement of the unit of account; (b) biodiversity-related performance; (c) materiality determination and reporting practices; and (d) biodiversity governance and assurance.

### ***2.2.1. Identification and measurement of the unit of account***

Academic research has considered how species and stocks of natural capital may be classified by extinction risk and whether biodiversity should be accounted for at organisational or ecosystem levels (Jones, 1996; Jones & Solomon, 2013). More recent guidance focuses on defining and measuring units of account that enable meaningful management and reporting of biodiversity impacts.

The starting point is the identification of favourable and unfavourable biodiversity impacts and dependencies (Carvalho et al., 2023; FSB, 2023b; Natural Capital Coalition, 2016). Mapping biodiversity “pathways” clarifies how these dependencies and impacts create risks and opportunities across the business model and value chain (FSB, 2023a), often requiring organisational boundaries to be expanded by including upstream and downstream activities (Atkins & Maroun, 2020; Panwar et al., 2023).

Economic, social and ecological considerations are assessed concurrently to avoid framing biodiversity solely as a short-term financial issue. The outcome is a classification of biodiversity-related dependencies based on economic materiality, ecological status and social importance, clarifying what natural capital is to be conserved and the reasons for doing so (see Jones, 2003; Samkin et al., 2014). Consistent with the GRI (2024), disclosures may include information on species, habitats, geographic location and conservation status.

Operationalising this approach requires systems to specify what data are collected, how they are organised and how they inform decision-making (see Alrazi et al., 2015; Schaltegger et al., 2023; White et al., 2023). Controls are needed to ensure data accuracy and reliability (Bui & De Villiers, 2018; Carvalho et al., 2023). To ensure that information is accessible throughout the organisation, biodiversity should be disaggregated into its core “components” and measured appropriately to support impact and dependency assessments (Kennedy et al., 2023).

Measurement frameworks enable tracking of species, habitats and ecosystem services using both quantitative and qualitative indicators (IPBES, 2022; Natural Capital Coalition, 2016; United Nations, 2019). Monetary measures may be included but are complemented by “nature-signalling numbers” and qualitative narratives to avoid

commodification (Sullivan & Hannis, 2017). Visual and descriptive elements further reinforce the intrinsic and socio-cultural value of biodiversity (Samkin et al., 2014). Measurement choices are formalised in biodiversity accounting policies (FSB, 2023b; GRI, 2024; ISSB, 2023). Where relevant, indicators distinguish between biodiversity under direct control and impacts arising elsewhere in the value chain (Kennedy et al., 2023; Schaltegger et al., 2023).

### **2.2.2. Biodiversity-related performances**

Emancipatory accounting ultimately seeks to reduce biodiversity degradation through action. The TFND (FSB, 2023b) and Biological Diversity Protocol (BDP) (Houdet et al., 2021) recommend organising actions according to a mitigation hierarchy: avoidance, minimisation, restoration and, only where necessary, offsetting. Performance should be assessed against biodiversity targets specified in accounting policies and informed by “integrated thinking” (Maroun et al., 2023). This requires multi-capital assessments of actions rather than reporting on commitments alone (Ecim & Maroun, *in press*).

Financial and scientific assessments of biodiversity outcomes are complemented by evaluations of how, for example, research, stakeholder partnerships and internal networks (intellectual and social and relationship capitals) are used to develop and implement action plans. Tangible assets allocated to biodiversity protection (manufactured capital), staffing requirements (human capital) and budgetary commitments (financial capital) should be provided (Atkins & Maroun, 2018; Ecim et al., 2025; Maroun & Atkins, 2021; Value Reporting Foundation, 2022). The aim is to demonstrate how, in practical terms, different resources or capitals are required to operationalise biodiversity plans (Büchling & Maroun, 2021; FSB, 2023b; Maroun & Atkins, 2021; Sobkowiak, 2023; Sun & Lange, 2023).

### **2.2.3. Reporting: materiality determination, best practices and regulation**

Emancipatory reporting requires clear identification of material biodiversity issues. Materiality may be determined using financial materiality, impact materiality or double materiality approaches (Elliot et al., 2024; GRI, 2024; ISSB, 2023). Financial materiality focuses on cash flow effects but risks narrowing the scope and commodifying biodiversity (Freeman & Groom, 2013). Impact materiality broadens accountability but may increase implementation costs, while double materiality offers more comprehensive reporting despite practical challenges (De Cristofaro & Gulluscio, 2023; Mio et al., 2020).

Although double materiality is most closely aligned with emancipatory aims, financial materiality does not preclude transformative change. Emancipatory accounting is scalable and adaptable, and materiality determinations are often shaped by regulation and stakeholder expectations rather than managerial discretion alone (Gallhofer & Haslam, 1996). Transparency in how materiality is defined and applied safeguards the emancipatory potential of biodiversity accounting and reporting (consider FSB, 2023b; GRI, 2024; ISSB, 2023).

Standards such as the GRI (2024) and FSB (2023b) provide guidance for preparing consistent and understandable biodiversity disclosures. While industry practices may enhance comparability, disclosures should not be driven solely by uncoded norms (see Atupola & Gunarathne, 2023). Whether applied voluntarily or mandatorily, reporting standards should support biodiversity management and accountability rather than symbolic compliance.

### 2.2.4. Biodiversity governance and assurance

Effective governance is essential for identifying and responding to biodiversity-related risks and opportunities (King et al., 2022). Boards oversee biodiversity policies and control frameworks, while audit, risk and sustainability committees expand their remit to integrate biodiversity into monitoring processes (Bui & De Villiers, 2018). Dedicated biodiversity-related roles, supported by internal and external expertise, can further strengthen implementation (FSB, 2023b; King et al., 2022). The same is true for the use of internal and external assurance which can be used to enhance risk identification, test controls and verify the reliability of biodiversity-related information used for decision-making and reporting (Seidenstein & Maroun, 2025).

### 2.3. Final model

The final model is summarised in Figure 1. We combine “context” and “scene-setting” per the earlier research into a single element: the rationale for incorporating biodiversity into the organisation’s business model, internal management and external reporting.

Figure 1: Characteristics of emancipatory accounting and reporting addressing biodiversity

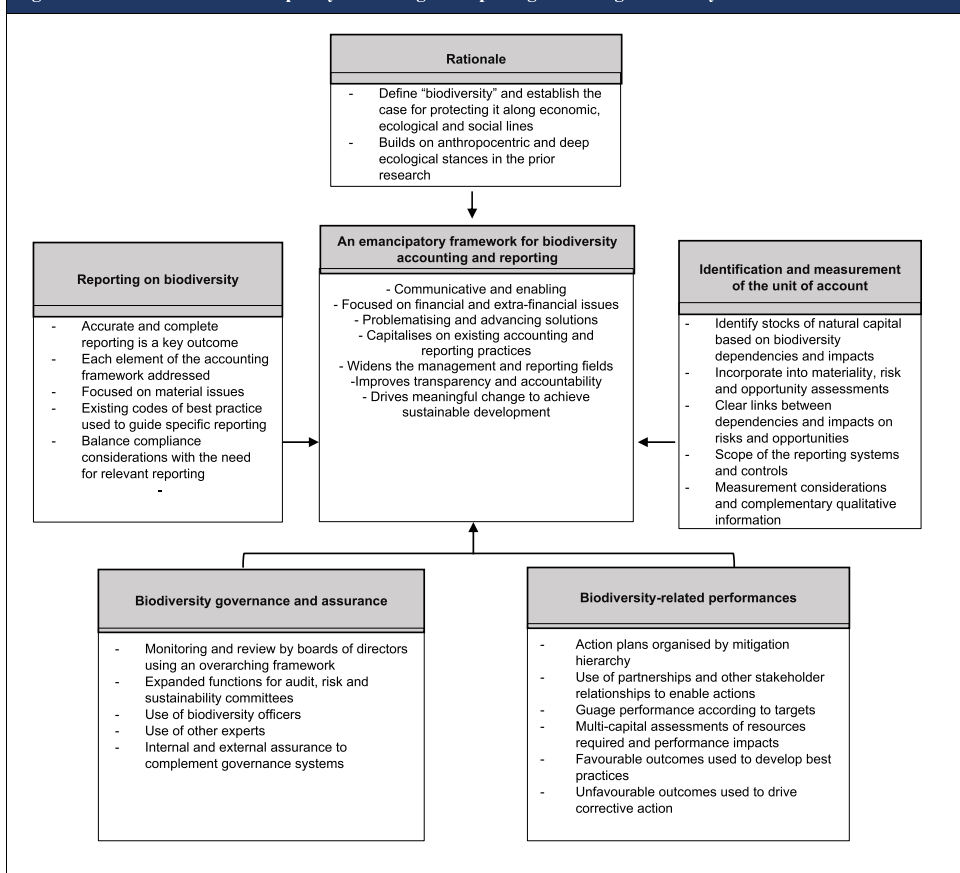


Figure 1. Characteristics of emancipatory accounting and reporting addressing biodiversity.

Social and stakeholder engagement, internal management and performance (Section 2.1) are aggregated and presented as “biodiversity-related performances”. These are complemented by the latest insights into the identification and measurement of the unit of account, biodiversity governance and assurance. The practices are interconnected and culminate in accurate, complete and reliable reporting guided by the organisation’s materiality determination process, international best practice and the requirements of the relevant regulation.

Not all environmental or biodiversity disclosures should be understood as emancipatory. Generic, unsubstantiated or decontextualised information has little change potential (see also Borghei et al., 2016; Michelon et al., 2015). Even detailed disclosures must be assessed holistically to determine how organisations construct and act upon the meaning of biodiversity. Per Gallhofer and colleagues (2005, 2015, 1996), stronger forms of emancipatory accounting problematise the economic status quo, empower stakeholders and orient organisations towards ecological and social transformation rather than compliance. Consequently, the analysis of South African and UK firms’ engagement with and reporting on biodiversity is mindful of the distinction between reporting focused on compliance and expanded accountability, on the one hand, and reporting on material operational and strategic efforts designed to mitigate biodiversity loss, on the other.

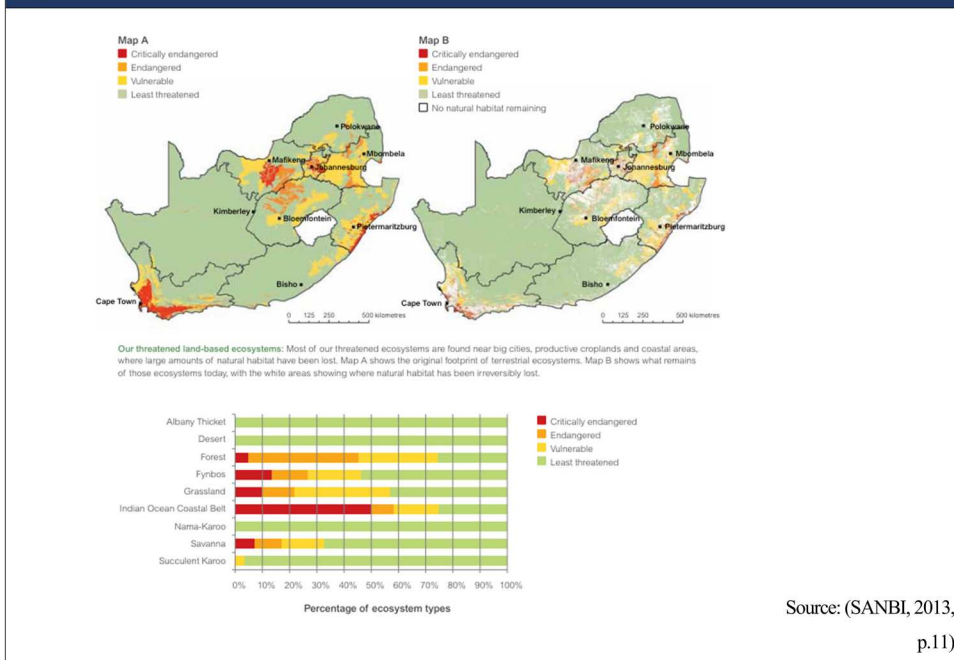
### 3. A brief review of the state of South Africa’s and the UK’s biodiversity

South Africa is well-known for its extensive and unique biodiversity. The country is home to approximately 95 000 species, which represents a significant portion of global biodiversity (Daly & Friedmann, 2016; Wynberg, 2002). This includes ecological diversity and endemic species across nine terrestrial biomes and six eco-marine regions (Republic of South Africa, 2014; SANBI, 2018).

South Africa’s biodiversity makes a significant economic contribution, accounting for up to 10% of the country’s gross domestic product (Wynberg, 2002). Forestry, agricultural, mining and certain manufacturers are a significant source of employment, foreign currency and tax revenues. Each also has material biodiversity impacts and dependencies which need to be carefully managed. The same is true for the marine and aquaculture business. Fish stocks are an essential source of revenue while contributing to employment and food security for some of the poorest communities in South Africa (Ecim & Maroun, 2024; SANBI, 2018).

Internationally renowned national parks have become important biodiversity conservancies on which ecotourism is directly dependent. At the same time, wilderness areas are of great scientific and ecological value. Their environmental importance is complemented by the fact that many of the plant and animal species have become an integral part of the cultural, religious and social practices of South Africans (Republic of South Africa, 2014; SANBI, 2018).

Despite the ecological, social and economic grounds for protecting biodiversity, up to 60% of plant and animal species are threatened with extinction. South Africa’s biodiversity is being degraded by climate change, over-farming, poor water management, pollution and urbanisation (IPBES, 2019). Figure 2 illustrates the size of land-based ecosystems threatened by human activity.

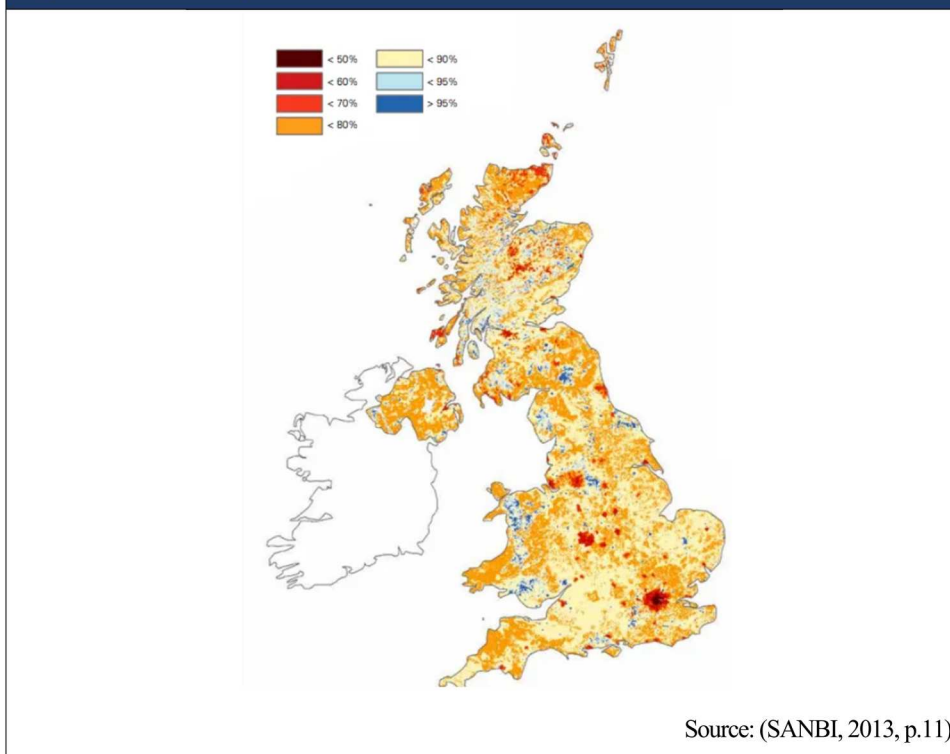
**Figure 2: Threatened South African habitats****Figure 2.** Threatened South African habitats.

Like South Africa, the UK has also experienced significant biodiversity loss with a 19% decline in wildlife reported since the 1970s. It is estimated that one in six species occurring in the UK is threatened with extinction (The National Biodiversity Network, 2023).

While the UK is home to over 70,000 known species of animals, plants, fungi and microorganisms, its biodiversity is less extensive and varied than South Africa's. In addition, with a more developed and diversified economy with a substantial services sector, biodiversity does not make as direct and substantial an economic contribution to the UK economy as it does in South Africa (The National Biodiversity Network, 2023). Nevertheless, biodiversity conservation is a key policy objective for the UK which focuses on maintaining ecosystem services and restoring habitats of economic, ecological and cultural significance (The National Biodiversity Network, 2023; The Royal Society, 2023). Figure 3 shows areas where biodiversity is concentrated in the UK.

Despite the UK being a signatory to the Convention on Biological Diversity and committing to a set of biodiversity goals known collectively as the Aichi Biodiversity Targets, public sector funding on biodiversity accounted for less than 0.5% of the country's GDP (The Royal Society, 2023). As a result, habitat degradation, declines in indigenous flora and fauna and increases in the number of invasive species continue to occur, iterating the need for more extensive intervention by the state and private sector (The National Biodiversity Network, 2023; The Royal Society, 2023).

From an accounting perspective, the UK requires certain disclosures on climate change from 2022 as part of an entity's "strategic reports," which must cover social

**Figure 3: Biodiversity levels in the UK****Figure 3.** Biodiversity levels in the UK.

and environmental risks. These requirements are effective from 2024<sup>4</sup>, but, unlike the European Union, the UK<sup>5</sup> has not introduced minimum reporting requirements for biodiversity.<sup>6</sup> In South Africa, codes on corporate governance and the stock exchange's listing requirements call on companies to prepare integrated reports but this stops short of a mandatory extra-financial reporting regime (Maroun & Cerbone, 2020). At the same time, pressure on organisations by institutional investors, non-governmental bodies or other stakeholders to expand the scope of their reporting could be addressed by dealing with a range of social and environmental topics. That companies have chosen to report on biodiversity specifically points to a change in how the relationship between biodiversity and leading businesses in both jurisdictions is understood and managed. The extent to which UK-listed firms have responded to biodiversity decline

<sup>4</sup>See <https://www.icaew.com/technical/corporate-reporting/non-financial-reporting/uk-sustainability-reporting-requirements>.

<sup>5</sup>The UK government has, however, been a strong advocate of the ISSB since its inception and has also supported the development of the UK Sustainability Reporting Standards (UK SRS). It has outlined plans to create a framework for evaluating the suitability of IFRS S1 and S2 for adoption within the UK. These standards will form part of a broader Sustainability Disclosure Reporting framework overseen by HM Treasury. See also: <https://www.gov.uk/guidance/uk-sustainability-reporting-standards>.

<sup>6</sup>Even if certain UK-based firms are subject to European Sustainability Reporting Standards because of the nature and location of their operations, the EU's reporting regime is only effective from 2024. .

and how this is compared with initiatives by their South African counterparts is the focus of the remainder of this paper.

## 4. Method

This study adopts an interpretive approach. Qualitative content analysis is used as the primary method to examine how companies account for and report on biodiversity, guided by the emancipatory accounting framework developed in Section 2. Complementary quantitative techniques are used to gauge the extent of biodiversity reporting in total and by framework element and to examine variations across jurisdictions and over time.

### 4.1. Sample

The sample comprises the top 50 companies listed on the Johannesburg Stock Exchange (JSE) and the London Stock Exchange (LSE) by market capitalisation. Firms operate across 34 sub-sectors, reducing the likelihood that results are driven by industry-specific reporting practices. Large, listed companies are examined because of their visibility, resource availability and exposure to stakeholder pressure, as well as their established commitment to expanded corporate reporting addressing financial and extra-financial issues.

Focusing on the largest firms in each jurisdiction controls for factors such as access to expertise and reporting capacity that may otherwise influence biodiversity disclosures. The selected jurisdictions are comparable in terms of legal traditions, corporate governance systems and reporting expectations, yet differ materially in ecological context and economic structure. Neither South Africa nor the UK mandates biodiversity-specific disclosures, but both encourage reporting on social and environmental issues through governance codes and listing requirements. This combination provides a suitable setting for examining how biodiversity accounting and reporting develop in the absence of prescriptive regulation.

The analysis covers primary corporate reports issued between 2018 and 2022. Interim reports, investor presentations, standalone web disclosures and company websites were excluded to ensure comparability and to focus on formally approved reports directed at a broad stakeholder audience.

### 4.2. Data collection and analysis

Qualitative content analysis was used to identify and interpret biodiversity-related disclosures in corporate reports, consistent with prior research on environmental and biodiversity reporting (e.g. Maroun & Atkins, 2018;; Samkin et al., 2014; Sun & Lange, 2023). Each company's primary report was examined to identify disclosures dealing directly or indirectly with biodiversity, including references to species, habitats, conservation initiatives, partnerships and performance targets.

To retain contextual meaning, the unit of analysis comprised themes or principles rather than isolated words or sentences. These were typically individual paragraphs, tables or short subsections. Images were excluded unless explicitly referenced in the accompanying text.

Identified disclosures were recorded in a disclosure register and assigned initial thematic tags based on content and location within the report. Tags were reviewed iteratively, with duplicates removed and closely related themes consolidated. One researcher led the consolidation process to ensure consistency, with the results reviewed by supporting researchers and a research assistant. Tags were also compared with themes identified in prior biodiversity accounting research to ensure coverage of material issues (e.g. Barry et al., 1999; Maroun & Atkins, 2018; Samkin et al., 2014).

The final set of disclosure themes (112 open codes disclosed in Appendix C) was mapped to the five elements of the emancipatory accounting framework developed in Section 2. These framework elements served as axial codes, enabling the organisation of disclosures according to how biodiversity was rationalised, measured, managed, governed and reported. Assigning disclosures to framework elements involved professional judgement, guided by prior academic and technical literature. The coding process was reviewed collaboratively to enhance reliability.<sup>7</sup> As a final check, keyword searches were conducted to confirm that no material biodiversity-related disclosures had been overlooked<sup>8</sup> (Barry et al., 1999).

Disclosures were analysed both individually and holistically to assess how companies operationalised emancipatory biodiversity accounting and reporting. Examples were selected to illustrate strengths and weaknesses across framework elements and reporting years. Selection was guided by representativeness, clarity and brevity, with examples drawn from multiple firms and periods to reduce bias.

To complement the qualitative analysis and facilitate comparison across firms and over time, a disclosure scoring approach was applied. Following established biodiversity reporting studies, disclosures were scored on a three-point scale. A score of “1” was assigned to minimal, vague or generic disclosures. A score of “2” was assigned to disclosures containing objective, verifiable and current information. A score of “3” was assigned to disclosures providing detailed, site-specific, quantified and strategically linked information, including performance trends or cross-references to targets and policies (Adler et al., 2018, p. 797).

Average scores were calculated for each company by framework element and year. Results are presented graphically and supported by non-parametric statistical tests to examine differences between jurisdictions and changes over time.<sup>9</sup> The analysis is descriptive and exploratory; formal testing of reporting determinants is beyond the scope of the study.

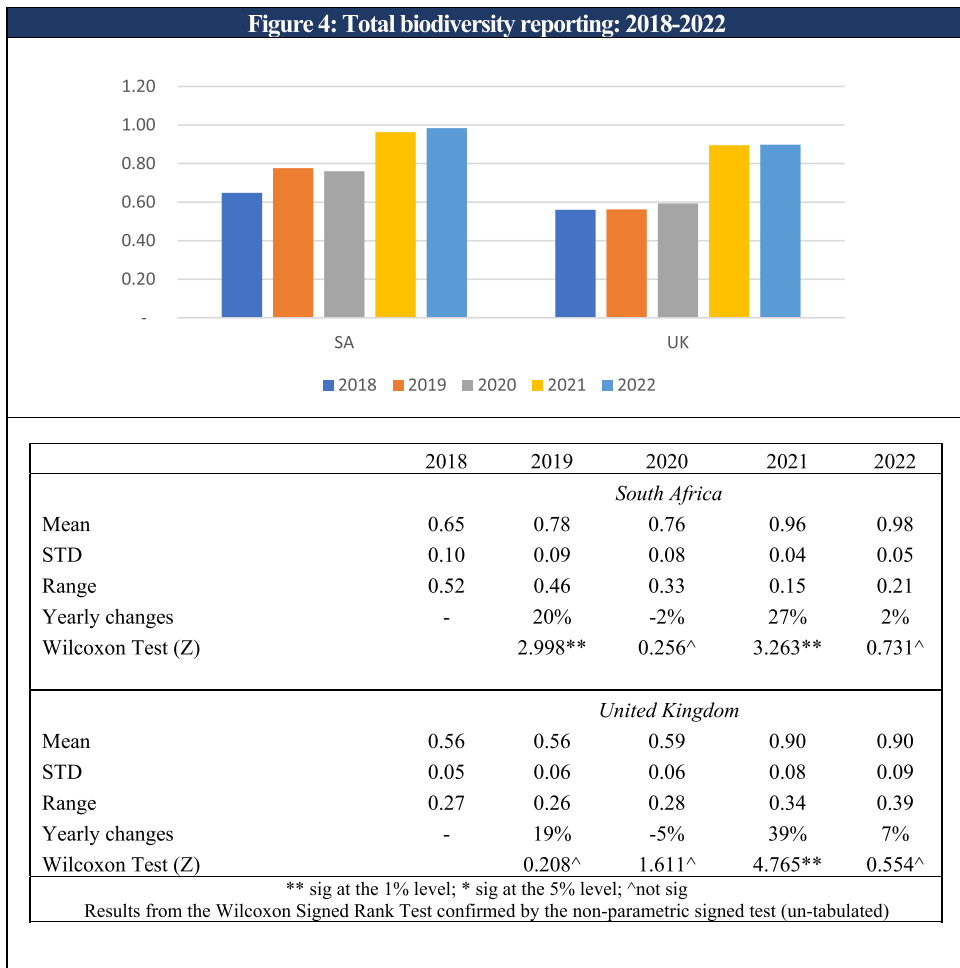
## 5. Results and discussion

Figure 4 shows that, from 2020, South African ( $\Delta = 27\%$ ,  $Z = 3.263$ ,  $p < 1\%$ ) and UK ( $\Delta = 39\%$ ,  $Z = 4.765$ ,  $p < 1\%$ ) companies increased reporting on biodiversity-related

<sup>7</sup>As a result, intercoder reliability scores were not computed and reported.

<sup>8</sup>Keywords included “ecology”, “habitats”, “ecosystems”, “ecosystem services”, “conservation”, “protection”, “restoration”, “extinct”, “extinction”, “EN11”, “EN12”, “EN13”, “EN14”, “wildlife”, “species”, “biodiversity”, “biodiversity offset”, “forest”, “flora”, “fauna”, “endangered”, “threatened”, “vulnerable”, “accident” (relating to biodiversity/extinction), “conservation”, “biological diversity”, “protected”, “floral/faunal wealth”, “rehabilitation”, “groundwater”, “marine”, “vegetation”, “wetland” and the names of different plant and animal species.

<sup>9</sup>To ensure methodological robustness, a complementary analysis is performed in Appendix D to compare the reported scores to well-established proxies for reporting quality, which have been developed independently of the emancipatory accounting literature.



**Figure 4.** Total biodiversity reporting: 2018–2022.

disclosures. COVID-19 and the proliferation of technical standards to account for and report on biodiversity are likely drivers of this change.

Some disclosures appear mainly progressive or indicative of weak-form emancipatory accounting. They broaden transparency and accountability while signalling alignment with new reporting norms. Others point to more extensive organisational change, consistent with a strong-form or transformative emancipatory orientation. Figure 5 summarises the reporting per element in the final model, with examples to illustrate the continuum of emancipatory accounting following.

### 5.1. Rationale for reporting

Companies are paying increased attention to explicating the rationale for protecting biodiversity ( $\Delta SA = 416\%$ ;  $\Delta UK = 333\%$ ):

We are committed to promoting animal welfare and to delivering on our commitment to treat animals humanely at all life stages. The Committee has **discussed** [emphasis added]

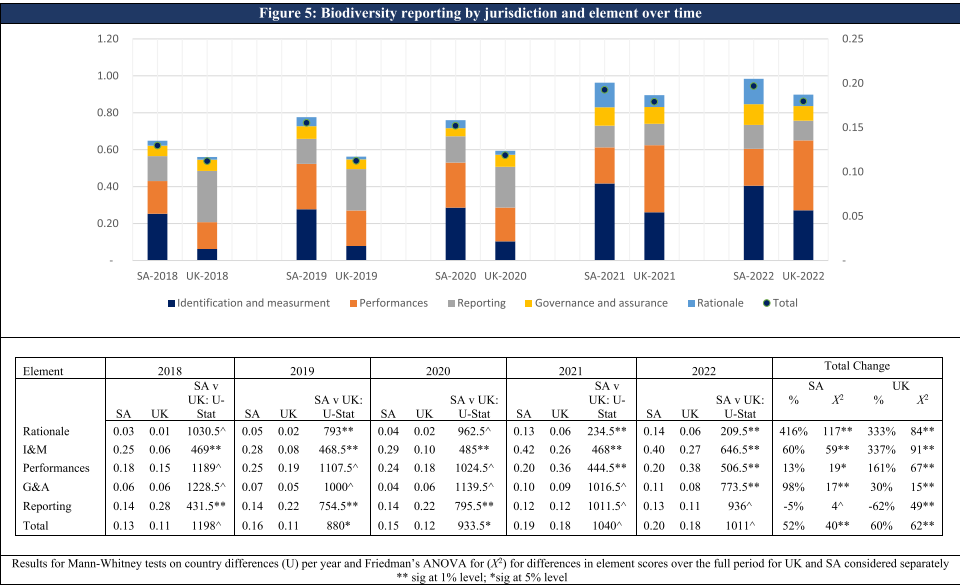


Figure 5. Biodiversity reporting by jurisdiction and element over time.

the Group’s position, minimum standards and challenges faced ... **Steps are being taken to address key issues where it makes good business sense to do so** [emphasis added] ... (UK Company 11)

The company makes a case for a firm commitment to mitigate biodiversity loss, but evidence of more extensive operational or strategic change is not provided. Un-tabulated detail prioritises compliance with specified reporting frameworks and industry regulation. There is a sense of expanded accountability but the reporting is insufficiently context-specific. Details to support the stated policy position are not offered and there was little indication of operational changes in the current or subsequent reports.

In contrast, some companies referred to different species, classified them according to risk of extinction and disaggregated the information by geographical area and type of ecosystem as recommended by best practice (GRI, 2024) and the academic research (Jones, 2003). The disclosures stop short of detailing reasons to protect biodiversity but do demonstrate the importance of environmental protection.

It is recognised that climate change and biodiversity are interconnected. Biodiversity is affected by climate change, with negative consequences for human well-being and ecosystems upon which we rely. .... Consequently, conserving and sustainably managing biodiversity is critical to addressing climate change. [SA Company 22] is committed to driving a net gain in biodiversity through:

- specialist assessment of the biotic and abiotic resources;
- driving clear, implementable, scientifically based action plans to drive resilience of ecosystems and
- integrated catchment management programmes (SA Company 22)

While not common practice, companies are starting to understand how biodiversity contributes to their business models in financial, environmental and socio-cultural terms. This is especially the case for miners, where codes of best practice iterate the importance of conserving important habitats. For example:

... Rehabilitation plans promote indigenous vegetation growth and aim to return land to a pre-mining state, weighed against socioeconomic development requirements as well as the views of impacted mining communities insofar as end land use is concerned. Our management processes contribute to the conservation of biodiversity and integrated approaches to land use planning, as guided by the [applicable best practice] ... Mitigation actions and plans are included in environmental management programmes for which approval is sought from the regulatory authorities. Where development needs to occur in ridges and wetlands, we apply for licensing, and specific mitigation measures are proposed and signed off by the relevant regulatory authority before implementation. Scientific information on mine closure and rehabilitation as well as biodiversity aspects are continuously generated by professional scientists and other experts [in line with best practice] ... (SA Company 31)

In addition, organisations must adopt a broader stakeholder perspective by evaluating the importance of affected environments to indigenous communities, recognising their rights and perspectives in decision-making processes:

[The company] ensures [that] wood-based fabrics are responsibly sourced. We are committed to ensuring cellulosic fibres used in our products do not come from ancient and endangered forests, endangered species or illegal sources and that the rights and wishes of indigenous communities are respected. (UK Company 41).

Examples of performances to support the policy statement are provided in different parts of the corporate reports. This included statistics on wetland management, engagements with regulatory authorities, case studies on culturally sensitive areas and details on site rehabilitations (un-tabulated). The specificity of the disclosures, coupled with a clear nexus between policy and action, suggested that accounting and reporting were linked to operational-level changes in addition to addressing any compliance-related requirements. This was not unique to only highly regulated companies. Un-tabulated descriptive statistics confirmed that each represented sector (including financial services, consumer goods and telecommunications) provided, at least, some detail on the rationale for protecting biodiversity. The reporting element is also given equal prominence by South African and UK firms by 2021 ( $U = 1011.5; p > 5\%$ ) and 2022 ( $U = 936; p > 5\%$ ), despite the former jurisdiction boasting greater biodiversity levels than the latter and also being less regulated.

## **5.2. Unit of account and biodiversity performance**

Some disclosures could be classified as high-quality when assessed narrowly because they included quantitative information (e.g. number of species) and were organisation-specific (e.g. stratified by sites under management). When viewed holistically, however, the biodiversity dependencies and impacts and the scope of the accounting and reporting were insufficiently clear to evidence an emancipatory potential.

Largely symbolic/generic practices should be contrasted with examples of biodiversity framed as a direct source of risks and opportunities based on identified pathways and impacts (Section 2.2). This type of reporting points to a transition from expansive/symbolic to more transformative/strong-form emancipatory accounting and reporting. For example:

... While the flexibility of [the company's] supply chain has provided good operational resilience to the physical impacts of climate change, there could be an impact if several key customers in a high-risk region were impacted simultaneously. More chronic impacts of climate change, such as drought or increased rainfall may, in certain circumstances, also

lead to resource shortages and price volatility of raw materials and packaging. [However, the opportunities are] our supply chain flexibility and lack of fixed manufacturing assets [which] provide an opportunity to quickly respond to changing operating conditions such as flooding and erosion caused by changed weather patterns. The risks and opportunities are applicable for all time horizons and are most significant in the medium- and long-term. (UK Company 9)

The company has chosen not to define biodiversity according to the units of account per recommended guidelines but based on a scientific assessment of natural capital most relevant for its risk exposure and operational mitigation plans (FSB, 2023b). The full supply chain, rather than only parts of the production process, was considered. Changes in circumstances over the short-, medium- and long-term are addressed and the disclosure is cross-referenced to a materiality determination process (un-tabulated), suggesting that more transformative changes are occurring.

This type of reporting necessitates extensive stakeholder engagement and an expanded accounting/management infrastructure to collect and process data (see Alrazi et al., 2015; Atkins & Maroun, 2018). There are cases of companies relying on partnerships with NGOs, think tanks, community forums and research groups to understand and manage biodiversity impacts and dependencies (van Liempd & Busch, 2013). These collaborations are not limited to informal information sharing. Third parties with the necessary environmental expertise are engaged to “audit” performances complemented by partnerships with other entities in the value chain.

... We’ve commissioned NGOs to carry out biodiversity audits on over 60 of our sites and are getting on with the recommendations. For land beyond our boundaries, we’re liaising with many partner organisations through our Great Big Nature Boost. We’re working with farmers and other landowners to make natural solutions integral to catchment management, both rural and urban ... (UK Company 43).

The results from social and stakeholder engagement are integrated into descriptions on the extent and health of ecosystems (un-tabulated) with various nature-signalling numbers, such as changes in species counts, area of land under conservation and the number of environmental impact assessments completed (Sullivan & Hannis, 2017). Various graphs, tables and images provide additional information to reinforce the rationale for conserving biodiversity and provide an account of biodiversity-related performance (Section 5.1). As the nexus between performance and biodiversity reporting becomes stronger, the likelihood of substantive organisational changes with positive biodiversity outcomes also increases. Consider the following example providing quantified indicators of changes in greenhouse gas emissions and water usage, two features of the entity’s broader biodiversity protection policy.

... In terms of environmental performance: this was the fifth successive year with no major (level 3 to 5) environmental incidents. The Company reduced greenhouse gas emissions by 10% (ahead of its 2020 target of 4%) and developed a roadmap to achieving carbon neutrality by 2040; and achieved its 2020 target of 17% reduction in freshwater usage against a 2015 baseline. (SA Company 4)

The company provides targets for each environmental indicator and comparative information (un-tabulated). The entity has formalised its accounting and management system to track changes in outcomes and report consistently on its performance over multiple

periods. The disclosure is indicative of, not just a commitment to expanded reporting and accountability, but of operational change with favourable environmental outcomes linked to the company's strategy and biodiversity mission statements.

While not ubiquitous, we find cases of companies experimenting with different measurement methodologies to complement a financial perspective on biodiversity (Cuckston, 2017). In some cases, financial key performance indicators (KPIs) are complemented by performance metrics capturing socio-environmental indicators and are dependent on various ecosystem assessment and measurement tools (Ferreira et al., 2025). These lend weight to the position that some organisations' accounting and reporting are linked to strategic, operational and system-level changes:

One way in which Social Impact is monitored and reviewed by the Board is via the Percentage of waste recycled KPI. The KPI monitors our operational and environmental efficiency, collecting data on the amount of waste the Group generates and recycles for each home sold. During 2022 the Group has focused on improving waste data capture and sharing best practice. The Board believes in the importance of ESG and cultural metrics and this is reflected in our use of customer care and quality in the annual bonus and PSP (performance share plan), and the incorporation of a clear and measurable environmental target in the PSP. (UK Company 11).

In this case, refinements are made to the data management process complemented with information exchanges to improve operations and measurement practices in other parts of the business. The environmental KPI has also been linked to the financial remuneration of senior executives. The link between the underlying accounting system, executive compensation and the individual disclosures suggests an integration of biodiversity into internal decision-making *and* external reporting. Other examples focus on mitigation steps and resources deployed to implement biodiversity mission statements/policies.

We focus on a clean production philosophy to address the impact from emissions, discharge, and waste. We manage our water resources responsibly to address risks related to water scarcity in some of our operations, and to ensure equitable use of water resources among local stakeholders wherever we operate. We emphasise the responsible management of forests and associated ecosystems and protect high conservation value areas. We ensure that we manage our forests responsibly and implement measures to protect biodiversity. (UK Company 44)

Like the earlier examples tagged as evidence of an emancipatory potential rather than only expanded environmental reporting, policy statements are backed by performance assessments (un-tabulated) and increasingly sophisticated systems of internal control. As recommended by best practice (FSB, 2023a; Houdet et al., 2021), "mitigation hierarchies" are developed to aid biodiversity management further:

... When looking at biodiversity, for example, this means that we first aim to avoid impacts on biodiversity and ecosystem services. Where avoidance is not possible, we aim to minimise our impact. Where our operations have affected biodiversity and the communities who rely on biodiversity for their livelihoods, we seek to help restore impacted habitats. We look for opportunities to make a positive contribution to conservation, also known as net-positive impact, where we operate. (UK Company 23)

Mitigation hierarchies are a key part of biodiversity policies and go together with action-oriented reporting. Evidence of performative-oriented reporting associated with

accounting's emancipatory potential includes (a) the results of expert assessments of action plans; (b) post-implementation reviews to measure outcomes against targets; (c) reports on both favourable and unfavourable developments; and (d) details on changes to biodiversity policies/plans. For example:

During the year we completed a review and gap analysis of the TCFD requirements to identify areas for improvement in our practices and disclosure. Many of the TCFD requirements were already integrated into our strategy, operations and culture and we have strengthened our reporting in this Annual Report & Accounts to provide additional disclosure as appropriate in the following key areas: Governance, Strategy, Risk Management and Metrics & Targets. We are working on an action plan to address areas for improvement to enable full disclosure with the requirements in 2021. (UK Company 10)

Integrated and action-oriented reporting is inconsistent with mere impression management (Atkins et al., 2018; van Liempd & Busch, 2013). The company expands explanations of how biodiversity-related matters are integrated into strategy development, risk management and performance assessments (un-tabulated) based on its "gap analysis" of international best practices. To bolster accountability and transparency, other organisations complement details on positive outcomes with their failures, including instances of non-compliance with regulations:

... In 2020, [the company] reported 82 non-monetary sanctions for non-compliance with environmental laws and regulations and eight environmental incidents with impacts outside our boundaries, where two had a limited short-term impact on external water bodies ... We paid fines totalling approximately €11,008 involving 6 cases [related to a leak releasing oil to the river, exceeding the limits of NOx emission, non-compliances with sanitary standards and non-compliance with a regulation on hazardous waste transportation] (SA Company 47)

While limited, there are examples of companies experimenting with new technologies to widen the scope of their collection and analysis of data used for biodiversity risk and impact assessment, application of mitigation hierarchies and other management actions. This type of innovation is consistent with a performative approach to managing, accounting for and reporting on biodiversity.

For example, one company reports on proprietary technology used to treat low-grade ores. It explains how the approach is "far less energy and water intensive than conventional processes" and, as a result, contributes to improved environmental outcomes. These are assessed in the context of "delivering equal or better recovery rates" (SA Company 4) and highlight that waste management, water consumption and production efficiency are being tracked and managed concurrently by the accounting system. Evidence of different units of accounting being identified, measured and tracked is complemented by the use of internal control systems to ensure the integrity of the information being used for internal management and external reporting.

[The company] ensure[s] compliance with commitments related to our environmental permits and legal requirements and effectively implement critical environmental controls ... Climate scenario analysis was used to better understand and assess the likelihood and impact of risks and opportunities and was integrated into our risk assessment processes using ISO 31000 and best practice methodology.. The estimated financial impact on operating costs and capital expenditure was calculated against three views: 1) no mitigation or adaptation, 2) controls already in place, and 3) plans and actions implemented in the

future. In 2023 we plan to improve our climate change risk management by determining the levels at which particular climate risks would trigger us taking preventative actions [including the use of more robust internal controls] (UK Company 37)

The disclosures highlighted in this subsection are not specific to only certain industries. There has been a substantial increase in the extent of reporting, especially among UK firms ( $\Delta SA = 60\%$ ;  $\Delta UK = 333\%$ ). These trends are not, however, indicative of only an expansion to existing extra-financial reporting because of regulatory, investor or other pressures. There are examples of South African and UK firms from a range of sectors developing more sophisticated accounting and management systems to track biodiversity metrics, incorporate these into performance assessments and guide changes to operational and risk-management practices. When this is the case, the accounting and reporting have an increasing emancipatory potential because of a stronger nexus between the information reported externally and the use of that information for internal decision-making.

### 5.3. Reporting

We find several examples of companies making explicit statements on compliance with reporting standards/codes of best practice. Compliance does not preclude emancipatory accounting and reporting, but there is a risk of organisations internalising the relevance of biodiversity for their business models to only a limited extent. Reported details are either curtailed based on minimum disclosure requirements or to limit legal liability. Similarly, an increase in biodiversity reporting by South African and UK organisations ( $\Delta SA = 13\%$ ;  $\Delta UK = 161\%$ ) could be attributed to the recent proliferation of codes, standards and guidelines addressing biodiversity in more detail (see [Figure 4](#)) rather than underlying transformative changes.

Increases in the extent of reporting should, however, be interpreted in the context of companies refining their materiality determination process. For example:

This year, we used a double assessment to define material issues from two perspectives: Impact materiality (Examining the impact that the Company's activities have on the environment, people, and economies) [and] Financial materiality (Examining the impact of sustainability issues on the financial value of the business. We enhanced our scoring process by engaging our internal expert working groups directly in the process of scoring potential material issues for impact and likelihood. The top-ranked issues were then validated and approved by our Corporate Sustainability Committee. (UK Company 1)

Examining how the choice of materiality affects biodiversity reporting is beyond the scope of this paper. What is key is that companies are developing frameworks for guiding decisions on what and how biodiversity-related information is being presented to their users (King et al., 2022). Entities with a formal process for identifying material information may also develop environmental accounting policies. These inform, for example, the type of data collected, the units of measurement and how data are interconnected (un-tabulated). Granular information will not be published in the respective corporate reports, but the formulation of accounting policies reassures users that the data underpinning managerial decisions and external reporting are more likely to be accurate, complete and consistent and, in turn, have a transformative potential. Materiality determination and formalised accounting policies also provide the basis for “combined

assurance” courtesy of the organisation’s governing bodies, internal auditors and external auditors.

#### **5.4. Governance and assurance**

The likelihood of biodiversity reporting capturing transformative organisational changes is increased by the operation of enhanced governance functions, a practice gaining traction among South African and UK firms ( $\Delta SA = 98\%$ ;  $\Delta UK = 30\%$ ). A formalised biodiversity governance framework is yet to be developed but there are examples of different board committees having their remits expanded to include biodiversity risk and performance assessments as discussed in Sections 5.1-5.3.

In FY 2019/20, a Sustainability Steering Committee chaired by the CEO was established to review and oversee the Group’s strategy on environmental and social issues. During FY 2021/22, we reviewed the governance of ESG topics. As part of this review, the Sustainability Steering Committee evolved to the Sustainability Committee, which will meet four times a year and is co-chaired by the CEO and the Chief Operating and Financial Officer (CO&FO). The Sustainability Committee will report to the Board at least twice a year to enhance the Board’s monitoring of progress. (UK Company 17).

The new committee is not dealing with sustainability-related issues in isolation. It engages bi-annually with the Board; is chaired by the company’s CEO and includes the chief operating and financial officers. This allows the sustainability committee to contribute directly to the entity’s “mainstream” business and governance. In the process, the nexus between policy and reporting, on the one hand, and performance and accountability, on the other, is bolstered. The information communicated to stakeholders is less likely to capture only industry trends or institutional norms but also incorporate a fair account of how biodiversity has been integrated into different parts of an organisation’s business model.

Entities with more complex business models may support their governing bodies’ monitoring and review with in-house experts or a biodiversity risk officer.

The Group is focused on understanding and reducing its impact on the planet. In February 2019, the Group appointed a Group Sustainability Manager. He is supported by an experienced sustainability team, including an engineering specialist. This manager reports to the Chief Business Officer and submits reports to the Social and Ethics Committee. Over the medium term, we aim to improve our water and energy use efficiency, and over the longer term we aim to source goods and services more responsibly. The Committee monitors customer sentiment towards and perceptions of the Group, including through stakeholder surveys, social media monitoring and other initiatives. Customers have indicated that they want more information on how the Group supports local businesses, reduces its environmental footprint and treats employees fairly. (SA Company 12).

Internal and external assurance providers complement the use of specialised sub-committees of the board of directors and the appointment of environmental experts.

... Our policy and practice is to seek external assurance of our Sustainable Development report on an annual basis. The Board (through the Sustainable Development (SD) Committee) and the Executive Committee approve the approach to and scope of external assurance every year ... Environmental Resources Management Certification and Verification Services (ERM CVS) provided limited assurance on [specified information] ... and limited (converting operations) levels of assurance. We monitor our environmental performance indicators

and report our progress against our 2020 commitments, with our GHG emissions independently assured to reasonable assurance level ... We monitor regulatory developments to ensure compliance with existing operating permits and [perform] water impact assessments locally to better understand our local environmental footprint and stakeholder needs. (SA Company 47)

Importantly, external assurers have been tasked with verifying the practices and resulting performance related to multiple activities and processes. These are related directly to the entity's core operations and culminate in a verification that biodiversity disclosures faithfully capture the underlying organisational-level changes. Codes of best practice recommend that internal and external assurance providers collaborate and that their efforts are used to amplify the coordination and review of the governing body. Consistent with earlier research, assurance enhances the quality and credibility of reporting (Edgley et al., 2010). The risk of biodiversity-related disclosures being used only to manage impressions is reduced because the assurance provider examines, for example, the materiality determination process (Elliot et al., 2024), management's basis for reaching specific conclusions (Sánchez-Sancho et al., 2024), compliance with applicable regulations (Atupola & Gunarathne, 2023) and the robustness of the internal controls in place to safeguard the accuracy and validity of reporting (King et al., 2022).

Overall, expanded governance and assurance activities, coupled with more evidence-based reporting (see Atkins & Maroun, 2018; White et al., 2023), decrease the likelihood of scores reported in Figures 4 and 5 capturing only symbolic reporting on biodiversity (see Alrazi et al., 2015; De Villiers et al., 2017). Improvements in each of the reporting elements by South African and UK firms from 2018 to 2022 suggest that there is a genuine commitment to internalise biodiversity as a valid part of how organisations are being managed and engage with their stakeholders (see Alrazi et al., 2015; Atkins & Maroun, 2018). Complementary analysis in support of these findings is provided in Appendix D.

## 6. Conclusion

This paper advances the biodiversity accounting and reporting literature by detailing a principles-based framework grounded in the emancipatory accounting tradition. Drawing on the seminal work of Gallhofer and colleagues on accounting's change potential (2005, 2015, 1996) and later academic and policy developments, five interrelated elements of emancipatory or transformative accounting and reporting are identified. When viewed holistically, the elements provide insights into the extent to which biodiversity accounting and reporting range from being a primarily compliance-focused extension to existing environmental disclosures, on the one hand, to an indicator of material positive change on the other.

Rather than treating emancipatory accounting as a niche or radical alternative, the framework demonstrates how it can be operationalised within mainstream corporate accounting, management and reporting systems. When applied to the corporate reports of leading listed companies in South Africa and the United Kingdom, the results reveal that biodiversity accounting and reporting practices are best understood as lying on a continuum. At one end, disclosures remain largely compliance-oriented

or symbolic, expanding transparency without clear evidence of substantive organisational change. The reporting focuses on generic policies, high-level commitments or alignment with reporting frameworks, with limited evidence of changes to internal systems, processes or decision-making. While such disclosures may improve transparency, they are unlikely to generate meaningful ecological outcomes in the absence of robust accounting, management and governance infrastructures.

At the other end of the continuum, the reporting reflects more integrated, action-oriented and context-specific practices that are indicative of stronger forms of emancipatory accounting. These applicable cases demonstrate how biodiversity-related information is increasingly used to inform operational decisions, resource allocation and post-implementation reviews. In turn, the biodiversity reporting is characterised by clearer links between policies, operational actions, performance evaluation and governance oversight, reducing the likelihood that disclosures merely serve impression-management purposes.

These findings challenge the view that corporate biodiversity reporting is inherently symbolic (Haji & Anifowose, 2016; Sun & Lange, 2023). While deficiencies remain, there is growing evidence that some organisations are developing more sophisticated accounting and management systems capable of identifying biodiversity dependencies and impacts, applying mitigation hierarchies, and tracking outcomes over time. The incorporation of “nature-signalling numbers,” multi-capital performance assessments and external assurance further strengthen the credibility of the resulting disclosures and enhances their emancipatory potential.

This study advances the literature on biodiversity accounting by consolidating insights from biodiversity reporting, extinction accounting and ecosystem accounting and situating these within recent international policy developments. In doing so, a contemporary framework for emancipatory biodiversity accounting is developed, which provides a structured basis for understanding how biodiversity accounting and reporting can transcend narrow disclosure metrics. The longitudinal and cross-jurisdictional analysis also extends existing earlier empirical work, which has typically focused on specific sectors, jurisdictions or shorter timeframes. The study contributes to ongoing debates about the capacity of accounting to support socio-ecological change, while offering a principle-based framework to assist practitioners with navigating multiple reporting standards and researchers with evaluating the development of biodiversity reporting from an emancipatory perspective.

These findings have important implications. The findings highlight how emancipatory accounting should not be treated as a binary or only theoretical construct but as a continuum from compliance-focused/weak-form accounting and reporting to more progressive, transformative or strong-form types. The framework consolidates earlier work on biodiversity, extinction and ecological accounting/reporting and the latest international standard-setting efforts into a schematic that can be used to analyse mainstream corporate reports. The aim is to deemphasise disclosure quantity or semantic quality indicators in favour of a critical assessment of underlying accounting, management and governance infrastructures that enable change. Scalability is an additional benefit. The framework can be used when dealing with companies in developed or developing economies, with varying environmental impacts and in locations with different “stocks” of natural capital.

The paper's findings are not limited to an academic audience. For preparers, the framework offers guidance on how biodiversity accounting and reporting can move beyond compliance by strengthening the links between policy, performance, governance and reporting. The results suggest that biodiversity reporting is most likely to support meaningful outcomes when embedded in existing decision-making, performance management and governance systems, rather than treated as a standalone disclosure exercise.

For investors and other users of corporate reports, it provides a basis for critically evaluating biodiversity disclosures and drawing informed inferences about their underlying change potential, particularly in contexts where site visits or direct verification are impractical. For policymakers and standard setters, the results highlight the importance of governance, materiality determination and assurance in amplifying the effectiveness of biodiversity reporting requirements. The principles-based approach means that the framework can be scaled to deal with different contexts/settings while reminding stakeholders that emancipatory-type practices are best understood as ranging along a continuum.

Finally, the results are timely. The World Bank (2021) has called on organisations to manage and report on biodiversity-related risks more proactively. This message is reiterated by various agencies of the United Nations (2023) and the international investor community (Financial Stability Board, 2021). It is in this context that the European Union has introduced mandatory sustainability-related disclosure requirements, which include details on biodiversity impacts and dependencies (see EFRAG, 2022). These are only applicable from 2024 and to select organisations but are being mirrored by the development of more detailed voluntary reporting guidelines which are becoming increasingly popular internationally. Most recently, the ISSB was formed to develop a global baseline for extra-financial reporting and has identified biodiversity as a focal point because of its economic, social and environmental significance (ISSB, 2023; Millar & Slack, 2024). Taking stock of what South African and UK-based firms are currently reporting leaves this research well-placed to inform both international practice and policy development.

Several limitations should be acknowledged. The analysis relies on publicly available corporate reports and cannot establish causality or definitively confirm changes to internal practices. There remains a risk of divergence between what organisations report and what they do in practice. Although complementary analyses suggest that the framework captures more than disclosure quantity or generic reporting quality, detailed interviews, site visits and ethnographic research would be valuable in validating and refining the framework's elements. Future research could also apply the framework to other jurisdictions, sectors or organisational forms, or examine how emerging mandatory biodiversity disclosure regimes influence the evolution of emancipatory accounting practices over time.

Despite these limitations, the study responds to calls for research that moves beyond dismissing corporate biodiversity reporting as mere impression management. By foregrounding accounting's emancipatory potential and illustrating how it is being operationalised in practice, the paper demonstrates that biodiversity accounting and reporting can contribute meaningfully to organisational change and sustainable development. As biodiversity loss becomes an increasingly material economic, social and ecological

issue, accounting systems that integrate financial and extra-financial considerations will be critical in enabling organisations to recognise risks, identify opportunities and support more sustainable business models.

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No potential conflict of interest was reported by the author(s).

## Data availability statement

Data are obtained from publicly available extra-financial reports. The data that support the findings of this study (as per the framework) are available from the corresponding author, upon reasonable request.

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