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An Investigation into Species Reporting by the Top 250 Fortune Global Companies

Drae BENT[1], Elisabete VIEIRA[2], Mara MADALENO[3]
[1,2,3]University of Aveiro, Portugal

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Corresponding Author:
Drae Bent
Email:
drae.bent@ua.pt

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Abstract:

Purpose:
This research paper aims to explore corporate reports published by companies to investigate the extent of species disclosure by top Fortune Global companies.

Methodology:
This paper uses content analysis to explore and investigate species disclosures in sustainability reports (and equivalents) for the 2020 reporting year, the COVID-19 pandemic era, by the top 250 Fortune Global companies.

Findings:
The results of this investigation are supported by frequency charts and tables, along with graphical depictions of the data. Our results reveal that species reporting still needs to be expanded to top companies across regions and sectors. Corporate reports are filled with a preference for highly charismatic and widespread species, which aligns with impression management theory. Our results also reveal a positive correlation between companies from high biodiversity risk sectors and the extent of species published in reports. This paper is the first to quantify and assess species reporting by leading Fortune Global companies.

Implication:
These findings contribute to the discussion on biodiversity reporting practices, particularly in the era of the COVID-19 pandemic, and the importance of working together to prevent species extinction. The results are helpful for policymakers, academic researchers, and all stakeholders who seek to promote and prevent species extinction in organizations.

INTRODUCTION

The declining rate of biodiversity is recognized as one of the world's top five global risks (World Economic Forum, 2022). Biodiversity is essential to the continuation and survival of life (Gaia & Jones, 2020). Therefore, the United Nations (UN) has urged all stakeholders to combat biodiversity and species loss, or else the ecosystem as we know it will collapse (UN, 2010). To raise awareness, the United Nations General Assembly proclaimed 2010 as the UN Decade of Biodiversity, outlining specific strategies for halting biodiversity depletion, which has continued as a long-hauled focus for now and the future (UN, 2010). The threat to nature is so severe that scientists have concluded that we are facing the sixth period of mass extinction (International Union for Conservation of Nature, IUCN, 2019). According to The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Service (IPBES, 2019), the loss of biodiversity is a significant risk and will disturb all the pillars of the economy).

Biodiversity describes the variety of life on our planet and encompasses species variation and the extent of the ecological systems across regions (Secretariat of the Convention on Biological Diversity, 2014). It is fundamental to all life forms and is of overwhelming concern as the species and nature are declining at unprecedented rates (UN, 2019). To increase species protection, established in 1964, the governing body of the IUCN has mainly become a key indicator for evaluating and assessing threatened species (IUCN, 2012). Recognized as the most comprehensive and global resource for the barometer of species, the IUCN Red List

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has become increasingly rigorous, accurate, and transparent on the status of animal, fungi, and plant species (Bennun et al., 2018; Mace et al., 2008). The IUCN Red List has reported that over 41,000 species are now at risk of extinction from 28% of quantitatively evaluated species over different geographic areas (IUCN, 2022). The World Wide Fund (WWF) (2020) Living Planet Report has found that there has been an average of 68% decline in the world's populations of mammals, fish, birds, reptiles, and amphibians since the 1970s. Moreover, one million animal and plant species are now threatened with extinction, the highest number in human history, as reported by the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES, 2019).

Biodiversity conservation is essential to all components of the economy, including long-term business survival (International Finance Corporation (IFC), 2006). Since the declaration of biodiversity conservation by the United Nations (UN), there has been more uptake in research to promote biodiversity and species extinction. However, researchers have noted that many businesses must provide substantial biodiversity conservational plans and proper species reporting (Adler et al., 2017; Hassan et al., 2020; UN, 2010). Businesses' long-term survival depends on the symbiotic balance between biodiversity and the impacts of companies on biodiversity (Adler et al., 2018; Hassan et al., 2020). Companies should metamorphose into species-related issues and pay attention as they rely directly on the value of the ecosystems, and their corporate activity is linked to nature (Adler et al., 2018; Atkins & Atkins, 2018; Bebbington & Unerman, 2018). Moreover, they are responsible to the public and will continue to be scrutinized for increased reporting on specific species affected by their operations (Zhao & Atkins, 2021).

Given the importance of understanding specific species affected by a company's operations, this literature aims to address the gap in the current bodies of accounting literature by investigating the disclosure practices on threatened species of the top 250 Fortune Global companies. To our knowledge, the current research is the first to examine companies' specific species reporting practices. The theory of legitimacy will be incorporated in this present study to support our understanding of the motives for providing species reporting by the companies within the research sample.

The research paper is structured as follows. The following section presents the literature review of biodiversity and species reporting. The following section discusses the data collection process and methodological approach carried out in the research paper. The following section reports on the results and detailed discussions of the results attained. Finally, the last section presents the conclusions, limitations of the paper, and future avenues for research.

Literature Review. The support system for humanity and biodiversity is under immense threat (Zurich Insurance Group, 2021). The World Economic Forum (2022) recognized biodiversity loss as one of the top three global risks over the next ten years, with irreversible consequences to the environment, humankind, and the economy. Biodiversity depletion is accelerating at a rate of no return, and unless all the Earth's inhabitants begin to play a part, the future is bleak (Grabsch et al., 2011; Jones & Solomon, 2013). Businesses are urged with a great calling to participate in biodiversity initiatives to aid conservation (World Economic Forum, 2021). The UN (2020) claims that Time is running out and much effort is needed to halt the collapse of precious biodiversity by 2030, with previous efforts in pushing the urgent call for biodiversity by labeling the years 2011-2020 as the Decade on Biodiversity (Convention on Biological Diversity, CBD 2010). While other countries heeded the urgent call, the European Union (EU) proposed action targets for companies to prevent biodiversity by 2020 and later legislated new requirements under the updated 2030 strategies for biodiversity after the Covid-19 pandemic (European Commission, 2020). With various initiatives in place to combat biodiversity loss, more research is necessary to understand and develop our understanding of where the attention could be improved and the progress of all the efforts (UN, 2019; Hassan et al., 2020).

The call for protecting biodiversity is crucial to ensure harmonious continuity in services derived from nature, and companies have an essential role to play (Buchling & Maroun, 2021; Zhao & Atkins, 2021). Still,

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the participation among corporations is deemed to be insufficient, and little few contributions by scholars on exploring organizational responsibility concerning biodiversity (Atkins & Maroun, 2018; Cuckston, 2013; Jones & Solomon, 2013; Zhang & Liu, 2015). To help with the efforts to halt the loss of biodiversity, businesses are urged to play their part by reporting on biodiversity to the general public; however, many companies are in the infant stages of exploring their impacts on biodiversity loss (Ernst & Young, 2022). Despite the apparent requests for participation in biodiversity conservation, the academic pool of research on biodiversity is still very scarce (Adler et al., 2018; Atkins & Maroun, 2018; Hassan et al., 2020; Rimmel & Jonäll, 2013). Predominantly, some researchers have explored biodiversity from the biological and natural assets, including Jones' (1996) natural inventory model (Jones 1996, 2003; Hossain, 2017; Siddiqui, 2013). According to Rimmel and Jonall (2013), accounting research has not paid enough attention to the elements of biodiversity disclosures.

A strand of literature has investigated the extent of companies reporting on biodiversity from different sectors, including Australian mining companies (Adler et al., 2017), Australian listed companies (Bhattacharyya & Yang, 2019), Canadian public organizations (Talbot & Boiral, 2021), Swedish companies listed on the Stockholm Stock Exchange (Rimmel & Jonäll, 2013), Danish largest capital companies (Van Liempd & Busch, 2013), Indian companies (Mansi et al., 2014), local authorities in New Zealand (Samkin et al., 2014), Chinese listed companies (Zhao & Atkins, 2021), United Kingdom public sector (Gaia & Jones, 2017; Weir, 2018), and the South African local stock exchange list companies (Mansoor & Maroun, 2016). Other researchers have given rise to the attention of biodiversity extinction and species disclosures on the global scene by examining the reporting practices of Fortune Global 500 companies (Adler et al., 2018; Hassan et al., 2019, 2020). At the same Time, other academic research has been focused on the development of normative frameworks for corporate reporting to solidify and guide the topic of biodiversity reporting (Atkins & Maroun, 2018; Atkins et al., 2018; Maroun & Atkins, 2018; Samkin et al., 2014). Given the depth and breadth of these previous studies, biodiversity accounting literature has not, thus far, analyzed the variety of species disclosed by companies.

Evaluating and monitoring biodiversity has become increasingly important, and the IUCN Red List has primarily contributed to these efforts to track species, with more than 41,000 species reported as threatened with extinction (United et al. (UNGC), 2012). Monitoring species has proven to be vastly complex, but the IUCN has allowed organizations and society to make critical conservational decisions (Young et al., 2014). Business operations have a significant role to play and should be concerned with species that their operations impact directly and indirectly. Furthermore, species should be considered the main stakeholders in business operations, as environmental decisions are crucial to survival (Roberts et al., 2021). A comprehensive understanding of species is necessary to make decisions and communicate information related to biodiversity effectively. The Global Reporting Initiative (GRI), the most prominent and commonly used reporting standard, requires companies to list species impacted by their operations and incorporate the IUCN Red List within the biodiversity framework (GRI, 2016; KPMG, 2020). It highlights the hope that companies are providing an overall assessment of the variety of species they both directly and indirectly impacted. However, previous research has indicated that species reporting is limited within the disclosures (Adler et al., 2018; Roberts et al., 2021; Van Liempd & Busch, 2013). The studies on species evaluation in sustainability reporting are limited, and this paper will seek to provide the gap and context of the study.

Accounting has been long criticized for the lackluster efforts in biodiversity conservation, with very few reporting on species (Hassan et al., 2020; Roberts et al., 2021). Of the attempts to explore accounting for species, in recent literature, Atkins et al. (2018) analyzed how accounting disclosures may impact strategies for conserving and protecting a single species of rhinoceros. In line with investigating single species, Jonall and Rimmel (2015) examined accounting disclosures and evaluated these companies' corporate activities and actions aimed at protecting the populations of bees. Similarly, Zhao and Atkins (2019) investigated the giant panda conservation in China, which receives significant funding from the Chinese government. Kuruppu and Milne (2010) explored accountability extinction accounting and the impacts of information sources on stakeholders

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from a single angle of species by utilizing the loss of endangered dolphins as a consequence of company activities in the UK public sector. Contrasting these studies carried out from an angle of single species, Adler et al. (2018) provided a mere list of species disclosed within the sampled companies; however, no further analysis was carried out on this list of disclosed species. Weir (2018) found that a specific type of species attracts more attention than others, and well-known species justify more conservation efforts. Despite the comprehensive understanding in society that all species should be protected, more social and political value is placed on higher-profile mammals and birds compared to other threatened species, such as insects and amphibian species (Czech et al., 1998; Weir, 2018). Therefore, a thorough investigation is required to determine if companies only indulge in disclosures of higher profile, exotic, and well-known species. Companies are partaking in impression management, exemplifying a superficial bias toward protecting nature (Roberts et al., 2020).

The depletion of biodiversity affects billions relying on species (Shao, 2022). The International Finance Corporation (IFC) (2022) informs that protecting species is essential to businesses' long-term survival and suggests that understanding the species affected can help with careful strategies and informed decisions to remedy biodiversity degradation. Additionally, companies have realized that financial instability is directly tied to biodiversity decline, and this material financial risk can be immensely vast (PwC & WWF, 2020). Therefore, this paper will add much value to the current stream of research in biodiversity, specifically within species disclosed within company reports, and fill the gap in understanding the motivations behind conservation efforts.

Theoretical Perspective. A review of theoretical approaches applied in social and environmental accounting identifies the stakeholder and legitimacy theories as the predominant theories utilized (Gray et al., 1995; Roberts et al., 2020). More specifically, the theory of legitimacy is the most established in biodiversity and extinction studies (Roberts et al., 2020). As defined, "Legitimacy is a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions" (Suchman, 1995, p. 574). The legitimacy theory explains that positive disclosures garner validity from the wider public and explain how people act and understand organizations (Suchman, 1995). Widely applied in accounting literature, the legitimacy theory commonly explains the motivations of managers for making environmental disclosures (Deegan, 2002; O'Dwyer, 2002; Siddiqui, 2013). This study builds upon the legitimacy theory and argues that companies are providing disclosures on species to legitimize impression management for biodiversity conservational issues (Adler et al., 2018; Hassan et al., 2020).

Another phenomenon that is beaming under legitimacy theory is greenwashing. The new perspective of greenwashing under the legitimacy theory is commonly used to explain companies' motivations for nonfinancial reporting (Hassan et al., 2020; Hassan & Guo, 2017). The term "greenwashing" is defined by the Oxford English Dictionary as "disinformation disseminated by an organization, etc., to present an environmentally responsible public image. It refers to a public image of environmental responsibility promoted by an organization, etc., but perceived as unfounded or intentionally misleading." The term was coined by environmental activists where corporations pose as "friends of the environment" to mislead and disguise claims that may not be substantiated (Greer & Bruno, 1996). Based on previous literature examining corporate reporting on biodiversity, there is the question of legitimacy as companies indulge in greenwashing to maintain impression management with shareholders and the wider public (Cho et al., 2015; Hassan et al., 2020). Roberts et al. (2021) argue that given organizations' dependency on the activities of biodiversity, it is reasonable to expect more disclosures to increase legitimacy.

Similarly, Adler et al. (2018) agree that biodiversity disclosures help cushion the public's scientism towards a company and its operations. Therefore, to maintain their image within the public, organizations will provide disclosures to ensure their social and environmental upkeeping. Impression management in disclosures was also found in an abundance of previous accounting literature and used to improve their corporate image

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(Boiral, 2016; Hassan et al., 2020; Jones & Solomon, 2013; Solomon et al., 2013). Zhao and Atkins (2021) found that companies were operating in their self-interests and impression management by focusing on species most helpful to humans. This study was in line with previous studies that found problems with anthropocentric practices and the maintenance of social image (Jones & Solomon, 2013; Rimmel & Jonäll, 2013; Van Liempd & Busch, 2013). Since the notion of "being a good neighbor is good for business" (Adler et al., 2018), the debate on the 'genuineness' of companies continues to loom as biodiversity conservation efforts carry on into the twenty-first century.

METHODS

Companies rely on the ecosystem; therefore, businesses should remain in harmony with nature (Van Liempd & Busch, 2013). However, the impacts of companies' activities directly threaten biodiversity and its degradation (Boiral, 2016). Therefore, examining the representation of species by companies is an appropriate measure of the progress of biodiversity reporting. This paper aimed to explore the species disclosed by the top Fortune Global 500 companies and to investigate if there was a bias towards species mentioned within their annual published sustainability reports and their equivalents. The reporting year selected for this research was 2020 to examine the reports during the era of the COVID-19 pandemic. For the final sample of companies selected in the research, the sustainability reports and their equivalents were examined using content analysis to identify, examine, and classify the species disclosed.

Data Collection. The sample size for this study consists of the top 250 companies listed on the Fortune Global 500 List in the year 2020 (https://fortune.com/global500/2020/). Every year, the Fortune Global 500 ranks companies based on gross revenues and lists the top 500 global companies worldwide. The Fortune Global 500 list was chosen because it comprises many countries that are industry leaders, known for reporting on Corporate Social Responsibility (CSR) activities, and much media attention on the global world stage (Adler et al., 2018; Hassan et al., 2020). We selected the year 2020 because we wanted to investigate reporting within the height of the COVID-19 pandemic, as one would expect companies to show greater responsibility towards biodiversity and society in the presence of a global pandemic. From the list of 500 companies represented, we investigated the top 250 companies (one-half of the population) with the justification that biodiversity reporting is rarely undertaken by the remaining companies (Adler et al., 2018). Like Hassan et al. (2020), we did not investigate the companies' websites for species-related information because it is unclear when companies update their websites. Not knowing this information will defeat the purpose of selecting a particular period.

We downloaded 232 sustainability reports and their equivalents for the top 250 Fortune Global list of companies. These reports were collected from their companies' publicly available websites from May 2022 through June 2022. The sustainability reports are referred to by different names, such as sustainability reports, environmental reports, responsibility reports, citizenship reports, and integrated/combined reports. Eighteen companies were dropped from the sample as twelve of the companies' (located in China) websites were inaccessible due to being blocked by location restrictions, and six companies were not available in the English language (locations of Brazil, China, and Mexico). The final sample consists of 232 companies and their relevant sustainability reports (or their equivalents). The final comprises 25 countries from Belgium, Brazil, Canada, China, France, Germany, Hong Kong, India, Italy, Japan, Luxembourg, Malaysia, Mexico, Netherlands, Norway, Russia, Saudi Arabia, Singapore, South Korea, Spain, Switzerland, Taiwan, Thailand, United Kingdom, and the United States of America (USA).

Data Analysis. The data analysis of the reports adopted the content analysis approach. Content analysis is widely applied in the analysis of CSR reports and employed in prior literature studies related to reporting on species information and biodiversity themes (Addison et al., 2019; Adler et al., 2018; Atkins et al., 2014; Bhattacharyya & Yang, 2019; Fifka, 2013; Hassan et al., 2020; Khan et al., 2020; Maroun & Atkins, 2018).

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Similar to previous studies, the sections of the reports addressing biodiversity were identified (Adler et al., 2018; Hassan et al., 2020; Grabsch et al., 2011; Van Liempd & Busch, 2013) and extended by the researchers to identify the mention of specific species. The reports were first searched for keywords used in previous studies (along with new ones introduced) such as 'biodiversity,' 'habitat,' 'ecosystem,' 'conservation,' 'species,' 'flora,' 'fauna,' 'wildlife,' 'marine life,' 'animal,' 'forest,' 'trees,' 'land,' 'wind,' 'deforestation,' 'organism,' 'waste,' 'wetland,' 'threat,' 'mammal,' and 'ecology' to preview relevant sections of the reports relating to biodiversity (Adler et al., 2018; Van Liempd & Busch, 2013). The reports were thoroughly examined to identify the sections related to the species and isolate the species-specific details. Once identified, the researchers re-examined this information in different rounds of reading to ensure specific species were identified correctly. Afterward, the researchers recorded the species' names (or scientific names, if stated) and maintained a complete list in a tabular format. If no species were mentioned, the company was classified as "None ."Table 1 in the next section represents the summarized final sample of species aggregation. The evaluation of the study was supported by descriptive reporting of the findings in the adaptive formats of various charts, graphs, and tables.

RESULTS AND DISCUSSION

The following section presents the findings and discussion of the species reporting for the list of companies within the sample chosen for this study. First, an overview of the general state of species reporting is presented with a supporting summary of the countries and companies and a discussion of significant findings. Second, an overall descriptive analysis of the extent, types, and popularity of species disclosed by companies is produced, along with a discussion of critical revelations. Third, an examination of the companies' industry and the sector and a thorough discussion of the significant discoveries are presented. Furthermore, the presentation of the results is supported by an array of tables, charts, and figures labeled for chronological reading in this paper. To comprehend the range of species included in the reports of the sampled companies, data was gathered on the types of species disclosed by the companies.

Table 1. List of Companies and Species Reported (2020)

Company Name	Country	Species
Walmart	USA	Tuna, Coffee, Bees, Butterflies, Tomatoes, Grapes, Leafy greens, Melons, Corn, Wheat, Oats, Rice, Shrimp, Salmon, Poultry, Soy
Sinopec Group	China	Black storks, Egrets, Herons
Royal Dutch Shell	Netherlands	Western gray whales
Saudi Aramco	Saudi Arabia	Mangroves
BP	United Kingdom	Bees, Bats, Nectar trees
Amazon.com	USA	Cotton
Toyota Motor	Japan	Oriental reed warbler, Dragonfly larvae, Oriental honey-buzzard, Grey-faced buzzard, Japanese night heron, Japanese eight-barbel loach, Japanese bellflower, Oaks, Azalea saplings, Mangroves, Frogs, Oriental dollar bird
Apple	USA	Elephants, Mangroves
CVS Health	USA	Elderberry, Ashwagandha, Maca, Turmeric

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Glencore	Switzerland	Rhino, Wombats, Red-necked wallabies, Swamp wallabies, Eastern grey kangaroos, Wallaroos, Short-beaked echidnas, Brushtail possums, Microbats, Lace monitors, Bearded dragons, Brown snakes, Eastern longneck turtles, Prasophyllum petroleum, Diuris tricolor
Samsung Electronics	South Korea	Otters, Carp, Mudskipper, Tubifex, Red midge
Daimler	Germany	Butterflies, Wild bees, Falcons
Total	France	Black rhinoceros, Chimpanzees
Hon Hai Precision Industry	Taiwan	Whales
Alphabet	USA	Egrets, Bees, Butterflies, Shrubs, Oak trees, Wildflowers, Whales, Cows
Ford Motor	USA	Kenaf, Wheat straw, Coconut tree, Coffee plants, Soy
Costco Wholesale	USA	Shrimp, Wild salmon, Atlantic cod, Atlantic halibut, Chilean sea bass, Greenland halibut, Grouper (Epinephelus morio), Orange roughly, Redfish, Shark, Skates, Rays, Swordfish, Bluefin tuna, Goats, Cocoa plants, Coconut trees, Soybean plants, Gliricidia plants, Coffee plants, Honey bees, Butterflies, Roses, Chickens, Cows, Turkey, Cattles, Hogs, Trout, Lobsters, Mahi Mahi, Yellowfin tuna, Corvina, Octopus, Tuna, Pangasius, Tilapia, Lettuce, Quinoa, Olive plants, Chia plants, Cotton trees, Almond trees
AXA	France	Lemurs
Agricultural Bank of China	China	Elm trees
Chevron	USA	Camels, Sociable Lapwing, Caribou
Walgreens Boots Alliance	USA	Honey bees
Mitsubishi	Japan	Gray whales, Salmon, Turtle
Bank of China	China	Shark, Black moss
Microsoft	USA	Beluga whale
Marathon Petroleum	USA	Brack hard wall cactus, Brack fishhook cactus, Freshwater mussels, Eastern hellbender, Hornshell mussel
Huawei Investment & Holding	China	Balkan chamois, Darwin foxes, Amur tigers, Amur leopards, Whales, Dolphins
Kroger	USA	Palm, Soy, Chicken, Turkey, Tuna
Gazprom	Russia	Amur Tiger, Leopards, Phytoplankton, Zooplankton, Zoobenthos, Ichthyoplankton

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Lukoil	Russia	Sea Cow, Greenland Seal, Ringed Seal, Bearded Seal, White Polar Bear, Caspian seal (Phoca caspica), Barnacle Goose, King Eider, Eider, Black-legged Kittiwake, Glaucous Gull, Dalmatian Pelican, Spoonbill, Black Stork, Pink Flamingo, Red-breasted Goose, Lesser White-fronted Goose, Marbled Teal, White-headed Duck, Osprey, Long-Tailed Duck, Common Velvet Scoter, Ringed Plover, Sea ducks, Long Rough Dab, Russian Sturgeon (IUCN Red List), Caspian vimba, Black Sea Roach, Baltic Sprat, East Baltic Cod, Harbour seal (Phoca vitulina)
Phillips 66	USA	Pine warbler, Salmon, Ducks
China National Offshore Oil	China	Harbor seals, Chinese prawns, Jellyfish, Half-smooth tongue sole
China Mobile Communications	China	Asian elephants
Citigroup	USA	Hawksbill sea turtle, Reddish egret, Soybean, Oil Palm trees
Valero Energy	USA	Monarch butterflies, Caterpillars, Bumblebee, Shrill carder bee, Shelduck waterfowl, Salt marsh harvest mice, American burying beetle, Peregrine falcon, Bald eagles, Turtles, Prune trees, Corn
Itochu	Japan	River dolphins, Manatees, Green turtles, Orangutan, Borneo Elephant, Chicken, Pigs, Cotton trees
Siemens	Germany	Bees
Pacific Construction Group	China	Mangrove trees
Rosneft Oil	Russia	Grey whale, Sperm whale, Reindeer, Grey heron, Golden eagle, Eurasian otter, European pond turtle, Sturgeon, Bottlenose dolphins, Wild reindeer, Ivory gull, Atlantic walrus, Polar bear, Evenk deer, Saddleback dolphins, Azov dolphins, Pelyad, Whitefish, Sterlet, Red Siberian sturgeon, Wild carp, Silver carp, Muksun, Siberian cedar, Siberian pine, Scots pine, White-tailed eagle
China Resources	China	Red fruit trees, Cattle
Nestlé	Switzerland	Coffee, Wheat, Tomatoes, Cocoa, Oil palm trees
Hyundai Motor	South Korea	Zelkova, Oak, Grass, Pine trees
Deutsche Telekom	Germany	Gorillas, Bees
Enel	Italy	Pitcairnia huilensis, Jaguars (Panthera et al. concolor)
Banco Santander	Spain	Olive trees, Cork, Red oak, Poplar, Ash, Boba turtles, Sharks, Red kite, Soybean, Oil palm trees
SK Holdings	South Korea	Hummingbird
Carrefour	France	Cotton, Chickens, Cocoa, Oil Palm trees, Banana trees, Soybean plants, Olive trees, Bees
Peugeot	France	Bees

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Tesco	United Kingdom	Potatoes, Sows, Chickens, Cows, Hens, Oil Palm trees
Johnson & Johnson	USA	Oil palm trees
Electricité de France	France	Beavers, Amphibians, Dragonflies, Bearded Vulture, Zingel Asper, Bonelli Eagle, Guiana dolphin, Large raptors, Bats, Golden lion tamarin
China Baowu Steel Group	China	Shrimp
AEON	Japan	Tuna, Spinach, Chickens, Cabbage, Radish, Tomatoes, Cauliflower, Broccoli, Prawns, Crabs, Almonds, Peanuts, Squid, Salmon, Orange, Cashew, Kiwi, Mackerel, Walnut, Banana, Soybean
Target	USA	Cotton, Coffee, Oil palm trees, Tuna
Petrobras	Brazil	Tapirs, Red knot (Calidris canutus), Humpback Whale, Live Coral, Spinner Dolphin, Atlantic Goliath, Meros of Brazil, Albatrosses, Petrels, Sea Turtles, Manx shearwater
Boeing	USA	Whales, Bees, Butterflies
Royal Ahold Delhaize	Netherlands	Coffee, Cocoa, Oil palm trees
United Parcel Service	USA	Tomatoes, Maize, Cassava, Piglet, Hen, Collard greens, Amaranth, Calliandra
Uniper	Germany	Thick-shelled river mussel, Baltic salmon, Eels, Danube salmon, Nase, Barbel, Little ringed plover, Meadow vipers
Munich Re Group	Germany	Norway maple, Bird cherry, Pedunculate oak, Sessile oak, Shrimp, Mangroves
COFCO	China	Soybean, Coffee, Sugarcane, Cotton, Oil palm trees, Corn, Wheat, Barley, Sorghum, Sunflowers
BASF	Germany	Southern muriqui monkey, Oil palms plants, Castor-oil plants, Sandalwood tree, Skylarks, Wild bees
Facebook	USA	Avian species, Oak trees, Bees, Snowy plover, Burrowing owl, Codling moth, Apple trees, Larvae
Country Garden Holdings	China	Seagrass
MetLife	USA	Honeybees, Saplings
Walt Disney	USA	Tigers, Cranes, Crocodiles, Oysters, Sharks, Lemurs, Cotton-top tamarin, Sea turtles
Panasonic	Japan	Scalesia trees, Itasenpara bitterling, Butterflies, Dragons, Oysters
Procter & Gamble	USA	Cotton, Sugar cane, Caribou
Engine	France	Mangrove, Bats
PepsiCo	USA	Potatoes, Corn, Oats, Oranges, Sugar cane

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Mitsubishi UFJ Financial Group	Japan	Cedar trees
Dai-ichi Life Holdings	Japan	Bamboo trees
Archer Daniels Midland	USA	Shrimp, Cows, Aphids, Palm Oil trees, Soybean, Wheat, Corn,
Equinor	Norway	Sea turtles, Whales
Mitsui	Japan	Shrimp, Salmon
Marubeni	Japan	Atlantic salmon, Trout
Renault	France	Araucaria trees
Greenland Holding Group	China	Hass avocado, Banana trees, Weinmannia tormentosa, Yellow guaiacum, Cedar, Native Bayberry, Dragon tree, Oak, Tibouchina lepidote, Chagual, Mimosa, Bucaro, Carbonaria, Willow, Hawks, Stone curlews, Owls, Hummingbirds, Turkeys, Wolfhounds, Coypus, Possums, Armadillos, Hares, Ant eaters, Boa constrictor, Sloths, Titi monkeys, Blue crabs, Iguanas, Howler monkeys
Seven & I Holdings	Japan	Watermelon, Chicken, Squid, Shrimp, Scallops
Sysco	USA	Tuna, Cod, Haddock, Salmon, Halibut, Clams, Whiting, Flounder, Shrimp, Catfish
Christian Dior	France	Elephants, Cotton trees, Oak trees, Grape vineyards, Vicuña, Mink, Fox, Raccoon, Orchids, Lavender, Vetiver grass, Jasmine, Wild tigers, Bees, Lime trees, Beech trees
Oil & Natural Gas	India	Neem, Banyan, Peepal, Krishnachura, Radhachura, Tamarind, Ringal Bamboo, Mangroves, Swamp deer, White wood winged duck
China Pacific Insurance (Group)	China	Spruce, Sabina chinensis, Poplar, Shrubs
POSCO	South Korea	Algae spores, Marine plankton, Starfish
Auchan Holding	France	Oil palm trees, Bluefin tuna, Catshark (Scyliorhinus) and Smooth-hound (Mustellus), Soybeans, Coffee, Pangasius
Tencent Holdings	China	Penguin, Whale
Nippon Steel Corporation	Japan	Kelp seaweed, Sargassum algae, Sea urchins, Ezo deer, Ezo red fox, Ezo squirrel, Eagle, Buzzard, Magpie, Moon bear, Japanese serow, Japanese dance, Carp, Deer, Hare, Black-tailed gull, Pheasant, Shrike, Duck, Bulbul, Little tern, Swallow, Egret, Raccoon, Great tit, Weasel, Starling, Marten, Tiger Keelbuck, Heron, Lizard, Killifish, White-tailed skimmer, Buzzard, Turtle dove, Bunting, Japanese Cormorant, Gull, Japanese wagtail, Graphium Sarpedon, Whooper swan, Kingfisher, Mayfly, Firefly, Herring gull, Black-tailed gull, Little tern
CNP Assurances	France	Ospreys, Capercaillie

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Energy Transfer	USA	Pitch pine, Scrub oak, Chicken, Turkey, Hornshell mussels, Ruffed grouse, Woodcock, Deer, Snow geese, Bears
Morgan Stanley	USA	Oil palm trees
Anheuser-Busch InBev	Belgium	Rice, Wheat, Maize, Barley, Cassava
Guangzhou Automobile Industry Group	China	Fire-breasted flowerpecker
LG Electronics	South Korea	Lions, Tigers, Bears, Cabbage
China Vanke	China	Snow Leopard, Wetland Bar-headed Geese, Himalayan Snowcock, Chinese White Dolphin
América Móvil	Mexico	Jaguar, Monarch butterfly, Crocodile - Crocodylus moreletii, Humpback whales, Sea turtles, Hammerhead shark, Hawksbill turtles, Whale shark, White shark, Giant manta ray
Cisco Systems	USA	Honeybees
JBS	Brazil	Lambs, Sheep, Goats, Hogs, Veal calves, Cattles, Chicks, Cow-calf, Codfish, Chickens, Corn, Soybean
Bayer	Germany	Corn, Soybeans, Cotton, Rapeseed, Dogs, Cats, Frogs, Rats, Rabbits, Honeybees, Milkweed (Asclepias), Monarch Butterfly, Sugar beet
State Bank of India	India	White tigers, Sambar deer, Zebra, Chimpanzee, Rhinoceros, Giraffe, Silver oak trees, Bamboo
Lenovo Group	Hong Kong	Bamboo trees
Novartis	Switzerland	Zebrafish, Rodents
Tokio Marine Holdings	Japan	Mangroves, Monkeys, Shrimps, Crabs, Shellfish
Korea Electric Power	South Korea	Storks
Idemitsu Kosan	Japan	Orangutans, Tigers, Sumatran Rhinos, Elephants, Salvia Plebeia (quasi-endangered), Jellyfish
Sumitomo Mitsui Financial Group	Japan	Oil palm trees
Sumitomo	Japan	Diademed sifaka (Propithecus diadema), Golden mantella (Mantella aurantiaca), Golden mantella (Mantella aurantiaca), Coffee
KDDI	Japan	Ganges River dolphins, Pine trees, Sweetfish, Boars
MS&AD Insurance Group Holdings	Japan	Okinawa rail
AIA Group	Hong Kong	Oil palm trees

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Table 1 summarizes the species and shows that out of 232 companies, 108 mentioned at least one species. Across the 232 companies, 666 species (floral and faunal) were disclosed within the reports. The species assemblage includes amphibians, birds, coral, crustaceans, echinoderms, fish, insects, mammals, mollusks, plants, reptiles, and worms. Nippon Steel Corporation and Costco Wholesale, located in Japan and the USA, reported the most significant number of species. On the contrary, 27 companies reported the least number of species.

In general, species reporting is entirely limited by the sampled top Fortune Global 232 companies, which is a finding consistent with Adler et al. (2018) and Van Liempd and Busch (2013). As shown in Table 1, less than 50% (108 out of 232) of the sampled companies disclosed information about at least one kind of species. From the list of companies disclosing species, most are geographically located in Europe (28.70%) and the USA (26.85%), as shown in Figure 1. The results of this data are not surprising as they are directly tied to the efforts made by these regions in terms of policies and requirements that mandate companies to provide stipulated biodiversity disclosures. Since the UN declared the "Decade on Biodiversity" in 2010, many countries entered the Convention on Biological Diversity and have become involved in biodiversity conservation and ecological restoration (CBD, 2010). To push companies to prevent biodiversity, the EU published specific targets and guidelines for companies in its 2020 biodiversity strategy to safeguard ecosystem services and halt biodiversity loss (European Commission, 2010). Failing to accomplish the targets post-2020 biodiversity framework, the EU set out and extended these comprehensive targets into specific actions to reverse the degradation of the ecosystems and recover biodiversity by 2030 in its new biodiversity strategy for 2030 (European Commission, 2020). Additionally, the European Green Deal was put in place to aid in overcoming the challenges of climate change and ensuring no company is left behind in its efforts to pioneer biodiversity restoration and degradation (European Commission, 2019).

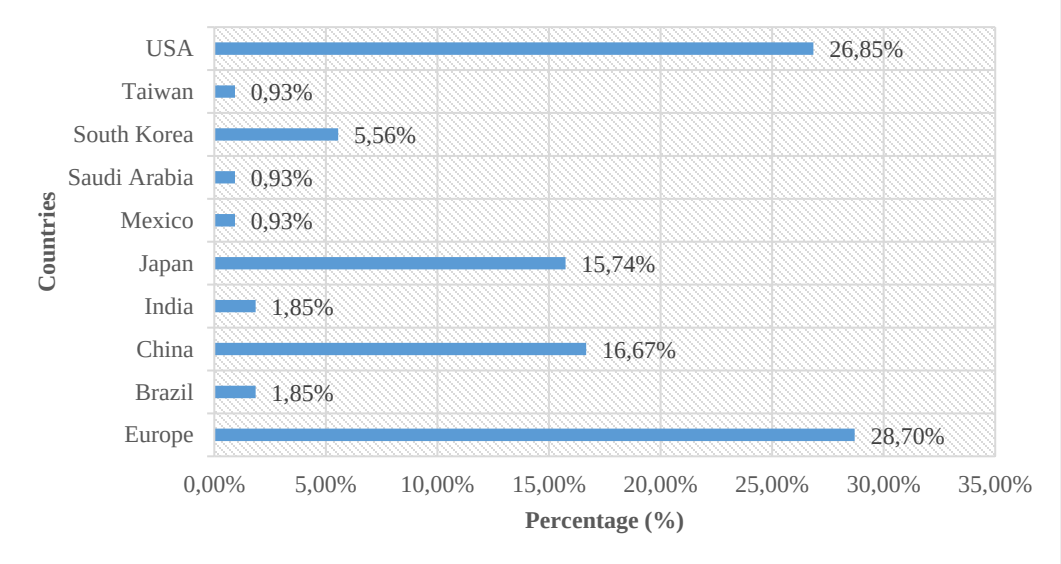

Figure 1. Representation of Companies Across Regions with Species Reporting (2020)

The USA has also extended partnerships with other biodiversity agreements, such as the Convention on International Trade in Endangered Species ("CITES") and the Ramsar Convention on Wetlands, in efforts to conserve biodiversity (Snape III, 2010). According to surveys conducted by KPMG (2020), the most

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prominent biodiversity reporting standard, incorporating specific species disclosure requirements, has been the GRI, which companies from Europe and the USA widely use to report on biodiversity. Moreover, there has been increased scrutiny and pressure from investors to provide biodiversity disclosures, leading to the launch of initiatives of the Task Force on Nature-related Financial Disclosures (TNFD) by the G20 countries, which helps companies in developing their biodiversity practices and reporting (KPMG, 2020). While many Western countries have put forth policies and commitment to species conservation, countries in the Eastern region, such as Japan and China, have joined these efforts on the international scene to protect the environment. Figure 1 shows that Japanese and Chinese-based companies have reported on at least one species with 15.74% and 16.67%, respectively. Both countries have also made many strides with biodiversity policies among businesses, which could reflect the results obtained in Figure 1. China is a mega-biodiverse country with rich genetic resources and, as a result, has urged businesses to participate in its specific action plans for the next two decades in its updated (2011-2030) National Biodiversity Conservation Strategy and Action Plan to protect biodiversity (CBD, 2022a). In line with this urgency to conserve biodiversity, the Japanese government has also developed various economic measures to promote businesses and local groups to participate in its biodiversity conservation plans within the National Biodiversity Strategy of Japan (CBD, 2022b).

In an attempt to understand the kinds of species disclosed by the companies in the sample, Tables 2 and 3 were constructed to present and discuss the relevant findings. Of the 108 companies with disclosed species, 81 (75%) reported on at least two species (floral and faunal). To understand the variety of species disclosed by the companies within the sample, the researchers narrowed the results to capture companies that reported on a wide variety of species chosen to be ten or more species. Within this scope of the research, a total of 15 (13.89%) companies reported on a wide variety of species. These 15 companies reported a total of 317 species, which represents almost half (48%) of the total species (666) reported by the companies within the overall sample. Nippon Steel Corporation disclosed the most significant number of species within their biodiversity conservation plans, including, but not limited to, plants, fish, birds, and various mammals.

Similarly, other companies such as Costco, Walmart, Lukoil, Rosneft, Greenland Holding, Toyota Motor, Petrobras, Christian Dior, Valero Energy, AEON, JBS, and Bayer disclosed a well-spread in variety of species that includes nonexotic kinds of species like Corn, salmon, etc. However, many of these species were listed and selected based on the merits of the main ingredients for these companies' (e.g., Costco and AEON) products instead of biodiversity protection actions. There were clear indications and observations of companies that handpicked and generally selected more popular species within their reports. For example, América Móvil's biodiversity conservation actions and achievements were limited to preserving species that gather their public interest, such as the jaguars, butterflies, crocodiles, whales, turtles, sharks, and rays. Similarly, Glencore led biodiversity action and management plans for popular species: rhinos, wombats, wallabies, kangaroos, possums, snakes, turtles, orchids, reptiles, bats, and echidnas. These companies' biodiversity reporting section was also noticeably riddled with pictures of the famous leading species, such as the rhinos and jaguars. Overall, it can be inferred that these companies are indulging in impression management because their reporting on species was too selectively biased, targeting species that gather more public interest and recognition.

Table 2. List of companies with ten or more species reported (2020)

Company Name	Country	Species
Walmart	USA	Tuna, Coffee, Bees, Butterflies, Tomatoes, Grapes, Leafy greens, Melons, Corn, Wheat, Oats, Rice, Shrimp, Salmon, Poultry, Soy

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Toyota Motor	Japan	Oriental reed warbler, Dragonfly larvae, Oriental honey-buzzard, Grey-faced buzzard, Japanese night heron, Japanese eight-barbel loach, Japanese bellflower, Oaks, Azalea saplings, Mangroves, Frogs, Oriental dollar bird
Glencore	Switzerland	Rhino, Wombats, Red-necked wallabies, Swamp wallabies, Eastern grey kangaroos, Wallaroos, Short-beaked echidnas, Brushtail possums, Microbats, Lace monitors, Bearded dragons, Brown snakes, Eastern longneck turtles, Prasophyllum petilum, Diuris tricolor
Costco Wholesale	USA	Shrimp, Wild salmon, Atlantic cod, Atlantic halibut, Chilean sea bass, Greenland halibut, Grouper (Epinephelus morio), Orange roughly, Redfish, Shark, Skates, Rays, Swordfish, Bluefin tuna, Goats, Cocoa plants, Coconut trees, Soybean plants, Gliricidia plants, Coffee plants, Honeybees, Butterflies, Roses, Chickens, Cows, Turkey, Cattles, Hogs, Trout, Lobsters, Mahi Mahi, Yellowfin tuna, Corvina, Octopus, Tuna, Pangasius, Tilapia, Lettuce, Quinoa, Olive plants, Chia plants, Cotton trees, Almond trees
Lukoil	Russia	Sea Cow, Greenland Seal, Ringed Seal, Bearded Seal, White Polar Bear, Caspian seal (Phoca caspica), Barnacle Goose, King Eider, Eider, Black-legged Kittiwake, Glaucous Gull, Dalmatian Pelican, Spoonbill, Black Stork, Pink Flamingo, Red-breasted Goose, Lesser White-fronted Goose, Marbled Teal, White-headed Duck, Osprey, LongTailed Duck, Common Velvet Scoter, Ringed Plover, Sea ducks, Long Rough Dab, Russian Sturgeon (IUCN Red List), Caspian vimba, Black Sea Roach, Baltic Sprat, East Baltic Cod, Harbour seal (Phoca vitulina)
Valero Energy	USA	Monarch butterflies, Caterpillars, Bumblebee, Shrill carder bee, Shelduck waterfowl, Salt marsh harvest mice, American burying beetle, Peregrine falcon, Bald eagles, Turtles, Prune trees, Corn
Rosneft Oil	Russia	Grey whale, Sperm whale, Reindeer, Grey heron, Golden eagle, Eurasian otter, European pond turtle, Sturgeon, Bottlenose dolphins, Wild reindeer, Ivory gull, Atlantic walrus, Polar bear, Evenk deer, Saddleback dolphins, Azov dolphins, Pelyad, Whitefish, Sterlet, Red Siberian sturgeon, Wild carp, Silver carp, Muksun, Siberian cedar, Siberian pine, Scots pine, White-tailed eagle
AEON	Japan	Tuna, Spinach, Chickens, Cabbage, Radish, Tomatoes, Cauliflower, Broccoli, Prawns, Crabs, Almonds, Peanuts, Squid, Salmon, Orange, Cashew, Kiwi, Mackerel, Walnut, Banana, Soybean
Petrobras	Brazil	Tapirs, Red knot (Calidris canutus), Humpback Whale, Live Coral, Spinner Dolphin, Atlantic Goliath, Meros of Brazil, Albatrosses, Petrels, Sea Turtles, Manx shearwater

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Greenland Holding Group	China	Hass avocado, Banana trees, Weinmannia tormentosa, Yellow guaiacum, Cedar, Native Bayberry, Dragon tree,Oak, Tibouchina lepidota, Chagual, Mimosa, Bucaro, Carbonaria, Willow, Hawks, Stone curlews, Owls, Hummingbirds, Turkeys, Wolfhounds, Coypus, Possums, Armadillos, Hares, Ant eaters, Boa constrictor, Sloths, Titi monkeys, Blue crabs, Iguanas, Howler monkeys
Christian Dior	France	Elephants, Cotton trees, Oak trees, Grape vineyards, Vicuña, Mink, Fox, Raccoon, Orchids, Lavender, Vetiver grass, Jasmine, Wild tigers, Bees, Lime trees, Beech trees
Nippon Steel Corporation	Japan	Kelp seaweed, Sargassum algae, Sea urchins, Ezo deer, Ezo red fox, Ezo squirrel, Eagle, Buzzard, Magpie, Moon bear, Japanese serow, Japanese dance, Carp, Deer, Hare, Black-tailed gull, Pheasant, Shrike, Duck, Bulbul, Little tern, Swallow, Egret, Raccoon, Great tit, Weasel, Starling, Marten, Tiger Keelbuck, Heron, Lizard, Killifish, Whitetailed skimmer, Buzzard, Turtle dove, Bunting, Japanese Cormorant, Gull, Japanese wagtail, Graphium Sarpedon, Whooper swan, Kingfisher, Mayfly, Firefly, Herring gull, Black-tailed gull, Little tern
América Móvil	Mexico	Jaguar, Monarch butterfly, Crocodile (Crocodylus moreletii), Humpback whales, Sea turtles, Hammerhead shark, Hawksbill turtles, Whale shark, White shark, Giant manta ray
JBS	Brazil	Lambs, Sheep, Goats, Hogs, Veal calves, Cattles, Chicks, Cow-calf, Codfish, Chickens, Corn, Soybean
Bayer	Germany	Corn, Soybeans, Cotton, Rapeseed, Dogs, Cats, Frogs, Rats, Rabbits, Honeybees, Milkweed (Asclepias), Monarch Butterfly, Sugar beet

Table 3 shows that from the total 108 companies with species information, 27 (25%) only reported on one kind of species. The category of species reported were whales, elephants, shrimp, lemurs, bees, birds, and various plants. These findings agree with previous research (e.g., Adler et al., 2018), where the top Fortune Global Companies are observed to have a limited number of species reported. Additionally, the types of species reported are considered more popular in the eyes of the general public. For example, the western gray whales (endangered) reported by Royal Dutch Shell, the lemurs (endangered) reported by AXA, the beluga whale reported by Microsoft, the hummingbird (critically endangered) reported by SK Holdings, and the Asian elephants by reported China Mobile Communications which are endangered species on the Union for the Conservation of Nature (IUCN) list.

In line with Boiral (2014), these companies appeared to be indulging in impression management as the types of species reported, albeit limited, are among the most popular and featured to garner more attention. Evidence of bias towards particular kinds of species was observed and was used to garner attention to the biodiversity efforts implemented by the companies. Some examples of these biases are seen with Guangzhou Automobile Industry Group (pg. 62, para. 3), which used a picture of the fire-breasted flowerpecker when describing its participation in the biodiversity survey, but no other species were mentioned. Similarly, Korea Electric Power (pg. 61, para.4) selectively presented the storks, a famous natural heritage and endangered species in South Korea. Still, it did not mention any other species affected by its operations. In describing its biodiversity action plans, China Mobile Communications (pg. 41, para.1) mentioned the famous and

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endangered Asian elephants within its artificial intelligence (AI) and ecological species monitoring. However, the company should have regarded other species within these action plans with a selective presentation of the business case on tracking herd migration among the elephants. Overall, there are vivid indications of preference towards popular species, suggesting that companies are indulging in the superficial representation of species and greenwashing in their species reporting.

Table 3. List of companies with only one species reported (2020)

Company Name	Country	Species
Royal Dutch Shell	Netherlands	Western gray whales
Saudi Aramco	Saudi Arabia	Mangroves
Amazon.com	USA	Cotton
Hon Hai Precision Industry	Taiwan	Whales
AXA	France	Lemurs
Agricultural Bank of China	China	Elm trees
Walgreens Boots Alliance	USA	Honeybees
Microsoft	USA	Beluga whale
China Mobile Communications	China	Asian elephants
Siemens	Germany	Bees
Pacific Construction Group	China	Mangrove trees
SK Holdings	South Korea	Hummingbird
Peugeot	France	Bees
Johnson & Johnson	USA	Oil palm trees
China Baowu Steel Group	China	Shrimp
Country Garden Holdings	China	Seagrass
Mitsubishi UFJ Financial Group	Japan	Cedar trees
Dai-ichi Life Holdings	Japan	Bamboo trees
Renault	France	Araucaria trees
Morgan Stanley	USA	Oil palm trees
Guangzhou Automobile Industry Group	China	Fire-breasted flowerpecker
Cisco Systems	USA	Honeybees
Lenovo Group	Hong Kong	Bamboo trees
Korea Electric Power	South Korea	Storks
Sumitomo Mitsui Financial Group	Japan	Oil palm trees

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MS&AD Insurance Group Holdings	Japan	Okinawa rail
AIA Group	Hong Kong	Oil palm trees

Altogether, 108 companies reporting on species comprise an ecosystem comprising different species' taxonomies. Figure 2 shows the various categories of species and their representation of the overall total species (floral and faunal). From the data collected, a species was classified into one of the following: amphibians, birds, coral, crustaceans, echinoderms, fish, insects, mammals, mollusks, plants, reptiles, and worms. The plant kingdom made up the largest group of reported species (32.88%), which was directly followed by mammals (22.07%), birds (16.67%), and fish (13.36%). The smaller groups of species in descending order were insects (6.31%), reptiles (3.15%), crustaceans (2.55%), mollusks (1.65%), amphibians (0.75%), worms (0.30%) and a tie between coral (0.15%) and echinoderms (0.15%).

Data were collected on the companies' names and the total number of species reported to understand the species types within each group further. Figure 3 shows the top three emerging species under each group. There is a preference for species that draws more attention from the general public. Charismatic species such as whales, dolphins, and monkeys surged as the most mentioned in the mammalian group. Likewise, turtles from the reptilian group, bees from the insect group, and sharks from the fish group soared among the disclosed species within the companies' reports. The widespread fascination with large and cute creatures is often given greater ecological importance and biodiversity action/recovery plans (The Conversation, 2017).

Consequently, non-charismatic species tend to go unnoticed with less biodiversity conservation attention (Douglas & Winkel, 2014). Some examples can be seen by Royal Dutch Shell, which mentioned their involvement in projects with the IUCN to protect species but presented an entire section on the protection of whales and failed to incorporate any other species. Similarly, Hon Hai Precision Industry should have presented accurate biodiversity action plans for the whales but mainly used the popular species to draw attention to its scholarship program. Previous studies have shown that larger exotic species, such as birds and mammals, are more likely to be listed as endangered, and it is a common practice to focus on such species (Albert et al., 2018; Metrick & Weitzman, 1996; The Conversation, 2017).

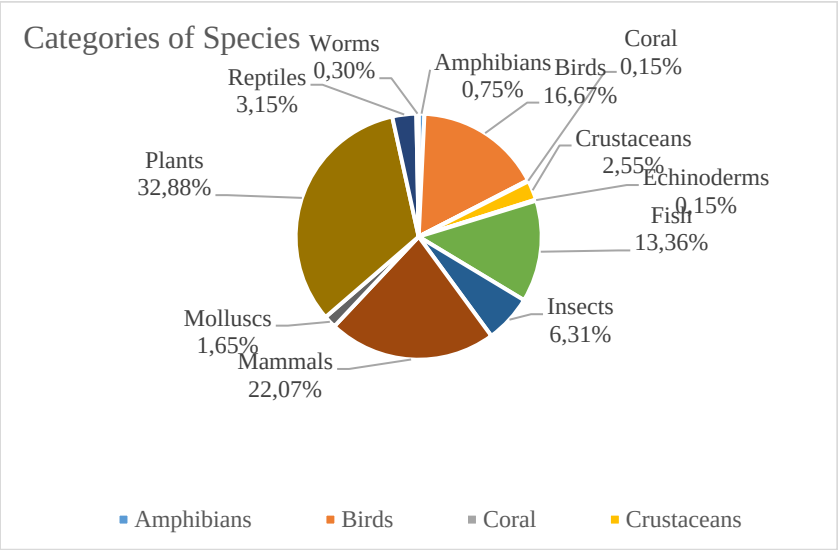

Figure 2. Categorization of Species (2020)

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This research aligns with those studies as companies such as América Móvil, Microsoft, and Sumitomo presented total pages with pictures of charismatic exotic species seemingly to only draw attention to their biodiversity efforts. Others failed even to mention appropriate conservational biodiversity management and plan but incorporated sentimental pictures of species such as otters and camels, as seen within the reports of Chevron and Samsung Electronics. For example, one of the biggest highlights of Chevron's biodiversity section was planting 30,000 trees (Chevron, 2020, p. 25) across their sites; however, they did not list any of the species of trees but listed popular species such as caribou, lapwing, and camels.

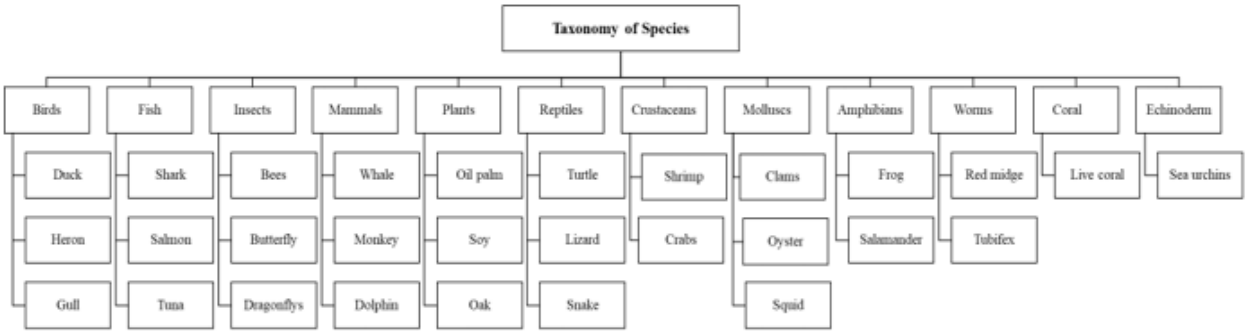

Figure 3. Top 3 most popular species reported by category (2020)

According to Albert et al. (2018), media coverage of impressive, beautiful, and charismatic species gains more audience. There are biases in the public with a preference towards charismatic species leading to influences on where investments and biodiversity conservation efforts are allocated (Farrier et al., 2007). This research paper draws direct support in examples of these claims as displayed by Apple, where elephants were mentioned as a plug for a popular documentary on AppleTv of the Reteti Elephant Sanctuary. Likewise, Alphabet highlighted popular species such as bees and whales in their trendy connection of conservation to artificial intelligence (AI) and machine learning for researchers but failed to incorporate a wide variety of the pest species and crops being protected through these efforts. Overall, the findings of this research support the findings of Weir (2018), where preferences are given to species that attract more attention than others and, thus, more extraordinary conservational efforts. Walsh et al. (2013) would conclude that this is because less ecological importance is levied on non-charismatic species, which often leads to meager biodiversity conservation efforts and recovery plans.

The sample of top Fortune 500 Global companies represented various sectors. To further analyze the relationships between the number of species disclosed by the companies and the industries in which they operate, the researchers grouped the 232 companies that disclosed species according to their level of biodiversity risk sectors. Following the approach of Adler et al. (2018), the companies were grouped into different zones based on the sectors in which they operate and their level of exposure to biodiversity risk, as suggested by the F&C Asset Report (2004). As outlined in the F&C Asset Report (2004), most companies placed within the red zone sectors have significant biodiversity risks (high-risk), some companies placed within the amber zone sectors have significant biodiversity risks (medium-risk), and finally, lower biodiversity risks companies are placed into the green zone (low-risk). The high-risk sectors (red zone) comprise Construction and Building Materials, Electricity, Food and drug Retailers, Food Producers and processors, Forestry and paper, Leisure and hotels, Mining, Oil and gas, and Utilities. The medium-risk sectors (amber zone) comprise Beverages, Chemicals, Financial Services, General Retailers, Household Goods and textiles, Personal Care and

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Household Products, Pharmaceuticals and biotech, Support Services, Tobacco, and Transport. Finally, the low-risk sectors (green zone) comprise Aerospace and defense, Automobiles and parts, Diversified Industrials, Electronic and Electrical Equipment, Engineering and machinery, Health, Information Technology Hardware, Media and entertainment, Software and Computer Services, Steel and other Metals, and Telecom Services.

Figure 4 summarizes the zones (red, amber, and green), the number of companies classified into each respective zone, and the number of species reported by companies in the zones. The results find that the majority of the companies, 90 in total, fall into the amber zone (medium-risk), directly followed by the green zone (low-risk), 83 in total, and finally, 59 in total fall into the red zone (high-risk).

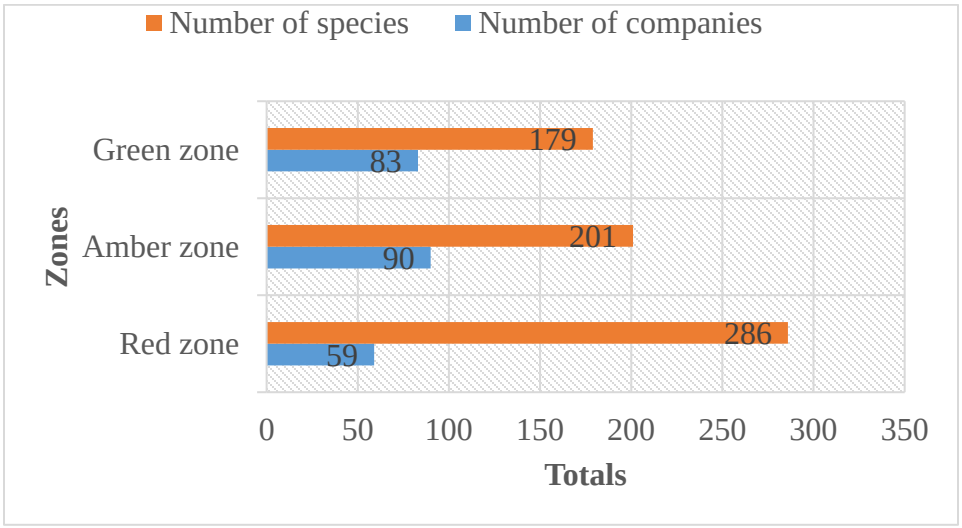

Figure 4. Categorization of zones by company sectors and species (2020).

Turning attention to the species reported by these companies, the red zone reported the most significant number of species (286), followed by the amber zone (201), and then the green zone (179). The results correlate significantly with the industry sector and the total species reporting. The companies with higher risks of biodiversity exposure provided more disclosures on species. That is, companies from the red and amber zones are seen with the most significant numbers of reporting on species, 286 (43%) and 201 (30%), respectively, in an overall comparison among the zones. In a direct comparison of the number of companies in the green zone to the red zone, there are fewer companies in the red zone, but a significantly higher reporting of species is seen within the red zone. It is also true for direct comparisons between the red zone and the amber zone as well. These findings consistently align with the research of Adler et al. (2018) and Hassan et al. (2020), where higher-risk companies are seen with the most significant biodiversity disclosures.

In a standalone direct comparison between the red and green zones, companies from the red zone reported 62% more species than green zone companies. Likewise, red zone companies reported 59% more species compared to amber zone companies, while amber zone companies reported 53% more species when compared to green zone companies (Trisnayanti et al., 2024). These results further support the greenwashing theory, which states that companies that operate in higher-risk sectors have more significant pressures to report and, as such, will likely provide more reporting. This increased reporting observed in this research is also consistent with the legitimacy theory, whereby high-profile firms with significant biodiversity impacts have disclosed more species (Adler et al., 2018); F&C (Report, 2004; Suchman, 1995). Suchman (1995) argues that

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these high-profile companies, such as red zone firms, need a legitimacy-repairing or defensive impression management strategy. The observed finding that red zone firms disclosed more than that of both the amber and green zones supports the expectations of the legitimacy theory's relationship between the company profile and the level of disclosures provided. Unlike green zone firms, Suchman (1995) would reason that these red zone firms would adopt the defensive impression management strategy, as seen in action within the observed results, where substantial efforts are made to provide disclosures on the part of the reporting entity. In particular, firms within the red zone will seek to self-enhance their image by assertive impression management techniques to promote their reputations with society (Adler et al., 2018; Ogden & Clarke, 2005).

CONCLUSION

Over recent years, companies have been called to increase reporting on biodiversity and threatened species. Previous studies such as Adler et al. (2018) and Hassan et al. (2020) have found that reporting is entirely limited by many firms on a global scale. To combat the lack of reporting, there has been an increase in guidance and policies to help companies when reporting on biodiversity. One such is the Global Reporting Initiative, which has been recognized as the most prominent set of standards used by companies to report on matters of sustainability and biodiversity. This study aimed to examine the extent of species disclosures within global companies' sustainability reports (and their equivalents) reports. In this vein, the paper filled the gaps in biodiversity accounting research by assessing and understanding the types of species being reported and symmetrically addressing the value for increased biodiversity disclosures within reports published by firms.

We examined 232 published reports from the top 250 Fortune Global companies for 2020. Eighteen top 250 companies were excluded from the sample due to published languages and website restrictions. We analyzed the dimensions of species reported by the companies from the dimensions of countries and sectors, along with the categories of species types and the popularity of the species disclosed. We incorporated the theories of legitimacy, impression management, and greenwashing to seek out and understand the companies' motivations behind reporting on species information (Artha et al., 2024). This paper has been one of the first to study biodiversity reporting from the concentrated aspect of species reported. From the sample, our results show that species disclosure at the top Fortune Global companies is limited and, where disclosed, needs more substantial conservational plans. Even among companies with the highest species reporting, only some provided substantial biodiversity plans for protecting these species.

Even though millions of species are on Earth, many go unnoticed and receive less conservational efforts (The Conversation, 2017). In line with Weir (2018), our results showed that charismatic species, such as mammals and birds, which attract more social and public attention, were seen with higher reporting than other categories, such as insects and invertebrates. The organizations' reports were riddled with superficial interests in species conservation and were only interested in the advantages that reporting on certain species could bring. Further examination of the individual species categories also echoed these sentiments as it was observed that charismatic species such as whales, sharks, monkeys, ducks, and others emerged as the most prominent within their respective groups. Our results are directly in line with previous research findings of organizations' indulgence in impression management and employing the use of greenwashing as a strategy to influence stakeholders and improve self-image when communicating species information (Adler et al., 2018; Boiral & Heras-Saizarbitoria, 2017; Deegan & Rankin, 1996; Hassan et al., 2020).

Our study found that companies operating in high-risk sectors were likelier to disclose species information than companies from lower-risk sectors. It was observed that companies from the red zone (high risk to biodiversity) reported the most significant numbers of species, followed by companies from the amber zone (medium risk to biodiversity) and the lower risk companies to biodiversity within the green zone. Our results demonstrated that the F&C (2004) assertions stand valid. The companies classified as having higher threats to biodiversity, namely the red and amber zones, disclosed significantly more species information and

engaged in more legitimacy repairs and defensive impression management to protect their self-image. These findings are consistent with prior studies by Adler et al. (2018), the legitimacy theory, and the F&C (2004) asset management assertions that the more exposed companies to biodiversity will have the most significant reporting.

Our present study is full of limitations. The research sample could be extended and broadened to examine a larger population of companies. Future research could investigate a more extended period as our research was limited by one year of reporting from top Fortune Global companies. Our research investigated the Fortune Global 250 top companies, which is broad and includes companies from various industries. Future research could focus on specific industries to examine and test the assertions listed by F&C (2004). It also raises opportunities for future studies on single sectors and countries in different combinations to analyze species reporting.

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