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# Angry Birds – The Use of International Union for the Conservation of Nature Categories as Biodiversity Disclosures in Extinction Accounting

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## ABSTRACT

The purpose of this research is to provide an account of whether extinction accounting and the use of IUCN categories offers a valuable and feasible addition to biodiversity disclosures for an organisation that has a professional interest in conservation programmes. Specifically, when and where IUCN categories can be used as biodiversity disclosures to address the threat of extinction. This study is based on a single anomalous case a Nordic zoo, located in Sweden, which has focused its operations exclusively on the conservation of threatened species and is the only zoo in Europe to do so. In order to comprehend the use of IUCN categories the annual report and the corporate website of Nordic Zoo have been examined. An open-ended interview with zoo management has been conducted to learn the intentions behind such specific disclosures and the use of IUCN categories. The findings of this study reveal that IUCN categories are appropriate biodiversity disclosures for highlighting extinction threats to various species. In an organisation with a professional interest in practicing conservation programmes, IUCN categories play a central role in communicating with stakeholders. This study demonstrates that biodiversity disclosures are part of a sincere effort to report on conservation.

## 1. Introduction

In the video game Angry Birds, pigs and birds share comical grudges against each other. In 2015, the Swedish zoo, Nordens Ark (Nordic Ark), received significant attention in the Swedish media by focusing on the loss of species habitat as a significant factor in the current biodiversity crisis. Nordens Ark presented a social media advertisement, 'Angry Birds', that went viral and was featured on Swedish news programmes. The 'Angry Birds' advertisement displayed illustrations of eight birds (European roller, Northern Bald Ibis, Grey Owl, Eagle Owl, White Stork, White-backed Woodpecker, Snowy Owl and Peregrine falcon) that were native to Sweden. These eight birds were either extinct or

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threatened by extinction, as indicated by their inclusion in the Red List of Threatened Species of the International Union for the Conservation of Nature (IUCN). The list itself is also referred to as 'the IUCN Red List'. The 'Angry Birds' campaign highlighted the extinction threat by stating, 'These birds have good reason to be angry because we humans have destroyed their living conditions'. According to the zoo's statement, they wanted to raise awareness of the zoo's efforts combatting the biodiversity crisis and their successful conservation practices (Nordens Ark 2016).

Rimmel (2019) reviewed the historical development of zoos from animal exhibitions to their vital role in preventing the extinction of endangered species. In 1993, the World Association of Zoos and Aquariums (WAZA) initiated the World Zoo Conservation Strategy so that zoos could evolve into conservation centres and save wild species and habitats (WAZA 1993). While many zoos have incorporated the WAZA conservation strategy, Nordens Ark is the only zoo that focuses solely on endangered species. Nordens Ark produces annual reports containing financial statements, a comprehensive animal inventory and narratives regarding accounting for biodiversity and the zoo's conservation work. This level of detail, while anomalous in comparison to other organisations, may enable to discover of a modification to biodiversity accounting.

In recent years, the academic accounting community has drawn attention to accounting for biodiversity (e.g. Jones 1996; Jones and Solomon 2013; Siddiqui 2013; Jones 2014). A growing number of studies on biodiversity accounting (Rimmel and Jonäll 2013; Van Liempd and Busch 2013; Jones and Solomon 2013; Jones 2014) have illustrated that our planet is facing the sixth period of mass species extinction (TEEB 2008; UNEP 2011). This biodiversity crisis is having possibly immeasurable impacts on the planet's ecosystem and society, which will be reflected in corporate reporting (Jones and Solomon 2013; Rimmel and Jonäll 2013). Jones (2014, 34) addressed the explicit role that disclosure and reporting play in a theoretical framework for biodiversity. An emergent stream of research investigating the quality and quantity of biodiversity reporting in corporate reports (Rimmel and Jonäll 2013; Van Liempd and Busch 2013; Atkins, Gräbsch, and Jones 2014) revealed that some companies disclose their actions to lower their operations' impact on endangered species. Although these studies demonstrate that there is little publicly disclosed biodiversity information (Jones 2014), they do prove that multinationals have begun to provide such information in order to contribute to a sustainability discourse and evidence corporate change (Rimmel and Jonäll 2013; Samkin, Schneider, and Tappin 2014). The pressure to account for biodiversity is not just limited to corporations but has also become practice in the public sector (Weir 2018, 2019). Atkins and Atkins (2016) stated that biodiversity accounting has opened up for a further stream of research on extinction accounting.

Although some multinational corporations have displayed a genuine interest in disclosing non-financial information about conservation programmes, they may not have the same professional knowledge of conservation practices as zoos. In Europe, zoos' role in the conservation of biodiversity has been reinforced by the European Union's (EU's) The Zoos Directive (CD 1999). According to the Zoos Directive, corporate annual reports should be produced by zoos and they should contain non-financial disclosures about preservation efforts.

Previous accounting studies on the amount of general biodiversity in annual reports of listed companies (e.g. Rimmel and Jonäll 2013; Van Liempd and Busch 2013; Atkins,

Gräbsch, and Jones 2014) found that the biodiversity disclosures in the reports limited. However, the results could be different if the organisation knows conservation practices and studying a zoo's disclosures may offer new insights into whether extinction accounting offers a valuable and feasible addition to biodiversity accounting. Atkins et al. argued that extinction accounting disclosures demonstrate accountability and responsibility to stakeholders.

The research questions addressed in this paper are:

- i When are the IUCN categories used as biodiversity disclosures to address the threat of extinction?
- ii Where could IUCN categories be considered important as biodiversity disclosures?

The purpose of this research is to provide an account of whether extinction accounting and the use of IUCN categories offers a valuable and feasible addition to biodiversity disclosures for an organisation that has a professional interest in conservation programmes.

The remainder of this paper is structured as follows: The biodiversity crisis, measuring the threat of extinction and key policy documents and their importance are outlined through descriptions of the IUCN and its categories for measuring the threat and degree of extinction. In order to understand the biodiversity crisis, an overview emphasises the intertwined international policy making performed by the United Nations (UN), EU and Sweden. Thereafter, the literature on biodiversity accounting is discussed, concentrating on environmental reporting and stakeholder theory, followed by a detailed description of extinction accounting. This is followed by a section describing the study's case methodology and data analysis. In order to comprehend the use of IUCN categories in corporate communication, examples are provided from annual reports and the corporate website of Nordic Zoo. An open-ended interview with zoo management has been conducted to learn the intentions behind such specific disclosures and the use of IUCN categories. The results of the corporate communications are interpreted in the light of the interview. Finally, future prospects on biodiversity reporting in corporate communication from an international point of view are discussed.

## 2. Literature review and background

### *2.1. Biodiversity crisis, measuring the threat of extinction and key policy documents*

During the past 50 years, biodiversity has declined dramatically due to mass extinctions. The rate of species extinctions caused by humans is estimated to be 1000 times faster than the typical rate of extinction within Earth's history, and we are currently facing the sixth period of mass extinction (TEEB 2008). A study by Spicer (2006) revealed that 'biological diversity' is often referred to as 'biodiversity' and has more than 80 different definitions. In general, all of these definitions refer to the variety of life forms and the interactions between them, as well as their habitats, ecosystems and ecological and evolutionary processes (Waldman and Shevah 2000). Accordingly, biodiversity can be used as a universal term for the uniqueness of the biological world and the variety of life forms and natural processes.

The term biodiversity per se is not restricted to the preservation of particular endangered species or the conservation of threatened ecosystems. It also encompasses genetic diversity and ecosystem diversity, which occurs at the level of biological communities, e.g. rainforests, wetlands and grasslands. Our understanding of biodiversity has evolved over recent years and has become an important issue for businesses and the economy, as the European Environment Agency noted:

Until recently, arguments in support of the conservation of species and habitats were based primarily on issues such as their evolutionary uniqueness, rarity or threat of extinction. Today, these arguments also include how maintaining biodiversity directly benefits people by contributing to well-being or quality of life. This new angle means that questions about the costs of biodiversity loss to society have become paramount. (European Environment Agency 2010, 5).

The IUCN Red List has achieved global acceptance as more than 1100 government and non-governmental organisation (NGO) members in more than 160 countries have applied it to evaluate the extinction risk for thousands of species and subspecies (IUCN 2016). The IUCN Red List classifies species into nine categories, ranging from 'extinct' to 'least concern'. The IUCN Red List is used not only by zoologists and ecologists; it has also found acceptance within corporate sustainability accounting. Specifically, the Global Reporting Initiative (GRI) 304 biodiversity standard addresses the importance of protecting and ensuring the survival of species, genetic diversity, and natural ecosystems (GRI 2016) and *Disclosure 304–4 IUCN Red List species and national conservation list species with habitats in areas affected by operations* can be applied by any organisation that wants to report their impact on biodiversity using IUCN categories (GRI 2016). The GRI clearly links corporate reporting with sustainability reporting and focuses corporations' impact on biodiversity and the risk of extinction. According to Atkins (2017), this disclosure requirement represents an elementary form of extinction accounting within accounting for biodiversity.

The IUCN is one of world's oldest and largest international environmental organisations, which focuses on nature conservation and the sustainable use of natural resources. The IUCN is the world's main authority on the conservation status of species (Rodrigues et al. 2006). The IUCN's central mission is dedicated to biodiversity: to 'influence, encourage and assist societies throughout the world to conserve nature and to ensure that any use of natural resources is equitable and ecologically sustainable' (IUCN 2015). The IUCN Red List applies criteria to evaluate the extinction risks of thousands of species and subspecies. These criteria are relevant to all species and all regions of the world. However, some countries and organisations produce a series of regional Red Lists that assess the risk of extinction within a political management unit. Bland et al. (2019) have found that the IUCN Red List has an impact on conservation policy and practice. This is reflected in the Swedish Red List is produced by the Swedish Species Information Centre (see Table 1) and it applies the nine IUCN Red List categories to classify species' degrees of extinction by criteria such as rate of decline, population size, area of geographic distribution, degree of population and distribution fragmentation.

The IUCN Red List's official term *extinct* is a grouping of the two categories: Extinct (EX) and Extinct in the wild (EW). The IUCN Red List's official term *threatened* is a grouping of the three categories: Critically Endangered (CR), Endangered (EN) and Vulnerable (VU). The IUCN Red List's official term *lower risk* is a grouping of the two categories: Near

**Table 1.** Key events and policy documents.

1848	International Union for Conservation of Nature (IUCN)
1972	United Nations Environment Programme (UNEP)
1979	Council Directive 79/409/EEC on the conservation of wild birds (Birds Directive)
1988	UNEP Working Group of Experts on Biological Diversity
1992	Convention on Biodiversity (CBD)
1992	Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (Habitats Directive)
1994	European Environment Agency (EAA)
1994	Swedish Biodiversity Centre
1996	Council Regulation (EEC) No 338/97 on the protection of species of wild fauna and flora by regulating trade
1999	Council Directive 1999/22/EC relating to the keeping of wild animals in zoos (Zoos Directive)
2011	United Nations declared the Decade on Biodiversity (2011–2020)

threatened (NT) and Least concern (LC). The purpose of these terms is to give a clear and objective view of the status for each individual species, but the classification system does not describe a linear degree of extinction risk. For example, the category Data Deficient is used across all the threat categories.

The IUCN has observer and consultative status at the UN and plays a role in the implementation of several international conventions on nature conservation and biodiversity. Before the Rio Earth Summit in 2012, the IUCN (2015, 2016) released an updated list comprising data on 63,837 species that indicated that 19,817 species are threatened with extinction, 3947 are described as CE and 5766 are EN, and more than 10,000 species are VU.

Extinction accounting is concerned with the threat of extinction and the sincere ambition to prevent species from extinction, which will lead to disclosure about conservation activities that refer to the categories of the IUCN Red List (Atkins et al. 2018). Cuckston (2018) examined the role of the IUCN Red List in achieving biodiversity and preventing the extinction of species, showing that the IUCN Red List is a calculative device that classifies species in terms of their exposure to the risk of extinction. In South Africa, noticeable focus has been drawn to poaching of high-profile species (e.g. elephants and rhinoceros) and their exposure to risk of extinction, which has led to large multinationals contributing financially to conservation programmes and disclosing non-financial information about preservation efforts in corporate reports (Atkins 2017). According to Alaniz et al. (2019) to date most efforts have been at the levels of species and populations, where a great deal of progress has been made using tools such as the Red List of Threatened Species and their implementation through guidelines and regulations to record the status quo to document the current biodiversity crisis. However, Bland et al. (2019), as well as Alaniz et al. (2019), uttered critique that the IUCN Red List of Ecosystems had less impact in comparison to the Red List of Threatened Species. Despite differences in the impact of the IUCN Red List of Threatened Species and the Red List of Ecosystems, Betts et al. (2020) showed that the development and implementation of the IUCN Red List of Threatened Species has led to positive conservation results. The Red List of Threatened Species is frequently referred to as one of the most influential tools in conservation, which has had frequently referred to in international policy documents dealing with the biodiversity crisis (Rodrigues et al. 2006).

The biodiversity crisis has been acknowledged in a number of policy documents and key events by established institutions (see Table 2). Since 1972, the United Nations



Table 2. The Swedish IUCN Red List.

Kunskapsbrist Data deficient DD	Nationellt utdöd Regionally Extinct RE	Threatened	Red-listed
	Akut hotad Critically Endangered CR		
	Starkt hotad Endangered EN		
	Sårbar Vulnerable VU		
	Nära hotad Near Threatened NT		
	Livskraftig Least Concern LC		

Category	Definition
Extinct (EX)	No known individuals remaining.
Extinct in the wild (EW)	Known only to survive in captivity, or as a naturalised population outside its historic range.
Critically endangered (CR)	Extremely high risk of extinction in the wild.
Endangered (EN)	High risk of extinction in the wild.
Vulnerable (VU)	High risk of endangerment in the wild.
Near threatened (NT)	Likely to become endangered in the near future.
Least concern (LC)	Lowest risk. Does not qualify for a more at risk category. Widespread and abundant taxa are included in this category
Data deficient (DD)	Not enough data to make an assessment of its risk of extinction.
Not evaluated (NE)	Has not yet been evaluated against the criteria.

Environment Programme (UNEP) has worked to support international decision-making processes for environmental governance and acts as a catalyst for international efforts to implement internationally agreed objectives (UNEP 2011). In 1988, UNEP started the Ad Hoc Working Group of Experts on Biological Diversity to explore the need for an international convention on biological diversity. At the Rio Earth Summit in 1992, the Convention on Biodiversity (CBD) was officially established and marked the international community's commitment to addressing biodiversity loss. In response, the Pan-European Biological and Landscape Diversity Strategy was endorsed by the United Nations Economic Commission for Europe.

The EU demonstrated its international commitment by establishing the European Environment Agency (EEA) in 1994. The EEA's purpose is to provide political decision-makers and the public with information on the state of the environment in Europe and monitor the impact of environmental policy. The EU's nature conservation policy is based on two pieces of legislation: the Birds Directive (CD 1979) and the Habitats Directive (CD 1992). On the national level, Sweden's environmental legislation was developed and aligns with the policies and legislation of the EU. The Swedish Environmental Protection Agency (SEPA), Sweden's authority on nature conservation, works on behalf of the Swedish Government and is responsible for the Swedish Biodiversity Centre and the

Swedish Species Information Centre. The Swedish Biodiversity Centre was established in 1994 by the Swedish government; it is a national institution with a mandate to promote, conduct and co-ordinate research, education and information on topics associated with biodiversity in Sweden. Their primary tasks are to collect, evaluate and store significant information about threatened and rare species, assess the degrees and types of threats and prepare the national Red Lists. In addition, SEPA has adopted the Swedish Red List into official documents for nature conservation (SEPA 2011).

In 1996, the EU issued the Council Regulation (EEC) No 338/97 on the protection of species of wild fauna and flora by regulating trade (CD 1996), which should prevent the illegal trade of animals and plants and contribute to the conservation of biodiversity in Europe. In 1999, the EU released the Council Directive 1999/22/EC (also referred to as the 'Zoos Directive') to enforce biodiversity conservation in zoos (CD 1999). In 2015, the EU released 'EU Zoos Directive Good Practices Document', which provides examples of how to interpret the Zoos Directive (EC 2015).

The UN declared the Decade on Biodiversity (2011–2020), which was designed to assist in the implementation of the Strategic Plan for Biodiversity. Since the current global biodiversity crisis has now been generally acknowledged by leading international economic organisations such as the World Bank and the Organisation for Economic Co-operation and Development (OECD), and extinction rates are accelerating. Maroun and Atkis (2020) mentioned that extinction accounting should be of concern to accountants and non-accountants alike, as it can be integrated in frameworks reporting biological impacts to report on environmental performance and post-implementation reviews using the guidelines provided by the Global Reporting Initiative (GRI) or the International Integrated Reporting Council (IIRC).

## 2.2. From biodiversity accounting to extinction accounting

Environmental and social accounting is not a new issue in accounting research. Corporate social responsibility (CSR) has been widely acknowledged and increased awareness of it has led to an extensive body of academic studies by accounting researchers (Adams 2004, 2008; Unerman 2008; Gray 2010; Henri and Journeault 2010; Jones and Solomon 2013).

Throughout the past four decades, accounting research has focused on social and environmental reporting, ranging from disclosure studies in corporate communications to management practices and corporate conduct in regards to social and environmental issues, but only recently has it devoted attention to the importance of biodiversity (Atkins, Gräbsch, and Jones 2014). So far, only a small number of accounting research studies by Jones (1996, 2003), Jones and Matthews (2000), Houdet (2008), and Rimmel and Jonäll (2013) have considered the biodiversity crisis. Jones carried out early biodiversity studies by applying a natural inventory approach to develop an accounting methodology for recording, valuing and reporting biodiversity and make organisations' responsibilities for biodiversity visible (1996, 2003). In 2013, a special issue of the Accounting, Auditing & Accountability Journal dedicated to 'Accounting for Biodiversity' drew attention to this emerging research area. Several problems in biodiversity accounting research were outlined, ranging from scientific and philosophical problems to accountability and accounting practice problems (Jones and Solomon 2013). In addition, biodiversity studies

analysed biodiversity valuations and the effects of discount rates on biodiversity-sensitive projects (Freeman and Groom 2013) and linked forest biodiversity conservation to financial accounting calculations (Cuckston 2013). Further studies applied Jones' natural inventory in different geographical settings (Siddiqui 2013) or studied accountability mechanisms for biodiversity offsetting (Tregidga 2013). Dey and Russell (2014) demonstrated another facet of biodiversity accounting research by adopting an arena approach that illustrated how arena participants use biodiversity accounts and reports to influence the governance of rivers. Thomson (2014) outlined an overview on 20 years' practice of biodiversity governance and indicators in the United Kingdom (UK), incorporating international political programmatic biodiversity discourses from 1992 to 2012.

This study examined relevant biodiversity reporting (Atkins, Gräbsch, and Jones 2014; Barut, Raar, and Azim 2016; Boiral 2016; Gaia and Jones 2017; Rimmel and Jonäll 2013; Samkin, Schneider, and Tappin 2014; Schneider, Samkin, and Davey 2014; Van Liempd and Busch 2013) but only a few biodiversity accounting studies focused specifically on biodiversity disclosures. Studies by Thomson (2014), Schneider, Samkin, and Davey (2014), Barut, Raar, and Azim (2016) and Gaia and Jones (2017) investigated biodiversity disclosures in local government authorities and studies by Rimmel and Jonäll (2013), Atkins, Gräbsch, and Jones (2014) and Boiral (2016) focused on disclosures by companies. In both cases, stakeholder theory and legitimacy theory were applied in the analysis. Rimmel and Jonäll (2013) applied legitimacy theory to study the quantity of, and motivation behind, biodiversity disclosures by Swedish large cap companies, revealing limited biodiversity disclosure reporting in annual reports. Similar findings were made by Van Liempd and Busch (2013) for Danish companies as well as a study by Atkins, Gräbsch, and Jones (2014), who compared UK- and German-listed companies. The study by Boiral (2016) demonstrated that New Zealand mining companies disclosed limited and biased biodiversity information, raising concerns for stakeholders.

Stakeholder theory, as mentioned above, has been the theoretical basis for a number of biodiversity accounting studies (e.g. Rimmel and Jonäll 2013; Samkin, Schneider, and Tappin 2014; Gaia and Jones 2017), as it recognises the existence of a dynamic and complex relationship between companies and their stakeholders (Gray, Owen, and Adams 1996). Stakeholder theory emphasises that organisations should consider the concerns of individuals and groups that can affect or are affected by their activities. Disclosures to stakeholders can be viewed as organisations' legitimate contribution to society (Gray, Owen, and Adams 1996). According to Deegan (2002), stakeholder theory sustainability disclosure is a mechanism by which companies can discharge their accountability to stakeholders. Consequently, stakeholders regard sustainability discourse as a measure of a company's reliability, transparency and legitimacy. Furthermore, Deegan (2002) links stakeholder theory, through a social contract, to legitimacy theory, which is often used when companies disclose voluntary information such as sustainability reports. Thus, companies want to ensure that their actions are in accordance with societal norms and fulfil societal expectations (Rimmel and Jonäll 2013, 763). Deegan (2002) showed that an extensive number of accounting studies use Lindblom's (1994) legitimacy theory framework, which views disclosure as a legitimising tool. Suchman (1995) expanded on Lindblom's explanation why managers voluntarily provide social and environmental disclosures,

advocating that diverse strategies can be applied to manage legitimacy. Legitimacy theory suggests that companies are expected to disclose more information because of societal pressure (Cho and Patten 2007; Patten 2002). If more information fails its intentions, a legitimacy gap occurs, which affects the disclosing organisation's credibility (Patten 2002). In this study, stakeholder theory and legitimacy theory were valuable for examining the when, where, as well as the motivation behind, the IUCN's categories of biodiversity disclosures.

Although there are many possibilities for biodiversity accounting, one suggestion from the emerging body of studies on biodiversity accounting was made by Atkins and Thomson (2014), who cited a historical perspective towards accounting for extinction. Since the current biodiversity crisis is accompanied by an accelerating rate of mass extinction, such a development will not halt by itself. While the threat of extinction of insects and animals with low profiles will be largely unnoticed, the economic loss due to their extinction could make the past financial crisis insignificant in comparison, as illustrated by the example of the pollination performed by bees (Jonäll and Rimmel 2016). If bees face extinction, humans would have to perform the pollination service, which could be difficult to accomplish (Atkins and Atkins 2016). However, the risk of extinction of high-profile animals (e.g. pandas, tigers, elephants, rhinoceros) due to human activities has drawn attention to rapid biodiversity loss and has led to the emergence of extinction accounting.

For corporations, it may no longer be enough to demonstrate good citizenship; they may also need to dedicate financial funds and corporate resources to halt and reverse the prevailing extinction trend through conservation programmes (Milne, Tregidga, and Walton 2009). Extinction accounting could propel biodiversity accounting forward and enable it to show that further action is needed for the conservation of species and ecosystems. Extinction accounting needs to measure the risk of extinction and can use the IUCN categories to do so. Betts et al. (2019) discussed that the IUCN Red List is a highly respected source of information, which influences many aspects of conservation (policy development, awareness raising, priority setting, resource allocation). Since the Red List is globally accepted and already measures the risk of extinction for thousands of species, Betts et al. (2019) analysis showed that IUCN Red List status is more frequently requested in applications for species-focused funding streams.

Although some multinational corporations have shown a genuine interest in disclosing non-financial information on conservation programmes (Atkins 2017), they may not have professional knowledge about conservation practice. Zoos, however, do have a professional interest in the conservation of biodiversity and know conservation practices. Due to the Zoos Directive, the EU has reinforced and institutionalised zoos' interest in biodiversity. The Zoos Directive presents a legal framework for biodiversity conservation in zoos. This directive was implemented by the EU's member states and is enforced nationally. The Zoos Directive is framed by other EU legislation, specifically the *Council Directive 79/409/ECC on the conservation of wild birds* (Birds Directive), the *Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora* (Habitats Directive) and the *Council Regulation (EEC) No 338/97 on the protection of species of wild fauna and flora by regulating trade* (CD 1996). According to the Zoos Directive, zoos should produce corporate annual reports to inform their stakeholders about their animal inventory and

biodiversity conservation; these annual reports should also include non-financial disclosures about conservation efforts.

### 3. Research methodology

In order to study when and where IUCN categories have been used as performance measures of reporting on biodiversity by organisations that have a professional interest in practicing conservation programmes, zoos are the focus of this study. However, the number of zoos in Europe is difficult to ascertain. Animal rights activists' organisations such as the Born Free Foundation note that 3500 zoos exist in Europe, but this number could not be verified. Unlike corporate annual report databases, there is no EU zoo database available. Even on an EU member state level, authorities in Bulgaria, Cyprus, England, Germany, Italy, Poland and Portugal do not maintain a national database of zoos (EU Zoo Inquiry 2011).

However, the European Association of Zoos and Aquaria (EAZA) has developed an accreditation programme for its members, which includes compliance with national and international legislation regarding animal and plant acquisition, possession and transport. Although EAZA has no accessible database or downloadable membership list for non-members, EAZA has an interactive map on their website that makes it possible to locate EAZA members as a verifiable source (EAZA 2016). To collect suitable data for this study, 279 websites of EAZA members were accessed manually in January 2016 (see Table 3). Thereafter, all EAZA member websites were examined in order to determine whether it would be possible to collect data from European zoos that would be comparable. For the purposes of data collection for this study, no distinction has been made among the three types of membership status in the EAZA (full, temporary or candidate members). Since the EU Zoos Directive advocates that corporate reports should be produced by zoos, all websites were initially examined to determine whether corporate reports were made available to the public.

Initially during data gathering, the study identified where the organisations made biodiversity information available. From 279 accredited EAZA members, only 25 members provided annual reports on their websites and two zoos in Lithuania and the Netherlands provided separate CSR reports. Eight annual reports were in English. With the help of native speakers, the remaining 17 annual reports in seven different languages were read to determine whether these reports contained disclosures about preservation efforts and illustrated extinction accounting or used IUCN categories to draw attention to the risk of extinction. In contrast to the listed companies, European zoos and aquaria tended not to provide corporate information and financial information regarding relevant preservation efforts was seldom made available. Further, upon examination of the 279 EAZA member websites' information about conservation efforts within their zoos (e.g. breeding programmes, endangered species programmes, studbooks or regional collection plans), 54 zoos stated that they are engaged in conservation programmes, but no detailed information was provided nor was it possible to determine what their specific conservation efforts were. Many zoos and aquaria presented barely any facts about their conservation efforts and instead provided marketing information that described high-profile animals, entrance fees and hours of operation.

**Table 3.** EAZA members of zoos and aquarium in Europe.

Country	Total	Zoo	Zoo/ Aquarium	Aquarium	EAZA	EAZA full	EAZA temporary	EAZA candidate	website	EN	Conservation info	AR	CSR	EN
Austria	6	4	1	1	6	6	0	0	6	4	0	2	0	4
Belgium	8	8	0	0	8	7	1	0	8	6	0	0	0	6
Bulgaria	1	1	0	0	1	0	0	1	1	1	0	0	0	1
Croatia	2	2	0	0	2	1	0	1	1	1	0	0	0	1
Cyprn	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Czech Republic	14	14	0	0	14	13	1	0	14	10	3	6	0	10
Denmark	11	8	0	3	11	11	0	0	11	10	6	5	0	10
Estonia	1	1	0	0	1	1	0	0	1	1	1	0	0	1
Finland	3	3	0	0	3	3	0	0	1	1	0	0	0	1
France	45	39	0	6	45	44	1	0	45	20	2	0	0	20
Germany	47	45	2	0	47	46	1	0	47	19	4	1	0	19
Greece	1	1	0	0	1	1	0	0	1	1	0	0	0	1
Hungary	8	8	0	0	8	7	1	0	8	5	0	1	0	5
Ireland	3	3	0	0	3	3	0	0	3	3	0	0	0	3
Italy	9	8	0	1	9	9	0	0	9	7	0	0	0	7
Latvia	1	1	0	0	1	1	0	0	1	1	0	1	0	1
Lithuania	1	1	0	0	1	0	0	1	1	0	0	1	1	0
Luxembourg	1	1	0	0	1	1	0	0	1	0	0	0	0	0
Malta	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Netherlands	17	15	1	1	17	17	0	0	17	12	0	2	1	12
Poland	11	11	0	0	11	11	0	0	11	6	0	0	0	6
Portugal	7	4	1	2	7	7	0	0	7	4	0	0	0	4
Romania	2	2	0	0	2	0	0	2	1	0	0	0	0	0
Slovakia	3	3	0	0	3	3	0	0	3	1	0	0	0	1
Slovenia	1	1	0	0	1	1	0	0	1	0	0	0	0	0
Spain	16	11	1	4	16	15	1	0	16	11	0	0	0	11
Sweden	12	11	0	1	12	12	0	0	12	10	4	2	0	10
United Kingdom	46	44	1	1	46	45	1	0	46	46	34	4	0	46
Norway	2	1	0	1	2	2	0	0	2	1	0	0	0	1
Total	279	251	7	21	279	267	7	5	275	181	54	25	2	181

After having examined 279 EAZA members, only one zoo was identified that provided an annual report containing financial statements and detailed information about their operations and conservation activities. This zoo was Nordens Ark, located in Sweden, which has focused its operations exclusively on the conservation of threatened species and is the only zoo in Europe to do so. Nordens Ark has an annual report comparable to those of companies, containing financial statements and notes, a detailed history, narratives about their projects and animals, and many specific biodiversity disclosures.

Since Nordens Ark represents a rather anomalous case, a single case study approach has been applied. According to Yin (2003), a case study design should be considered when: (a) the focus of the study is to answer 'how' and 'why' questions; (b) you cannot manipulate the behaviour of those involved in the study; (c) you want to cover contextual conditions because you believe they are relevant to the phenomenon under study; or (d) the boundaries are not clear between the phenomenon and context. The data employed to analyse the research questions consist of archival data from Nordens Ark's annual report, the zoo's website, and interviewed management. Different categories of archival data were used and this provided an opportunity for triangulation (Miles and Huberman 1998; Yin 2003). The research method in this section is introduced by presenting the case company, the case data and the research methodology.

The case company is Nordens Ark, which started its operation in 1988 and is a rather young and small zoo compared to traditional zoos such as the London Zoo (inaugurated in 1826), the Copenhagen Zoo (initiated in 1859) or Vienna's Tiergarten Schönbrunn (opened in 1752). Nordens Ark has approximately 100,000 visitors a year, which is low compared to the London Zoo (1.2 million visitors in 2015; Statista 2017). Nordens Ark is operated by the non-profit foundation, Nordens Ark Foundation, which owns and maintains the zoo's premises, Åby Manor, located on the Swedish west coast. Åby Manor covers 400 hectares and is an estate that dates back to the 1300s. Many of the estate's buildings are from the 1700s and 1800s, and include a hotel, farm and scientific facilities. According to the 2015 annual report (Nordens Ark 2016, 3), Nordens Ark Foundation seeks to promote biological diversity under the following principles:

- Contributing to the conservation of endangered species by controlled breeding, and supporting wild animal populations in their natural habitats through various support measures.
- Conducting research and studies of the animals at the park, contributing to an increased understanding of animals and promoting animal survival in the wild.
- Acting as an educational resource at all levels from pre-school to colleges and universities.
- Being accessible to the public, thereby increasing public interest in and knowledge of conservation work.

Nordens Ark operations and scientific activities are 50 per cent funded through donations, gifts, funds, sponsors, bequests and adoptions. Twenty-five per cent of the remaining funding comes from admission charges, education, forestry and agriculture, and 25 per cent comes from the hotel's shop and restaurant. The turnover was 55 million Swedish kroners (approximately 5.6 MEUR). The Foundation Nordens Ark has 54 employees, which includes management, scientists and animal caretakers (Nordens Ark



2016). The Swedish Environmental Protection Agency acknowledged Nordens Ark as the leading Swedish zoo with respect to conservation, as Nordens Ark runs funded biodiversity programmes that have shown successful results in conservation, cooperates globally as a member of EAZA, the IUCN, the European Endangered Species Programme (EEP), the Conservation Breeding Specialist Group and the WAZA and contributes to scientific research. Although young in comparison with eminent traditional zoos, Nordens Ark is renowned in the European zoo and aquarium community for keeping animals and presenting them for the education of the public and contributing to scientific research and the conservation of global biodiversity (SEPA 2011).

Since this study aims to examine when IUCN categories are used as biodiversity disclosures and why the IUCN categories are important biodiversity disclosures for illustrating the threat of extinction, the sample became a case study approach. Cooper and Morgan (2008) discussed that case study methodology can enhance accounting research and practice. They argued that case studies are suited to answer 'how' and 'why' questions and that case study research might answer the 'how' and 'why' so compellingly and vividly that readers could find valuable insights in describing how new accounting issues are actually carried out. According to Cooper and Morgan (2008), case study research has always had a storytelling element, as cases often need a descriptive illustration. In management literature, narratives about an organisation is a common exercise as storytelling can address a considerable amount of complexity.

Nordens Ark's website was examined to gather data regarding biodiversity disclosure and, in particular, determine whether IUCN categories had been disclosed. The website was presented in two languages: Swedish and English. Both versions were analysed to determine whether they contained similar information or if the Swedish version, due to it being the mother tongue, might include more information than the English version. However, the English and Swedish versions provided similar information without significant differences in content. Under the rubric 'About us', a tab with the latest annual report also provided two language versions. No archive with annual reports from previous years was made available. According to Farneti and Guthrie (2009), corporations have freedom of choice in terms of where to include environmental disclosures within their annual reports or present them as a standalone CSR report.

Although the EU Zoos Directive (CD 1999) states that zoos should produce corporate annual reports to inform their stakeholders about their animal inventory and biodiversity conservation, it does not specify if sustainability information should be included in the annual report or as a standalone document. None of the 279 zoos applied Global Reporting Initiative standards, and in particular GRI standard 304, which is a specific biodiversity standard. With respect to Nordens Ark, all CSR information, including biodiversity disclosures, had been integrated into the annual report, which was made available online on the corporate website. Additional disclosures about animals and projects were also available on the zoo's corporate website. While it is possible to analyse earlier annual reports, but it is impossible to determine how the website content might change if it is not monitored continuously. The programme NVivo V.11 was applied, which created 'word trees' for a deeper analysis of content. A Word Tree visualises the context of the examined word; the word is displayed in its 'narrow' context of approximately 5 words on either side (Rimmel and Jonäll 2013). A coding system was also developed by studying the data in



relation to existing literature. The coding used in the analysis was verified with assistance from colleagues that have worked on similar projects.

In order to capture when and where IUCN categories are important as biodiversity disclosures, a semi-structured interview was conducted.<sup>1</sup> Nordens Ark has 54 employees, including six within management who were involved in producing and communicating information for the annual report and corporate website. Each management member was sent an introductory letter with an interview request by email. The management agreed that one of their members, who is knowledgeable about the entire organisation, should participate in an interview.<sup>2</sup> A semi-structured interview approach employed open-ended questions determined in advance, which permitted the interviewer to ask follow-up questions for more detail or clarification. There is a wealth of literature available on standardised versus non-standardised or semi-structured interviews (e.g. Denzin and Lincoln 1994; Taylor and Bogdan 1984) and this method of data inquiry was regarded as highly appropriate for the purpose of this study. The semi-structured interview followed an interview guide, which aimed to learn the intentions for providing biodiversity accounts and why the work with this specific IUCN information was initiated and used in their annual reports. For this study, the semi-structured interview started with general questions about Nordens Ark history before specifically focusing on biodiversity-related questions (e.g. What is the role of the annual report as a document for the Norden Ark?; Why do you report biodiversity and the IUCN's Red List categories in the annual report and on the website when you present your animals?; What role does the EU's Zoos Directive play for your way of reporting?; What role do you think accounting plays for spreading knowledge about biodiversity and endangered species?).

The interview was conducted in Swedish on site and lasted more than one and a half hours. The interview was digitally recorded. The interview recording was transcribed and all interview transcripts were professionally translated to English. Thereafter, it was coded by the project team and checked for accuracy. All passages with codes were re-read and common themes and patterns were identified. Since this study is based on a single Swedish organisation that has chosen to provide information on biodiversity by using IUCN categories, the results cannot be claimed for statistical generalisability.

#### 4. The use of IUCN categories in the annual report to illustrate the extinction risk

The 2015 annual report from Nordens Ark contains, besides the traditional financial statements, narratives about how Nordens Ark works to save and preserve endangered animals. In 44 pages, the 2015 annual report reviews the zoo's main projects and its participation in preservation programmes. Approximately 80 species and breeds comprise the animal inventory at Nordens Ark; most of these species and breeds come from a climate similar to that in Scandinavia. In the annual report, species and breeds are grouped into nine categories: insects, fish, amphibians, turtles, lizards, snakes, birds, mammals and native breeds. The 2015 annual report applies the IUCN categories to illustrate the extinction risk globally and in Sweden by providing the number of individuals of each sex (male/female/undetermined grouped by born/arrived/died/discontinued). In the report, [Tables 4](#) and [5](#) were presented as a single table that spanned three pages (Nordens Ark 2016, 12–14).

**Table 4.** Nordens Ark 2015 animal inventory using IUCN categories.

Insects	Globally	Sweden	co-ordination	Status Jan 1, 2015	Born	Arrived	Died	Departured	Status Dec 31, 2015
Great capricorn	VU	CR		14.14.744	0.0.362	24.25	1.0.35	44.45.668	20.20.350
Longhorn beetle	–	EN		–	70.47.22	10.10	80.57	–	0.0.22
<b>Fish</b>									
European catfish	LC	EN		1.1.210	–	–	0.0.6	–	1.1.4
<b>Amphibians</b>									
Kaiser's spotted newt	CR			2.4.17	–	–	1.2.1	–	8.11
Northern crested newt	LC	–		1.2.6	–	–	–	1.2.6	–
Green toad	–	CR		4.0.125	–	0.0.15000	0.0.14792	0.0.279	4.0.54
Natterjack toad	LC	VU		0.0.16	–	–	–	–	0.0.16
Yellow-headed poison frog	LC			3.4	0.0.8	–	–	–	3.4.8
Blue poison dart frog	LC			0.0.10	–	–	0.0.3	–	0.0.7
Golden poison frog	EN			0.0.3	–	–	–	–	0.0.3
European fire-bellied toad	LC	–		3.0	–	–	2.0	–	1.0
Mission golden-eyed tree frog	LC			8.6	–	–	3.0	–	5.6
White's tree frog	LC			0.0.9	–	–	0.0.1	–	0.0.8
Lemur leaf frog	CR			1.9	–	–	1.0	–	0.9
Splendid leaf frog	LC			2.2	–	–	–	–	2.2
Mnt. chicken frog	CR		EEP	1.3	–	–	–	–	1.3
Golden mantella	CR			0.2.4	–	–	0.2.4	–	–
Tomato frog	LC			4.5	–	–	–	–	4.5
Edible frog	LC	–		1.1.4	–	–	1.1.4	–	–
Pool frog	LC	VU		4.3.33	0.0.144	–	1.0.114	–	37.33
Marsh frog	–	–		2.9	–	–	0.2	–	2.7
Bamboo tree frog	LC			12.4	–	–	4.1	–	8.3
Tonkin bug-eyed frog	DD			0.0.8	–	–	0.0.3	–	0.0.5
<b>Turtles</b>									
European pond turtle	NT			1.11	–	–	–	–	1.11
Annam leaf turtle	CR			1.4.4	–	–	0.0.1	–	1.4.3
Hermann's turtle	NT			2.1	–	–	–	–	2.1
Snake-necked turtle	CR		ESB	3.6.1	–	–	–	–	3.6.1
<b>Lizards</b>									
Brown basilisk	–			1.3.9	0.0.7	–	0.3.6	–	1.3.7
Yellow-headed day gecko	EN		ESB	2.4	–	–	1.0	–	1.4
Standing's day gecko	VU			2.2	–	–	–	–	2.2
Guichenot's giant gecko	VU			1.1	0.0.2	–	0.0.2	–	1.1
Sand lizard	LC	VU		2.1.16	0.0.19	–	0.3.15	2.6	9.9
<b>Snakes</b>									
Grass snake		NT		6.1	–	–	1.0	–	5.1
Common Adder	LC	–		4.1	–	–	–	–	4.1

**Table 5.** Nordens Ark 2015 animal inventory using IUCN categories.

Birds	Globally	Sweden	co-ordination	Status Jan 1, 2015	Born	Arrived	Died	Departured	Status Dec 31, 2015
Lesser white-fronted goose	VU	CR		20.16.3	0.0.50	–	1.1.3	7.2.47	14.15.8
Red-breasted goose	EN			1.0	–	–	–	–	1.0
Northern pintail	LC	VU		0.2	–	–	0.2	–	–
White stork	LC	RE	SDF	3.3	–	–	–	–	3.3
Bald ibis	CR		EEP	9.8	5.3.4	–	0.0.4	3.2	11.9
Peregrine falcon	LC	VU		10.10	6.4.6	–	1.0.6	6.4	9.10
White-naped crane	VU		EEP	2.1	1.1	–	1.0	0.1	2.1
Manchurian crane	EN		EEP	1.2	–	–	–	0.1	1.1
Eurasian eagle-owl	LC	NT		1.2	1.3	–	–	1.4	1.1
Snowy owl	LC	CR		1.1	–	–	–	1.1	–
Great grey owl	LC	NT		1.1	–	–	–	–	1.1
Ural owl	LC	–		2.0	–	–	–	–	2.0
European roller	NT	RE		1.1	1.0	–	1.0	–	1.1
Eurasian Hoopoe	LC	RE	ESB	1.1	5.2	–	1.1	4.1	1.1
White-backed woodpecker	LC	CR		17.17	7.6	–	3.5	4.1	17.17
<b>Mammals</b>									
European ground squirrel	VU			6.6	0.0.24	–	6.10	–	9.11
Pallas cat	NT		EEP/ISB	1.1	1.3	–	–	1.1	1.3
European wildcat	LC			3.0	–	–	1.0	–	2.0
Eurasian lynx	LC	NT	ESB/SDF	1.1	1.0.1	–	0.0.1	–	2.1
Amur leopard	CR		EEP/ISB	1.1	–	–	–	–	1.1
Persian leopard	EN		EEP/ISB	–	–	–	–	–	1.1
Snow leopard	EN		EEP/ISB	3.2	–	–	–	1.1	2.1
Grey wolf	LC	EN	SDF	1.1	1.3	–	–	–	2.4
Maned wolf	NT		EEP/ISB	1.1	1.1	–	0.1	–	2.1
Eurasian Otter	NT	VU	EEP	2.2	–	–	1.0	–	1.2
Wolverine	LC	VU	EEP	2.2	2.0	–	–	–	4.2
Red panda	VU		EEP/ISB	2.2	–	–	–	1.0	1.2
Przewalski's wild horse	EN		EEP/ISB	0.3	–	–	–	–	0.3
Chilean pudu	VU		EEP/ISB	1.2	0.1.1	–	0.0.1	–	1.3
Forest reindeer	NT		ESB	1.7	3.1	–	0.1	–	4.7
Tadjik markhor	CR		EEP	10.9	4.4	–	5.6	6.0	3.7
Urial sheep	VU		MON	1.5	–	1.0	1.0	–	1.5
<b>Domestic breeds</b>									
Nordic brown bee				> 10.000	> 10.000	–	> 10.000	–	>10.000
Orust poultry		EN		3.7	12.15	–	0.0.10	2.9	2.9
Bohus-Dals pultry		EN		3.10	7.8	–	1.1	2.3	7.11
Gammaldags dvärghöna		CR		3.10	4.3	–	4.3	1.0	2.10

Tables 4 and 5 list the animals in the inventory that are the focus of Nordens Ark's preservation programmes. The use of IUCN categories is accentuated by statistics for each species stating the number of individuals of each sex, male/female/undetermined, by showing figures of born/arrived/died/discontinued. In a narrative about the animal inventory, Nordens Ark states that the zoo decided to concentrate on species for which a direct conservation benefit can be achieved, whereas previously the zoo's focus was only on species threatened by extinction. Nordens Ark Management communicated through their annual report, as well as on their website, that the number of species held at Nordens Ark was reduced during 2015, as three domestic and two exotic amphibian species were phased out and two bird species were disposed of (Nordens Ark 2016, 4). This reflects Betts et al. (2019), which highlighted the ubiquitous nature of the IUCN Red List, indicating the potential of the IUCN Red List to influence communication and awareness raising of species extinction risk to wider audience.

The 2015 annual report highlights global concern about the increasing extinction rate of birds. Currently, one in eight bird species is at risk of extinction, and some 200 are classed as critically endangered on the IUCN Red List, which is considered a sign of a more extensive environmental problem (Nordens Ark 2016). In the report, special attention is devoted to the Project Peregrine Falcon, which has become Sweden's most successful ex-situ<sup>3</sup> project. In 1974, the breeding project was established to save the peregrine falcon, which was dying out in Sweden due to environmental toxins and habitat destruction. In 2000, the breeding programme was moved to Nordens Ark's breeding centre, which by 2012 had bred 180 falcons and released them into the wild. The breeding work of Project Peregrine Falcon proved decisive in saving the species in Sweden. After 40 years of conservation work, viable populations of peregrine falcons are found in Sweden. In 2012, the Peregrine falcon moved upwards on the IUCN Red List category from VU to NT.

Zoos Directive (CD 1999), article 3, fifth indent states that animal records serve two functions. The first is that they are a source of information for competent authorities during inspection and authorisation. The second is that they are essential for zoos when planning and executing conservation programmes. The IUCN Species Survival Commission (2013, 2014) emphasises that conservation activities are highly dependent on up-to-date animal records, both for internal and external purposes. Internally, animal records assist in administrating, monitoring and controlling the population level of a species. Externally, up-to-date animal records are used to exchange conservation information with other zoos, scientists and competent authorities. Although Nordens Ark's animal inventory does not provide comparable information from year to year, it does provide an inventory such as Jones (1996, 2003), Houdet (2008) and Siddiqui (2013) proposed. Compared to the corporate biodiversity disclosure studies by Rimmel and Jonäll (2013), Atkins, Gräbsch, and Jones (2014) and Boiral (2016), the animal inventory provides specific and detailed biodiversity information that demonstrates the threat of extinction by detailing the status quo of each species in accordance with the IUCN categories.

## 5. Zoo website information about projects and animals

Sabelfeld (2013) suggested that examining corporate websites and Internet reporting for capturing the extent of disclosures is an important part of corporate communication with

stakeholders. Nordens Ark's website is illustrative and informative. The website's header features six navigation buttons; two of which are 'our projects' and 'our animals'. Both of these buttons link to pages about conservation programmes and information regarding specific animals. When navigating to the 'our projects' main page, 13 projects are displayed in the navigation pane along with a statement that the conservation projects form the backbone of Nordens Ark's work. When navigating to the 'our animals' main page, a subset of categories from the animal inventory projects is displayed in the navigation pane. Clicking on specific categories opens a page with a navigation pane that links further to all individual animals in the annual report animal inventory. Each animal page includes a short description and most include an illustration depicting their IUCN category.

Twenty-six species attracted individual sponsors. The sponsors' names, and usually their company logos, are displayed along with basic information regarding weight, height, wing-span or withers height. Nordens Ark activities are 50 per cent funded through donations, gifts, funds, sponsors, bequests and adoptions. All animals without sponsors are advertised as available for sponsorship. The short descriptions about the animals convey detailed information regarding the necessary initiatives and how they are contributing to conservation efforts. The texts also refer to the threat of extinction. In addition to the 28 individual sponsors identified both on the website and in the annual report, Nordens Ark has partners such as Volvo, Swedish Postcode Lottery, the Hasselblad Foundation, Segré Foundation and Swedish Environmental Protection Agency, all of which have their logos displayed on the website and in the annual report.

According to the Zoos Directive Good Practices Document (2015), zoos should not solely focus on animal presentations and encounters to attract visitors' attention; they should also adopt an information strategy that describes successful conservation efforts and encourages financial aid through sponsorship. Therefore, zoos' websites should encourage long-lasting relationships and interactions between the zoo and stakeholders who might financially commit themselves through sponsorships or donations. Many studies have examined the extent of online disclosure to determine the quality and transparency of Internet reporting (Craven and Marston 1999; Marston 2003; Sabelfeld 2013). Nordens Ark's website contains a wealth of information about the species in their inventory; it also provides users of the website with transparent information regarding the species' IUCN categories and the conservation programmes they are part of as well as the opportunity to make a financial commitment through sponsorships. This follows the IUCN Commission on Education and Communication (IUCN CEC 2016)'s recommendation to create awareness through Internet reporting on websites, which brings stakeholders and zoos closer.

## 6. Interview with zoo management

This section focuses on the reasons behind biodiversity reporting and extinction accounting. Initially, the interviewee was asked, 'Why do you report biodiversity in the annual report and on the website?' to discern what biodiversity and reporting meant to him or her.

Biodiversity knowledge is the motor for our conservation work from species to habitat. [...] We are used to measure, record and to report inventories about our animals to have accurate

information for projects to studbooks. [...] Since, we have to observe, collect, record and put it into the program Species360 [...] we can measure the biodiversity activity and set up goals [...] we report more and make our results known to the public [...] is a challenge to work on for saving our planet's nature for future generations. (Quotes from interview)

Biodiversity for us [...] it is hard work over decades with hopefully a happy ending. [...] If you see the results from success stories like our Project Peregrine falcon that is rewarding. [...] It is also important to our members Friends of Nordens Ark to see how we work with conservation to improve biodiversity [...] Biodiversity is a learning process, but of course you will understand what impact on biodiversity our way of living has, which caused global impact on the environment and ecosystem. [...] We have seen how conservation can be successful for future generations [...] to improve biodiversity. (Quotes from interview)

Atkins, Gräbsch, and Jones (2014; Atkins et al. 2018), as well as Maroun and Atkis (2020) stated that biodiversity disclosures in corporate reports are a way for corporations to express care for stakeholders. During the interview, a clear relationship between the zoo and stakeholders' groups outside the organisation was recognised, and the interviewee expressed concern regarding how stakeholders receive communications about conservation activities. This indicates a recognition of the dynamic and complex relationships between companies and their stakeholders and is in keeping with the argument presented by Gray, Owen, and Adams (1996) that disclosure to stakeholders can be regarded as organisation's way to legitimate their operations.

The interviewee also addressed when and where IUCN categories were used:

For us it is quite simple to answer. Many of us in the management are natural scientists by training and not just accountants who prepare the annual report or our website [...]. We are used to work with IUCN and their categories our everyday work [...] we have to record and report these figures in our cooperation. [...] It is simply a logical path to follow. Once you have a measurement system for recording internally you can easily use this data externally. [...] If it is biodiversity data, IUCN stats or other financial data makes no difference in this case. Once you have the data, you can provide it if you think it's something for our stakeholders. (Quotes from interview).

We experienced that society currently is going towards more information on the environment. [...] If you watch the TV news and see oil spills are killing thousands of birds or pesticides in your food. Of course, people ask how this affects our wildlife. [...] We deliberately use IUCN, as people can refer to this scale. [...] it is easy to understand [...] the closer to extinction a specie is, the more can we push to upscale existing programmes or initiate new ones. Of course this you can tell in your annual reports to your community. (Quotes from interview).

[...] we do not want to put too much emphasis on what biodiversity means in monetary terms but of course IUCN categories are also link to this. How costly is an extinct species? (Quotes from interview).

During the interview, it became apparent that, although biodiversity records are part of the conservation programmes, there are opportunities to use this existing information as disclosures. Burritt and Schaltegger (2010) found that sustainability reporting is a result of internal or external pressures or due to opportunities. This can be seen as a pragmatic inside-out approach that transforms sustainability topics into key performance indicators and information sets (Burritt and Schaltegger 2010).

Furthermore, the interviewee was asked 'What role does the EU's Zoos Directive play for your way of reporting?' to determine the impact that regulation may have on reporting practices in the industry.

The Zoos Directive is very much appreciated by us and our fellow zoos that have scientific intentions. [...] We have spent a lot of time convincing the EU not put the draft aside without putting it into action [...] EU thought that this directive was too small [...] together with other zoos we convinced discussing the positive effects for our business [...] we would like to hinder dodgy actors running zoos just for business purposes [...]. The problem for us serious zoos is that some actors all of a sudden get hold of animals that we did not know were available on the market [...] you can get a tiger for 200 dollars in Las Vegas, but it should not be like that [...]. It is good to demand proper animal records and operation reports to obtain a licence from the competent authorities [...] a problem is that in many countries local authorities are licencing zoos, which might be a local tourists attraction [...]. (Quotes from interview).

The Zoos Directive is welcomed but we would like to see stronger enforcement [...] more recording and reporting is not a problem if you are already involved in conservation programmes [...] such programmes demand accurate data, which you can make public on the website or in your annual report. [...] To do an annual report is not that difficult [...] accept from layout and print we do everything in-house. All text, all data every information. [...] following the Zoos Directive and the practice guide will provide good information about our operations to our visitors, employees and friends of the zoo, who provide an important part to our finance. (Quotes from interview).

The Zoos Directive seems to fulfil a role by providing legitimacy to zoos that report about their operations. However, there seems to be a lack of enforcement by national authorities, which might explain the lack of reports and detailed information from EAZA members. Therefore, it could be argued that the Zoos Directive in its current state fails its intentions. However, for Nordens Ark, the Zoos Directive report was taken as a positive factor in gaining or maintaining legitimacy with its stakeholders, as Suchmann discussed (1995).

## 7. Concluding discussion

The principal purpose of this research is provide an account of when are the IUCN categories used as biodiversity disclosures to address the threat of extinction and where IUCN categories could be considered important as biodiversity disclosures in an organisation that has a professional interest in practicing conservation programmes to prevent species extinction. Earlier biodiversity accounting studies that focused on examining biodiversity disclosures in listed companies (Rimmel and Jonäll 2013; Van Liempd and Busch 2013; Atkins, Gräbsch, and Jones 2014; Boiral 2016) demonstrated that companies provide only limited disclosures, if any. This study produced a contrasting result: Nordens Ark is anomalous case that provides a high degree of disclosures both in its annual report and on its website to inform stakeholders about its conservation programmes and its strategy to prevent species extinction. As the interview revealed, the IUCN categories play a central role in corporate communication because the zoo's stakeholders can easily understand them. Disclosing an animal inventory together with IUCN categories in an annual report might be a logical step for a zoo that is participating in conservation programmes, since the zoo is already recording this information for internal purposes.

This would be in line with Rodrigues et al. (2006) discussion, as the IUCN Red List data are a source of information that is essential to guide priorities of conservation efforts focused on species to prevent extinction. However, the fact that, out of 279 accredited EAZA members, only 25 provided annual reports, but without specific information about conservation programmes, illustrates that EU member states' authorities do not sufficiently enforce the EU's Zoos Directive. The Zoos Directive has institutionalised zoos' interest in biodiversity and it is a legal framework; however, it is implemented by EU member states and enforced nationally through licensing and inspections by local authorities. The interview identified this as problematic because there may be regional interest in preserving a local tourist attraction.

Boiral (2016) demonstrated that companies disclosed limited and biased biodiversity information, which raised concerns among stakeholders. This is not the case for Nordens Ark; both the website and annual report contain a wealth of disclosures on biodiversity, which are linked to the IUCN Red List categories. This may be due to, unlike companies with no professional knowledge of conservation programmes, Nordens Ark's management has backgrounds in natural sciences and the zoo documents its conservation efforts. Certainly, the nature of a zoo and the nature of a listed company differ in that the latter is unlikely to include an animal inventory such as the one Nordens Ark provides in its annual report. Still, companies can apply IUCN categories for raising awareness of species that are at risk of extinction as a result of their impact on nature. Even though some companies displayed a genuine interest in disclosing non-financial information on conservation programmes (Atkins et al. 2018; Atkins 2017; Maroun and Atkis 2020), they might not have professional knowledge about conservation practice. These companies can learn from zoos. Companies have the capability to change the rate of mass extinction by dedicating funds and corporate resources to conservation programmes (Milne, Tregidga, and Walton 2009). Extinction accounting could propel biodiversity accounting forward but it needs to measure the risk of extinction, which the IUCN categories visualise.

Indeed, centring the business model of the zoo on conservation may complement traditional accounting, including sustainability reporting. However, despite the substantial growth in CSR during the past years and acknowledgement of the biodiversity crisis, few zoos have made serious attempts to report on their conservation efforts. The interview illustrated that reporting to stakeholders is about informing them about the zoos' operations. Biodiversity disclosures can be regarded as a mechanism to demonstrate accountability to stakeholders and, as explained during the interview, they can also be used to gain legitimacy, attract funding for operations and maintain legitimacy with stakeholders who are already supporting the zoo, which is in line with Suchman's (1995) discussion.

This study contributes to the infant stage of extinction accounting. The IUCN categories are globally accepted to express species' risk of extinction (Rodrigues et al. 2006). Therefore, they may be used as measures for extinction accounting. Of course, measuring extinction accounting is not the same as monitoring biodiversity. Previous studies focus on measuring biodiversity via recording, valuing and reporting. However, such a view provides only a snapshot of biodiversity and documents the number of species only at the time of the measurement. The content of the website examined in this study provides more insights on monitoring biodiversity. Monitoring is an ongoing process; it allows researchers to identify changes and trends over time and determine



it conservation projects are achieving their biodiversity goals or if they require further action.

In this sense, extinction accounting can be seen as the next step in accounting for biodiversity, with one significant difference. Biodiversity accounting focuses on loss caused by human impact and considers 'loss' in terms of damage to, or a reduction of, habitats or species, whereas extinction accounting focuses on the permanent disappearance of a species.

Nordens Ark is a good example of the impact its activities have on conservation of biodiversity and how the IUCN Red List categories can be used to illustrate the conservation status of species. This reflects Rodrigues et al. (2006) highlighting the value of IUCN Red List of Threatened Species as a powerful tool for conservation planning, management, monitoring and decision making. The 2015 annual report provides a good overview of the conservation work. The measurement aspect is clearly expressed in the animal inventory, providing numbers and figures on the different species' threat of extinction. However, the narratives provide insights on the monitoring aspects. Successful conservation work might take 40 years to reverse the trend towards extinction, as the Peregrine Falcon conservation project demonstrated.

In summary, the findings from the analysis of corporate websites and annual reports, as well as the interview, demonstrate that IUCN categories are a useful part of biodiversity disclosures in illustrating the threat of species extinction. Many industries have a substantial impact on biodiversity and a better understanding of how to measure, monitor and report on their impact could change the current sustainability reporting practices. However, if there is no monetary value attached in extinction accounting. Certainly, this might be a double-edged sword, because high values could attract those who would wish to harm biodiversity (e.g. poachers). On the other hand, monetary value could provide more than a philanthropic touch to extinction accounting because it could provide information about how costly it would be to continue the current trend towards mass extinction.

## Notes

1. The interview was conducted in November 2016 in Swedish and the transcription has been translated professionally into English.
2. In order to fulfil the university's ethics requirements, anonymity had been guaranteed to the interviewee. Consequently, all quotes from the interview have been reviewed and it is not possible to use the quotes to identify the interviewee.
3. Ex-situ conservation means the conservation of biological diversity components outside their natural habitats.

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