Can Accounting Save Nature(s)? The Case of Endangered Species

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This study examines one of the first performance indices developed by conservationists to assess their effectiveness at saving endangered species. The article demonstrates that conservationists used the performance index to select the species to be saved. This selection, however, eventually led to transform species into investments that had to show a return, relative to the efforts put forward by the conservationists to save them. The article demonstrates that the financialization work of conservationists is an outcome of the penetration of humankind into the Anthropocene, and the adoption of *The Economy* as the default mode for governing societies. Although conservationists described this move as a collective failure, they nevertheless praised financialization work, that they believed provided a way to re-connect humans to nature(s). The article discusses the implications of such findings for accounting, conservation science and the protection of biodiversity. The article is based on an in-depth study of the conservation organization that created the performance index, 53 interviews with conservationists and conservation finance specialists, conservation fieldwork and secondary evidence.

Keywords: Anthropocene, Biodiversity, Conservation Performance, Extinction Accounting, Financialization, Modes of Existence, Visuals

[1] Note that both authors contributed equally to the paper.

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1. Introduction

- *Researcher*: It seems that us – Moderns – have not been very good at protecting our planet. Many social scientists, like Bruno Latour or Philippe Descola, are suggesting that we should be willing to learn from indigenous knowledge. Do you agree? Will you help us?
- *Indigenous conservationist*: Everything that is happening now was in the prophecies, including that people like you will come and ask for our help. The Earth is shaking to get rid of us, like an animal would do with a parasite. There will be more earthquakes, more hurricanes, many people will die. But the planet will eventually heal.
- *Researcher*: But are you going to help us?
- *Indigenous conservationist*: We have to heal first. It will take twice the time for us to heal than it took us to arrive to this point. These [accounting] metrics you are showing me are the connection between you and us.
- *Researcher:* But it means that it will take hundreds of years before you help us. Are we all going to die in the mean time?
- *Indigenous conservationist*: On this, I cannot tell you what the prophecy says.

Indigenous Conservationist, Reserve, 2018

Between 1970 and 2012, half of the vertebrates on Earth disappeared (Huwyler, Käppeli, Serafimova, Swanson, & Tobin, 2014). In 2014, there were 22,413 endangered species in the world (IUCN, 2014). Over 10,000 species become extinct each year, a rate that is estimated to be between 1,000 and 10,000 times higher than the natural extinction rate (WWF, 2017). As such, we are now facing the sixth period of mass extinction of species (Ceballos et al., 2015). The conservation community is at the forefront of the fight for the protection of endangered species. Conservation science is defined as the interdisciplinary study of care and protection of ecosystems and their biodiversity. But conservationists lack resources. Faced with this challenge, some conservationists decided to demonstrate to society and financiers that their work mattered, *"We are a conservation results business – and we have to prove it"* (Internal Presentation of the Index, 2014). It is estimated that US$200 billion to US$300 billion in additional capital is needed to finance the preservation of the world's most precious ecosystems (Huwyler, Käppeli, & Tobin, 2016). Between 2004 and 2015, the private sector channeled US$8.2 billion of private capital into investments that sought measurable environmental benefits (Hamrick, 2016). This emerging field of finance is known as "conservation finance." By proving their impact on the planet and its inhabitants, conservationists hope to channel private money towards the protection of lands and their species. With the help of financiers, conservationists design new financial products, such as "rhino-impact" bonds, whose return on investment is linked to the ability of conservationists to save rhinoceros.[2]

Our paper studies one of the first "conservation performance indices" – referred to as the *Index* – developed by conservationists to measure the impact of their work on the protection of endangered species. Conservationists designed this Index to demonstrate to donors and citizens that their job was useful and therefore needed to be funded. The Index is probably best described as a mix of conservation science, accounting and politics. The idea underlying such assessment is simple: The more effective a conservation organization is at saving species, the more

[2] Rhino-Impact Bond, https://www.zsl.org/conservation-initiatives/animals-on-the-edge/rhino-impact-investment-project, accessed 23 February 2018

resources it should receive. Financiers are likely to use such indices to select conservation projects.

Our research method followed a two-step design inspired by the pragmatic methods of collective inquiry (Dewey, 1939; Latour, 1987, 2013; Lorino, Tricard, & Clot, 2011). First, we conducted an in-depth study of the Index and the conservation organization that created it – based on 28 interviews with conservationists, employees, investors and donors; and on documentary evidence. The findings demonstrated how conservation was being financialized through the use of the Index. Financialization consists of infusing environmental and social spaces previously outside the economic sphere with a financial rationale. Conservationists were aware of their financialization work and its implications. They barely studied business, were not forced by financiers, yet they formed a deep belief that accounting will help them save endangered species by showing the value of conservation for society in economic terms. Faced with this unexpected conclusion, we decided to conduct a second round of interviews. We hoped to understand whether the conservation organization we studied was representative of the field of conservation or an exception. Moreover, we were puzzled by the fact that conservationists themselves were leading the financialization of their field and believed it would contribute to saving species. We discussed our findings with 25 conservationists and conservation finance specialists. Some were well-known for their expert status and influence on policy-making, others were field-based conservationists with no political engagement. The conservationists we interviewed approached financialization work through a different lens, but all of them envisioned positive effects, confirming our first findings. Conservationists nevertheless recognized that this situation was the result of a collective failure of science, politics and society.

In the rest of this article, we will clarify the genealogy and content of the Index. We will also elucidate why conservationists praised financialization work despite lamenting its need, and the role accounting played in this endeavor. Last, we will elaborate on the implications of such findings for the field of accounting, conservation and the protection of biodiversity more broadly. Because the specifics of conservation performance are important, the article touches upon conservation technicalities that cannot altogether be avoided: they matter to overall outcomes. Understanding the work of conservationists is crucial if we want to understand whether accounting can be used to save nature(s) or not.

2. Conservation Performance

2.1. The Field of Conservation

The global field of conservation is estimated at over US$ 21.5 billion. Conservation organizations represent between US$ 1 to 1.5 billion. Conservation organizations can be large, such as the International Union for Conservation of Nature (IUCN), Conservation International, the Nature Conservancy, and the World Wildlife Fund (WWF), whose individual annual budgets exceed US$ 0.70 billion (Waldron et al., 2013). Most conservation organizations, however, are small and focus on specific field efforts. The conservation organization that developed the Index was a small zoo. While zoos have traditionally been placed in the entertainment sphere, the mission of the modern zoo is the conservation of endangered species (West & Dickie, 2007; Zimmermann & Wilkinson, 2007). The zoo we studied was over fifty years old and had three branches: a wildlife park, field programs, a training and education program. The Index they developed aimed to assess the conservation impact on the field – i.e. the ability of conservationists to save animals in insular regions, not the captive breeding

conducted in the zoo itself.

The conservationists we interviewed during the second step of the research belonged to diverse conservation organizations, that we believe are representative of the field. Yet one must also admit that there are as many different types of conservation organizations, as ecosystems and their species that are being protected. The ecology of each land is unique, which implies inimitable ties between conservationists and their environment. Our classification of the field is therefore schematic, at best. We shall describe our typology below:

- Many conservation organizations are protecting public lands, appointed and funded by governmental authorities. Conservationists in these organizations consider themselves as stewards of the land, on behalf of citizens. The public status of such land is usually protected by laws and any private exploitation must obtained legal clearance. In emerging countries, however, the protection of ecosystems and their species is difficult to implement, due to a scarcity of resources.
- Other conservation organizations own the lands. Known as trusts, they buy or inherit properties through donations. Their goal is to protect the ecosystems under their care by preventing any transformation or exploitation of the faunae, including species at risk.
- The third group of conservation organizations work with private owners to enhance the protection of their parcels. Such properties include farms, forestry, touristic places, fisheries, or mining. Conservationists working with private owners try to accommodate the financial needs implied by the exploitation of resources while strengthening the protection of habitats.
- Another group of conservation organizations can be referred to as indigenous or natural reserves. The status of indigenous reserve does not necessarily imply that indigenous communities own the land but it is a recognition that the land is of cultural and spiritual importance for native people, and that this mode of existence should be accommodated. Indigenous conservationists consider themselves as stewards of the land, on behalf of everybody on earth and to be born. Natural reserves benefit from a specific protection status that acknowledges the exceptional character of the natural environment and its faunae. Depending on the country, natural reserves can be privately or publicly owned and subject to conservation laws.
- Modern zoological societies, or zoos, or wildlife parks, were first created in the mid 1800s, although some menageries already existed thousands of years ago. The historical legacy of zoos (e.g. a symbol of colonialist power and domestication of wildlife) and the enclosures imposed on animals have long put zoos at the boundaries of the conservation world. Contemporary zoos, however, play a key role in conservation, notably through their captive breeding, education of citizens and conservation work on the field. For instance, the zoo under study in this article uses the money generated by the zoo to protect endangered species in insular regions on the globe.
- Last, transnational conservation organizations aim to protect parts of the planet that overcome national boundaries. This could include the protection of oceans, the Antarctica but also migrating birds or freshwater fishes that navigate multiple countries.

Conservation organizations can span over this typology and adopt different conservation approaches. Some conservation organizations target uniquely urban settings (e.g. increasing the number of trees into a city), others aim to protect wilderness area, while some organizations specialize in advocacy, policy-making, or coordination efforts. All conservation organizations we interviewed wanted to save species at risk, as part of their engagement with the land. To achieve such goal, most organizations tend to adopt an “ecosystem” or an “habitat” approach, which consists of working on the ecology of the system as a whole, rather than focusing on the

species themselves. A fewer organizations, like the zoo under study, employ a specie-based approach, which consists of channelling their efforts towards specific animals (e.g. through captive breeding or advocacy).

Conservationists have in common a deep care about nature(s) and its faunae, but their training varies. Such education can include biology, forestry, geology, conservation, primatology, fishery, ecology, zoology and anthropology, among others. The field is well-educated and hyper-specialized, in the sense that conservationists tend to develop the skills required by the type of ecosystems they work with. The nature of disciplines mobilized by conservation science is dictated by the ecosystems' needs. For instance, universities now include courses about policy making and citizen engagement. Most conservationists who graduate today are indeed expected to work for public authorities and foundations. Despite this diversity, all conservationists identify themselves as conservationists, although they would often prefer to be named ecologists. Conservation indeed implies that ecosystems should be protected according to a reference in the past – maintaining the land in its past state, while conservationists perceive themselves as resolutely engaged in the future – helping the land evolve and adapt.

2.2. The Challenges of Conservation Performance

Biodiversity comprises "a range of features that are important for evolution and the effective functioning of the ecosystems", such as species richness and ecological, genetic, phylogenetic, and functional diversity (Collen, Pettorelli, Baillie, & Durant, 2013). According to Collen et al. (2013), "it can be argued, however, that the natural units of biodiversity conservation are species". The recent loss of species is so dramatic and serious that it could propel the world to a state of mass extinction (Barnosky et al., 2011). Protecting biodiversity is important for several reasons. According to the Convention about Life on Earth, at least 40 per cent of the world's economy and 80 per cent of the needs of the poorest people on the planet are derived from biological resources. Healthy ecosystems are more likely to survive disasters and greater species diversity tends to ensure natural sustainability for all life forms. When the diversity of life is richer, there is greater opportunity for discoveries that could help address global challenges, such as epidemics or climate change. Finally, it can be argued that protecting animals and nature more broadly is a think we have to do, simply since the earth does not belong to us – humans (Atkins, Maroun, Atkins, & Barone, 2018; Gray & Milne, 2018).

Biodiversity conservation is a human endeavor, "initiated by humans, designed by humans, and intended to modify human behavior to achieve a socially desired objective – conservation of species, habitats, and ecosystems" (Mascia et al., 2003). Biodiversity conservation is therefore complex and socially sensitive (Boiral & Heras-Saizarbitoria, 2017), and requires local communities, businesses, NGOs, academics, and public authorities to collaborate with each other (CBD, 1992). Accounting for biodiversity is described in Jones' (1996) seminal paper as comprising three steps: collecting, classifying, and aggregating physical data relating to wildlife and wildlife habitats; deciding whether to value wildlife assets in monetary or non-monetary terms; and publishing information to assess the performance of the organization. Jones and Solomon (2013) summarize accounting for biodiversity as "accounting for biodiversity impacts" and "reporting on actions taken to enhance and protect biodiversity."

In this growing area of research, a new form of biodiversity accounting named "extinction accounting" is emerging. It is based on "the acknowledgement of a need to protect species at risk of extinction" (Atkins & Maroun, 2017; Cuckston, 2018; Maroun & Atkins, 2018). Within extinction accounting, we intend to focus on conservation management and measurement. The

conservation of biological diversity is defined as the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings (CBD, 1992; Mace et al., 2007).

Biodiversity accounting faces three main challenges that all involve issues linked to the relationships between humans and their ecosystems. The first challenge relates to the ability to design metrics that eventually save ecosystems. Extinction accounting needs to be transformational if it is to contribute to extinction prevention (Atkins et al., 2018). Yet, unravelling the agency of accounting in the shaping of ecosystems is extremely complex and difficult to anticipate. The second issue deals with the human agency in this endeavor. Biodiversity accountants have traditionally opposed a "deep ecological ground" or "ecocentric" approach to biodiversity, which favors the perspective of the environment, to an "anthropocentric" one, which takes the viewpoint of humans (Atkins & Maroun, 2017; Cuckston, 2018; Gray & Milne, 2018). However, the distinction between human and non-human actants is difficult to made. Humans are part of ecosystems that they both shape and are shaped by. The last problem is that humans tend to make decisions that favour their (short-term) interests, often understood as economic ones, at the expense of the faunae. Humans are indeed the first cause of species' extinction. The problem of extinction accounting, as framed in the current literature, is therefore almost intractable. Accountants suggest to put animals at the core of the extinction accounting project, but cannot make these animals speak, without humans.

Although it is at the core of the problem, opposing humans to nature(s) does not help address the problem of extinction. This divide neglects the complex and dynamic relationships that link humans to their ecosystems and suggests that humans could know what animals want, which is ontologically impossible. To address this obdurate problem, the latest research on biodiversity accounting suggests to change the relationships between humans and nature(s), and to get at the root causes of the problem – i.e. the current model of development of societies (Gray & Milne, 2018). Denouncing the "modern" divide between nature and culture born during the enlightenment, Gray and Milne (2018) point to the need to develop alternative modes of relationships, more aspirational and spiritual. The authors believe that transforming how humans approach nature(s) could help create new stories, narratives and accounts, that might eventually contribute to healthier relationships between humans and their ecosystems (Brown & Dillard, 2013). Throughout, accounting could become an "emancipatory device" for both humans and animals (Atkins & Maroun, 2017). The conditions under which such transformation could be achieved, however, remain to be identified (Atkins, Atkins, Thomson, & Maroun, 2015). We still need to find ways to accommodate the different modes of existence on the planet, so as the frogs, the indigenous spirit, the farmer' crops, the citizens, the financiers and the conservationists, among others, can co-exist in a way that enables each of them to subsist.

2.3. Measuring Conservation Performance

In practice, conservationists throughout the world use four different types of measurement system to assess the performance of their conservation projects. Conservation projects comprise the actions that directly enhance the persistence of wild habitats and species (Mace et al., 2007). The first method involves assessing the importance of the different *threats* affecting a system, and then measuring the ability of conservationists *to reduce those threats* (Salafsky & Margoluis, 1999). This method is said to be "indirect" since it measures whether the threats have been addressed but not whether species or habitats have been saved. The second method

is used by the UK Darwin Initiative's funding scheme for biodiversity conservation – a leading actor in the field of conservation. This evaluation system measures conservation *outputs*. It compares the number of animals at the beginning and at the end of a conservation project; however, it does not estimate what the outputs would have been without the intervention of conservationists.

The last two methods aim to assess conservation *outcomes* – i.e. to measure the actual impact of conservationists' actions on the survival of species. Both methods are at the pilot stage. The first of these two methods, the *Impact Assessment Index*, relies on a scoring method that takes into account the importance, volume, and effect of conservation projects (Mace et al., 2007). The score depends on how endangered the species is, how many animals in the total population are targeted by the project, and the conservationists' effect on the species through the project. The more endangered the species, the greater the percentage of animals targeted by the conservation project (in comparison to the global population), and the larger the conservationists' impact on the species in the context of the project (compared to no project), the higher the score will be. The second method, the *Ranked Outcomes Index* (Howe & Milner-Gulland, 2012) captures the textual statements found in projects' final reports by ranking the positive and negative outcomes achieved in different categories, specifically education and training, research and infrastructure, species and habitat, and legacy outcomes. In the rest of the article, we will study the construction, use, and expected consequences of a new outcomes–referred to as the *Index* – on conservationists' practices. We will show that conservationists hope to use this index to financialize their work.

3. Financialization Work in the Field of Conservation

3.1. Financialization Work as a Calculability Process

Financialization work is the process of evaluating organizations based on their market value – i.e. the monetary price for which their products and services could be exchanged. Designing accounting metrics that help assess the financial value of those products and services is key to financialization work (Arjaliès & Bansal, 2018; Chiapello, 2014). The financialization of non-for-profit organizations such as zoos is a well-established global phenomenon. Non-for-profit organizations are indeed increasingly required to evaluate the "impact" of their work on society to justify their funding – notably through financial metrics (Barman, 2015; Chiapello, 2014; Cooper, Graham, & Himick, 2016). Recent examples include the True Value Methodology developed by KPMG in 2014 that aims to "find a way to measure, in financial terms, the value that a company creates or reduces for society through its most significant environmental and socio-economic impacts" (Hendriksen, Weimer, & McKenzie, 2016). Likewise, the Kering company initiated the Environmental P&L (Profit and Loss) methodology that consists of the measure and the valuation of an organization's impacts on natural capital (greenhouse gas emissions (GHG), water use, land use, air pollution and waste). For example, for the brand puma, the impact was evaluated at €145 million for 2010. Additional methodologies using monetization of non-financial impacts are developing rapidly as for example the Integrated Profit and Loss[3] of the company True Price applied by both DSM and Akzo Nobel, the Crown Estate's Total Contribution Methodology or SAP's financial valuation of some of their non-financial key performance indicators such as carbon emissions or

[3] The Integrated Profit & Loss is a methodology that calculates in monetarized terms the value created by an organization through the six capitals defined by the IIRC (manufactured, financial, natural, social and relationship, intellectual and human).

employee retention. Through financialization, calculative practices become "intrinsic to and constitutive of social relations, rather than secondary and derivative" (Miller, 2001).

A major consequence of financialization is that objects, people and activities that are not financially calculable are marginalized and gradually discarded by the actors involved in the new calculable space (Vaivio, 1999). The use of financial metrics discards difficult to value elements, such as mercy, salvation or grace (Bromley, 2010). Not-for-profit organizations and their stakeholders consequently tend to focus their attention on what the metrics identify as a key area – financially wise. Individuals and the environment are "normalized" as objects of financial calculability and rendered "governable" through accounting numbers (Miller, 2001; Miller & Power, 2013). To escape financialization, an increasing number of non-for-profit organizations suggest adopting a broader stakeholder inclusive accountability system (O'Dwyer & Boomsma, 2015). Such a system would assess the financial but also the social and environmental performance of the organization based on its missions and relationships with its stakeholders (Andreaus & Costa, 2014; Mook, 2014). Most researchers in the social and environmental accounting field also believe that moving away from financial metrics towards a better inclusion of society would help avoid financialization and restore "legitimacy in the public's eye" (Balanoff, 2013). Key to this change is the ability to include not only the organization, but also its stakeholders and society as a whole. Such transformation however has yet to happen.

3.2. Financialization Work as a Civilization Project

The phenomenon of financialization is troubling. Although a growing number of practitioners, policy makers and researchers denounce the dangers of such approach for the planet and its inhabitants (Arjaliès & Bansal, 2018; Chiapello, 2014; Cooper et al., 2016); an increasing number of organizations adopt financialized techniques to assess their impact. Why would a society encourage financialization if this process threatens its own survival? According to sociologists, anthropologists and philosophers, financialization expands because societies are facing a crisis of institutions: political, family, religious but also scientific (Serres, 2009). Financialization has gradually become the only envisioned way to govern our societies – a project of civilization (Kurunmäki, Mennicken, & Miller, 2016). Latour (2013, p. 466) explains: "*by a sort of mistake in civilization, and ill-formed institution, The Economy, has been entrusted with the task of collecting (…) entanglements of humans and nonhumans, but with no possibility of durable instauration for any of them*". The economic sphere has turned into a political arena where global challenges but also scientific results are from now on. Moderns (i.e. white Europeans fashioned by the enlightenment) no longer trust their politicians nor their scientists (Latour, 2013). Discussions surrounding the veracity of global warming epitomized these doubts (Ansari, Wijen, & Gray, 2013). Believing in climate change has converted into a political decision. Meanwhile, "science" has become a societal question. The distinction between science and society has consequently eroded (Latour, 2013).

Part of this movement towards an increased politicisation of sciences is the growing acknowledgment by natural scientists themselves that we are starting a new geological era: the "Anthropocene". The Holocene is the name given to the post-glacial geological epoch of the past ten to twelve thousand years. The Anthropocene describes the current epoch in which humans and societies have become a global geophysical force (Crutzen, 2006). Latour (2013, p. 8) comments: "*If geologists themselves, rather solid and serious types, see humanity as a force of the same amplitude as volcanoes or even of plate tectonics, one thing is now certain: we have no hope whatsoever – no more hope in the future than we had in the past – of seeing a*

definitive distinction between Science and Politics." Since nature and society are now impossible to separate, human beings search new ways to "civilize" nature (Latour, 2009). This includes new modes of "domesticating" animals (Serres, 2001, p. 162). Conservationists increasingly feel that "modern" conservation science has reached a turning point. A growing number of conservationists evoked the entry of natural sciences into the "end of nature" or a "post-natural" era they expect to completely question scientific practices (Schmidt, Brown, & Orr, 2016; Wapner, 2014), an observation also made by Latour (2011) and social and environmental accountants who evoked the "death of environmental debates." (Brown & Dillard, 2013) Not only humans are responsible for themselves, they are now entitled to save the planet. Since *The Economy* is the default institution that governs our lives, civilization most often takes the form of financialization.

Yet social and natural scientists are both unequipped to deal with the Anthropocene era. Many questions remain: How can nature "speak"? How can conservationists make animals part of the civilization project of our societies? What does it mean to be linked to geological forces? The challenges ahead are enormous: ""*we" no longer know who we are, nor of course where we are, we who had believed we were modern . . . End of modernization. End of story. Time to start over.*" (Latour, 2013, p. 8) With faced with these unknown challenges, Latour suggests that accounting devices should be praised as a means to accommodate the various modes of existence on the planet (e.g. humans vs. animals):

> Courses of interests like those of scripts, would simply have been equipped with devices, abacuses, benchmarks, instruments, arrangements, models, in short VALUE METERS, to help the actors get their bearings in an ever-increasing number of linkages and thus obtain the ALLOCATION KEYS acceptable to the various parties." (Latour, 2013, p. 445, emphasis in original)

According to Latour, accounting does not play this role, although it could definitely play it, if we collectively wanted it. He explains, "*The world "law" in the "law of economics" should be understood as in "civil laws," that is a highly revisable affair in the hands of a polity.*" (Latour, 2014, p. 10) The problem of accounting is that instead of making the values visible and restoring the trajectories of each mode of existence by making them observable, accounting has transformed *The Economy* into metaphysics by replacing human discussions with apparent objective calculations. "Value-free" computations had emptied the agora in an impossible quest for the optimal, "*So The Economy puts an end to all moral experience.*" (Latour, 2013, p. 443) According to Latour (2013), only a restoration of the moral ends pursued by humans within *The Economy* through the design of accounting metrics that make those values visible could provide a new foundation for the civilization to come.

In the rest of the article, we will be particularly interested in the role accounting could have in the co-existence of the trajectories of three modes of existence, *the beings of reproduction, the beings of technology and the beings of politics*. Modes of existence is the term used by Latour (2013) to describe the ontological practices attached to the realms of politics, society, law, religion and science (among others).[4] We chose to focus on these three modes of existence since they were the most salient in the practices of conservationists we observed.[5] The beings of reproduction refer to how to prolong existence, or in our case, the ability of humans,

[4] The modes of existence are : Reproduction, Metamorphosis, Habit, Technology, Fiction, Reference, Politics, Law, Religion, Attachment, Organization, Network, Preposition, Double Click.

[5] For indigenous conservationists, the law – and the property rights it entails – is certainly a primary mode of existence.

ecosystems and their faunae of endangering themselves. The beings of technology refer to the practices of conservation science, or the zigzags of ingenuity and invention. The beings of politics encompass the uninterrupted courses of action through which humans engage to regroup and assemble to maintain their existence in their (natural/social) environment. We will investigate how conservationists used the Index in an effort to financialize their practices, and this in order to accommodate the three modes of existence.

4. Research Methods

4.1. Research Setting

The conservation organization that designed the Index is a zoological society of over fifty years old that comprises three branches: a wildlife park, field programs, and a training and education program. The Index was developed to assess the performance of conservation programs of the organization. Despite being a zoological society, the organization perceives itself as being closer to academic conservation organizations than to other zoos. The zoo is only a part of their activities, and the conservation organization wants to be seen as a scientifically based organization that provides scientific evidence of its strategic and operational conservation decisions. Its conservation programs span more than 40 years and involve a high number of PhDs and academic partnerships. The zoo also distinguishes itself from other zoos by its desire to save the less glamorous and most isolated species on Earth. Such species include frogs, groundhogs, and snakes on remote islands (cf. Figure 1). For instance, at the time of writing, conservationists are trying to save the last 48 mountain chicken frogs alive on the planet, principally in the Caribbean islands of Dominica and Montserrat. It is estimated that 41% of the most endangered vertebrates on earth evolve in insular areas (Spatz et al., 2017).

Insert Figure 1

The zoo has roughly 150 employees and 120 volunteers. The Executive Director is responsible for the daily management of the zoo and is assisted by a team of senior managers responsible for the zoo's eight key teams: Animal Collection, Conservation, Conservation Science, Training and Education, Marketing, Fundraising, Accounts, and Human Resources. This top management team is accountable to a Board of Trustees that serves on a range of committees covering audit, governance, investment, remuneration, and risk. Since the publication of its Index in early 2015, the zoo has been judged by its peers to be one of the most advanced conservation organizations in terms of conservation performance measurement. In 2016, the Index was rated as the most "advanced tool for assessing conservation performance" in a study by an international consultancy firm. This zoo can therefore be considered as a revelatory case study for extinction accounting (Yin, 2013).

4.2. The Index

The Index was prepared in two phases. From 2011 to 2015, the conservation science team worked on establishing "global indicators." These indicators attempt to estimate the performance of the organization as a whole. They comprise three types of indicator: pressure, response, and impact indicators. In 2015, conservationists developed "species indicators" whose goal is to assess conservationists' impact on the species they aimed to protect. They include status, response, and impact indicators (cf. Table 1).

Insert Table 1

All the indicators are presented online on the zoo's website; however, the Index was first presented with global indicators in a single PDF. In that PDF, each indicator was illustrated through three visuals: a societal visual, a management visual, and an animal photo accompanied by an animal "story" (cf. Table 2). The conservation science team defines the Index as:

> Our approach for *measuring the conservation performance* of the [zoo] – it's a tool, or strictly speaking a set of tools, that allows us *to measure our actions* on the ground, how we are trying to battle the threats to our species and the results of that. So, *what impacts we're having* in terms of our mission to save species from extinction. But essentially, it's about our *conservation performance*. (Interview 2, Conservation Science Team, emphasis added)

Insert Table 2

The conservationists from the zoo aimed to include the effective impact of their work on both the protection of endangered species and on the education of society more broadly. The Index differs from previous assessment on three dimensions. First, the Index is the first metric to assess a zoo's conservation performance in its entirety – not just in terms of specific conservation projects – a measure considered to be essential to attract funding. Second, the Index measures the organization's impact on the conservation of species by explaining what the situation would have been without its intervention. Last, the Index proposes measuring the return on investment for the survival of species and society more broadly.

4.3. Data Collection

Our data collection followed a two-stage process inspired by the methods of collective inquiry developed in pragmatism and ANT research (Dewey, 1939; Latour, 1987, 2013; Lorino et al., 2011), and as suggested by previous accounting research on science (Power, 1996b). During the first stage, we studied the Index developed by the zoo. The second stage consisted of exchanging on our findings with conservationists and conservation finance specialists. We shall describe the process below.

1st stage. Data included semi-structured interviews and documentary evidence. Interviews with members of the zoo were collected through face-to-face and Skype interviews that lasted from 36 minutes to two hours. Face-to-face interviews took place at the conservation science and conservation trust teams' head offices at the end of 2015. Interviews with the field conservationists were conducted via Skype in May 2016 and 2017. Another six interviews were conducted with stakeholders in the organization via Skype (with the exception of one respondent with whom we communicated by email). A feedback session with the conservation team was organized in May 2016 to present the research and obtained their initial reactions to it. In 2017, and 2018, a few follow-up exchanges were also conducted. Of the 25 interviews conducted, ten interviewees were internal stakeholders in the Index, nine were directly related to the construction phase of the Index, and six were external stakeholders of the organization. Questions explored the following general themes: the organization, its governance, and its stakeholders; conservation performance and accountability; the Index and visuals; the current internal and external use of the Index; the construction of the tool; and the future of the tool. Within these themes, some questions were explored in greater depth, depending on the interviewee's background, in particular the construction of the Index or its use and consequences for conservationists' practices. Secondary data were collected to complete and

confirm interviewees' stories about the Index. Such data included board meeting presentations, notes from three workshops, and external communication material. Internal data cover the period from 2011 to 2015.

2nd stage. The interviews conducted for the first stage led us to wonder whether the financialization work we observed was representative of the field of conservation more broadly, or an exception. To answer this question, we decided to discuss our findings with conservationists and conservation finance specialists (September 2017-ongoing). We selected interviewees to represent the typology of conservation organizations described above in order to apprehend different ways of saving endangered species. We also interviewed conservation specialists adopting a variety of conservation finance approaches (e.g. carbon offsetting, project financing, impact bonds, ecosystem valuation services). We contacted individuals via emails, explaining our research, and attaching a previous working version of this article that focused only on the zoo and the Index. We looked for well-known conservationists, involved in policy making and academia, as well as small conservation organizations with no presence online to be able to discuss with conservationists we expected to have less exposure to the discussions on conservation finance. When we could, we combined these interviews with visits of ecosystems under care. We also purposefully contacted conservationists who we believed would have reservations about financialization. To select them, we read twitter accounts and press articles, and wrote in the emails we sent them that we would like their voices to be heard. We did the same with indigenous conservationists. As in the first stage, all interviews were recorded and fully transcribed for analysis.

Following these exchanges, we were fortunate to be invited in some conservation events, where the topic of financialization was discussed openly. After the interviews, and as part of our own scholarship and teaching engagement, we also agreed to help some conservationists calculate ecosystem valuation services and design carbon offsetting models. This choice was not triggered by our own belief in those mechanisms – which we made it clear to the conservation organizations we volunteered for, but rather by our desire to better understand such calculative devices. It was also led by our desire to help those we interviewed. We also provided public authorities suggestions as to how include biodiversity accounting in the food sector. This personal experience enabled us to better understand the challenges of conservation science by being deeply immersed in the field. The Appendix summarizes the data sources.

4.4. Data Analysis

Our analysis was informed by performative approaches used in visual accounting research (Davison & Warren, 2017; Justesen & Mouritsen, 2009) and collective inquiry methods inspired by pragmatism (Dewey, 1939; Latour, 1987, 2013; Lorino et al., 2011). Drawing on ANT (Latour, 1992), visual approaches are based on the assumption that realities are constructed through the interactions between individuals and their inscriptions. This research method follows the trajectories of calculative devices and considers their effects on practices. The collective inquiry method consists of co-investigating the findings with the individuals concerned by the research.

1st stage. The first stage analysis started with a classical form of coding. We first used *focused coding* to identify relevant emerging codes (Charmaz & Belgrave, 2002, p. 321), i.e., terms consistent with respondents' meanings and words. Focused codes included managerial and financial terms relating to the discussion of the Index, such as "return on investment", "risk management", "planning", and "production of results." As the codes emerged, we began

comparing our findings to the literature on biodiversity accounting, NGOs, and financialization – an approach known as *pattern matching* (Yin, 2013). At this stage, we were surprised by conservationists' use of what we named "societal visuals." We wondered how a process of financialization could unfold without visible financialization techniques.

To better understand this mechanism, we refined our data structure through *axial coding* (Strauss & Corbin, 1998), which involves exploring the relationships between the different codes. In a similar vein to grounded theory (Strauss & Corbin, 1998), we wanted to generate theoretical findings from the data themselves. As we lacked the necessary insights to conduct such analysis on ecosystems, we decided to develop our own analytical method. We booked a room specifically designed for innovative thinking, which contained walls and tables we could write on. We wanted to access the different modes of existence and understand how they were linked through the Index. On one wall, we described all human actants. On another wall, we analyzed the Index itself. On the last wall, we defined the specificities of conservation performance and the animals themselves. We used the table at the center of the room to physically draw the modes of connection between these three groups of actants. We also studied the habitats and animals targeted by the zoo to determine whether our assumptions about the ecosystems under study were accurate. While walking amidst the ecosystem we had reproduced, we realized that the content of the Index itself mirrored the construction of the Index by conservationists. We also noticed that as the story unfolded, the connections between the Index and the ecosystem weakened and financialization grew.

2nd stage. In our first version of this article, we identified four phases through which the Index financialized conservation. Each phase corresponded to a layer of the Index itself: conservation performance was first a scientific project, then a societal one, before becoming a business, and ultimately a financial project. We sent this working version to the interviewees involved in the second stage of our analysis. We first asked conservationists and conservation finance specialists to explain to us their conservation work and the specificities of the ecosystems under their care. We then discussed the role of financialization work and regularly pointed to the Index developed by the zoo as an example. We asked interviewees whether they believed financialization work was a good idea and if so, whether they were developing metrics themselves. Some of our interviewees started drawing on the figures used by the zoo, sketching their own vision of what financialization work should look like, for them. Through these exchanges, we could better understand what was unique to the zoo we studied and what was of broader significance.

Our last decision related to the structure of the findings themselves. How should we tell the story of the Index? We spent considerable time deciding whether to choose the animals, the Index or the human actants as our analytical lens. Given the evolution of the Index and of conservationists' perspectives on conservation performance over time, we decided to historically account for the construction of the Index through the lens of the conservationists themselves. To reflect the collective inquiry, we conducted in the second stage, we included the reflections of fellow conservationists in the findings themselves. Throughout, we hope to describe how and why the trajectories of each mode of existence are related through the Index and its financialization work.

5. The Financialization Work of Conservationists

Our study analyzes the development of a conservation performance index – referred to as the Index – designed to measure the ability of conservationists to save endangered species. We

show how the Index gradually shifted from a scientific to a financial project. While coding the data, we realized that the financialization work was actually reflected in the form of the Index itself. Figure 2 summarizes this financialization work by describing the four different "layers" that structure the Index, as communicated by the zoo to donors and the general public in 2015.

Insert Figure 2

These four "layers" show how conservation performance evolved over time. The first layer describes conservation performance as a scientific project and only involves conservationists. The second layer identifies conservation performance as a societal project that consists of demonstrating to citizens the benefits of protecting faunae. The third layer transforms species into products and mobilizes a management performance framework. The final, decisive layer converts the protection of species into an investment whose return has to be proved. The below sections explain how such evolution unfolded.

5.1. The Launch of the Conservation Performance Index

In 2011, the zoo was in a financial turmoil. The money given by donors had decreased significantly from 2005. Trustees were concerned about the survival of the zoo and constantly questioned the management team about these financial problems. The management team was worried that financial decisions would be made at the expense of the protection of species. The conservation science team wanted to refocus discussions with trustees onto the conservation projects themselves and suggested creating a set of performance indicators that would allow trustees to better understand the zoo's conservation work in the insular regions where conservationists were working. Conservationists believed that these indicators would also help them improve their conservation practices, "*We can make management decisions in a way that's timely and make the best possible decisions to get the best possible effect on the ground."* (Interview 2, Conservation Science Team)

The conservation science team reviewed the indicators used by other zoos and swiftly realized that the measure of conservation performance could be improved. The zoo's conservationists wanted to be the first in the conservation field to design a performance index that could measure the conservation impact of an entire zoo. They believed that this type of organizational tool was lacking and that it would increase the zoo's reputation. They believed that measuring conservation performance would also help them convince the broader public of the need to protect endangered species. The Index would enable them to inform citizens of their conservation projects and the importance of the ecosystems at stake. The conservationists believed that such awareness would ultimately bring more donors.

5.2. Conservation Performance as a Scientific Project

5.2.1. The Index: Revealing the Trajectory of Species

The conservation science team was an ambitious group of young conservationists who aimed to reinstate conservation as the main topic in their zoo. The conservationists also aimed to transform the way conservation performance was measured in the field more broadly. The team believed that the financial pressures faced by conservation organizations all over the world had led most conservationists to focus on funding at the expense of their conservation work. The conservationists wanted to refocus stakeholders' attention onto conservation performance, but they wanted to do it in their own way:

> I much prefer talking to the scientists who are doing the work. It just seemed to be such *a revolutionary idea*[6] that a group of young men, totally passionate about the science they wanted to do and the changes they wanted to bring about, were no longer leaving that in the hands of a professional, but non-scientific, fundraising department, but *finding a way to communicate the potential and the successes of what they were doing themselves*. (Interview 17, Board of Trustees)

The conservation science team put great emphasis on the fact that the Index had to be based on standard conservation frameworks. It was essential that the indicators were scientifically robust:

> I absolutely wanted the tool to be *scientifically credible.* For me, unsurprisingly, as a scientist, it's the most important thing. The people that we speak to within our sector, so our peers, a lot of our donors, are very knowledgeable people. They know that science is important in terms of providing the best possible evidence of a particular impact, whatever it may be. (Interview 2, Conservation Science Team)

To ensure that their approach was scientifically grounded, the conservation science team chose the "Red List Index" as the main indicator for assessing their conservation impact. The Red List Index (designed by the IUCN) defines the "threat status" of major species groups and measures trends in extinction risk over time. Although conservation scientists continue to discuss the assessment outcomes and criteria for categorizing species in one extinction tier or another, the Red List Index remains the most objective and authoritative system available for assessing the global risk of extinction for species.

The conservation science team also met a scientist from the IUCN who had just published an academic paper on species conservation success. The article studied the impact of conservation on the "threat status" of a particular set of species. The author argued that it was possible to demonstrate that the "threat status" of certain species in the Red List Index would have been different if conservationists had not intervened. For the conservation science team, this finding was extremely encouraging since it signified that they could actually demonstrate their impact on the protection of species.

Based on this study, the conservation science team decided to work on an "impact indicator" that would measure the zoo's impact on the 17 species they had been working on for a long period of time. The long-term horizon of the conservation projects (40 years) enabled conservationists to gather data on threats and species recoveries. The fact that the zoo was species focused (as opposed to habitat focused) was also helpful. The programs were relatively well documented and defined, which allowed the conservationists to replicate the impact measure developed in the academic paper mentioned above. At this stage, however, conservation performance calculations relied mainly on ad hoc inputs from the field regarding the different species for which the zoo was trying to develop their calculations, with the team using these inputs to construct different scenarios (no intervention compared to a scenario where they had an impact).

After three years of work based on these ad hoc inputs, the conservation science team eventually succeeded in designing a complex calculation method based on counterfactual scenarios.

[6] Emphasis added by the authors, and in all future citations in the article.

According to the conservation science team, this new impact indicator enabled them to demonstrate the long-term impact of the zoo's conservation programs on the target species.

> I think it shows how much effort has to be put in, what these things actually require. I think there's a misunderstanding sometimes that conservation is easy once you start, whereas actually, for the [individual species in question], after 30-odd years we're now worse off than we were when we started. But the species would be extinct altogether if we hadn't done anything. (Interview 24, Conservation Field Team)

The conservationists insisted that the Index had to be recognized by the scientific community. They submitted their impact measurement to an academic journal and made all the data and methods used for the calculation freely available on the zoo's website. The team named their conservation performance tool the "Index".[7]

The conservationists' priority from then on was to collect evidence and demonstrate the "verifiability" of the Index. By involving the rest of the scientific community, they wanted to "draw on external research to add weight" (Internal Presentation to the Board of Trustees) to their performance measure. By embedding their tool into existing frameworks and higher-level indicators such as the Red List Index, the conservation science team was able to make their tool credible and reliable. The conservationists inside the zoo also believed that this new Index would help them better allocate their resources and time.

> We decide what's good. … We know what we need to do, so that's what we're going to do, which in the case of these things was to do all that, in particular restoring a population to get it breeding again. … We didn't have any set goals or numbers on how many we wanted or how big an area or anything. (Interview 24, Conservation Field Team)

Conservationists believed that the Index could also be used by the zoo to explain to the broader public the "conservation journey of species" and the importance of measuring the performance of a conservation project over the long term, "The Index reflects this long process and the effectiveness of perseverance" (Interview 22, External Stakeholder). But the marketing and communication teams were not convinced. The Executive Director was also doubtful. He warned the conservationists not to spend too much time on "those types of things" (Interview 2, Conservation Science Team). Only the fundraising team praised the Index, which allowed them to "actually position ourselves amongst our peers in a very favorable way" (Interview 11, Administration Team).

Meanwhile, the community of conservationists working for zoological societies was extremely enthusiastic. Conservationists all over the world referred to the Index as one of the most advanced conservation performance tools. The conservation science team of the zoo became internationally renowned.

> I think it's already had an impact. I can't speak very widely, but I can speak for colleagues of mine that I've spoken to *who applauded its introduction and fed back very positively when it was introduced*, because it's such a neat way of packaging the model, if you like. … It's sort of folded into people's thinking. (Interview 19, External Stakeholder)

[7] Index is a pseudonym.

5.2.2. An Inquiry into the Beings of Technology

Conservationists we exchanged with during the second stage of the research all understood why the zoo developed a specie-based method of assessment. First, this lens was aligned with the zoo's approach. Second, monitoring species was the most obvious way to assess the impact of conservationists on the field. A specie can be classified at risk only if numbers show a decrease; hence it has to be counted. The first task of conservationists is therefore to make inventories. The Index could become a useful tool to convince policy-makers that conservation work needs to be done, to mitigate the mass extinction of species. Without making the animals visible, species would never be saved.

> This is the problem with freshwater fishes, nobody sees them. They are under the water. So, people don't even know that they are disappearing. We need to make some inventories, to show policy-makers that they need to be protected. This is the first step to any conservation work. (Freshwater Fishes Specialist, Academia, 2017)

Conservationists we interviewed during the second stage of the research made suggestions, as to how to improve the Index, notably by studying "umbrella species" whose survival was a good indication of the health of an ecosystem. They also suggested favoring species that were the most genetically diverse, since such diversity was perceived by some to be correlated to a better likelihood of survival for the habitats. Conservationists overall showed enthusiasm for the scientific layer of the Index, "it is always good to have good metrics to monitor our work." (Wilderness Officer, Zoological Society).

Yet conservationists were also doubtful about the ultimate usefulness of this scientific approach. They evoked three main problems. The first one was the inability to employ such Index to monitor their own ecosystems. Most conservation organizations lacked capacities and historical data. Conservationists also wondered how this approach could apply to the protection of habitats in non-insular regions, where many social factors shape conservation work. The second problem was the impossibility to catch up with the disappearance of species; conservationists alone could never monitor all ecosystems.

> Every year, there are more species at risk that appear on the list. We will never catch up with the mass extinction that is going on. We cannot spend all our money counting species that disappear. We are beyond this point in terms of urgency. (Invasive Species Specialist, Trust, 2017)

The last problem evoked by conservationists was the limitations of "modern" conservation science as a solution to the problems faced by the planet. Indigenous conservationists, in particular, questioned conservation work based on a scientific rationale.

> We have done it for years, and here are the results. We manage the problem the wrong way. We look for scientific evidence, then, we suggest a plan, policy-makers check the plan, based on evidence. Once everything is proved, they implement the plan, collect more evidence, and then decide what to do, and then it is too late. If this approach worked, we would not be in such a situation. (Indigenous Conservationist, Reserve, 2018)

When we asked conservationists what they would suggest to do. They all concurred:

> You need to make people realize that our habitats are dying, and that we need to save them. They need to feel the natural environment that surrounds them, to go out there, to see it, to connect. This is the only way we could protect our wilderness. (Wilderness Endangered Species Specialist, Wilderness Advocacy, 2018)

As we will see below, conservationists at the zoo also shared this viewpoint.

5.3. Conservation Performance as a Societal Project

5.3.1. The Index: Revealing the Trajectories of Humans

After the Index was published, the conservation science team convinced a donor, a former trustee of the zoo, to support the development of a broader conservation performance tool. Conservationists believed that if they could demonstrate the added value of their work to the general public, they would eventually garner support and attract more funding.

The conservationists wanted to adopt a "story like" approach (Interview 12, Administrative Team) to enable non-conservationists to "enter" the conservation world (cf. Figure 3). They also wanted to render the Index attractive to the general public by making science "sexy basically, attractive" (Interview 2, Conservation Science Team):

> It tells you the story of how we… did research, built up the knowledge; we plan actions, empower local people. (…) So, it tells a story of what we're doing here very nicely. *I mean a child could follow that really*…, my little boy can understand it. (Interview 16, Wildlife and Training Team)

Insert Figure 3

The conservationists and the marketing team chose to transform each indicator from the Index into an analogy that could be understood by anyone. They transformed the total surface of preserved habitats into football pitches and the need to monitor threats on ecosystems into the readings on a car speedometer. The conservationists tested these visuals on friends and family members external to the zoo and noted that "they could see [our work] instantly". Societal visuals were not only readily understandable, they were also readily available anytime:

> You can do this when you like – in your home with your slippers on – and that's also a powerful tool in today's world I think. Have it on demand. (Interview 16, Wildlife and Training Team)

These visuals were consequently considered to be powerful devices: "Sometimes if you try and communicate data to people they might be switched off; however, I'd assure them that it's not quite what you think, it's not just all charts." (Interview 12, Administrative Team)

To convince the general public of the need to save the endangered species protected by the zoo, i.e. neglected and insular species, the conservationists compared the size of the species targeted by the zoo to the polar bear population size (cf. Figure 4). Iconic animals such as polar bears attract funding; the conservationists wanted to redirect this funding to their species. They believed they had no choice but to defend the mission of the organization.

> I personally think the "population size" one with the concentric circles and the polar bear on the outside and the skink, not that I have a particular affection for skinks, but it illustrates that the kinds of animals we work with are *incredibly endangered*, compared to the things we popularly think of as being endangered. (Interview 17, Board of Trustees)

Insert Figure 4

To meet the expectations of the general public and the donors, the conservationists decided to communicate the Index on a yearly basis. They also expanded the scientific Index with additional indicators and explanations (e.g. societal visuals) (cf. Figure 2). Inspired by NGOs (e.g. Charity Water), the conservationists wanted to explain to their private and public donors how the money from each donation was spent, which species were supported, and by which type of project.

> It doesn't necessarily communicate *the impact directly* but I think that in a sense it does reassure the user that their money's being well spent and they can actually see where it's going. (Interview 12, Administrative Team)

Although the zoo's employees did not show much interest in the first version of the Index, i.e. the scientific one, they were extremely proud of the broader Index as communicated to the wider public. They were very happy to be able to communicate their work to external stakeholders. The Index became the embodiment of the zoo's identity.

> People just call it "the Index" now and it's our[s] … *it has a really important institutional relevance now … it's had quite an interesting effect on the confidence* with which people speak to their particular audiences. (Interview 2, Conservation Science Team)

Trustees also praised the zoo's work, "When people saw it, they were moved and touched and incredibly proud." (Interview 17, Board of Trustees)

5.3.2. An Inquiry into the Beings of Reproduction

The first scientific layer evoked conservation work as non-conservationists would envision it – the counting and monitoring of animals on the field. Yet, all conservationists we interviewed actually explained to us that an important part of their daily job was to explicate to the general public why they work mattered. How conservationists envisioned their relationships with society, however, varied. Indigenous conservationists and conservationists working on public lands, clearly considered themselves as stewards of the land, on behalf of society. They were the voice of their fellow human beings. Most conservationists positioned themselves as educators who needed to explain to humans deprived of their natural environment that ecosystems mattered. This education mission was particularly clear for zoos and urban conservation organizations, that evolved in cities. It was also the case for indigenous reserves, that hoped to add a spiritual layer to this engagement with nature(s):

> The only way you can protect the land is *to connect to it*. It does not need to be your land. You can go anywhere on earth and connect to the spirit of the plant, the spirit of the animal, the spirit of the water. But for this, you need people *to be in nature*, outside, to close their eyes, listen and smell. (Indigenous conservationist, Reserve, 2018)

Conservationists therefore perfectly understood the need for the zoo under study to communicate with the general public. Most conservation organizations we interviewed had similar "societal visuals" (see layer 2 of Figure 2) they complemented with measures such as number of education events, distributed flyers, and individual discussions. The goal of conservationists was clear: To reconnect humans to their environment so as they realized that species were valuable and needed to be saved.

> We have to speak more to the general public. *We cannot stay together, we have already convinced each other*. We should convince those that can be and have not yet been. (Land Stewardship Specialist, Trust, 2017)

Yet, another reason was also that conservation organizations had to secure funding. Such public engagement was not only an increasing criterion for grants awarded by foundations and public organizations, it was also a way to attract individual donors, sometimes at the expense of a scientific rationale.

> *Researcher*: Does it happen that you choose a specific place to plant trees, only because donors ask for it, although you know that you should work elsewhere?
> *Partnership and marketing manager (urban forestry)*: Of course, it does. But I mean, you have to think that it is better than nothing. It is not the place where we believe the needs are the greatest, but it contributes overall to improving the situation.

Conservationists we interviewed also embraced "citizen science," notably the use of applications on smartphones through which citizens can take a picture of an animal they saw and indicated its localization thanks to a GPS system. The involvement of citizens in conservation work was perceived as a necessary commitment to the protection of habitats. Conservationists, however, were conscious of the fact that this approach showed limitations, "people will only go outside when the weather is good for instance." (Head of a Department of Biological Sciences, Academia, 2017) Conservationists were also aware that humans were shaping ecosystems in a way that they could not anticipate, "for instance, we built paths for people to discover the forest, but these paths encourage some animals to go to places they did not go before." (Director, New Conservation Strategies, Large International Organization) Even for wilderness specialists, there was nothing like a wilderness area anymore – humans always have and will always continue to shape the earth. Echoing the choice of the zoo to compare skinks to polar bears (see Figure 4), we asked conservationists whether they were concerned by the fact that only the conservation organizations working on iconic species or in well-populated areas would attract citizen support. Most had a similar answer:

> Everything that could participate in conservation work is a good thing. If individual donors are happy to give for the little turtles, we should rejoice. It is the role of public authorities to be sure that ecosystems in their entirety are protected. (Head of a Department of Biological Sciences, Academia, 2017)

Conservationists hence made a clear distinction between what was of the general public's duty – to individually care and protect the natural environment that surrounded them, and the one of public authorities – to ensure the protection of the planet in its entirety for the forthcoming generations.

5.4. Conservation Performance as a Management Project

5.4.1. The Index: Revealing the Trajectories of Conservationists

While working on the publication of the new indicators planned for 2015, the conservationists decided to use the indicators they developed not only to account for their conservation work but also to manage it. They hired a database manager and a conservationist to build a database of indicators, and a monthly and yearly reporting process. Conservationists hoped to make the Index the backbone of their strategy and internal reporting to the Executive Director and Board of Trustees.

The conservationists believed that the Index could be used to assess the zoo's performance. Accordingly, they started choosing their activities based on the Index. This new form of management was considered to be a step-change for the organization and a huge move forward (Interview 4):

> I mean, anecdotally I've heard people say, "*There was no planning before*," but that can't be true. There must have been some. … We only implemented the [X] Species Survival Plans in the last year, so it's completely new. All of these plans are new. (Interview 4, Conservation Science Team)

The conservation science team had actually changed strategy. For years, the conservationists had been against what they judged to be a "managerial approach": "In evaluating our success, it is important we are viewed as a charity and *not in terms of profit and loss*." (Annual Report, 2005) From then on, they aimed to use this approach to further their own goals:

> [The zoo] has been in financial difficulties for some time, so unsurprisingly it's our finances that dominate board meetings. The Board of Trustees is largely made up of people from business backgrounds, though not exclusively. (…) So the conversation is dominated by our finances and it annoyed me intensely that, for however many board meetings in a row, we weren't even talking in a sensible, logical way about our mission as a charity and actually looking at some data about what we were delivering and how we were performing. (…). So I thought probably one of the reasons why is that these people who are used to very high-level metrics, key performance indicators or whatever, of an organization's performance, we're just not giving them the information. *So maybe this will change completely if I can produce these things*. (Interview 2, Conservation Science Team)

The conservationists went on to explain, "Charities used to be measured by the size of their halos. What we have done … is to make sure that everything is properly evidenced" (Internal Presentation 2013, citing the St Giles Trust CEO).

The conservationists did not want to set species against each other. "The philosophy of the Index (…) is not to try and compare the performance of different projects or different people, to therefore make decisions about whether we emphasize one or the other." (Interview 1, Conservation Science Team). Despite the conservationists' worries, the zoo started becoming a business-like organization that produced and sold "conservation results" (Interview 2). Species became products that could be virtually manipulated, monitored, and traded.

> Some species have a Species Survival Plan. Not all species we work with will have one; it's only *the really high investment species*. (Interview 4, Conservation Science Team)

Over time, the presentations of the Index to the Board of Trustees also started mentioning the need for "bottom-line, financial information." Conservation programs had to be "managed."

> How is the Trust performing in delivering its mission? Which programs give you the best bang for your buck? Which programs are performing well, which are under-achieving? (Internal Presentation, December 2014)

The conservation science team itself acknowledged that this approach made it easier to measure the performance of each program, species, and field manager. "You can aggregate and disaggregate across different organizational levels." (Interview 2, Conservation Science Team) The conservationists wanted the Index to become an integral part of the organization's routines, a "boring part of the day job." (Interview 1, Conservation Science Team) They consequently started using the Index to structure and monitor their conservation projects and to link them to the zoo's operations and strategy. This also enabled them to shorten the time horizon of their actions.

> For monthly and annual reporting, the field managers will get asked in the report "This is what you told us your indicators were. This is your target. Are you on track, yes or no? If not, why?" If they've achieved it, they just need to tell us. (Interview 4, Conservation Science Team)

Meanwhile, the management team started monitoring the species that were not "delivering" results. "It's a big fight because people feel we're here exactly not to do that, not to give up on species and it's a big fight" (Interview 10, Administrative Team). They dreamt of creating a "species scorecard" with red, amber, and green lights that would compare programs and identify issues and their progression:

> On the mission success side, we need something similar. We need to track progress. (…) "Okay, so we've got red here, and red here; it's not funded and it's not progressive, it's not progressing. So, let's talk about this one, [X], are we going to continue with it; shall we pull out; where is the money going to come from? (…) This is what you would typically have in business *if you had product lines*." (Interview 10, Administrative Team)

Employees welcomed the increased monitoring of their daily work. However, they were concerned about having the Index stay a simple, applicable measure to avoid "stacking up institutional time to constantly measure" (Interview 14, Wildlife Park Team), and therefore having it become "obsolete through complexity" (Interview 14, Wildlife Park Team). The possibility of comparing their programs and using the bottom line as a way of deciding whether to continue conservation efforts was never mentioned or even envisioned, despite top management's willingness to improve efficiency.

The conservationists also hoped that the Index would be part of the regular board pack that the trustees would receive as their annual reporting. The trustees concurred, "The Index should be used for the effectiveness of the whole organization, not just the conservation programs. So, it is going to be something that will make quite an impact internally." The conservationists and trustees hoped to use the Index to demonstrate to "business people" and donors outside the

conservation field what the zoo was capable of, "It's great to be able to use that in our toolbox to, in a way, sell to those who can't see" (Interview 11, Administrative Team).

5.4.2. An Inquiry into the Beings of Politics

The societal layer was the one of the beings of reproduction, the management layer is the one of the beings of politics. In the case of the zoo, conservationists wanted to please their board members by implementing management processes. This layer was the one where the conservationists we interviewed during the second stage disagreed the most with the approach implemented by the zoo. A conservationist working on public land (wilderness specialist) explained, "They lost their mind on the way! I mean this is crazy. Transforming animals into products, really?" For a specialist of zoos, the main problem was that zoos tend to see their natural environment as "collection of species," and therefore do not favor an ecosystem approach:

> This is where you have to realize what the historical legacy of zoos is. Conservationists in zoo still speak about their "collections." They have a specific place for each animal in the zoo, on which they collect a lot of data. Of course, this is changing, with the increased number of wilderness parks, but it does shape their relationships to the faunae. (Zoo Specialist, Academia, 2018)

The management layer indeed conveyed the relationship between the zoo and nature(s), their vision of animals as "objects to be managed." Most conservationists opposed this vision they labelled as a "zoo approach:"

> It is not how we approach ecosystems. Someone who understands ecology well would understand that if you give the conditions habitats need to flourish, they will eventually flourish. (Species at Risk Specialist, Coordination Efforts, 2017)

Conservationists nevertheless admitted that they also had to choose on a daily basis to which species or areas they should dedicate their resources.

> On this land, there are what we believe to be the last two specimens of this plant. I mean, on earth. Should we focus all our efforts on this plant or try to save the habitat as a whole? We do not like it, but we have to discuss between us to decide which species to save. (Restoration Ecology Specialist, Trust, 2017)

To better understand the reluctance of conservationists vis-à-vis the specie-based approach, we reframed our question in terms of "impact."

> *Researcher*: Ok, you argue that you only need to look at the inputs, and that habitats will flourish. But this zoo is doing something else, it wants to prove the impact of their work. You only suggest to measure your inputs – you stay in the second layer, but this tells nothing about your impact.
> *Conservationist (Species at Risk Specialist, Coordination Efforts)*: This is a fair point; the truth is that we also try to show our impact. We just have not figured it yet how to do it.

At the time of the interview, a new arena of discussion often emerged. Conservationists explained to us their desire to assess their impact and show citizens, policy-makers, donors that

they work mattered, but without losing how their envisioned ecosystems. The critique of conservationists vis-à-vis the zoo was not against the fact they wanted to better manage their conservation work, but that they did not employ an ecosystem approach. Had the zoo replaced those species-based metrics with some habitats-based metrics and discussion, conservationists we interviewed would have certainly been more welcoming. There was a difference between counting species on the field (i.e. scientific layer) and deciding what the conservation strategy should be, based only on those metrics. During our exchanges, some conservationists started sketching what a good impact measurement system would be, for them. They moved some parts of the Index, crossed others, added graphs, throughout mirroring their own relationship to nature(s). Although conservationists criticized the zoo for wanting to manage species as "products," conservationists we interviewed also searched to "manage" their conservation work in a way that proved to the rest of the world that their work was valuable. Conservationists were willing to use "impact metrics" if the latter could help them restore influence in the political arena. A conservationist commented:

> I mean this is a bit sad. But yes, we clearly use topics such as "climate change," "impact" or "reconciliation"[8] to push our agenda. We re-shape our conservation work in those terms, to be better aligned with the priorities of the government and the financiers. They want to be sure that their money goes towards organizations that can demonstrate their impact. I understand that. (Restoration Ecology Specialist, Trust, 2017)

Conservationists were reluctant to name conservation work a "business," but they were disposed to seize the opportunity of climate change and the urgency of the situation to gain power in society. An experienced academic explained:

> Conservation is a political matter. You have to decide which ecosystems you want to save, convince the public authorities, find the resources, and shape humans' behaviors accordingly. *Conservation you see in textbooks does not exist. It has never existed.* (Head of a Department of Biological Sciences, Academia, 2017)

5.5. Conservation Performance as a Financial Project

5.5.1. The Index: Revealing the Trajectories of Money

The conservationists inside the zoo increasingly argued that the Index shared the same cognitive financial frames as those used by donors and funding agencies. In internal presentations, the Red List Index was compared to "financial risk assessment". The urgency of protecting species was also emphasized using financial terms, "We need to be better at M&E [monitoring and evaluation] than others in the sector ... and get ready for ROI." (Internal Presentation, December 2014) Species that used to be "products" therefore gradually transformed themselves into "cash flows."

> The original idea was to find a way to represent what we had attempted and what we had achieved in a way similar to a share investment or a portfolio investment so that people who were used to seeing figures and successes and graphs would see it in that way and would hopefully see the light. (Interview 17, Board of Trustees)

[8] Reconciliation is the process through which the Canadian government is leading the way in engaging Canadians in dialogue and transformative experiences that revitalize the relationships among indigenous peoples and all Canadians.

The "Index" itself is promoted as being the way "to verify the impact of our work so that key stakeholder groups understand the 'return on their investment.'" The transformation of the Index into a financial device also appeared in the visual itself (cf. Figure 5).

Insert Figure 5

At the time of the interviews, both the conservationists and the external stakeholders from the conservation field had come to the conclusion that what had happened in the field of "impact investing" – e.g. the privatization of prisons, "homelessness" – would be the future of conservation. They argued that conservation performance therefore needed to become "more focused, more objective, more business-like, better managed, and that means a lot of emphasis on evaluation." (Interview 19, External Stakeholder) They explained to us that conservation NGOs needed to move to an "investment paradigm."

Several interviewees acknowledged that they were keen to follow the "social investment-type stuff" (Interview 1, Conservation Science Team) in their next strategic plan and use the Index as an impact prediction tool to lever fundraising and future development. Although the zoo in our case has not yet designed a financial product based on conservation performance (e.g. a "frog-impact bond"), it could potentially use the indicators from its Index for such a project. If this type of project did unfold, conservation would probably take the form of "investment programs" where the value of conserving specific species would be monetized.

> I've been very keen on pushing for stronger management and the selection of projects and their evaluation and assessment, and absolutely see it as an investment paradigm, where there are limited resources and you have to apply some form of selection, prioritization, assessment, and then check that your investment is actually working. (Interview 19, External Stakeholder)

While conservationists aimed to prove their return on investment, the donors we interviewed surprisingly insisted on the informal aspect of their evaluations. They explained that they actually evaluate grant applications on very qualitative and often informal information: through personal networks about past applicants and particular projects (Interview 21, External Stakeholder), or by building personal relationships (Interview 20, External Stakeholder). For example, a new project would be examined in terms of the people who would actually set up the project and in terms of the capacity and support these people could receive within the organization.

The donor organizations we interviewed even went so far as to say that they purposely did not develop any key performance indicators to assess projects as this was against their aims – in other words long-term conservation success. Donors were actually highly unhappy with the move of the zoo towards financialization. Overall, they doubted that a particular conservation success could be attributed to one organization – as conservation is often based on collegial success (Interview 20, External Stakeholder). Additionally, they complained that the Index had little to say about what could go wrong during the "conservation journey."

> Quantifying the overall performance of an NGO will still *only give you a feeling* for a particular project that the NGO might be implementing. So, in other words, even if an NGO has a good track record in implementing conservation projects for threatened species, it doesn't necessarily follow that the project that has been submitted to us, for example […], is a project that they can implement. (Interview 21, External Stakeholder)

Internally, a few people seemed increasingly aware that the Index could become a double-edged sword, starting a tendency for certain donors to focus on more attractive investments, namely shorter, simpler, and less risky conservation projects.

> The positive thing being that, I guess, you're going to be funded for the activities that you're best at because if you can prove that you can return a certain amount based on the investment you're given, *you're a more attractive investment*, as it were. But I guess that may tend towards funding *simpler short-term projects*, rather than projects where you're going into the unknown a bit because there is no expertise in dealing with that threat, which might be the species that most need help. (Interview 6, Conservation Science Team)

Yet all of the conservationists seemed to consider financialization as the "natural next step" (Interview 16, Wildlife Park Team) that would put them ahead of others in conservation performance, without seeing how their main objective – conservation – could be modified through the financialization process and its consequences. In 2017, the new Executive Director of the zoo hence explained to us:

> It is an interesting tool (i.e. the Index) to be able to go to investors and say 'You are an investor, you want to see the line goes up. Our line goes up, we are a good investment.' It gives confidence to the investors that we are a good bet. (Interview 25, New CEO)

5.5.2. An Inquiry into The Economy[9]

Conservationists we interviewed all admitted that they understood why the zoo eventually perceived itself as an investment. "I mean, this is how people think today, you have to put a dollar value on everything you do." (Stewardship Coordinator, Trust) Some conservationists explained to us that they would never financialize habitats, especially those who worked on public lands. They explained: "The government committed itself to protect those ecosystems. This is the law, they have to do it." When we notified them that governments authorize exploitation of mining resources, for economic reasons. They answered:

> Yes, it is the case. Economic rationale shapes governmental decisions. This is the reality. Financialization happens everywhere, but this does not mean that it should be the case, or that there is no alternative. *We should value nature for its intrinsic value*. (Wilderness Specialist, Public Land, 2018)

All conservationists we exchanged with valued nature(s) for its intrinsic value, but the above comments against financialization were scarce. None of conservationists rejoiced with today's situation, but many embraced financialization work. Many were hopeful that economic valuation of ecosystems could help governments and citizens eventually care about nature(s). All conservationists have at least already had a look at carbon offsetting or ecosystem valuation services, even those who were not involved with private owners of lands. Conservationists were hopeful that conservation finance could channel some private funding towards the protection of habitats. When we asked them whether they worried that such financialization process would discard nature(s) for its intrinsic value, many had a similar answer:

[9] Note that The Economy is not a mode of existence in Latour (2013) – its ontological standalone suggested by the title is actually part of the problem that has led to today's situation.

> If putting a dollar on the environment helps people value nature, why not? It does not take away the intrinsic value of nature. I will still value nature for what it is – it will not take that away from me. And if we can save more ecosystems thanks to that, we have to do it. Everything we tried before did not work, this, this and this [*showing the first three layers on Figure 2*], so we should stop convincing people to protect nature for their intrinsic value – it does not work. (Restoration Ecology Specialist, Trust, 2018)

An indigenous conservationist commented:

> *Indigenous conservationist (reserve)*: It's funny because at first, I thought that you would love this [i.e. financialization], coming from a business school. And then, I read the paper, and I discovered that you did not really like it.
> *Researcher*: Yeah, I mean, it's a bit sad to be in such a situation, isn't it?
> *Indigenous conservationist*: I don't like the history. I'd rather not have my people suffer. But this is what happened. You have to accept it and go from there. (…) These metrics enable me to please them [i.e. governments and funders]. They enabled this meeting to happen. It enables a lot of small islands to be saved and throughout to protect the land. They add to each other. My people do not care about these metrics. But this is the way we can connect, you and us.
> *Researcher*: You mean that it is not such a bad thing, after all?
> *Indigenous conservationist*: Maybe not.

After these exchanges, we wondered whether our fears of financialization as researchers related to our inability of accepting our own history, as Moderns and business scholars. Since we chose *The Economy* to govern our lives, why did we not succeed to accept that accounting and its financial metrics had become the default language of our society? Probably, because we had a doubt. We wondered whether financialization of conservation was a fiction. Financialization work indeed happened, but financialization seemed to remain a dream. As a conservationist noticed:

> I mean everybody is talking about it. But did you find any conservation organization that actually attracted money thanks to a financial product of some sort? Did this zoo attract more money? If you prove to me that this works, yes, why not. *But I think that this whole story of financialization is a myth*. (Wilderness Specialist, Public Land, 2018)

6. Discussion

The article turns our attention away from how market actors force financialization of new environmental and social spaces through the use of "financialized techniques" and toward how conservationists attempt to regain power in society through financialization work. The previous section analyzed how conservationists in the zoo progressively transformed species into products, and eventually investments that should generate returns. This evolution unfolded through the shaping of the Index, a performance measurement system aimed to measure the effectiveness of conservationists at saving endangered species. Our second round of interviews confirmed the attempts of conservationists to financialize their work, and this to convince their fellow humans to care more about nature(s). We shall elaborate on the implications of these findings for the endangered species, the humans and their accounting systems.

6.1. Implications of the Performance Index for Endangered Species

The Index has just been launched. Its consequences on conservationists' practices are therefore necessarily speculative. We nevertheless suspect that by implementing a performance index that rewards species that are more likely to survive, the conservationists of the zoo might have inadvertently built a system that could distract them from their mission. Conservationists recognize the importance of protecting all ecosystems whereas the Index push to value species that conservationists are the better at saving or that are more highly valued by the broader public and financiers. This type of development could make conservationists abandon the insular and neglected animals they are focusing on. We identify three main reasons for this potential negative outcome.

First, the endangered species the zoo aims to protect are species that are extremely difficult to save. These animals mainly die for reasons that are not directly linked to human behaviors, namely diseases and the evolution of complex interactions within their ecosystems. For instance, 99% of the global population of mountain chicken frogs has been lost in the last two decades due to a devastating amphibian disease called chytridiomycosis – a disease that conservationists cannot treat. Yet human-based incentives such as the Index encourage conservationists to focus their efforts on factors they can influence.[10] This reasoning relies on the fact that biodiversity is usually threatened by urbanism, global warming, and predatory human behaviors. But in the context of the zoo we studied, as in many ecosystems, conservationists' power is limited.

Second, society might not be willing to save such species. By involving the general public and donors in the accountability process, it is the citizens and donors, rather than the conservationists, who choose the animals to be saved. This choice is not incidental; it is the product of a specific social process that links nature(s) to politics, and that epitomizes in the Anthropocene (Latour, 2009, 2013; Lövbrand et al., 2015; Wapner, 2014). Conservationists attempt to use the societal layer to convince the general public of the need to save unknown animals such as the orange-tailed skink (cf. Figure 4) on the basis that there are very few of them left. Yet this argument could be counter-productive. Society might not see the benefits of spending money on faunae that are not part of their day-to-day life. In fact, most donations tend to favor iconic animals such as pandas and rhinoceros; animals "useful" for society (e.g. bees); or animals striking for their beauty or ugliness (Swift, 2008). Will a citizen judge a skink to be attractive, iconic or directly useful for society? Probably not.

Last, the zoo might lose its existing donors. The donors we exchanged with were, for the most part, unhappy with the development of the Index. There was a clear misunderstanding between what conservationists of the zoo envisioned donors wanted them to do and what donors actually desired. Donors of such zoos are charities run by individuals who tend to believe in the sacred character of faunae. All animals should be saved, which is precisely why these donors deliberately favor insular and unpopular species. They trusted conservationists and never asked them to prove their performance. They may ultimately stop donating to the zoo if they believe that the organization's mission no longer embodies their vision of biodiversity. The use of the Index for species that are directly threatened by humans probably makes more sense. This reasoning recently encouraged London Zoo to launch a £50 million "Rhino-Impact Bond." However, the intrinsic features of the endangered species protected by the zoo under study

[10] We acknowledge, however, that there may be unknown, causal mechanisms between human behaviors and the disease of animals. Although there may equally be no relationship – natural selection is after all a "natural" process.

render the latter's ability to attract such investors very unlikely. Why would an "impact investor" fund the protection of difficult-to-save species with little return for humans? The zoo not only risks losing its existing donors but it might also fail to attract new ones.

Our study hence demonstrates that it can be dangerous to consider all environmental issues as social ones. Humans might apply a social lens to a problem that might of a different ontological nature. Homelessness is certainly a social problem (Cooper et al., 2016). The refusal of the mountain chicken frogs to be saved might be less so. While humans are a source of species extinction (Romi & Longing, 2017; Tregidga, 2013), animals are not necessarily willing to be socialized. It is essential to maintain the plurality of ontologies at stake. Addressing the humanization problem of biodiversity is not easy, and has already been evoked in previous research (Atkins & Maroun, 2017; Jones & Solomon, 2013). The very fact that conservationists are human beings makes conservation anthropocentric. How can we not be humans? The ontological inclusion of the different modes of existence suggested by Latour (2013) is in practice difficult to achieve.

Yet one could also acknowledge that by linking species conservation performance to organizational performance through the Red List Index, the zoo we studied has nevertheless paved the way for extinction accounting that can link local and global management of conservation efforts. Biodiversity needs to be tackled using a global approach that is beyond corporate control (Milne & Gray, 2013; Whiteman, Walker, & Perego, 2013). The zoo managed to achieve this through an organizational indicator linking the zoo to a global boundary. The Index hence provides a pivotal link between humanity and nature and helps organizations account for their biodiversity impacts (Atkins & Maroun, 2017; Jones & Solomon, 2013). Last, our study suggests that in the case of animals directly threatened by humans (e.g. bees, polar bears, sharks), a conservation performance index based on human incentives is certainly a good system for attracting funding and increasing the survival of these species. Since humans and their domesticated animals represent 97 per cent of the biomass of all larger animals combined, with wild animals representing merely three per cent, the performance index is certainly adapted to many situations faced by conservationists.

6.2. Financialization: A New Myth for Society?

Organizations like the IUCN, WWF, Nature Conservancy – some of them led by former bankers – support financialization of conservation, notably by encouraging the development of conservation finance (Huwyler et al., 2014, 2016). Ironically, many conservationists embrace financialization to escape financial pressures. By designing metrics, such as the Index, they hope to attract funding and political support. Conservationists and financiers have developed together new financial products, such as impact bonds, public-private project financing or carbon offset models. The motivations of financiers certainly vary, from financial to societal and environmental. Conservation finance seems promising, as social impact bonds were. In practice, however, financialization work is actually extremely difficult.[11] Conservation finance requires an ownership structure that enables a private appropriation of the financial value generated through conservation efforts. It also needs a way to prove that an improvement/reduction of costs and risks was actually obtained thanks to conservation work. Last, it has to generate money.

[11] At a conservation finance event organized by conservationists, we could notice that almost all participants were conservationists, not financiers, despite the important efforts of the organizers to reach out the financial industry. Interrogated on this, the organizer answered, "*Our goal is to achieve a "maybe." Maybe we could link social finance and conservation. Maybe."* (informal exchanges, 22 February 2018)

It is a challenge to achieve these three goals. First, conservation science does not include a lot of counter-factual reasoning, especially on the positive side (see biodiversity offsetting as a good illustration of the problems at stake (Cuckston, 2013)). The Index is by far an exception in the field and extremely difficult to apply to other ecosystems. Social issues, like the fight against homelessness, are easier to assess from an impact perspective. This is notably the case since social impact bonds do not target the beings of reproduction. Life is "*at once the most important of all, the most obviously perceptible in experience, and the most difficult to characterize without getting wrong from the start*." (Latour, 2013, p. 423) The trajectories through which life unfolds and the causal mechanisms that link this mode of existence to the other beings are extremely hard to reveal. The beings of reproduction are either dead or alive; there is nothing in between. Assessing conservation performance, is therefore attempting the impossible.

Second, ecosystem valuation services – which are to a certain extent easier to value, give an economic value to ecosystems, but they do not generate cash, unless someone is ready to pay for it. Being a common, this payment certainly requires public authorities to implement a tax system that pays for these services, which is rare (see as a counter example Switzerland's subsidy farming model[12]). Third, while many conservationists evoked carbon offsetting, the price of carbon is so low that it makes little sense for owners to transform the usage of their land.[13] Only project financing through public-private partnerships, sometimes through impact bonds, is working. Yet such projects only target lands that can be exploited, such as forestry, farms, reserves (through tourism) and mining. In addition, those projects are rare, notably since they are very complex to implement due to a large number of stakeholders involved and the mechanisms of carbon offsetting often attached to the design of the financial model. A lot of work is still required to make conservation investable.

Conservation finance remains a niche, that has barely touched any of the conservation organizations we interviewed. Most conservation projects would probably be classified by financiers as "underlying" conservation projects, i.e. unwilling to attract private capital, for lack of cash flows (cf. Figure 6). Studying the conservation field hence enables us to examine financialization not through financiers, but through a new lens: civilization (Latour, 2013). Conservationists show us that financialization has gradually become the only imaginable way to govern our lives (Kurunmäki et al., 2016), a new myth for conservationists and their organizations. Believing that the inclusion of society – through for instance multi-stakeholder initiatives – would prevent financialization is therefore doubtful. First, the financialization work of the zoo did not imply the use of financial techniques, unlike what financialization research advances (Chiapello, 2014; Cushen, 2013; Giamporcaro & Gond, 2016). The succession of layers of the performance Index comprised visuals – including societal ones, informed by calculations that did not directly evoke an economic rationale. There was no financial metric on the Index itself, only drawings of some birds and monkeys on a curve (cf. Figure 5). Yet the nature and meaning of conservation performance has clearly evolved towards a financial viewpoint. Second, the involvement of citizens and other stakeholders is not necessarily a counter-force to financialization (Andreaus & Costa, 2014; Mook, 2014; O'Dwyer & Boomsma, 2015). Such reasoning relies on the opposition of the economic to the societal sphere

[12] "Instead Fritz is being paid for biodiversity: these tree species would be extinct in Switzerland if they relied on market forces for their survival," Switzerland's farmers become landscape gardeners, http://www.bbc.co.uk/news/world-europe-42731932, Accessed 25 February 2018

[13] A farmer evoked $50 dollars for an acre of land used for carbon offsetting, versus $10,000 if this land is cultivated.

– i.e. shareholders against stakeholders. This division barely holds anymore. Nature, The Economy, and society are now inseparable (Latour, 2013).

Insert Figure 6

6.3. A Financialization Work that Does Not Speak its Name?

The financialization work we observed was subtle and shaped by conservationists themselves. Conservationists actually used *The Economy* as the common language to accommodate the modes of existence they were intertwined with, to wit: The beings of technology (conservation science), the beings of reproduction (humans, ecosystems and their faunae), and the beings of politics (citizens, governments, society). They hoped to use accounting – and its ability to transform economic valuation into transactions that appear on the books, to generate cash flows. According to our interviewees, the entry of conservation in the field of "impact investing," would indeed be possible only if accounting metrics are designed to value financially conservation projects. As such, our findings remind us the mechanisms through which accounting begun in other fields, such as healthcare or education (Power, 2015). Yet, unlike those fields, financialization in conservation is not directly imposed by finance, nor by business schools or the States, as governmentality research has often suggested it. This appraisal of financialization by conservationists is probably where our account of contemporary conservationists differs the most from previous research, either in accounting and science (Power, 1996a) or in social and environmental accounting research (Gray, 2010). Conservationists did not need financial metrics to be enrolled and interested in *The Economy* (Chiapello, 2014; Malsch, 2013), they were already *The Economy*. Throughout the research, it was ironically us – accountants, who were the less enthusiastic for the process of financialization work. Conservationists lamented that people did not value nature(s) for its intrinsic value, but they did not perceive financialization as a threat to their own mode of valuation (Barman, 2015). In contrast, they hoped that economic valuation would add one mode of valuation through which more people could value ecosystems. This was also the case for the indigenous conservationists we interviewed. They did not oppose financialization to spirituality, instead acknowledging the ontological nature of both, as Latour (2013) suggests to do. Indigenous conservationists also included *The Economy* in their own modes of existence, as a way to accommodate modernity, in their own fashion.

Conservationists were also willing to expand conservation science towards society, notably towards citizen science, to involve more individuals in the protection of ecosystems. They believed that involving the general public was key to their success – a way to educate, raise impact and restore faith in the scientific institution. Many conservationists also pointed to the need to include indigenous knowledge in the conservation work, notably to expand current practices and hep reconnect human with nature(s). The modalities of such inclusion, however, were not clear. Those findings are aligned with the transformation of scientific authority envisioned in the aftermath of the Anthropocene (Brown & Dillard, 2013; Kunseler & Tuinstra, 2017; van der Hel, 2016; van der Hel & Biermann, 2017). Overall, our conversations seemed to indicate that conservation science itself was shifting from a modernist lens based on science – an approach that conservationists confessed has never existed, to a plurality of interconnected ontologies where accounting is expected to play a key role, maybe at the image of the Anthropocene itself. This evolving lens was also probably explained by the fact that we interviewed conservationists, i.e. engaged interdisciplinary scientists who try to find pragmatic solutions to the problems they face, not "armchair ecologists" as one of the interviewees noticed. More research is needed to expand such findings to other scientific fields.

It was clear however that conservationists did not imply increased relativism – post-modernism or alternative facts, but rather referred to a broader set of evidence informed by various ways of connecting to ecosystems – performance metrics such as the Index being only one of their "value meters." (Latour, 2013, p. 445) Most conservationists we interviewed hence did not want to use accounting metrics to calculate a "value-less" optimal. In *The Economy*, conservationists hoped to find a language that most of individuals could understand to help them accommodate the different relationships to nature(s), each with its own values and metrics, as social and environmental accountants suggest to do (Atkins et al., 2015; Atkins & Maroun, 2017; Gray & Milne, 2018). This is notably why conservationists opposed the zoo's desire to transform species into products; they were worried to base decisions on one set of metrics only. We were approaching conservation in terms of intrinsic value of nature vs. economic commodification (Atkins & Maroun, 2017; Jones & Solomon, 2013), ready to protect conservationists under the threat of financiers, but we realized that this divide was long overdue on the field. Conservationists had long understood that conservation science is intertwined with politics and that their power on life is rather limited. Faced with these observations, most conservationists we interviewed seemed to simply take financialization as the next natural step to reshape their relationships with the rest of society and make all modes of existence co-exist, not an "anthropocentric" view that would trump a "deep ecology" vision (Atkins & Maroun, 2017; Gray & Milne, 2018). The sense of urgency brought by the Anthropocene made the conversation about the role of humans of secondary importance – it was clear that humans shape ecosystems and reciprocally. The priority was on how to find solutions. Does it mean that we should approach accounting with a different lens, as conservationists encouraged us to do? Should we engage more in the design of pragmatic responses, instead of lamenting the unfortunate course of events that led to today's situation? We wonder.

According to Latour (2013), the way conservationists approached accounting could actually be emancipatory (Maroun & Atkins, 2018), provided the values and the trajectories of each mode of existence are revealed through the metrics, and constantly (re)questioned. It could theoretically help *The Economy* to make its morals re-appeared and the faith in the scientific institution to be restored. Could it, really? It is difficult to answer. As mentioned above, revealing the trajectories of life is almost impossible. In addition, the variety of connections between the beings of reproduction, politics and technology involved in the ecosystems makes these exchanges complex and the compromises almost always necessary. One must be careful not to replace the diversity of values with an economic rationale only. Could conservationists prevent the economic rationale to win if they start shaping the relationships between humans and nature(s) in those terms? The history of fictional expectations shaped by the Moderns forces us to be cautious – the very belief in financialization as a way to attract support from fellow humans has not yet been proved. Is regaining power in society the only way conservationists can help protect ecosystems? Should not be more involved in our own survival? This situation is not only theirs; it is ours. We indeed failed, but we can re-build. Conservationists encourage us to accept what we have done with the planet and our lives, and to start from there. We might question financialization, but this is the language most of us speak. Maybe this is where we should start then, the time for indigenous people to heal and for us to reinvent a way to be Moderns – if we survive.

7. Conclusion

Most scientists come to agree that the movement of humans into the Anthropocene might be one of the most disruptive events of all times for the environment and for our societies alike.

Since our civilization seems to choose finance as the default institution for governing societies, we – business scholars – probably have even more responsibility than others to consider the consequences of such a transformation. Nature, politics, and business are distinctions that will probably cease to hold in the near future. Financialization is maybe not the evil process that many describe; although it does require scrutiny in terms of the conditions under which it should be allowed to unfold. Beyond accounting, this study raises questions about how social and natural scientists, but also citizens and financiers – among others – could work together to tackle the challenges the planet and its inhabitants are facing. We hope that our attempt to collaborate with conservationists to improve the protection of biodiversity will encourage others to push the boundaries of our discipline.

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LIST OF TABLES

Table 1: Global and Species Indicators making up the Index

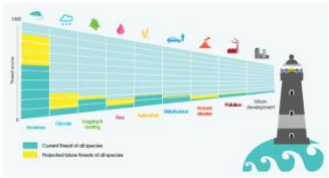
Global Indicators	
Pressure indicator	Threats to species survival
Response indicator	Acting to save species
Response indicator	Building the scientific evidence base
Response indicator	Advancing the [zoo] Ark
Response indicator	Rebuilding wild populations
Response indicator	Protecting threatened places
Response indicator	Controlling invasive species
Response indicator	Training for conservation success
Impact indicator	Species trends: successes and challenges
Impact indicator	The Index of species survival

Species Indicators	
Status indicator	Range
Status indicator	Population size
Pressure indicator	Threats
Response indicator	Actions
Response indicator	Species survival journey
Impact indicator	Population trend
Impact indicator	Extinction risk

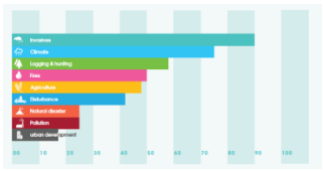
Table 2: Representations of Indicators used in the Index

Threats to Species Survival (Global Indicator)

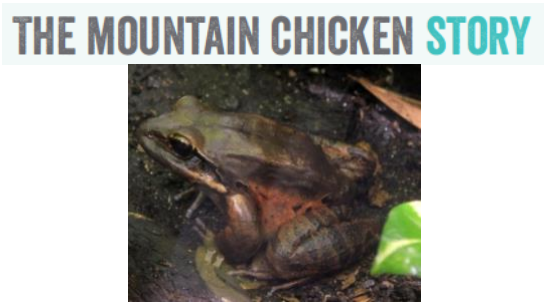
Societal visual



Business visual



Animal picture



Extinction Risk (Species Indicator)

Status

Indicator

LIST OF FIGURES

Figure 1: Types of Endangered Species Targeted by the Zoo under Study

Source: Royalty Free Images Found Online, pictures of animals similar to the ones tackled by the zoo.

Figure 2: The Financialization of Conservation Performance through the Index

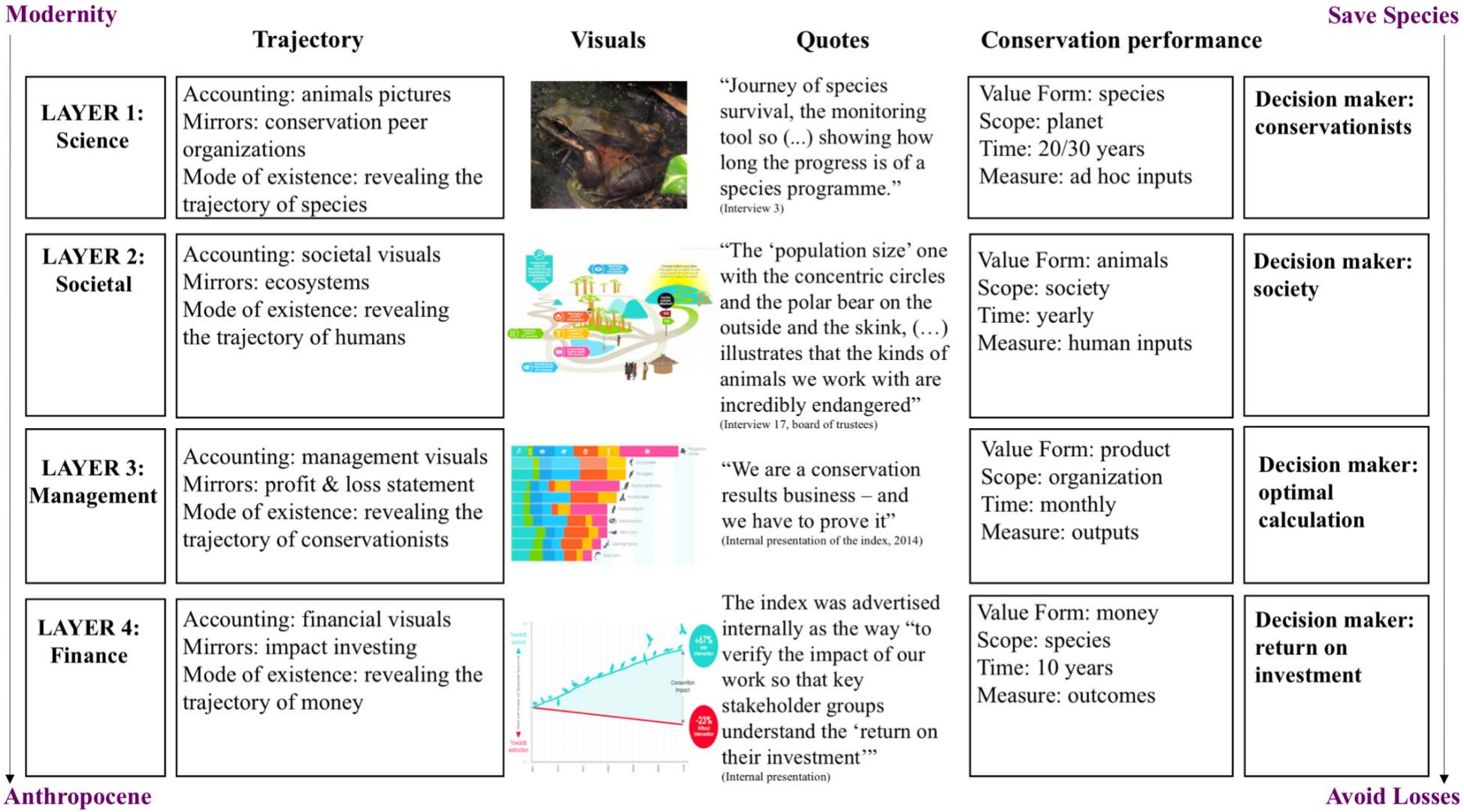


Figure 3: The Conservation Journey (Source: Zoo under Study)

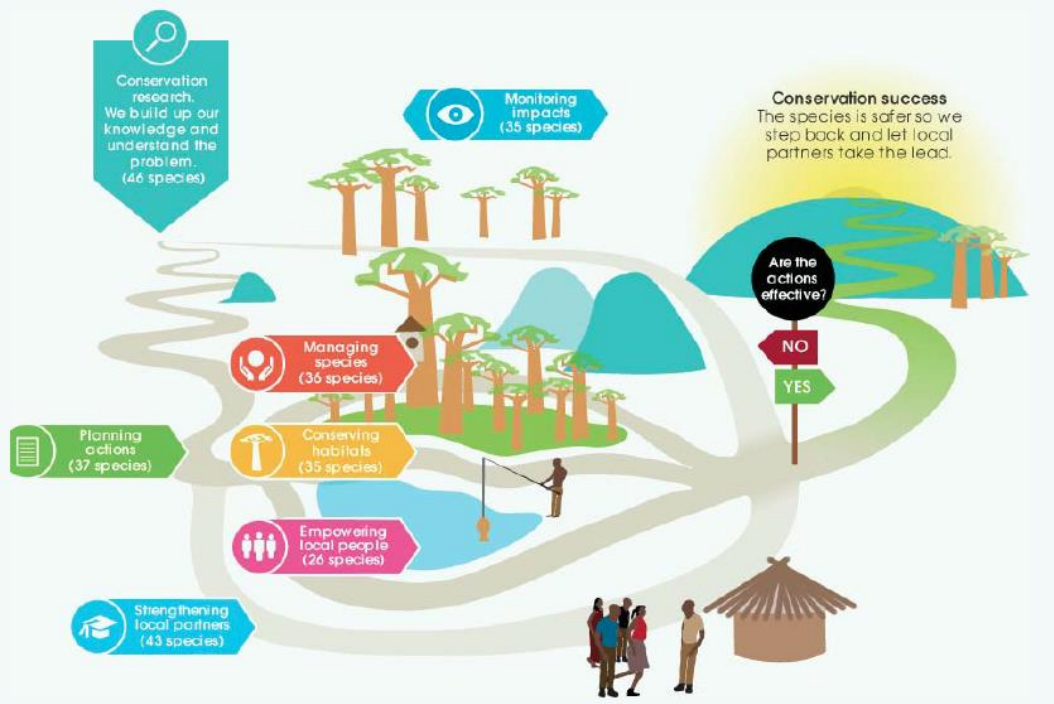


Figure 4: Population Size (Source: Zoo under Study)

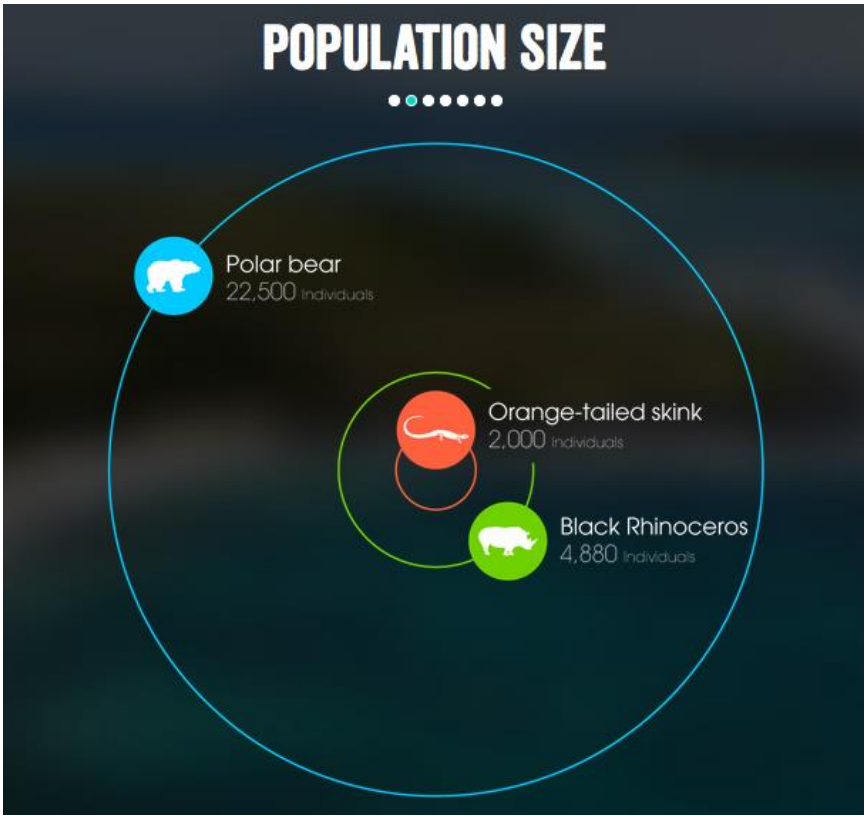


Figure 5: The Index of Species Survival (Source: Zoo under Study)

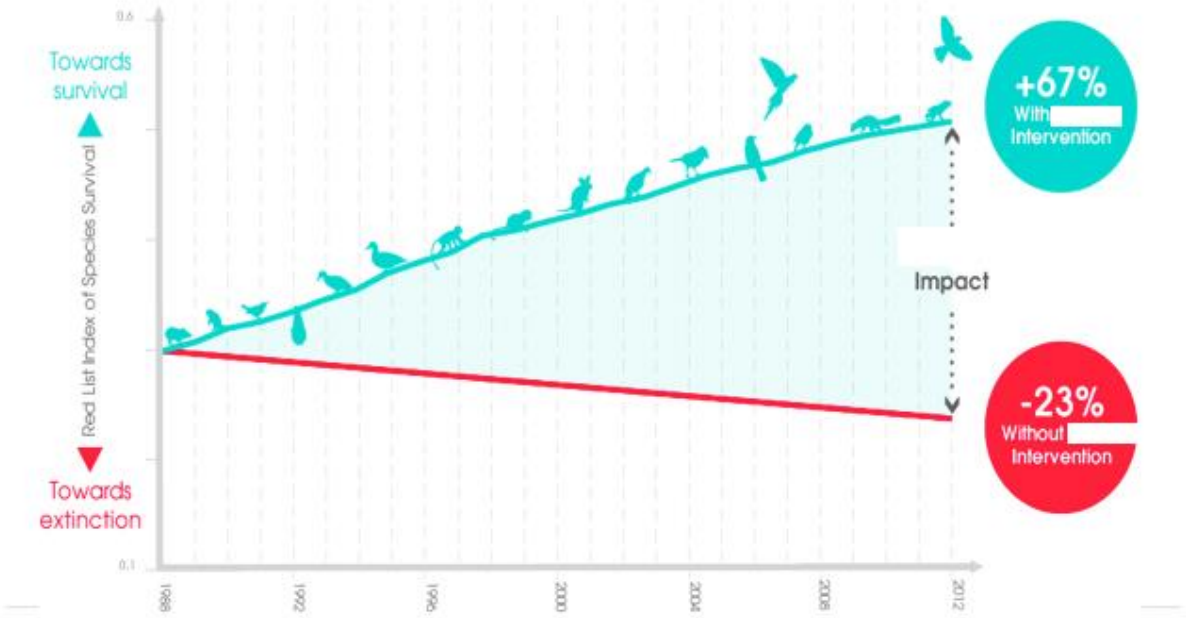


Figure 6: Classification of Conservation Investment Modules (Source: CS/WWF/McKinsey)

	Underlying	Cash flow generation	
Investment into	Ecosystems	Sustainable ecosystem management or related infrastructure	Environmental markets and regulatory arbitrage
Examples	▪ Grassland ▪ Temperate forest ▪ Tropical forest ▪ Freshwater — Wetlands — Rivers — Lakes ▪ Deserts ▪ Mountains ▪ Marine/coastal areas	▪ Sustainable agriculture ▪ Sustainable forestry ▪ Sustainable fishery/aquaculture ▪ Freshwater protection ▪ Ecotourism ▪ Renewable power generation	▪ Permit or rights issuance and trading ▪ Offsetting – voluntary ▪ Offsetting – mandatory ▪ Tax arbitrage
Typical investor rationale	▪ Long-term ▪ Capital protection	▪ Mid-term ▪ Return generation ▪ Prevention of capital erosion	▪ Short-term ▪ Return enhancement

WWF (2014), "Conservation Finance-Moving Beyond Donor Funding Toward and Investor-Driven Approach", report co-written by Credit Suisse, WWF and McKinsey&Company, p.19.

APPENDIX – DATA SOURCES

1st stage (Zoo under study only)

Interviewees	Number of Interviews	Duration
Board of Trustees	2	75’
External stakeholders	4	110’
Members of conservation science team*	8	588’
Members of field conservation team*	2	73’
Members of wildlife park team	4	211’
Members of administrative team	6	246’
Conservation Finance Specialists (informal discussions)	2	120’
Total	**28**	**24 hours**

*The three managers of the teams (i.e. Head of Animal Collection, Head of Conservation Programs, and Head of Conservation Science) all graduated in zoology. Only one conservationist in the team later obtained an MBA.

Type of secondary data	Number of Documents
Board meeting presentations	5
Index workshop documents	3
Annual reports	10
Public documents relating to the Index	1
Communication (blog) on the Index	1
Communication (scientific) on the Index	1
Public documents relating to the organization	2
Total	**23**

2nd stage (Field of Conservation)

	Interviewees	Specialty	Organization	Duration
1	Head of a Department of Biological Science	Conservation Ecology and Evolution	Academia	122’
2	Head of a Department of Anthropology	Primatology with an ecological focus that incorporates conservation	Academia	99’
3	Professor of Biological & Geological Sciences, Conservation Property Manager	Restoration Ecology and Invasive Species Management	Academia & Trust	91’
4	Stewardship Coordinator	Land Stewardship, Environmental Outreach and Partnerships Development	Trust	91’
5	Conservation Project Manager	Ecological Restoration, Rehabilitation and Environmental Assessment	Urban Forestry	84’
6	Partnerships and Marketing Manager	Environmental Outreach and Partnerships Development	Urban Forestry	88’
7	Senior Conservationist	Landscape Ecology, Forest Management and Conservation Finance	Trust, Advocacy, Coordination Efforts / National	67’
8	CEO and Founder	Carbon Offsetting, Urban Forestry *(Business Degree)*	Investment Management Company	67’
9	Professor, Policy-Maker	Conservation Protection, Recovery of Freshwater Fish Biodiversity	Academia	70’
10	Director, Conservation Finance & New Conservation Strategies	Resource Management, Conservation Finance *(Undergraduate in Forestry, MBA later)*	Large International Conservation Organization	118’
11	Corporate Strategy Specialist	Conservation Impact Bonds *(Business Degree)*	Advocacy, Coordination Efforts / Regional	76’
12	Executive Director	Ecosystem Recovery, Wildlife Research and Land Stewardship, Species at Risk	Advocacy, Coordination Efforts / Regional	76’
13	Executive Director	Funding of Conservation Projects	Large Foundation	57’
14	Director of Ecosystem Recovery	Protection and Recovery of Ecosystems, Sustainable Land Uses and Lifestyles, Deep Reverence for the Natural World	Advocacy, Coordination Efforts / Regional	81’

	Interviewees	Specialty	Organization	Duration
15	Investment Director	Project Financing Against Desertification *(Engineering, then Business Degree)*	Large Transnational Initiative	60’
16	Director of Conservation Planning	Connections between Science and Indigenous Knowledge, Innovative Policy Solutions, Endangered Species	Public Land	81’
17	Farmer, Executive Director	Ecosystem Farming, Alternative Land Use Services *(Business Degree)*	Large Foundation, Advocacy, Support of Farmers	84’
18	Forestry Manager, Trustee, Municipality Councilor	Planted Forest Management	Large Cooperative	
19	Manager, Wildlife Office (Indigenous Conservationist)	Holistic Management of Ecosystems	Reserve	86’
20	Professor, Zoo Specialist	Zoos, Structure of Evolutionary Biology and its Implications for the Study of Cultural Evolution	Academia	65’
21	Wilderness Officer	Stewarding, Protecting Wilderness Areas	Zoological Society	69’
22	Head of Climate and Carbon Finance	Project Financing, Impact Bonds *(Engineering, then Economics Degree)*	Large Transnational Funding Organization	42’
23	Conservation Specialist	Conservation of Wilderness, Endangered Species *(MBA later)*	Public Land, Advocacy, Coordination Efforts	53’
24	Natural Heritage Coordinator (Indigenous Conservationist)	Holistic Management of Ecosystems	Reserve	105’
25	CEO	Conservation and Management of Endangered Species	Zoological Society	39’
26	Chair	Political aspect of conservation (i.e. negotiation with governments, policy making)	Conservation organization (Advocacy, Coordination Efforts – Regional Level)	72’
27	Conservation Science Specialist	Conservation Science, Protection of Endangered Species	Large International Conservation Organization	60’
				32.5 hours

N-B: Given the focus of the article on financialization, we indicated when the interviewees studied business or economics during their career. Only 3 interviewees only studied business. The rest of individuals graduated from zoology, forestry, ecology, biology, conservation, veterinary, anthropology, among other fields.

Participative Observation

Events	Status of the Researcher(s)	Occurrence	Participants Involved	Duration
Working Group on Biodiversity in Food SMEs (Eklipse)	Participant	One-year project with bi-weekly meetings and 4 in person meetings	NGOs, public sector organizations, farmers, economists, political science academics, finance academic, management and accounting academics	One year
Visit of Ecosystems	Observer	4	Conservationists	5 hours
Interdisciplinary Panel on the Financialization of Conservation	Participant	1	Conservationists, Indigenous Leaders, Academics	90’
Panel on Conservation Finance	Facilitator	1	Conservation Finance Specialists, Conservationists	120’
Conservation Conference – With a Focus on Conservation Finance	Observer	1	Conservationists, Policy-Makers, Conservation Specialists, Indigenous Leaders	1 day
Ecosystem Valuation Services Calculation	Supervisor	2 Projects	Farmers, Students	3 months
Carbon Offsetting Modelling	Pro Bono Advisory	2 meetings	Conservation Finance Specialists, Conservationists	120’