PART I

Roots of Unsustainability

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THE LONG HISTORY OF UNSUSTAINABILITY

Inter-species relations since the 1850s

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Introduction

According to current estimations, the global populations of wild vertebrate animals have fallen by more fifty percent during the past forty years, and approximately one-fifth of all known vertebrate species are threatened by extinction because of human activity (International Union for Conservation of Nature, 2017; World Wide Fund for Nature, 2016, p. 18).

Since the UN Conference on the Human Environment in Stockholm in 1972, the international community has sought to regulate the human-nature relationship on a global scale. Despite countless efforts to curb human impact on the environment, both domestically and internationally, well intentioned policies have fallen short of their purpose. Anthropogenic environmental changes threaten to surpass planetary boundaries that have made the development of complex human societies possible. Reasons for this can be traced in the past.

Our aim is to demonstrate that human conduct, which has led to the current situation, cannot be understood or altered without looking back at the history of inter-species relations in the western world. Since humans are animals we use the concept of inter-species relations instead of the anthropocentric human–animal relations concept. We argue that the failure to reverse the slump towards mass extinction springs partly from the built-in anthropocentrism in western scientific, economic and popular ideas about and practices towards nature. According to this, other species have been seen merely from the perspective of utility and economic progress. In this chapter, we focus on the industrial and post-industrial era since the 1850s. This time period is characterised not only by the massive growth of industrial production but also by the endemic belief in progress which presented material growth and consumption as wellbeing and advancement (Syrjämaa, 2007, pp. 175–227; Hetherington, 2008).

The notions of sustainability and sustainable development are often considered to have gained ground in the latter part of the twentieth century and infiltrated into the heart of political and social discourse as a result of the Brundtland Report of 1987. However, human societies have generally striven for economic sustainability vis-à-vis their living environment – although often unsuccessfully. In Europe, for example, laws to regulate the use of forests and the hunting of game animals date back to the Middle Ages. Their goal was to maintain the exploitable natural resource base.

Human impact on the natural environment has long been known, as the preface of a famous book entitled *Man and Nature*, published in 1864, demonstrates – with a catch:

> The object . . . is: to indicate the character and . . . extent of the changes produced by human action in the physical conditions of the globe we inhabit; to point out the dangers of imprudence and the necessity of caution in all operations which . . . interfere with the spontaneous arrangements of the organic or the inorganic world; to suggest the possibility and the importance of the restoration of disturbed harmonies; and . . . to illustrate the doctrine, that man is, in both kind and degree, a power of a higher order than any of the other forms of animated life, which, like him, are nourished at the table of bounteous nature.
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> *(Marsh, 1864, p. iii)*

Despite acknowledging dangers caused by human action, the quotation reveals a firm belief in the supremacy of humans, who are considered to possess an ability to simultaneously exploit and protect a subservient nature. This kind of belief still prevails and is often called weak sustainability, which, in reality, is unsustainability in progressive disguise.

By the late nineteenth century, local and regional climate change, besides natural resources, had become a concern. As a result of extensive logging, soil erosion and flooding had led to desertification and a change from moderate to hot climates in many parts of the world from Asia and Arabia to Europe and America. In 1884, *The New York Times* quoted an article by Dr Felix L. Oswald:

> The coast lands of the Mediterranean have wasted away in a decline, 'which seems to be the ultimate fate of all civilised countries'. 'Planets die by desiccation', and there is no doubt that 'the hectic glow of that malady begins to be felt in the lands of the Western Hemisphere'. In two centuries the lumbermen of the United States have 'killed as many trees as the inhabitants of Southern Europe felled in two thousand years between the foundation of Rome and the conquest of Granada'.
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> *('Destroying a treasure', 1884)*

Hence, despite the fact that Svante Arrhenius observed in 1896 that carbon dioxide in the air increases the Earth's ground temperature (see McKibben, 1990, pp. 7–8),

this verifiable scientific claim was ignored until a century later. In other words, many of the mechanisms of climate change impacts were already understood in the late nineteenth century. The impact of local and regional climate change on humans, but not on other animals, has been agonised over. Coal, which fuelled the technologies of industrialisation, was the main culprit of warming (Crosby, 2006, p. 69). Robert Angus Smith had discovered a correlation between acid rain, heavy coal burning regions and wind currents as early as 1852 (see McKibben, 1990, p. 33).

Yet, such concerns did not shake popular faith in economic growth as a route to prosperity and happiness. Whilst the idea of progress had been a key issue for eighteenth-century philosophers, such as Nicolas de Condorcet (1794), the concept gradually infiltrated into commonplace thinking in practically every sphere of life. Since the mid-nineteenth century it has become evident that people believed that human ingenuity could solve all problems, including the less desirable side effects of technological innovations and growing industrial production. Later, alongside the disruptive world wars and ecological crises of the twentieth century, the word 'progress' gradually lost its glamour. Yet, commonplace beliefs have continued to fuel weak sustainability discourses and actions in the twenty-first century.

In this chapter we study inter-species relations over the past 150 years. This subject is at the core of the history of unsustainability and the Anthropocene, and is intertwined with the belief in human supremacy. Our research will investigate historic inter-species relations from three perspectives: the media, business and science. We will first contemplate the absence of living animals in the context of portraying modernity in world's fairs, the most spectacular and one of the most powerful forms of mass media of the time. We will then examine the long-standing exploitation business of Africa's Big Five and compare it with that of Finland's Big Five. Finally, we will analyse how the prevailing scientific ethos has emphasised the control of non-human species by highlighting the sustainable methods adopted to catch fish. The idea of a delicate balance between deficit and surplus, vis-á-vis animal populations, has also encroached into mainstream environmentalist practices. Endangered species are often preserved as nothing more than curiosities, although they no longer have agency in supporting ecosystems.

Media spectacles of anthropocentric progress at world's fairs

The nineteenth century witnessed numerous major changes and innovations that substantially contributed to the formation and spread of unsustainable modes of living. The Victorian era was epitomised by the feeling of dizzyingly swift technological and scientific change and the continuous flow of novelties. The mass media played a crucial role in this process, as it efficiently circulated ideas of human progress and supremacy. A great variety of media, from newspapers to colossal exhibitions, depicted and celebrated human ability: with the advent of the steam engine people travelled much faster and more safely than ever before. Distances were seemingly reduced and conceptions of time and space were shaken. The use of gas and then electricity overcame darkness in urban streets, factories and wealthy homes. With

new medical insights, people were about to beat a newly found enemy: microbes. With new communication technologies people were able to record images and voices and transmit messages across oceans and continents.

The anthropocentric worldview offered only secondary and subordinate roles for 'nature', whether non-human animals, plants or inorganic elements of the Earth. Industrialisation and urbanisation increased and radically transformed the utilisation of animals, who became raw material for industrial products and sources of power for factories and cities (Baratay, 2012, pp. 107–134). This intensified a long process, which has gradually rendered obsolete rural practices of close daily co-living between humans and animals in the Global North. The role of animals in the biggest and most spectacular mass medium of the nineteenth century, world's fairs, is a telling example of the ethos that has led to intensified exploitation of living animals. This process also banished animals and their suffering from the gaze of the vast majority of humans.

Expositions were mega events of unprecedented size, beginning with the Great Exhibition held in Crystal Palace in London in 1851. By 1900, the Paris *Exposition Universelle* attracted fifty million visitors. These events were therefore highly newsworthy and influential (Roche, 2000, pp. 38–48). The exhibition medium consisted of a great variety of genres, including thematically and geographically restricted events that efficiently disseminated the ethos of the great exhibitions far beyond the largest metropolises (Filipová, 2015). Other media eagerly anticipated, depicted, documented and eternalised expositions, thereby further enlarging their sphere of influence (Snickars, 2006, pp. 126–128). Due to rising literacy rates and the rapidly expanding printed media, millions of people (especially Europeans and North Americans), who were not able to visit an exposition, read or heard stories of these ephemeral cities of wonder and awe.

As spectacular mass events, exhibitions powerfully reinforced values and defined worldviews. Expos, as well as subsequent media reports, circulated information regarding scientific, technological and commercial novelties to a large audience. This process promoted all-round education, but also divulgated information to specialists in many fields (Syrjämaa, 2016). They did not promote a coherent ideology, but were even more influential in enhancing the ambiguous idea of progress. This was a concept that was not only flexibly utilised in relation to technology and science, but also in regard to aesthetics, consumption and morals. Progress was exemplified and proven in expositions by a wide variety of displays, which ranged from ethnographic collections to the newest electronic gadgets: from mines and minerals to fashionable wallpaper. By amalgamating science and commercial interests with burgeoning nationalism and imperialism, the expositions encouraged people to trust in and compete for material wealth. The banal belief in progress equated growth in quantity and variety of goods with that of human wellbeing (Syrjämaa, 2007; Caradonna, 2014, pp. 55–62). This paved the way for modes of living that are at the core of weak sustainability, namely privileging in production and consumption apparent growth in human capital such as financial profit and ignoring the concurrent loss of environmental assets. In this context, unbalanced inter-species relations are essential.

Animal matter was present in numerous industrial goods that were displayed at the expos. The official classification of exhibits at the Chicago World's Fair, for example, which attracted some 27 million visitors in 1893, included exhibitions dedicated to canned meats, animal fibres and to machinery for fabricating animal products (*Classification*, 1891). The presence of animals, however, was opaque in this context, as they merely constituted part of the production process in the form of flesh, bones and tissues. It was – and continues to be – common to overlook the life and death of an animal, when our attention is directed to the end product. The only qualities of a dead animal that were deemed worthy of display were rarity, exoticity, expensiveness and size: an elephant hide was peculiar enough to be shown in the Shoe and Leather Building. This exhibit was even eternalised in a photographic souvenir album as 'the largest piece of leather ever tanned' (*The Dream City*, 1893). The emphasis, however, was less on the animal, the raw material, than on the human achievement in tanning the large hide. The ordinary mass of animal matter that was used in industrial production, which would not have pleased the eye, was kept out of sight.

A somewhat more common attraction were taxidermied animals. Taxidermy was an important method for adjusting animal bodies for the needs of science, education and entertainment. The paradoxical idea of taxidermy is to present the lives of species, albeit it requires the death of the exhibited individuals (Thorsen, 2014, pp. 24–33). Natural history museums, in particular, have acted as forums for stuffed animals. They have also been displayed as trophies or ornaments elsewhere, including private homes. Mounted animals from far-away lands were also included in the exhibits of the Chicago World's Fair (The Field Museum, 2017), but were not among the choicest attractions. Although they were essentially human-made objects, they could easily be perceived as authentic animals in a scientifically valid form. This was deemed to justify the killing of individual animals – and the same justification spurred vivisection.

There were only a small number of living animals at the world's fairs, which can be partly explained by practical obstacles. Specific agricultural fairs or pet shows, in which animal presence was unavoidable, usually only lasted for a few days. Yet, despite the obvious difficulties, some living animals did participate in world's fair exhibits, such as in connection with cattle breeding. Their presence was, however, most prominent and eye-catching in the ethnographic displays that became increasingly popular from the 1870s. Among the most famed displays was Cairo Streets, which presented traditional festival-style camel processions in a simulated Arab street. A close inter-species relationship was depicted in the ethnographic displays that portrayed exoticised foreign cultures that were not regarded to be at the same level of modernity and progress as the supposedly civilised Western world. Eric Ames notes that these habitat displays, which consisted of people, their utensils and buildings as well as animals, aimed to show entire lifestyles and cultures in action. These thoroughly colonial and imperialistic displays were extremely popular at the time and their organisers aimed at to present a respectable and scientifically based image (Ames, 2008, pp. 70–88). Whether intentionally or not, they promoted

a view in which close inter-species relationships formed part of traditional, old-fashioned ways of life.

Presenting indivisible human-animal co-living only in connection with traditional lifestyles begs the questions of the whereabouts of the animal with whom modern human – the mass of the spectators – could live in close proximity? Returning to the Chicago example and examining souvenir albums (*The Columbian Exposition Album*, 1893; *The Dream City*, 1893), which showcased the most important and popular sights, we can find only a few references to contemporary American inter-species co-living. Examples include a series of statues that presented a cowboy with his horse and a farmer and a horse tilling a field. In the context of an exposition, which aimed at presenting state-of-the-art human achievements, these statues had a decisively nostalgic undertone that represented practices that it was believed would be inevitably transformed in the future.

In sum, the visible presence of animals was almost non-existent at the largest expos. When animals did appear at fairs, their presence was connected with traditional ways that humans lived. The mantra of progress (that led to inequality among humans based on cultural, ethnic and gender divides) strengthened the conviction of overall human supremacy and their privileges over nature. The roots of weak sustainability are tightly interwoven with this outlook. The myth of modernity, which highlighted difference and distance between culture and nature (Latour, 1993) and between humans and other living creatures, sustained the unscrupulous utilisation of nature for the sake of seeming human enrichment and profit. After the heyday of the world's fairs, the word 'progress' has fallen out of use, but the very same ethos, the primacy of human needs, is still forcibly alive. This can be seen, for example, when weighing the value of short-time human employment against animal suffering or the long-term loss of biodiversity.

The exploitation business of Africa's Big Five

The exploitation of wild animals for business and pleasure has long historical roots. The hunting of wildlife for markets and trophies has existed at least since the Roman era (International Fund for Animal Welfare, 2016, p. 8). Colonialism in the nineteenth century made big game hunting an occupation and an elite hobby for white men. In colonial Africa, professional hunters competed to kill the Big Five: lions, elephants, buffalos, rhinos and leopards (Le Noël, 1999). Traders imported ivory into Europe and America (Walker, 2009). In India the British aristocracy learnt how to hunt tigers on elephants from local rajas and maharajas (Allsen, 2006). Zoos and circuses bought live wild animals from Africa and Asia in order to attract spectators (Ritvo, 1987; Nance, 2013).

Circuses, menageries and zoos in the United States grew larger than anywhere else in the world. The largest circuses – Ringling Brothers, Hagenbeck-Wallace and Barnum & Bailey – employed some 1,000 people and 600 animals each. The elephant became the icon of the American circus, and every big top had to have one (e.g. 'Prices of', 1885). In 1851, P.T. Barnum and Seth Howe started a race by

exhibiting a team of ten elephants in their Asiatic Caravan, Museum and Menagerie (Nance, 2013, p. 146). Subsequently, all large railway circuses bought a dozen or more elephants and trained them to pose in pyramids.

When the most famous circus elephant of the nineteenth century, a huge African elephant called Jumbo that had been bought by P.T. Barnum from London Zoo (Ritvo, 1987, p. 232), died, a question of the future of elephants was raised in newspapers: were elephants dying out of the world? It was suggested that with over 100,000 elephants killed annually, the natives of Africa and Asia were not capable of protecting the species from becoming extinct and therefore Westerners should step in ('Jumbo's successors', 1885) – although it was mainly white hunters who were killing them. This debate expanded to include other exotic game. Circuses and zoos volunteered to offer sanctuary for wildlife and breed them. Circuses argued that 'the privatisation of wild animal populations was progressive' and 'consumers could help animals by paying to see them held in captivity' (Nance, 2013, p. 209). Maintaining exotic animals in captivity symbolised human power, and 'refusal' of many animals to breed in captivity was considered defiance to be overcome by zoos (Ritvo, 1987, pp. 232–235) and circuses. Moreover, circuses claimed that the successful reproduction of captive animals signified their happiness (Nance, 2013, p. 214).

The life of elephants in circuses was that of slaves. Every morning they erected the big top with workmen in a new town, then walked in a parade through the town, performed in the afternoon and evening shows, disassembled the circus with workmen, and finally, overnight, travelled on a circus train to the next town to start the process again, for the duration of the season which lasted from early April to late November (Davis, 2002, pp. 69, 143–152). Circus owners claimed that the elephants had to earn their keep: water, hay and shelter (Nance, 2013, pp. 148, 152–154). Other circus animals, such as lions, leopards, rhinos, cheetahs, hyenas, zebras, tigers and polar bears lived in cages and performed unnatural tricks, often posing together against their true nature (e.g. 'These wild', 1909; 'Hagenbeck-Wallace opening', 1910; Nance, 2013, p. 202).

During the circus boom of the first decades of the twentieth century, towns shut down on the Circus Day (Davis, 2002, pp. 1–3). Everybody went to the circus, including the presidents of the United States (e.g. 'President Wilson', 1914; Davis, 2002, p. 32). After his presidency, Theodore Roosevelt went on a year-long hunting expedition in Africa. His team shot more than 8,000 vertebrates, including lions, giraffes, elephants, rhinos, hippos and waterbucks, and shipped them to the collections of the Smithsonian Institution ('Roosevelt's hunt', 1910). When a circus elephant escaped from a train in North Carolina, a hundred local farmers, inspired by Roosevelt, organised a hunting expedition of their own; since the elephant did not die from the bullets they finished it off with axes ('100 hold', 1914).

The conditions for wildlife in zoos were not much better than in circuses. The animals had to live in cages or otherwise confined spaces, perform tricks, and travel when zoos exchanged them. Zoos have ancient origins in the private collections of royals and public menageries (Kisling, 2001a, pp. 8–21). London Zoo was established already in 1828. In the United States, the private Philadelphia Zoo opened

in 1874 and the science-oriented National Zoo of the Smithsonian Institution in Washington DC in 1891 ('Our "zoo"', 1874; 'Crowds visit', 1891; see Kisling, 2001b, pp. 147–163). The education and entertainment of citizens were the main justifications of the nineteenth century zoos for keeping exotic animals in captivity, like with circuses. The emerged public debate on threats of extinction in the wild gave them another valid reason: reproduction as a means of conserving species.

However, only after the increased public awareness of wildlife issues in the 1970s, conservation has become the main role of the most enlightened zoos. This has required a holistic approach to breeding, with not only successful births but also more natural environments for the young animals. In many countries the introduction of animal welfare standards has resulted in closing some substandard zoos (e.g. Nance, 2013, p. 232). The brutal exploitation of wildlife for profit has given way to a more humane approach to the treatment of wild animals. Yet, most zoos and many circuses still imprison wildlife.

As long as there is a demand for wild animals, there remains a supply. After costly litigations by animal rights activists, the largest contemporary U.S. circus, Ringling Brothers and Barnum & Bailey, announced in 2015 that its elephants would retire in two years ('Elephants to retire', 2015). In 2017 the circus closed after 146 years of performances because people did not come to its big top without elephants ('Ringling Bros', 2017). This exemplifies the deep divide between environmentalists and old-time progressives in present-day society.

Trophy hunting by upper and middle class people is still thriving (International Fund for Animal Welfare, 2016, p. 7). Furthermore, elephant tusks, rhino horns and lion bones are in high demand as traditional medicines in Asia. This has led to weakened conservation statuses: African elephants, lions, leopards and Indian rhinos are vulnerable; Asian elephants are endangered; and black, Javan and Sumatran rhinos are critically endangered (International Union for Conservation of Nature, 2017).

In nature reserves, wildlife can live freely in restricted areas that resemble parts of their former natural environments. Rangers try to protect them from poachers. Yet, several poor countries explicitly allow trophy hunting at a price and implicitly accept poaching in exchange for bribes.

Natural wildlife habitats no longer exist. Climate change, population growth, logging, mining and other anthropocentric upsets have ended nature's separation from human societies (see McKibben, 1990, p. 60). Human population growth in Africa follows the same exponential hockey-stick growth pattern as global warming. Since the 1950s, the human population in Africa has doubled every 25 years, and continues to do so. Poor people may become poachers to survive. Human habitats have occupied the natural habitats of wild animals, forcing them into ever-smaller zones that cannot sustain them (African Wildlife Conservation, 2018). This results in their mass deaths, and leads to violent conflict with humans. For instance, a century ago lions lived in 70 percent of Africa, now in scattered small patches in about 5.5 percent of the continent (International Union for Conservation of Nature, 2017). The same progressive thought that encouraged commercial exploitation of

wild animals also drove the exploitation of African ecosystems by colonialists for profit (see Collins and Burns, 2007, p. 265). Multinational corporations continue this devastation. The clear-cutting of forests and open-pit mining have destroyed those wildlife habitats that human habitat expansion has not conquered (African Wildlife Conservation, 2018). The tiny habitat patches left for animals are exposed, and without the support of extensive ecosystem coverage and diversity much more vulnerable, to droughts, floods and other extreme weather conditions caused by climate change.

As a result of historic progressivism, human-induced mass extinction of species is imminent in Africa and in the Global South in general. Animal circuses are not needed, but are there any alternatives to zoos to prevent the extinction of endangered species?

The exploitation business of Finland's Big Five

In the Global North human threats to the Big Five have historically been similar to those in the Global South, but development has led them in a different direction.

The Big Five that hunters have for centuries aspired to shoot in northern forests, such as in Finland, include brown bears, wolves, wolverines, lynxes and elks. Even nineteenth-century environmentalists, consisting of artists and scientists who protected the landscape, flora and small birds, considered the four predators to be harmful beasts, wanting to eradicate them altogether, and supported game hunting of elk for sustenance by the rural poor (Leikola, 2008, pp. 36–37).

Massive elk hunting, actually by aristocracy, reduced their numbers so radically by the 1850s that wolves had to kill domestic animals to survive, which ignited a war against wolves (Laaksonen, 2013, p. 130). This fury was fuelled further by a local episode of twenty-two children being killed by a wolf or wolves during 1880–1881 (Godenhjelm, 1891; Lappalainen, 2005, pp. 89–93). The resulting massacre made wolves practically extinct in Finland in the 1880s. In contrast, Finns stood in awe of the brown bear and regarded it as the king of the forest. But, in addition to traditional native bear hunting, Russian aristocracy and tsarist army officers brought safari-style bear hunting to autonomous Finland, which wiped out the bear population (Meriluoto-Jaakkola, 2010, p. 118). The lynx was another sought-after catch for hunters: its beautiful fur and valued meat were its ruin by the 1890s (Pulliainen, 1999). The wolverine, on the other hand, was despised as a harmful pest because of its looks, smell and gluttonous habits as a carcass eater and reindeer killer. It was terminated from Southern and Central Finland by 1900, with only a few escaping to Lapland's tundra (Suominen, 1992, pp. 23–29).

By the turn of the century the numbers of these Big Five had diminished near extinction in Finland. Elk was then protected for 1923–1933 and again for 1969–1971 (Mälkönen, 1989, pp. 92–93) to revive stock for hunting. With the development of ecological awareness and conservation sciences, the need for predator protection was realised. Lynxes were partially protected in 1962, wolves in 1973, wolverines in 1982 and bears in 1988 (Pulliainen, 1999). Widespread poaching

compromised partial protection attempts, but stocks increased gradually. The tug of war between the traditionally powerful hunting lobby and environmentalists has been going on since the 1960s and mitigated development towards a more sustainable approach to the Big Five.

Traditional hunting rights and attitudes towards predators have compromised attempts to allow their numbers to grow to a sustainable level. Nowadays the four predators are protected, but licenses to kill them are liberally granted each year for stock control and domestic animal safety, although only reindeer-herding Sami people in Lapland inevitably suffer animal losses to predators since their herds roam free (Metsähallitus, 2018). Predator hatred is deeply rooted in Finns. Stringently controlled low numbers of bears, wolves and lynxes mean that elk numbers have exploded. The only real threat elks face emanates from humans. Game hunting of elk is as popular as ever, but for fun, not sustenance. Ironically, elks are the most dangerous of the Big Five for humans: they are involved in thousands of traffic accidents every year. Forests have been split by roads that elks need to cross to find food and shelter (Finnish Association for Nature Conservation, 2018).

Unlike in Africa and generally in the Global South, population growth in Finland and other countries in the Global North is not a reason for the loss of wildlife habitat. It is the massive clear-cutting of forests by the forest industry that has destroyed habitats of the Big Five on a large-scale ever since the 1870s. The world's biggest forest industry corporations come from the Global North, and two of them are Finnish: UPM and Stora Enso (PwC, 2016). In 2017 Finnish forest industry operations are more intensive and extensive than ever. UPM and Stora Enso execute the bio-economy strategy of the Finnish government, which aims to secure both economic competitiveness and the mitigation of climate change, by logging forests for the production of pulp, paper, bioenergy, biofuels and plastic replacements. The eradication of fossil-based materials is necessary, but replacing them with tree-based materials exacerbates the loss of biodiversity, hardly cuts carbon dioxide emissions and wipes out the Big Five's habitats.

Although all Five are internationally 'least concern' animals conservation-wise, in Finland wolverines are critically endangered, wolves endangered and bears and lynxes vulnerable, due to their small numbers, active hunting and accumulative habitat loss (Metsähallitus, 2018). In 2005 the European Commission sued Finland for violating the nature directive by hunting strictly protected wolves, which have such low numbers in Finland, only some two hundred (like wolverines), that hunting is unsustainable.

Earth's biodiversity requires genetic, species and ecosystem diversity (see Farnham, 2007, p. 24). Hence it is crucial to protect native animals and plants of every ecosystem. Predators are dynamic actors in maintaining biodiversity: a higher number of wolves, bears and lynxes would keep the elk population under control (Laaksonen, 2013, pp. 92–95) and give wolverines carrions to eat. Wolves, bears, lynxes and wolverines regulate mammal populations and protect plants and trees, such as aspen, which high numbers of elks destroy (see Laaksonen, 2013, pp. 92–95). The actions

of the Big Five are essential parts of nature's ecosystem regulating mechanism that progressive, industrialised humankind has interfered in, destabilising its balance.

Science for unsustainable fisheries

Categorising animals in terms of valuable and harmful species has a long history. This categorisation has justified massive eradication campaigns of predatory mammals and birds, as well as a number of other species. The war against harmful species has often been legitimised by science. It is true, that with the growing understanding of how ecosystems function, since the early twentieth century, there has been a gradual change in mainstream scientific ideas towards animals. This only applies, however, to certain species (mainly mammal and bird species), whereas other classes of the animal kingdom have been neglected.

A case in point is fish, which in the western imagination barely qualify as animals and are merely seen from a commodity point of view. At present, marine ecologists unanimously warn that the vast majority of world fisheries are either fully fished or overfished (Food and Agriculture Organization, 2016, pp. 5–6). Yet, fishing fleets are emptying seas as if the sea could produce an infinite amount of fish. We argue that these practices of fishing, which have led to severe ecological, economic and social costs, originated in the early and mid-twentieth century. At this time fishery scientists confidently argued that marine fish stocks were inexhaustible. By the 1950s, it had become clear that the world was being rapidly overpopulated by humans. The global human population at this time almost doubled to nearly 3 billion in the space of a mere fifty years and the number of human beings was growing at an astonishing two percent per year. Fishery scientists saw that the oceans and the seas provided the last remaining untapped resource to increase global food production and their work could therefore be regarded as a means of greatly relieving the imminent scarcity of resources (Hamblin, 2005, p. 121). In the eyes of politicians, the rationale of many fishery scientists provided an excellent excuse for building massive fishing fleets, which competed with each other to get the most out of the sea for their host nations. Although politicians could disguise fishery exploitation as an altruistic deed in terms of feeding the world's poor and hungry, the real reason behind this policy was to spur domestic economies (Finley and Oreskes, 2013, pp. 245–247).

The first signs that fish stocks were seriously declining date back to the 1930s. Yet, the one and the only concern of western governments, then and well into the post-Second War period, was to raise fishing quotas. It was up to science to help fulfil this task (Finley and Oreskes, 2013, pp. 245–246). In the 1950s and 1960s, in particular, it was a commonly held belief in the western world, within and outside the scientific community, that science could solve all the problems faced by humanity. This mentality reflected a shift in the scientific paradigm concerning fisheries. As Helen Rozwadoswki (2002) has shown, fishery scientists previously only focused on finding the largest possible fish stocks. After the Second World War, however, they began to champion what Rozwadowski has called the 'cultivation model', according to which scientists should seek methods to boost stocks. The detonation

of nuclear devices in the sea was among the most radical suggestions for triggering a welling of nutrients to the surface of the water, thereby bringing about an improvement in the sea's productivity (ibid., p. 154).

The hubris of progress and the sense of omnipotence in biological sciences abated with the intellectual crisis that hit the Western world in the 1960s. The awakening to the global ecological crisis put the final nail into the coffin of the harmonic relationship between humankind and the natural world – and defied the might of humans to control ecosystems, which had been inherently built into the ethos of modern science. However, some fundamental ideas that lie behind the cultivation model in fishery science have remained surprisingly enduring. Indeed, with the advent of advanced technological systems, such as satellite fishing services, efforts to control and exploit marine ecosystems have nothing but intensified during the past half century.

Perhaps the best example of this continuity is the endurance of the principle called maximum sustainable yield (MSY). A more policy-oriented version is known as total allowable catch (TAC). It is worth stressing that the term MSY does not imply the sustainability of three entangled elements (ecological, social and economic), as in the contemporary sustainable development discourse. It only declares a principle according to which fish catches should not exceed the reproductive capacity of certain fish stock, whereupon it is argued that it is possible to continue harvesting the stock indefinitely. The theory of MSY as a scientific principle to enhance and manage fisheries was founded in the late 1940s. Its basis was the idea that fishing is, by definition, beneficial to fish populations, since removing old fish would speed up the growth of a new generation of stock. However, there was virtually no scientific evidence to support this view (Finley and Oreskes, 2013, p. 247; Punt and Smith, 2001, pp. 41–42). Instead, the problem with MSY lies in its reliance on unfounded presuppositions that expose more about an overly optimistic scientific narrative than of scientific findings.

First, by focusing on catches in relation to single species, MSY ignored how the health of the stock is dependent on the species' relationship to other species (see, for example, Zabel et al., 2003, p. 156). More importantly, scientists adhering to MSY theory envisioned that their research would determine the exact input-output ratios of biological production. In the mid-1960s, a Finnish marine scientist, Ilmo Hela, for example, wrote the following: 'science is now moving into a new era where [forecasts needed by the world fisheries] will be much closer than ever before' (Hela, n.d.). When this was attained, scientists could 'disentangle the amount of organic matter [the sea] produces each year' (Hela, 1962, p. 291; see also Rozwadoswki, 2002, p. 146). In other words, for MSY to become sustainable, it would have required scientists to be able to accurately estimate fish stock sizes and the levels of sustainable catches. Both of these assumptions have been repudiated by later studies as well as harsh reality, as one fish stock after another have declined or collapsed (Finley and Oreskes, 2013, p. 247). Moreover, scientists should have also been able to assess all the other human or non-human variables in the ecosystem that affect fish stock sizes, which, needless to say, has proved to be impossible.

Notwithstanding the tragic consequences in the past, fisheries management in the late twentieth century and early twenty-first century has continued to rely on MSY and quotas defined by scientific calculations of single species studies and set in concert between decision-makers (see, for example, European Commission, n.d.). The implicit goal is to catch as many fish as the sea produces. Pressure is highest among the largest fish, which, according to current knowledge, are vitally important for the health of fish stocks. As is often the case with international bargaining on natural resources, sovereign states have been unable to agree on fishing quotas. In northern Europe, for example, it has been particularly problematic to approve quotas in regard to catches of Atlantic salmon (see, for example, Sjöblom, Hildén, and Toivonen, 1984, pp. 122–123). According to many ecologically minded scientists, this has resulted in an imbalance of fish species in favour of those that are not desired by commercial fisheries (Zabel et al., 2003, pp. 155–156). In contrast, the population of Atlantic salmon has diminished, even in undammed rivers, to where the species can still freely return to spawn (Sjöblom et al., 1984, p. 114). In the past ten years, however, stricter rules have allowed the salmon population in some of these rivers to increase.

MSY was originally partly supported by the noble idea of combatting poverty and hunger in an overpopulated world. Yet, the results have not been a success in any shape or form, as collapsing fisheries hit the overpopulated developing world and their malnourished people the hardest. Global temperatures are on the rise, and the warming and acidification of sea water will further diminish fish stocks and destroy their habitats. Without a radical change in attitudes towards fish, as well as new ways to distribute resources on a global scale, the imbalance between the world's rich and poor is likely to be exacerbated in the coming decades.

Conclusions

The Anthropocene cannot be understood by only looking at the era when industrialisation has polluted the Earth since the mid-twentieth century. The key to human conduct, which has led to this situation and keeps spurring weak sustainability, is found in banal history.

The biased conception of human primacy and the blind trust in the almighty ability of humans to control the natural world were cemented as defining principles in human relation to nature in tandem with emerging industrialism in the course of the nineteenth century. They have gradually led to the unsustainable exploitation of nature that has permeated all major sectors of society.

Focusing on the period since the 1850s, we have demonstrated how the progressive mindset of the past 150 years has shaped human values and actions to an Anthropocene in which humans continuously drive other species to extinction, diminish biological diversity and develop the planet into an ever 'hotter and fuller Earth'. In this chapter, we have examined cases that illustrate three especially influential sectors of modern society, namely the media, business and science, which are in many ways interconnected and hybridised. The subordinated role of animals

has been revealed in expositions, circuses and zoos regardless of whether the main motivation has been to run a business or to accelerate human advancement. In a similar vein, science has subjugated animals, for example, by determining quotas for different species of fish and for predators, such as bears, wolves, lynxes and wolverines. Business has not only exploited fauna but also clear-cut forests and destroyed the flora and habitats it depends on.

Implications for a hot and full Earth

Our analysis has aimed to formulate a deeper understanding of values and practices to promote reflection and reconsideration, which are indispensable for changing human conduct that so far has prevented a balanced inter-species co-living and has instead set the world on the collision course with global ecology. The examination of the past 150 years proves that practices originating from the weak sustainability approach, with its maximum 'sustainable' use of animals and plants alike, have been entirely unsuccessful in maintaining biodiversity and healthy life communities.

Fundamental changes in everyday human conduct are needed in order to pursue strong sustainability. It seems clear that numerous species will be lost and the planet's web of life will be severely thinned out during the coming decades. Yet, humankind still has a chance to avoid the worst-case scenarios of the current sixth wave of extinction. This requires, firstly, the recognition and widely shared understanding that practices and values that underpin unsustainability are not natural laws or subjective rights but have evolved historically. Secondly, it is essential to renounce the current paradigm that categorises non-human species according to their importance to humans and shapes the natural world solely for short-sighted human purposes. Instead of calculating the use values of nature, we – individuals and institutions – should respect the intrinsic values of animals, plants, forests and waters.

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