



The Coexistence Potential of Different Wildlife Conservation Frameworks in a Historical Perspective

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Wildlife management in contemporary society means balancing multiple demands in shared landscapes. Perhaps the greatest question facing today's policy makers and wildlife professionals is how to develop frameworks for coexistence between wildlife and the plethora of other land use interests. As a profession, the roots of wildlife management and conservation can be traced back to the 1600's, but most of the relevant frameworks that have shaped the management of wildlife over time have emerged after the mid-1800's and particularly since the 1960's. Here we examine the historical development of the main traits and concepts of a number of management and conservation frameworks that have all contributed to the multifaceted field of contemporary wildlife management and conservation in Europe and North America. We outline a chronology of concepts and ideologies with their underlying key ideas, values, and operational indicators, and make an assessment of the potential of each paradigm as a coexistence framework for dealing with wildlife. We tie this to a discussion of ethics and argue that the lack of unity in approaches is deeply embedded in the differences between rule-based (deontological) vs. results-based (consequentialist) or context dependent (particularist) ethics. We suggest that some of the conflicts between ideologies, value sets and frameworks can be resolved as an issue of scale and possibly zonation in shared landscapes. We also argue that approaches built on anthropocentrism, value pluralism and environmental pragmatism are most likely to succeed in complex socio-political landscapes. However, we caution against moral relativism and the belief that all types of cultural values are equally valid as a basis for contemporary wildlife management.

Keywords: wildlife management, conservation, frameworks, concepts, values, ethics

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WILDLIFE MANAGEMENT AS A CHALLENGE IN CONTEMPORARY LAND USE MANAGEMENT

Wildlife management has matured over the last 150 years into a professional discipline aiming at nurturing sustainable wildlife populations as well as meeting a range of complex and often conflicting societal goals. Throughout this history, the scientific debates and politics of wildlife management have struggled to find some level of consensus on purpose, optimal strategies and ways of dealing with diversifying value systems, conflict, and trade-offs. Over such an extended period

of time, society has experienced tremendous changes. Public and scientific perspectives on nature and wildlife have undergone a long and extensive journey from early interest in wildlife biology to managing complex socio-ecological systems. Despite massive amounts of scientific research on wildlife, a highly developed management profession and associated institutions, the issues and challenges facing contemporary wildlife management are formidable (Daskin and Pringle, 2018; Linnell et al., 2020; Van Beeck Calkoen et al., 2020). We are far from a consensus in the sense of broad public acceptance on what should be the key objectives of maintaining viable populations of various species, what are the optimal management models, which of the benefits that may accrue from wildlife are the most important ones, and what management practises are acceptable to the greater public? In fact the whole future relationship between humans and wildlife is under negotiation, including issues related to the appropriate space to conserve wildlife (i.e., land-sharing vs. land-sparing, sensu Phalam et al., 2011) and the appropriate forms of interaction that we should have with wildlife (i.e., hunting or protection). In this article we will argue that the field is marred by deep conceptual challenges relating to conflicting views on pluralism vs. monism in values and goals, methodological differences, and most importantly the lack of a unified ethical framework as a basis for developing important, but difficult priorities and strategies for wildlife management.

Contemporary wildlife management cannot be separated from wider discussions of land use management, environmental governance, sustainability, and biodiversity conservation. Indeed, it cannot be separated from other societal and political sectors such as health and welfare, defence, border security, food security, climate change adaptation, energy production, rural development, forestry or agriculture. In short, these are the larger discussions of how we manage the multiple and complex demands on already pressured landscapes. We no longer live in an era where the propagation and harvesting of a single game species is considered an independent task left to a small cadre of professionals, where in many cases emotional responses or economic interests often challenge reason and fact and lobby for influence (Nelson et al., 2016).

The most central challenge in contemporary wildlife management is finding acceptable modes of coexistence both between wildlife and people in general, and coexistence between different groups of people with competing interests. These dynamics reflect the ever on-going changes of values, perceptions, and interests in wider society, and burdens the field of wildlife management with the challenge of interacting with an increasing number of other societal interests.

The question of understanding conflict has dominated the study of human—wildlife interactions through recent years (Redpath et al., 2015), although there is a recent and increasing focus on coexistence (Nyhus, 2006). Although coexistence is as yet a poorly defined and emerging concept for the purposes of this paper, we conceptualise coexistence in a broad sense as efforts to achieve increased acceptance for wildlife and positive relations between people and wildlife, and between people about wildlife (Frank, 2016). To define coexistence, we find it useful to follow the general thinking of how biodiversity can be impacted

by human activities, and conversely how biodiversity can affect the well-being of people (e.g., Treves et al., 2009; Young et al., 2010; König et al., 2020). Impacts of, and interactions with biodiversity are almost inevitably perceived and experienced differently by different stakeholders (Linnell et al., 2020). Hence mitigating impacts typically lead to conservation conflicts since different stakeholders have different societal and conservation goals (Redpath et al., 2013, 2015). Ideally, coexistence between people and wildlife is the absence of such conflicts, where intolerance of wildlife is reduced as well as equitable distribution of costs and benefits of wildlife conservation is increased (Jordan et al., 2020). In reality, coexistence will never be a steady state of bliss, but at best a more sustainable dynamic state where human-wildlife interactions are managed in socially legitimate ways, and at reasonable levels of risk and cost (Carter and Linnell, 2016; Pooley et al., 2020).

Clearly, the challenges and tasks of wildlife management have moved beyond the trade-offs between consumptive and non-consumptive interests. In modern democracies where land-sharing, (where multiple interests need to get along), rather than land-sparing (areas set aside for more exclusive interests) of more, or less, natural environments will be the dominant mode of use and management, there must be space for value pluralism, but equally a need for large-scale policy coordination (Loconto et al., 2020). This implies an urgent need to sort between compatible and incompatible values, strategies, and management approaches for the long term aim of maximising coexistence with other land use interests. That notwithstanding, there is also similar need for discussion around how to manage land-sparing areas in protected zones.

In this paper we review the main tenets of what we consider a historical development of conservation and wildlife management frameworks from early regulatory harvesting approaches to contemporary debates over multifaceted conservation and management regimes. We live in an increasingly interconnected and complex world, where much of the current debate in wildlife management and conservation centres around ideas like rewilding, compassionate conservation, and new types of conservation science—all of which are manifestations of underlying competing value discourses, ethics, and intellectual traditions. Current wildlife management and conservation debates reflect fundamental underlying societal concerns beyond maintaining certain species and population levels such as; environmental sustainability (e.g., Mebratu, 1998), ecosystem health (e.g. McShane, 2004), public health (e.g. Morris et al., 2006), food security (e.g., Weste et al., 2014), livelihoods (e.g., DeFries et al., 2006), both social and environmental justice (e.g., Chapron et al., 2019), governance (e.g., Newell et al., 2012), economic revenue (e.g., Hediger, 2008), cultural identity and heritage (e.g., Cheape et al., 2009), and more. The extensive conflation of ethics, values, strategies, vested interests and scientific evidence give rise to controversy, conflict, and confusion in current wildlife management debates.

This motivates our overall goal to shed some light on which ideas might help further the development of coexistence frameworks, as well as pointing out salient questions that need further study in order to better understand what drives the

various positions in wildlife management. We attempt this through two objectives. The first is to outline a broad chronology of wildlife management concepts, including a description of the main ideas and framings that have driven the development of a series of more or less distinct frameworks. Secondly, we wish to identify the key values that characterise these frameworks and the relationships between them. Based on this we suggest a set of operational indicators of the frameworks and outline a chronology of the frameworks and our interpretation of when each one commenced. Essentially our work builds on the broad outline offered by Mace (2014), but goes into greater detail and depth.

Our review is mainly based on published material, chiefly scientific articles, scientific books, text books and technical reports. Some of these sources are review papers, while other publications are exponents for the various frameworks as we have defined and interpreted these. Furthermore, we have surveyed Wikipedia and other popular scientific outlets to calibrate our interpretation of scientific traditions, expressions, and frameworks with those in more popular use. Essentially, our perspective is a first world view and the material we build on is largely from Europe and North America. We in no way suggest that we have reached maturity or arrived at an end point in the deliberations over the most appropriate wildlife management concepts. Likewise, we do not have space to explore all the nuances of each. Our intention however, is to develop a narrative by broadly assessing the main lines in historical and contemporary management frameworks with respect to the potential for coexistence with other land use interests.

We assert that all conservation and management frameworks are social constructions, i.e., multiple ways we have chosen to select and represent knowledge, the way we distinguish between the human and the non-human world, the needs of wildlife and people, as well as the (if any) ethical and moral obligations we have toward the environment. It follows then that an analysis of these social constructions (framework) can follow different socio-cultural, philosophical, legal, or ethical paths. Our main interest here is to draw out the key ideas from different frameworks that are particularly important for designing future coexistence frameworks, broadly understood as management approaches that facilitate the maintenance of viable populations of wildlife in shared landscapes in a context of broad public acceptance. For the purposes of discussion here we have chosen a mixed approach in examining historical frameworks where we primarily focus on what we interpret to be the key ideas and societal values shaping the core of the frameworks, and the conceptual framing these ideas have evolved within, which includes both ethical orientations and scientific epistemologies.

FRAMEWORK CHARACTERISTICS

We recognise 14 different conceptual frameworks commencing from the seventeenth century and up till today; animal rights/animal liberation, animal welfare, wilderness, restoration ecology, deep ecology, socio-ecological systems, conservation biology, wildlife management, sustainable use, ecosystem

services, heritage/cultural landscape conservation, rewilding, and biocultural conservation. We built this categorisation on a set of loosely defined criteria; that each conceptual orientation/framework is supported by a number of scientific references, that each framework to some extent seems to have influenced debates over management policy as evidenced by scientific and public publications, that the frameworks self-identify with their own terminology, journals, associations, and/or textbooks, and that each framework appears to have significant relevance for our interest about how to balance multiple interests in coexistence management. For each of these we have delimited a rough time line indicating an approximate inception point (**Table 1**), as well as a short listing of what we identify as the main concepts and framing, the key ideas and values, and the operational indicators of the frameworks. We have also assessed the compatibility of each conceptual framework with the other frameworks, and listed some significant and defining institutional events for each one (**Table 2**). In **Table 3** we identify the dominant value orientation characterising each framework and how some salient values are shared across several frameworks. All of these frameworks internally embrace a diversity of forms. An analysis of each in detail would require multiple books, not just a review article. Hence our discussion is by definition only able to compare the broadest elements of each framework. However, our goal in this article is to open a high-level discussion of relevant strategies for the practical operationalisation of human-wildlife coexistence rather than engage in (the equally important) academic discussions of within-framing scholarship.

Chronology and Complexity

Concern for the population status and well-being of wildlife and animals in general and for the appropriate relationship between humans and wildlife is not a recent idea and is visible in philosophy, religion, cultural norms, and legislation of human societies on a millennial timescale. However, in order to keep this review manageable we focus on more recent periods. The idea that non-human animals are sentient beings with consciousness and an ability to suffer independent of humans goes back (at least) as far as the seventeenth century, and this particular value orientation has spurred some of the earliest known wildlife-related legislation. Other frameworks like wilderness preservation, wildlife management, socio-ecological systems and animal rights also have old historical roots ranging from early 1800's to early 1900's and have persisted up to the present. The wilderness preservation movement has particular relevance to coexistence models in the Anthropocene with its emphasis on the intrinsic value of nature, the explicit integration of science with ethics, and the strong influence on land use zoning politics since the late 1800's. The movement was shaped by thoughtful and eloquent individuals like John Muir and many others in subsequent years (e.g., Oelschlager, 1991; DeLuca and Demo, 2001). Also, the early phase of the wildlife management era in the early to mid-twentieth century (notably the works of Aldo Leopold) had a profound impact on the later environmental movement and environmental ethics in its quest to integrate

TABLE 1 | Approximate historical timeline of conceptual frameworks.

	1600	1700	1800	1850	1900	1950	1960	1970	1980	1990	2000	Present
Animal welfare	█	█	█	█	█	█	█	█	█	█	█	█
Wildlife management			█	█	█	█	█	█	█	█	█	█
Wilderness				█	█	█	█	█	█	█	█	█
Animal rights/animal liberation					█	█	█	█	█	█	█	█
Deep ecology							█	█	█	█	█	█
Heritage/cultural landscape conservation								█	█	█	█	█
Social-ecological systems								█	█	█	█	█
Sustainable use									█	█	█	█
Biocultural conservation									█	█	█	█
Conservation biology									█	█	█	█
Restoration ecology									█	█	█	█
Rewilding										█	█	█
Ecosystem services											█	█
New conservation science												█

science with ethics and deliberation of values and societal benefits (e.g., Lorbiecki, 1996).

Frameworks such as deep ecology, heritage conservation, socio-ecological systems, and sustainable use (e.g., Sessions, 1995; Glasby, 2002; Ostrom, 2009; Bridgewater and Rotherham, 2019) have been around for several decades, but all emerged as articulated ideas in the second half of the twentieth century. Some of the frameworks and value orientations that currently are at the centre of many controversies such as ecosystem services, restoration ecology, and rewilding (e.g., Brown et al., 2011; Petriello and Wallen, 2015; Svenning et al., 2016; Martin, 2017), are actually fairly recent constructions, emerging from the 1980's and onwards (Table 1).

Debates around approaches to wildlife conservation can sometimes give the impression that the field has gone through an evolution from one set of ideas and values to another. A linear type of development and replacement would suggest that differences and conflicts are resolved and greater consensus on measures and objectives are achieved as time goes on. On the contrary, the opposite seems to be the case. Each new development or new paradigm emerging from a schism has persisted alongside its parent paradigm. We argue that one of the main causes of the conflicts we are presently witnessing is caused by the fact

that just about every idea, concept or paradigm that has ever been developed is still around. The critical insight is that while new ideas and frameworks have emerged, the old ones have still persisted alongside their respective supporters, stakeholders, and opponents. Inter-framework complexity has increased significantly with time. Rather than replacing older frameworks and notions, new ideas have mostly widened the field without retiring the ideas in previous or parallel directions of thought (Table 2). Obviously, there is no simple explanation for this. Wildlife conservation is a multi-layered concept, and it is highly debateable whether a single approach or framework can encompass all the challenges and tasks it involves. Complementarity can be useful as well as an impediment to progress.

Concepts, Framing, and Key Ideas

Animal Welfare and Animal Rights: Ideology vs. Science

We see a great span in complexity and roots of the concepts that frame the different conceptual frameworks (Table 2). In some cases the frameworks build on tenets from specific philosophical traditions. In other cases frameworks rest on, or get their inspiration from, a mixture of scientific disciplines, or they

TABLE 2 | Main traits of frameworks and assessment of coexistence potential.

Frameworks	Timeline	Concepts/framing	Key ideas/values	Operational indicators	Compatibility	Significant institutional events
Animal welfare	Ca. 1600–present	Non-human animals are sentient beings, consciousness exist in non-human animals (dominant view of neuroscientists)	Focus on well-being and suffering of animals, especially in the care of humans (science, slaughtering, pets, zoos), and how human activities affect welfare and survival of wild species. “Welfarism” attitude; utilitarian notion that animals can be exploited if benefit to humans is greater than suffering of animal	Measures of stress, illness, injury, freedom to express normal behaviour	Anthropocentrically driven, can both support and oppose harvesting and population control depending on the techniques and performance. Opposed by animal rights movement arguing animals should not be regarded as property and any use of animals is unacceptable. Also opposed by the view that humans have no duties to humans. <i>Coexistence potential = medium</i>	Early legislation in UK 1600 and 1700's Animal Welfare Act 1966, 2006. EU directives for farm animals in 2009, 2012.
Wildlife management	Game laws in Europe, early 1800's–present	Natural—and social science, balancing human needs with needs of wildlife. Integrates knowledge from multiple disciplines	Multiple goals, consumptive, non-consumptive, conservation, population control, conflict reduction Carrying capacity, Enhance desired/profitable species	Culling, habitat improvement	Strategically driven to achieve acceptable/desirable multiple outcomes of wildlife resources, resonates with sustainable use, ecosystem service, conservation biology. <i>Coexistence potential = medium</i>	Scientific approaches to game management in USA 1920's–30's (Leopold).
Wilderness	Prehistoric roots (philosophy, art) Conservation movement late 1800's Management 1960's–present	Preservationist	Biologically intact Legally protected Unchanged by modern human activities High spiritual and experiential value	Absence of hunting Specific allowances for indigenous groups Possible re-introduction of extinct species	To some extent resonates with deep ecology, human ecology, Coexistence limited to conservation/preservation strategies, overall goal—secure “space” for natural processes <i>Coexistence potential = low</i>	US Wilderness Act (1964) IUCN Protected areas classification (incl. Wilderness areas) Finnish Wilderness act
Animal rights–Animal liberation	Ca. 1900–present	Moral philosophy Rights advocates Utilitarian liberationists	Moral rights of animals Speciesism Maximising animal welfare Legal constructs Individual animals should have same basic rights as humans Animals should be free from human induced pain and suffering Animals should not be exploited for human purposes Individual animals have equal status irrespective of commonality and origin	Abstain from killing and eating animals Protection of species and specimens	Incompatible with most other framework, narrow focus, strongly at odds with multi-purpose management and human-centric approaches Virtually no potential for coexistence strategies Does not recognise other framework as morally legitimate, strongly value driven. <i>Coexistence potential = low/zero</i>	Contemporary movement formed in 1970 by Oxford post-graduate philosophy students. Animal law courses taught in a range of universities commencing 1980's and 90's. Radical factions of movement linked to violence and terrorist acts from 70's on
Deep ecology	Early roots early 1960's, definable movement from 1972/73 to present	Ecological and environmental philosophy promoting inherent worth of non-human beings and radical re-organisation of modern society Gaia hypothesis Living systems theory. Ecosystems can absorb only limited change caused by humans	The living environment has legal rights to live and flourish independent of instrumental or utilitarian needs and beliefs. The natural world is a homeostasis dependent on complex interrelationships between life organisms	Wildlife has intrinsic and legal rights, source of spiritual and educational value.	Strongly value driven—at odds with instrumental approaches, provides no practical direction for management goals and actions <i>Coexistence potential = low</i>	Coupling of ecocriticism, philosophy through literary writings, environmentalism in early 1970's Early influences; Spinoza, Nietzsche, Muir, Leopold, Carson. Næss, Arne. (1989). <i>Ecology, Community and Lifestyle: Outline of an Ecosophy.</i>

(Continued)

TABLE 2 | Continued

Frameworks	Timeline	Concepts/framing	Key ideas/values	Operational indicators	Compatibility	Significant institutional events
Heritage -Cultural landscape conservation	1970's–present	Holistic landscape ecology Multiple disciplines, history, archaeology, anthropology, ecology, geography, psychology, planning	Nature-culture links Historical events and trends in humans use and formation of landscapes Dynamics of integrated landscape values	Historic and contemporary hunting regimes. Subsistence practises	Idea/value driven, focus on history and cultural processes, provides little strategic guidance for applied management. Some resemblance with human ecology <i>Coexistence potential = low/medium</i>	UNESCO World Heritage Convention 1972. European Landscape Convention 2004.
Social-ecological systems	Late 1800's to present	Relationships between humans and their natural, social, and built environments	Holistic perspective on human relationships and interactions with surroundings. Social, psychological, cultural factors in human-environment interactions. Favours complexity over reductionism. Transdisciplinary approach to problem solving. Humans seen as a keystone species in ecosystems Anthropogenic biomes.	Holistic and integrative perspective on wildlife management vs. single species objectives. Conflict oriented	Strategic shift away from traditional nature-society dichotomy toward interlinked complexity. Potential to guide the evolution of sustainable use, conservation biology, wildlife management, ecosystem services <i>Coexistence potential = high</i>	Historical roots in geography and sociology. George Perkins Marsh's book <i>Man and Nature; or, physical geography as modified by human action.</i> (1864) Human Ecology journal 1972.
Sustainable use	Prehistoric roots as a concept, 1970'–80's–present as conservation paradigm	Recent: Sustainability science Multiple social–and natural science disciplines, Multiple scales	Avoid compromising environmental capacity and preserve options for future use Resilience Carrying capacity Avoid decline in biodiversity	Monitoring and maintaining desired population levels of species. Balancing of consumptive and non-consumptive goals	Strategically driven to achieve dynamic and multiple goals with high public and political acceptance. <i>Coexistence potential = high</i>	Brundtland Commission 1987, Millennium goals, SDG.
Biocultural conservation	1970's–present	Landscape geography and ecology mechanistic approaches to socio-ecological systems. Interdependence between biological and cultural evolution, emphasises social justice	Indigenous and local community knowledge, innovations, practises, adapted to social-ecological context	Adaptive capacity, social learning, flexible governance	Combines insights from community based conservation, co-management, social-ecological systems, cultural heritage and biocultural diversity. The broad bases of knowledge systems can both be enabling through incorporating a complexity of ideas, and disabling through lack of focus and large requiring large resources by adding multiple commitments. <i>Coexistence potential = medium</i>	World Heritage Convention 1972.
Conservation biology	1978–present	Interdisciplinary science, evolutionary processes Reaches beyond biology into humanities, social sciences, art, and education.	Maintenance, loss, restoration, and management of biodiversity	Species and habitat protection, preservation, <i>in-situ</i> and <i>ex-situ</i> conservation.	Ecocentrally driven strategy, resonates with wilderness management, partly wildlife management and restoration ecology <i>Coexistence potential = medium</i>	Modern movement formed at conference in 1978 at University of California, concern over tropical deforestation, eroding genetics in species, loss of species. Historical roots in late eighteenth century British Enlightenment. 1970's and on: multiple conservation acts (globally) addressing species protection.

(Continued)

TABLE 2 | Continued

Frameworks	Timeline	Concepts/framing	Key ideas/values	Operational indicators	Compatibility	Significant institutional events
Restoration ecology	1980's–present	Restoring and renewing degraded ecosystems by active human intervention (practical application ecological restoration).	Biodiversity has intrinsic worth and is important to ecological functioning Natural ecosystems provide humans and society with essential needs Damaged nature can be brought back to “natural” and desirable states Nature can “repaired” justified by anthropocentric as well as biocentric perspectives.	Impaired species richness/diversity can be restored. Extinct species can be re-introduced. New species can be introduced. Ranges from targeted, active intervention to minimal human intervention (rewilding)	Resonates with sustainable use, ecosystem services and to some extent wildlife management. Strategically driven to achieve desirable environmental states <i>Coexistence potential = medium</i>	First international meetings at the University of Wisconsin in 1980's as a response to vast environmental disasters caused by industry. Hilderbrand et al. (2005). <i>The myths of restoration ecology</i> . Ecology and Society
Rewilding	1990's–present	All living organisms are part of ecosystems and food chains Ecological complexity Socio-ecological interconnectedness	“Short cuts” to bring back ecological balance and earlier/original composition of nature and ecosystems Active and passive interventions Designate and protect land areas so that natural processes can unfold. Key concept: cores, corridors, and carnivores	Re-introduction of extinct species Extreme rewilding: back breeding, cloning, genetic engineering	Drive by both ideological and strategic concerns, i.e., establish desired and imagined natural states. Some correspondence with restoration ecology and wilderness management. <i>Coexistence potential = low.</i>	Earth First grassroots network 1990. Re-intro wolves Yellowstone 1994, arctic fox Norway 2000, golden eagles Scotland and Ireland, bison/visent 2010–2011 Europe.
Ecosystem services	Early 2000's–present	Economic valuation Ecology	Multiple benefits and services humans gain from the environment Human well-being	Tangible and intangible benefits from consumptive and non-consumptive benefits from wildlife Hunting fees, wildlife tourism revenues, meat sales	Strategically driven to optimise human benefits <i>Coexistence potential = low/medium</i>	First naming of term “natural capital” in 1973 (Schumacher) Millenium Ecosystem Assessment 2003.
New conservation science	Early roots mid 1980's (Soulé, 1985), active debate ca. 2010–present	Anthropocentrism. Protect, restore, enhance environmental services that benefit people	Refocusing conservation biology by de-emphasising protecting nature for nature's sake. Conservation challenge is too large to include or prioritise intrinsic values. Challenges the idea of nature's intrinsic values. Discourse pitted as “nature and people” against “nature for people”	(possibly) instrumental objectives, consumptive management goals, economic measures	Strategically driven toward prioritising (narrow) human needs and dispelling intrinsic values on the grounds of excessive and unmanageable complexity. Somewhat extreme extension of ecosystem services thinking. <i>Coexistence potential = low</i>	Debate commencing with papers by Kareiva and Marvier (2012) and Soule (2013).

Note that the timeline represents the more formalized emergence of explicit versions of the framework, the underlying ideas have almost always circulated in implicit form for long periods.

TABLE 3 | Relationship between key values and conceptual frameworks (the dominant framework with respect to key values in bold).

Key values characterising the framework	Dominant framework	Associated framework		
Moral rights of wildlife and nature	Animal rights	Animal welfare	Deep ecology	
Animal well-being	Animal welfare	Animal rights		
Restoration of naturalness	Restoration ecology	Conservation biology		
Interdependence of humans and wildlife	Wildlife management	Deep ecology	Social-ecological systems	
Human/social benefits	Ecosystem services	Animal welfare (if benefits exceed suffering)	Heritage conservation	New conservation science
Indigenous knowledge	Biocultural conservation	Social-ecological systems	Deep ecology	Heritage conservation
Spiritual	Wilderness	Deep ecology		
Pristineness	Wilderness	Deep ecology	Rewilding	
Complexity and integration	Social-ecological systems	Deep ecology	Heritage conservation	
Instrumental needs	Ecosystem services	New conservation science	Animal welfare (if benefits exceed suffering)	
Intrinsic worth of species and nature	Animal rights	Restoration ecology	Conservation biology	Rewilding
Carrying capacity and resilience	Sustainable use	Wildlife management	Social-ecological systems	
Consumption	Wildlife management	Animal welfare (if benefits exceed suffering)		
Population control	Wildlife management	Sustainable use	Social-ecological systems	
Environmental maintenance	Conservation biology	Restoration ecology		

build on a selection of ideological and/or practical notions. The long lasting animal welfare tradition (e.g., Everett, 2001) has for centuries advocated that also non-human animals are sentient beings and that many animals have consciousness. At least early advocates based this on morality, pragmatic ideology, and utilitarian ideas (i.e., Singer, 1975), but the animal welfare tradition has gained support from science in later years (e.g., Dawkins, 2006). The movement began with a focus on domestic production, companion, and experimental animals, with only a recent expansion to embrace wild animals. At least some animal welfare considerations can be integrated with other frameworks. In contrast, animal rights frameworks stand almost purely on moral grounds (Regan, 1984), often with little grounding in modern science (e.g., Hutchins and Wemmer, 1986). This framework has over time resulted in sharp conflicts, violence, and speciesism (e.g., Carson et al., 2012). The animal rights framework generally leaves little scope for any other approach to animal conservation and management on moral grounds.

Wilderness, Rewilding and Deep Ecology: Removal of Human Agency

The wilderness paradigm is one of the older formalised frameworks and a land preservation concept originally coined in a western cultural construction arguing that man is an intruder into nature (e.g., Oelschläger, 1991; DeLuca and Demo, 2001). This proposition and framing based on a human-nature dualism has provoked many indigenous and rural cultures that view people as belonging as interactive elements within nature. Wilderness shares some of its philosophical grounds with the deep ecology paradigm through the emphasis on naturalness and human moral obligations to avoid leaving undue impact (Reed and Rothenberg, 1993). In recent years (1990s onward) there is

a clear line from wilderness and deep ecology to the rewilding paradigm with the focus on restoring wilderness and ecological integrity, and removing human agency (e.g., Drouilly and O’Riain, 2021). The operational boundary between restoration ecology and rewilding is fuzzy, as both frameworks strive to implement both active and passive management interventions. However, there is an important value distinction between the two in that rewilding actively argues that “wild” (in all its diverse meanings of the word but where removal of human agency is central) is a superior value over any other ecological variable, which again justifies a “no interventions” and a “let nature take its course” approach (Lorimer et al., 2015; Perino et al., 2019).

Recent Conservation Approaches: Confusion Over “Naturalness”

Some frameworks struggle particularly with the complexity of defining natural benchmarks. The conservation biology, restoration ecology and new conservation science frameworks, often indirectly, assume that nature can be brought back to natural and desirable states, but these frameworks also lack unambiguous frameworks and methods for defining which of multiple potential states should be the goal (e.g., Hobbs et al., 2006; Griffiths and Dos Santos, 2012; Higgs et al., 2014; Morse et al., 2014). Conservation biology in particular has been hugely influential on contemporary wildlife conservation and management, probably because it has managed to develop a fairly coherent framework that integrates biology, social sciences, and even art and education (Bennet et al., 2016). The key point for this group of frameworks is that an assumed idea of “naturalness,” i.e., a representation of nature that interests of power (influential stakeholders) can agree upon, justifies

management interventions on a landscape level (e.g., Bowman et al., 2017).

The Struggle for an Instrumental and Economic Justification

Recent decades have also seen the emergence of the importance of economics in conservation. The ecosystem services (e.g., Gómez-Baggethun and Ruiz-Pérez, 2011) and the new conservation science (e.g., Petriello and Wallen, 2015) frameworks both place human interests and benefits in the centre. Ecosystem services attempts the gargantuan task that no conservation or management paradigm has achieved, namely to integrate all tangible and intangible nature related values and benefits within one accounting system. With its conceptual basis in economic models, the idea has been to develop a yardstick of values that could guide virtually any type of resource management and policy decisions (e.g., Chan et al., 2012). Central to this concept is the idea that human well-being is the ultimate goal of successful resource management (Diaz et al., 2015). Hence, although the paradigm in theory recognises nature as having intrinsic values, it is in reality wholly instrumental and anthropocentric in its orientation attempting to include all the contributions of nature, positive, and negative to people such as diversity of organisms, ecosystems, and associated ecological and evolutionary processes. The new conservation line is even more explicitly anthropocentric and openly defies the idea that nature has intrinsic value (Miller et al., 2011, 2014; Soule, 2013). According to this paradigm, the contemporary biodiversity/sustainability crisis is too large and complex to include anything more than the most urgent human needs and interests, lest biodiversity conservation fail altogether.

Culture as Motivation for Conservation

Heritage and culture thinking has also influenced conservation and management frameworks in recent decades, albeit in different ways. Biocultural conservation and cultural landscape conservation both apply a suite of ideas from different disciplines in the natural and social sciences to the extent that they emerge as fairly fuzzy epistemological directions (e.g., Gavin et al., 2015; Ekblom et al., 2019). Biocultural conservation takes a more mechanistic approach to socio-ecological systems, yet with a heavy slant toward indigenous knowledge and practises (e.g., Bridgewater and Rotherham, 2019). Cultural landscape conservation places more emphasis on the role of history and views conservation as a dynamic process with a continuous negotiation and evaluation of priorities and key values. A key element in all these frameworks is that human activity, especially that which is defined as “traditional” or “indigenous” is actively valued as a part of nature, effectively promoting relational values with nature (Chan et al., 2016). This influences both the definition of conservation baselines (e.g., by recognising that human modified landscapes may have strong conservation values) and the appropriate role of humans in nature by supporting more interactive relationships (e.g., hunting, gathering, farming).

Sustainability; Interdisciplinary Science Shaped Through Policy

Sustainable use is perhaps the most heralded, most complicated and hardest to define conservation and management paradigm of recent decades (e.g., Mebratu, 1998; Constanza et al., 2007; Gore, 2015). It is certainly the paradigm that has attracted the most political attention since the 1970's. Although sustainable use is commonly referred to as a novel, integrating concept of recent decades, its key ideas stems from forestry, wildlife management, and other forms of natural resource management that have their roots in the nineteenth century, or even earlier. Its conceptual foundation can be loosely described as sustainability science which is a pragmatic conglomerate of natural and social science approaches at multiple scales (Kates et al., 2001). It is far easier to define the key ideas, indicators, and goals of this paradigm than its value- or conceptual foundations. However, the core of this paradigm is to avoid compromising environmental capacity in a long term perspective beyond what current public judgment deems acceptable. It is strongly informed and updated by available science, but ultimately finds its form through public and political policy processes. Recent papers have begun to merge aspects of sustainability science with ecosystem services and elements of biocultural conservation (e.g., Pascual et al., 2021).

Operational Indicators

For wildlife management purposes we are concerned with identifying the critical factors in coexistence frameworks. The question of what characterises conservation and management paradigms in a more operational sense is quite salient. This is also a question of how we actually recognise the grounds and motivations underlying political, ideological, and management expressions in policy or other forms of advocacy. The hunting—non-hunting dichotomy is perhaps the most obvious distinction relevant for wildlife. In the hunting category we find the wildlife management, sustainable use, ecosystem services, cultural landscape conservation, biocultural conservation, and new conservation science frameworks. In contrast, the animal rights, compassionate conservation, animal welfare, deep ecology, wilderness (but in some cases specific allowances are made for indigenous groups) and rewilding frameworks have little or no room for hunting practises as a legitimate activity. A less clear stance on the acceptability of hunting is found within the conservation biology and restoration ecology conservation frameworks. Here the main focus is on restoring species populations and ecological processes, but population control through hunting is in some cases seen as a necessary management strategy to achieve desirable states of “naturalness” and species diversity. However, both the legitimacy of hunting and its ecological impacts are contested within the pages of conservation biology journals.

Beyond the hunting—no hunting divide, a few other operational indicators can be identified (Table 2). These include positions on; re-introduction of species (wilderness, rewilding, restoration ecology, conservation biology), back-breeding, cloning, genetic engineering (rewilding), measures of stress, illness, and injury (animal welfare), expression and definition of animal rights and experiential values (deep ecology

and animal rights), changes in social learning and adaptive capacity (biocultural conservation), subsistence practises (cultural landscape conservation), hunting fees, wildlife tourism revenues, meat sales (wildlife management), monitoring of desired population levels of species (sustainable use, wildlife management), and economic cost-benefit evaluations (ecosystem services, new conservation science).

A final indicator lies in the location specificity of actions. Frameworks like wilderness, restoration ecology, rewilding, and heritage conservation are largely restricted to specific and limited areas of exceptional value with limited, or very specific forms of, human land use. In contrast, animal rights, animal welfare, compassionate conservation, deep ecology, sustainable use, biocultural conservation, ecosystem services, new conservation science and wildlife management are intended to be applied across a diversity of land use settings and the wider landscape. Conservation biology can find expression in both settings, as it focuses both on the limited extent of protected areas and on the wider landscape.

Value Differences

All wildlife management is embedded in social contexts (e.g., Manfredo, 2008). Management and conservation science proximately reflect beliefs about appropriate ways to value and rank the costs and benefits of keeping wildlife around, but ultimately reflect deeper sets of public values and ethical aspects of how we as humans interact with nature, and with each other. Recent debates and developments in different narratives of wildlife management and conservation reveal a complexity of underlying motives, attitudes, values, and beliefs in science as well as the rights of the non-human world. A major fault line runs between the animal rights/welfare community with a tendency to focus on individual animals' well-being or suffering, and several other groupings with a focus on ecosystems, populations and processes (e.g., Singer, 1975; Callicott, 1988, 1990; Hettinger, 1994; Light, 2002; Palmer, 2013; Dickman et al., 2015). Most of these debates demonstrate different social constructions of the (subjectively) preferred role of wildlife in society grounded in different ethical approaches. For instance, it seems we are currently witnessing an emerging doctrine of wildlife protectionism justified as compassion for wildlife (e.g., Treves et al., 2017; Wallach et al., 2018) which competes with the more traditional idea of stewardship through active management that underpins most western ideas of wildlife management. There is a long running debate about power and influence. Various individuals argue for a greater role of technical experts, the public, stakeholders, or appointed advocates to represent the interests of wildlife (Redpath et al., 2017; Treves et al., 2017). Likewise the fast growing debate over rewilding is also diversifying into more complex socio-ecological framings (e.g., Perino et al., 2019), and it appears that some groups use this essentially ecologically oriented narrative to argue that also humans should "rewild" their attitudes in the sense of being more enchanted and reunited with nature (e.g., Bekoff, 2014). In other words, different attitudes toward the hunting/no hunting dichotomy as management tools, as well as disparate views of the different parts of the public as legitimate stakeholders run as

salient conflict lines through many of these debates (e.g., Treves et al., 2019a,b).

Ethical debates related to wildlife management often circle around disagreements between animal ethics on the one hand and environmental/ecological ethics on the other (Hutchins and Wemmer, 1986; Light, 2002). While animal ethics often focus on the sentience (ability to experience pleasure and suffering) and/or suffering of individual animals, it can also be about rights and justice. Environmental ethics places greater emphasis on populations, ecosystems and ecological processes. A major point of contention is the criteria for moral considerability and how to value nature, where some see the two ethical orientations as fundamentally incompatible (e.g., Singer, 1975; Faria and Paez, 2019), while others try to find some common ground (e.g., Callicott, 1988). For example, both schools of thought are often perceived as convergent fields collectively aiming to counter moral anthropocentrism, i.e., the notion that human interests should always be favoured over non-human interests. For our discussion of how ethical positions have shaped these conceptual frameworks, compatibility and coexistence potential in landscapes with wildlife and multiple other interests, the salient distinction is between the focus on the rights and welfare of individual animals and the prioritization of population viability and ecological functioning ("well-being") of the species and ecosystems which provide the prerequisite context for individual specimens (e.g., Palmer, 2013; Faria and Paez, 2019).

This schism springs out of different theoretical positions in environmental ethics (Palmer, 2013). Consequentialist approaches to wildlife management aim at producing the best possible outcomes and are often identified as utilitarianism, for instance bringing about optimal harvests, high levels of non-consumptive goal attainment (pleasurable experience of wildlife) or low levels of disease and suffering. Such approaches are also often more open to accepting a diversity of approaches adapted to local settings, in effect opening for ethical particularism. In contrast, deontologist approaches oppose the searching for best outcomes, since achieving flourishing or pleasure of populations of systems can come at the expense of individual suffering, and is therefore unjust and places unreasonable demands on individual specimens (Hettinger, 1994; Ramp and Bekoff, 2015). Deontological ethics argue that wildlife management should be guided by moral rules, principles and rights, or some combination of these, and not desired outcomes (e.g., Regan, 1984). Furthermore, there is often a tendency for these approaches to seek universalism, i.e. to apply the same rules across very diverse settings.

Compatibility and Coexistence Potential

History shows that conservation and management frameworks have not replaced one another as time went on. Most of the ideas of how we should manage wildlife that have emerged over time still seem to be out there with distinct schools of thought and supporters in different camps. With the lack of consensus and the resultant competition within and between frameworks, the question of compatibility of different frameworks becomes urgent. It is interesting to note that the domain of conservation and management frameworks have in no significant way matured

into any form of consensus and unity that can adequately deal with the complex human-wildlife interactions we are struggling with today. This begs the question of which framework(s) is/are best suited for a future human-wildlife coexistence perspective? However, it should be noted that while we have divided this complex field of ideas and values into 14 different frameworks, this is not a discrete classification. **Table 3** shows how we identify 15 key values that characterise the different frameworks, and how some of these values in some cases are found across more than one approach. Still, while some salient values are shared among some conceptual frameworks, this does not necessarily imply compatibility among the overall approaches (**Table 3**).

In fact, most of the conservation and management frameworks that we have conceptualised here demonstrate for various reasons limited, or even minimal, compatibility with each other. In our view, the sustainable use and socio-ecological systems approaches hold the greatest promise for future-proof coexistence frameworks, whereas animal rights holds the least promise (when applied to wildlife rather than the domestic/laboratory/companion animal contexts in which they developed). For the sustainable use paradigm the critical coexistence factor is the dynamic approach toward multiple goals (i.e., the Sustainable Development Goals) with high public and political acceptance as well as international institutionalisation. It is less preoccupied than several of the other frameworks with a narrow ideology, any particular set of values or moral rules, or notions of what constitutes the “correct” science. It can be organised to integrate indigenous, lay, and scientific knowledge, operates on different scales, and can provide specific directions to guide management actions under a diversity of situations, without attempting a one-size-fits-all approach. Recent papers within the field have been underlining the need to embrace value pluralism (Pascual et al., 2021).

The socio-ecological systems framework explicitly ties natural and social systems together and attempts to work against the traditional deconstruction of complex wildlife and conservation issues into separate disciplines or topics. This is perhaps the most holistic perspective of all the current frameworks, favouring complexity over simplicity and taking a transdisciplinary approach to problem solving. In wildlife contexts it is often human-wildlife conflict oriented and moves away from single species strategies. With a holistic framework that seeks to integrate social, psychological, cultural, and biological factors, we see potential for guiding the maturation of sustainable use, conservation biology, wildlife management and ecosystem services into more efficient, realistic, and legitimate management models.

We have chosen to characterise six conceptual frameworks as having a medium level potential for applicability to coexistence management models. Overall animal welfare proponents take a flexible approach to harvest control, and are more concerned with the humanness of techniques than principles. Restoration ecology resonates with other frameworks with explicit management objectives (ecosystem services, sustainable use, wildlife management), but has a specific strategy of achieving certain desirable environmental states—which can alienate or cause conflict with some stakeholders. Conservation biology

is an ecocentrically driven strategy with some shared baggage with restoration ecology and wildlife management, but has a relatively narrow focus on species and habitat restoration, which excludes multiple other interests. Wildlife management has a somewhat broader reach with multiple objectives on consumptive and non-consumptive wildlife values, but often limited or poor integration with other resource management objectives or broader societal nature values (especially the non-use values). Its traditional orientation toward one specific stakeholder group, hunters, is part of its baggage which it is trying to shake-off. Ecosystem services frames everything in anthropocentric and economic schemes, and struggles with value diversity (especially values not suited for monetization). However, it can be fairly compatible with sustainable use and wildlife management, if it accepts hunting and harvesting as a set of provisioning and cultural services, and expands its frames to fully embrace the multiple ways of valuing the services, and disservices, associated with wildlife conservation in shared spaces (Brendin et al., 2015; Linnell et al., 2020).

We find the remaining seven frameworks to have less potential as frameworks for coexistence. They all have a rather narrow topical and/or ideological focus and too limited recognition of the legitimacy, value or usefulness of other frameworks. At the most extreme end we find the animal rights groups which often do not recognise other frameworks on moral grounds. We find this framing to be of virtually no use in operationalising human-wildlife coexistence. For example, it is not uncommon for thinkers in this field to argue that nature itself is not ethical because of the suffering inherent within natural processes (Bramble, 2021), thus rejecting both the non-human and human aspects of coexistence. The wilderness paradigm is likewise limited to conservation/preservation with the overall goal of securing space for natural processes, and has no room for multiple use or land-sharing. Deep ecology opposes any instrumental approaches and provides no direction for practical management goals in shared landscapes. Heritage/cultural landscape conservation is driven by a cultural value bias, and provides little strategic guidance for solving land use management or complex conflicts. Yet, it carries some relevance for wildlife management since it views hunting as a cultural practise and a way of maintaining traditional forms of interaction with wildlife. Furthermore, traditionally used landscapes may retain high value for biodiversity in some cases.

The rewilding and new conservation science frameworks both represent rather extreme expressions of wildlife value priorities, but in totally different directions. Rewilding shares some of its ideological baggage with the wilderness and restoration ecology traditions. Its origins are linked to achieving former, and sometimes idealised, ecological states without human influence (e.g., Donlan et al., 2006), and hence runs the risk of neglecting the human dimensions and diversity of views among stakeholders that always need to be reconciled. Proponents do not often acknowledge multiple land uses or land-sharing as alternatives. Some emerging forms of rewilding are more pragmatic, but then differ little from other frameworks such as restoration or conservation biology (Hayward et al., 2019). The new conservation science line of thinking can

be seen as an extreme extension of the ecosystem services paradigm in the way it simply shortcuts the multiple use/value plurality discussion by excluding any non-human needs or values on the basis of unmanageable complexity and dearth of time to achieve sustainability. In the face of conflicts, new conservation science could in theory reject the goal of conserving wildlife at all. We would argue that neither rewilding nor new conservation science carry any noteworthy potential as frameworks in future coexistence frameworks in dealing with wildlife in complex landscapes.

However, considering that landscapes consist of a diversity of land-use zones which often include various categories of protected areas it is clearly possible for some of these other frameworks to achieve greater relevance within limited areas, such as formally protected areas, or on private lands whose owners wish to adopt specific management approaches. For example, heritage/cultural landscape approaches can guide land-use and wildlife management decisions in landscape protection areas, and it is possible for rewilding or wilderness approaches to guide management of core areas of nature reserves and national parks. It is only the animal rights approaches that find no place in any point of the landscape because even national parks often implement various forms of wildlife population control or reintroduction, which is equally opposed by many animal rights groups.

HOW DO WE ADVANCE THE DISCUSSION ABOUT COEXISTENCE OF HUMANS AND WILDLIFE?

Most of the ideas about how to manage wildlife that have emerged through history are still circulating in public and professional debates. The complexity of structured ideas, interests, and opinions has increased since the early 1900s, although some of these ideologies and ideas go much further back. Diversity in frameworks and conflicts between them have increased significantly since the 1970–80's. One might expect that the field would gradually reach some agreement on the major goals of wildlife management and on how to reach them, especially in light of the enormous explosion in knowledge within the natural sciences, social sciences and humanities that has appeared in recent decades. Alas, this has not been the case. Rather than reaching unity where older frameworks evolve into newer versions with higher goal attainment and improved efficiency and legitimacy, while older frameworks are quietly allocated to the shelves of history, current wildlife management appears to be ablaze with more strife, schism, conflict, and disagreement over the appropriate strategies than ever before. Then again, perhaps a core issue is that several of the frameworks do not actually have much interest in wildlife management and/or are only marginally involved in wildlife issues.

Much of the reason for the lack of unity comes from major disagreements over underlying values and ethics, and whether policies should be norm or rule based (deontological) or guided by pragmatic approaches to reach desirable outcomes

(consequentialism). There is also conflict over the degree of scope for context dependence and variation (universalism vs. particularism or monism vs. pluralism). The major distinction runs between proponents of animal ethics, which tend to be framed within principled or rule-based approaches and proponents of environmental ethics or ecological ethics which tend to be associated with concerns about outcomes. Although some scholars have tried to argue that there are points of common interests and hence a certain compatibility, their differences largely appear irreconcilable due to the fundamentally different notions of morality and rights of non-human animals and the importance of ecological systems vs. individual animals. Interestingly, while both environmental ethicists and animal ethicists argue incompatibility between the two ethical orientations, they sometimes land at the same conclusion for exactly the opposite reasons, namely different definitions of which subjects or entities that are worthy of moral considerations. Rewilding is a good example as both “camps” advocate a return to a more pristine and natural environment with as little human involvement as possible. Environmental and ecological ethicists arguing for rewilding are motivated by protecting or re-establishing the larger system, while animal ethicists are concerned with the individual animals and value the removal of human agency.

It is hard to see how animal ethics can be a viable platform for contemporary wildlife management frameworks in coexistence landscapes for two major reasons. First, the monistic focus on “individual animals” rights and suffering is incompatible with the broader focus and functioning of larger ecological systems in environmental ethics. This is a major schism in how nature and wildlife is valued. Animal rights advocates strive to reduce the suffering of individual animals, and cannot accept that the importance of system functioning may incur costs and suffering to individuals. This is a biologically illiterate approach that mistakenly equates the well-being of animals with the absence of suffering. Some have argued that animal rights positions even lead to a rejection of nature (Hettinger, 1994) since many natural processes like predation, disease, density-dependent food limitation and climate driven fluctuations in available food sources lead to suffering. An extreme version of this is a recent suggestion to genetically modify carnivores so that they turn into herbivores, or alternatively killing them painlessly since it may be the obligation of humankind to prevent suffering among animals (Bramble, 2021).

Second, this essentially boils down to monism vs. pluralism in values and contexts (Pascual et al., 2021). Animal ethics is primarily concerned with sentience and the possible suffering of individual animals, and thereby rejects other potential values attributed to wildlife depending on contexts. Various forms of environmental ethics open up for valuing wildlife at multiple scales from species to ecosystems, as well as pluralism in contexts and a diversity of value attribution. Value pluralism and coexistence models fitted to local cultures and contexts are essential in modern democracies where policy and management strategies will only be successful in the long run if they are products of negotiations among multiple stakeholders (Jensen et al., 2011; Bauer et al., 2020; Redpath et al., 2017; Drouilly and

O’Riain, 2021). Unfortunately, actually attaining value pluralism is a wholly different matter than identifying the need, as long as we witness a continuing social and political battle between ideology, deeply entrenched beliefs and science. How to reach a wider space for value pluralism in wildlife management is no doubt one of the key questions for future research, but also clearly needs to be seen together with similar struggles across a range of social issues including immigration, taxation, and LGBTQ policies.

Most of the conservation and management frameworks we have sketched out here have limited compatibility with other frameworks as long as we are talking in broad terms about larger landscapes, i.e., environments on a regional scale. Some frameworks such as animal rights, wilderness, deep ecology, rewilding, and new conservation science, all of which are grounded more on narrow ideologies than science, often reject other approaches to conservation and management as either morally unjustified and/or lacking of understanding of the most salient issues. By building walls against other schools of thoughts and sometimes even taking aggressive stances against reflection and deliberation around how to solve conflicts, they render themselves of limited use to current wildlife management challenges in a coexistence perspective. That is not to say however, that they don’t have potential in carefully zoned and differentiated landscapes. We consider this an issue of scale; in a large reserve or multiple use area careful planning should theoretically be able to make room for a range of ideologies, value sets and management goals. That said, we are the first to acknowledge that protected areas globally are rife with conflicts and tensions between wilderness and preservationist orientations and biocultural and cultural heritage proponents, as well as conflicts between land-owners, local residents and national authorities (e.g., Grodzinska-Jurczak and Cent, 2011).

On the positive side, several frameworks show some promise and potential for promoting coexistence since they in various ways contain ideas and mechanisms that can guide cooperation. However, we only really find that one or two frameworks contain the breadth, flexibility, integrative, and cooperative nature and sufficient emphasis on research based knowledge. At the moment we opt to put our money on the sustainability paradigm and social ecological systems as the best options for future coexistence in shared landscapes.

Management and Policy Implications

There is an urgent need to figure out what distinguishes frameworks from one another in a practical way. We have identified a number of crude indicators in this review, but several are difficult to operationalise. The main divide seems to be about killing—or not killing animals. The problem here however, is that we know little about what the public in general (i.e., a long list of stakeholders) as opposed to academic framers of ideas think about killing wildlife. We need to know much more about the extent to which lay people adopt consequentialist or deontological ethics in their thinking about wildlife, and how they embrace pluralism. In other words—is the public concerned about the moral worth of the outcomes of management or simply judging the principles behind strategies and actions? There is

also much scope for exploring the dynamics of divergence between frameworks through the same frameworks that are used to explore religious schisms (Finke and Scheitle, 2009) or organisational schisms (Gorup and Podjed, 2017).

We find it premature and unrealistic to suggest a single, specific framework for future wildlife management, and it is unlikely that the field will agree on a unified approach in the near future. The way wildlife management is performed is a reflection of the embedding cultures, negotiations between value orientations and world views, competing political interests and the larger power struggles that exist in society at any given time. Considering the diversity in values, ethical platforms, and vested interests that surely will continue to characterise environmental issues in the foreseeable future, we recognise wildlife management as an evolving “wicked problem.” There will be few, lasting clear-cut solutions. Rather, we will see a demand for multisectoral decision making, innovative approaches and diversity in tools and geographic adaptations (DeFries and Nagendra, 2017; Mason et al., 2018). Furthermore, we must expect that the wildlife management field will face new challenges demanding growing attention such as zoonotic diseases and biosecurity (Chaber and Saegerman, 2017; Garcia-Diaz et al., 2017). These are not new questions to the wildlife field, but they are re-enforced by the covid pandemic (Roe et al., 2020) and will be increasingly important for other sectors such as the livestock-, food-, and health industries as a facet of the agriculture/wildlife interface. In fact, the emerging One Health approach with its origins in veterinary science (and its associated traditions, values, and sets of ethics), is rapidly emerging as a framework of increasing relevance for wildlife management.

We concur with those who argue that we need to develop of form a anthropocentrism with positive connotations for strategic purposes, since anthropocentric arguments for environmental protection are much more likely to be successful than non-anthropocentric ones. Furthermore, if anthropocentrism is sufficiently reflective, it can embody enough concerns and interests to in practise forge some convergence between anthropocentric and non-anthropocentric policy (Palmer, 2013). In dynamic and complex wildlife settings, environmental pragmatism characterised by methodological pluralism, i.e., policies allowing room for different theories and values, are much more likely to succeed than rule-based monistic approaches. In shared landscapes, there will always be diversity and disagreement among stakeholders who collectively form a coalition of value positions. If we embrace methodological pluralism and reject universalist and deontological approaches, the objective for policy becomes a task of developing common recommendations and areas of convergence in shared landscapes, although different interests have varying reasons for doing so. We believe that this should be possible to some extent for several of the frameworks we have examined here in a zoned landscape. Many wildlife habitats comprise both protected areas and multiple use landscapes. So there is room to accommodate different values and ethical positions—but in different places in a zoned landscape. It will however, require the acceptance of methodological pluralism and environmental pragmatism.

Finally, although we argue for pluralism we also caution against “moral relativism,” i.e., the notion that culturally distinct values cannot be judged against one another, and are therefore all equally valid (Dickman et al., 2015). Unbounded cultural relativism opens up for an “anything goes” strategy that will undermine efforts to merge concepts and approaches into management frameworks with higher public acceptance. The one thing we can be certain about however, is that the diversity of views among the public is growing. Wildlife management is increasingly stretching out beyond the realm and control of professionals, and our understanding of needs, perceptions, and wildlife values must increasingly embrace those of the greater public. Wildlife conflicts always have roots in deeper social structures that shape attitudes and behaviour. We strongly believe that future coexistence frameworks have a great need for better understanding the diverse ethical platforms supporting the diversity of stakeholders involved in wildlife issues.

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DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

BK conducted most of the research and wrote the first draft of the manuscript. JL discussed framing of article, main ideas, and co-wrote subsequent drafts of the manuscript. All authors contributed to the article and approved the submitted version.

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